STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

ADDENDUM NO. 4
FOR
APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
AIP PROJECT NO. 3-15-0006-064-2025

May 27, 2026

This Addendum shall make the following amendment(s) to the Solicitation:

A. SPECIFICATIONS

1. Delete **PART 0.B – BIDDING DOCUMENTS TO BE SUBMITTED WITH BID** in its entirety and replace it with attached **PART 0.B – BIDDING DOCUMENTS TO BE SUBMITTED WITH BID**, dated r05/27/26.

B. PLANS

Volume 1 Changes

1. Delete **PLAN SHEET NO. E001 ELECTRICAL SYMBOLS, ABBREVIATIONS, GENERAL NOTES** and replace it with attached **PLAN SHEET NO. ADD 3 E001 ELECTRICAL SYMBOLS, ABBREVIATIONS, GENERAL NOTES.**

2. Delete **PLAN SHEET NO. E201 ELECTRICAL PLAN 1** and replace it with attached **PLAN SHEET NO. ADD 3 E201 ELECTRICAL PLAN 1.**

3. Delete **PLAN SHEET NO. E203 LIGHTING PLAN 3** and replace it with attached **PLAN SHEET NO. ADD 3 E203 LIGHTING PLAN 3.**

4. Delete **PLAN SHEET NO. E204 LIGHTING PLAN4** and replace it with attached **PLAN SHEET NO. ADD 3 E204 LIGHTING PLAN 4.**

5. Delete **PLAN SHEET NO. E205 ELECTRICAL PLAN 5** and replace it with attached **PLAN SHEET NO. ADD 3 E205 ELECTRICAL PLAN 5.**

6. Delete **PLAN SHEET NO. E206 ELECTRICAL PLAN 6** and replace it with attached **PLAN SHEET NO. ADD 3 E206 ELECTRICAL PLAN 6.**

7. Delete **PLAN SHEET NO. E207 ELECTRICAL PLAN 7** and replace it with attached **PLAN SHEET NO. ADD 3 E207 ELECTRICAL PLAN 7.**

8. Delete **PLAN SHEET NO. E208 ELECTRICAL PLAN 8** and replace it with attached **PLAN SHEET NO. ADD 3 E208 ELECTRICAL PLAN 8.**

9. Delete **PLAN SHEET NO. E209 ELECTRICAL PLAN 9** and replace it with attached **PLAN SHEET NO. ADD 3 E209 ELECTRICAL PLAN 9.**

10. Delete **PLAN SHEET NO. E210 ELECTRICAL PLAN 10** and replace it with attached **PLAN SHEET NO. ADD 3 E210 ELECTRICAL PLAN 10.**

11. Delete **PLAN SHEET NO. E301 MAIN TERMINAL HARDSTAND LIGHT POLE DETAILS** and replace it with attached **PLAN SHEET NO. ADD 3 E301 MAIN TERMINAL HARDSTAND LIGHT POLE DETAILS.**

12. Delete **PLAN SHEET NO. E302 COMMUTER TERMINAL HARDSTAND LIGHT POLE DETAILS** and replace it with attached **PLAN SHEET NO. ADD 3 E302 COMMUTER TERMINAL HARDSTAND LIGHT POLE DETAILS.**

13. Delete **PLAN SHEET NO. E311 LIGHT FIXTURE SCHEDULE 3** and replace it with attached **PLAN SHEET NO. ADD 3 E311 LIGHT FIXTURE SCHEDULE 3.**

Volume 2 Changes

1. Delete **PLAN SHEET NO. E001 ELECTRICAL SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES** and replace it with attached **PLAN SHEET NO. ADD 3 E001 ELECTRICAL SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES.**

2. Delete **PLAN SHEET NO. E401 APRON LIGHT DETAILS** and replace it with attached **PLAN SHEET NO. ADD 3 E401 APRON LIGHT DETAILS.**

The following is provided for information.

C. RESPONSES TO REQUESTS FOR INFORMATION (RFI'S/QUESTIONS)

1. The attached **RESPONSES TO REQUESTS FOR INFORMATION** are provided for information.

D. REPORTS

1. The attached revised **Geotechnical Reports** are provided for information.

E. RECORD DRAWINGS

1. The attached Tram Bridge and Ramp Details record drawing is provided for information.

Please acknowledge receipt of this **ADDENDUM NO. 3** by recording the date of its receipt in the space provided on **PAGE P-4** of the Proposal.

NATHAN C. KANESHIGE
Engineering Program Manager

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

PART 0 B – BIDDING DOCUMENTS TO BE SUBMITTED WITH BID

PROPOSAL TO THE
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

PROJECT:	**APRON LIGHT REPLACEMENT AT KAHULUI AIRPORT KAHULUI, MAUI, HAWAII AND LANAI AIRPORT LANAI CITY, LANAI, HAWAII**
PROJECT NO.:	**AS10378-12R**
AIP PROJECT NO.:	**3-15-0006-064-2025**
COMPLETION TIME:	SIXTY (60) calendar days for pre-construction activities followed by: FOUR HUNDRED FIFTY (450) calendar days for construction activities, whereby; All work under this contract shall be completed within FIVE HUNDRED TEN (510) calendar days from the date indicated in the Notice to Proceed from the State.
LIQUIDATED DAMAGES:	TEN THOUSAND DOLLARS ($10,000.00) for each and every working (or calendar) day which the Contractor has delayed the completion of this project.
DBE PROJECT GOAL:	**None specified**
DESIGN PROJECT MANAGER:	WESLEY SHIROMA DEPARTMENT OF TRANSPORTATION - AIRPORTS DANIEL K. INOUYE INTERNATIONAL AIRPORT 400 RODGERS BLVD, SUITE 700 HONOLULU, HI 96819 EMAIL: WESLEY.R.SHIROMA@HAWAII.GOV PHONE NO. 808-838-8876 FAX NO.: 808-838-8751
ELECTRONIC SUBMITTAL:	**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. See SPECIAL PROVISIONS 2.8 PREPARATION AND DELIVERY OF BID for complete details. FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.**

Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned Bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e., an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

4. It will not maintain for its employees any segregated facilities at any of its establishments.

5. Does not and will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained.

The undersigned Bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 1032D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Unless amended by Special Provision, agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

7. The undersigned Bidder further agrees to the following: Pursuant to HAR §3-122-13(e), any contractor (including consultants) paid for services to develop or prepare specifications or work statements shall be precluded from submitting an offer or receiving a contract for that particular solicitation. This includes the preparation of reports relied upon by HDOT in the development of the project scope.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: Hawaii Standard Specifications for Road and Bridge Construction, 2005, and/or the General Provisions for Construction Projects for AIR and WATER Transportation Facilities Division dated 2016, as applicable, the Notice to Bidders, Special Provisions, Proposal, Contract, Bond Forms, and Project Plans.

In accordance with Section 103D-323, Hawaii Revised Statutes, this proposal is accompanied with a bid security in the amount of 5% of the total amount bid, in the form checked below. (Check applicable bid security submitted with bid.)

_____Surety Bid Bond (Use standard form),

_____Cash,

_____ Cashier's Check,

_____ Certified Check, or

_____.
(Fill in other acceptable security.)

The undersigned Bidder acknowledges receipt of any addendum issued by the Department by recording in the space below the date of receipt.

Addendum No. 1 _____ Addendum No. 3 _____

Addendum No. 2 _____ Addendum No. 4 _____

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as Bidder has listed the name of each person or firm who will be engaged by the Bidder on the project as Subcontractor or Joint Contractor and the nature of work to be done by each on the following page. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Subcontractor or Joint Contractor. For each listed firm, the Bidder declares the respective firm is a Subcontractor or Joint Contractor and is subject to evaluation as a Subcontractor or Joint Contractor. It is understood that failure to comply with the aforementioned requirements may be cause for rejection of the bid submitted.

SUBCONTRACTOR LISTING

(Attach additional sheets if necessary.)

	NAME OF FIRM	NATURE OF WORK
SUBCONTRACTOR:		
1.	_____	_____
1a[1].	_____	_____
2.	_____	_____
2a.	_____	_____
3.	_____	_____
3a.	_____	_____
4.	_____	_____
4a.	_____	_____
5.	_____	_____
5a.	_____	_____
6.	_____	_____
6a.	_____	_____
7.	_____	_____
7a.	_____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

[1] Second tier subcontractors

JOINT CONTRACTOR LISTING

(Attach additional sheets if necessary.)

	NAME OF FIRM	NATURE OF WORK
JOINT CONTRACTOR:		
1.	_____	_____
1a[1].	_____	_____
2.	_____	_____
2a.	_____	_____
3.	_____	_____
3a.	_____	_____
4.	_____	_____
4a.	_____	_____
5.	_____	_____
5a.	_____	_____
6.	_____	_____
6a.	_____	_____
7.	_____	_____
7a.	_____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

[1] Second tier joint contractors

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty of perjury under the laws of the United States and is in violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorities, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

_____
Bidder (Company Name)

_____
Authorized Signature

_____
Title

_____
Business Address

_____ _____
Business Telephone Email

_____
Date

_____
Contact Person (If different from above.)

Phone:_____Email: _____

NOTE:

If Bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority ofthe officer(s) to sign for the corporation.

If Bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If Bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

KAHULUI AIRPORT

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
01010.1	Temporary Traffic Control & Signs	Allowance	Allowance	Allowance	$ 50,000.00
01010.2	Unforeseen Conditions	Allowance	Allowance	Allowance	$ 500,000.00
01010.3	Safety Risk Management Activities	Allowance	Allowance	Allowance	$ 50,000.00
01524.1	Construction Waste Management	L.S.	L.S.	L.S.	$
01561.1	Construction Site Pollution Controls	L.S.	L.S.	L.S.	$
01562.1	Management of Contaminated Media, Soil Disposal, and Soil Reuse	L.S.	L.S.	L.S.	$
01565.1	Security Measures	Allowance	Allowance	Allowance	$ 15,000.00
01700.1	Mobilization (Not to exceed 6% of sum of all items, excluding this item, all allowances and force account items)	L.S.	L.S.	L.S.	$
02232.1	Aggregate Base Course	3,255	S.Y.	$	$
02232.2	Aggregate Subbase	400	S.Y.	$	$
02450	Portland Cement Concrete Sidewalks	3,600	S.F.	$	$
02513	Asphalt Pavement	3,695	S.Y.	$	$
02578.1	Concrete Curbs and Gutters (Landside)	245	L.F.	$	$
02578.2	Painted Pavement Markings	4,000	L.F.	$	$
02579.1A	Pavement Markings – Full Application (OGG Airfield-Main Terminal)	1,300	L.F.	$	$
02579.1B	Pavement Markings – Full Application (OGG Airfield-Cargo)	5	L.F.	$	$
02579.1C	Pavement Markings – Full Application (OGG Airfield-Commuter Terminal Aprons)		L.F.	$	$
02721.1A	Subbase Course (OGG Airfield-Main Terminal)	4,355	S.Y.	$	$

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
02721.1B	Subbase Course (OGG Airfield Cargo)		S.Y.	$_____	$_____
02721.1C	Subbase Course (OGG Airfield-Commuter Terminal)		S.Y.	$_____	$_____
02752.2A	Portland Cement Concrete 15-inch Unreinforced (OGG Airfield-Main Terminal)	L.S.	L.S.	L.S.	$_____
02752.2B	Portland Cement Concrete 15-inch Unreinforced (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
02752.2C	Portland Cement Concrete 15-inch Unreinforced (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
02752.4A	Portland Cement Concrete 15-inch Reinforced (OGG Airfield-Main Terminal)	931	S.Y.	$_____	$_____
02752.4B	Portland Cement Concrete 15-inch Reinforced (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
02752.4C	Portland Cement Concrete 15-inch Reinforced (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
02760.1A	Joint Sealing Filler (OGG Airfield-Main Terminal)	L.S.	L.S.	L.S.	$_____
02760.1B	Joint Sealing Filler (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
02760.1C	Joint Sealing Filler (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
03300.1	AL1 (OGG Airfield-Main Terminal) Light Pole Foundation	18	E.A.	$_____	$_____

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
03300.2	AL1(OGG Airfield-Commuter Terminal) Light Pole Foundation	4	E.A.	$_____	$_____
03300.3	PL1 Light Pole Foundation	30	E.A.	$_____	$_____
03300.4	PL2 (Pole w/ 2 arms) Light Pole Foundation	10	E.A.	$_____	$_____
03300.5	RL1 Light Pole Foundation	11	E.A.	$_____	$_____
03300.6	RL2 (Pole w/ 2 arms) Light Pole Foundation	31	E.A.	$_____	$_____
03300.7	OPL1-B Light Pole Foundation	70	E.A.	$_____	$_____
03300.8	OPL2-B Light Pole Foundation	37	E.A.	$_____	$_____
03300.9	OPL2-C Light Pole Foundation	12	E.A.	$_____	$_____
03300.12A	Concrete Bollard (OGG Airfield-Main Terminal)	144	E.A.	$_____	$_____
03300.12B	Concrete Bollard (OGG Airfield-Commuter Terminal)	32	E.A.	$_____	$_____
03300.12C	Concrete Bollard (OGG Airfield-Landside)	64	E.A.	$_____	$_____
16050.1A	Basic Materials and Method (OGG Airfield-Main Terminal)	L.S.	L.S.	L.S.	$_____
16050.1B	Basic Materials and Method (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
16050.1C	Basic Materials and Method (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
16050.1D	Basic Materials and Method (OGG Airfield-Landside)	L.S.	L.S.	L.S.	$_____
16301.1A	Underground Electrical Work (OGG Airfield-Main Terminal)	L.S.	L.S.	L.S.	$_____

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
16301.1B	Underground Electrical Work (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
16301.1C	Underground Electrical Work (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
16301.1D	Underground Electrical Work (OGG Airfield-Landside)	L.S.	L.S.	L.S.	$_____
16500.1A	Lighting (OGG Airfield-Main Terminal)	L.S.	L.S.	L.S.	$_____
16500.1B	Lighting (OGG Airfield-Cargo)	L.S.	L.S.	L.S.	$_____
16500.1C	Lighting (OGG Airfield-Commuter Terminal Apron)	L.S.	L.S.	L.S.	$_____
16500.1D	Lighting (OGG Airfield-Landside)	L.S.	L.S.	L.S.	$_____
16500.2A	Airport Obstruction Light (OGG Airfield-Main Terminal)	18	E.A.	$_____	$_____
16500.2B	Airport Obstruction Light (OGG Airfield-Commuter Terminal)	4	E.A.	$_____	$_____
	KAHULUI SUBTOTAL				$_____

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

LANAI AIRPORT

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
01010.1	Temporary Traffic Control & Signs	Allowance	Allowance	Allowance	$ 20,000.00
01010.2	Unforeseen Conditions	Allowance	Allowance	Allowance	$ 100,000.00
01010.3	Safety Risk Management Activities	Allowance	Allowance	Allowance	$ 10,000.00
01524.1	Construction Waste Management	L.S.	L.S.	L.S.	$
01561.1	Construction Site Pollution Controls	L.S.	L.S.	L.S.	$
01562.1	Management of Contaminated Media, Soil Disposal, and Soil Reuse	L.S.	L.S.	L.S.	$
01565.1	Security Measures	Allowance	Allowance	Allowance	$ 150,000.00
01700.1	Mobilization (Not to exceed 6% of sum of all items, excluding this item, all allowances and force account items)	L.S.	L.S.	L.S.	$
02232.1	Aggregate Base Course	L.S.	L.S.	L.S.	$
02232.2	Aggregate Subbase	L.S.	L.S.	L.S.	$
02450	Portland Cement Concrete Sidewalks	L.S.	L.S.	L.S.	$
02513	Asphalt Pavement	L.S.	L.S.	L.S.	$
02578.1	Concrete Curb and Gutters (Landside)		L.F	$	$
02578.2	Painted Pavement Markings	L.S.	L.S.	L.S.	$
02579.1D	Pavement Markings – Full Application (LNY)	L.F.	L.F.	L.F.	$
02721.1D	Subbase Course (LNY)	L.S.	L.S.	L.S.	$
02752.1D	Portland Cement Concrete 10-inch Unreinforced (LNY)	L.S.	L.S.	L.S.	$
02752.3D	Portland Cement Concrete 10-inch Reinforced (LNY)	L.S.	L.S.	L.S.	$
02760.1D	Joint Sealing Filler (LNY)	L.S.	L.S.	L.S.	$
03300.10	Lanai Apron Light Pole Foundation	7	E.A.	$	$
03300.11	Lanai Parking Lot Light Pole Foundation	46	E.A.	$	$
03300.12D	Concrete Bollard (LNY)	56	E.A.	$	$

APRON LIGHT REPLACEMENT
AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII AND
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII
STATE PROJECT NO. AS1037-12R
PROPOSAL SCHEDULE

Item No.	Description	Quantity (a)	Unit	Unit Price (c)	Total (a x c)
16301.1E	Underground Electrical Work (LNY)	L.S.	L.S.	L.S.	$_____
16500.1E	Lighting (LNY)	L.S.	L.S.	L.S.	$_____
16500.2C	Airport Obstruction Light (LNY)	7	E.A.	$_____	$_____
	LANAI SUBTOTAL				$_____

PROPOSAL SCHEDULE SUMMARY

KAHULUI SUBTOTAL	$_____
LANAI SUBTOTAL	$_____
TOTAL AMOUNT FOR COMPARISON OF BIDS	$_____

PROPOSAL SCHEDULE NOTES

1. Bids shall include all Federal, State, County and other applicable taxes and fees.

2. The TOTAL AMOUNT FOR COMPARISON OF BIDS shall be used to determine the lowest responsible bidder.

3. Bidders shall complete all unit prices and amounts. Failure to do so shall be grounds for rejection of bid.

4. If a discrepancy occurs between unit bid price and the bid price, the unit bid price shall govern.

5. **Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents with the proposal. The record of each bidder and**

respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified.

6. The bidder's attention is directed to Section 2.11 – BID SECURITY of the "General Provisions", as amended by the Special Provisions.

7. Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.

8. If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS is less than, or approximately equal to the funds available for this project, an award will be made to the lowest responsible bidder.

9. If the TOTAL AMOUNT FOR COMPARISON OF BIDS exceeds the funds available for the project, the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes, to further reduce the scope of work and award a contract thereafter.

10. The State reserves the right to reject any or all Bids and to waive any defects in said Bids in the best interest of the State.

11. Submission of a Bid is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.

12. Proposal sheets P-1 through P-21 shall be submitted at the time of bid. Failure to submit all pages shall result in rejection of bid.

SUPPLEMENT TO PROPOSAL SCHEDULE

The Department recognizes that certain items of material to be incorporated into the project and/or consumed in the prosecution of the project are temporarily in short supply and beyond the control and without the fault of the Contractor. The effect of such shortages has, among other things, resulted in periodic fluctuations in the posted prices of such short supply materials, thereby making the proposal difficult for the Contractor to bid with confidence.

The only materials considered to be in short supply are asphalt cement, portland cement, reinforcing steel, structural steel and galvanized steel.

Each bidder shall submit with the proposal a written statement from the supplier of each short supply material indicating the supplier's current posted price, effective date of that price and the location of the material at that posted price (by island).

If the price of such short supply material is increased or decreased by more than 5% by the supplier prior to the completion of that contract item requiring the short supply material, the Contractor shall submit to the Department a written statement from the supplier indicating the effective date and changed price the Contractor will thereafter be charged for such short supply material. The Contractor shall also obtain whenever possible, quotations for furnishing the material from other available local suppliers. The quotations shall be obtained sufficiently in advance of the need for the material to allow review by the Department so as not to delay the work. The Contractor's request to the Department for adjusted compensation due to such changed prices will be computed only with prices in effect at the time of delivery. Only the lowest quotation obtained will be accepted by the Department. Transportation, handling, loading, processing and other similar costs will not be subject to adjusted compensation.

No adjustment to the unit bid prices will be made when the increase or decrease in the price of the short material is less than 5% of the original posted price.

If the adjustment to the unit bid price is decreased in the price of the short supply material by more than 5% of the original posted price, the State will be credited. The Contractor shall notify the State within five (5) working days in the event of such an occurrence.

When an adjustment in price is made in accordance with this section, the adjustment will be allowed only so long as the purchase price remains more or less than 5% of the original posted price.

If an increase in the price of any short supply material exceeds or is scheduled to exceed 5% of the original posted price, the Contractor must notify the State within five (5) working days before using the short supply material. Upon receipt of such notification from the Contractor, the State will direct the Contractor to either (1) authorize work to proceed as usual with the assurance that the indicated incremental price increase above the 5% will be compensable, (2) issue such change orders as the State may deem necessary to reduce further requirements of the short supply material which is to be paid at the increase price, or (3) if the material is considered to have priced itself beyond reason or beyond what the State can pay, the State may order cessation of further use of such short supply material on the project. Such notification by the Contractor will be required at each instance of incremental price increase above the 5% limit. If the Contractor fails to notify the State of any such incremental price increase within five (5) working days before

using the short supply material and continues to utilize the short supply material on the project, the State will not be responsible for payment for the incremental cost increase of which the State was not forewarned.

Computation for the adjusted compensation will be as follows:

(A) Portland Cement

If, X = Adjustment per cubic yard of concrete,

P = Portland cement content of the approved mix design expressed in hundredweight per cubic yard of concrete,

Q = Increase or decrease in the price of portland cement in dollars per hundredweight,

Then, X = QP

Example: Posted price of Portland cement increases from $1.40 to $1.70 per cwt. and the hundredweight (cwt) of concrete is 5.6 cwt per c.y., then the adjustment will be:

$1.70 - $1.40	=	$0.30
($1.40) × (5%)	=	$0.07
$0.30 - $0.07	=	$0.23
X	=	($0.23) × (5.6)
	=	$1.29 per c.y. of concrete

(B) Asphalt Cement

If, X = Adjustment per ton of mix,

P = Asphalt cement content, expressed in percentage of dry weight of the aggregates, as determined and accepted by the Department for each of the design plant mixes,

Q = Increase or decrease in the price of asphalt cement, in dollars per ton,

Then, X = Q × (P) ÷ (100 + P)

Example: Posted price of asphalt concrete increases from $70 to $80 per ton and the asphalt content of the A.C. mix was accepted at 6.0%, then the adjustment shall be:

$80.00 - $70.00	=	$10.00
($70.00) × (5%)	=	$3.50
$10.00 - $3.50	=	$6.50
X	=	$6.50 × 6 / (100 + 6)
	=	$0.37 per ton A.C. mix

(C) Reinforcing Steel

If, X = Adjustment for reinforcing steel,

P = Weight of reinforcing steel, expressed in hundredweight,

Q = Increase or decrease in the price of reinforcing steel in dollars per hundredweight,

Then, X = QP

Example: Posted price of grade 40 reinforcing steel increases from $14.00 to $15.00 per cwt and the weight of the grade 40 reinforcing steel is 80,000 pounds, then the adjustment shall be:

$15.00 - $14.00	=	$1.00
($14.00) × (5%)	=	$0.70
$1.00 - $0.70	=	$0.30
X	=	($0.30) × (800)
	=	$240 for grade 40 reinforcing steel

The contractor shall submit to the Department original receipted bills covering the short supply material used on the project as soon as practicable after shipments are completed. The bills shall be accompanied by a tabulation on which the bills are listed in chronological order showing for each bill the quantity, the date shipped from the supplier's terminal and the price per unit at the place indicated in the posted price (reflecting any deductions for quantity shipments). These bills shall be subject to audit verification.

The Department reserves the right to alter the quantities of material to be furnished in accordance with the provisions of SP Article IV, Paragraph. 4.2.

The Department also reserves the right, during construction, to decrease or increase the scope of work, because of limitations of funds, with no adjustment in unit prices other than that specified hereinabove.

Price increases as specified hereinabove shall not exceed the remaining unpaid balance in the contract at any point in time without prior review and approval from the Engineer or designated representative.

SURETY BID BOND

Bond No. _____

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full name or legal title of offeror)
as Offeror, hereinafter called the Principal, and

_____
(name of bonding company)
as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto

_____
(State/county entity)
as Owner, hereinafter called Owner, in the penal sum of

_____
(required amount of bid security)
Dollars ($_____), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for

_____
(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____, _____

_____
Name of Principal (Offeror) (Seal)

_____
Signature

_____
Title

_____
Name of Surety (Seal)

_____
Signature

_____
Title

CERTIFICATE OF COMPLIANCE WITH FAA BUY AMERICAN PREFERENCE – EQUIPMENT / BUILDING PROJECTS

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, the Bipartisan Infrastructure Law (BIL) Build America, Buy America Act (BABA), and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA, and other related Made in America Laws, U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel, and manufactured products produced in the United States;

b) Only installing construction materials defined as an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall that have been manufactured in the United States;

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

1. To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
2. To faithfully comply with providing U.S. domestic product.
3. To furnish U.S. domestic product for any waiver request that the FAA rejects.
4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
5. To certify that all construction materials used in the project are manufactured in the U.S.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) and BABA but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the bidder or offeror agrees:

1. To submit to the Airport Sponsor or FAA within 15 calendar days of bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
3. To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
4. To furnish U.S. domestic product for any waiver request that the FAA rejects.
5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) – The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for a Type 2 Nonavailability waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire.
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "item". The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver (Unreasonable Costs) – Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for a Type 4 Unreasonable Costs waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) At minimum, two comparable equal bids and/or offers.
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005 indicates that no domestic source exists for the project and/or component.
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

_____
Bidder (Company Name)

_____ _____
Signature Date

_____
Name and Title of Signing Official

GENERAL ELECTRICAL NOTES:

1. ALL WORK SHALL COMPLY WITH LOCAL ORDINANCES; REQUIREMENTS OF STATE FIRE MARSHAL; NATIONAL ELECTRICAL CODE; NATIONAL ELECTRICAL SAFETY CODE; APPLICABLE REGULATIONS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS; STANDARD OF UL, ANSI, NEMA AND EEI; AND REGULATIONS OF KAHULUI AIRPORT.
2. ALL WORK SHALL CONFORM TO CONSTRUCTION PRACTICES AS RECOMMENDED BY AMERICAN ELECTRICIANS HANDBOOK BY CROFT (LATEST EDITION) AND APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF MATERIAL SUPPLIED FOR THIS PROJECT.
3. PLANS DO NOT INDICATE THE COMPLETE EXISTING ELECTRICAL CONDITIONS. VISIT JOBSITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND EXTENT OF DEMOLITION AND NEW WORK PRIOR TO THE START OF WORK. REPORT ANY DISCREPANCIES AND/OR DIFFERENCES IN DRAWINGS, WITH RESPECT TO EXISTING CONDITIONS, TO THE ENGINEER.
4. RESOLVE ALL DISCREPANCIES AND QUESTIONS PRIOR TO THE START OF WORK. NO EXTRA PAYMENT SHALL BE ALLOWED ON ACCOUNT OF WORK MADE NECESSARY BY CONTRACTOR'S FAILURE TO VISIT THE SITE AND/OR FAILURE TO RESOLVE DISCREPANCIES AND QUESTIONS.
5. ALL MATERIALS, EQUIPMENT AND WIRING LOCATED OUTDOORS SHALL BE SUITABLE FOR WEATHERPROOF LOCATIONS.
6. UPON COMPLETION OF PROJECT, CONTRACTOR SHALL PROVIDE ENGINEER WITH "AS-BUILT" DRAWINGS.
7. THE DATA INDICATED ON DRAWINGS ARE EXACT AS COULD BE SECURED FROM EXISTING DRAWINGS AND FIELD CHECKS BUT THEIR ABSOLUTE ACCURACY CANNOT BE GUARANTEED. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER CONDITIONS WILL BE GOVERNED BY JOB DECISION OF ENGINEER. IN EVENT OF DISCREPANCIES BETWEEN DRAWINGS AND CONDITIONS AT SITE, IMMEDIATELY NOTIFY ENGINEER. DO NOT PROCEED WITH INSTALLATION IN AREAS OF DISCREPANCIES UNTIL ALL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
8. REMOVE ALL EXISTING EXPOSED CONDUIT AND WIRES NOT TO REMAIN IN SERVICE; CONCEALED RACEWAYS NO LONGER REQUIRED SHALL BE CAPPED AND ABANDONED IN PLACE WITH ALL WIRES REMOVED.
9. PROVIDE METAL SEAL(S) FOR ALL ABANDONED RACEWAY OPENING(S) IN BOX(ES), CABINET(S), AND EQUIPMENT ENCLOSURE(S); SEALS SHALL RETAIN NEMA RATING OF REMAINING BOX(ES), CABINET(S), AND EQUIPMENT ENCLOSURE(S).
10. FOR EXISTING CIRCUIT(S) WHERE ELECTRICAL ITEMS ARE REMOVED, CONTRACTOR SHALL PROVIDE ALL NECESSARY RACEWAYS, WIRES, BOXES, AND ETC. PER NEC REQUIREMENTS TO ENSURE ELECTRICAL CONTINUITY AND PROPER OPERATION OF REMAINING CIRCUIT COMPONENT(S).
11. ALL EXTERIOR EQUIPMENT MOUNTING HARDWARE SHALL BE TYPE 316 SS.
12. ALL ELECTRICAL ITEMS AND WORK SHALL BE NEW UNLESS OTHERWISE INDICATED ON PLANS.
13. PROVIDE ARC FLASH WARNING LABELS AS REQUIRED PER 2020 NEC 110.16 AND 2018 NFPA-70E 130.5 FOR ALL ELECTRICAL EQUIPMENT. CONTRACTOR SHALL ATTAIN ALL INFORMATION REQUIRED FOR THE CALCULATIONS, PERFORM THE CALCULATIONS, AND PROVIDE THE LABELS AT NO ADDITIONAL COST.
14. ADA STANDARDS FOR ACCESSIBLE DESIGN: THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2010 ADA STANDARDS.
15. REPAIR, PATCH, PAINT ALL AREAS AFFECTED BY DEMOLITION AND REMOVAL WORK.
16. VERIFY RATINGS OF ALL ELECTRICALLY OPERATED OR CONTROLLED EQUIPMENT PROVIDED BY OTHER TRADES. COORDINATE RATINGS OF OVERCURRENT PROTECTIVE DEVICES, DISCONNECT SWITCHES, CONDUIT AND WIRING TO MATCH THE ACTUAL EQUIPMENT SUPPLIED AT NO ADDITIONAL COSTS.
17. ALL ITEMS SPECIFIED AS NEMA 4X SHALL BE STAINLESS STEEL (316L) UNLESS OTHERWISE INDICATED. ALL C-CHANNELS AND FASTENING HARDWARE: SCREWS, NUTS, BOLTS, WASHERS, ETC., SHALL BE STAINLESS STEEL (316L). ALL EXPOSED FACTORY PROVIDED HARDWARE NOT STAINLESS STEEL (316L) SHALL BE REPLACED WITH STAINLESS STEEL (316L) HARDWARE. PAINT ALL NEW ELECTRICAL INSTALLATIONS (EQUIPMENT AND RACEWAYS) PER SPECIFICATION SECTION 09901 "PAINTING", UNLESS OTHERWISE NOTED. DO NOT PAINT LIGHT FIXTURES, LIGHT POLES, DRY-TYPE TRANSFORMER, OIL FILLED TRANSFORMERS, ELECTRICAL PANELBOARDS, AND SWITCHBOARDS.
18. COORDINATE INSTALLATION OF ALL ELECTRICAL ITEMS WITH OTHER TRADES AND ADJUST LOCATIONS AS NECESSARY TO AVOID CONFLICTS.
19. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND MAY NOT SHOW ALL REQUIRED ACCESSORIES, FITTINGS, COUPLINGS, JUNCTION BOXES OR OTHER INCIDENTALS. THE CONTRACTOR SHALL PROVIDE A COMPLETE INSTALLATION WITH ALL REQUIRED ACCESSORIES, FITTINGS, COUPLING, JUNCTION BOXES OR OTHER INCIDENTALS AS REQUIRED BY THE NEC AND THE EQUIPMENT MANUFACTURER.
20. CONTRACTOR'S FIRST PHASE OF WORK SHALL BE THE WORK INVOLVING THE APRON LIGHT POLES. WHEN WORKING ON THE APRON LIGHT POLES, ONLY ONE GATE MAY BE SHUT DOWN AT ANY ONE TIME. CONTRACTOR TO PREPARE ACCORDINGLY.

PHASING NOTES:

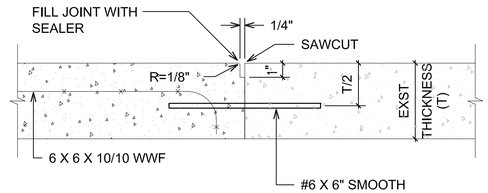
1. CONTRACTOR'S FIRST PHASE OF WORK SHALL BE THE WORK INVOLVING THE APRON LIGHT POLES. ADDITIONALLY, WHEN WORKING ON THE APRON LIGHT POLES, ONLY ONE GATE MAY BE SHUT DOWN AT ANY GIVEN TIME. CONTRACTOR TO PREPARE ACCORDINGLY.
2. ONLY ONE LANE OF TRAFFIC MAY BE SHUT DOWN AT ANY ONE TIME.
3. WHEN WORKING ON PARKING LOT LIGHT POLES, CONTRACTOR SHALL BLOCK OFF A MAXIMUM OF 5 STALLS EITHER SIDE OF THE POLE.
4. ALL WORK SHALL BE PERFORMED DURING THE AIRPORT'S NON OPERATIONAL HOURS. ANY WORK DURING OPERATIONAL HOURS MUST BE APPROVED BY DOTA IN ADVANCE.
5. LIGHTING FOR THE CARGO AND APRON AREAS MUST BE AVAILABLE DURING ALL NIGHT HOURS.

ELECTRICAL SYMBOLS

EXST SYMBOL	NEW SYMBOL	DESCRIPTION
	A / 1NL	ROADWAY SHOEBOX AREA LIGHT POLE. "A" INDICATES TYPE "A" LIGHT POLE, "1NL" DENOTES CONNECTED TO NIGHT LIGHT CIRCUIT NUMBER "1" VIA TIME SWITCH
		ORNAMENTAL AREA LIGHT POLE.
		APRON LIGHT POLE.
		ELEC 2' X 4' HANDHOLE. SEE DETAILS ON SHEET
		ELEC TYPE "A" METRIC PULLBOX. SEE DETAILS ON SHEET
	EA / LA (2-5E, 2-2L)	ELECTRICAL DUCTLINE WITH DUCT SECTION DESIGNATORS; ITEMS IN CIRCLE INDICATES DUCT SECTION TYPE; DUCT DESIGNATORS IN ADJACENT CIRCLES INDICATES DUCTS INSTALLED IN COMMON TRENCH AND COMBINED CONCRETE ENCASEMENT WITH REQURED DUCT SEPARATIONS; DUCT DESIGNATION CUT LINE INDICATES VIEW OF DUCT SECTION; SHOWN WITH DUCT COMPLEMENTS TYPE "EA" DUCT SECTION WITH 2-5"E DUCTS AND TYPE "LA" DUCT SECTION WITH 2-2"L DUCTS IN COMMON TRENCH AND CONCRETE ENCASEMENT (E=ELECTRIC, L=LIGHTING, P=SECONDARY POWER); SEE THIS SHEET FOR DUCT SECTION DETAILS
— — —e— — —	—E—	UNDERGROUND ELEC DUCTS & CABLES
	1	NOTE SYMBOL, SEE PLAN FOR NOTES

NOTE(S):

1. SOLID ITEM DENOTES "NEW"; DASHED ITEM DENOTES "EXISTING".
2. "X" THRU DASHED ITEM DENOTES "EXISTING ITEM TO BE REMOVED.



SECTION

NOTES:

1. SAWCUTTING SHALL BE MADE EITHER PARALLEL OR PERPENDICULAR TO THE WALKWAY.
2. SAWCUT AT CONSTRUCTION JOINTS AND/OR SCORE LINES. DEMOLISH & REPAIR FULL WIDTH OF SIDEWALK FROM SCORELINE TO SCORELINE.

2 / E001 WALKWAY RESTORATION DETAIL
NOT TO SCALE

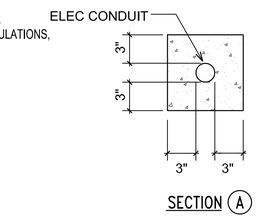
COUNTY OF MAUI MAUI COUNTY CODE, CHAPTER 16.16B ENERGY CODE COMMERCIAL PROVISIONS	
COMPLIANCE METHOD Check applicable method	
☐	C401.2(1) ANSI / ASHRAE / IESNA 90.1
☐	C401.2(2) Sections C402 through C406
☒	C401.2(3) Sections C402.5, C403.2, C404, C405.2, 405.3, C405.4, C405.6 & C407
☐	C102.1 Alternative

To the best of my knowledge, this project's design substantially conforms to the Energy Code.

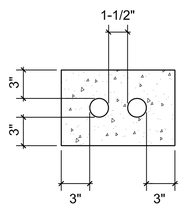
Signature: _____ Date: 01/09/25
Name: BILLY J. ORNELLAS
Title: PRINCIPAL
License No.: 11658-E

ABBREVIATIONS

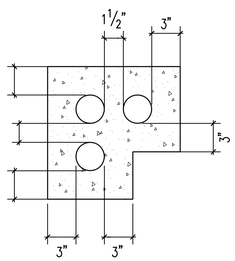
SYMBOL	DESCRIPTION
AFF	DENOTES "ABOVE FINISH FLOOR"
BRKR	DENOTES "BREAKER"
CKT	DENOTES "CIRCUIT"
DISC	DENOTES "DISCONNECT"
ENCL	DENOTES "ENCLOSED"
JB	DENOTES "JUNCTION BOX"
MIN	DENOTES "MINIMUM"
MTD	DENOTES "MOUNTED"
PNL	DENOTES "PANELBOARD"
SW	DENOTES "SWITCH"
SWBD	DENOTES "SWITCHBOARD"
TYP	DENOTES "TYPICAL"
WP	DENOTES "WEATHERPROOF"



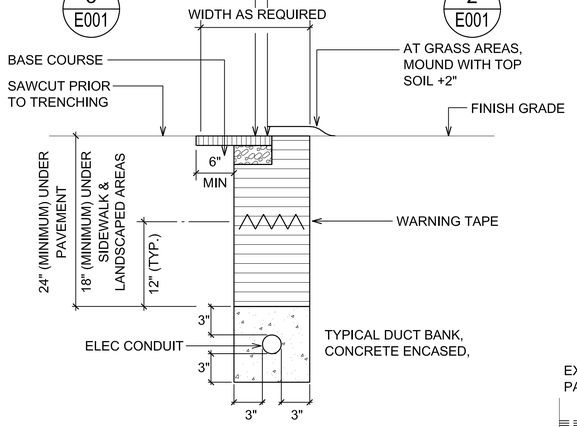
SECTION (A)



SECTION (B)



SECTION (C)

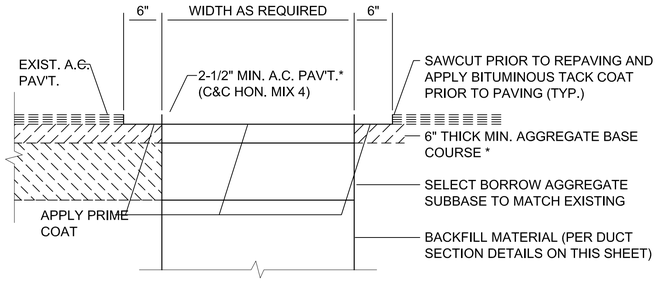


BACKFILL NOTES:

TYPE "A" BACKFILL - EARTH & GRAVEL. ROCK SIZE TO BE 1" MAX. & THE MIXTURE TO CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES. 95% COMPACTION.

CONCRETE - 3" ENCASEMENT, 4000 psi COMPRESSIVE STRENGTH @ 28 DAYS. (3)

1 / E001 TYPICAL DUCT SECTION DETAIL
NOT TO SCALE



* NOTE:
OR MATCH EXISTING PAVEMENT THICKNESS, WHICHEVER IS GREATER, INCLUDING A.C. AND/OR PORTLAND CONCRETE PAVEMENT, BASE COURSE AND SELECT BORROW.

3 / E001 TRENCH REPAVEMENT DETAIL
NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U. S. A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

SHEET TITLE:

ELECTRICAL SYMBOLS, ABBREVIATIONS, GENERAL NOTES

DATE :
AUGUST 2025
SHEET :
33 OF 75 SHEETS

DWG. NO.
E001

Z:\ACAD\PROJECTS\23032\A003_AS-1037-12R_E001_SYMB_NOTES.DWG

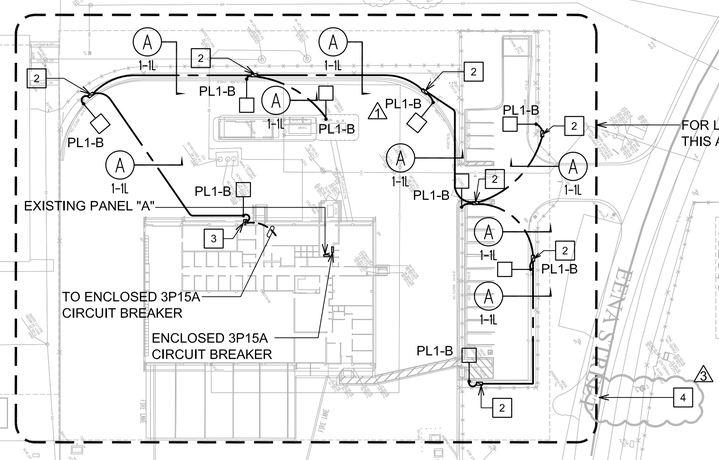
NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.

[2] TYPE "A" HANDHOLE. SEE SHEET EXX FOR DETAIL.

[3] 16"SQ X 8"D JB, NEMA 4X 316SS

[4] LIGHT POLES LOCATED IN THIS AREA SHALL HAVE A DEPTH LOCATION OF L15. REFER TO DETAIL 5/101. (3)



ELECTRICAL PLAN 1
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
(3)	05/06/26	ADDENDUM NO. 4
(1)	03/24/26	ADDENDUM NO. 1

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

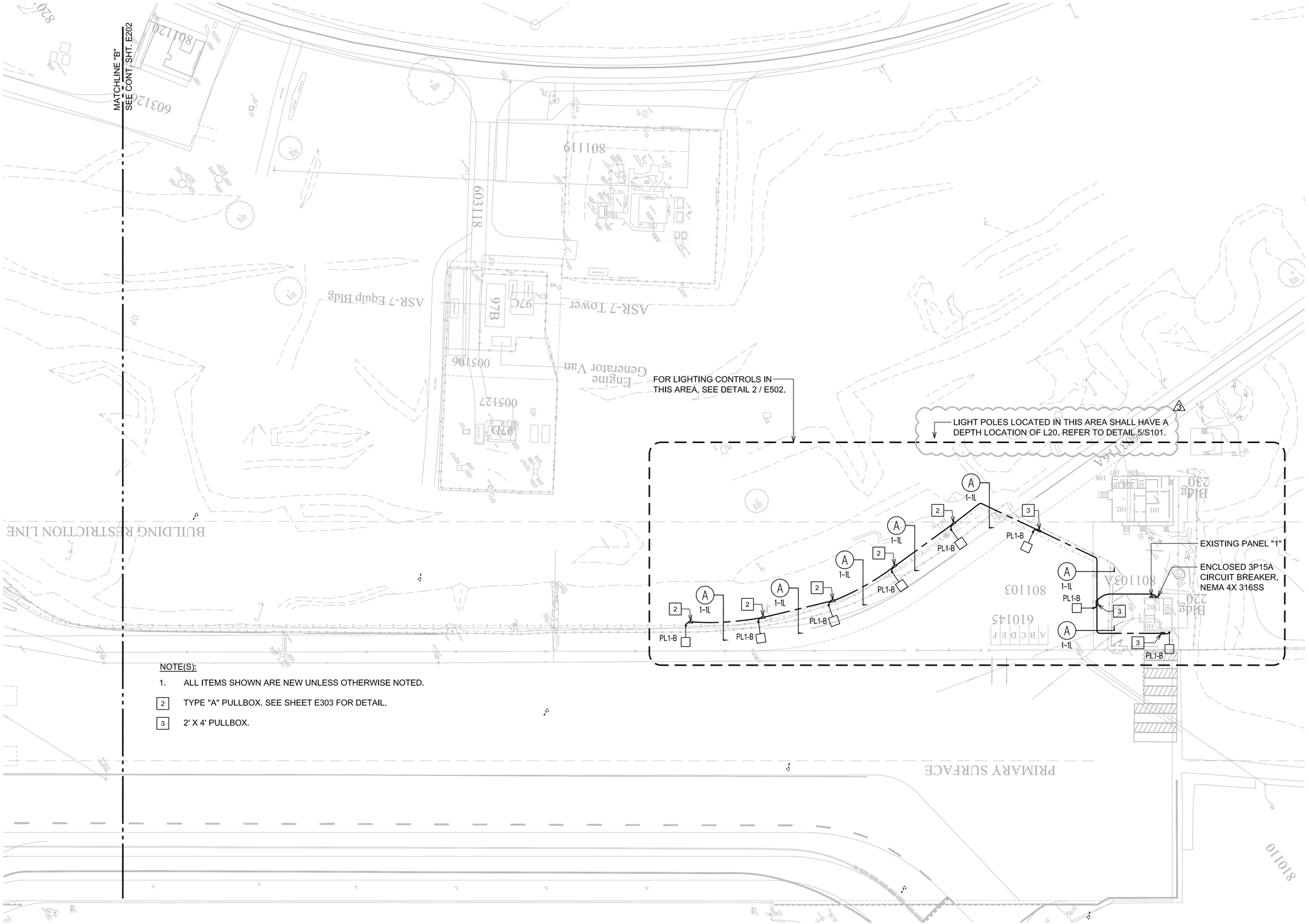
SHEET TITLE:

ELECTRICAL PLAN 1

DATE :
AUGUST 2025
SHEET :
46 OF 75 SHEETS

DWG. NO.
E201

Z:\AcAD\PROJECTS\223032A\046_AS-1037-12R_E201_223032A_ELEC_PLAN 1.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.
2. TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAIL.
3. 2' X 4' PULLBOX.

LIGHTING PLAN 3
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.

2026.05.18

04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

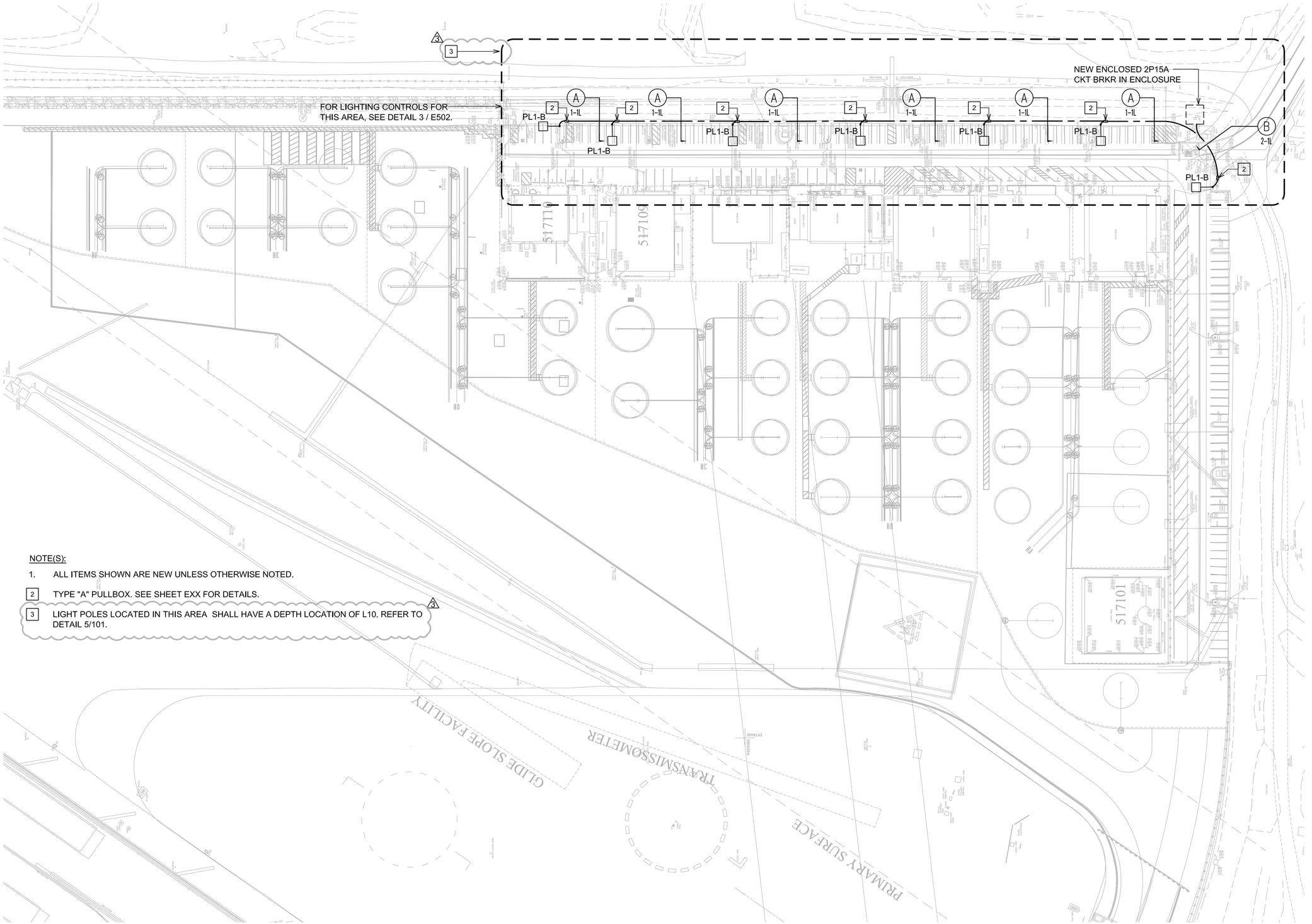
SHEET TITLE:

LIGHTING PLAN 3

DATE :
AUGUST 2025
SHEET :
48 OF 75 SHEETS

DWG. NO.
E203

Z:\ACAD\PROJECTS\223032A\048_AS-1037-12R_E203_223032A_ELEC_PLAN 3.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.

2 TYPE "A" PULLBOX. SEE SHEET EXX FOR DETAILS.

3 LIGHT POLES LOCATED IN THIS AREA SHALL HAVE A DEPTH LOCATION OF L10. REFER TO DETAIL 5/101.

NORTH

LIGHTING PLAN 4
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.

2026.05.18

04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

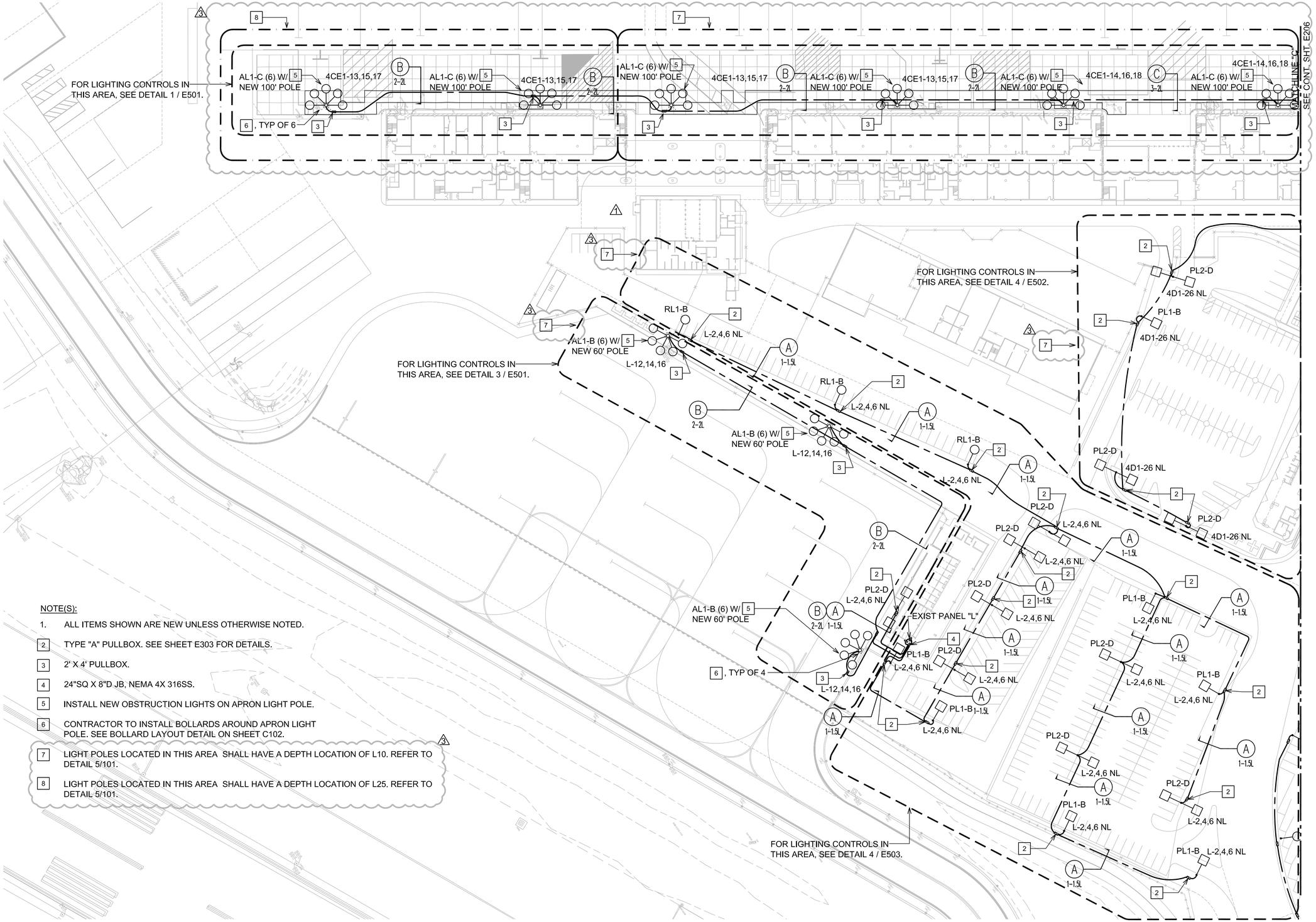
SHEET TITLE:

LIGHTING PLAN 4

DATE :
AUGUST 2025
SHEET :
49 OF 75 SHEETS

DWG. NO.
E204

Z:\ACAD\PROJECTS\23032A\049_AS-1037-12R_E204_223032A_ELEC_PLAN 4.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.

2 TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS.

3 2' X 4' PULLBOX.

4 24"SQ X 8"D JB, NEMA 4X 316SS.

5 INSTALL NEW OBSTRUCTION LIGHTS ON APRON LIGHT POLE.

6 CONTRACTOR TO INSTALL BOLLARDS AROUND APRON LIGHT POLE. SEE BOLLARD LAYOUT DETAIL ON SHEET C102.

3

7 LIGHT POLES LOCATED IN THIS AREA SHALL HAVE A DEPTH LOCATION OF L10. REFER TO DETAIL 5/101.

8 LIGHT POLES LOCATED IN THIS AREA SHALL HAVE A DEPTH LOCATION OF L25. REFER TO DETAIL 5/101.

NORTH

ELECTRICAL PLAN 5
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

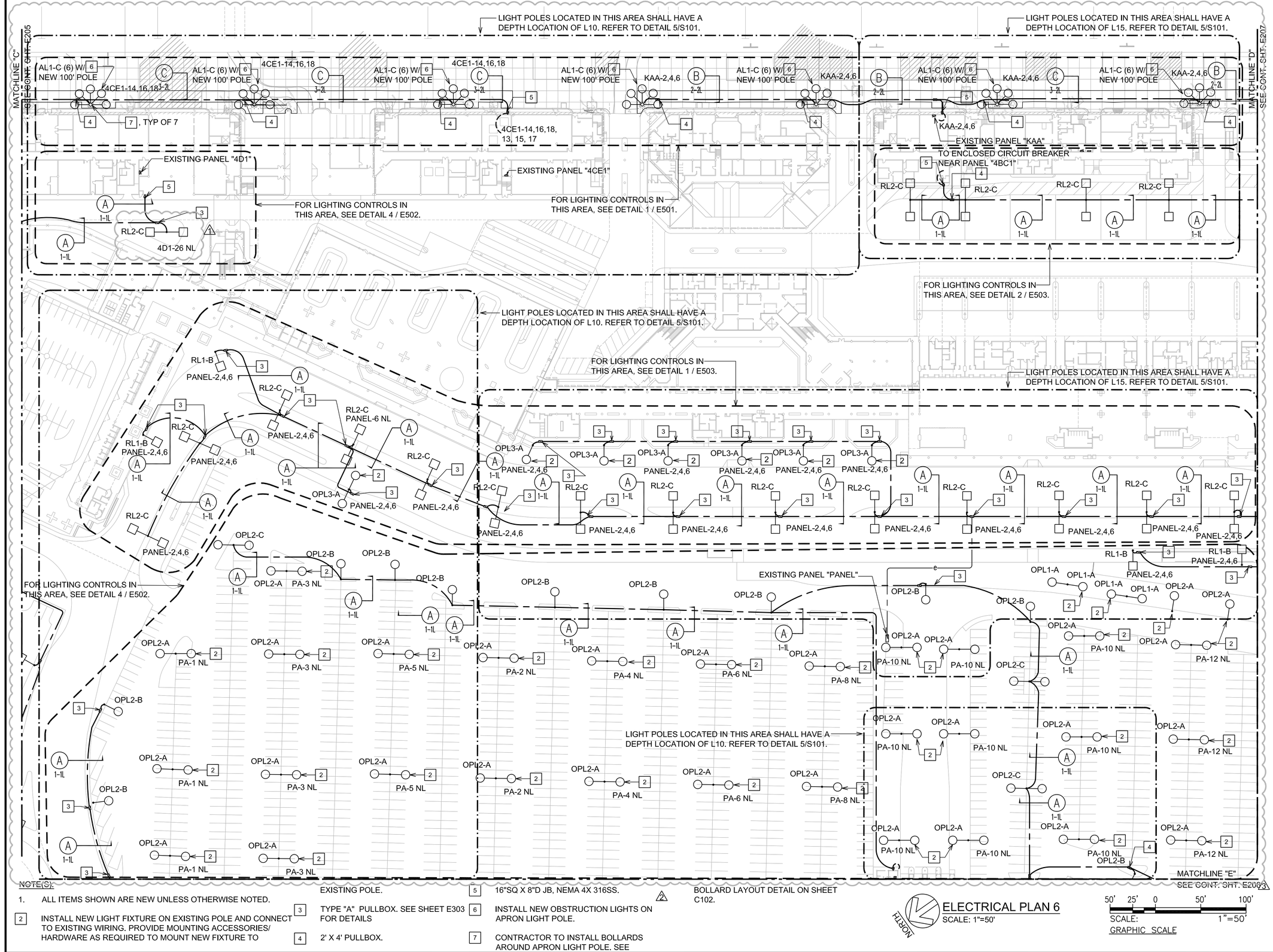
SHEET TITLE:

ELECTRICAL PLAN 5

DATE :
AUGUST 2025
SHEET :
50 OF 75 SHEETS

DWG. NO.
E205

Z:\ACAD\PROJECTS\223032A\050_AS-1037-12R_E205_223032A_ELEC_PLAN 5.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.

2. INSTALL NEW LIGHT FIXTURE ON EXISTING POLE AND CONNECT TO EXISTING WIRING. PROVIDE MOUNTING ACCESSORIES/ HARDWARE AS REQUIRED TO MOUNT NEW FIXTURE TO EXISTING POLE.

3. TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS

4. 2' X 4' PULLBOX.

5. 16"SQ X 8"D JB, NEMA 4X 316SS.

6. INSTALL NEW OBSTRUCTION LIGHTS ON APRON LIGHT POLE.

7. CONTRACTOR TO INSTALL BOLLARDS AROUND APRON LIGHT POLE. SEE ⚠2 BOLLARD LAYOUT DETAIL ON SHEET C102.

NORTH

ELECTRICAL PLAN 6
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.

2026.05.18

04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
⚠3	05/06/26	ADDENDUM NO. 4
⚠1	03/24/26	ADDENDUM NO. 1

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

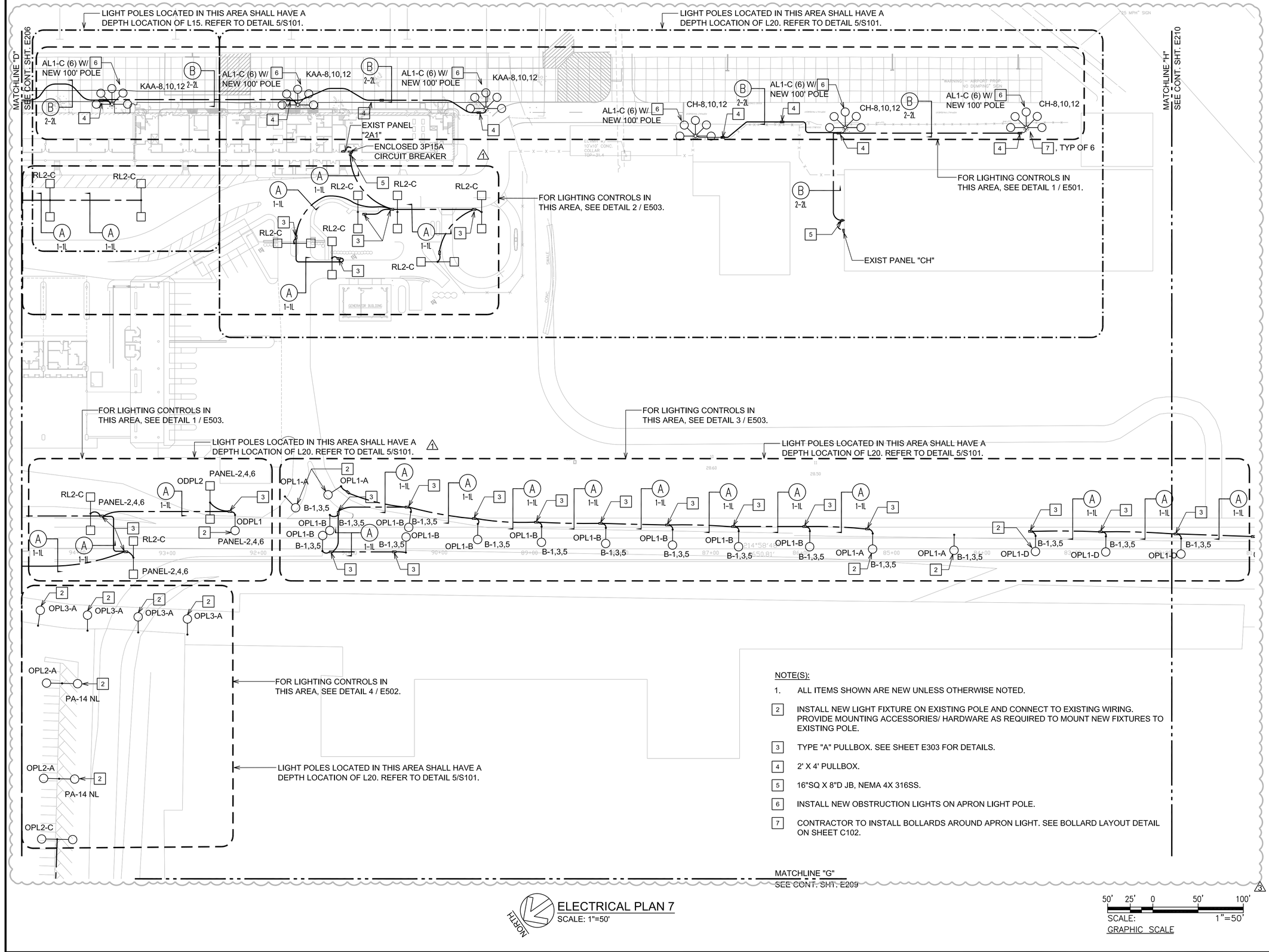
SHEET TITLE:

ELECTRICAL PLAN 6

DATE :
AUGUST 2025
SHEET :
51 OF 75 SHEETS

DWG. NO.
E206

Z:\ACADPROJECTS\223032A\051_AS-1037-12R_E206_223032A_ELEC_PLAN 6.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.
2. INSTALL NEW LIGHT FIXTURE ON EXISTING POLE AND CONNECT TO EXISTING WIRING. PROVIDE MOUNTING ACCESSORIES/ HARDWARE AS REQUIRED TO MOUNT NEW FIXTURES TO EXISTING POLE.
3. TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS.
4. 2' X 4' PULLBOX.
5. 16"SQ X 8"D JB, NEMA 4X 316SS.
6. INSTALL NEW OBSTRUCTION LIGHTS ON APRON LIGHT POLE.
7. CONTRACTOR TO INSTALL BOLLARDS AROUND APRON LIGHT. SEE BOLLARD LAYOUT DETAIL ON SHEET C102.

ELECTRICAL PLAN 7
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4
1	03/24/26	ADDENDUM NO. 1

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

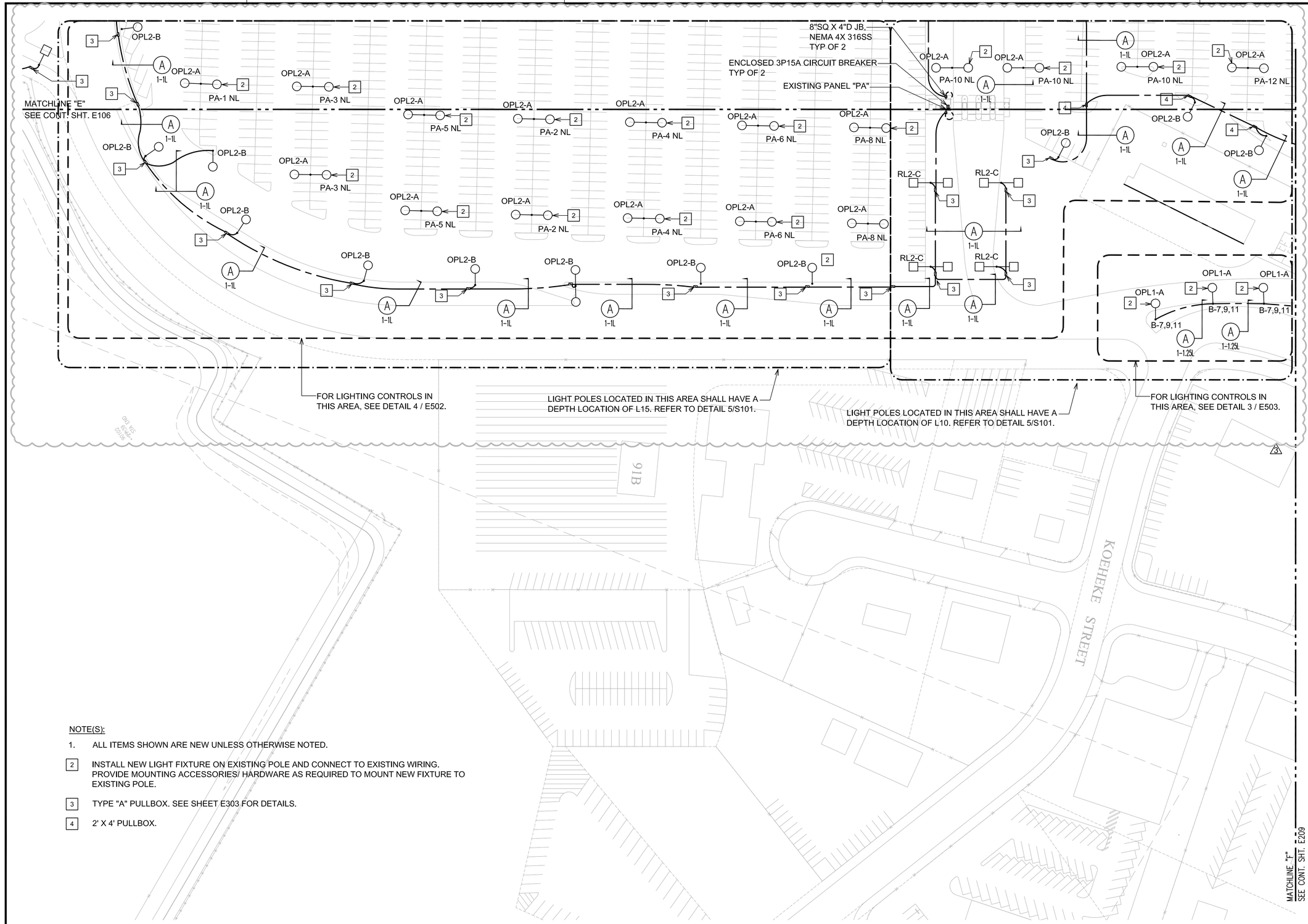
SHEET TITLE:

ELECTRICAL PLAN 7

DATE :
AUGUST 2025
SHEET :
52 OF 75 SHEETS

DWG. NO.
E207

Z:\ACAD\PROJECTS\223032A\052_AS-1037-12R_E207_223032A_ELEC_PLAN 7.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.

[2] INSTALL NEW LIGHT FIXTURE ON EXISTING POLE AND CONNECT TO EXISTING WIRING. PROVIDE MOUNTING ACCESSORIES/ HARDWARE AS REQUIRED TO MOUNT NEW FIXTURE TO EXISTING POLE.

[3] TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS.

[4] 2' X 4' PULLBOX.

NORTH

ELECTRICAL PLAN 8
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U. S. A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

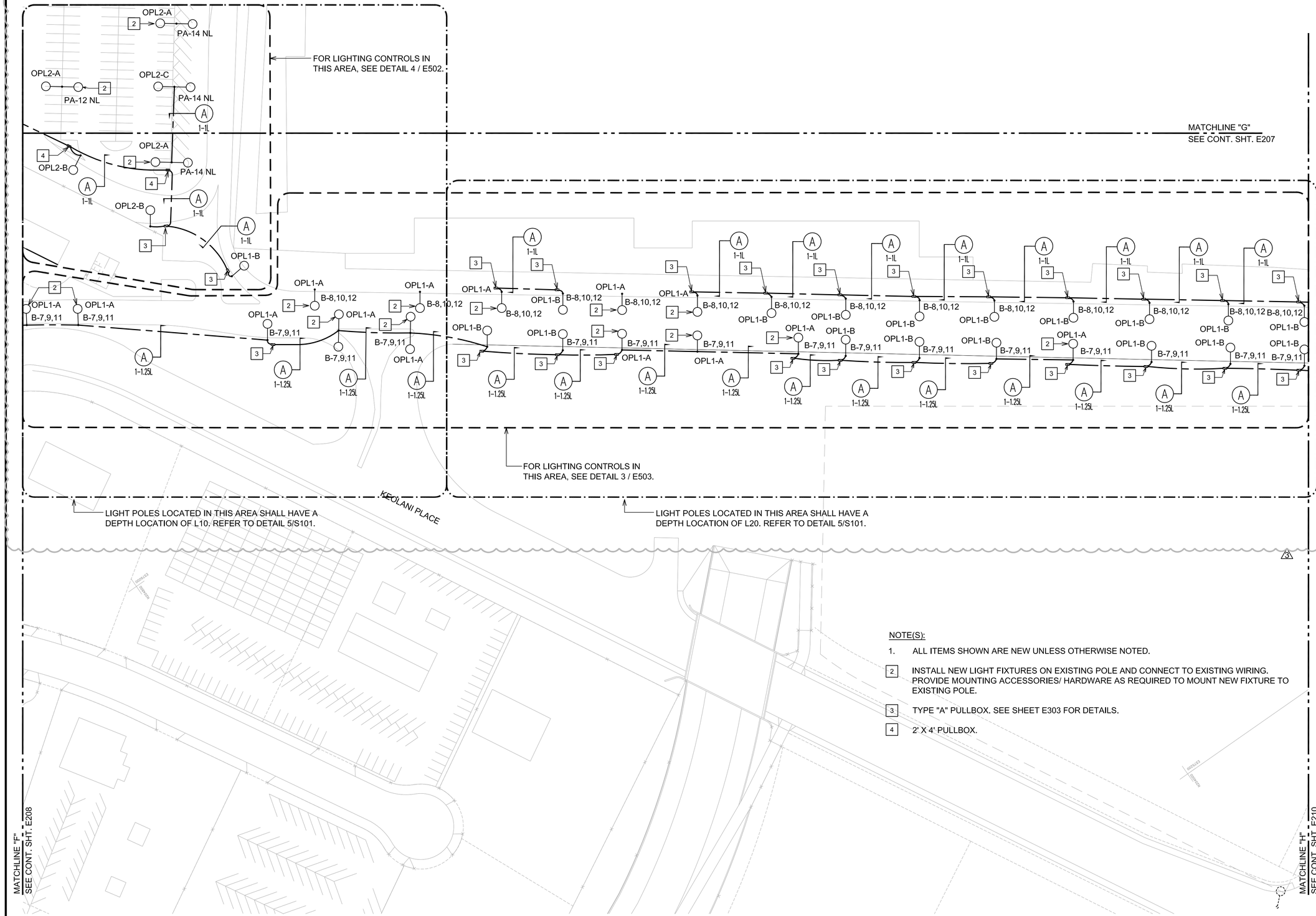
SHEET TITLE:

ELECTRICAL PLAN 8

DATE :
AUGUST 2025
SHEET :
53 OF 75 SHEETS

DWG. NO.
E208

Z:\ACAD\PROJECTS\223032A\053_AS-1037-12R_E208_223032A_ELEC_PLAN 8.DWG



ELECTRICAL PLAN 9
SCALE: 1"=50'

NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.
2. INSTALL NEW LIGHT FIXTURES ON EXISTING POLE AND CONNECT TO EXISTING WIRING. PROVIDE MOUNTING ACCESSORIES/ HARDWARE AS REQUIRED TO MOUNT NEW FIXTURE TO EXISTING POLE.
3. TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS.
4. 2' X 4' PULLBOX.

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

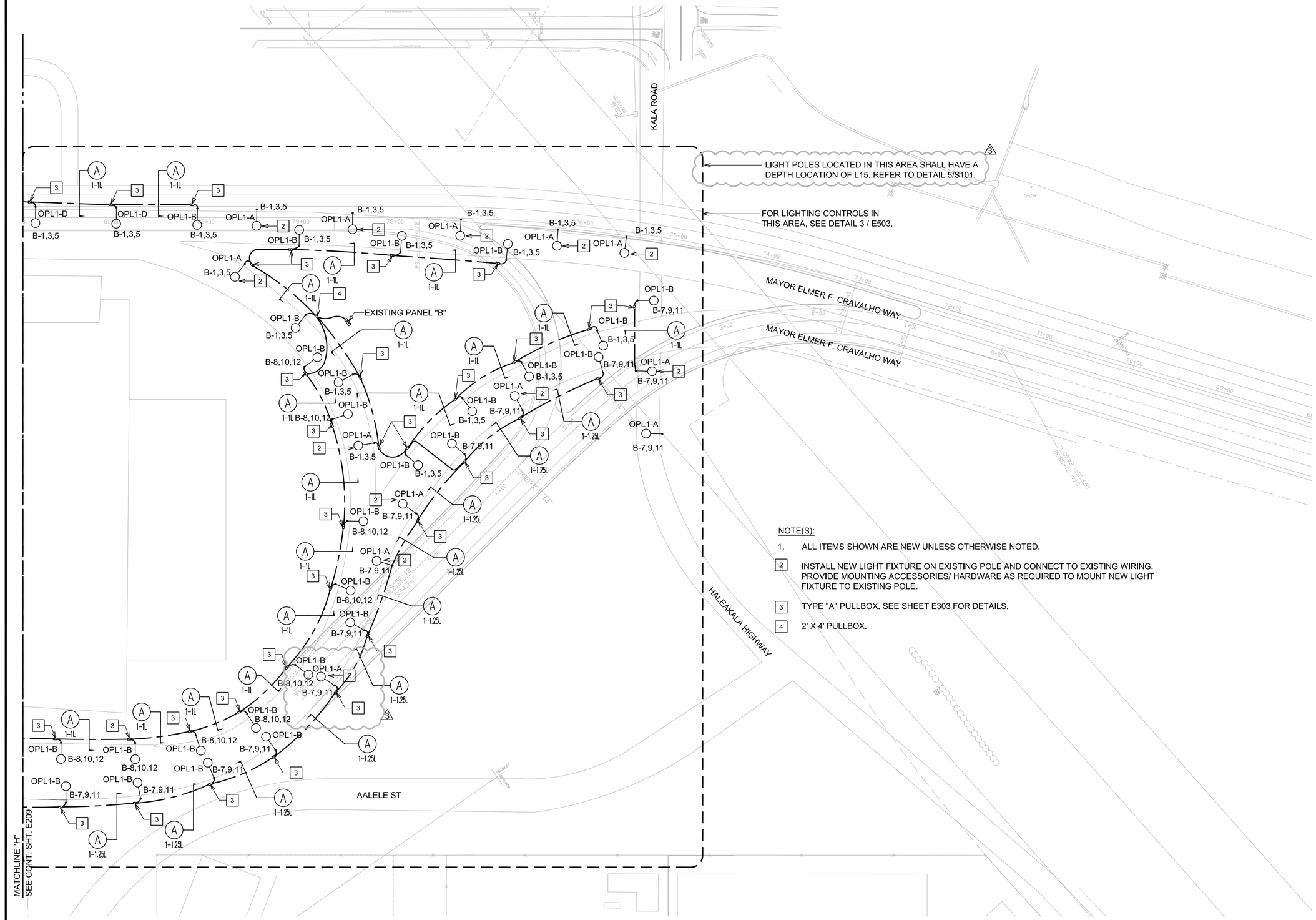
AS1037-12R

SHEET TITLE:

ELECTRICAL PLAN 9

DATE :	DWG. NO.
AUGUST 2025	E209
SHEET :	
54 OF 75 SHEETS	

Z:\ACAD\PROJECTS\23\932A\064_AS-1037-12R_E209_223932A_ELEC_PLAN 9.DWG



NOTE(S):

1. ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED.
2. INSTALL NEW LIGHT FIXTURE ON EXISTING POLE AND CONNECT TO EXISTING WIRING. PROVIDE MOUNTING ACCESSORIES/ HARDWARE AS REQUIRED TO MOUNT NEW LIGHT FIXTURE TO EXISTING POLE.
3. TYPE "A" PULLBOX. SEE SHEET E303 FOR DETAILS.
4. 2' X 4' PULLBOX.

ELECTRICAL PLAN 10
SCALE: 1"=50'

50' 25' 0 50' 100'
SCALE: 1"=50'
GRAPHIC SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

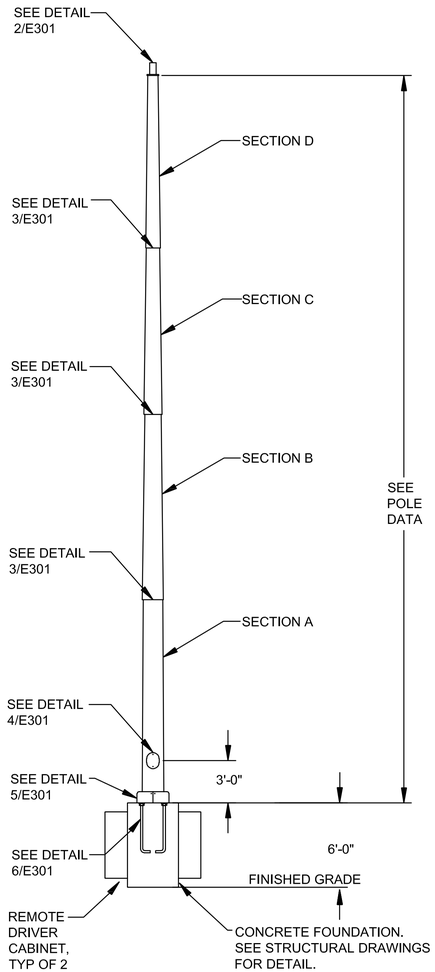
SHEET TITLE:

ELECTRICAL PLAN 10

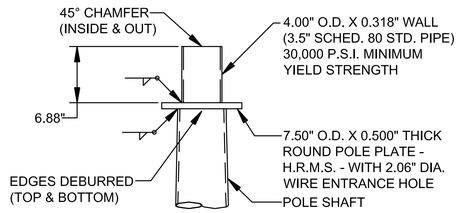
DATE :
AUGUST 2025
SHEET :
55 OF 75 SHEETS

DWG. NO.
E210

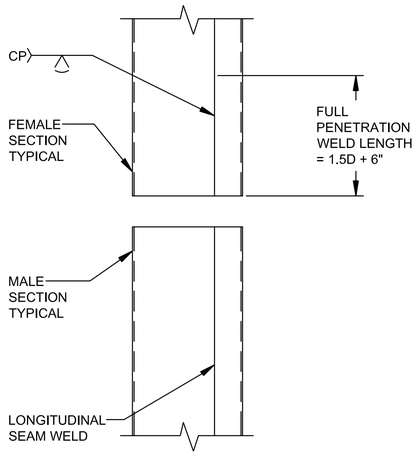
Z:\ACAD\PROJECTS\223032A\005_AS-1037-12R_E210_223032A_ELEC_PLAN 10_RECOVER.DWG



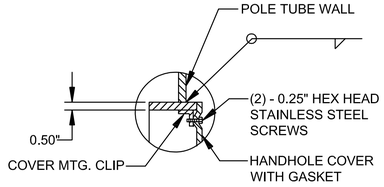
1 E301 **POLE DETAIL** NOT TO SCALE



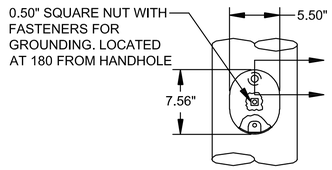
2 E301 **POLE TOP** NOT TO SCALE



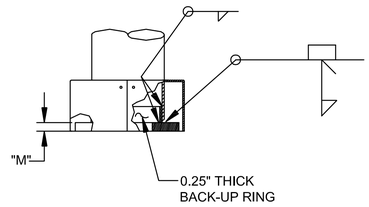
3 E301 **SLIP JOINT** NOT TO SCALE

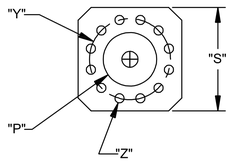


SECTION A-A



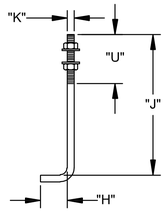
4 E301 **4.0" x 6.5" HANDHOLE** NOT TO SCALE



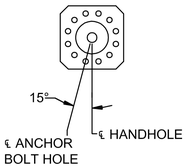


5 E301 **POLE BASE** NOT TO SCALE

316 SS ANCHOR BOLTS WITH (2) HEX NUTS AND (2) WASHERS PER BOLT WITH THREADED END GALVANIZED AT LEAST 12.00"

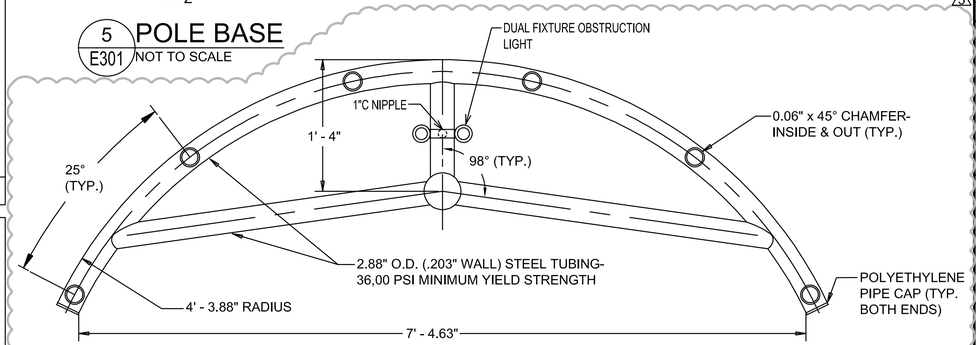


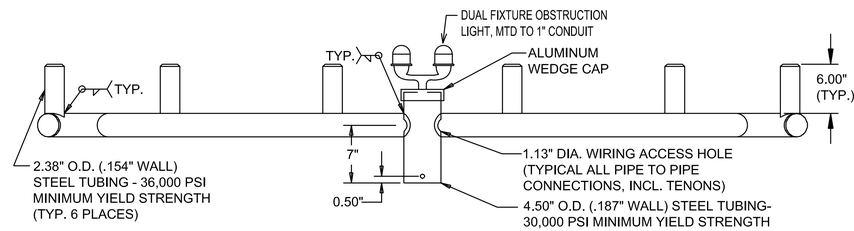
6 E301 **ANCHOR BOLT** NOT TO SCALE



ALL ANGLES MEASURED CLOCKWISE FROM HAND-HOLE AS VIEWED FROM SMALL END OF POLE

7 E301 **RADIAL INDEX** NOT TO SCALE





8 E301 **MC116 ARM** NOT TO SCALE

ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. THE VALMONT WARRANTY SPECIFICALLY EXCLUDES FATIGUE FAILURE OR SIMILAR PHENOMENA RESULTING FROM INDUCED VIBRATION, HARMONIC OSCILLATION OR RESONANCE ASSOCIATED WITH MOVEMENT OF AIR CURRENTS AROUND THE PRODUCT.

VIBRATION DISCLAIMER

THE LIGHTING STRUCTURES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE LOADING AND THE ALLOWABLE STRESS REQUIREMENTS OF THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SIXTH EDITION, LTS-6. THE WIND LOADS WERE CALCULATED FROM A BASIC WIND VELOCITY 0F 100 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS,

AASHTO 2013 SPECIFICATIONS

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
TAPERED TUBES	A572 GR. 65	
POLE BASE	A36	
ANCHOR BOLTS	F1554 GR. 55	
GALVANIZING-HARDWARE	HOT DIP ZINC	

FINISH DATE

SYSTEM:	GALVANIZED (GV)
BASE COAT:	HOT-DIP GALVANIZED TO ASTM A123
PRIME COAT:	NONE
FINISH COAT:	NONE
COLOR:	NONE
SPEC:	F-1

POLE DATA

ITEM	QTY.	NOMINAL MOUNTING HEIGHT (FT)	POLE SHAFT						POLE BASE					ANCHOR BOLT				
			SEC.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THK. (IN)	DES SLIP REQ'D (IN)	SQUARE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK "M" (IN)	CENTER HOLE "P" (IN)	HOLE "Z" (IN)	QTY.	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)
1	1	100.00	A	29.00	24.77	30.18	0.500	N/A	38.50	34.00	2.50	15.00	2.00	12	1.75	84.00	6.00	8.00
			B	26.00	21.95	28.93	0.313	51.40										
			C	23.00	19.06	28.11	0.25	47.10										
			D	20.00	16.56	24.55	0.219	42.70										

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

SHEET TITLE:

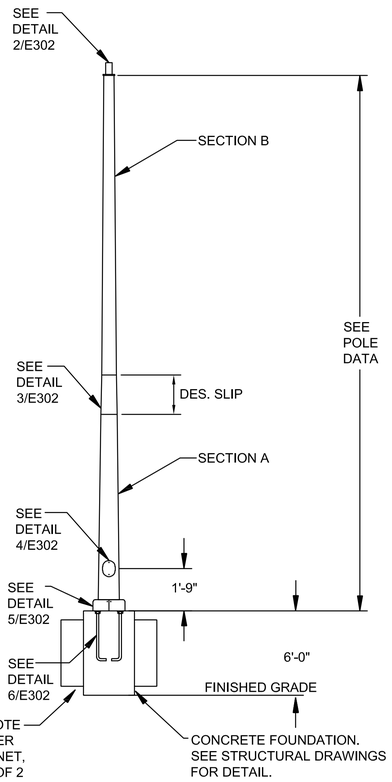
MAIN TERMINAL HARDSTAND LIGHT POLE DETAILS

DATE : **AUGUST 2025**

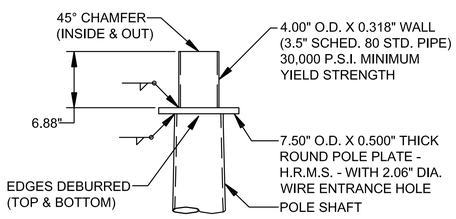
SHEET : 57 OF 75 SHEETS

DWG. NO. **E301**

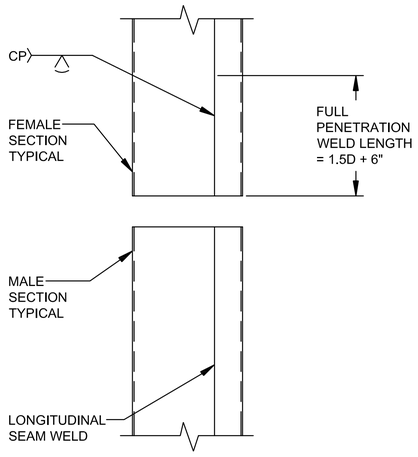
Z:\AC\D\PROJECTS\23033A\057_AS-1037-12R_E301_LT-POLE_DET01.DWG



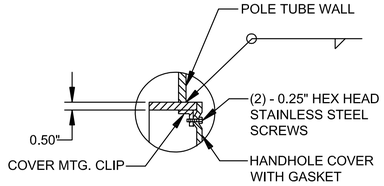
1 E302 POLE DETAIL
NOT TO SCALE



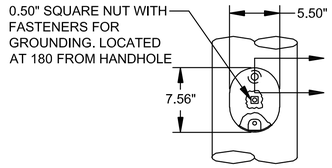
2 E302 POLE TOP
NOT TO SCALE



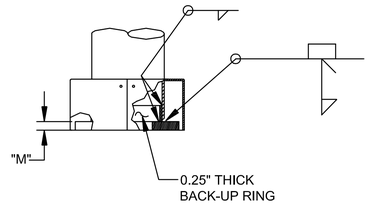
3 E302 SLIP JOINT
NOT TO SCALE

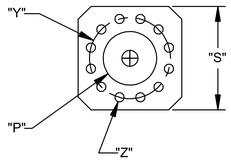


SECTION A-A



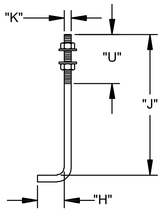
4 E302 4.0" x 6.5" HANDHOLE
NOT TO SCALE



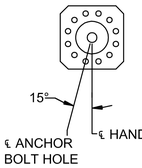


5 E301 POLE BASE
NOT TO SCALE

316 SS ANCHOR BOLTS WITH (2) HEX NUTS AND (2) WASHERS PER BOLT WITH THREADED END GALVANIZED AT LEAST 12.00"

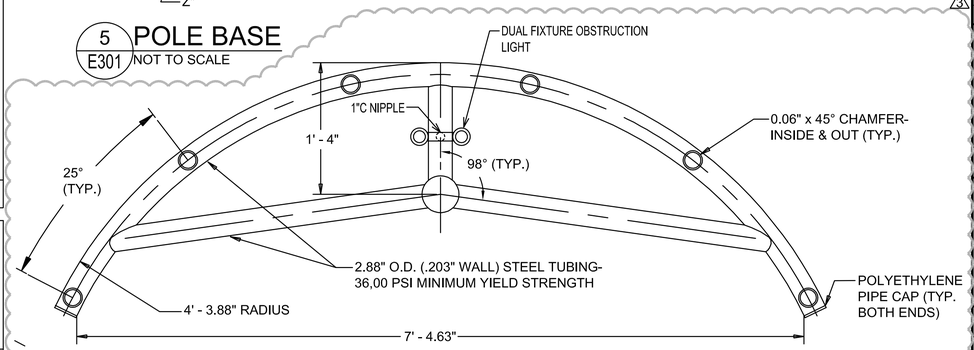


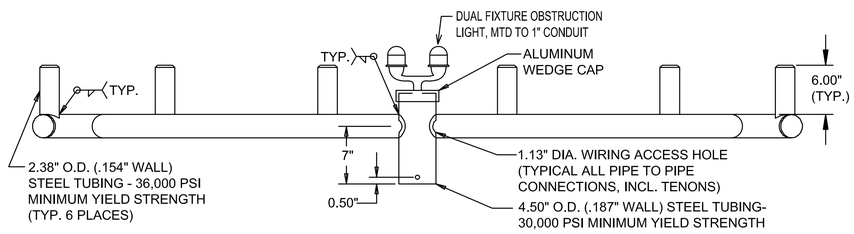
6 E302 ANCHOR BOLT
NOT TO SCALE



ALL ANGLES MEASURED CLOCKWISE FROM HAND-HOLE AS VIEWED FROM SMALL END OF POLE

7 E302 RADIAL INDEX
NOT TO SCALE





8 E302 MC116 ARM
NOT TO SCALE

MATERIAL DATA

COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
TAPERED TUBES	A572 GR. A OR A572	55
POLE BASE	A36	36
ANCHOR BOLTS	F1554 GR. 55	55
GALVANIZING-HARDWARE	HOT DIP ZINC	- -

FINISH DATE

SYSTEM:	GALVANIZED (GV)
BASE COAT:	HOT-DIP GALVANIZED TO ASTM A123
PRIME COAT:	NONE
FINISH COAT:	NONE
COLOR:	NONE
SPEC:	F-1

VIBRATION DISCLAIMER

ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. THE VALMONT WARRANTY SPECIFICALLY EXCLUDES FATIGUE FAILURE OR SIMILAR PHENOMENA RESULTING FROM INDUCED VIBRATION, HARMONIC OSCILLATION OR RESONANCE ASSOCIATED WITH MOVEMENT OF AIR CURRENTS AROUND THE PRODUCT.

AASHTO 2013 SPECIFICATIONS

THE LIGHTING STRUCTURES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE LOADING AND THE ALLOWABLE STRESS REQUIREMENTS OF THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SIXTH EDITION, LTS-6. THE WIND LOADS WERE CALCULATED FROM A BASIC WIND VELOCITY 0F 100 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS,

POLE DATA

ITEM	QTY.	NOMINAL MOUNTING HEIGHT (FT)	POLE SHAFT						POLE BASE					ANCHOR BOLT			
			SEC.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THK. (IN)	DES SLIP REQ'D (IN)	SQUARE "S" (IN)	BOLT CIRCLE "V" (IN)	THK "M" (IN)	CENTER HOLE "P" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)
1	1	60.00	A	15.00	10.18	34.42	0.375	N/A	22.50	22.00	2.00	10.00	2.25	2.00	84.00	6.00	10.00
			B	11.00	7.08	28.01	0.239	29.20									

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

SHEET TITLE:

COMMUTER TERMINAL HARDSTAND LIGHT POLE DETAILS

DATE :
AUGUST 2025
SHEET :
58 OF 75 SHEETS

DWG. NO.
E302

Z:\ACAD\PROJECTS\23\2303A\068_AS-1037-12R_E302_LT-POLE_DET02_.DWG

LIGHT FIXTURE SCHEDULE (CONT.) 3

TYPE	MOUNTING	DESCRIPTION	LIGHT ENGINE	VOLTAGE	POWER	MANUFACTURER OR APPROVED EQUAL	REMARKS	LOCATIONS
(OPL2-A) ORNAMENTAL PARKING LOT LIGHTING (AREA LIGHT ONLY)	POLE MOUNT	ORNAMENTAL ARM MOUNTED LED LUMINAIRE, DIE CAST ALUMINUM HOUSING A360, SODA LIME CLEAR TEMPERED FLAT GLASS LENS, IES TYPE III DISTRIBUTION, TEXTURED DARK FOREST GREEN FINISH, TRUE AMBER LED (590nm +/- 2nm COLOR TEMPERATURE ANSI/NEMA BIN TRUE AMBER, 1200-1600, LESS THAN 2% BLUE LIGHT CONTENT.	INTEGRATED LED, 1200-1600K NOMINAL, DELIVERED LUMENS, CRI	120V/277V	(2) 135W	LUMEC LIGHTING (2) RN30-135W80LEDTA-001G3-LE3F-120-DMG-**SMA**-PH8/RCD7-GN6TX-**BAA**	DUSK TO DAWN OPERATION VIA TIME CLOCK	PARKING LOT LIGHTING
(OPL2-B) ORNAMENTAL ROADWAY LIGHTING (COMPLETE ROADWAY LIGHT, POLE, & ARM)	POLE MOUNT	SINGLE HEAD, ORNAMENTAL ARM MOUNTED LED LUMINAIRE, DIE CAST ALUMINUM HOUSING A360, SODA LIME CLEAR TEMPERED FLAT GLASS LENS, IES TYPE III DISTRIBUTION, TEXTURED DARK FOREST GREEN FINISH, TRUE AMBER LED (590nm +/- 2nm COLOR TEMPERATURE ANSI/NEMA BIN TRUE AMBER, 1200-1600, LESS THAN 2% BLUE LIGHT CONTENT., 24 FT ORNAMENTAL POLE, 316 STAINLESS STEEL ANCHOR BOLTS, SINGLE 6 FT ORNAMENTAL ARM, BUY AMERICA ACT (BAA) COMPLIANT	INTEGRATED LED, 1200-1600K NOMINAL, DELIVERED LUMENS, CRI	120V/277V	135W	LUMEC LIGHTING RN30-135W80LEDTA-001G3-LE3F-120-DMG-**SMA**-PH8/RCD7-GN6TX-**BAA** LUMEC LIGHITNG RTA608-V-24-GN6TX LUMEC LIGHITNG VR6-2-R4-PRMA-GN6TX-**BAA**	DUSK TO DAWN OPERATION VIA TIME CLOCK	PARKING LOT LIGHTING
(OPL2-C) ORNAMENTAL ROADWAY LIGHTING (COMPLETE ROADWAY LIGHT, POLE, & ARM)	POLE MOUNT	DOUBLE HEAD, ORNAMENTAL ARM MOUNTED LED LUMINAIRE, DIE CAST ALUMINUM HOUSING A360, SODA LIME CLEAR TEMPERED FLAT GLASS LENS, IES TYPE III DISTRIBUTION, TEXTURED DARK FOREST GREEN FINISH, TRUE AMBER LED (590nm +/- 2nm COLOR TEMPERATURE ANSI/NEMA BIN TRUE AMBER, 1200-1600, LESS THAN 2% BLUE LIGHT CONTENT.24 FT ORNAMENTAL POLE, 316 STAINLESS STEEL ANCHOR BOLTS, DOUBLE 6 FT ORNAMENTAL ARM, BUY AMERICA ACT (BAA) COMPLIANT	INTEGRATED LED, 1200-1600K NOMINAL, DELIVERED LUMENS, CRI	120V/277V	(2) 135W	LUMEC LIGHTING (2) RN30-135W80LEDTA-001G3-LE3F-120-DMG-SMA-PH8/RCD7-GN6TX-**BAA** LUMEC LIGHITNG RTA608-V-24-GN6TX LUMEC LIGHITNG VR6-2-R4-PRMA-GN6TX-**BAA**	DUSK TO DAWN OPERATION VIA TIME CLOCK	PARKING LOT LIGHTING
(OPL3-A) ORNAMENTAL ROADWAY LIGHTING (AREA LIGHT ONLY)	POLE MOUNT	ORNAMENTAL ARM MOUNTED LED LUMINAIRE, DIE CAST ALUMINUM HOUSING A360, SODA LIME CLEAR TEMPERED FLAT GLASS LENS, IES TYPE III DISTRIBUTION, TEXTURED DARK FOREST GREEN FINISH, TRUE AMBER LED (590nm +/- 2nm COLOR TEMPERATURE ANSI/NEMA BIN TRUE AMBER, 1200-1600, LESS THAN 2% BLUE LIGHT CONTENT., BUY AMERICA ACT (BAA) COMPLIANT	INTEGRATED LED, 1200-1600K NOMINAL, DELIVERED LUMENS, CRI	120V/277V	135W	LUMEC LIGHTING RN30-135W80LEDTA-001G3-LE3F-120-DMG-**SMA**-DE1-PRMA-GN6TX-**BAA**	DUSK TO DAWN OPERATION VIA TIME CLOCK	MAIN TERMINAL WALKWAY
(OPL3-B) ORNAMENTAL ROADWAY LIGHTING (AREA LIGHT ONLY)	POLE MOUNT	DOUBLE HEAD ORNAMENTAL ARM MOUNTED LED LUMINAIRE, DIE CAST ALUMINUM HOUSING A360, SODA LIME CLEAR TEMPERED FLAT GLASS LENS, IES TYPE III DISTRIBUTION, TEXTURED DARK FOREST GREEN FINISH, TRUE AMBER LED (590nm +/- 2nm COLOR TEMPERATURE ANSI/NEMA BIN TRUE AMBER, 1200-1600, LESS THAN 2% BLUE LIGHT CONTENT., 20 FT ORNAMENTAL POLE, 316 STAINLESS STEEL ANCHOR BOLTS, 4 FT ORNAMENTAL ARM, BUY AMERICA ACT (BAA) COMPLIANT	INTEGRATED LED, 1200-1600K NOMINAL, DELIVERED LUMENS, CRI	120V/277V	(2) 135W	LUMEC LIGHTING (2) RN30-135W80LEDTA-001G3-LE3F-120-DMG-**SMA**-DE1-PRMA-GN6TX-**BAA**	DUSK TO DAWN OPERATION VIA TIME CLOCK	MAIN TERMINAL WALKWAY
(SOL1-A) SOLAR PARKING LOT LIGHTING (AREA LIGHT ONLY)	POLE MOUNT	SINGLE HEAD LED PARKING AND AREA LIGHTING, LOW COPPER ALUMINUM HOUSING AND MOUNTING ARM, FULL CUTOFF, LIGHT SHALL BE PARALLEL TO THE GROUND NO TILT. SIDE POLE MOUNT, BLACK TGIC POWDER COAT, BLUE LIGHT BLOCKER- LESS THAN 2% BLUE LIGHT CONTENT, DARK SKY ASSOCIATION CERTIFICATION COMPLIANT, MICROCONTROLLER BASED SOLAR LIGHTING CONTROLLER, 10+ YEAR OF BATTERY LIFE, RETROFIT MOUNT BRACKET, 10 YEAR WARRANTY	INTEGRATED LED, 3000K NOMINAL, 3250 DELIVERED LUMENS, CRI	SOLAR		FIRST LIGHT TECHNOLOGIES SCL2-SPM-BK-T3-WW-00-BLB	DUSK TO DAWN OPERATION VIA PHOTOCELL	EMPLOYEE PARKING LOT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U. S. A.

2026.05.18

04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
SY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII

PROJECT NO.:

AS1037-12R

SHEET TITLE:

LIGHT FIXTURE SCHEDULE 3

DATE :	DWG. NO.
AUGUST 2025	E311
SHEET :	
67 OF 75 SHEETS	

Z:\ACAD\PROJECTS\23\32A\067_AS-1037-12R_E311_LIGHT FIX SCHEDULE 3.DWG

GENERAL ELECTRICAL NOTES:

1. ALL WORK SHALL COMPLY WITH LOCAL ORDINANCES; REQUIREMENTS OF STATE FIRE MARSHAL; NATIONAL ELECTRICAL CODE; NATIONAL ELECTRICAL SAFETY CODE; APPLICABLE REGULATIONS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS; STANDARD OF UL, ANSI, NEMA AND EEI; AND REGULATIONS OF LIHUE AIRPORT.
2. ALL WORK SHALL CONFORM TO CONSTRUCTION PRACTICES AS RECOMMENDED BY AMERICAN ELECTRICIANS HANDBOOK BY CROFT (LATEST EDITION) AND APPLICABLE INSTRUCTIONS OF MANUFACTURERS OF MATERIAL SUPPLIED FOR THIS PROJECT.
3. PLANS DO NOT INDICATE THE COMPLETE EXISTING ELECTRICAL CONDITIONS. VISIT JOBSITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND EXTENT OF DEMOLITION AND NEW WORK PRIOR TO THE START OF WORK. REPORT ANY DISCREPANCIES AND/OR DIFFERENCES IN DRAWINGS, WITH RESPECT TO EXISTING CONDITIONS, TO THE ENGINEER.
4. RESOLVE ALL DISCREPANCIES AND QUESTIONS PRIOR TO THE START OF WORK. NO EXTRA PAYMENT SHALL BE ALLOWED ON ACCOUNT OF WORK MADE NECESSARY BY CONTRACTOR'S FAILURE TO VISIT THE SITE AND/OR FAILURE TO RESOLVE DISCREPANCIES AND QUESTIONS.
5. ALL MATERIALS, EQUIPMENT AND WIRING LOCATED OUTDOORS SHALL BE SUITABLE FOR WEATHERPROOF LOCATIONS.
6. UPON COMPLETION OF PROJECT, CONTRACTOR SHALL PROVIDE ENGINEER WITH "AS-BUILT" DRAWINGS.
7. THE DATA INDICATED ON DRAWINGS ARE EXACT AS COULD BE SECURED FROM EXISTING DRAWINGS AND FIELD CHECKS BUT THEIR ABSOLUTE ACCURACY CANNOT BE GUARANTEED. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER CONDITIONS WILL BE GOVERNED BY JOB DECISION OF ENGINEER. IN EVENT OF DISCREPANCIES BETWEEN DRAWINGS AND CONDITIONS AT SITE, IMMEDIATELY NOTIFY ENGINEER. DO NOT PROCEED WITH INSTALLATION IN AREAS OF DISCREPANCIES UNTIL ALL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
8. REMOVE ALL EXISTING EXPOSED CONDUIT AND WIRES NOT TO REMAIN IN SERVICE; CONCEALED RACEWAYS NO LONGER REQUIRED SHALL BE CAPPED AND ABANDONED IN PLACE WITH ALL WIRES REMOVED.
9. PROVIDE METAL SEAL(S) FOR ALL ABANDONED RACEWAY OPENING(S) IN BOX(ES), CABINET(S), AND EQUIPMENT ENCLOSURE(S); SEALS SHALL RETAIN NEMA RATING OF REMAINING BOX(ES), CABINET(S), AND EQUIPMENT ENCLOSURE(S).
10. FOR EXISTING CIRCUIT(S) WHERE ELECTRICAL ITEMS ARE REMOVED, CONTRACTOR SHALL PROVIDE ALL NECESSARY RACEWAYS, WIRES, BOXES, AND ETC. PER NEC REQUIREMENTS TO ENSURE ELECTRICAL CONTINUITY AND PROPER OPERATION OF REMAINING CIRCUIT COMPONENT(S).
11. ALL EXTERIOR EQUIPMENT MOUNTING HARDWARE SHALL BE TYPE 316 SS.
12. ALL ELECTRICAL ITEMS AND WORK SHALL BE NEW UNLESS OTHERWISE INDICATED ON PLANS.
13. PROVIDE ARC FLASH WARNING LABELS AS REQUIRED PER 2020 NEC 110.16 AND 2018 NFPA-70E 130.5 FOR ALL ELECTRICAL EQUIPMENT. CONTRACTOR SHALL ATTAIN ALL INFORMATION REQUIRED FOR THE CALCULATIONS, PERFORM THE CALCULATIONS, AND PROVIDE THE LABELS AT NO ADDITIONAL COST.
14. ADA STANDARDS FOR ACCESSIBLE DESIGN: THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2010 ADA STANDARDS.
15. REPAIR, PATCH, PAINT ALL AREAS AFFECTED BY DEMOLITION AND REMOVAL WORK.
16. VERIFY RATINGS OF ALL ELECTRICALLY OPERATED OR CONTROLLED EQUIPMENT PROVIDED BY OTHER TRADES. COORDINATE RATINGS OF OVERCURRENT PROTECTIVE DEVICES, DISCONNECT SWITCHES, CONDUIT AND WIRING TO MATCH THE ACTUAL EQUIPMENT SUPPLIED AT NO ADDITIONAL COSTS.
17. ALL ITEMS SPECIFIED AS NEMA 4X SHALL BE STAINLESS STEEL (316L) UNLESS OTHERWISE INDICATED. ALL C-CHANNELS AND FASTENING HARDWARE: SCREWS, NUTS, BOLTS, WASHERS, ETC., SHALL BE STAINLESS STEEL (316L). ALL EXPOSED FACTORY PROVIDED HARDWARE NOT STAINLESS STEEL (316L) SHALL BE REPLACED WITH STAINLESS STEEL (316L) HARDWARE. PAINT ALL NEW ELECTRICAL INSTALLATIONS (EQUIPMENT AND RACEWAYS) PER SPECIFICATION SECTION 09901 "PAINTING", UNLESS OTHERWISE NOTED. DO NOT PAINT LIGHT FIXTURES, LIGHT POLES, DRY-TYPE TRANSFORMER, OIL FILLED TRANSFORMERS, ELECTRICAL PANELBOARDS, AND SWITCHBOARDS.
18. COORDINATE INSTALLATION OF ALL ELECTRICAL ITEMS WITH OTHER TRADES AND ADJUST LOCATIONS AS NECESSARY TO AVOID CONFLICTS.

ELECTRICAL SYMBOLS

EXST SYMBOL	NEW SYMBOL	DESCRIPTION
	A 1NL LT#1	AREA LIGHT POLE. "A" INDICATES TYPE "A" LIGHT POLE, "1NL" DENOTES CONNECTED TO NIGHT LIGHT CIRCUIT NUMBER "1" VIA TIME SWITCH, "LT#1" INDICATES POLE #1.
		APRON LIGHT POLE. 5 FIXTURES INDICATED.
		ELEC 2' X 4' HANDHOLE. SEE DETAILS ON SHEET
	A 2-2L	ELECTRICAL DUCTLINE WITH DUCT SECTION DESIGNATORS; ITEMS IN CIRCLE INDICATES DUCT SECTION TYPE; DUCT DESIGNATORS IN ADJACENT CIRCLES INDICATES DUCTS INSTALLED IN COMMON TRENCH AND COMBINED CONCRETE ENCASEMENT WITH REQURED DUCT SEPARATIONS; DUCT DESIGNATION CUT LINE INDICATES VIEW OF DUCT SECTION; SHOWN WITH DUCT COMPLEMENTS TYPE "A" DUCT SECTION WITH 2-2"L DUCTS IN COMMON TRENCH AND CONCRETE ENCASEMENT; SEE SHEET E001 FOR DUCT SECTION DETAILS
– – –e– – –	—·—E—·—	UNDERGROUND ELEC DUCTS & CABLES
	1	NOTE SYMBOL, SEE PLAN FOR NOTES

NOTE(S):

1. SOLID ITEM DENOTES "NEW"; DASHED ITEM DENOTES "EXISTING".
2. "X" THRU DASHED ITEM DENOTES "EXISTING ITEM TO BE REMOVED.

ABBREVIATIONS

SYMBOL	DESCRIPTION
AFF	DENOTES "ABOVE FINISH FLOOR"
BRKR	DENOTES "BREAKER"
CKT	DENOTES "CIRCUIT"
DISC	DENOTES "DISCONNECT"
ENCL	DENOTES "ENCLOSED"
JB	DENOTES "JUNCTION BOX"
MIN	DENOTES "MINIMUM"
MTD	DENOTES "MOUNTED"
PNL	DENOTES "PANELBOARD"
SW	DENOTES "SWITCH"
SWBD	DENOTES "SWITCHBOARD"
TYP	DENOTES "TYPICAL"
WP	DENOTES "WEATHERPROOF"

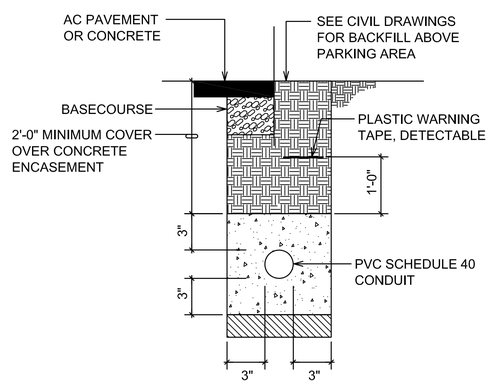
DUCT SECTION BACKFILL NOTES:

TYPE "A" BACKFILL - EARTH & GRAVEL. ROCK SIZE TO BE 1" MAX. & THE MIXTURE TO CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES. 95% COMPACTION.

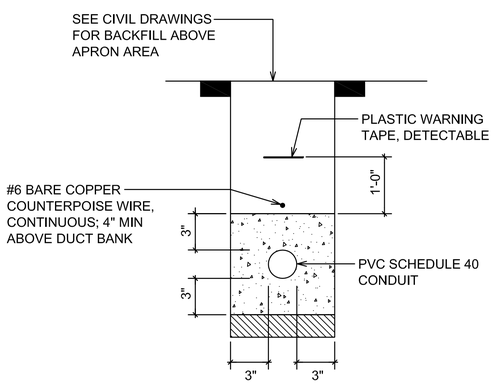
TYPE "B" BACKFILL - EARTH & GRAVEL. MIXTURE MUST PASS A 1/2" MESH SCREEN & CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES. 95% COMPACTION.
NOTE - IF NORMAL MATERIAL AT BOTTOM OF TRENCH IS NOT TYPE "B", AN ADDITIONAL 3" SHALL BE EXCAVATED & TYPE "B" BACKFILL PROVIDED.

3 CONCRETE - 3" ENCASEMENT, 4000 psi COMPRESSIVE STRENGTH @ 28 DAYS.

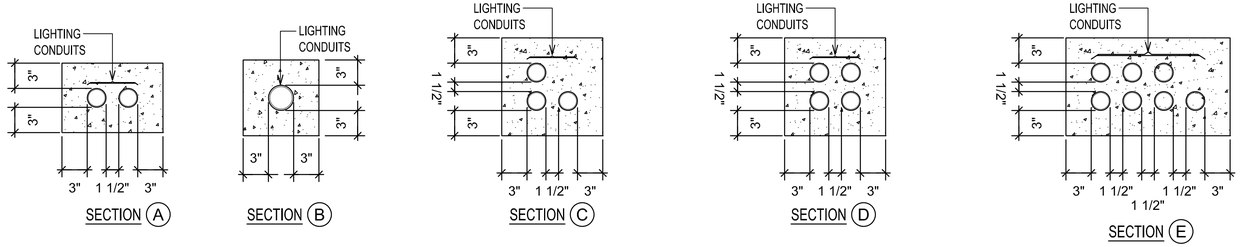
NOTE: SEE CIVIL DRAWINGS FOR SURFACE RESTORATION DETAILS.



1 E001 PARKING AREA TRENCH AND BACKFILL DETAILS
NOT TO SCALE



2 E001 APRON TRENCH AND BACKFILL DETAILS
NOT TO SCALE



3 E001 DUCT SECTION DETAILS
NOT TO SCALE

COUNTY OF MAUI
MAUI COUNTY CODE, CHAPTER 16.16B ENERGY CODE
COMMERCIAL PROVISIONS

COMPLIANCE METHOD
Check applicable method

☐	C401.2(1) ANSI / ASHRAE / IESNA 90.1
☐	C401.2(2) Sections C402 through C406
☒	C401.2(3) Sections C402.5, C403.2, C404, C405.2, 405.3, C405.4, C405.6 & C407
☐	C102.1 Alternative

To the best of my knowledge, this project's design substantially conforms to the Energy Code.

Signature: _____ Date: 04/07/25
Name: BILLY J. ORNELLAS
Title: PRINCIPAL
License No.: 11658-E

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
RY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII

PROJECT NO.:

AS1037-12R

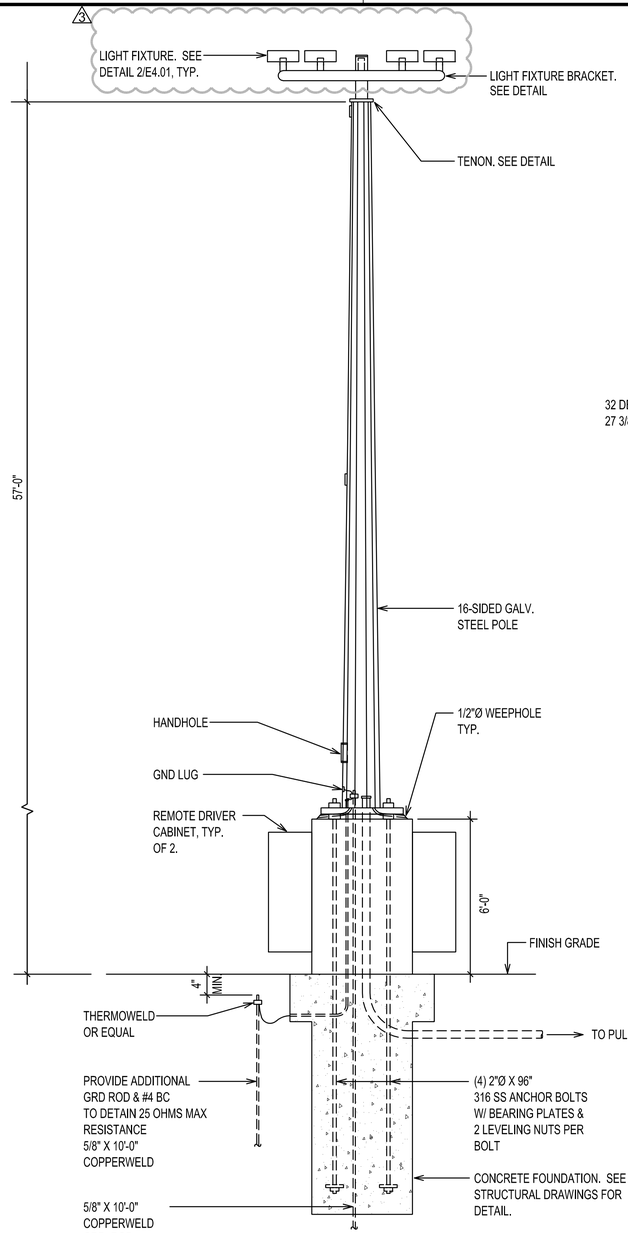
SHEET TITLE:

ELECTRICAL SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

DATE :
AUGUST 2025
SHEET :
18 OF 30 SHEETS

DWG. NO.
E001

Z:\ACAD\PROJECTS\22303B\006_AS1037-12_E001_SYMB_NOTES.DWG



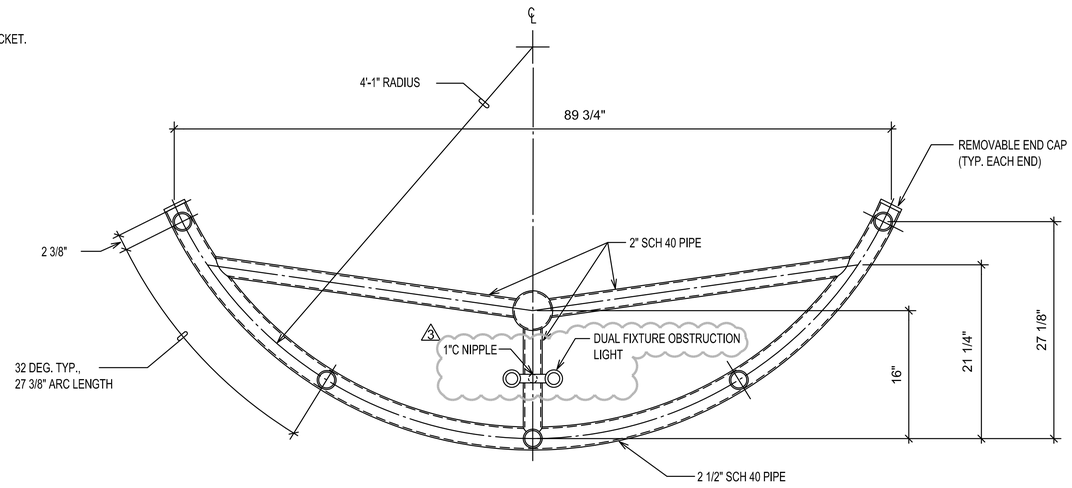
MATERIAL SPECIFICATIONS:

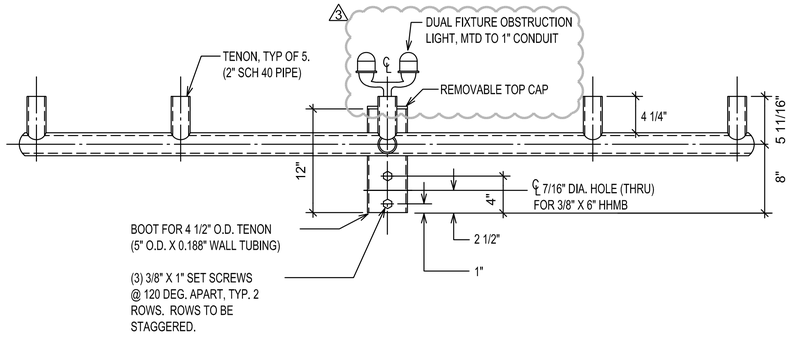
POLE SHAFT ASSEMBLY:
POLE SHAFT - ASTM A-572 (65 KSI MIIN YIELD)
BASE PLATE - ASTM A-572 (50 KSI MIIN YIELD)
ANCHOR BOLTS - F1554 (60 KSI MIIN YIELD)

LIGHTING BRACKET:
PIPE - ASTM A53, GRADE B
STRUCTURAL SHAPES AND PLATES - ASTM A-36

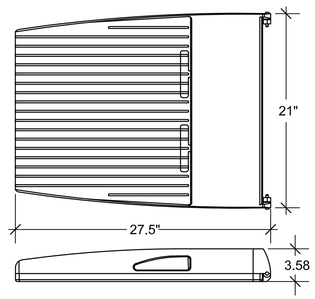
STRUCTURE TO BE GALVANIZED IN ACCORDANCE WITH ASTM A-123 AND COATED WITH A THERMOSET POLYESTER POWDER COAT FINISH.

1 E401 APRON LIGHT POLE DETAILS
NOT TO SCALE





BRACKET DETAIL



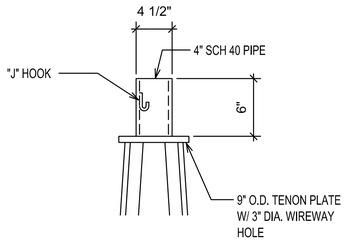
LIGHT ENGINE: 671W LED, 71,101 LUMEN, COHI LENS

HOUSING/OPTICS: LED FLOODLIGHT, DIE CAST ALUMINUM HOUSING, EXTERNAL COOLING FINS, CORROSION RESISTANT EXTERNAL HARDWARE, IP65/IP67 RATED, COHI LENS, TYPE IV DISTRIBUTION.

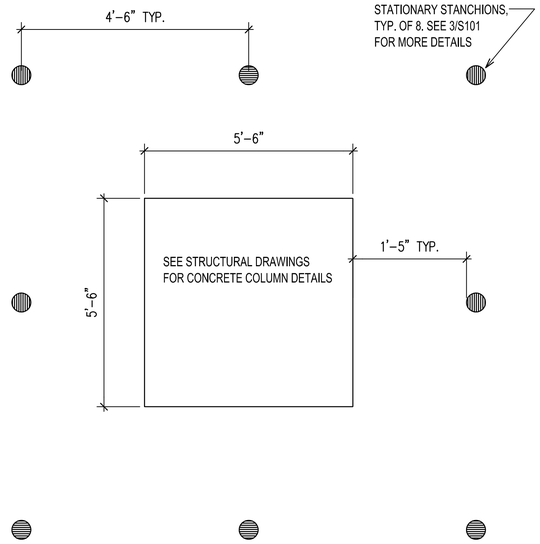
DRIVER: REMOTE, 0-10V DIMMING LED DRIVER W/INTEGRAL 10KA/ 10KV SURGE PROTECTION, 0.95 PF, <20% THD.

MANUFACTURER: NLS LIGHITNG NV-3-T4-90-KELVIN-UNV-KM-STD-FINISHGF-BL OR APPROVED EQUAL.

2 E401 APRON LIGHT FIXTURE DETAILS
NOT TO SCALE



TENON DETAIL



3 E401 APRON LIGHT BOLLARD DETAILS
NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

BILLY J. ORNELLAS
LICENSED PROFESSIONAL ENGINEER
No. 11658-E
HAWAII, U.S.A.
2026.05.18
04/30/2026
Licensed Expiration Date

This work was prepared by me or under my supervision.

DSGN.	DRWN.	CHKD.	APPD.
RY	CAD	BO	BO

NO.	DATE	REVISIONS
3	05/06/26	ADDENDUM NO. 4

PROJECT TITLE :

APRON LIGHT REPLACEMENT

AT
LANAI AIRPORT
LANAI CITY, LANAI, HAWAII

PROJECT NO.:

AS1037-12R

SHEET TITLE:

APRON LIGHT DETAILS

DATE :	DWG. NO.
AUGUST 2025	E401
SHEET :	
28 OF 30 SHEETS	

Z:\ACAD\PROJECTS\2303\2B016_AS1037-12_E401_LIGHT_POLE_DETAILS.DWG

Questions for solicitation: B26001611 AS1037-12R Apron Lighting Replacement, OGG & LNY
04/29/2026

48. **ON SHEET E206, IN THE LIGHTING CONTROL AREA OF DETAIL 1/E503, THERE IS A OPL3-B POLE ON THE LEFT SIDE OF THE MIDDLE AREA THAT HAS TWO LUMINAIRES ON THAT POLE. ON THE POLE AND FIXTURE SCHEDULE ON SHEET E311 THIS POLE ONLY HAS ONE LUMINAIRE ON IT. PLEASE CONFIRM THE CORRECT SPEC**

Answer: The light fixture schedule and plan will be corrected in the upcoming addendum.

49. **THERE ARE NO PULL BOXES NEXT TO THESE RL2-C LIGHTING POLES. PLEASE CLARIFY THAT THIS IS CORRECT.**

Answer: If you are referring to the main terminal roadway lighting, that are pull boxes called out next to the new poles. They are called out by box note 3.

50. **ARE THERE TWO OBSTRUCTION LIGHTS PER POLE? DO WE NEED TO INSTALL STAIRS ON ANY OF THE POLES THAT HAVE OBSTRUCTION LIGHTS? ARE WE GOING TO NEED ISOLATION TRANSFORMERS FOR THESE LIGHTS?**

Answer: There is a dual-fixture obstruction light on each pole. There does not need to be stairs to the obstruction light. Isolation transformers are not required since they will have their own dedicated circuit.

51. **ON SHEET E207 THERE IS A LIGHT POLE AT THE BOTTOM OF THIS AREA OPL2-C THAT IS OUT OF PLACE WITH THE OTHER LIGHTING IN THIS AREA. IF YOU TURN TO SHEET E209 THE CONTINUATION OF THIS AREA THE FIXTURES ARE OPL2-A. DO WE KEEP THE OPL2-C FIXTURES OR CHANGE THEM OUT TO OPL2-A FIXTURES? ARE WE CHANGING ALL THE FIXTURES ON THESE POLES IN THIS AREA BOTH ON SHEET E207 AND E209?**

Answer: Revised matchline. For the main parking lot, there is a mixture of reusing existing poles with new light fixtures as well as new poles with new light fixtures. Contractor will need to refer to the plans carefully to see which poles are which.

52. **ON SHEET E208, NOTE 2, OPL2-A LIGHT POLES. ARE WE REPLACING BOTH FIXTURES ON THESE POLES OR JUST THE NIGHT LIGHT FIXTURE?**

Answer: We are placing both of the fixtures on these lights. Revised light fixture schedule accordingly.

53. **ON POLE OPL1-A ARE WE INSTALLING A NEW FIXTURE ONLY OR ARE WE DOING NOTHING WITH THIS POLE, OR ARE WE INSTALLING A NEW POLE AND FIXTURE? (NOTE 2) FOR A NEW OPL1-B POLE. ARE WE JUST CHANGING OUT THIS FIXTURE ONLY. PLEASE CONFIRM WHAT IS INTENDED FOR THIS? SEE LINK FOR MARKUP AS REFERENCE: https://spaces.hightail.com/space/CrL7pZicYe**

Answer: For all poles marked OPL1-A, we are replacing the existing fixture only. Existing pole is to remain. For that pole OPL1-B that is marked with the box note 2, it is confirmed that there is an existing pole there. So only need to replace the light for that pole.

54. **ON E209, FOR THE LIGHTING CONTROLS AREA OF DETAIL 4/E502 THERE IS A OPL2-A POLE, PLEASE CONFIRM THIS IS A NEW POLE AND FIXTURE. SEE ATTACHED LINK FOR MARKUP FOR REFERENCE: https://spaces.hightail.com/space/sTnC4E7aJF**

Answer: It is confirmed that this is a new pole and fixture. Will revise it in the addendum.

55. **PLACING THE OBSTRUCTION LIGHTS ON THE APRON LIGHT POLES 100' AND 60' AT BOTH AIRPORTS KAHULUI AND LANAI STATES CONTRACTOR SHALL FURNISH AND INSTALL SINGLE OR DOUBLE OBSTRUCTION LIGHTS AS SPECIFIED AND SHOWN ON THE PLANS. AS PER SPEC THE OBSTRUCTION LIGHT SHALL BE INSTALLED WITH ITS HUB AT LEAST AS HIGH AS THE TOP OF THE POLE. IF SPECIFIED, POLE STEPS SHALL BE FURNISHED AND INSTALLED, THE LOWEST STEP BEING 5 FEET ABOVE GROUND LEVEL. ARE WE INSTALLING STAIRS AND PAINTING THESE POLES?**

Answer: We do not need stairs for the obstruction lights.

56. **ARE PLACING TWO OBSTRUCTION LIGHTS ON THE APRON LIGHT POLES 100' AND 60' AT BOTH AIRPORTS KAHULUI AND LANAI? NOTE 5 ON THE PLANS STATES (INSTALL NEW OBSTRUCTION LIGHTS ON THE APRON LIGHT POLE.)**

Answer: Place 1 dual-head obstruction light at the top of each pole.

57. **KAHULUI PLANS NOTE 5 ON THE DRAWING E205 STATES INSTALL NEW OBSTRUCTION LIGHTS ON THE APRON LIGHT POLE. ARE THEY ASKING FOR TWO OBSTRUCTION LIGHTS PER POLE?**

Answer: Place 1 dual-head obstruction light at the top of each pole.

58. **Please confirm whether the pull boxes are required to be traffic-rated or non-traffic-rated? Detail 3 on E303 indicates a non-traffic-rated box; however, the installation appears to be in a traffic area.**

Answer: The type A metric pull boxes will not need to be traffic rated as they are located on the sidewalks and medians, not in the immediate road.

59. **Please confirm the load rating requirements (H-20, HL-93, or aircraft-rated) for the 2'x4' pull boxes and Type A pull boxes. We are concerned that, since some of the pull boxes are located in the apron area, they may need to be aircraft-rated**

Answer: All of the pullboxes located in the apron will not be near the path of travel of the planes. Therefore, aircraft rated pulboxes are not needed.

60. **Would the State consider separating the bid into two areas and allow bidders to bid them separately?**

Answer: No.

61. **Regarding the demolition of existing electrical lighting conduits. Can the conductors be removed and the ducts be abandoned in place. This would save on the restoration costs.**

Answer: Only if it is stated on the plans.

62. **Will there be any Landscape Irrigation Sheets added, other than what is shown?**

Answer: No

63. **What type of 6" topsoil required per C101**

Answer: Replace with existing soil that was removed during the trenching.

64. **Does the landscape symbol indicate Hydroseeding?**

Answer: No, it's just a general symbol to indicate landscaping vs. hardscape. The intent is to replace the existing landscape in kind.

65. **Is landscape irrigation required? If so, is any existing irrigation to remain? Type of new irrigation-Permanent or temporary? Spay heads or drip line? Is there a maintenance period, if so, how long?**

Answer: No, If the existing area has irrigation. However, if there is an existing system and it has to be demolished for the trenching work, then it will need to be reconstructed to preexisting conditions. If no irrigation is in that area, temporary irrigation methods should be established during the grow in period.

66. **Are the Low-Pro barriers to be set up the entire length or gate by gate?**

Answer: Gate by Gate

67. **On S100, Detail 5: Drilled shaft length schedules and S101, Detail 5: Parking Lot Light Pole Foundation Schedule there is a noted "Location" (example: L10,L15,L20) for the different pole type or drilled shaft. For each "Location", there is a corresponding length for the foundation drilling. Currently there is no Structural site plans that indicate how deep each light's foundation needs to be. Please provide a plan that shows which pole uses which location, be it L10, L15,L20, L25,etc.**

Answer: Foundation lengths added to electrical plans.

68. **Please confirm if there is an allowance for vertical rock drilling for this project.**

Answer: No

69. **Can temporary patching be used in the AOA until PCCP can be installed?**

Answer: Yes

70. **There are asphalt curbs in various locations that will need to be removed & replaced for conduit installation. What pay item with asphalt curbs be paid?**

Answer: see concrete curbs

71. **Railing between Lanui Circle & main parking lot at OGG will need to be removed to install conduit. Please provide detail on pipe railing to be reinstalled.**

Answer: See the record drawings and specs attached.

72. **There is a bus stop in the median of Lanui Circle in front of the main terminal at OGG that will need to be removed to install conduit. Is this bus stop to be reconstructed? What pay item will this work be paid under?**

Answer: The conduit path has been updated to route around the bus stop. Bus stop does not need to be removed.

73. **Notes on OGG plans state conduits can be abandoned but for LNY all conduits are to be removed. Can conduit at LNY be abandoned in place as well?**

Answer: No, all conduits must be removed unless otherwise stated on the plans.

74. **There is a strip of asphalt pavement adjacent to the PCCP at LNY. Plan view scales to a 2 foot strip but section details show it as a 1 foot strip. Please confirm with of asphalt pavement adjacent to the PCCP at LNY.**

Please follow the section. A 1-foot asphalt strip should be provided to tie back into the existing asphalt pavement.

75. **Asphalt paving at LNY is shown to be 20' wide in the AOA which seem large for a singular duct line to be installed. Please confirm dimensions of asphalt paving on LNY due to LS bid item.**

Answer: DOTA wanted to repave a 20' path instead of only along the trench since its on the asphalt apron area.

76. **Can trench patching match the restoration section detail widths in lieu of planimetric dimensions shown on BMP restoration plan. Do contractors need to restore to the planimetric dimensions of the BMP plan or can we restore only what is disturbed during construction?**

Answer: Please follow the trench restoration sections. The plan view limits may not be correct as we did not know how wide the trench section would be. The plan view is pictorial in nature.

77. **If conduits can be abandoned in place at LNY would the parking lot need to be paved as shown on the BMP plan or would only the extents of disturbance be repaved.**

Answer: Only the extent of the disturbed area according to the trench restoration section details.

78. **There are multiple areas shown at both airports where the restoration of areas does not match the existing condition. For example if a location has concrete sidewalk before construction but is called out as landscaping, what is to be placed there. Is the priority to match existing conditions or to follow the restoration plan?**

Answer: The intent is to match the existing condition.

79. **Will a phasing plan be provided?**

Answer: Phasing is determined based on airport operational needs. These needs are in constant flux, There fore exact phasing plan cannot be provided. Phasing plans must be coordinated properly with the Maui Airport District Manager's Office, and they will be developed and coordinated after the contract is awarded.

80. **What are the allowable work times?**

Answer: Work times are outlined in Section 01100 of the specifications but will vary depending on operational needs.

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – KAHULUI AIRPORT

KAHULUI, MAUI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8859-00 APRIL 15, 2026

Prepared for

RONALD N.S. HO & ASSOCIATES, INC.

GEOLABS, INC.
Geotechnical Engineering and Drilling Services

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – KAHULUI AIRPORT

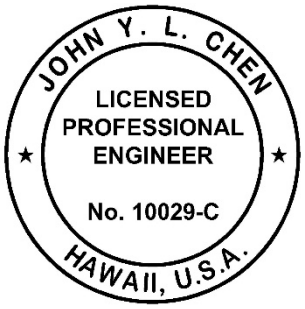
KAHULUI, MAUI, HAWAII

STATE PROJECT NO. AS1037-12

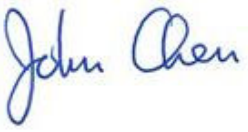
W.O. 8859-00 APRIL 15, 2026

Prepared for

RONALD N.S. HO & ASSOCIATES, INC.



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.



4-30-26

SIGNATURE — EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.
Geotechnical Engineering and Drilling Services
94-429 Koaki Street, Suite 200 • Waipahu, HI 96797

Hawaii • California

GEOLABS, INC.

Geotechnical Engineering and Drilling Services

April 15, 2026
W.O. 8859-00

Mr. Billy J. Ornellas
Ronald N.S. Ho & Associates, Inc.
2153 North King Street, Suite 201
Honolulu, HI 96819

Dear **Mr. Ornellas:**

Geolabs, Inc. is pleased to submit our report entitled "Geotechnical Engineering Exploration, Apron Light Replacement – Kahului Airport, Kahului, Maui, Hawaii, State Project No. AS1037-12" prepared for the proposed project.

Our work was performed in general accordance with the scope of services outlined in our revised fee proposal dated January 17, 2023.

Please note that the soil and/or rock samples recovered during our field exploration (remaining after testing) will be stored for a period of two months from the date of this report. The samples will be discarded after that date unless arrangements are made for a longer sample storage period. Please contact our office for alternative sample storage requirements, if appropriate.

Detailed discussion and specific design recommendations are contained in the body of this report. If there is any point that is not clear, please contact our office.

Very truly yours,

GEOLABS, INC.

John Y.L. Chen, P.E.
Vice President

JC:TO:lf

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – KAHULUI AIRPORT

KAHULUI, MAUI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8859-00 APRIL 15, 2026

TABLE OF CONTENTS

Page

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – KAHULUI AIRPORT

KAHULUI, MAUI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8859-00 APRIL 15, 2026

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Our field exploration generally encountered surficial fills and alluvium overlying basalt formation extending to depths of about 12 to 22.5 feet below the existing ground surface. It should be noted that basalt formation was not encountered in some areas in the vicinity of Boring Nos. 4, 8, 12, and 16. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

We recommend designing a cast-in-place concrete drilled shaft foundation system to support the proposed new light pole structures. We envision that drilled shaft foundations with diameters of 30 to 48 inches may be used to support the new light pole structures extending to 10 to 25 feet below the design finished grade. It should be noted that some of the drilled shafts would likely be required to extend into the basalt formation. Very hard basalt rock formation should be anticipated with compressive strength up to 32,000 psi or higher.

The load-bearing capacities of the drilled shafts depend, to a significant extent, on the friction between the shaft and the surrounding soils. Therefore, proper construction techniques, especially during the drilling operations, are important. The contractor should exercise care in drilling the shaft holes and placing concrete into the drilled holes. It is imperative for a Geolabs representative to be present at the project site to observe the drilling and installation of the drilled shafts during construction to confirm the subsurface conditions and should be designated as a "Special Inspection" item in accordance with Section 1704 of the International Building Code (2018 Edition).

The text of this report should be referred to for detailed discussions and specific geotechnical recommendations.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS

SECTION 1. GENERAL

This report presents the results of our geotechnical engineering exploration performed for the *Apron Light Replacement* project located at the Kahului Airport in the Kahului area on the Island of Maui, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

This report summarizes the findings and geotechnical recommendations resulting from our field exploration, laboratory testing, and engineering analyses for the project. These findings and geotechnical recommendations are intended for the design of the apron light pole foundations only. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

1.1 Project Considerations

The project site is located at the Kahului Airport (OGG) in Kahului on the Island of Maui, Hawaii. Based on the information provided, we understand that the existing apron lighting system will be replaced with a new lighting system to meet Maui County's new outdoor lighting standards. In addition, we understand that all street and building-mounted exterior lighting on Kahului Airport property will be replaced as well.

The following structural loading information was provided by the structural engineer on April 7, 2025, and used for the foundation design analyses of the new apron light pole structures.

FACTORED STRUCTURAL LOADING INFORMATION	
Apron Main Terminal (100 ft) Light Pole	
Axial Loading	24 kips
Shear Loading	10 kips
Moment Loading	455 kip-foot
Apron Commuter Terminal (60 ft) Light Pole	
Axial Loading	14 kips
Shear Loading	5 kips
Moment Loading	138 kip-foot

FACTORED STRUCTURAL LOADING INFORMATION	
Parking Light Pole	
Axial Loading	3 kips
Shear Loading	2 kips
Moment Loading	35 kip-foot

1.2 Purpose and Scope

The purpose of our exploration was to obtain an overview of the surface and subsurface conditions at the site to develop a soil and/or rock data set to formulate geotechnical recommendations in support of the design of the Apron Light Replacement project at Kahului Airport. The work was performed in general accordance with our revised fee proposal dated January 17, 2023. The scope of work for this exploration included the following tasks and work efforts:

1. Research and review of the available reports/plans, in-house soil, and geologic information related to the project site.

2. Application for FAA 7460 permits and One–Call utility clearance.

3. Coordination of site access, boring stake out, and underground utility toning at the proposed boring locations by our geologist.

4. Preparation of an accident prevention plan with activity hazard analysis in support of our field exploration activities.

5. Provision of traffic control, including all required safety devices for closures within the AOA areas.

6. Retaining soil cuttings, drilling fluids, and safety disposables in DOT-approved 55-gallon steel drums and storing at the site for disposal by others.

7. Mobilization and demobilization of a truck-mounted drill rig, water truck, and operators to and from the project site.

8. Drilling and sampling of 17 borings, extending to depths of about 12 to 22.5 feet below the existing ground surface.

9. Backfilling boreholes with non-shrink grout and topped with fast-setting concrete upon completion of the drilling, sampling, and field testing work.

10. Coordination of the field exploration and logging of the borings by our geologist.

11. Geotechnical laboratory testing of selected samples obtained during the field exploration as an aid in classifying the materials and evaluating their engineering properties.

12. Analyses of the field and laboratory data to formulate geotechnical recommendations for the design of the project.

13. Preparation of a technical memorandum and this report summarizing our work and presenting our findings and geotechnical recommendations for the project.

14. Coordination of our overall work on the project by our engineer.

15. Quality assurance of our work and client/design team consultation by our principal engineer.

16. Miscellaneous work efforts, such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration methodology and the Logs of Borings are presented in Appendix A. Results of the laboratory tests performed on selected soil samples are presented in Appendix B. Photographs of the core samples retrieved during our field exploration are presented in Appendix C.

END OF GENERAL

SECTION 2. SITE CHARACTERIZATION

2.1 Regional Geology

The Island of Maui was built by two major volcanoes, the older West Maui (Tertiary Epoch) and the more recent East Maui, also known as Haleakala (Pleistocene Epoch). The Isthmus of Maui is a narrow, gently sloping plain located between these two volcanoes. The project site is located in the northern area of this gently sloping plain.

The Isthmus of Maui was created by lava flows from Haleakala ponding on West Maui. It is comprised of alluvium washed from the slopes of West Maui and East Maui (Haleakala). The erosional processes are dominated by the detachment of soil and rock masses from the mountain walls, and the soil materials are transported downslope toward the Isthmus primarily by gravity as colluvium. Once these materials reach the stream in the central portion of a valley, alluvial processes become dominant, and the sediments are transported and deposited as alluvium.

In general, stream flows in Hawaii are intermittent and flashy, such that the stream flows transmit large volumes of water for a very short duration. Because of this, the transport of sediments is intermittent, and the bulk of the stream's hydraulic load consists of a poorly-sorted mixture of boulders, cobbles, gravel, sands, and fines. When the erosional base levels change, these sediment loads are left as deposits.

When deposits are left in-place for long periods of time, chemical processes begin to alter the materials, simultaneously causing a breakdown or weathering of the materials. Chemical processes also cause induration, or cementation, of the coarse-grained portion of the sediment into a poorly-consolidated sedimentary rock or conglomerate. Simultaneously, erosion continues in the areas above the valley floors and upstream in headwaters. This continued erosion generates material, which is transported downslope covering the older alluvial soil deposits. Depending on the local base level and rate of transport, these newer sediments are generally transient in terms of geologic time. In addition, their consistency and density are generally less than those of the older, partially consolidated deposits.

Underlying the alluvial soil deposits are overlapping lava from the West Maui and East Maui volcanoes. The bulk of the Haleakala Shield was built during the late Pliocene and early Pleistocene Epoch by thinly bedded basaltic lava flows of the Honomanu Volcanic Series. During the Pleistocene Epoch, the characteristics of the lava changed to very hard, thickly bedded flows of andesitic composition. These lavas have been grouped as the Kula Volcanic Series. Typically, the basalt rock formation consists of thinly to thickly bedded a'a and pahoehoe type lava flows. Development of the Kahului Airport in the past decades has brought the project site to its present condition.

2.2 Existing Site Conditions

The proposed project site is located at the existing Kahului Airport in the Kahului area on the Island of Maui, Hawaii. Our field exploration involved work within the Air Operation Area (AOA) as well as in the existing airport parking lots and terminal roadways, as shown on the Overall Site Plan, Plate 2.

Majority of the project site was covered with asphalt concrete pavement. At the time of our field exploration, the parking area consisted mainly of passenger vehicles and pick-up trucks. The existing pavement was observed to be in fairly good condition. However, some minor pavement cracks were observed on the surface of the parking lots in isolated areas.

Based on Google Earth™, the majority of the airport site is slightly sloping from northeast to southwest with existing ground surface elevations ranging from about +39 to +13 feet Mean Sea Level (MSL), respectively.

2.3 Subsurface Conditions

We explored the subsurface conditions by drilling and sampling 17 borings, designated as Boring Nos. 1 through 17, extending to depths of about 12 to 22.5 feet below the existing ground surface. The approximate boring locations are shown on the Site Plans, Plates 3.1 through 3.8.

Based on our field exploration, the project site is generally underlain by surficial fills and alluvium overlying basalt formation. The subsurface generally consisted of 2 to 18 inches of asphaltic concrete or 8 to 9 inches of concrete, and soft to very stiff silty and clayey soils. The

alluvial soils consisted of medium stiff to hard silty and clayey soils with various amounts of cobbles/boulders extending up to about 15.5 feet below the existing ground surface. Underlying the alluvium, our borings encountered soft to very hard basalt formation with various fractured conditions extending to a depth up to 22.5 feet below the ground surface. It should be noted that basalt formation was not encountered in some areas in the vicinity of Boring Nos. 4, 8, 12, and 16.

We did not encounter groundwater in the borings at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

Detailed descriptions of the field exploration methodology and graphic representations of the materials encountered in the borings are presented on the Logs of Borings in Appendix A. We performed laboratory tests on selected soil samples obtained during our field exploration, and the test results are presented in Appendix B. Photographs of the core samples retrieved during our field exploration are presented in Appendix C.

2.4 Seismic Design Considerations

Based on the International Building Code (2018 Edition), the project site may be subject to seismic activity, and seismic design considerations will need to be addressed. The following provides discussion on the soil profile type for seismic design and liquefaction design consideration at the project site.

Based on the subsurface materials encountered at the project site and the geologic setting of the area, we believe that the project site may be classified as a “Soft Rock and Very Dense Soil Profile” from a seismic analysis standpoint. Therefore, we believe the seismic design of the building structures may be designed based on a Site Class C soil profile in accordance with Chapter 20, Site Classification Procedure for Seismic Design, contained in ASCE Minimum Design Loads for Buildings and Other Structures, 2010 Edition (ASCE 7-10).

Based on a Site Class C soil profile, the following seismic design parameters shown in the table below were estimated and may be used for the seismic analysis of the project site.

SEISMIC DESIGN PARAMETERS	
Parameter	**Value**
Peak Bedrock Acceleration, PBA (Site Class B)	0.365g
Mapped MCE Spectral Response Acceleration, S_S (Site Class B)	0.999g
Mapped MCE Spectral Response Acceleration, S_1 (Site Class B)	0.255g
Site Class	"C"
Site Coefficient, F_{pga}	1.200
Site Coefficient, F_a	1.200
Site Coefficient, F_v	1.500
Design Peak Ground Acceleration, PGA (Site Class C)	0.292g
Design Spectral Response Acceleration, S_{DS}	0.799g
Design Spectral Response Acceleration, S_{D1}	0.255g

Based on the subsurface conditions encountered, the phenomenon of soil liquefaction is not a design consideration for this project site. The risk for potential liquefaction is non-existent based on the subsurface conditions encountered (relatively stiff alluvial soils overlying basalt formation in the absence of groundwater).

END OF SITE CHARACTERIZATION

SECTION 3. DISCUSSION AND RECOMMENDATIONS

Based on our field exploration, the project site is generally underlain by surficial fills and alluvium overlying basalt formation extending to depths of about 12 to 22.5 feet below the existing ground surface. It should be noted that basalt formation was not encountered in some areas in the vicinity of Boring Nos. 4, 8, 12, and 16. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

We recommend designing a cast-in-place concrete drilled shaft foundation system to support the proposed new light pole structures. We envision that drilled shaft foundations with diameters of 30 to 48 inches may be used to support the new light pole structures extending to 10 to 25 feet below the designed finished grade.

It should be noted that some of the drilled shafts would likely be required to extend into the basalt formation. Very hard basalt rock formation should be anticipated with compressive strength up to 32,000 psi or higher.

Detailed discussions of these items and other geotechnical aspects of the project are further discussed in the following sections.

3.1 Drilled Shaft Foundations

In order to develop the required bearing and lateral load resistances, we recommend supporting the proposed new light pole structures on a deep foundation system consisting of cast-in-place concrete drilled shafts. Detailed discussions and recommendations for foundation design are presented in the following sections.

3.1.1 Compressive Load Capacity

Based on the structural load demands provided and the subsoil conditions encountered at the project site, we recommend installing 30 to 48-inch diameter drilled shaft

foundations extending to 10 to 25 feet below the design finished grade to support the new light pole structures.

The load-bearing capacities of the drilled shafts will depend largely on the relative depth of the basalt rock formation within the bearing strata. If basalt rock is encountered, the drilled shafts should extend to achieve a minimum rock socket of about 5 feet into the basalt formation. Because local variations in the subsurface materials likely will occur at the site, we recommend implementing a probing program to better distinguish the depths of rock contour.

Our recommendations pertaining to the drilled shaft capacities and estimated lengths are presented in the table below.

COMPRESSIVE LOAD CAPACITIES OF DRILLED SHAFT FOUNDATIONS FOR APRON MAIN TERMINAL LIGHT POLE

Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Allowable Compressive Load Capacity** (kips)
36	25	115
	15 (min.5-foot rock socket)	210
	10 (min. 5-foot rock socket)	210
48	20	125
	15 (min.5-foot rock socket)	280
	10 (min. 5-foot rock socket)	280

COMPRESSIVE LOAD CAPACITIES OF DRILLED SHAFT FOUNDATIONS FOR APRON COMMUTER TERMINAL LIGHT POLE		
Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Allowable Compressive Load Capacity** (kips)
30	20	75
	15 (min.5-foot rock socket)	175
	10 (min. 5-foot rock socket)	175

COMPRESSIVE LOAD CAPACITIES OF DRILLED SHAFT FOUNDATIONS FOR PARKING LIGHT POLE		
Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Allowable Compressive Load Capacity** (kips)
30	20	75
	15 (min.5-foot rock socket)	175
	10 (min. 5-foot rock socket)	175

The allowable compressive load capacities for the drilled shafts presented above are for supporting dead-plus-live loads. The compressive load capacities may be increased by up to one-third (⅓) when considering transient loads, such as wind or seismic forces.

3.1.2 Lateral Load Resistance

The lateral load resistance of drilled shafts is a function of the stiffness of the surrounding soil, the stiffness of the drilled shaft, allowable deflection at the top of the drilled shaft, and the induced moment in the drilled shaft. The lateral load analyses were performed using the program *LPILE*, which is a microcomputer adaptation of a finite difference, laterally loaded deep foundation program originally developed at the University of Texas at Austin. The program solves for deflection and bending moment along a deep foundation under lateral loads as a function of depth. The analysis was carried out with

the use of non-linear "p-y" curves to represent soil moduli. The lateral deflection was then computed using the appropriate soil moduli at various depths.

Based on the provided structural loads and the subsurface soil conditions encountered during our field exploration, we performed the lateral load analyses for the above drilled shaft foundations. The results of our analyses are summarized in the table below. The project structural engineer should verify the drilled shaft structural capacity for the calculated induced stresses.

LATERAL LOAD CAPACITY AND MAXIMUM INDUCED MOMENT FOR APRON MAIN TERMINAL LIGHT POLE

Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Lateral Deflection** (inches)	**Maximum Induced Moment** (kip-feet)	**Depth to Maximum Moment** (feet)
36	25	0.7	466	2.3
	15 (min.5-foot rock socket)	0.6	467	2.3
	10 (min.5-foot rock socket)	0.2	470	3.0
48	20	0.3	466	2.3
	15 (min.5-foot rock socket)	0.1	469	2.8
	10 (min.5-foot rock socket)	0.1	472	3.4

NOTE: Lateral load analysis based on concrete compressive strength of 4,000 psi and a minimum of 1% longitudinal steel reinforcement.

LATERAL LOAD CAPACITY AND MAXIMUM INDUCED MOMENT FOR APRON COMMUTER TERMINAL LIGHT POLE				
Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Lateral Deflection** (inches)	**Maximum Induced Moment** (kip-feet)	**Depth to Maximum Moment** (feet)
30	20	0.2	143	1.8
	15 (min.5-foot rock socket)	0.2	143	1.8
	10 (min.5-foot rock socket)	0.1	143	2.0
NOTE: Lateral load analysis based on concrete compressive strength of 4,000 psi and a minimum of 1% longitudinal steel reinforcement.				

LATERAL LOAD CAPACITY AND MAXIMUM INDUCED MOMENT FOR PARKING LIGHT POLE				
Drilled Shaft Diameter (inches)	**Drilled Shaft Length** (feet)	**Lateral Deflection** (inches)	**Maximum Induced Moment** (kip-feet)	**Depth to Maximum Moment** (feet)
30	20	0.01	37	1.5
	15 (min.5-foot rock socket)	0.01	37	1.5
	10 (min.5-foot rock socket)	0.01	37	1.6
NOTE: Lateral load analysis based on concrete compressive strength of 4,000 psi and a minimum of 1% longitudinal steel reinforcement.				

3.1.3 Foundation Settlement

Settlement of the drilled shaft foundations will result from elastic compression of the shaft and subgrade response of the foundation embedded in the soils encountered at the site. Total settlement of the drilled shaft is estimated to be less than 0.5 inches. We believe that a significant portion of the settlement will be elastic and should occur as the loads are applied.

3.1.4 Drilled Shaft Construction Considerations

In general, the performance of drilled shafts depends significantly upon the contractor's method of installation and construction procedures. The following conditions would have a significant effect on the effectiveness and cost of the drilled shaft foundations.

The load-bearing capacities of drilled shafts depend, to a significant extent, on the friction between the drilled shaft, the surrounding soils, and basalt formation. Therefore, proper construction techniques, especially during the drilling operations are important. The contractor should exercise care in drilling the shaft holes and in placing concrete into the drilled holes.

The thickness and hardness of the basalt formation may vary significantly across the project site. Therefore, some difficult drilling conditions likely will be encountered and should be expected. The drilled shaft subcontractor will need to have the appropriate equipment and tools to drill through these types of natural obstructions, where encountered. The drilled shaft subcontractor will need to demonstrate that the proposed drilling equipment (and coring tools, where appropriate) will be capable of installing the drilled shafts to the recommended depths and dimensions.

We recommend concrete placement by the tremie method during drilled shaft construction. A low-shrink concrete mix with a high slump (7 to 9-inch slump range) should be used to provide close contact between the drilled shafts and the surrounding soil/rock. The concrete should be placed in a suitable manner to reduce the potential for segregation of the aggregates from the concrete mix. In addition, the concrete should be placed promptly after drilling (within 24 hours after drilling the hole) to reduce the potential for softening of the sides of the drilled hole.

It is imperative for a Geolabs representative to be present at the project site to observe the probing, drilling, and installation of the drilled shafts during construction. Although the drilled shafts are designed based primarily on skin friction, the bottom of the drilled holes should be relatively free of loose materials prior to placement of concrete. Therefore, it is necessary for Geolabs to observe the drilled shaft installation operations

to confirm the subsurface conditions and should be designated as a "Special Inspection" item in accordance with Section 1704 of the International Building Code (2018 Edition).

3.2 Corrosion Potential

Five sets of laboratory corrosivity tests, including pH (ASTM G51), Minimum Resistivity (ASTM G57), Chloride Content (EPA 300.0), and Sulfate Content (EPA 300.0), were performed (by our office and CERCO Analytical, Inc.) on selected soil samples obtained from our field exploration. The test results are summarized and presented on Plate B-12 of Appendix B.

Resistivity is generally recognized as one of the most significant soil characteristics with regard to the corrosivity of the soil to buried metallic objects. In general, the lower the resistivity, the greater the potential for corrosion of the buried metallic structure. Conversely, the higher the resistivity, the less likely the soil will contribute to the corrosion of metallic objects.

On the basis of the laboratory resistivity and pH results, the subsurface soils at the project site have resistivity values ranging from approximately 1,200 to 3,000 ohm-cm and pH values of between 8.0 and 8.4 within the upper 5 feet of soils, corresponding to a corrosion rating of 2 (Very Corrosive) based on the guidelines provided by the City & County of Honolulu – Board of Water Supply. Therefore, we recommend properly designing near-surface metallic substructures for protection against the potential for corrosion.

The method used to control the corrosion of underground concrete structures is dependent, in part, on the chloride and sulfate content found in the soil. In general, soils with a chloride content of less than 500 parts per million (ppm), sulfate content of less than 2,000 ppm, and a pH greater than 5.0 may be considered "non-corrosive" to underground concrete pipelines and structures.

Based on the relatively low values of chloride content and sulfate content tested on the in-situ materials, we believe that the near-surface soils at the project site may be considered "non-corrosive" and either Type I or Type II (Type I/II) cement may be used for the concrete in contact with the ground. It may be appropriate to consult with a professional corrosion engineer to review the test results and provide detailed recommendations for corrosion protection.

3.3 Design Review

Preliminary and final drawings and specifications for the proposed construction should be forwarded to Geolabs for review and written comments prior to bid advertisement and/or construction. This review is needed to evaluate the conformance of the plans and specifications with the intent of the earthwork and foundation recommendations provided herein. If this review is not made, Geolabs cannot assume responsibility for the misinterpretation of our recommendations.

3.4 Construction Monitoring

Due to the variability in the subsurface conditions, it is recommended to retain Geolabs for geotechnical engineering services during the construction of the project. The following are critical items of construction monitoring that require "Special Inspection":

- Observation of the foundation probing program
- Observation of drilled shaft foundation installation

A Geolabs representative should monitor other aspects of earthwork construction to observe compliance with the intent of the design concepts, specifications, and/or recommendations and to expedite suggestions for design changes that may be required in the event that subsurface conditions differ from those anticipated at the time this report was prepared. The recommendations presented herein are contingent upon such observations.

If the actual exposed subsurface soil conditions encountered during construction differ from those assumed or considered in this report, Geolabs should be contacted to review and/or revise the geotechnical recommendations presented herein.

END OF DISCUSSION AND RECOMMENDATIONS

SECTION 4. LIMITATIONS

The analyses and recommendations submitted herein are based in part upon information obtained from the drilled borings. Variations of the subsurface conditions between and beyond the field borings may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented herein.

The field boring locations indicated herein are approximate, having been estimated by using a handheld Global Positioning System (GPS) to field-locate selected locations from referenced points shown on the Overall Site Electrical Plan by Ronald N.S. Ho & Associates dated May 2024. The field boring locations should be considered accurate only to the degree implied by the methods used.

The stratification breaks shown on the graphic representations of the borings depict the approximate boundaries between soil types and, as such, may denote a gradual transition. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

This report has been prepared for the exclusive use of Ronald N.S. Ho & Associates, Inc. and their project consultants for specific application to the design of the *Apron Lighting Replacement* project at the Kahului Airport in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the architect and engineers in the design of the proposed project. Therefore, this report may not contain sufficient data or the proper information to serve as a basis for detailed construction cost estimates.

The owner/client should be aware that unanticipated soil conditions are commonly encountered. Unforeseen subsurface conditions, such as perched groundwater, soft deposits, hard layers, or cavities, may occur in localized areas and may require additional probing or corrections in

the field (which may result in construction delays) to attain a properly constructed project. Therefore, a sufficient contingency fund is recommended to accommodate these possible extra costs.

This geotechnical engineering exploration conducted at the project site was not intended to investigate the potential presence of hazardous materials existing at the project site. It should be noted that the equipment, techniques, and personnel used to conduct a geo-environmental exploration differ substantially from those applied in geotechnical engineering.

END OF LIMITATIONS

CLOSURE

The following plates and appendices are attached and complete this report:

-ΩΩΩΩΩΩΩΩΩ-

Respectfully submitted,

GEOLABS, INC.

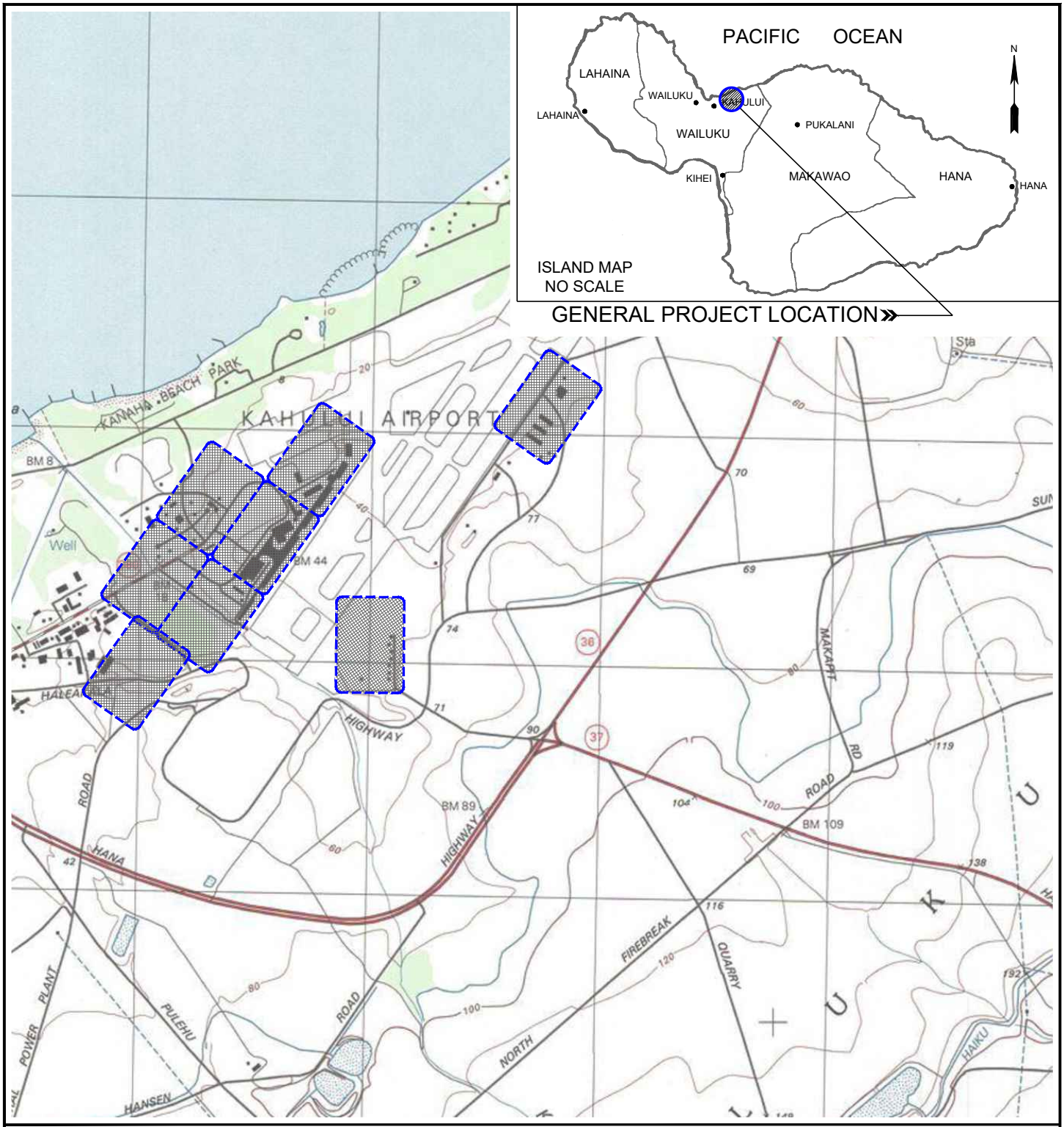
By _____
Taylor Onizuka, P.E.
Project Engineer

By _____
John Y.L. Chen, P.E.
Vice President

JC:TO:lf

h:\8800Series\8859-00.to2

PLATES



PROJECT LOCATION

PROJECT LOCATION MAP

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

2000 1000 0 2000 FT.

GRAPHIC SCALE

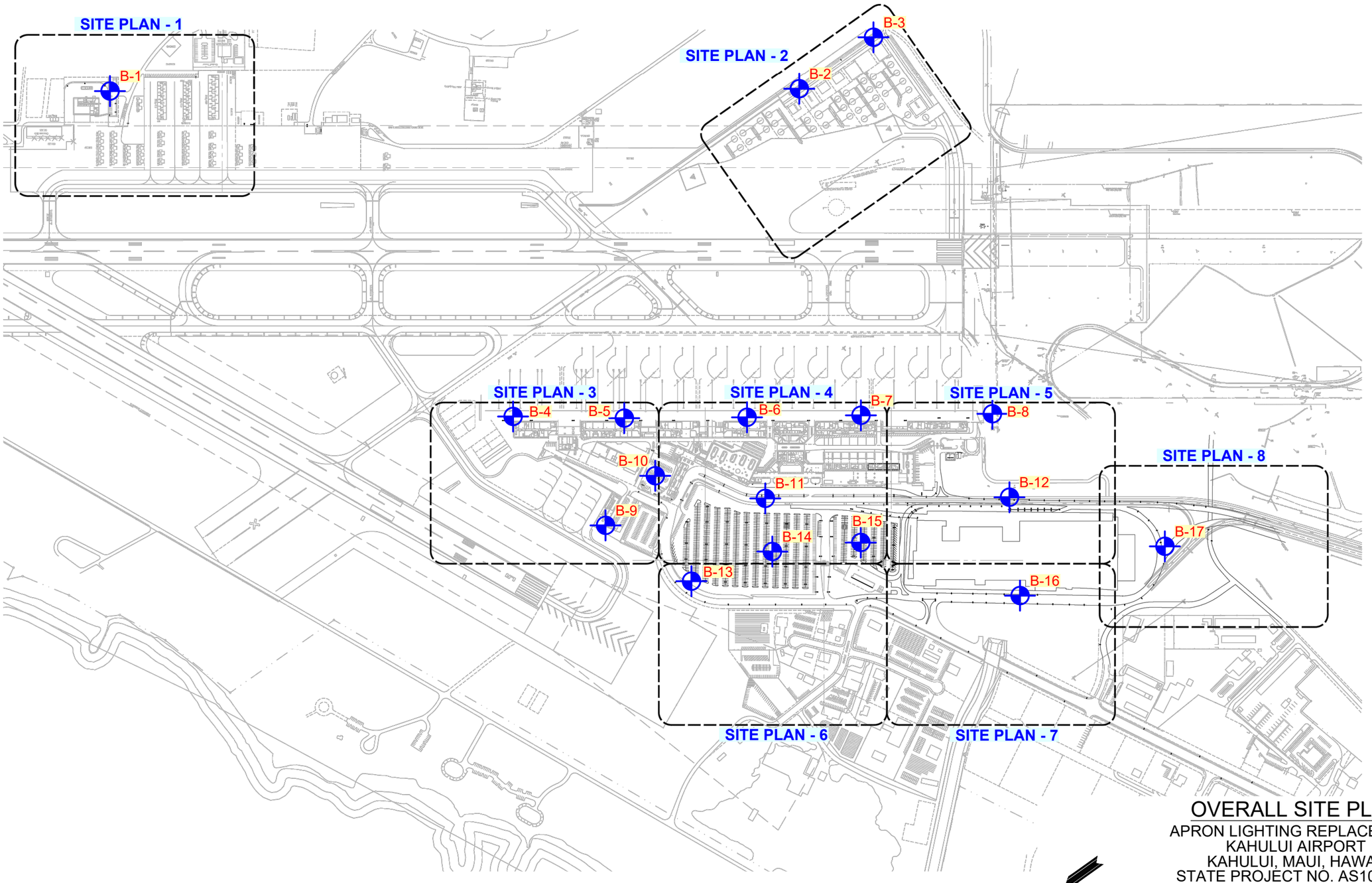
N

REFERENCE: MAP CREATED WITH TOPO!® ©2010 NATIONAL GEOGRAPHIC; ©2007 TELE ATLAS, REL. 1/2007.

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	1
SCALE	W.O.	
1" = 2,000'	8859-00	

CAD User: KIM File Last Updated: October 01, 2024 9:24:20pm Plot Date: October 01, 2024 - 9:25:26pm
File: T:\Drafting\Working\8859-00_Apron_Light_Replacement_Kahului_Airport\8859-00PLM.dwg\1
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-No-Dither-RBGC-HEAVY.ctb



OVERALL SITE PLAN

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: OVERALL SITE ELECTRICAL PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

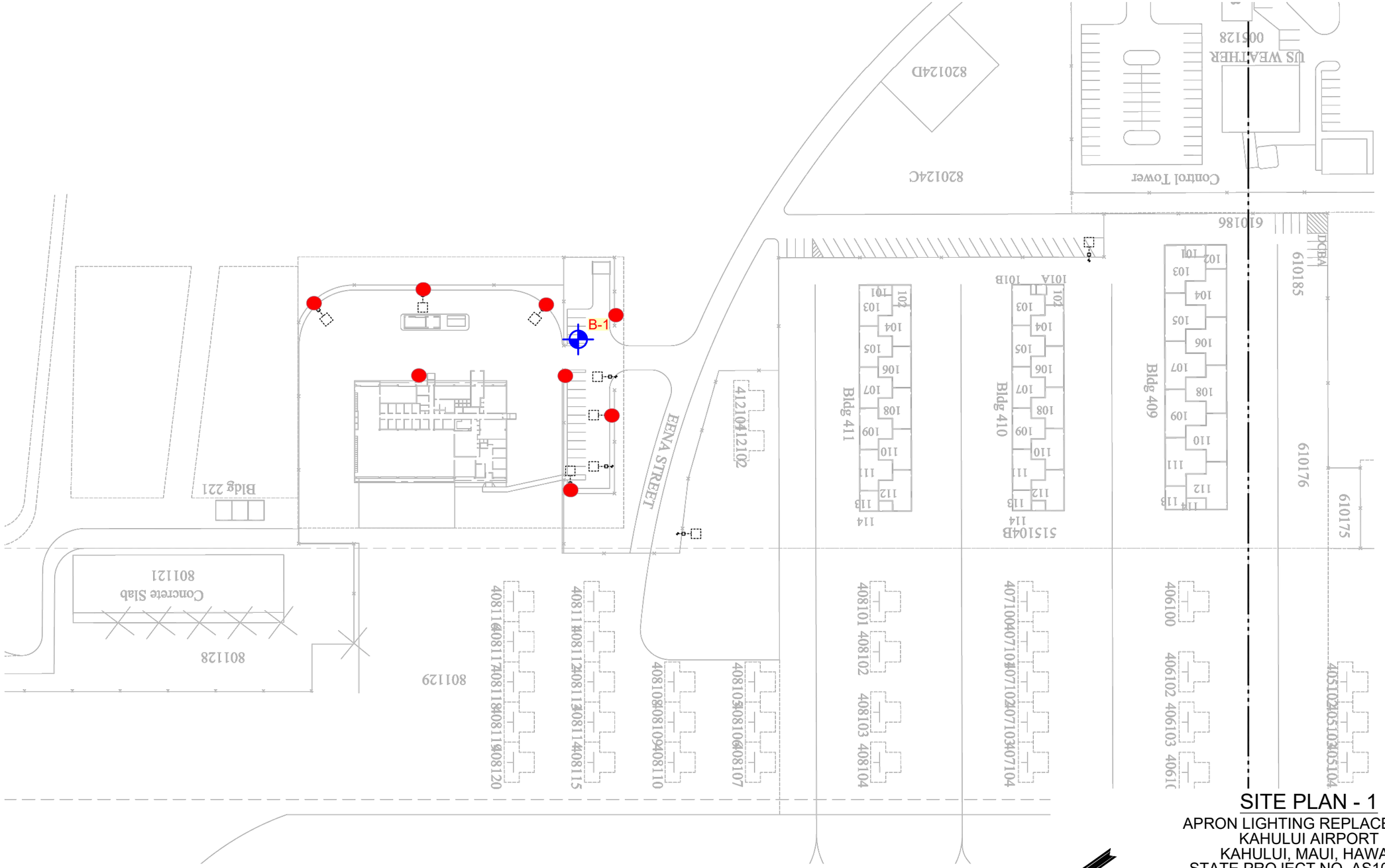
0 300 600 1200 1800 FT.

GRAPHIC SCALE

N

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	2
SCALE	W.O.	
1" = 600'	8859-00	



SITE PLAN - 1

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

GRAPHIC SCALE

N

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.1
SCALE	W.O.	
1" = 100'	8859-00	

SITE PLAN - 2

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

LEGEND:

APPROXIMATE BORING LOCATION

N

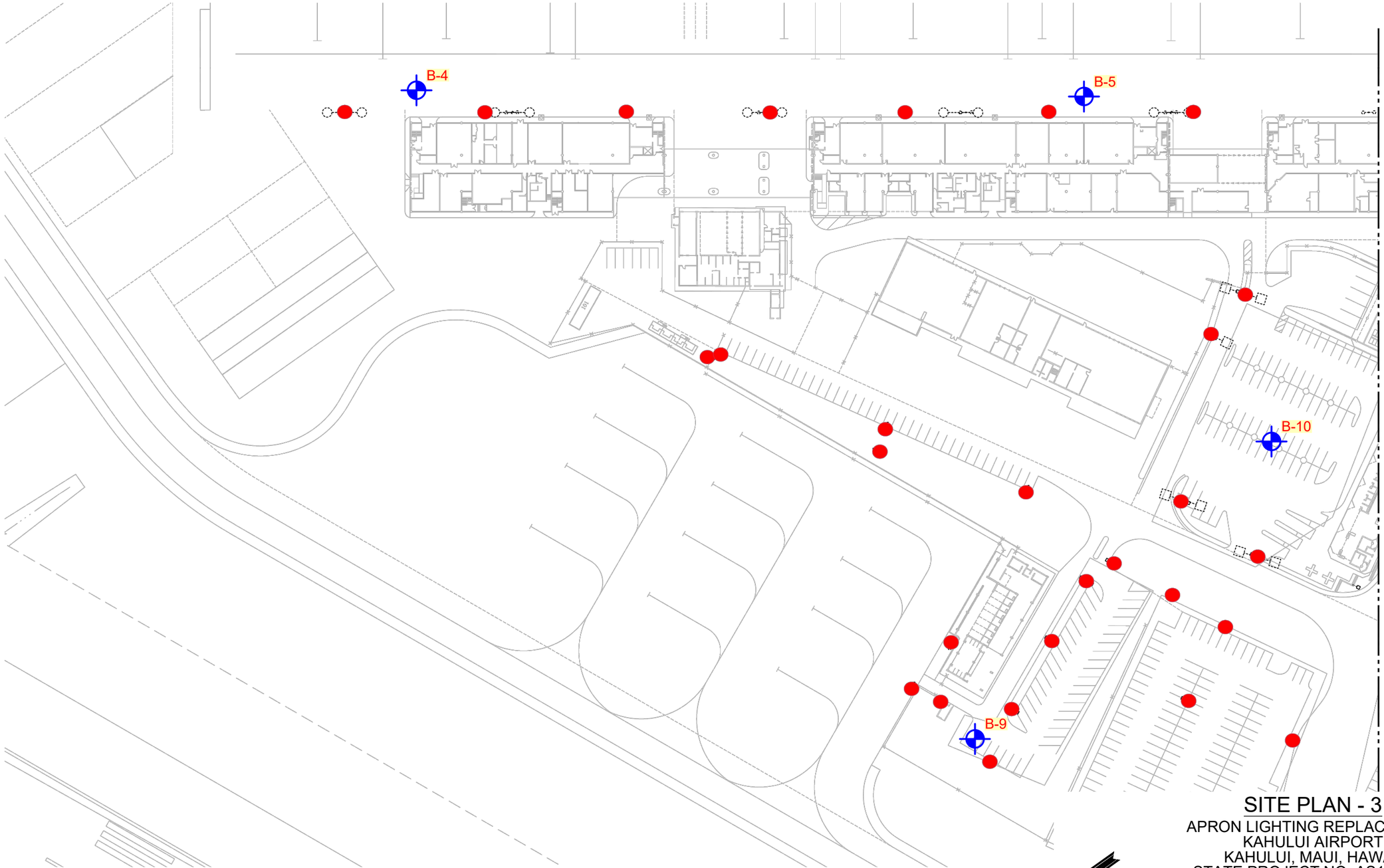
0 50 100 200 300 FT.

GRAPHIC SCALE

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.2
SCALE	W.O.	
1" = 100'	8859-00	



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

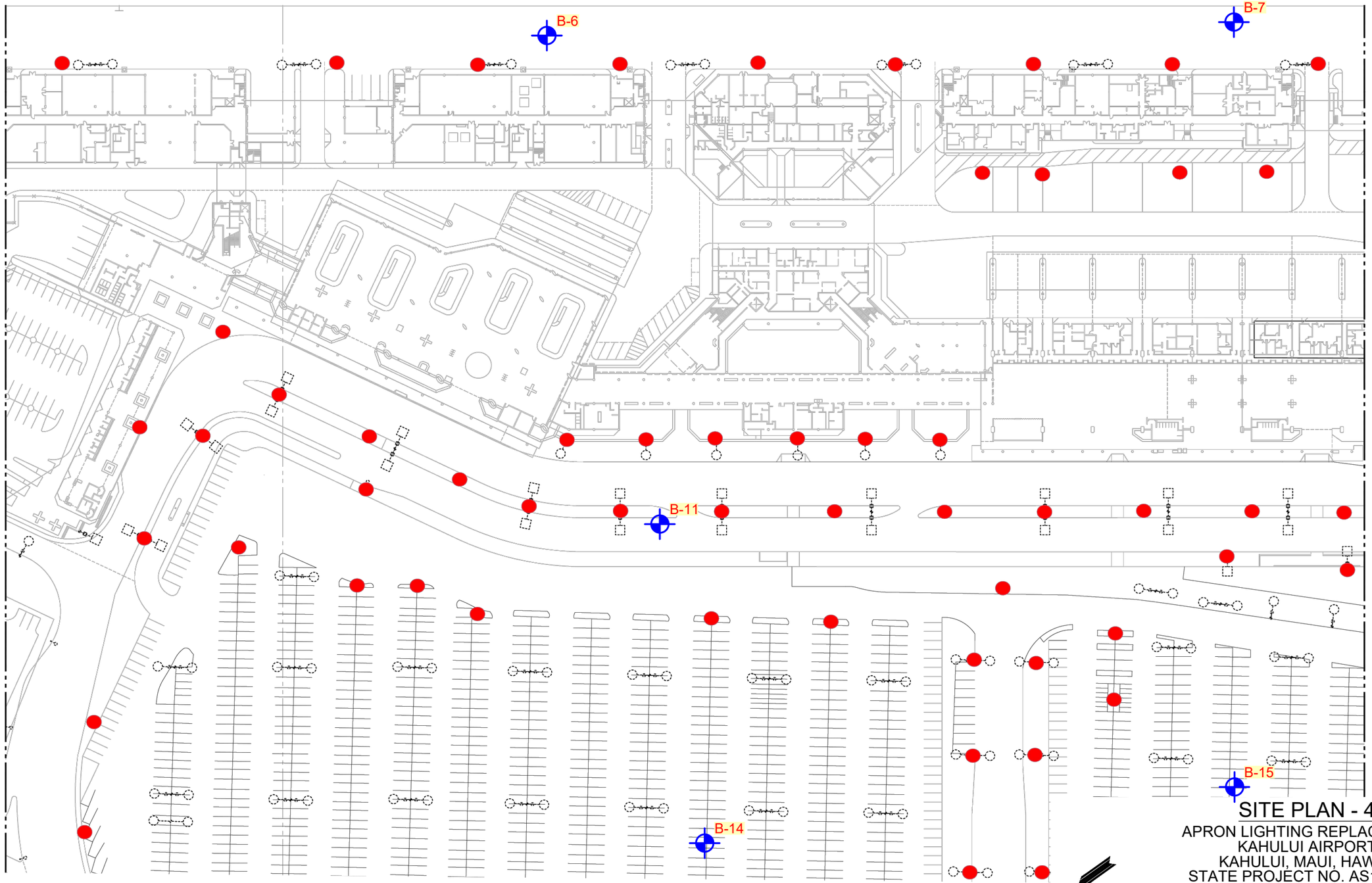
GRAPHIC SCALE

SITE PLAN - 3

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.3
SCALE	W.O.	
1" = 100'	8859-00	



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

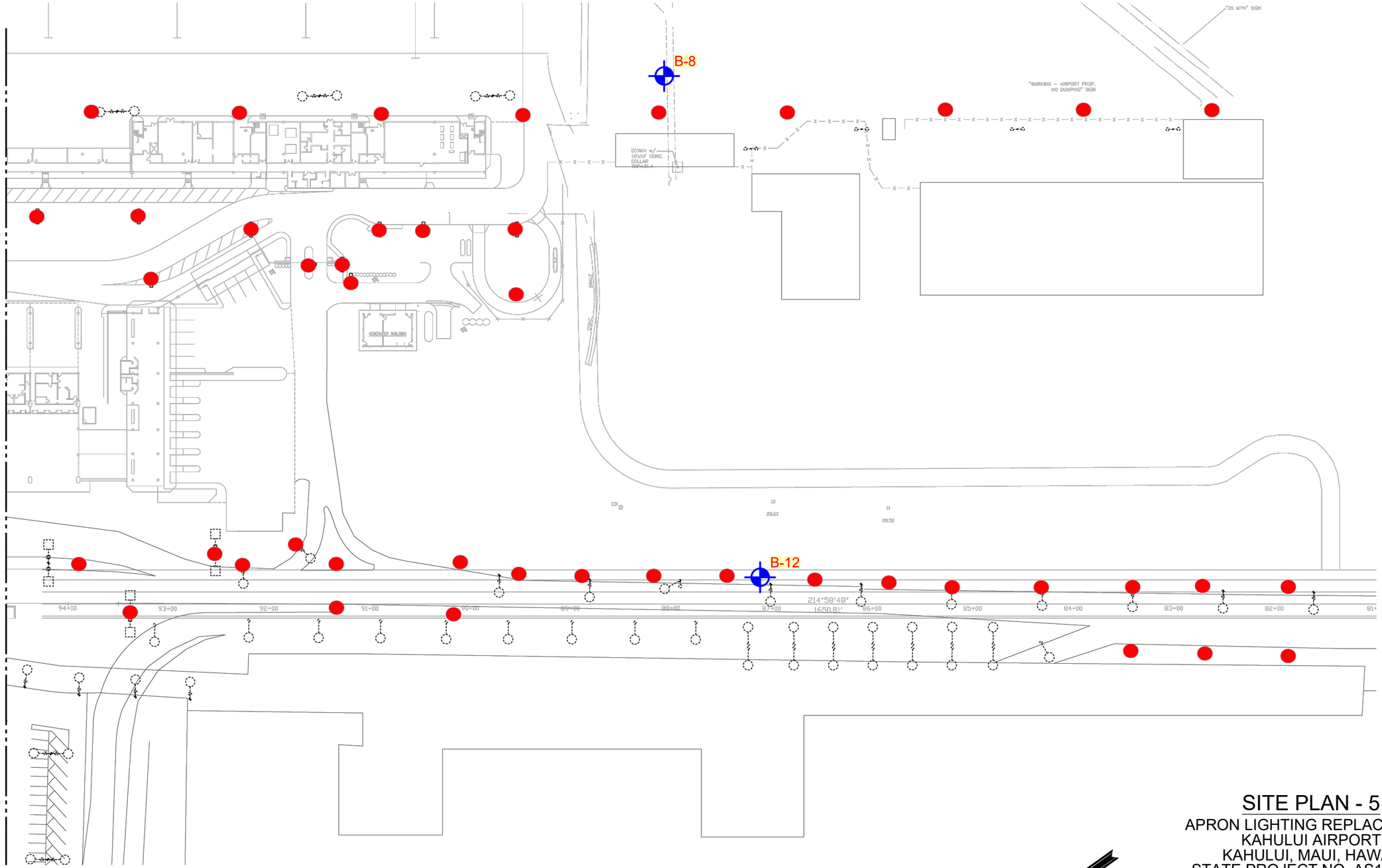
GRAPHIC SCALE

SITE PLAN - 4

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.4
SCALE	W.O.	
1" = 100'	8859-00	



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

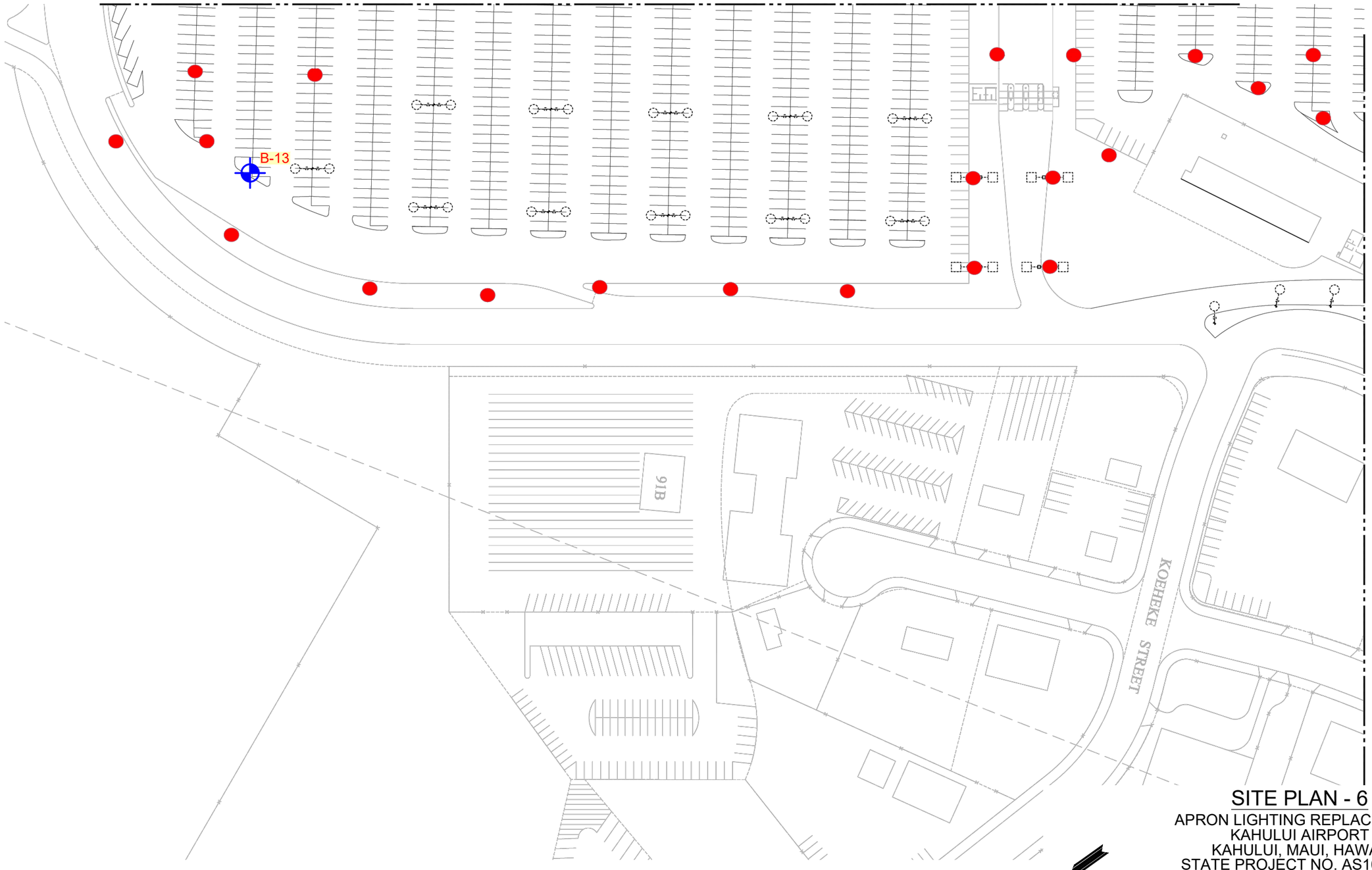
GRAPHIC SCALE

SITE PLAN - 5

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.5
SCALE	W.O.	
1" = 100'	8859-00	



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

GRAPHIC SCALE

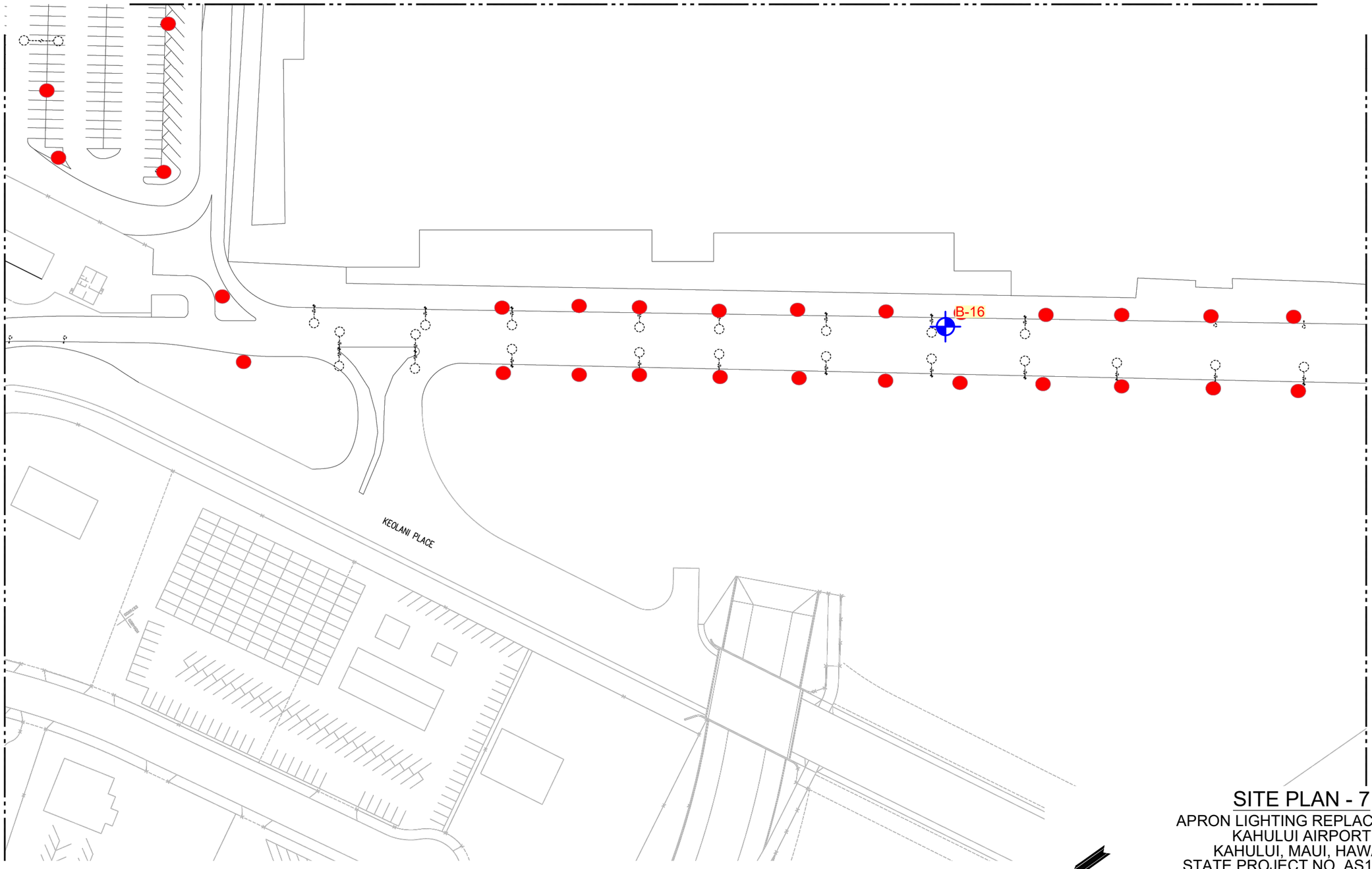
SITE PLAN - 6

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.6
SCALE	W.O.	
1" = 100'	8859-00	

CAD User: KIM File Last Updated: October 04, 2024 9:19:30pm Plot Date: October 04, 2024 - 9:24:27pm
File: T:\Drafting\Working\8859-00 Apron_Light_Replacement\ Kahului_Airport\8859-00SitePlans.dwg5.6
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-No-Dither-RBGC-HEAVY.ctb



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

N

0 50 100 200 300 FT.

GRAPHIC SCALE

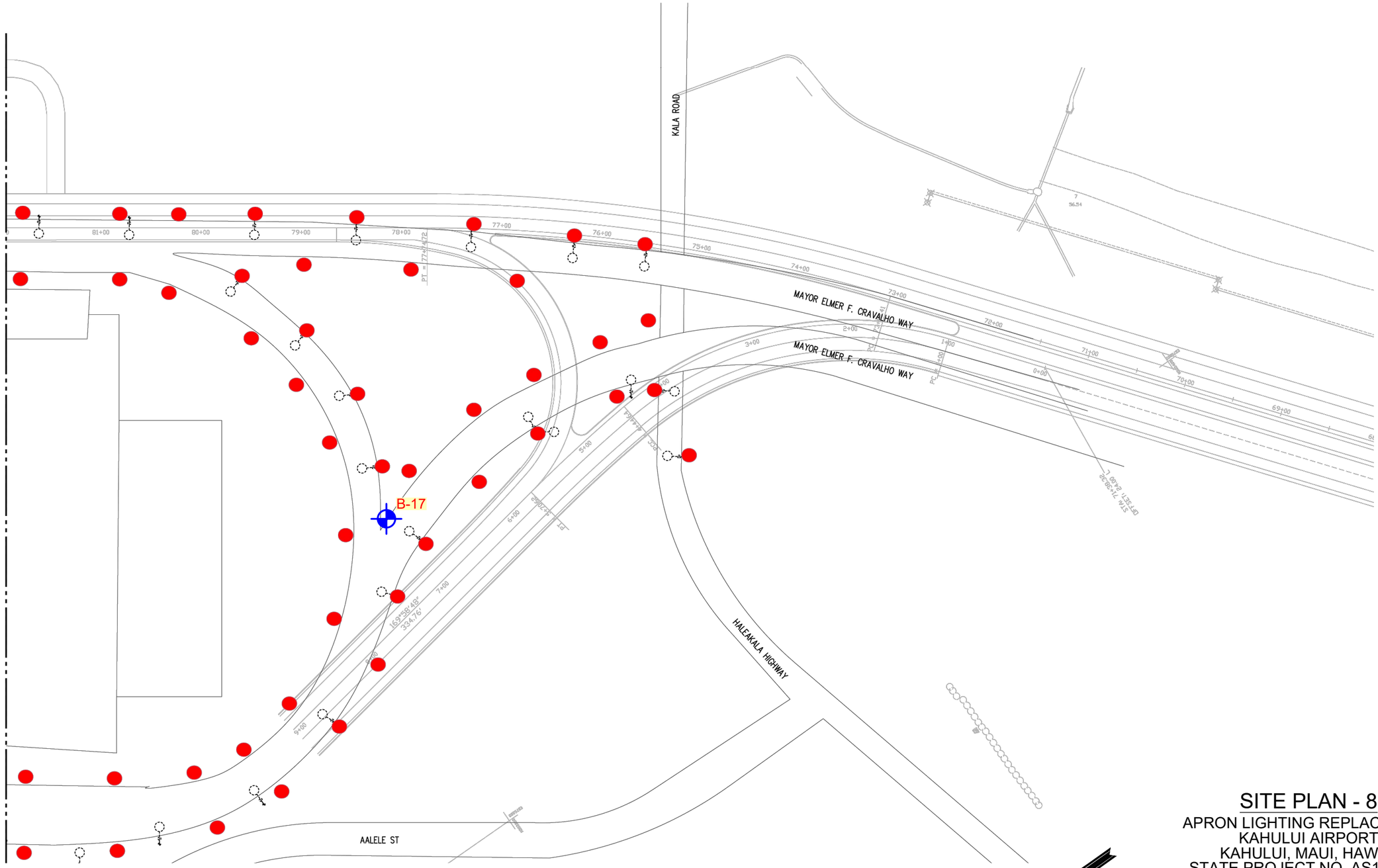
SITE PLAN - 7

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.7
SCALE	W.O.	
1" = 100'	8859-00	

CAD User: KIM File Last Updated: October 04, 2024 9:19:30pm Plot Date: October 04, 2024 - 9:24:49pm
File: T:\Drafting\Working\8859-00 Apron_Light_Replacement_Kahului_Airport\8859-00SitePlans.dwg3.7
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-No-Dither-RBGG-HEAVY.ctb



LEGEND:

APPROXIMATE BORING LOCATION

REFERENCE: APRON LIGHTING PLAN BY RONALD N.S. HO & ASSOCIATES, INC. DATED MAY 2024.

0 50 100 200 300 FT.

GRAPHIC SCALE

SITE PLAN - 8

APRON LIGHTING REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
OCTOBER 2024	KHN	3.8
SCALE	W.O.	
1" = 100'	8859-00	

APPENDIX A

APPENDIX A

Field Exploration

We explored the subsurface conditions at the project site by drilling and sampling 17 borings, designated as Boring Nos. 1 through 17, extending to depths of about 12 to 22.5 feet below the existing ground surface. The approximate boring locations are shown on the Site Plan, Plate 2. The borings were drilled using a truck-mounted drill rig equipped with continuous flight augers and coring tools.

Our geologist classified the materials encountered in the borings by visual and textural examination in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils, and monitored the drilling operations on a near-continuous (full-time) basis. These classifications were further reviewed visually and by testing in the laboratory. Soils were classified in general accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), as shown on the Soil Log Legend, Plate A-0.1. Deviations made to the soil classification in accordance with ASTM D2487 are described on the Soil Classification Log Key, Plate A-0.2. Graphic representations of the materials encountered are presented on the Logs of Borings, Plates A-1 through A-17.

Relatively "undisturbed" soil samples were obtained in general accordance with ASTM D3550, Ring-Lined Barrel Sampling of Soils, by driving a 3-inch OD Modified California sampler with a 140-pound hammer falling 30 inches. In addition, some samples were obtained from the drilled borings in general accordance with ASTM D1586, Penetration Test and Split-Barrel Sampling of Soils, by driving a 2-inch OD standard penetration sampler using the same hammer and drop. The blow counts needed to drive the sampler the second and third 6 inches of an 18-inch drive are shown as the "Penetration Resistance" on the Logs of Borings at the appropriate sample depths. The penetration resistance shown on the logs of borings indicates 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.

Pocket penetrometer tests were performed on selected cohesive soil samples retrieved in the field. The pocket penetrometer test provides an indication of the unconfined compressive strength of the sample. Pocket penetrometer test results are summarized on the Logs of Borings at the appropriate sample depths.

Core samples of the rock materials encountered at the project site were obtained by using diamond core drilling techniques in general accordance with ASTM D2113, Diamond Core Drilling for Site Investigation. Core drilling is a rotary drilling method that uses a hollow bit to cut into the rock formation. The rock material left in the hollow core of the bit is mechanically recovered for examination and description. Rock cores were described in general accordance with the Rock Description System, as shown on the Rock Log Legend, Plate A-0.3. The Rock Description System

is based on the publication "Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses" by the International Society for Rock Mechanics (March 1977).

Recovery (REC) may be used as a subjective guide to the interpretation of the relative quality of rock masses, where appropriate. Recovery is defined as the actual length of material recovered from a coring attempt versus the length of the core attempt. For example, if 3.7 feet of material is recovered from a 5.0-foot core run, the recovery would be 74 percent and would be shown on the Logs of Borings as REC = 74%.

The Rock Quality Designation (RQD) is also a subjective guide to the relative quality of rock masses. RQD is defined as the percentage of the core run in rock that is sound material in excess of 4 inches in length without any discontinuities, discounting any drilling, mechanical, and handling induced fractures or breaks. If 2.5 feet of sound material is recovered from a 5.0-foot core run in rock, the RQD would be 50 percent and would be shown on the Logs of Borings as RQD = 50%. Generally, the following is used to describe the relative quality of the rock based on the "Practical Handbook of Physical Properties of Rocks and Minerals" by Robert S. Carmichael (1989).

Rock Quality	**RQD** (%)
Very Poor	0 – 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 – 100

The excavation characteristic of a rock mass is a function of the relative hardness of the rock, its relative quality, brittleness, and fissile characteristics. A dense rock formation with a high RQD value would be very difficult to excavate and probably would require more arduous methods of excavation.

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 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

Soil Classification Log Key

(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR 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**)
- **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.
- **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**)

COHESIVE SOIL (- #200 ≥ 50%)

- **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, 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 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

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)

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).

Plate

A-0.2

GEOLABS, INC.

Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

	**BASALT**		**CONGLOMERATE**
	**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

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

1

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
	27	90			16	2.5				GP	2-inch **ASPHALTIC CONCRETE**
										MH	Gray **SILTY GRAVEL (BASALTIC)** with a little sand, dry (fill)
					11						Reddish brown **CLAYEY SILT**, stiff, dry (fill)
LL=37 PI=13	38	79			11	3.5	5			CL	Brown with some multi-color mottling **SANDY CLAY** with some gravel (basaltic), stiff (saprolite)
UC= 5220 psi			67	33	13/0" Ref.		10				Brownish gray vesicular **BASALT**, slightly to moderately fractured, moderately to highly weathered, soft to medium hard (basalt formation)
			87	13							
							15				Gray vugular **BASALT**, slightly to moderately fractured, slightly weathered, hard (basalt formation)
			75	0							Brownish gray vesicular **BASALT**, slightly to moderately fractured, moderately weathered, soft to medium hard (basalt formation)
							20				Gray vugular **BASALT**, moderately to closely fractured, moderately weathered, medium hard (basalt formation)
											Boring terminated at 21.5 feet
							25				

Date Started:	June 27, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 27, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 1
Total Depth:	21.5 feet	Drilling Method: 4" Casing & HQ Coring	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

2

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
							0			SP	3-inch **ASPHALTIC CONCRETE**
LL=41 PI=19	31	92			7					CL	Reddish brown **GRAVELLY SAND** with some silt, m___ (fill)
	24				13/3"						Reddish brown with some multi-color mottling **SANDY CLAY** with some gravel (basaltic), soft to medium stiff, dry (alluvium)
			90	23							Gray dense **BASALT**, massive to moderately fractured, unweathered to slightly weathered, very hard (basalt formation)
UC= 13900 psi							5				
			73	38							
							10				
			57	10							
										GP	Dark reddish gray **SANDY GRAVEL (BASALTIC)**, very dense, dry (clinker)
UC= 32790 psi							15				
					8/0"						
							20				Gray dense **BASALT**, moderately fractured, moderately to highly weathered, medium hard (basalt formation)
					12/0" Ref.						Boring terminated at 20.5 feet
							25				

Date Started:	June 27, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 27, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	20.5 feet	Drilling Method:	4" Casing & HQ Coring	A - 2
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

3

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	26	98	83	11	21/0" Ref.	4.5				ML
			97	43			5			
UC= 27000 psi										
			90	43			10			
UC= 21830 psi										
							15			
							20			
							25			

Approximate Ground Surface Elevation : N/A

Description

3-inch **ASPHALTIC CONCRETE**

Reddish brown with some multi-color mottling **GRAVELLY SILT**, hard, dry (alluvium)

Gray dense **BASALT**, massive to moderately fractured, unweathered to slightly weathered, very hard (basalt formation)

Boring terminated at 16 feet

Date Started:	June 25, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 25, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	16 feet	Drilling Method:	4" Casing & HQ Coring	A - 3
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

4

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											18-inch **ASPHALTIC CONCRETE**
	15	108			17					GP	Gray **GRAVEL (BASALTIC)**, dry (fill)
	23				14	2.5				ML	Brown with orange mottling **SANDY CLAY** with a little gravel (basaltic), stiff, dry (fill)
TXUU S_u=0.7 ksf	14	106			11	2.0	5				grades to medium stiff
LL=39 PI=17	30		0 0	0 0	16/0" Ref.		10			ML	Reddish brown **CLAYEY SILT** with traces of boulders (basaltic), stiff, dry (alluvium)
	43			0	13		15				
	48				4		20			ML	Dark brown **SANDY SILT**, soft to medium stiff, dry (alluvium)
							25				Boring terminated at 22.5 feet

Date Started:	June 18, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 18, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	22.5 feet	Drilling Method:	3" Casing & HQ Coring	A - 4
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

5

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS

Approximate Ground Surface Elevation : N/A

Description

Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	USCS	Description
								18-inch **ASPHALTIC CONCRETE**
	21	112			65	2.5	GP	Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
	11				25/0" Ref.		MH	Brown with orange mottling **CLAYEY SILT** with a little gravel (basaltic), hard, dry (fill)
UC= 12610 psi			97	40				Gray dense **BASALT**, massive to moderately fractured, unweathered to slightly weathered, very hard (basalt formation)
			93	60				
			93	43				
UC= 10640 psi								
			88	62				
								Boring terminated at 21 feet

Depth (feet): 5, 10, 15, 20, 25

Date Started:	June 20, 2024	Water Level: ▼	Not Encountered
Date Completed:	June 20, 2024		
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK
Total Depth:	21 feet	Drilling Method:	3" Casing & HQ Coring
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 5

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

6

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	67	73			15	4.5				GP
										MH
LL=41 PI=15	42				15					ML
							5			
Sieve - #200 = 12.3%	22	98			48	4.5				GM
			83	0			10			
							15			
							20			
							25			

Approximate Ground Surface Elevation : N/A

Description

15-inch **ASPHALTIC CONCRETE**

Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)

Reddish brown **CLAYEY SILT**, medium stiff to stiff, dry (fill)

Brown **SANDY SILT** with traces of gravel (basaltic), stiff to very stiff, moist (alluvium)

Tannish brown **SILTY GRAVEL (BASALTIC)** with some sand, medium dense, moist (alluvium)

Gray dense **BASALT**, massive to slightly fractured, unweathered, very hard (basalt formation)

Boring terminated at 16 feet

Date Started:	June 19, 2024	Water Level: ▼	Not Encountered
Date Completed:	June 19, 2024		
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK
Total Depth:	16 feet	Drilling Method:	3" Casing & HQ Coring
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 6

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

7

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A Description
											18-inch **ASPHALTIC CONCRETE**
	4	112			85	4.5				GP	Gray **GRAVEL (BASALTIC)**, dry (fill)
	26				7					SP-SM	Brown **GRAVELLY SAND (BASALTIC)** with a little silt, dense, dry (fill)
LL=38 PI=14	31	87			9	4.5	5			CL	Reddish brown **SANDY CLAY** with traces of boulders (basaltic), medium stiff, dry (alluvium)
			58	0	12/0" Ref.		10				Gray dense **BASALT**, massive to slightly fractured, unweathered, very hard (basalt formation)
UC= 28380 psi			83	58							
			97	57			15				
							20				Boring terminated at 21 feet
							25				

Date Started:	June 18, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 19, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 7
Total Depth:	21 feet	Drilling Method: 3" Casing & HQ Coring	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

8

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											18-inch **ASPHALTIC CONCRETE**
	27	90			13					GP	Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
						3.5				MH	Reddish brown **CLAYEY SILT** with traces of boulders (basaltic), medium stiff to stiff, dry (alluvium)
	26				11						
Direct Shear	28	86			13		5				
						4.0					
	33				9		10				
										ML	Brown **CLAYEY SILT**, stiff, moist (alluvium)
TXUU S_u=0.7 ksf	34	88			25		15				
						4.5				ML	Brown with some multi-color mottling **CLAYEY SILT** with a little gravel (basaltic), dry (alluvium)
										ML	Reddish brown **SANDY SILT**, very stiff, moist (alluvium)
LL=NP PI=NP	19				18		20				
											Boring terminated at 21.5 feet
							25				

Date Started:	June 20, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 21, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 8
Total Depth:	21.5 feet	Drilling Method: 3" Casing & HQ Coring	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

9

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	35	84			6	3.0	0			GP
	45				12					MH
UC= 11530 psi			92	75	12/0" Ref.		5			
			97	48						
			95	33			10			
			97	27			15			
							20			
							25			

Approximate Ground Surface Elevation : N/A

Description

3-inch **ASPHALTIC CONCRETE**

Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)

Brown with orange mottling **CLAYEY SILT** with a little gravel (basaltic), soft to stiff, dry (fill)

Gray dense **BASALT**, massive to slightly fractured, unweathered, very hard (basalt formation)

Gray dense **BASALT**, closely to severely fractured, slightly to moderately weathered, very hard (basalt formation)

Gray dense **BASALT**, massive to slightly fractured, unweathered, very hard (basalt formation)

Boring terminated at 21 feet

Date Started:	June 24, 2024	Water Level: ▼	Not Encountered
Date Completed:	June 24, 2024		
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK
Total Depth:	21 feet	Drilling Method:	4" Casing & PQ Coring
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 9

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

10

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
	33	101			21	4.5				GP ML	3-inch **ASPHALTIC CONCRETE** Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
LL=35 PI=4	35				18						Brown with orange mottling **SANDY SILT** with a little gravel (basaltic), stiff to very stiff, dry (fill)
	40	74	83 43	0 10	22/0" Ref.	4.0	5				Gray dense **BASALT**, massive to slightly fractured, unweathered, very hard (basalt formation)
											VOID encountered at 8.5 feet
UC= 9890 psi			49	33			10				
							15				**VOID** encountered at 16 feet
											Boring terminated at 17.5 feet
							20				
							25				

Date Started:	June 17, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 17, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 10
Total Depth:	17.5 feet	Drilling Method: 4" Casing & PQ Coring	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

11

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
											8-inch **ASPHALTIC CONCRETE**
	10	110			27					GP MH	Gray **SANDY GRAVEL (BASALTIC)** with a little silt, dry (fill)
	32				9	4.0				MH	Brown **CLAYEY SILT** with some gravel and cobbles (basaltic), dry (fill)
											Brown with some multi-color mottling **CLAYEY SILT**, stiff to very stiff, dry (alluvium)
TXUU S_u=1.0 ksf	37	71			8	4.0	5			MH	Brown **CLAYEY SILT** with a little sand, medium stiff, dry (alluvium)
	15				40/4"		10				grades with boulders
										ML	Light brown **GRAVELLY SILT** with a little sand, very stiff, dry (residual soil)
											Brownish gray **WEATHERED BASALT**, moderately to highly weathered, medium hard to hard (basalt formation)
							15				Boring terminated at 14 feet
							20				
							25				

Date Started:	June 25, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 25, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	14 feet	Drilling Method:	4" Casing	A - 11
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

12

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A Description
											8-inch **CONCRETE**
Direct Shear	14	121			26	4.5				GP ML	Gray **SANDY GRAVEL (BASALTIC)** with a little silt, dry (fill)
	11				20						Brown **SANDY SILT** with some gravel and cobbles (basaltic), stiff to very stiff, dry (fill)
	14	105			23	4.0	5				
LL=NP PI=NP	11				24		10				
TXUU S_u=2.6 ksf	15	109			40		15			MH	Brown with some multi-color mottling **CLAYEY SILT**, very stiff, dry (alluvium)
										ML	Brown **SANDY SILT** with a little clay, very stiff, dry (alluvium)
	27				26		20				
											Boring terminated at 21.5 feet
							25				

Date Started:	June 25, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 25, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	21.5 feet	Drilling Method:	4" Casing	A - 12
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

13

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
							0			GM	2-inch **ASPHALTIC CONCRETE**
	25	92			15	2.5				MH	Gray **SILTY GRAVEL (BASALTIC)** with a little sand, dry (fill)
	34				7						Reddish brown **CLAYEY SILT**, medium stiff to stiff, dry (fill)
	38	83			17		5			MH	Dark reddish brown with some orange mottling **CLAYEY SILT** with some gravel (basaltic)
						4.0					Brownish gray dense **WEATHERED BASALT**, highly to extremely weathered, very soft to soft (basalt formation)
UC= 18940 psi			89	69			10				Gray dense **BASALT**, massive to slightly fractured, unweathered to slightly weathered, very hard (basalt formation)
			100	93			15				Boring terminated at 15 feet
							20				
							25				

Date Started:	June 26, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 26, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 13
Total Depth:	15 feet	Drilling Method: 4" Casing & HQ Coring	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

14

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
	7	112			15					GM	2-inch **ASPHALTIC CONCRETE**
										ML	Gray **SILTY GRAVEL (BASALTIC)** with a little sand, dry (fill)
											Brown **SANDY SILT** with some gravel (basaltic), medium stiff to stiff, dry (fill)
			83	0							Brownish gray dense **WEATHERED BASALT**, highly to extremely weathered, very soft to soft (basalt formation)
							5				Gray dense **BASALT**, massive to slightly fractured, unweathered to slightly weathered, very hard (basalt formation)
			97	60							
UC= 28130 psi							10				
			95	47							
							15				
											Boring terminated at 16.5 feet
							20				
							25				

Date Started:	June 26, 2024	Water Level: ▼	Not Encountered
Date Completed:	June 26, 2024		
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK
Total Depth:	16.5 feet	Drilling Method:	4" Casing & HQ Coring
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 14

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

15

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
							0			GM
LL=32 PI=11	22	104			37					CL
	15				56					
			58	0						
			93	80			5			
							10			
			93	57						
UC= 22660 psi							15			
							20			
							25			

Approximate Ground Surface Elevation : N/A

Description

2-inch **ASPHALTIC CONCRETE**

Gray **SILTY GRAVEL (BASALTIC)** with a little sand, dry (fill)

Brown **SANDY CLAY** with some gravel (basaltic), very stiff, dry (fill)

Brownish gray dense **WEATHERED BASALT**, highly to extremely weathered, very soft to soft (basalt formation)

Gray dense **BASALT**, massive to slightly fractured, unweathered to slightly weathered, very hard (basalt formation)

Boring terminated at 16 feet

Date Started:	June 27, 2024	Water Level: ▼	Not Encountered
Date Completed:	June 28, 2024		
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK
Total Depth:	16 feet	Drilling Method:	4" Casing & HQ Coring
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 15

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

16

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
											9-inch **CONCRETE**
	12	127			77					GP MH	Gray **SANDY GRAVEL (BASALTIC)** with a little silt, dry (base material)
	10				33	4.5					Reddish brown **CLAYEY SILT** with a little gravel (basaltic), hard, dry (fill)
Direct Shear	9	127			54	4.5	5				grades to very stiff
										ML	Orangish brown with some gray mottling **SANDY SILT**, hard, dry (alluvium)
LL=NP PI=NP	29				31		10				
										MH	Brown **CLAYEY SILT** with traces of sand, soft, dry (alluvium)
- #200 = 99.3%	48	58			5	3.0	15				
											Boring terminated at 16.5 feet
							20				
							25				

Date Started:	June 21, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	June 21, 2024			
Logged By:	N. Mc Clean	Drill Rig:	CME-45C TRUCK	
Total Depth:	16.5 feet	Drilling Method:	4" Solid-Stem Auger	A - 16
Work Order:	8859-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

17

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation : N/A
											3-inch **ASPHALTIC CONCRETE**
	18	115			28					GP	
						4.5				CL	Gray **SANDY GRAVEL (BASALTIC)** with a little silt, dry (base material)
LL=35 PI=15	27				7						Brown **SANDY CLAY** with a little gravel (basaltic), medium stiff to very stiff, dry (fill)
	32	87			109		5			ML	Brown **SANDY SILT** with some cobbles (basaltic), hard (fill)
						4.5					
	14				40/4"		10				Gray dense **BASALT**, slightly weathered, very hard (basalt formation)
											Boring terminated at 12 feet
							15				
							20				
							25				

Date Started:	June 24, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	June 24, 2024		
Logged By:	N. Mc Clean	Drill Rig: CME-45C TRUCK	A - 17
Total Depth:	12 feet	Drilling Method: 4" Casing	
Work Order:	8859-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8859-00.GPJ GEOLABS.GDT 10/2/24

APPENDIX B

A P P E N D I X B

Laboratory Tests

Moisture Content (ASTM D2216) and Unit Weight (ASTM D2937) determinations were performed on selected samples as an aid in the classification and evaluation of soil properties. The test results are presented on the Logs of Borings at the appropriate sample depths.

Eleven Atterberg Limits tests (ASTM D4318) were performed on selected soil samples to evaluate the liquid and plastic limits. The test results are summarized on the Logs of Borings at the appropriate sample depths. Graphic presentations of the test results are provided on Plates B-1 and B-2.

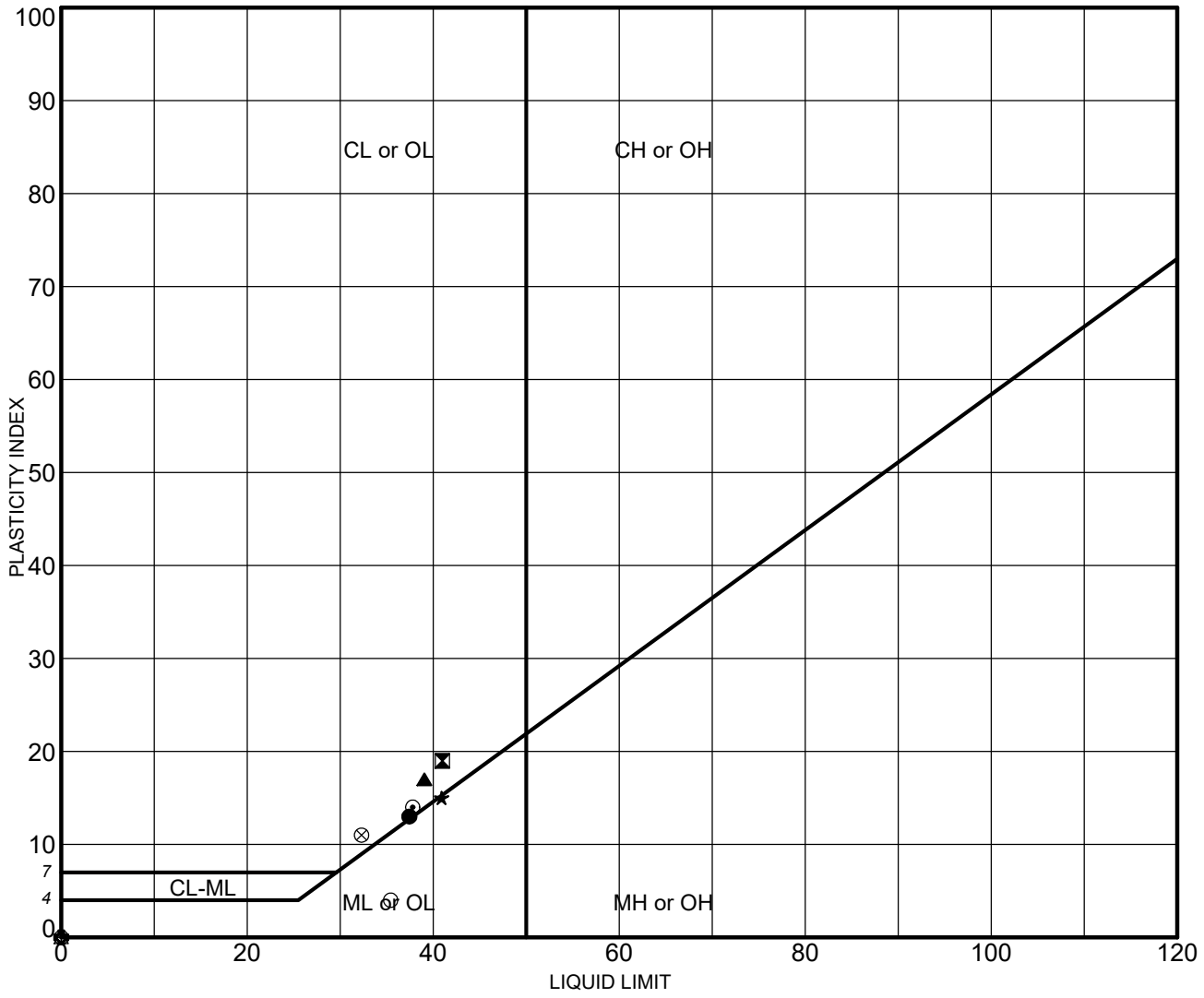
Two Sieve Analysis tests (ASTM C117 & C136) were performed on selected soil samples to evaluate the gradation characteristics of the soils and to aid in soil classification. Graphic presentations of the grain size distributions are provided on Plate B-3.

Three Direct Shear tests (ASTM D3080) were performed on selected samples to evaluate the shear strength characteristics of the materials tested. The test results are presented on Plates B-4 through B-6.

Four Unconsolidated Undrained Triaxial Compression tests (ASTM D2850) were performed on selected soil samples to evaluate the undrained shear strength of the in-situ soils. The approximate in-situ effective overburden pressure was used as the applied confining pressure for the relatively “undisturbed” soil sample. The test results and the stress-strain curves are presented on Plates B-7 through B-10.

Thirteen Uniaxial Compression tests (ASTM D7012, Method C) were performed on selected intact core runs to evaluate the unconfined compressive strength of the basalt formation encountered. The test results are presented on Plate B-11.

Five sets of Corrosivity tests, including pH (ASTM G51), Minimum Resistivity (ASTM G57), Chloride Content (EPA 300.0), and Sulfate Content (EPA 300.0), were performed by our office and CERCO Analytical, Inc. on selected soil samples obtained from our field exploration. The test results are summarized on Plate B-12.



	Sample	Depth (ft)	LL	PL	PI	Description
●	B-1	5.0-6.5	37	24	13	Brown w/ multi-color mottling sandy clay (CL) with some gravel
⊠	B-2	0.8-2.3	41	22	19	Red-brown w/ some multi-color mott. sandy clay (CL) w/ some gravel
▲	B-4	10.0-10.5	39	22	17	Brown with orange mottling sandy clay (CL)
★	B-6	2.8-4.3	41	26	15	Brown sandy silt (ML) with traces of gravel
⊙	B-7	5.0-6.5	38	24	14	Reddish brown sandy clay (CL)
✿	B-8	20.0-21.5	NP	NP	NP	Reddish brown sandy silt (NP)
○	B-10	1.8-3.3	35	31	4	Brown w/ orange mottling sandy silt (ML) with a little gravel
△	B-12	10.0-11.5	NP	NP	NP	Brown sandy silt (NP) with some gravel
⊗	B-15	1.0-2.5	32	21	11	Brown sandy clay (CL) with some gravel
⊕	B-16	10.0-11.5	NP	NP	NP	Orangish brown w/ gray mottling sandy silt (NP)

NP = NON-PLASTIC

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

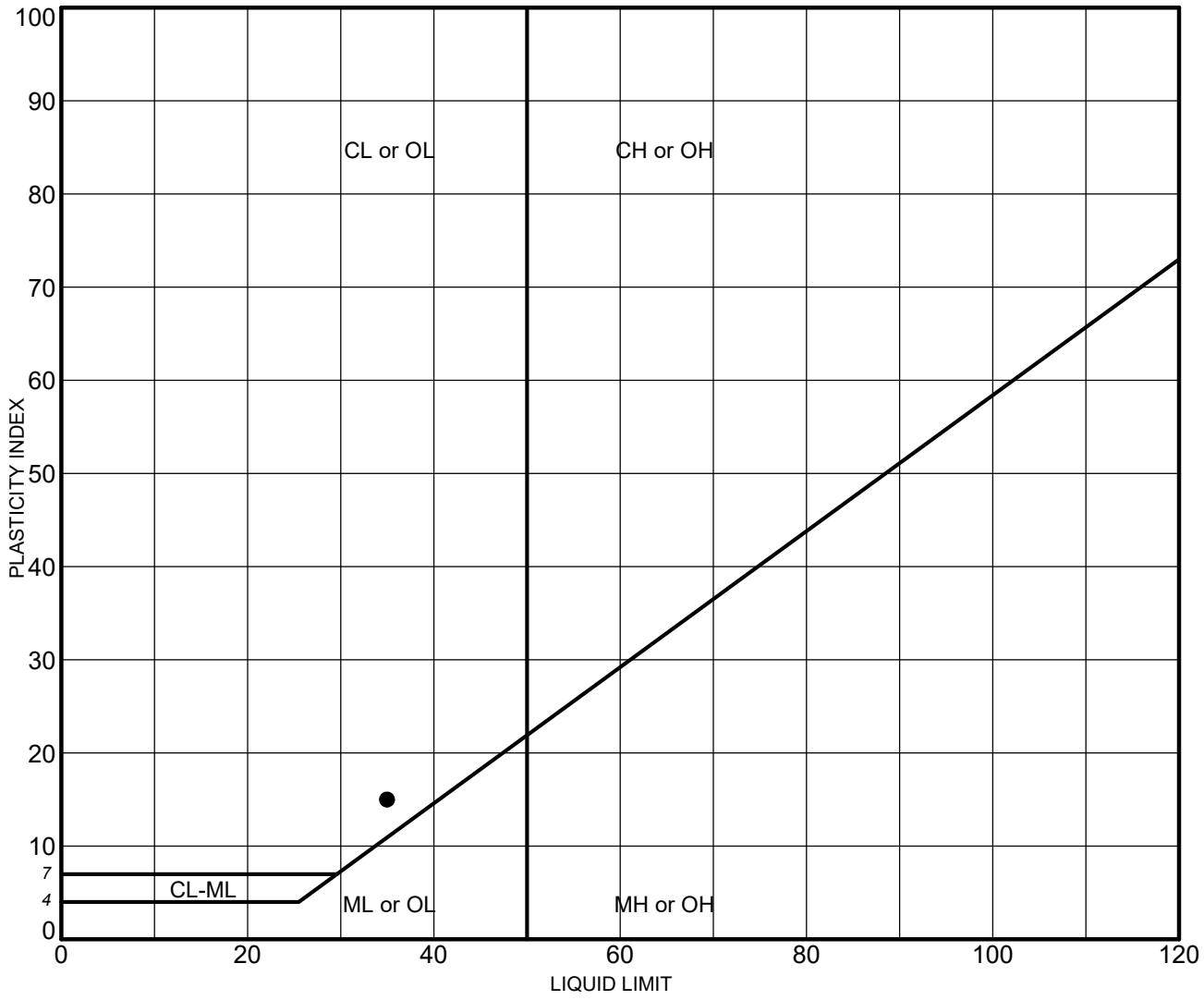
W.O. 8859-00

ATTERBERG LIMITS TEST RESULTS - ASTM D4318

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 1

G ATTERBERG PI-100 LL-120 8859-00.GPJ GEOLABS.GDT 10/31/24



	Sample	Depth (ft)	LL	PL	PI	Description
●	B-17	2.5-4.0	35	20	15	Brown sandy clay (CL) with a little gravel

NP = NON-PLASTIC

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

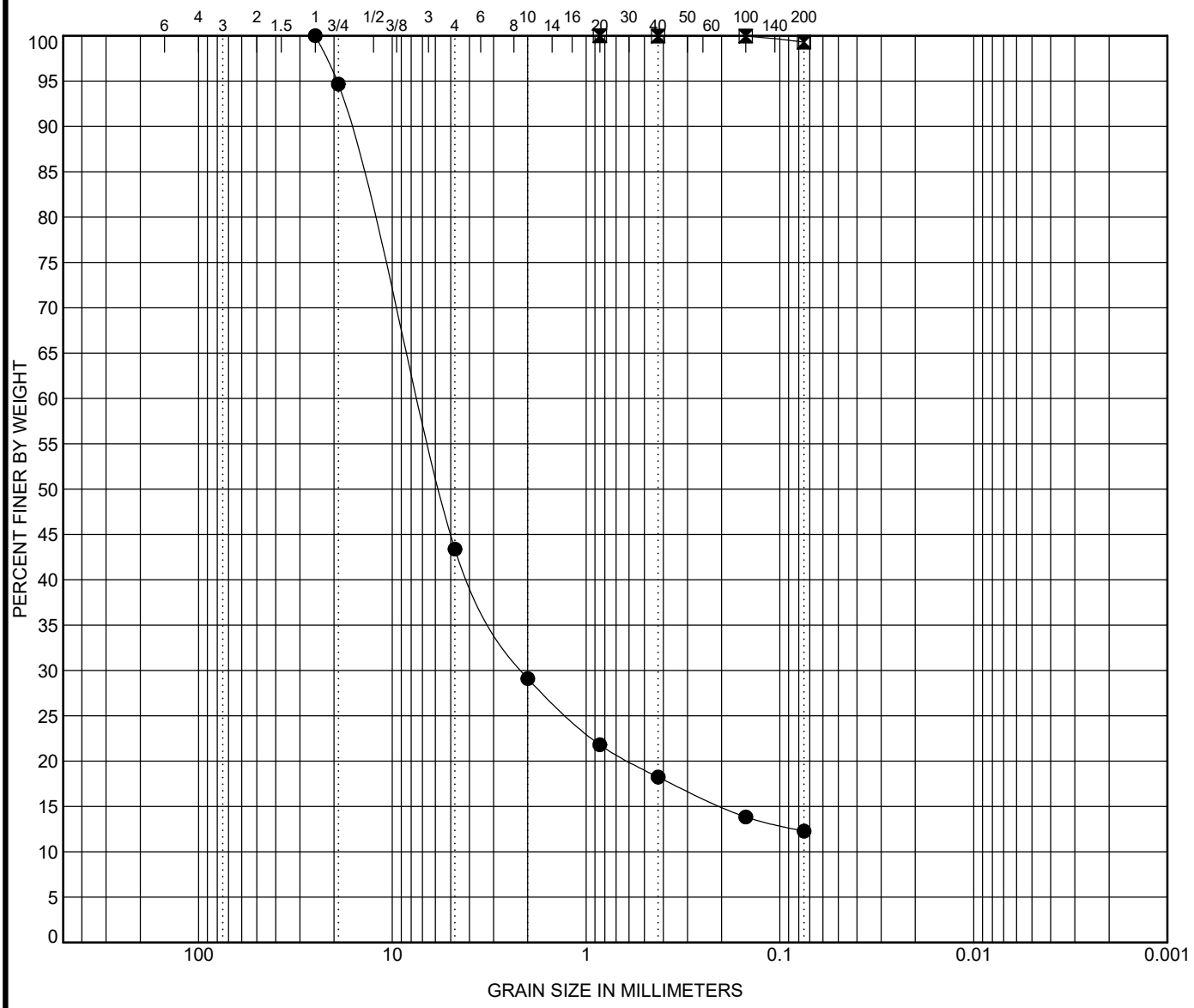
W.O. 8859-00

ATTERBERG LIMITS TEST RESULTS - ASTM D4318

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 2

G ATTERBERG PI-100 LL-120 8859-00.GPJ GEOLABS.GDT 10/31/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	B-6	5.0-6.5	Tannish brown silty gravel (GM) with some sand				21.8	270.6
⊠	B-16	15.0-16.5	Brown clayey silt (ML) with traces of sand					

	Sample	Depth (ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Fine
●	B-6	5.0-6.5	25	7.445	2.113		56.6	31.1	12.3
⊠	B-16	15.0-16.5	0.85				0.0	0.7	99.3

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

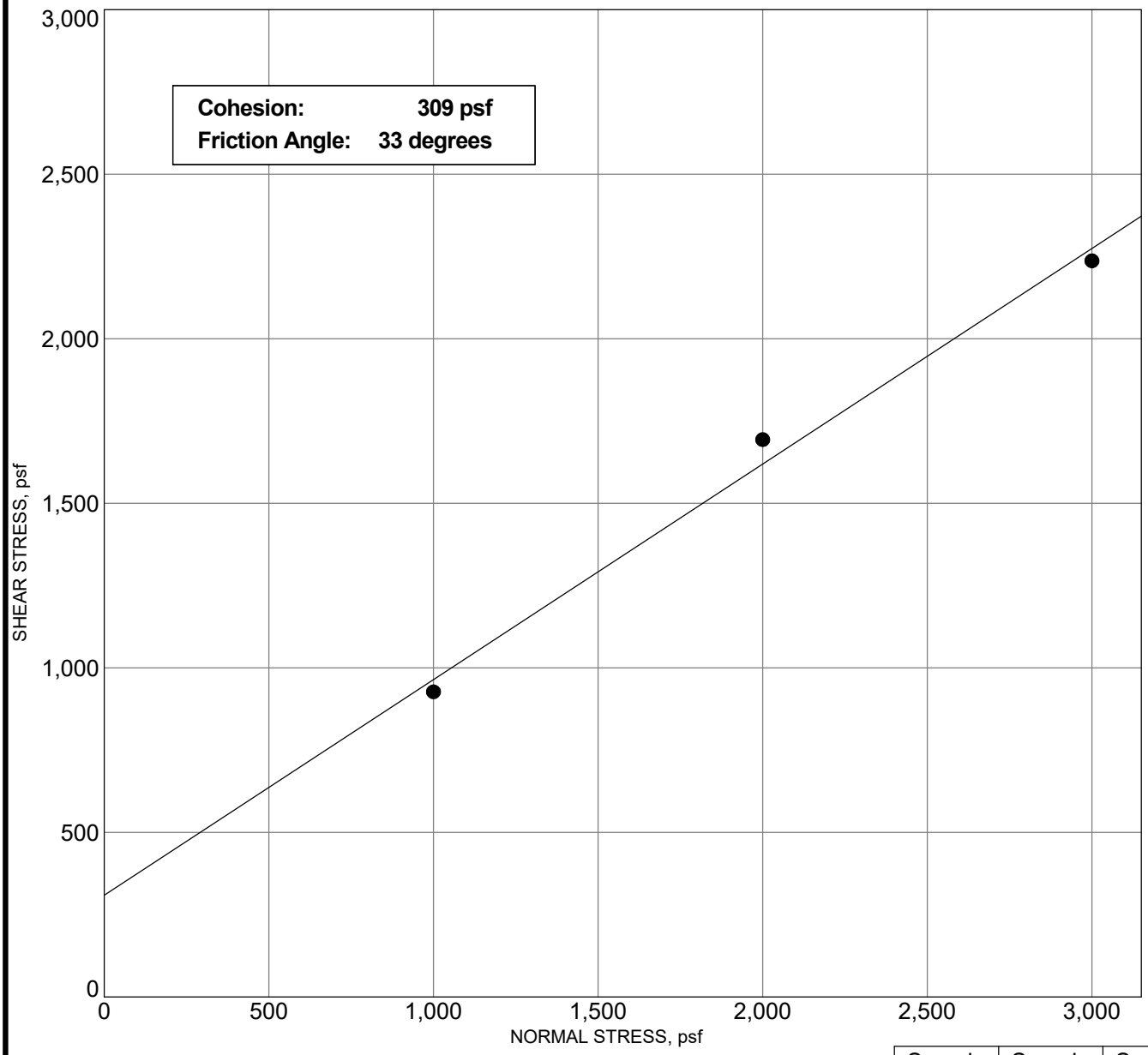
W.O. 8859-00

GRAIN SIZE DISTRIBUTION - ASTM C 117 & C 136

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 3

G_GRAIN_SIZE_MOD_8859-00.GPJ GEOLABS.GDT 10/2/24



		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	28.7	29.2	29.5
	Dry Density, pcf	85.1	88.7	88.6
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	35.6	33.0	31.8
	Dry Density, pcf	81.4	92.3	91.9
	Height, inches	1.045	0.961	0.964
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0025	0.0022	0.0020
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**927**	**1693**	**2237**
	Shear Displacement, inches	0.43	0.42	0.41

Sample: B-8
Depth: 5.0 - 6.5 feet
Description: Reddish brown clayey silt

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

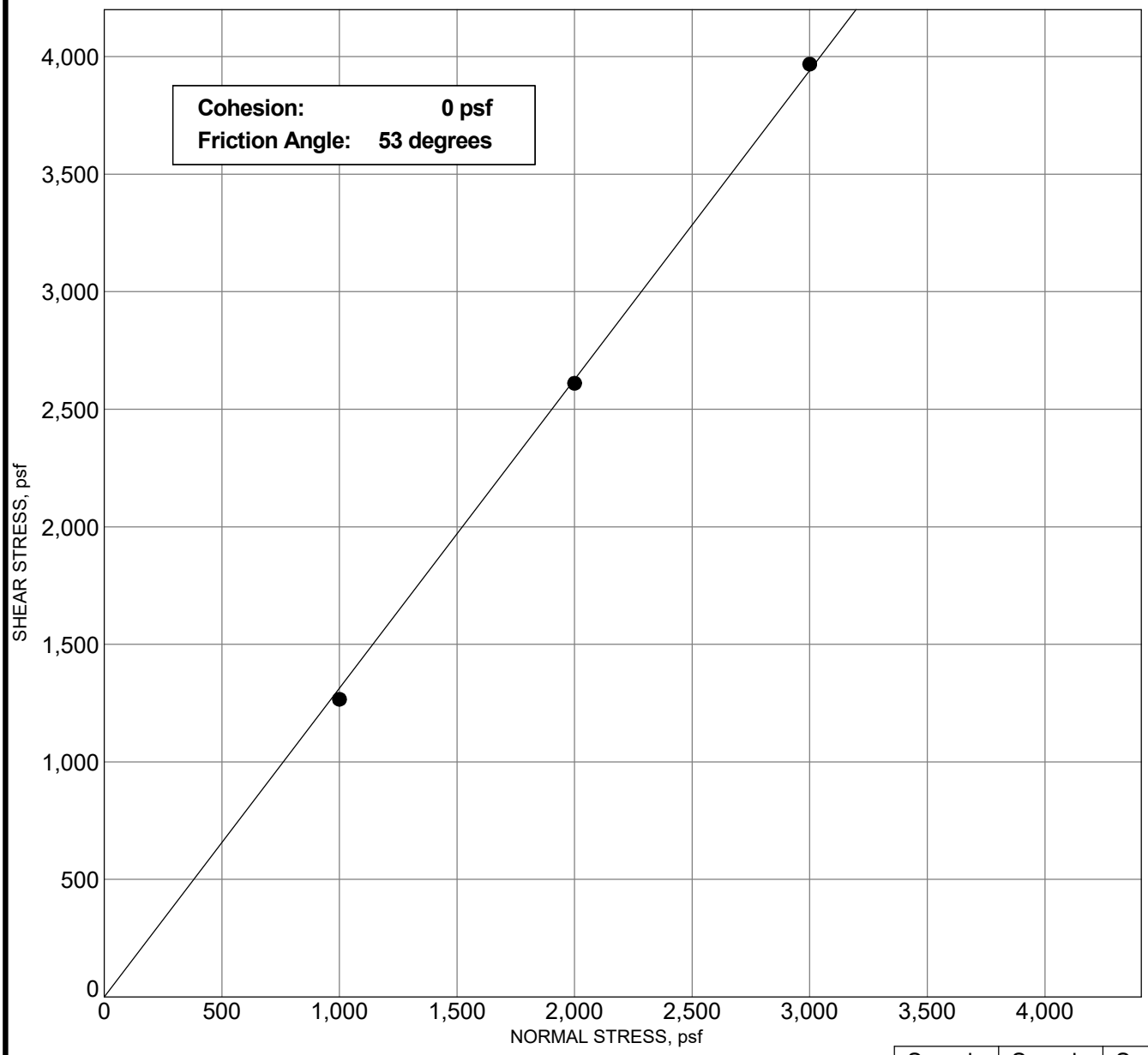
W.O. 8859-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 4

G_DIRECT_SHEAR_8859-00.GPJ_GEOLABS.GDT 10/2/24



		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	21.7	22.6	15.1
	Dry Density, pcf	105.5	105.1	116.7
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	26.8	24.6	17.8
	Dry Density, pcf	103.2	106.7	117.2
	Height, inches	1.023	0.985	0.996
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0024	0.0020	0.0021
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**1266**	**2611**	**3968**
	Shear Displacement, inches	0.43	0.40	0.40

Sample: B-12
Depth: 1.0 - 2.5 feet
Description: Brown silty clay with some gravel

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

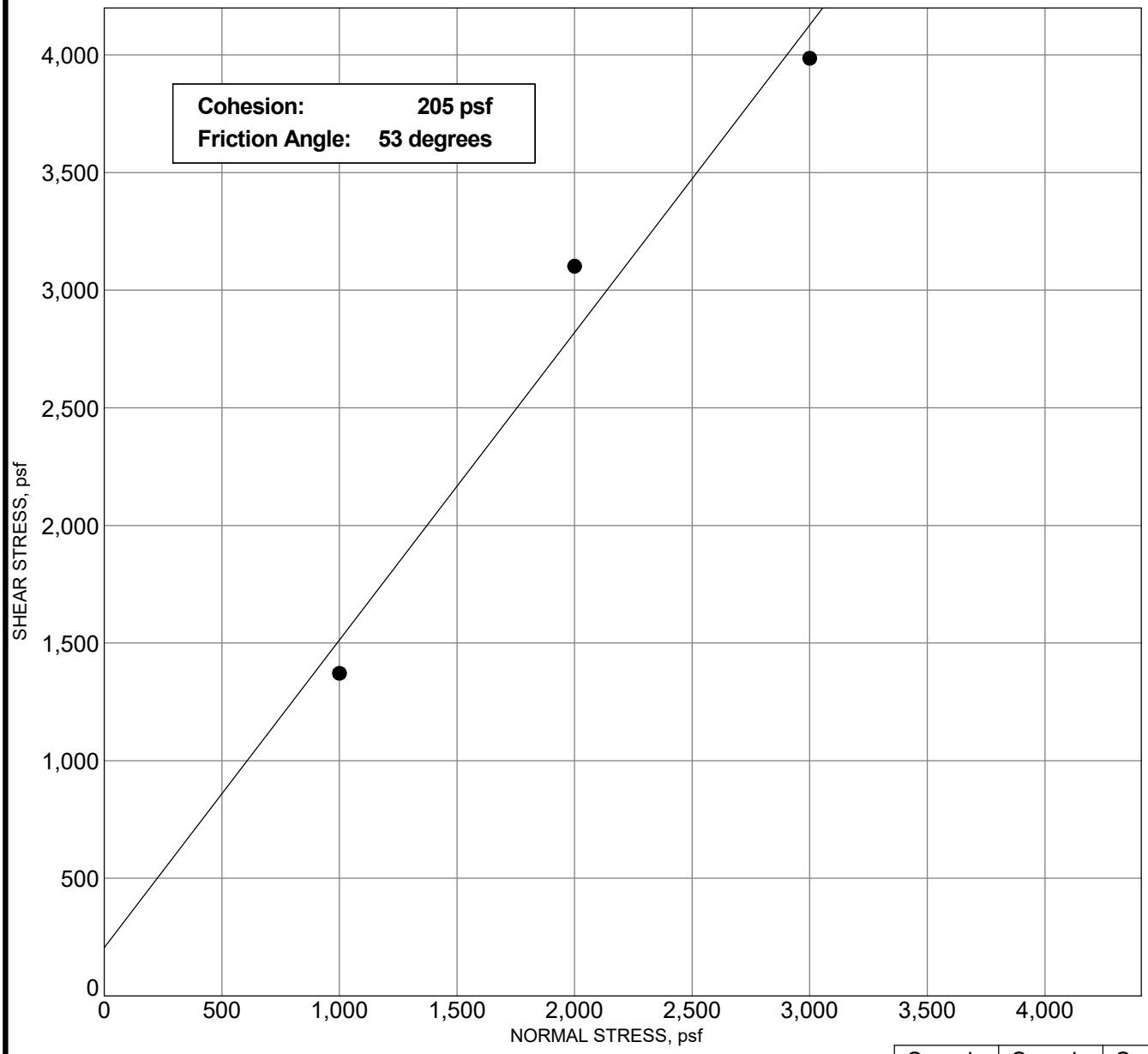
W.O. 8859-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 5

G DIRECT_SHEAR 8859-00.GPJ GEOLABS.GDT 10/2/24



		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	14.7	14.6	14.2
	Dry Density, pcf	113.5	116.0	122.7
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	20.2	17.8	16.9
	Dry Density, pcf	111.3	118.1	120.7
	Height, inches	1.019	0.981	1.017
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0024	0.0022	0.0021
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**1371**	**3102**	**3986**
	Shear Displacement, inches	0.42	0.39	0.39

Sample: B-16
Depth: 5.0 - 6.5 feet
Description: Reddish brown clayey silt with a kittle gravel

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

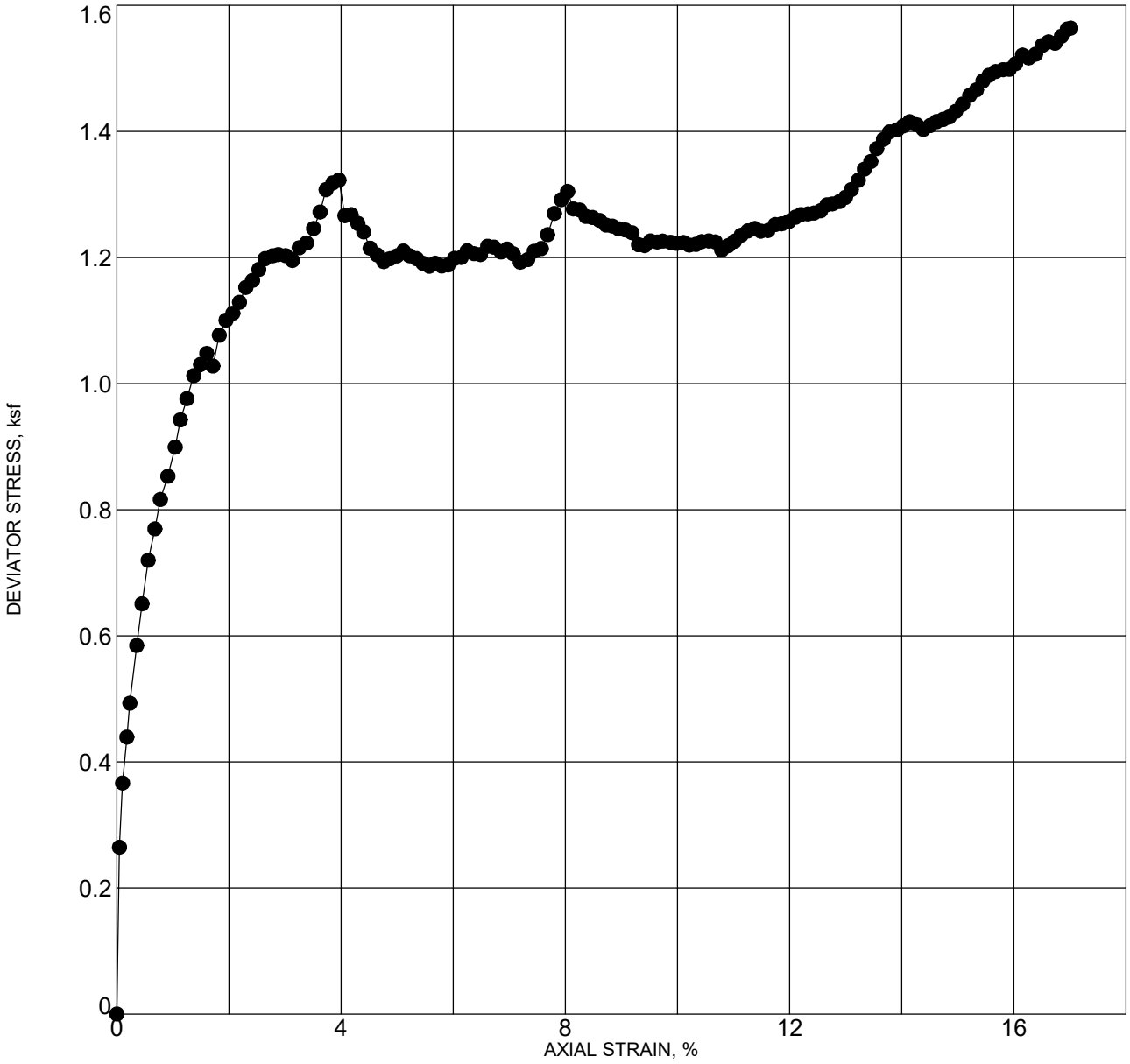
W.O. 8859-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 6

G_DIRECT_SHEAR_8859-00.GPJ_GEOLABS.GDT 10/2/24



Max. Deviator Stress (ksf):	1.4
Confining Stress (ksf):	0.7

Location: B-4
Depth: 5.0 - 6.5 feet
Description: Brown with orange mottling sandy clay with a little gravel
Test Date: 7/13/2024

Dry Density (pcf)	114.4	Sample Diameter (inches)	2.413
Moisture (%)	14.3	Sample Height (inches)	5.033
Axial Strain at Failure (%)	15.0	Strain Rate (% / minute)	0.70

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

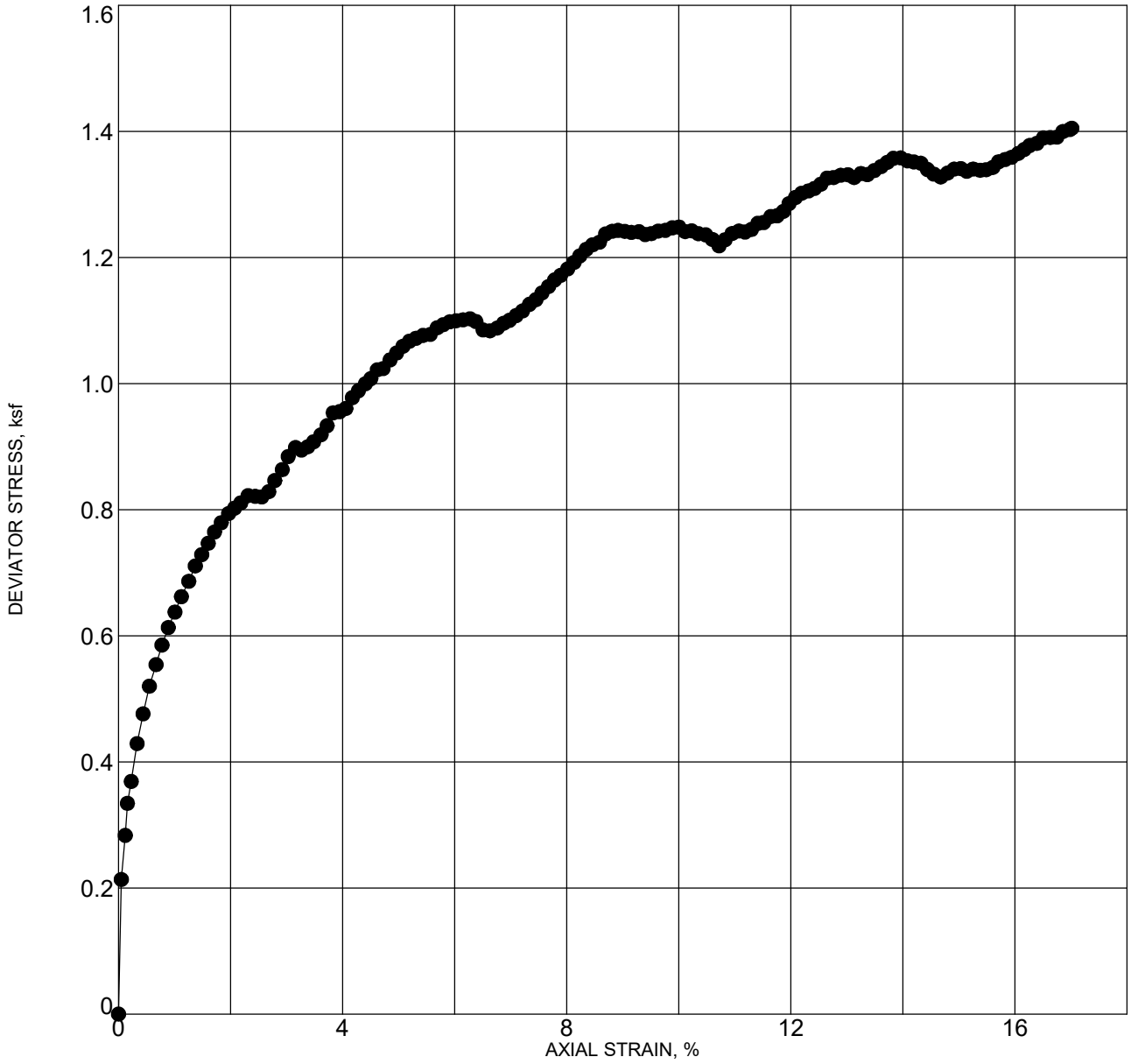
W.O. 8859-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 7

G_TXUU 8859-00.GPJ GEOLABS.GDT 10/2/24



Max. Deviator Stress (ksf):	1.3
Confining Stress (ksf):	1.7

Location: B-8
Depth: 15.0 - 16.5 feet
Description: Brown clayey silt
Test Date: 7/18/2024

Dry Density (pcf)	96.3	Sample Diameter (inches)	2.413
Moisture (%)	24.4	Sample Height (inches)	5.033
Axial Strain at Failure (%)	14.9	Strain Rate (% / minute)	0.70

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

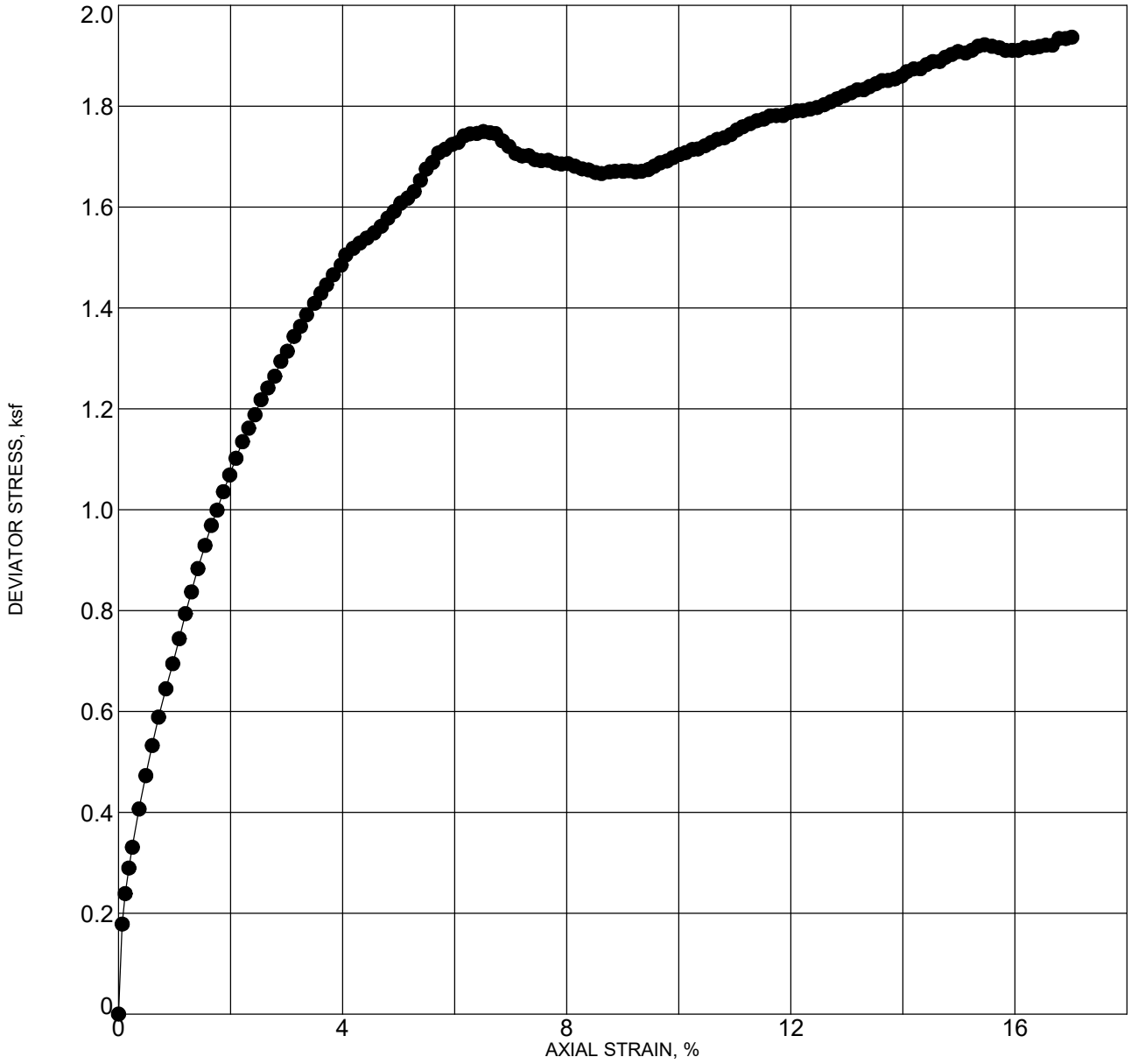
W.O. 8859-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 8

G_TXUU_8859-00.GPJ GEOLABS.GDT 10/2/24



Max. Deviator Stress (ksf):	1.9
Confining Stress (ksf):	0.7

Location: B-11
Depth: 5.0 - 6.5 feet
Description: Brown clayey silt with a little sand
Test Date: 7/18/2024

Dry Density (pcf)	72.5	Sample Diameter (inches)	2.413
Moisture (%)	37.0	Sample Height (inches)	5.033
Axial Strain at Failure (%)	15.0	Strain Rate (% / minute)	0.67

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

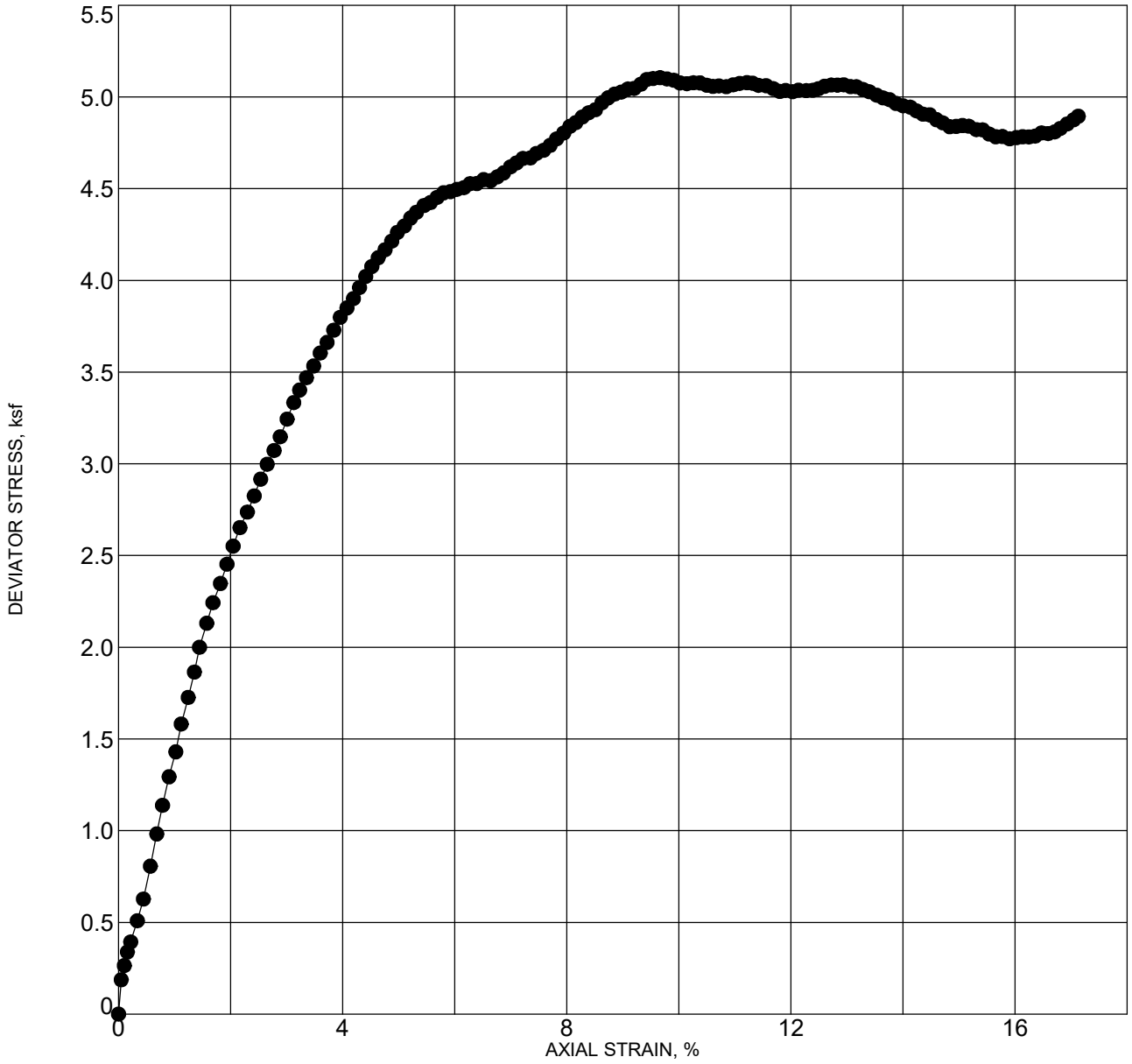
W.O. 8859-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 9

G_TXUU_8859-00.GPJ GEOLABS.GDT 10/2/24



Max. Deviator Stress (ksf):	5.1
Confining Stress (ksf):	1.7

Location: B-12
Depth: 15.0 - 16.5 feet
Description: Brown with some multi-color mottling clayey silt
Test Date: 7/18/2024

Dry Density (pcf)	103.6	Sample Diameter (inches)	2.413
Moisture (%)	22.8	Sample Height (inches)	5.033
Axial Strain at Failure (%)	9.7	Strain Rate (% / minute)	0.70

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

W.O. 8859-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 10

G_TXUU_8859-00.GPJ GEOLABS.GDT 10/2/24

Location	Depth	Length	Diameter	Length/ Diameter Ratio	Density	Load	Compressive Strength
	(feet)	(inches)	(inches)		(pcf)	(lbs)	(psi)
B-1	10.5 - 11	4.880	2.400	2.03	135.1	23,630	5,220
B-2	4 - 4.5	4.960	2.400	2.07	178.7	62,895	13,900
B-2	13 - 13.5	4.880	2.400	2.03	182.3	148,350	32,790
B-3	8 - 8.5	4.920	2.400	2.05	180.0	122,130	27,000
B-3	11.5 - 12	4.850	2.400	2.02	179.8	98,760	21,830
B-5	5 - 5.5	6.490	3.250	2.00	174.2	104,590	12,610
B-5	13 - 13.5	6.510	3.250	2.00	178.7	88,245	10,640
B-7	14 - 14.5	4.880	2.400	2.03	178.3	128,410	28,380
B-9	5.5 - 6	4.900	2.400	2.04	173.9	52,155	11,530
B-10	12 - 12.5	6.500	3.250	2.00	179.7	82,070	9,890
B-13	9.5 - 10	4.870	2.400	2.03	178.6	85,695	18,940
B-14	8.5 - 9	4.900	2.400	2.04	177.9	127,250	28,130
B-15	15.5 - 16	4.850	2.400	2.02	178.2	102,510	22,660

ASTM D7012 (METHOD C)

Note: Samples were not prepared in accordance with ASTM D4543. Therefore, results reported may differ from results obtained from a test speciment that meets the requirements of Practice D4543

GEOLABS, INC.

GEOTECHNICAL ENGINEERING

W.O. 8859-00

UNIAXIAL COMPRESSIVE STRENGTH TEST

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 11

G_ROCK_UC_TEST_PORTRAIT_8859-00.GPJ_GEOLABS.GDT_10/2/24

Location	Depth (feet)	pH Value	Minimum Resistivity (ohm-cm)	Chloride Content (mg/kg)	Sulfate Content (mg/kg)
B-4	1.5 - 3.0	8.38*	3000*	ND	47
B-7	3.0 - 4.5	8.02*	1600*	ND	83
B-9	1.0 - 2.5	8.29*	2500*	16	21
B-13	1.0 - 2.5	8.18*	2700*	ND	38
B-16	1.0 - 2.5	8*	1200*	110	75

TEST METHODS (by CERCO Analytical, Inc.)

pH Value	Method 9045C
Minimum Resistivity	SM 2510B
Chloride Content	EPA 300.0
Sulfate Content	EPA 300.0

TEST METHODS (by Geolabs, Inc.)*

pH Value	ASTM G51
Minimum Resistivity	ASTM G57
Chloride Content	N/A
Sulfate Content	N/A

ND: Not Detected Within Reporting Limits

G SUMMARY OF CORROSIVITY TESTS 8859-00.GPJ GEOLABS.GDT 10/2/24

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

W.O. 8859-00

SUMMARY OF CORROSIVITY TESTS

APRON LIGHT REPLACEMENT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 12

APPENDIX C

B-1 10.0’ TO 21.5’

10.0’

21.5’

B-2 3.0’ TO 20.5’

3.0’

20.5’

B-3 1.5’ TO 16.0’

1.5’ **11.0’**

11.0’ **16.0’**

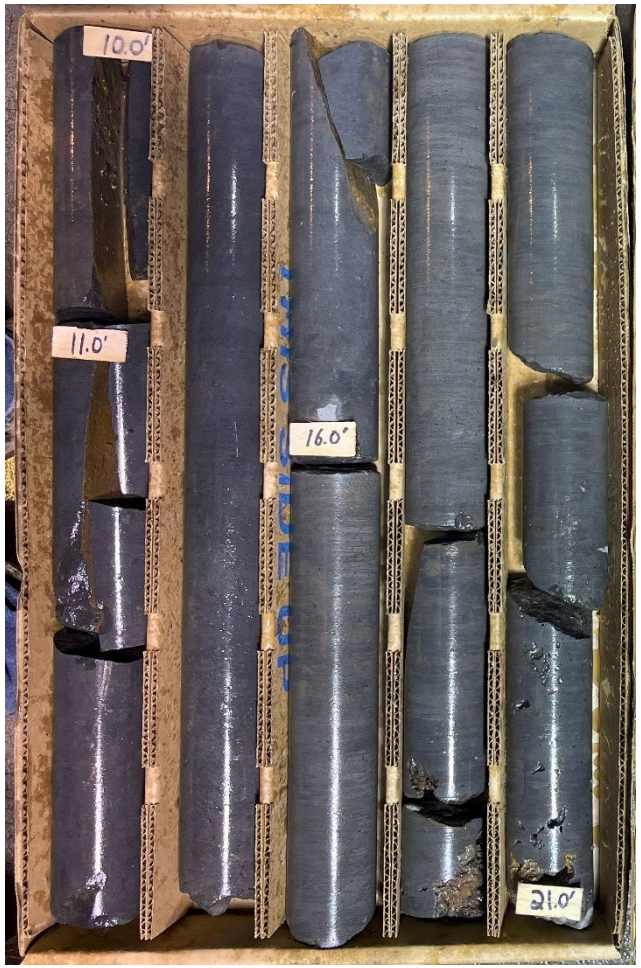
B-5 3.5’ TO 21.0’

3.5’ **6.0’** **11.0’** **16.0’**

6.0’ **11.0’** **16.0’** **21.0’**

B-7 10.0’ TO 21.0’

10.0’



21.0’

B-9 5.0’ TO 21.0’

5.0’ **11.0’**

11.0’ **21.0’**

B-10 5.5’ TO 16.0’

5.5’

16.0’

B-13 8.5’ TO 15.0’

8.5’

15.0’

B-14 3.0’ TO 16.5’

3.0’ **11.5’**

11.5’ **16.5’**

B-15 4.0’ TO 16.0’

4.0’

16.0’

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – LANAI AIRPORT

ISLAND OF LANAI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8860-00 APRIL 15, 2026

Prepared for

RONALD N.S. HO & ASSOCIATES

GEOLABS, INC.
Geotechnical Engineering and Drilling Services

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – LANAI AIRPORT

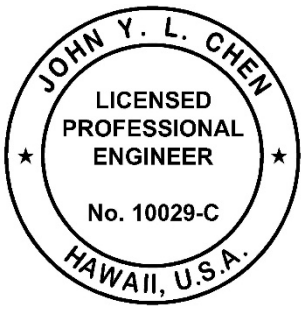
ISLAND OF LANAI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8860-00 APRIL 15, 2026

Prepared for

RONALD N.S. HO & ASSOCIATES



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.

4-30-26

SIGNATURE — EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.
Geotechnical Engineering and Drilling Services
94-429 Koaki Street, Suite 200 • Waipahu, HI 96797

Hawaii • California

GEOLABS, INC.

Geotechnical Engineering and Drilling Services

April 15, 2026
W.O. 8860-00

Mr. Billy J. Ornellas
Ronald N.S. Ho & Associates
2153 North King Street, Suite 201
Honolulu, HI 96819

Dear **Mr. Ornellas:**

Geolabs, Inc. is pleased to submit our report entitled "Geotechnical Engineering Exploration, Apron Light Replacement – Lanai Airport, Island of Lanai, Hawaii, State Project No. AS1037-12," prepared for the proposed project.

Our work was performed in general accordance with the scope of services outlined in our revised fee proposal dated January 17, 2023.

Please note that the soil samples recovered during our field exploration (remaining after testing) will be stored for a period of two months from the date of this report. The samples will be discarded after that date unless arrangements are made for a longer sample storage period. Please contact our office for alternative sample storage requirements, if appropriate.

Detailed discussion and specific design recommendations are contained in the body of this report. If there is any point that is not clear, please contact our office.

Very truly yours,

GEOLABS, INC.

John Y.L. Chen, P.E.
Vice President

JC:TO:lf

94-429 Koaki Street, Suite 200 • Waipahu, Hawaii 96797
Telephone: (808) 841-5064 • E-mail: hawaii@geolabs.net

Hawaii • California

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – LANAI AIRPORT

ISLAND OF LANAI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8860-00 APRIL 15, 2026

TABLE OF CONTENTS

Page

APPENDIX B

GEOTECHNICAL ENGINEERING EXPLORATION

APRON LIGHT REPLACEMENT – LANAI AIRPORT

ISLAND OF LANAI, HAWAII

STATE PROJECT NO. AS1037-12

W.O. 8860-00 APRIL 15, 2026

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Our field exploration generally encountered a thin layer of surficial fill overlying relatively stiff alluvium and residual soils extending to depths of about 16.5 to 21.5 feet below the existing ground surface. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

We recommend designing a cast-in-place concrete drilled shaft foundation system to support the proposed new light pole structures. We envision that drilled shaft foundations with diameters of 24 or 30 inches may be used to support the new light pole structures with a minimum embedment length of 10 to 15 feet below the designed finished grade.

The load-bearing capacities of the drilled shafts depend, to a significant extent, on the friction between the shaft and the surrounding soils. Therefore, proper construction techniques, especially during the drilling operations, are important. The contractor should exercise care in drilling the shaft holes and placing concrete into the drilled holes. It is imperative for a Geolabs representative to be present at the project site to observe the drilling and installation of the drilled shafts during construction to confirm the subsurface conditions and should be designated as a "Special Inspection" item in accordance with Section 1704 of the International Building Code (2018 Edition).

The text of this report should be referred to for detailed discussions and specific geotechnical recommendations.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS

SECTION 1. GENERAL

This report presents the results of our geotechnical engineering exploration performed for the *Apron Light Replacement* project located at the Lanai Airport on the Island of Lanai, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

This report summarizes the findings and geotechnical recommendations resulting from our field exploration, laboratory testing, and engineering analyses for the project. These findings and geotechnical recommendations are intended for the design of the light pole foundations only. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

1.1 Project Considerations

The project site is located at the Lanai Airport on the Island of Lanai, Hawaii. Based on the information provided, we understand the existing apron lighting system will be replaced with a new lighting system to meet Maui County's new outdoor lighting standards. In addition, we understand that all street and building-mounted exterior lighting on Lanai Airport property will also be replaced.

The following structural loading information was provided by the structural engineer on April 7, 2025, and used for the foundation design analyses of the new light pole structures.

FACTORED STRUCTURAL LOADING INFORMATION	
Apron (60 ft) Light Pole	
Axial Loading	14 kip
Shear Loading	5 kip
Moment Loading	138 kip-foot
Parking Light Pole	
Axial Loading	4 kip
Shear Loading	2 kip
Moment Loading	14 kip-foot

1.2 Purpose and Scope

The purpose of our exploration was to obtain an overview of the surface and subsurface conditions at the site to develop a soil and/or rock data set to formulate geotechnical recommendations in support of the design of the Apron Light Replacement project at Lanai Airport. The work was performed in general accordance with our revised fee proposal dated January 17, 2023. The scope of work for this exploration included the following tasks and work efforts:

1. Research and review of the available reports/plans, in-house soil, and geologic information related to the project site.

2. Application for FAA 7460 permits and One–Call utility clearance.

3. Coordination of site access and underground utility toning by our engineer or geologist.

4. Preparation of an accident prevention plan with activity hazard analysis in support of our field exploration activities.

5. Retaining soil cuttings, drilling fluids, and safety disposables in the DOT-approved 55-gallon steel drums and stored them to be tested and disposed of by others as appropriate.

6. Mobilization and demobilization of a truck-mounted drill rig, support truck, and two operators from Honolulu to the project site and back.

7. Drilling and sampling of seven borings, each extending to depths of about 16.5 to 21.5 feet below the existing ground surface.

8. Backfilling the borings with non-shrink grout and topped with fast-setting concrete upon completion of the drilling, sampling, and field testing work.

9. Coordination of the field exploration and logging of the borings by our geologist.

10. Geotechnical laboratory testing of selected samples obtained during the field exploration as an aid in classifying the materials and evaluating their engineering properties.

11. Analyses of the field and laboratory data to formulate geotechnical recommendations for the design of the project.

12. Preparation of a technical memorandum and this report summarizing our work and presenting our findings and geotechnical recommendations for the project.

13. Coordination of our overall work on the project by our engineer.

14. Quality assurance of our work and client/design team consultation by our principal engineer.

15. Miscellaneous work efforts, such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration methodology and the Logs of Borings are presented in Appendix A. Results of the laboratory tests performed on selected soil samples are presented in Appendix B.

END OF GENERAL

SECTION 2. SITE CHARACTERIZATION

2.1 Regional Geology

The Island of Lanai is a shield volcano built by eruptions at the summit and along three rift zones more than 1.20 to 1.46 million years ago. The principal rift zone trends northwestward as a broad ridge and is responsible for the conspicuous elongation of the island in that direction. A less conspicuous bulge on the southern side of the island is the result of building on the southwest rift zone. The summit of the shield collapsed to form a caldera from which a shallow graben, bordered by an echelon of step faults, extends south-southeast toward Manele Bay. Numerous dikes exposed in the sea cliff indicate that this Manele Graben lies along another rift zone.

The caldera was largely, but not completely, filled by lava flows, and the present Palawai Basin is a remnant of the caldera. Just to the west of it, Miki Basin (with an average diameter of about 0.9 miles) is a nearly filled pit crater. The top of the ridge between these basins is about 140 feet above the floor of the Palawai Basin. On the south, the floor of Palawai Basin merges with the floor of the Manele Graben, where the most recent lava flows in the caldera overflowed onto the outer slope of the volcano.

The Island of Lanai was built by the extrusion of thin-bedded a'a and pahoehoe tholeiitic basaltic flows that are generally inclined at about 6 to 15 degrees from horizontal (where not disturbed by faulting). Volcanic rocks on the Island of Lanai are grouped as the Lanai Volcanic Series. The near-surface soils generally consist of well-drained, fine-textured, and moderately fine-textured soils derived from volcanic ash and the in-situ weathering of the igneous rocks. The formation of the Island of Lanai is also the result of large changes in sea-level that caused submergence and re-emergence of the land mass through geologic time. Faulting and stream erosion, in conjunction with changes in sea-level, are also responsible for the high sea cliffs along the southern and western coastlines.

The project site is westerly from the Palawai Basin and is near the foothills of the central mountain portion of the island. The existing Lanai Airport was built in terraces through the

mountain range with Kapano Gulch traversing northeast of the site and Kaiholena Gulch across the north of the airport limits in an east-west direction. Most of the soils in the project area are alluvium and residual/saprolitic soils, derived from the gulch/stream depositions and in-situ weathering of volcanic ash and igneous rock. In general, the residual and saprolitic soils grade to basaltic rock formation with depth.

2.2 Existing Site Conditions

The proposed project site is located at the existing Lanai Airport on the Island of Lanai, Hawaii. Our field exploration involved working within the Air Operation Area (AOA) as well as in the existing airport parking lots.

Majority of the project site was covered with asphalt concrete pavement. At the time of our field exploration, the parking area consisted mainly of passenger vehicles and pick-up trucks. The existing pavement was observed to be in fairly good condition. However, some minor pavement cracks were observed on the surface of the parking lots in isolated areas.

Based on Google Earth™, the project site terrain was relatively flat with existing ground surface elevations ranging from about +1,293 to +1,309 feet Mean Sea Level (MSL).

2.3 Subsurface Conditions

We explored the subsurface conditions by drilling and sampling seven borings, designated as Boring Nos. 1 through 7, extending to depths of about 16.5 to 21.5 feet below the existing ground surface. The approximate boring locations are shown on the Site Plan, Plate 2.

Based on our field exploration, the project site is generally underlain by a thin layer of surficial fills overlying alluvium and residual soils. The surficial fill soils generally consisted of 3 to 8 inches of asphaltic concrete and sandy gravel aggregate base. Underlying the asphalt pavement section, alluvial deposits consisting of medium stiff to very stiff clayey silt and silty clay were encountered at about 0.5 to 1 foot below the existing ground surface. The residual soils encountered in our borings drilled consisted of medium stiff to hard silty soils extending to depths of about 16.5 to 21.5 feet below the existing ground surface.

We did not encounter groundwater in the borings at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

Detailed descriptions of the field exploration methodology and graphic representations of the materials encountered in the borings are presented on the Logs of Borings in Appendix A. We performed laboratory tests on selected soil samples obtained during our field exploration, and the test results are presented in Appendix B.

2.4 Seismic Design Considerations

Based on the International Building Code, 2018 Edition (IBC 2018), the project site may be subject to seismic activity, and seismic design considerations will need to be addressed. The following sections provide discussions on the soil profile type for seismic design and liquefaction design consideration at the project site.

Based on the subsurface materials encountered at the project site and the geologic setting of the area, we believe that the project site may be classified as a "Stiff Soil Profile" from a seismic analysis standpoint. Therefore, we believe the seismic design of the building structures may be designed based on a Site Class D soil profile in accordance with Chapter 20, Site Classification Procedure for Seismic Design, contained in ASCE Minimum Design Loads for Buildings and Other Structures, 2010 Edition (ASCE 7-10).

Based on a Site Class D soil profile, the following seismic design parameters shown in the table below were estimated and may be used for the seismic analysis of the project site.

SEISMIC DESIGN PARAMETERS	
Parameter	**Value**
Peak Bedrock Acceleration, PBA (Site Class B)	0.309g
Mapped MCE Spectral Response Acceleration, S_S (Site Class B)	0.757g
Mapped MCE Spectral Response Acceleration, S_1 (Site Class B)	0.209g
Site Class	"D"
Site Coefficient, F_{pga}	1.291

SEISMIC DESIGN PARAMETERS	
Parameter	**Value**
Site Coefficient, F_a	1.197
Site Coefficient, F_v	2.182
Design Peak Ground Acceleration, PGA (Site Class D)	0.266g
Design Spectral Response Acceleration, S_{DS}	0.604g
Design Spectral Response Acceleration, S_{D1}	0.304g

Based on the subsurface conditions encountered, the phenomenon of soil liquefaction is not a design consideration for this project site. The risk for potential liquefaction is non-existent based on the subsurface conditions encountered (relatively stiff alluvium and residual soils in the absence of groundwater).

END OF SITE CHARACTERIZATION

SECTION 3. DISCUSSION AND RECOMMENDATIONS

Based on our field exploration, the project site is generally underlain by a thin layer of surficial fill overlying relatively stiff alluvium and residual soils extending to depths of about 16.5 to 21.5 feet below the existing ground surface. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

We recommend designing a cast-in-place concrete drilled shaft foundation system to support the proposed new apron lighting structures. We envision that drilled shaft foundations with diameters of 24 or 30 inches may be used to support the new apron light structures with a minimum embedment length of 10 to 15 feet below the designed finished grade.

A detailed discussion of these items and other geotechnical aspects of the project is further discussed in the following sections.

3.1 Drilled Shaft Foundations

To develop the required bearing and lateral load resistances, we recommend that the new light pole structures be supported by a deep foundation system consisting of cast-in-place concrete drilled shafts. Detailed discussions and recommendations for foundation design are presented in the following sections.

3.1.1 Compressive Load Capacity

Based on the structural load demands provided and the subsoil conditions encountered at the project site, we recommend installing 24 to 30-inch diameter drilled shaft foundations with a minimum embedment length of 10 to 15 feet below the designed finished grade to support the new light pole structures. Our recommendations pertaining to the drilled shaft capacities and estimated lengths are presented in the table below.

COMPRESSIVE LOAD CAPACITIES OF DRILLED SHAFT FOUNDATIONS			
Light Pole Type	**Drilled Shaft Diameter** (inches)	**Drilled Shaft Length** (feet)	**Allowable Compressive Load Capacity** (kips)
Apron Light	24	15	45
	30		55
Parking	24	10	30
	30		40

The allowable compressive load capacities for the drilled shafts presented above are for supporting dead-plus-live loads. The compressive load capacities may be increased by up to one-third (⅓) when considering transient loads, such as wind or seismic forces.

3.1.2 Lateral Load Resistance

The lateral load resistance of drilled shafts is a function of the stiffness of the surrounding soil, the stiffness of the drilled shaft, allowable deflection at the top of the drilled shaft, and the induced moment in the drilled shaft. The lateral load analyses were performed using the program *LPILE*, which is a microcomputer adaptation of a finite difference, laterally loaded deep foundation program originally developed at the University of Texas at Austin. The program solves for deflection and bending moment along a deep foundation under lateral loads as a function of depth. The analysis was carried out with the use of non-linear "p-y" curves to represent soil moduli. The lateral deflection was then computed using the appropriate soil moduli at various depths.

Based on the provided structural loads and the subsurface conditions encountered during our field exploration, we performed the lateral load analyses for the above drilled shaft foundations. The results of our analyses are summarized in the table below. The project structural engineer should verify the drilled shaft structural capacity for the calculated induced stresses.

LATERAL LOAD CAPACITY AND MAXIMUM INDUCED MOMENT FOR APRON LIGHT POLE				
Pile Diameter (inches)	**Drilled Shaft Length** (feet)	**Lateral Deflection** (inches)	**Maximum Induced Moment** (kip-feet)	**Depth to Maximum Moment** (feet)
24	15	0.4	141	1.3
30		0.1	141	1.3
NOTE: Lateral load analysis based on concrete compressive strength of 4,000 psi and a minimum of 1% longitudinal steel reinforcement.				

LATERAL LOAD CAPACITY AND MAXIMUM INDUCED MOMENT FOR PARKING LIGHT POLE				
Pile Diameter (inches)	**Drilled Shaft Length** (feet)	**Lateral Deflection** (inches)	**Maximum Induced Moment** (kip-feet)	**Depth to Maximum Moment** (feet)
24	10	0.005	15	1.4
30		0.002	15	1.5
NOTE: Lateral load analysis based on concrete compressive strength of 4,000 psi and a minimum of 1% longitudinal steel reinforcement.				

3.1.3 Foundation Settlement

Settlement of the drilled shaft foundations will result from elastic compression of the shaft and subgrade response of the foundation embedded in the soils encountered at the site. The total settlement of the drilled shaft is estimated to be less than 0.5 inches. We believe that a significant portion of the settlement will be elastic and should occur as the loads are applied.

3.1.4 Drilled Shaft Construction Considerations

In general, the performance of drilled shafts depends significantly upon the contractor's method of installation and construction procedures. The following conditions would have a significant effect on the effectiveness and cost of the drilled shaft foundations.

The load-bearing capacities of the drilled shafts depend, to a significant extent, on the friction between the shaft and the surrounding soils. Therefore, proper construction techniques, especially during the drilling operations, are important. The contractor should exercise care in drilling the shaft holes and placing concrete into the drilled holes.

We recommend placing concrete using the tremie method during drilled shaft construction. A low-shrink concrete mix with a high slump (7 to 9-inch slump range) should be used to provide close contact between the drilled shafts and the surrounding soil. The concrete should be placed in a suitable manner to reduce the potential for segregation of the aggregates from the concrete mix. In addition, the concrete should be placed promptly after drilling (within 24 hours after drilling the holes) to reduce the potential for softening of the sides of the drilled hole.

It is imperative for a Geolabs representative to be present at the project site to observe the drilling and installation of the drilled shafts during construction. Although the drilled shafts are designed primarily based on skin friction, the bottom of the drilled holes should be relatively free of loose materials prior to the placement of concrete. Therefore, it is necessary for Geolabs to observe the drilled shaft installation operations to confirm the subsurface conditions, and should be designated as a "Special Inspection" item in accordance with Section 1704 of the IBC 2018 Edition.

3.2 Corrosion Potential

Four sets of laboratory corrosivity tests, including pH (ASTM G51), Minimum Resistivity (ASTM G57), Chloride Content (EPA 300.0), and Sulfate Content (EPA 300.0), were performed (by our office and CERCO Analytical, Inc.) on selected soil samples obtained from our field exploration. The test results are summarized and presented on Plate B-12 of Appendix B.

Resistivity is generally recognized as one of the most significant soil characteristics with regard to the corrosivity of the soil to buried metallic objects. In general, the lower the resistivity, the greater the potential for corrosion of the buried metallic structure. Conversely, the higher the resistivity, the less likely the soil will contribute to the corrosion of metallic objects.

On the basis of the laboratory resistivity and pH results, the subsurface soils at the project site have resistivity values ranging from approximately 900 to 3,000 ohm-cm and pH values of between 6.5 and 8.0 within the upper 5 feet of soils, corresponding to a corrosion rating of 1 to 2 (Extremely Corrosive to Very Corrosive) based on the guidelines provided by the City & County of Honolulu – Board of Water Supply. Therefore, we recommend properly designing near-surface metallic substructures for protection against the potential for corrosion.

The method used to control the corrosion of underground concrete structures is dependent, in part, on the chloride and sulfate content found in the soil. In general, soils with a chloride content of less than 500 parts per million (ppm), sulfate content of less than 2,000 ppm, and a pH greater than 5.0 may be considered "non-corrosive" to underground concrete pipelines and structures.

Based on the relatively low values of chloride content and sulfate content tested on the in-situ materials, we believe that the near-surface soils at the project site may be considered "non-corrosive" and either Type I or Type II (Type I/II) cement may be used for the concrete in contact with the ground. It may be appropriate to consult with a professional corrosion engineer to review the test results and provide detailed recommendations for corrosion protection.

3.3 Design Review

Preliminary and final drawings and specifications for the proposed construction should be forwarded to Geolabs for review and written comments prior to bid advertisement and/or construction. This review is needed to evaluate the conformance of the plans and specifications with the intent of the earthwork and foundation recommendations provided herein. If this review is not made, Geolabs cannot assume responsibility for the misinterpretation of our recommendations.

3.4 Construction Monitoring

Due to the variability in the subsurface conditions, it is recommended to retain Geolabs for geotechnical engineering services during the construction of the project. The following are critical items of construction monitoring that require "Special Inspection":

- Observation of drilled shaft foundation installation

A Geolabs representative should monitor other aspects of earthwork construction to observe compliance with the intent of the design concepts, specifications, and/or recommendations and to expedite suggestions for design changes that may be required in the event that subsurface conditions differ from those anticipated at the time this report was prepared. The recommendations presented herein are contingent upon such observations.

If the actual exposed subsurface soil conditions encountered during construction differ from those assumed or considered in this report, Geolabs should be contacted to review and/or revise the geotechnical recommendations presented herein.

END OF DISCUSSION AND RECOMMENDATIONS

SECTION 4. LIMITATIONS

The analyses and recommendations submitted herein are based in part upon information obtained from the field boring locations. Variations of the subsurface conditions between and beyond the field borings and bulk samples may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented herein.

The field boring locations indicated herein are approximate, having been estimated by using a handheld Global Positioning System (GPS) to field-locate selected locations from referenced points shown on the Site Plan transmitted by Ronald N.S. Ho & Associates, Inc. in May 2024. The field boring locations should be considered accurate only to the degree implied by the methods used.

The stratification breaks shown on the graphic representations of the borings depict the approximate boundaries between soil types and, as such, may denote a gradual transition. Groundwater was not encountered at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

This report has been prepared for the exclusive use of Ronald N.S. Ho & Associates and their project consultants for specific application to the design of the *Apron Lighting Replacement* project at the Lanai Airport in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the architect and engineers in the design of the proposed project. Therefore, this report may not contain sufficient data or the proper information to serve as a basis for detailed construction cost estimates.

The owner/client should be aware that unanticipated soil conditions are commonly encountered. Unforeseen subsurface conditions, such as perched groundwater, soft deposits, hard layers, or cavities, may occur in localized areas and may require additional probing or corrections in

the field (which may result in construction delays) to attain a properly constructed project. Therefore, a sufficient contingency fund is recommended to accommodate these possible extra costs.

This geotechnical engineering exploration conducted at the project site was not intended to investigate the potential presence of hazardous materials existing at the project site. It should be noted that the equipment, techniques, and personnel used to conduct a geo-environmental exploration differ substantially from those applied in geotechnical engineering.

END OF LIMITATIONS

CLOSURE

The following plates and appendices are attached and complete this report:

-ΩΩΩΩΩΩΩΩΩ-

Respectfully submitted,

GEOLABS, INC.

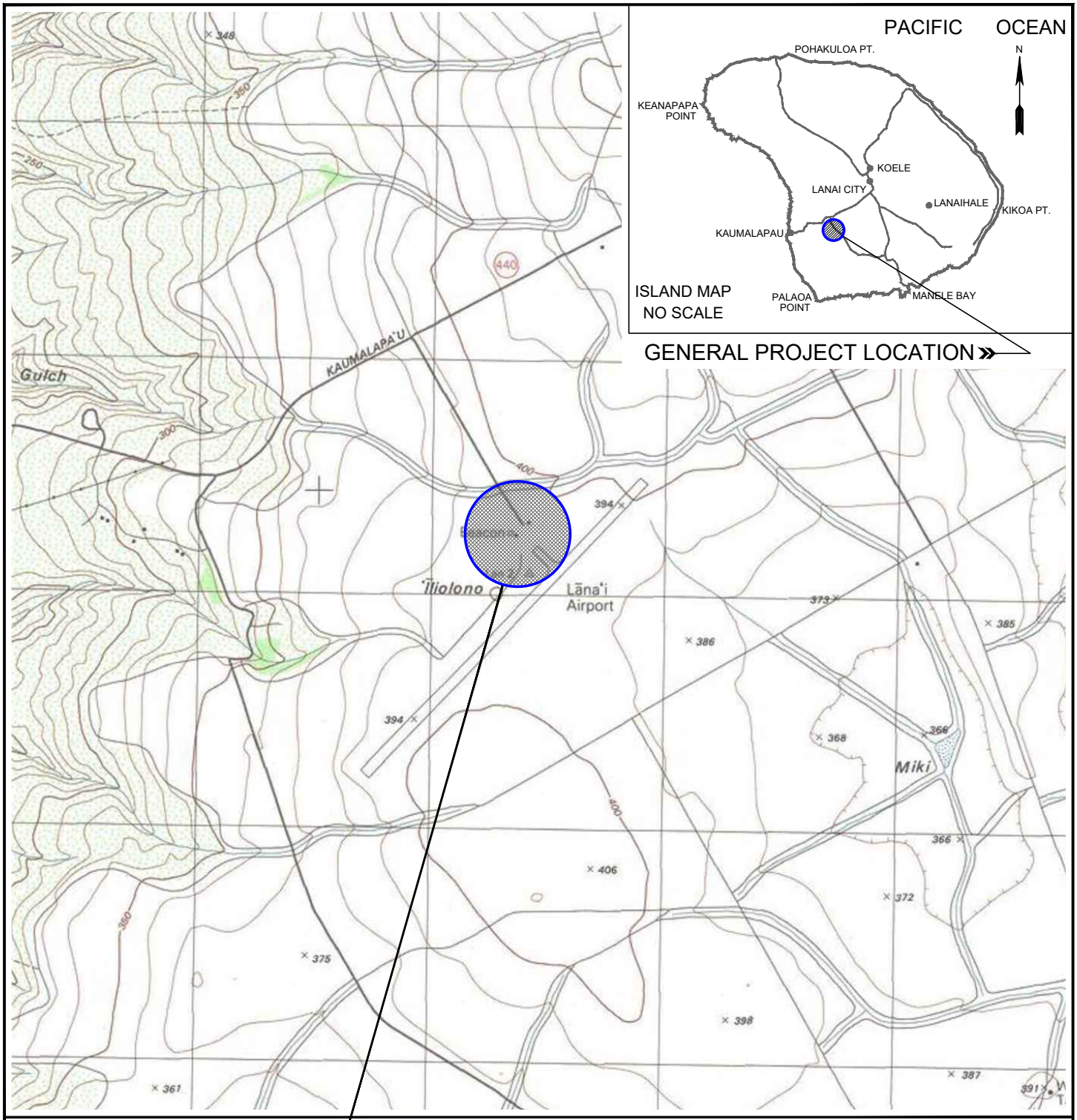
By _____
Taylor Onizuka, P.E.
Project Engineer

By _____
John Y.L. Chen, P.E.
Vice President

JC:TO:lf

h:\8800Series\8860.to2

PLATES



PROJECT LOCATION MAP

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

2000 1000 0 2000 FT.

GRAPHIC SCALE

N

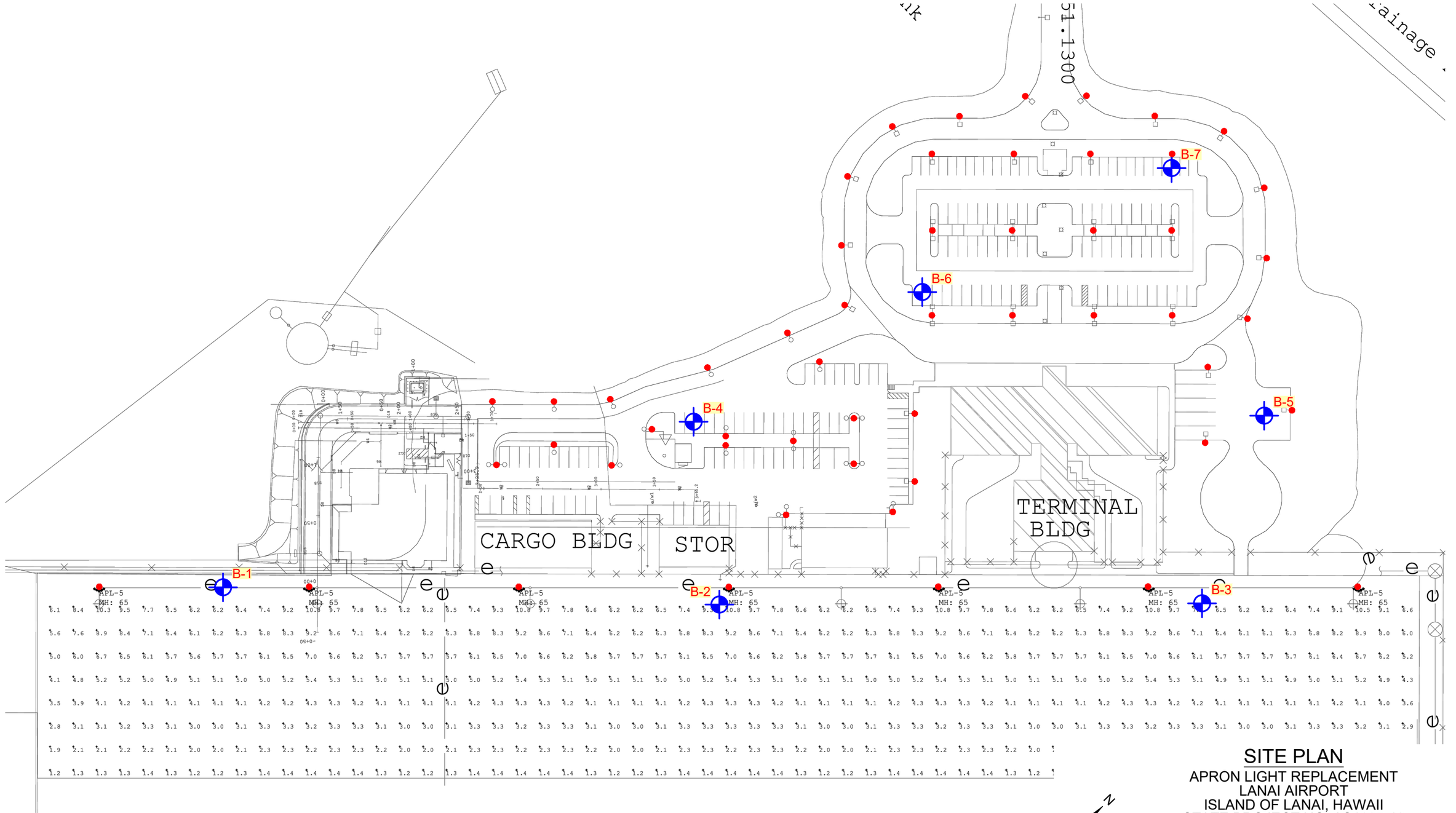
NOTE: CONTOURS ARE IN METERS.

REFERENCE: MAP CREATED WITH TOPO!® ©2010 NATIONAL GEOGRAPHIC; ©2007 TELE ATLAS, REL. 1/2007.

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
SEPTEMBER 2024	KHN	1
SCALE	W.O.	
1" = 2,000'	8860-00	

CAD User: KIM File Last Updated: September 19, 2024 7:30:53pm Plot Date: September 19, 2024 - 7:33:42pm
File: T:\Drafting\Working\8860-00_Lanai_Airport_Apron_Light\8860-00PLM.dwg\1
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-No-Dither-RBGC-HEAVY.ctb



LEGEND:

APPROXIMATE BORING LOCATION

LIGHT

REFERENCE: SITE PLAN TRANSMITTED BY RONALD N.S. HO & ASSOCIATES, INC. IN MAY, 2024.

0 40 80 160 240 FT.

GRAPHIC SCALE

SITE PLAN

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
SEPTEMBER 2024	KHN	2
SCALE	W.O.	
1" = 80'	8860-00	

APPENDIX A

A P P E N D I X A

Field Exploration

We explored the subsurface conditions at the project site by drilling and sampling seven borings, designated as Boring Nos. 1 through 7, extending to depths of about 16.5 to 21.5 feet below the existing ground surface. The approximate boring locations are shown on the Site Plan, Plate 2. The borings were drilled using a truck-mounted drill rig equipped with continuous flight augers.

Our geologist classified the materials encountered in the borings by visual and textural examination in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils, and monitored the drilling operations on a near-continuous (full-time) basis. These classifications were further reviewed visually and by testing in the laboratory. Soils were classified in general accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), as shown on the Soil Log Legend, Plate A-0.1. Deviations made to the soil classification in accordance with ASTM D2487 are described on the Soil Classification Log Key, Plate A-0.2. Graphic representations of the materials encountered are presented on the Logs of Borings, Plates A-1 through A-7.

Relatively "undisturbed" soil samples were obtained in general accordance with ASTM D3550, Ring-Lined Barrel Sampling of Soils, by driving a 3-inch OD Modified California sampler with a 140-pound hammer falling 30 inches. In addition, some samples were obtained from the drilled borings in general accordance with ASTM D1586, Penetration Test and Split-Barrel Sampling of Soils, by driving a 2-inch OD standard penetration sampler using the same hammer and drop. The blow counts needed to drive the sampler the second and third 6 inches of an 18-inch drive are shown as the "Penetration Resistance" on the Logs of Borings at the appropriate sample depths. The penetration resistance shown on the Logs of Borings indicates 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.

Pocket penetrometer tests were performed on selected cohesive soil samples retrieved in the field. The pocket penetrometer test provides an indication of the unconfined compressive strength of the sample. Pocket penetrometer test results are summarized on the Logs of Borings at the appropriate sample depths.

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 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

Soil Classification Log Key

(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR 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**)
- **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.
- **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**)

COHESIVE SOIL (- #200 ≥ 50%)

- **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, 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 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

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)

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).

Plate

A-0.2

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

1

Laboratory			Field								Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	**Description**
											11-inch **CONCRETE**
	43	75			15	4.5				GW	Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
										MH	Brown **CLAYEY SILT**, medium stiff to stiff, dry (alluvium)
	41				7						
Direct Shear	39	67			12	3.0	5			MH	Reddish brown **CLAYEY SILT** with traces of sand, medium stiff, dry (residual soil)
TXUU S_u=2.0 ksf	43	72			13	3.0	10				
	39				23		15			MH	Grayish brown **CLAYEY SILT** with a little sand, very stiff, moist (residual soil)
	48	67			41	4.5	20				grades to reddish brown
											Boring terminated at 21.5 feet
							25				

Date Started:	July 1, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	July 1, 2024			
Logged By:	D. Gremminger	Drill Rig:	CME-45C TRUCK	A - 1
Total Depth:	21.5 feet	Drilling Method:	4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

2

Approximate Ground Surface Elevation : N/A

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	Description
									GM	3-inch **ASPHALTIC CONCRETE**
	27	90			33	4.5			MH	Brownish gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
LL=53 PI=23 TXUU S_u=1.4 ksf	32	76			13					Reddish brown **CLAYEY SILT**, very stiff, dry (alluvium) grades to stiff
					16	2.5	5		MH	Brown with tan mottling **CLAYEY SILT** with traces of sand, stiff, moist (residual soil)
	46				5		10			grades to dark brown, medium stiff
	39	82			77	4.5	15		MH	Brown with reddish mottling **CLAYEY SILT** with a little sand and traces of decomposed gravel, hard, moist (residual soil)
	48				13		20		MH	Reddish brown **CLAYEY SILT**, stiff, moist (residual soil)
							25			Boring terminated at 21.5 feet

Date Started:	July 1, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	July 1, 2024			
Logged By:	D. Gremminger	Drill Rig:	CME-45C TRUCK	
Total Depth:	21.5 feet	Drilling Method:	4" Solid-Stem Auger	A - 2
Work Order:	8860-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

3

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											8-inch **ASPHALTIC CONCRETE**
										GW	Gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
	26	90			26	4.5				CH	Reddish brown **SILTY CLAY**, stiff to very stiff, dry (alluvium)
	25				15						
Direct Shear	27	83			20	3.5	5			MH	Brown with orange mottling **CLAYEY SILT** with a little sand and traces of decomposed gravel, stiff to very stiff, moist (residual soil)
LL=55 PI=12	38	74			27	4.5	10				grades to reddish brown
	40				24		15			SM	Brown **SILTY SAND** with a little gravel, very dense, dry (saprolite)
Sieve - #200 = 45.5%	34	81			58		20				
											Boring terminated at 21.5 feet
							25				

Date Started:	July 1, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	July 1, 2024			
Logged By:	D. Gremminger	Drill Rig:	CME-45C TRUCK	A - 3
Total Depth:	21.5 feet	Drilling Method:	4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

4

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											6-inch **ASPHALTIC CONCRETE**
										GW	Grayish brown **SANDY GRAVEL (BASALTIC)**,
Direct Shear	25	84			22	4.5				MH	dry (fill)
	30				11						Brown **CLAYEY SILT**, medium stiff to stiff, dry (alluvium)
TXUU S_u=1.3 ksf	43	70			17	4.0	5				grades with orange mottling
										MH	Orangish brown **CLAYEY SILT**, stiff, dry (residual soil)
LL=51 PI=14	47				12		10				
	49	66			23		15				grades to brown with multi-color mottling
											Boring terminated at 16.5 feet
							20				
							25				

Date Started:	July 2, 2024	Water Level: ▽ Not Encountered	Plate
Date Completed:	July 2, 2024		
Logged By:	D. Gremminger	Drill Rig: CME-45C TRUCK	A - 4
Total Depth:	16.5 feet	Drilling Method: 4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

5

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											6-inch **ASPHALTIC CONCRETE**
	30	80			17	4.0				GW MH	Grayish brown **SANDY GRAVEL (BASALTIC)**, dry (fill)
	39				8						Orangish brown **CLAYEY SILT** with traces of sand, medium stiff to stiff, dry (residual soil)
LL=55 PI=18	42	64			15	4.5	5				grades to brown with orange mottling
										MH	Dark grayish brown with red mottling **CLAYEY SILT** with some sand, medium stiff, moist (residual soil)
TXUU S_u=1.2 ksf	55	58			11	3.0	10				
	43				21		15				grades to orangish brown, very stiff
	47	71			31		20				grades to grayish brown with multi-color mottling
							25				Boring terminated at 21.5 feet

Date Started:	July 2, 2024	Water Level: ▽	Not Encountered	Plate
Date Completed:	July 2, 2024			
Logged By:	D. Gremminger	Drill Rig:	CME-45C TRUCK	A - 5
Total Depth:	21.5 feet	Drilling Method:	4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

6

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
										GW	4-inch **ASPHALTIC CONCRETE**
	21	76			39	4.5				MH	Brownish gray **SANDY GRAVEL (BASALTIC)**, dry (fill)
	21				28						Reddish brown **CLAYEY SILT** with a little sand, very stiff (residual soil)
	20	75			34	4.5	5				grades to orangish brown with some sand
										ML	Grayish brown **SANDY SILT** with some sand, very stiff, dry (residual soil)
LL=48 PI=4	30				28		10				
TXUU S_u=12.4 ksf	34	81			70	4.5	15			CH	Brown with multi-color mottling **SILTY CLAY**, hard, dry (residual soil)
											Boring terminated at 16.5 feet
							20				
							25				

Date Started:	July 2, 2024	Water Level: ▼ Not Encountered	Plate
Date Completed:	July 2, 2024		
Logged By:	D. Gremminger	Drill Rig: CME-45C TRUCK	A - 6
Total Depth:	16.5 feet	Drilling Method: 4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy: 140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.

Geotechnical Engineering

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Log of Boring

7

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A **Description**
											3-inch **ASPHALTIC CONCRETE**
	29	72			43	4.5				GW MH	Brownish gray **SANDY GRAVEL (BASALTIC)** with a little silt, dry (fill)
	27				29					MH	Brown **CLAYEY SILT** with a little sand and traces of decomposed gravel, very stiff, dry (residual soil)
Direct Shear	30	75			37	4.5	5				Orangish brown with tan mottling **CLAYEY SILT** with a little sand, very stiff, dry (residual soil)
	29				14		10				grades to grayish brown with tan mottling, stiff
										SM	Grayish brown **SILTY SAND** with a little decomposed gravel, medium dense, dry (saprolite)
Sieve - #200 = 15.1%	23	81			43		15				
											Boring terminated at 16.5 feet
							20				
							25				

Date Started:	July 2, 2024	Water Level: ▼	Not Encountered	Plate
Date Completed:	July 2, 2024			
Logged By:	D. Gremminger	Drill Rig:	CME-45C TRUCK	A - 7
Total Depth:	16.5 feet	Drilling Method:	4" Solid-Stem Auger	
Work Order:	8860-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 8860-00.GPJ GEOLABS.GDT 9/22/24

APPENDIX B

A P P E N D I X B

Laboratory Tests

Moisture Content (ASTM D2216) and Unit Weight (ASTM D2937) determinations were performed on selected samples as an aid in the classification and evaluation of soil properties. The test results are presented on the Logs of Borings at the appropriate sample depths.

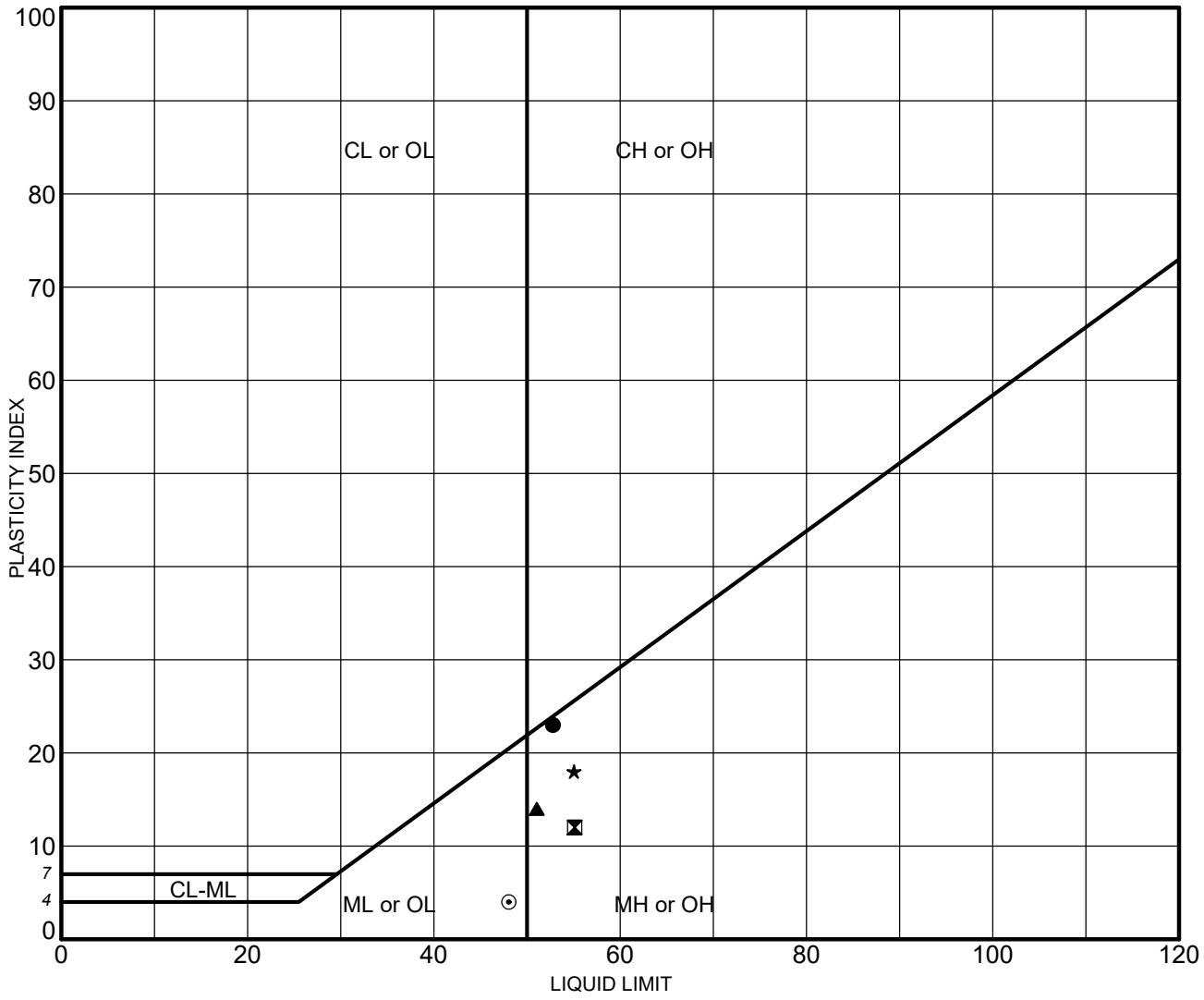
Five Atterberg Limits tests (ASTM D4318) were performed on selected soil samples to evaluate the liquid and plastic limits. The test results are summarized on the Logs of Borings at the appropriate sample depths. A graphic presentation of the test results is provided on Plate B-1.

Two Sieve Analysis tests (ASTM D6913) were performed on selected soil samples to evaluate the gradation characteristics of the soils and to aid in soil classification. Graphic presentations of the grain size distributions are provided on Plate B-2.

Four Direct Shear tests (ASTM D3080) were performed on selected samples to evaluate the shear strength characteristics of the materials tested. The test results are presented on Plates B-3 through B-6.

Five Unconsolidated Undrained Triaxial Compression tests (ASTM D2850) were performed on selected soil samples to evaluate the undrained shear strength of the in situ soils. The approximate in-situ effective overburden pressure was used as the applied confining pressure for the relatively “undisturbed” soil sample. The test results and the stress-strain curves are presented on Plates B-7 through B-11.

Four sets of Corrosivity tests, including pH (ASTM G51), Minimum Resistivity (ASTM G57), Chloride Content (EPA 300.0), and Sulfate Content (EPA 300.0), were performed by our office and CERCO Analytical, Inc. on selected soil samples obtained from our field exploration. The test results are summarized on Plate B-12.



	Sample	Depth (ft)	LL	PL	PI	Description
●	B-2	2.5-4.0	53	30	23	Reddish brown clayey silt (MH)
⊠	B-3	10.0-11.5	55	43	12	Brown w/ orange mottling clayey silt (MH) w/ a little sand & tr. gravel
▲	B-4	10.0-11.5	51	37	14	Orangish brown clayey silt (MH)
★	B-5	5.0-6.5	55	37	18	Orangish brown clayey silt (MH) w/ traces of sand
⊙	B-6	10.0-11.5	48	44	4	Grayish brown sandy silt (ML) with some sand

NP = NON-PLASTIC

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

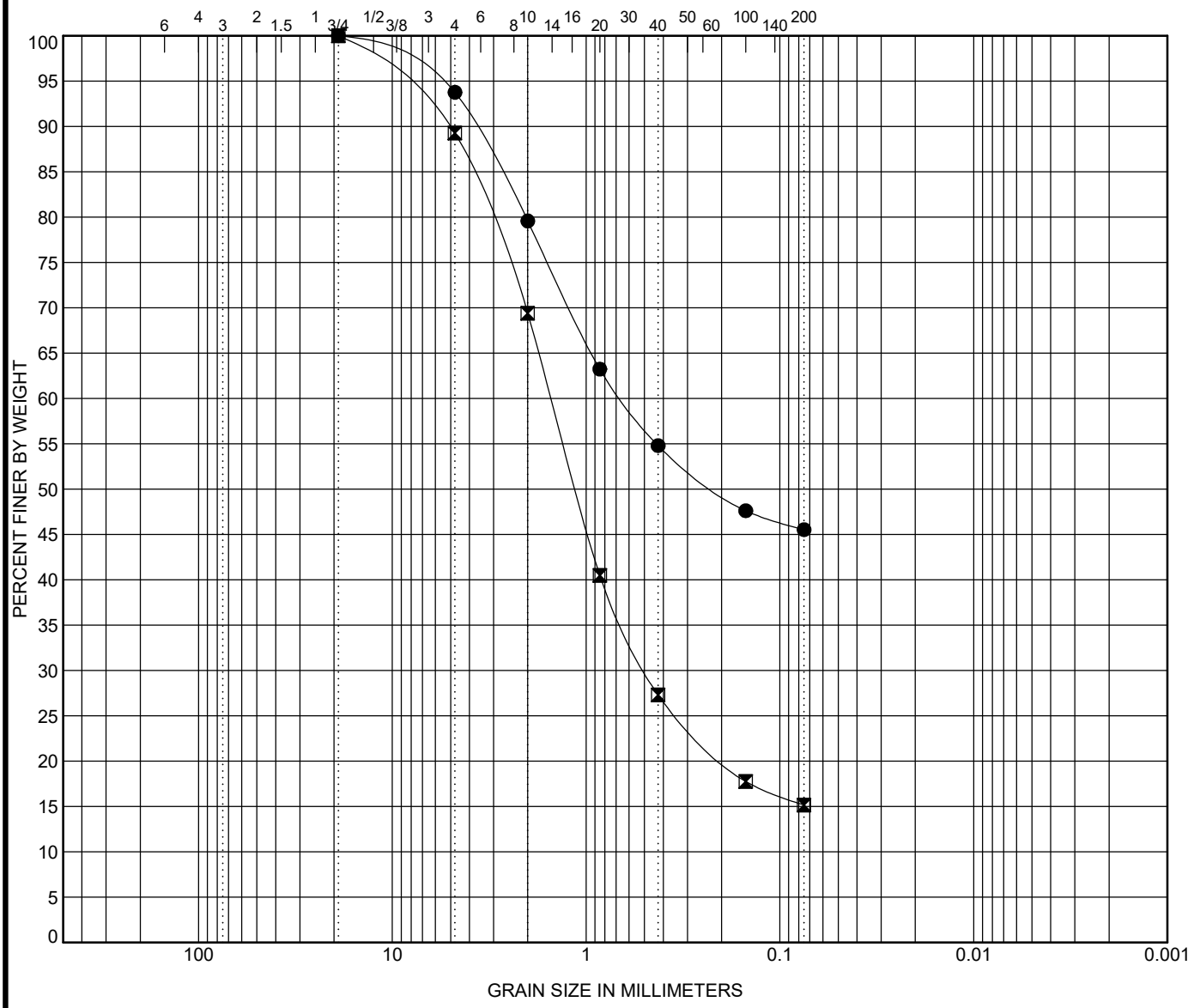
W.O. 8860-00

ATTERBERG LIMITS TEST RESULTS - ASTM D4318

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 1

G ATTERBERG PI-100 LL-120 8860-00.GPJ GEOLABS.GDT 9/22/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	B-3	20.0-21.5	Brown silty sand (SM) with a little gravel					
⊠	B-7	15.0-16.5	Grayish brown silty sand (SM) with a little gravel					

	Sample	Depth (ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Fine
●	B-3	20.0-21.5	19	0.652			6.2	48.2	45.5
⊠	B-7	15.0-16.5	19	1.514	0.49		10.7	74.1	15.1

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

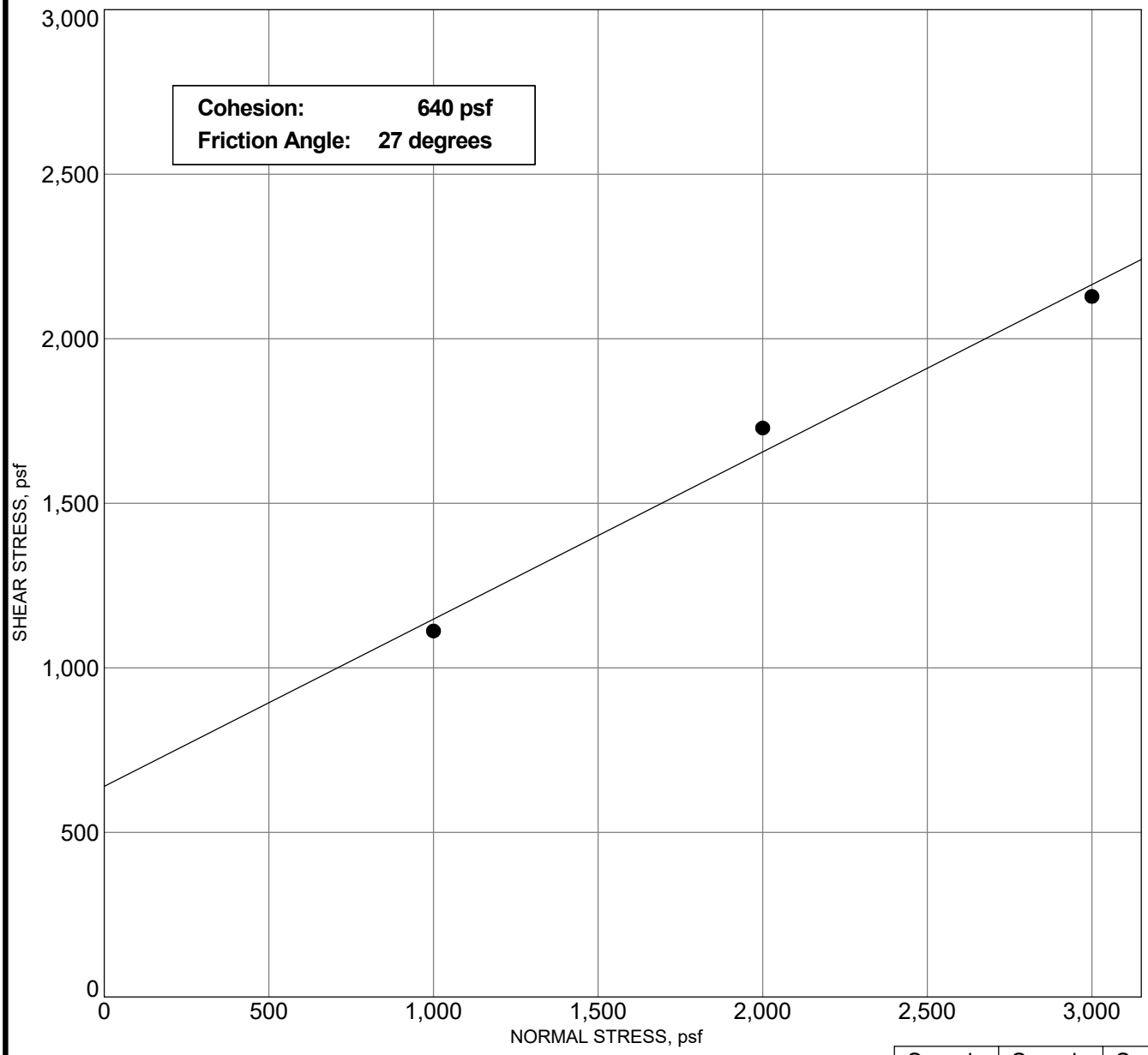
W.O. 8860-00

GRAIN SIZE DISTRIBUTION - ASTM D6913

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 2

G_GRAIN_SIZE_MOD_8860-00.GPJ GEOLABS.GDT 9/30/24



Sample: B-1
Depth: 5.0 - 6.5 feet
Description: Reddish brown clayey silt with traces of sand

Description of Soil Structure: Undisturbed
Oversized material present in sample. Does not meet ASTM minimum sample height requirement

		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	30.7	29.5	36.0
	Dry Density, pcf	69.2	68.7	71.7
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	55.6	50.6	48.7
	Dry Density, pcf	68.3	70.2	74.6
	Height, inches	1.013	0.980	0.961
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0024	0.0016	0.0023
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**1112**	**1729**	**2128**
	Shear Displacement, inches	0.43	0.38	0.41

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

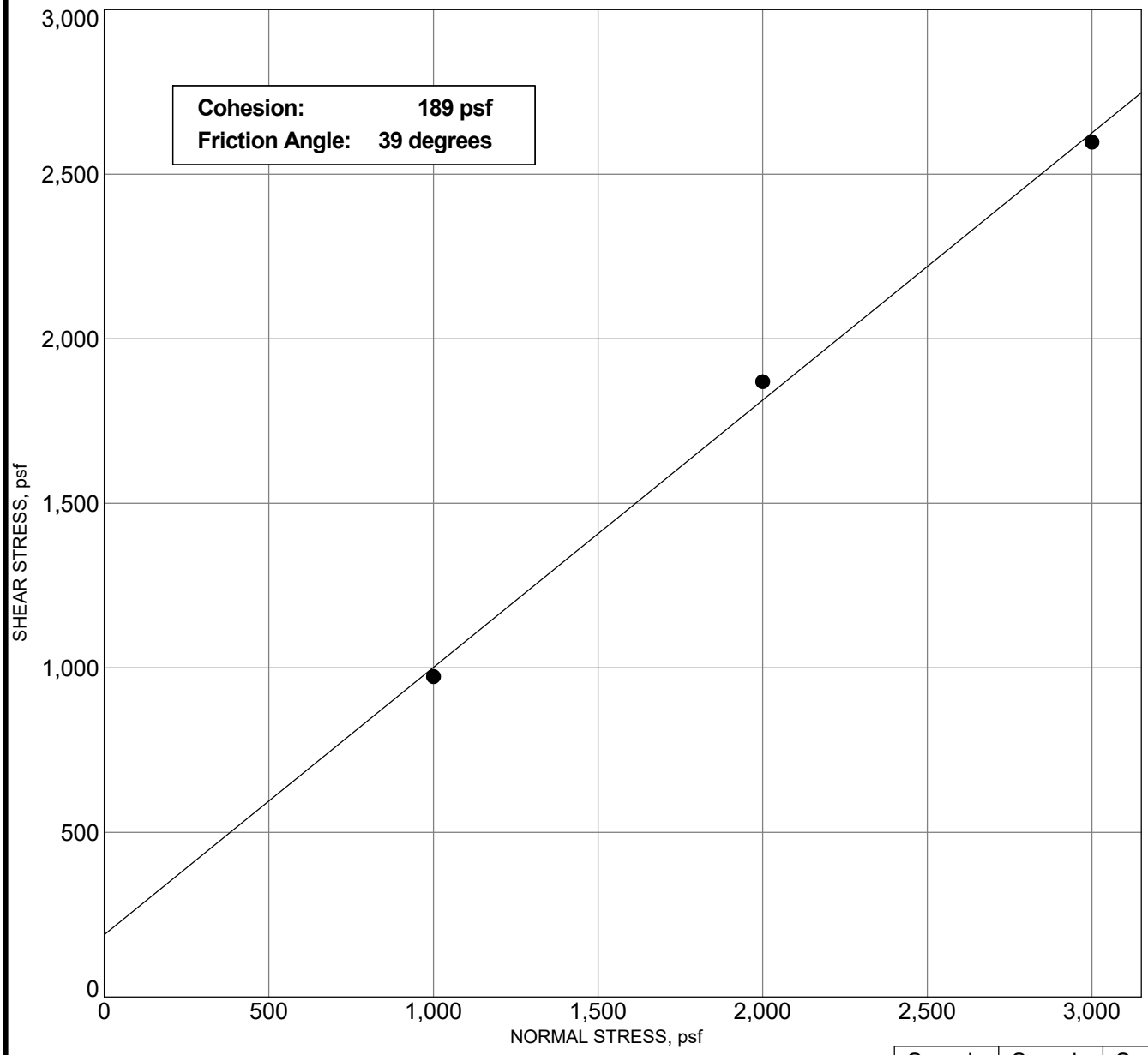
W.O. 8860-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 3

G_DIRECT_SHEAR_2_8860-00.GPJ GEOLABS.GDT 9/22/24



Sample: B-3
Depth: 5.0 - 6.5 feet
Description: Brown with orange mottling clayey silt with a little sand and traces of gravel

Description of Soil Structure: Undisturbed
Oversized material present in sample. Does not meet ASTM minimum sample height requirement

		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	20.5	25.3	21.8
	Dry Density, pcf	79.7	77.7	84.6
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	44.8	43.3	37.2
	Dry Density, pcf	78.6	80.5	87.1
	Height, inches	1.014	0.965	0.972
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0024	0.0016	0.0023
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**973**	**1870**	**2597**
	Shear Displacement, inches	0.42	0.38	0.40

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

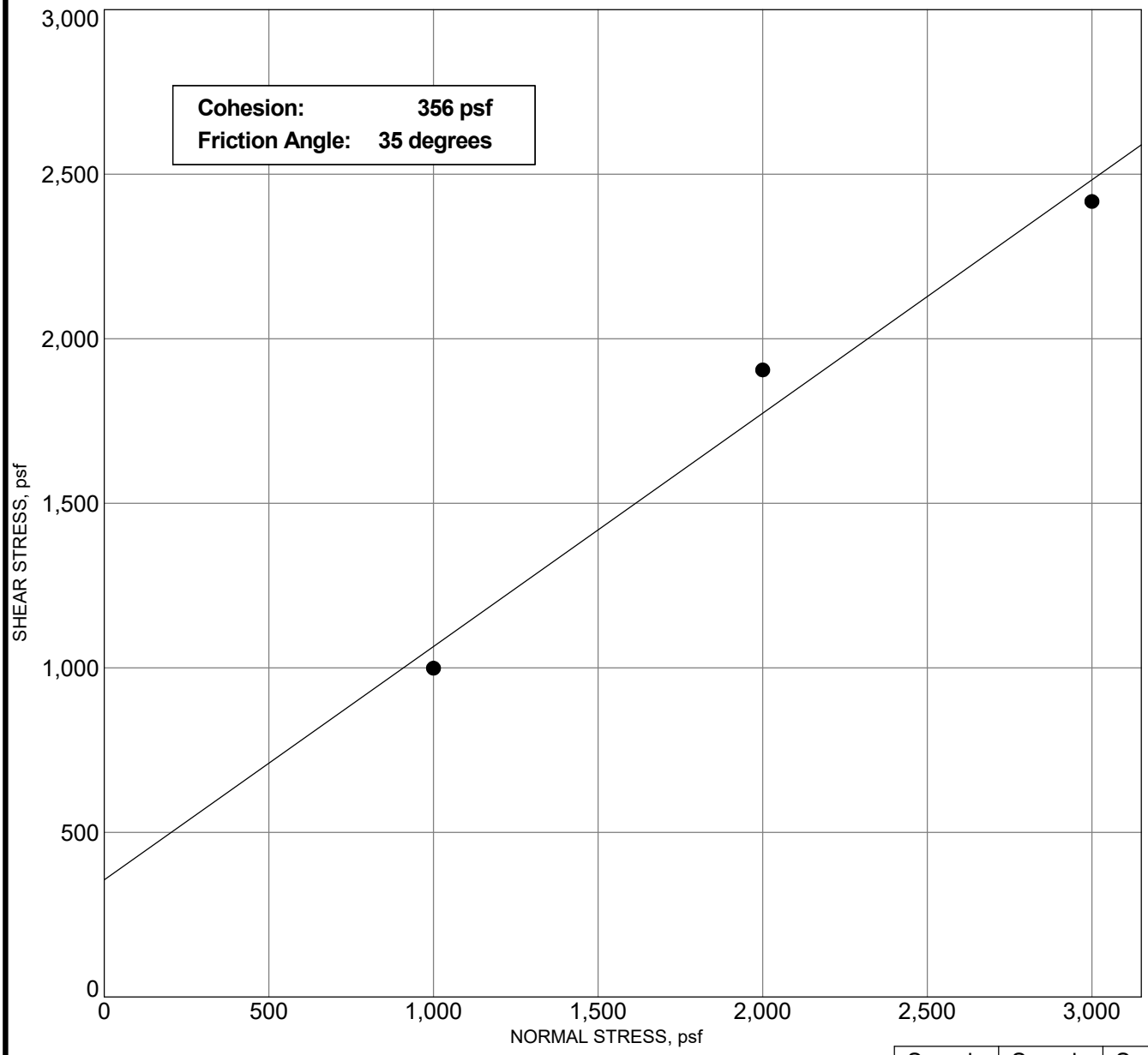
W.O. 8860-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 4

G_DIRECT_SHEAR_2_8860-00.GPJ GEOLABS.GDT 9/22/24



Sample: B-4
Depth: 1.0 - 2.5 feet
Description: Brown clayey silt

Description of Soil Structure: Undisturbed
Oversized material present in sample. Does not meet ASTM minimum sample height requirement

		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	21.9	21.2	20.5
	Dry Density, pcf	87.1	96.8	82.5
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	36.2	31.2	31.8
	Dry Density, pcf	83.9	100.9	85.6
	Height, inches	1.039	0.959	0.964
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0024	0.0022	0.0024
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**999**	**1905**	**2417**
	Shear Displacement, inches	0.43	0.41	0.41

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

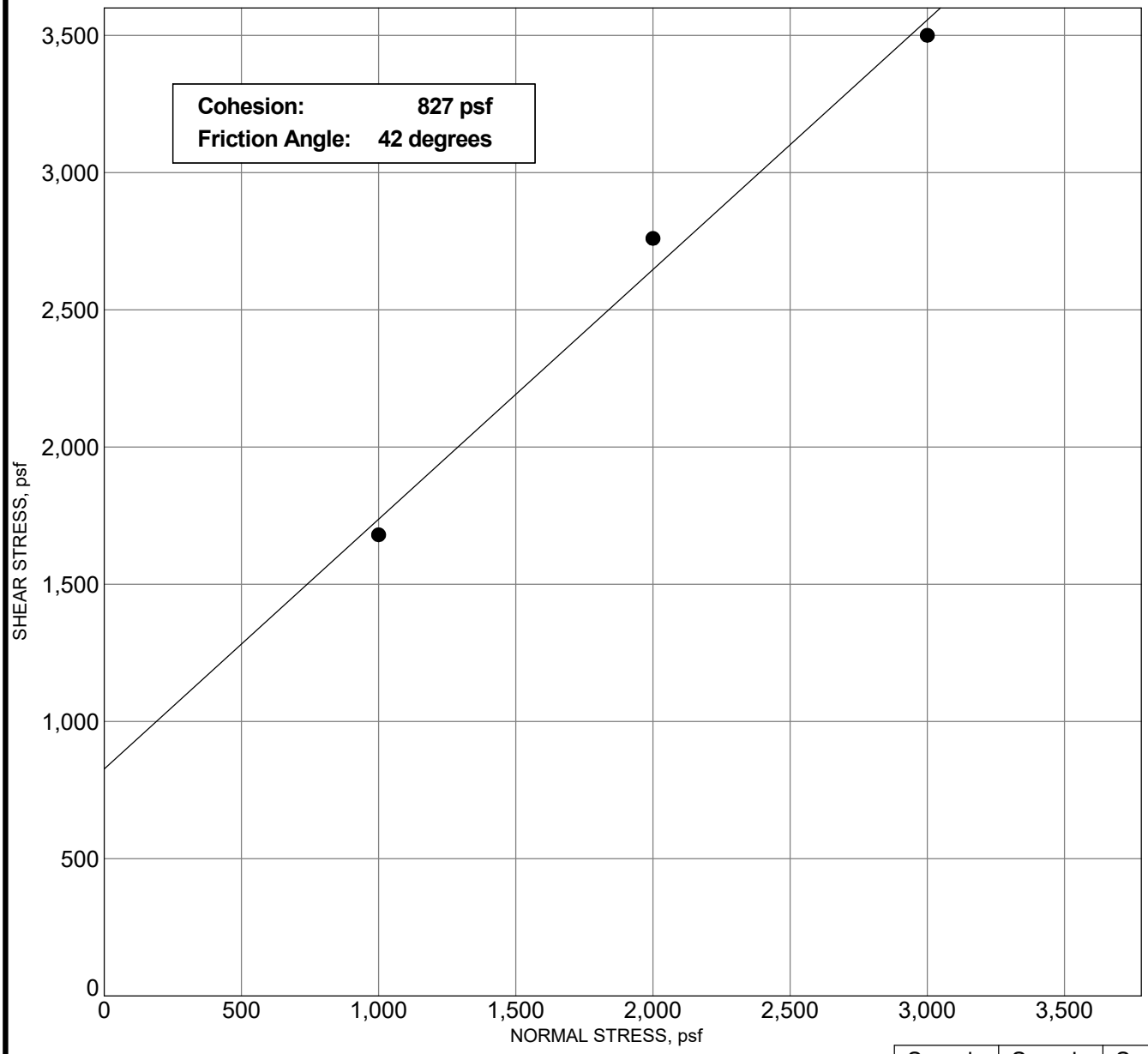
W.O. 8860-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 5

G_DIRECT_SHEAR_2_8860-00.GPJ GEOLABS.GDT 9/22/24



Sample: B-7

Depth: 5.0 - 6.5 feet

Description: Orangish brown with tan mottling clayey silt with a little sand

Description of Soil Structure: Undisturbed

Oversized material present in sample. Does not meet ASTM minimum sample height requirement

		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	26.5	25.9	24.4
	Dry Density, pcf	78.2	78.5	77.9
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	49.9	50.8	50.3
	Dry Density, pcf	77.6	78.2	78.8
	Height, inches	1.008	1.004	0.988
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0023	0.0024	0.0024
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**1680**	**2760**	**3500**
	Shear Displacement, inches	0.50	0.50	0.50

GEOLABS, INC.

GEOTECHNICAL ENGINEERING

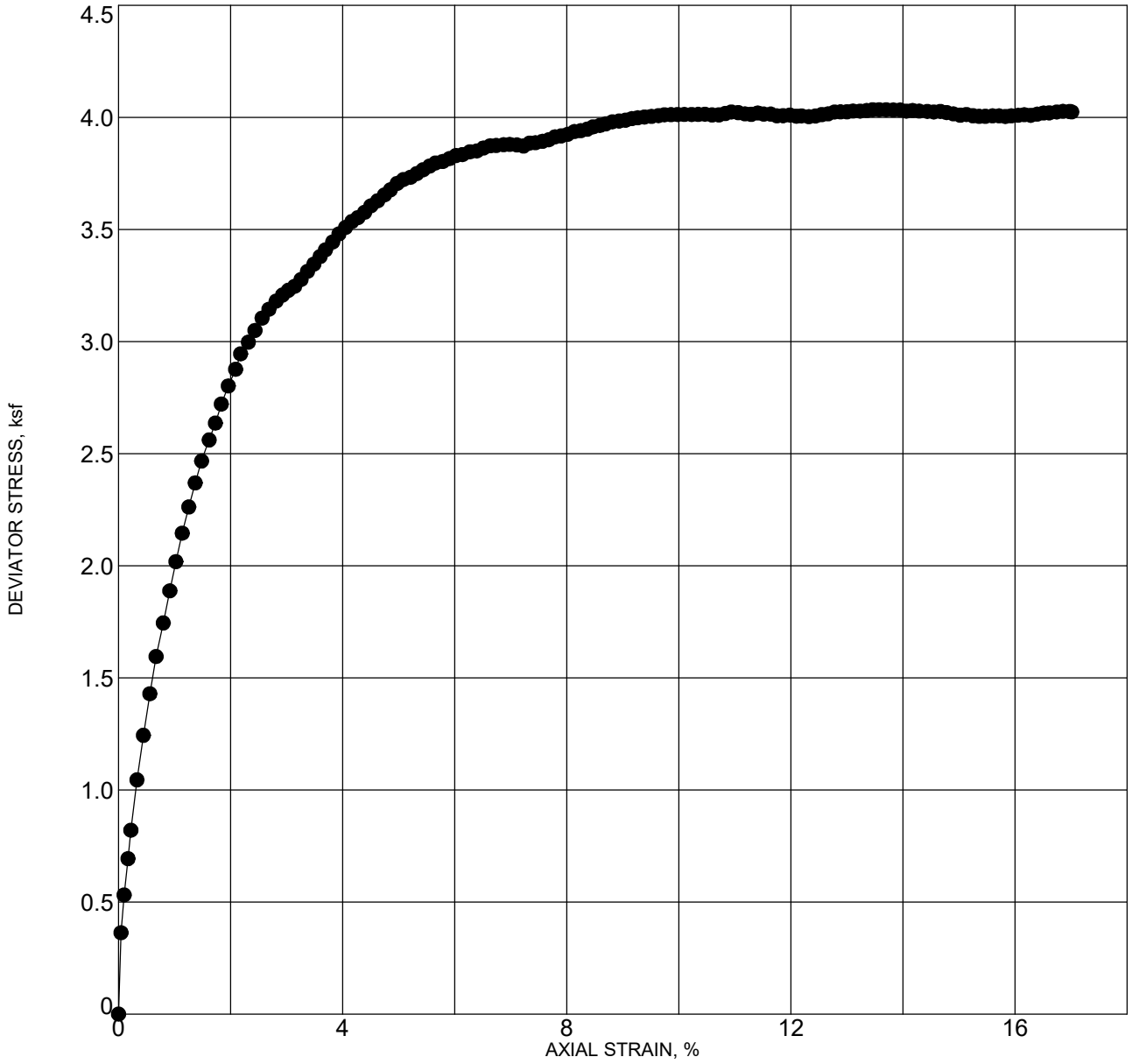
W.O. 8860-00

DIRECT SHEAR TEST - ASTM D3080

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 6

G DIRECT_SHEAR_2 8860-00.GPJ GEOLABS.GDT 9/22/24



Max. Deviator Stress (ksf):	4.0
Confining Stress (ksf):	1.2

Location: B-1
Depth: 10.0 - 11.5 feet
Description: Reddish brown clayey silt with traces of sand
Test Date: 7/13/2024

Dry Density (pcf)	75.4	Sample Diameter (inches)	2.413
Moisture (%)	39.9	Sample Height (inches)	5.033
Axial Strain at Failure (%)	14.7	Strain Rate (% / minute)	0.71

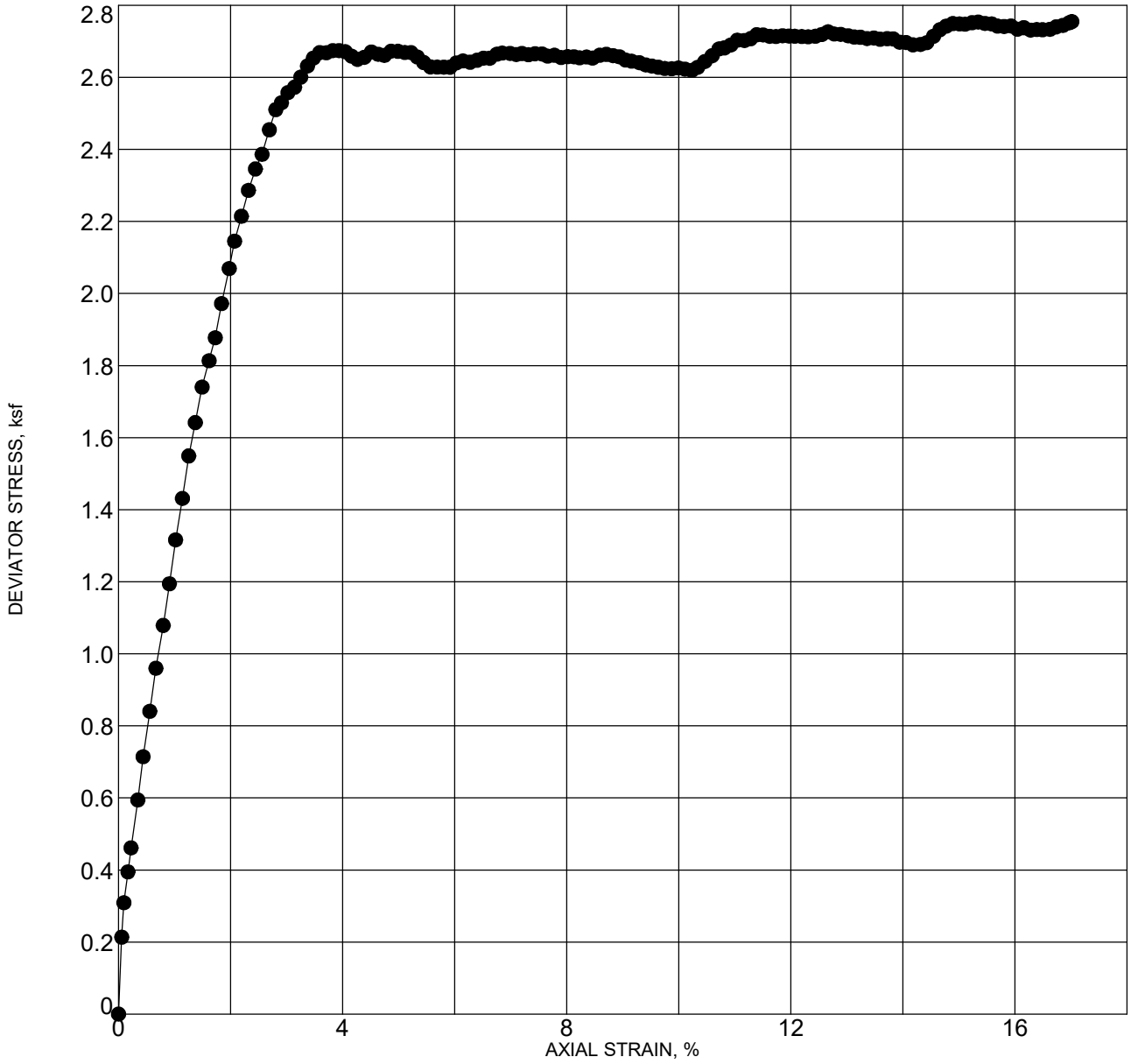
GEOLABS, INC.
GEOTECHNICAL ENGINEERING
W.O. 8860-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 7

G_TXUU_8860-00.GPJ GEOLABS.GDT 9/22/24



Max. Deviator Stress (ksf):	2.7
Confining Stress (ksf):	0.7

Location: B-2
Depth: 2.5 - 4.0 feet
Description: Reddish brown clayey silt (MH)
Test Date: 7/15/2024

Dry Density (pcf)	75.1	Sample Diameter (inches)	2.413
Moisture (%)	36.6	Sample Height (inches)	5.033
Axial Strain at Failure (%)	14.9	Strain Rate (% / minute)	0.71

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

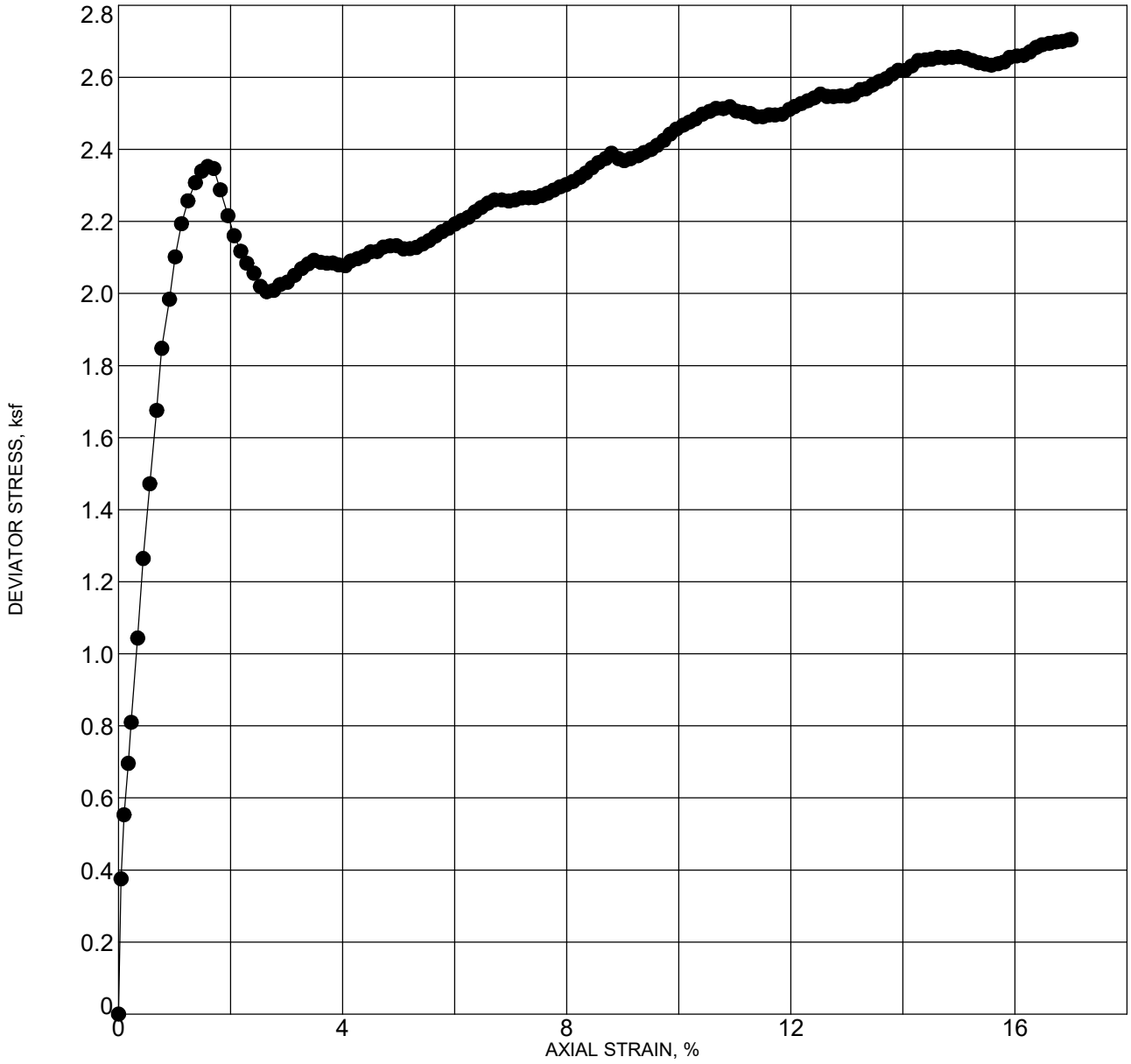
W.O. 8860-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 8

G_TXUU_8860-00.GPJ GEOLABS.GDT 9/22/24



Max. Deviator Stress (ksf):	2.7
Confining Stress (ksf):	0.4

Location: B-4
Depth: 5.0 - 6.5 feet
Description: Brown with orange mottling clayey silt
Test Date: 7/16/2024

Dry Density (pcf)	72.5	Sample Diameter (inches)	2.413
Moisture (%)	39.7	Sample Height (inches)	5.033
Axial Strain at Failure (%)	15.0	Strain Rate (% / minute)	0.70

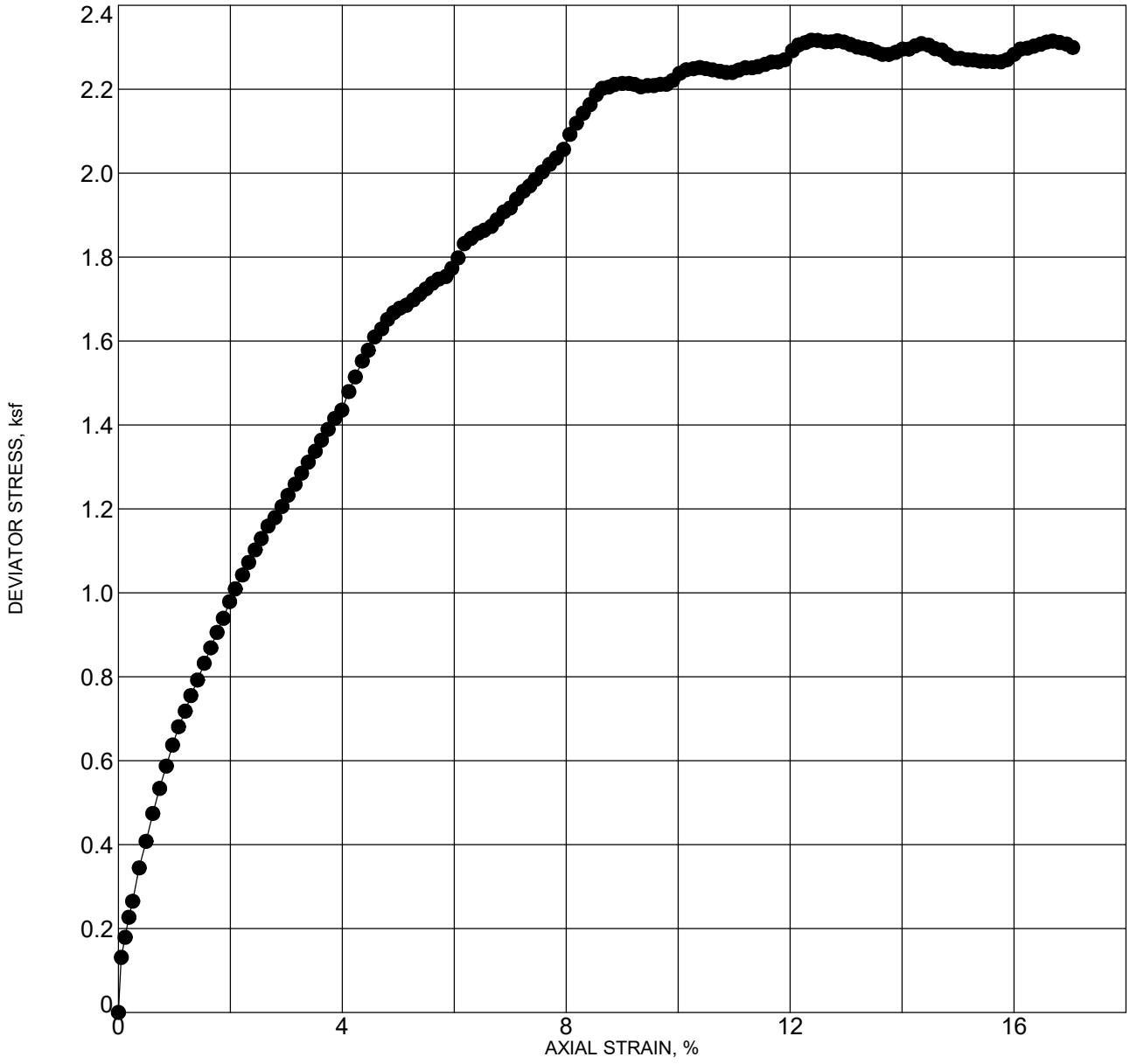
GEOLABS, INC.
GEOTECHNICAL ENGINEERING
W.O. 8860-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 9

G_TXUU_8860-00.GPJ GEOLABS.GDT 9/22/24



Max. Deviator Stress (ksf):	2.3
Confining Stress (ksf):	1.2

Location: B-5
Depth: 10.0 - 11.5 feet
Description: Dark grayish brown with red mottling clayey silt with some sand
Test Date: 7/16/2024

Dry Density (pcf)	59.2	Sample Diameter (inches)	2.413
Moisture (%)	52.9	Sample Height (inches)	5.033
Axial Strain at Failure (%)	12.8	Strain Rate (% / minute)	0.70

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

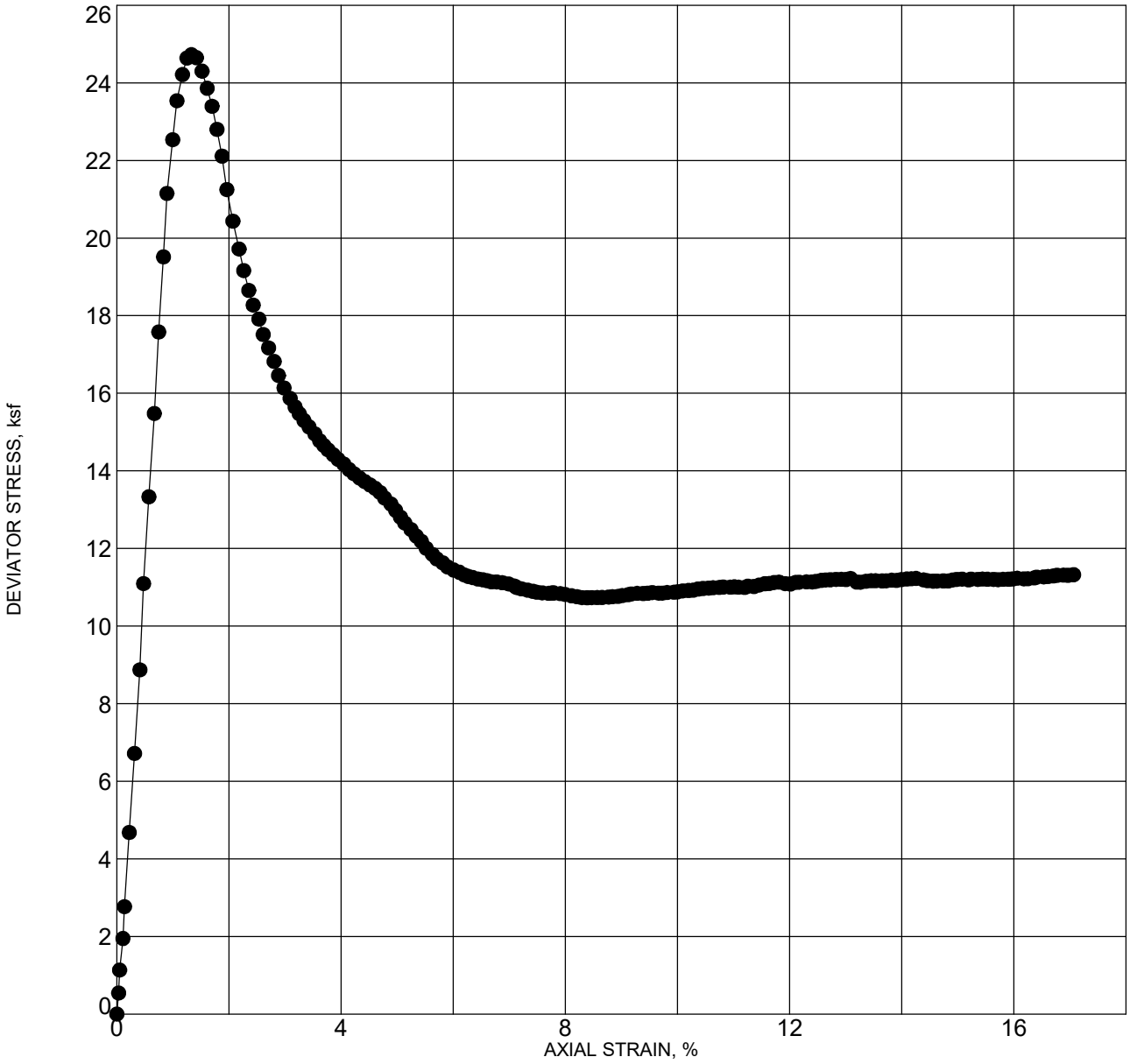
W.O. 8860-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 10

G_TXUU_8860-00.GPJ GEOLABS.GDT 9/22/24



Max. Deviator Stress (ksf):	24.7
Confining Stress (ksf):	1.7

Location: B-6
Depth: 15.0 - 16.5 feet
Description: Brown with multi-color mottling silty clay
Test Date: 7/16/2024

Dry Density (pcf)	82.2	Sample Diameter (inches)	2.413
Moisture (%)	32.2	Sample Height (inches)	5.033
Axial Strain at Failure (%)	1.3	Strain Rate (% / minute)	0.50

GEOLABS, INC.
GEOTECHNICAL ENGINEERING
W.O. 8860-00

TRIAXIAL UU COMPRESSION TEST - ASTM D2850

APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 11

G_TXUU_8860-00.GPJ GEOLABS.GDT 9/22/24

Location	Depth (feet)	pH Value	Minimum Resistivity (ohm-cm)	Chloride Content (mg/kg)	Sulfate Content (mg/kg)
B-1	1.0 - 2.5	6.9*	3000*	25	87
B-3	1.0 - 2.5	7.14*	900*	37	ND
B-5	1.0 - 2.5	7.37*	2800*	32	82
B-6	1.0 - 2.5	7.72*	2100*	65	74

TEST METHODS (by CERCO Analytical, Inc.)

pH Value	Method 9045C
Minimum Resistivity	SM 2510B
Chloride Content	EPA 300.0
Sulfate Content	EPA 300.0

TEST METHODS (by Geolabs, Inc.)*

pH Value	ASTM G51
Minimum Resistivity	ASTM G57
Chloride Content	N/A
Sulfate Content	N/A

ND: Not Detected Within Reporting Limits

G SUMMARY OF CORROSIVITY TESTS 8860-00.GPJ GEOLABS.GDT 9/22/24

GEOLABS, INC.
GEOTECHNICAL ENGINEERING

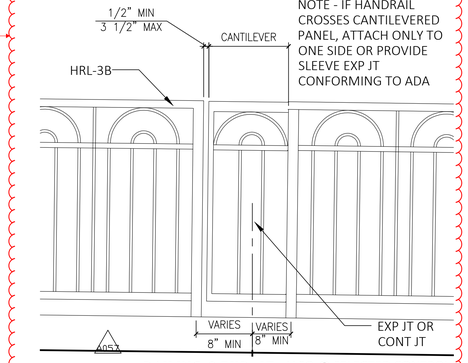
W.O. 8860-00

SUMMARY OF CORROSIVITY TESTS

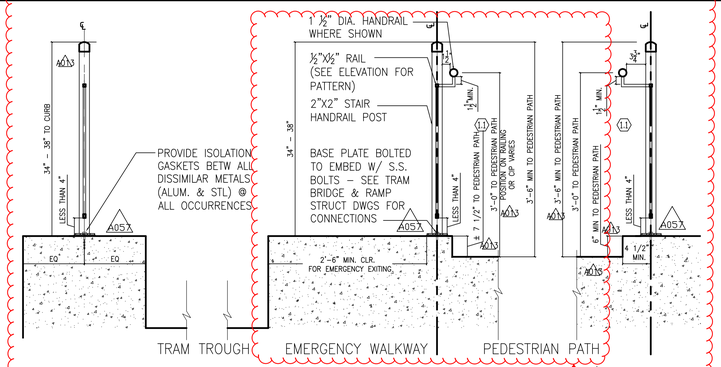
APRON LIGHT REPLACEMENT
LANAI AIRPORT
ISLAND OF LANAI, HAWAII
STATE PROJECT NO. AS1037-12

Plate
B - 12

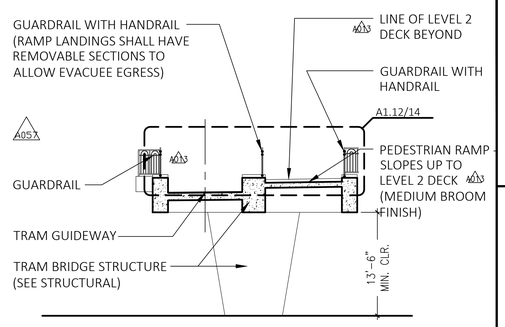
SEE RFI 1807 FOR TRAM RAMP & BRIDGE RAILING HEIGHT DISCREPANCY CLARIFICATION



15 RAILING @ EXP. JT. ALSO @ SELECTED CONTROL JOINT LOCATIONS
1"=1'-0"

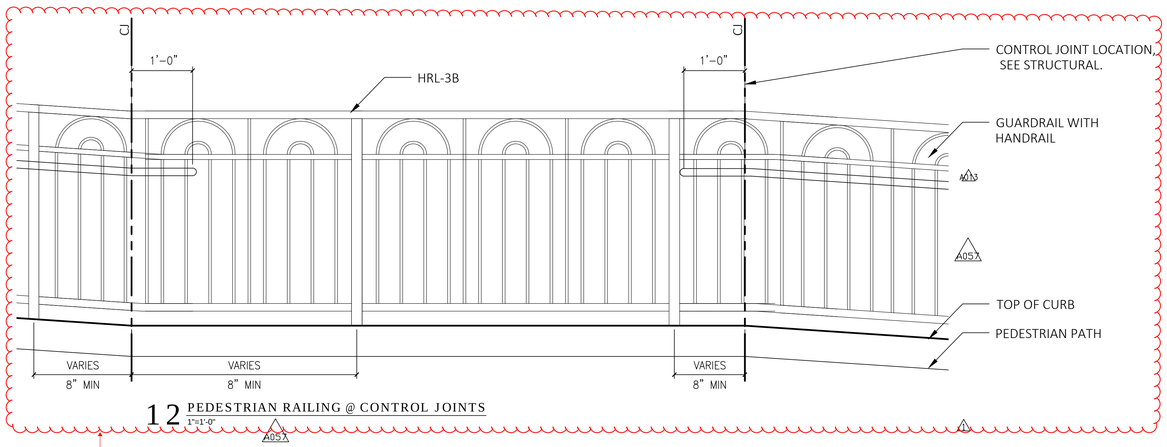


14 TRAM BRIDGE RAILING SECTION
1"=1'-0"



13 TRAM BRIDGE SECTION LOOKING WEST
1/4"=1'-0"

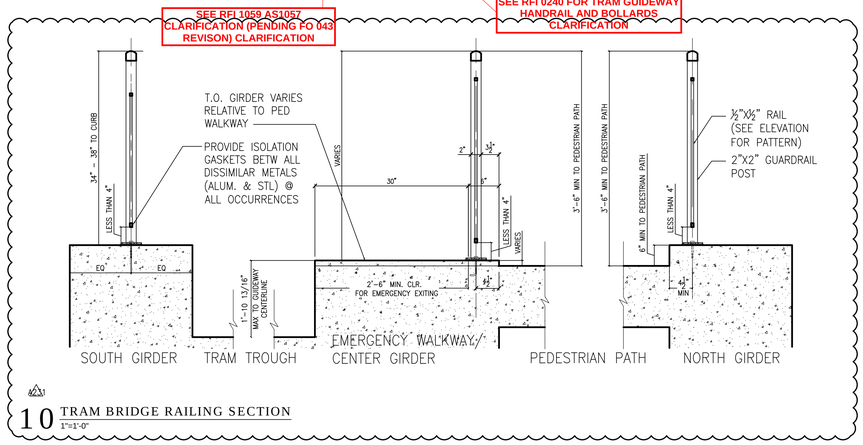
16 NOT USED
1"=1'-0"



12 PEDESTRIAN RAILING @ CONTROL JOINTS
1"=1'-0"

SEE RFI 1059 AS1057 CLARIFICATION (PENDING FO 043 REVISON) CLARIFICATION

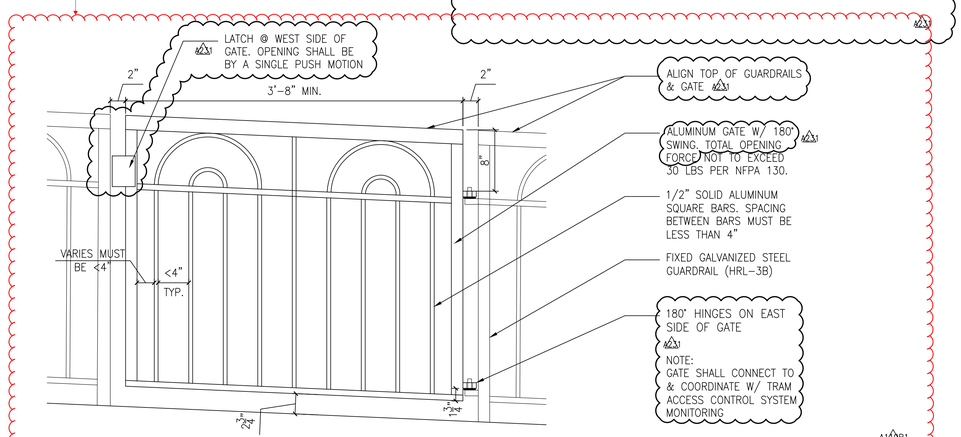
SEE RFI 0240 FOR TRAM GUIDEWAY HANDRAIL AND BOLLARDS CLARIFICATION



10 TRAM BRIDGE RAILING SECTION
1"=1'-0"

SEE RFI 1160 FOR HANDRAIL CURB FINISH CLARIFICATION

SEE RFI1921 FOR PANIC BAR HARDWARE AT SWING GATES CLARIFICATION



03 REMOVABLE GUARDRAIL
1 1/2" = 1'-0"
RAILING TYPE HRL-3B

SEE SHEET:

TRUE NORTH
PLAN NORTH

02 NOT USED
1/8"=1'-0"

S:\12\21282_OGG\Drawings\DWA-OGG-A1-12.dwg Feb 15, 2018 - 3:58pm

Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

ANTHONY J DEMATTEI
LICENSED PROFESSIONAL ARCHITECT
No. AR 12710
HAWAII U.S.A.

This work was prepared by me or under my supervision and construction of this project will be under my observation

DEMATTEI WONG ARCHITECTURE, INC. 4/30/2016
EXP. DATE

DSGN.	DRWN.	CHKD.	APPD.
DWA	DWA		

NOTES :

SEE FO043 /ASI057HANDRAILTYPE HRL-2 AND HRL-3 REVISION PRICING

SEE FO147 DETAILING OF REMOVABLE RAILINGS PRICING (ASI057 ASI119R1)

SEE FO177 TRAM GUIDEWAY PRICE AND PROCEED (RFI9008, 0917, ASI013)

SEE RFI 0865 FOR EXPANSION JOINT AT TRAM BRIDGE CONFIRMATION

SEE FO223 TRAM BRIDGE EMERGENCY WALKWAY REDESIGN PRICING (RFI1429 ASI231 CMSI007)

AS-BUILT DRAWINGS/SPECIFICATIONS

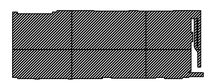
This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field

Hawaiian Dredging and Construction Co.
CONTRACTOR'S NAME

3/10/2021
Signature Date

NO.	DATE	REVISIONS
A231	02/13/17	ASI-231
A013	10/13/17	ASI-013
A119R1	08/30/17	ASI-119R1
A057	06/13/17	ASI-057
1	01/22/16	PCD-1.1
1	05/23/14	ADDENDUM 1

KEYPLAN



100% CONSTRUCTION DOCUMENTS

PROJECT TITLE :

ROADWAY IMPROVEMENTS AND CONSOLIDATED CAR RENTAL (ConRAC) FACILITY

KAHULUI AIRPORT
KAHULUI, MAUI, HAWAI'I

PROJECT NO. :

STATE PROJECT NO.: AM1032-13

SHEET TITLE :

TRAM BRIDGE & RAMP DETAILS

DATE :
MAR-24-2014
DWG. NO. :

A1.12