FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	137	167

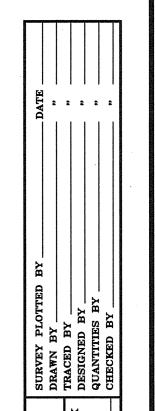
					L	
			ELECTRICA	L SYMBO	DLS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION SYMBOL	DESCRIPTION
8	Existing Highway Light Standard, Bracket Arm and		Existing Utility Wood Pole			
3 €	Luminaire on Existing Concrete Base		Utility or Highway Light Wood Pole			
	Highway Light Standard, Bracket Arm and Luminaire on		Existing Pole Down Guy & Anchor			
	New Concrete Base		Type "A" Highway Light Pullbox Per Std. Plan TE-37			
6	Highway Light Standard, Bracket Arm and Luminaire Mounted on New Retaining Wall or Barrier Wall, See Plan		Type "B" Highway Light Pullbox Per Std. Plan TE-37			
4	for Pole Height		Type "C" Highway Light Pullbox Per Std. Plan TE-37		Highway Light and Traffic Signal System Ductline with Duct Designations, Item In Circle Indicates Duct Section	
		[]	Existing Pullbox or Handhole		Type, With Duct Complement Noted Below (Type "LA"	
		ep2	Indicates Existing Joint Utility Pole Designation		Indicated with 1—2"L Duct; L=Highway Light Ducts;	
			Type "A" Communications Electric Pullbox Per Std. Plan TE-37	1-2L	S=Traffic Signal Ducts, SE=Traffic Signal Power Ducts); See Duct Section Detail Sheets EA-5 to EA-7	
xABx _	Indicates Existing Highway Lighting Conduit with Circuit		Type "B" Communications Signal Pullbox Per Std. Plan TE-37			
xdbx -	Wires, Remove Circuit Wires, Fill Empty Conduit with Concrete and Abandon in Place Indicates Existing Highway Lighting Direct Buried Cable		Type "C" Traffic Signal / Communications Signal Pullbox Per Std. Plan TE—37			
* * * *	Circuit Wires to be Removed Indicates Existing Highway Lighting Conduit with Circuit Wires to be Disconnected and Removed		Traffic Rated Type "A" Highway Light / Traffic Signal / Communications Electric Pullbox Per Std. Plans TE-37A, TE-37B and TE-37J Traffic Rated Type "B" Highway Light / Traffic Signal /	1	HIGHWAY LIGHT ID TAG INDICATOR LEGEND = Highway Light & Pole Number = Pole Location, Offset In Feet from Baseline; BGR=Behind Guardi	<u>Pole Location Notes:</u> ISW = Inside Sidewalk BSW = Behind Sidewalk rail IUG = In Upslope Grade
——hI ——			Communications Signal Pullbox Per Std. Plans TE-37C, TE-37D, TE-37E and TE-37J	3	= Pole Location, Offset in Feet from Baseline, BGK—Berlina Guarai = Bracket Arm Span, In Feet	IDG = In Downslope Grade
	Wires		Traffic Rated Type "C" Highway Light / Traffic Signal / Communications Signal Pullbox Per Std. Plans TE—37F, TE—37G, TE—37H and TE—37J	4 5 6 7	= Pole Height, In Feet = Pole Location, Station Number = Pole Base Condition, See Pole Base Type Note at Right = Light Circuit Number & Phase To Phase	BGR = Behind Guardrail BPS = Behind Paved Shoulder BGS = Behind Grass Swale BRW = Behind Retaining Wall OBW = On Barrier or Retaining Wall
R/W	Denotes "State Right-of-Way"				Connection, When Applicable	<u>Pole Base Type Notes:</u>
HECO	Denotes "Hawaiian Electric Company"					A = Breakaway Transformer Base
HTCO	Denotes "Hawaiian Telcom"					B = Non-Breakaway Transformer Base C = Non-Breakaway Anchor Base
CATV	Denotes "Oceanic Time Warner Cable"					

Note Indicator Designators, "See Note No. 1" Indicated;

"See Note A" Indicated

Equipment Indicator, See Utility Equipment Schedule on Sheet EA-2

Equipment Indicator



Notes:

LICENSED PROFESSIONAL ENGINEER No. 10038-E

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

ELECTRICAL SYMBOLS

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271) Date: August 2022

SHEET No. EA-1 OF 167 SHEETS

Denotes "Oceanic Time Warner Cable"

1. "X" Through Symbol Denotes Item to be Removed, Unless Otherwise Noted.

2. Dashed Symbol Denotes Existing Item, Unless Otherwise Noted.

GENERAL CONSTRUCTION NOTES

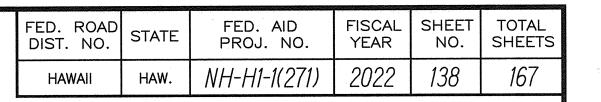
- Trenching to be by hand digging near and across existing utility lines.
- Unless otherwise requested by the Board of Water Supply, minimum clearance between water lines and conduits shall be: Horizontal = 3 feetVertical = 6 inches (12 inches for 16" and larger diameter water lines)
- Adjust new conduit alignment, if required to provide clearances. If conduit cannot be realigned, adjustments to existing water system shall be performed in accordance with standards of the Board of Water Supply.
- Minimum clearance between street light standards and fire hydrants shall be 3 feet.
- Underground utilities shown hereon are for information only. No quarantee is made on the accuracy or completeness of said information.
- All new and existing concrete pullbox and handhole covers which are located in new finished sidewalks shall be provided with new exposed aggregate concrete covers to match new exposed aggregate concrete sidewalk finish.
- All construction work shall be done in accordance with the Standard Specifications for Public Works Construction Sept., 1986 and Standard Details for Public Works Construction, Sept. 1984, as amended, of the Department of Public Works, City and County of Honolulu.
- The Contractor shall notify the Civil Engineering Branch, Department of Planning and Permitting @ 523-4881, seven (7) days prior to commencement of construction.
- Where necessary, reconstruction of sidewalk, gutter and driveway areas shall conform to the standard details of the governmental agency having jurisdiction over the work.
- The Contractor, at no increase in contract price or contract time, shall keep the project area free from dust nuisance. The work shall be in conformance with the air pollution control standards and regulations of the state department of health.
- The Contractor shall be responsible for removal of all silt and debris resulting from their work and deposited in drainage facilities, roadways and other areas. The cost for any necessary remedial action by the Engineer shall be payable by the Contractor.
- Where ductline crosses guard rail locations, ductline shall be provided with a minimum of 4'-0" cover from top of concrete encasement to finish grade to ensure clearance to guard rail posts embedded approximately 3'-6" below finish grade.

GENERAL ELECTRICAL NOTES

- Electrical Work shall be New Unless Indicated Otherwise.
- 2. Existing Electrical Equipment shall Remain Unless Indicated Otherwise.
- 3. The Location of Existing Underground Utilities Shown on Plans are from Existing Records and are Approximations Only. Contractor shall Exercise Caution when Construction Crosses or is in Close Proximity to Existing Underground Utilities. Damages to Utility Companies' Existing Facilities shall be Repaired by the Respective Utility Company and Repair Costs shall be Paid by the Contractor at No Increase in Contract Time or Contract Price.
- 4. For Utility, Traffic Signal and Additional Notes, See Sheets EA-3 Thru EA-8, Inclusive.
- 5. Existing Highway Lighting and Traffic Signal Pullboxes to Remain shall be Cleaned of Debris and Dirt. Cleaning of Existing Pullbox will not be Paid for Separately, but Considered Incidental to the Various Contract Items.
- 6. CAUTION!!! Existing Hawaiian Electric Company (HECO) Handholes/Pullboxes to be Relocated or Adjusted to Match Finish Grade Contains Energized High Voltage Cables. Contractor shall Exercise Extreme Caution when Working on the Existing Handhole/Pullboxes. All Work on the Existing Handhole/Pullbox shall be Coordinated with the HECO Underground Division. HECO Underground Division Personnel shall be Present whenever the Contractor is Working on Existing Handholes/Pullboxes. Work to be Done by HECO Includes Chipping and Cracking Existing Concrete Jacket and Ductline, Penetrating Existing Pullboxes, Handholes and Manholes and Providing Temporary Protection of Energized Cables. A Minimum of Ten Working Days Notice is Required Prior to the Start of Work.

ELECTRICAL DEMOLITION NOTES

- The Contractor Shall Verify All Existing Circuit Wiring Prior to Any Demolition Work.
- 2. The Contractor Shall Remove All Abandoned Wires and Exposed Raceways.
- 3. Where Contract Documents Indicate Wiring is to be Removed, the Contractor Shall Remove Existing Wires, Underground Conduits, and Remove Exposed Raceways for Existing Utility Lines, Respective Utility Company Shall Remove Their Wires, and Contractor Shall Remove All Underground and Exposed Conduits and Raceways.
- 4. For Circuits where Contractor Removes Existing Electrical Equipment, Contractor Shall Provide All Conduit and Wiring Necessary to Maintain Circuit Continuity to Existing Component(s).
- 5. Existing Highway Lighting System shall Remain Operational During Non Daylight Hours Until New Highway Lighting System is Operational. Contractor Shall Provide Temporary Lighting if the Existing Highway Lights are De-energized Before the New Highway Lights are Operational. Temporary Work shall be Coordinated with and shall be Acceptable to the Engineer. Temporary Highway Lighting System will not be Paid for Separately, but Considered Incidental to the Various Contract Items.



LICENSED PROFESSIONAL ENGINEER No. 10038-E/

License Exp. Date: <u>04.30.2024</u>

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

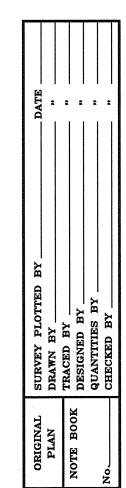
Signature 2022.08.18

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION **GENERAL**

ELECTRICAL NOTES INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3

Federal Aid Project No. NH-H1-1(271) Scale: As Noted Date: August 2022

SHEET No. EA-2 OF 167 SHEETS



New Design Requirements for Traffic Signal Standards (January 8, 2018)

(Highway Lighting Luminaires, Pole Standards, Bracket Arms and Traffic Signal Standards and Mast Arms Being Furnished for this Project Shall Conform with the New Design Requirements Noted Below)

- Equipment Manufacturers Providing Structural Supports for Luminaires and Traffic Signals, the Following Design Parameters to be Included in the Design of the Project Materials.
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1st Edition, (2015) Including Subsequent Interim Revisions, Published by the American Association of State Highway and Transportation Officials, as Modified Herein.
- Basic Wind Speed [Article 3.8.2] to Determine the Design Wind Pressure Shall be 145 Mph. for Unusual or Differing Exposure Conditions, the Basic Wind Speed Should be Increased Using Rational Procedures and Sound Engineering Judgment. Alternatively, the Design Wind Pressure May be Increased by Using a Higher Wind Importance Factor [Table 3.8.3-1] Corresponding to a Recurrence Interval of At Least One Level Greater Than Recommended. the Wind Maps for Effective Wind Speed, Topographic Effects and Exposure Category Included in the State Building Code (Hawaii Administrative Rules, Chapter 3-180) Should be Used for Guidance.
- Wind Importance Factors [Article 3.8.3—1] and Velocity Conversion Factors [Table 3.8.3-3] Used to Determine the Design Wind Pressure Shall be Based on the Following Recurrence Intervals:
- 1700 Years For Overhead Sign Structures: 1700 Years For Traffic Signal Structures: For Luminaire Support Structures Less Than 50
 - Feet in Height: 25 Years For Other Support Structures Including Luminaire Support Structures 50 Feet or More in Height, and When Luminaire is Mounted on a Traffic
- Signal Structure: 50 Years For Roadside Sign Structures and Temporary Support Structures: 10 Years
- Height and Exposure Factor [Article 3.8.4]. for Support Structures on Bridges, the Height and Exposure Factor Shall be Determined Based on the Maximum Height They Are Above the Surrounding Ground. for Severe Exposure Conditions Such as Along the Coastline, the Factor Shall be Increased Based on the Latest Asce Standard ASCE/SEI 7,

- Minimum Design Loads for Buildings and Other Structures. the Wind Maps for Effective Wind Speed, Topographic Effects and Exposure Category Included in the State Building Code (Hawaii Administrative Rules, Chapter 3—180) Should Also be Used for Guidance.
- Minimum Anchor Bolts [Article 5.16]. Cantilevered Traffic Signal Structures with Mast Arms Greater Than 40 Feet and Other Cantilevered Support Structures with Design Life of 50 Years or More Shall Have Base Plate Connections with a Minimum of Six (6) Anchor Bolts. A Minimum of Four (4) Anchor Bolts Shall be Provided for All Other Base Plate Connections.
- 7. <u>Use of Grout</u> [Article 5.16]. Grout Shall Not be Used Under Base Plates for All Support Structures Except for Ordinary Street Light Poles Unless Approved by the Bridge Design Engineer. Anchor Bolts with Leveling Nuts Shall be Designed to Transfer All Loads From the Structure to Its Base Support. a Wire Cloth Screen Shall Specified to be Placed Vertically Between the Base Plate and the Top of the Foundation and Wrapped Horizontally Around the Base Plate with a 3 Inches Minimum Lap. the Wire Cloth Shall be Galvanized Steel Standard Grade Plain Weave 2x2 Mesh 0.063 inch Diameter Wires. Secure the Wire Cloth At the Lapped Ends with Stainless Steel Wire Ties (Min 2). Loop the Wire Ties and Twist Tie Them Securely. Also, Alternate Means of Protecting the Underside of the Base Plate From Debris, Birds, Bees and Other Nesting Animals May be Proposed for Consideration.
- Plumbness of Anchor Bolts [Article 5.16]. Anchor Bolts Shall be Installed with Misalignments of Less Than 1:40 From Vertical. After Installation, Firm Contact Shall Exist Between the Anchor Bolt Nuts, Washers, and Base Plate on Any Anchor Bolt Installed in a Misaligned Position.
- Fatigue Importance Factors [Article 11.6] Noted in Table 11.6-1 for Overhead Sign and Traffic Signal Structures Shall be Based on Fatigue Category I. support Structures Other Than That Noted in Table 11.6-1 with Round Cross Sections Under 50 Feet, Roadside Sign Structures, and Temporary Structures Do Not Need to be Designed for Fatigue. Support Structures 50 Feet or More in Height Shall be Designed for Fatigue and be Based on Fatigue Category I.
- Galloping [Article 11.7.1.1]. Provisions Shall be Made to Install Effective Vibration Mitigation Devices on Overhead Cantilevered Sign and Traffic Signal Support Structures Unless They Are Designed for

- Galloping-Induced Cyclic Loads. With Approval from HDOT, Mitigation Devices May be Installed after Construction If Vibration Due to Galloping is Identified.
- 11. Natural Wind Gust [Article 11.7.1.2]. Overhead Sign, Traffic Signal, and High-Level Support Structures Shall be Designed to Resist An Equivalent Static Natural Wind Gust Pressure.
- 12. <u>Truck-Induced Gust</u> [Article 11.7.1.3]. Overhead Sign and Traffic Signal Support Structures Shall be Designed to Resist An Equivalent Static Truck Gust Pressure Range Based on a Truck Speed of 20 MPH Over the Posted Speed.
- 13. Equipment Manufacturers Providing Structural Supports for Luminaires and Traffic Signals, is Responsible to Provide the Engineer with Any Information That Will Impact the Current Foundation Design.
- 14. <u>Square or Rectangular Steel Post Sections</u> [Sections 5 and 11]. Square or Rectangular Steel Sections Are Not Recommended to be Used for Overhead Sign and Traffic Signal Supports Because They Are More Prone to Poor Fatigue Performance. However, the Post Sections Contained in the Highways Division Standard Plans (2008) for Overhead Sign Structures (Standard Plans TE-17A Through TE-19M) Shall be Considered Acceptable and May Still be Used. Any Special Designs or Deviations from the Standard Plans Shall be Considered with the Bridge Design Engineer.
- 15. Traffic Signs on Light Poles and Traffic Signals. All Light Poles of Highway Light Standards Shall be Designed for a Traffic Sign of Nine (9) SF with its Resulting Wind Force Applied 10 Feet Above the Finish Grade. See Standard Plan TE-47 (5/21/07).

SHEET TOTAL NO. SHEETS FED. ROAD DIST. NO. FED. AID PROJ. NO. FISCAL YEAR STATE HAW. NH-H1-1(271) 2022 139 167 HAWAII



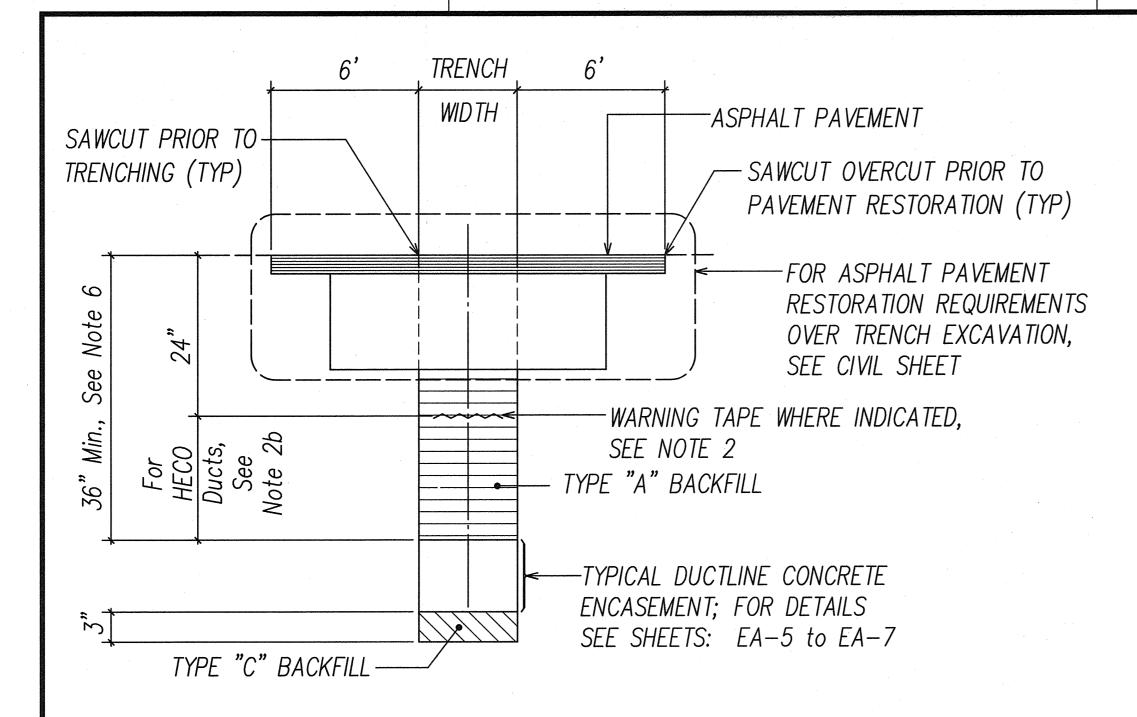
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION **GENERAL** CONSTRUCTION NOTES INTERSTATE ROUTE H-1 ADDITION AND MODIFICATION OF FREEWAY ACCESS

(Kapolei Interchange Complex), Phase 3 Federal Aid Project No. NH-H1-1(271)

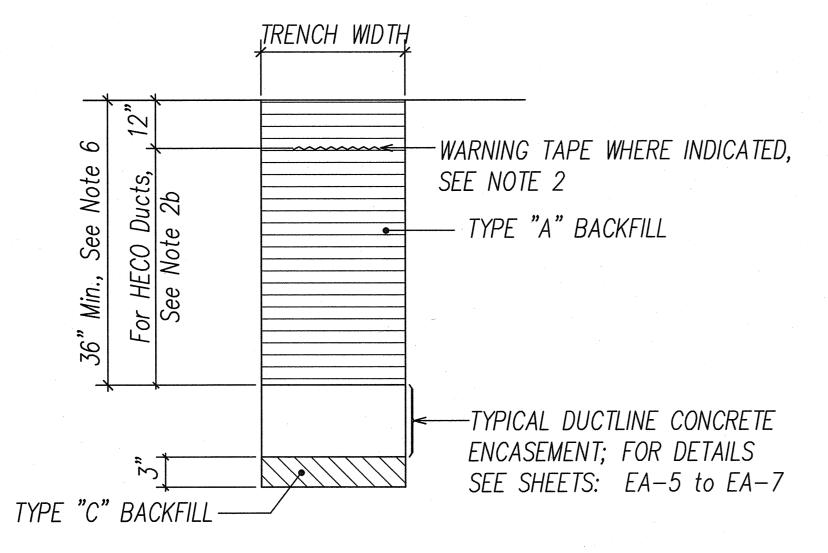
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ASPHALT PAVEMENT RESTORATION OVER TRENCH EXCAVATION WITHIN STATE R-O-W





STATE RIGHT-OF-WAY BACKFILL NOTES

TRENCH BACKFILL MATERIAL "A" When Tested According to AASHTO T176, The Sand Equivalent Value Shall be 20 or Greater.

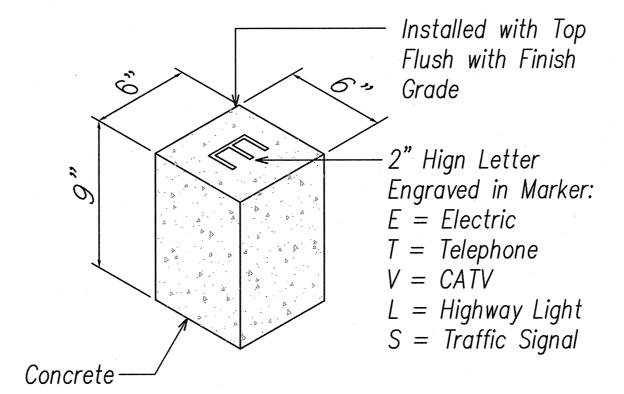
TRENCH BACKFILL MATERIAL "B" When Tested According to AASHTO T176, The Sand Equivalent Value of the Backfill Material Shall be Equal to or Greater Than the Surrounding Soil.

TRENCH BACKFILL MATERIAL "C" Excavate Material and Provide 3" Backfill Material "A", See Above.

CONCRETE - 3" ENCASEMENT, 3000 PSI COMPRESSIVE STRENGTH @ 28 DAYS.

NOTE:

See Specification Section 703.21 for Additional Trench Backfill Material Requirements.



CONCRETE CONDUIT STUB-OUT MARKER

•	FED. ROAD STATE		FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	HAWAII	HAW.	NH-H1-1(271)	2022	140	167

GENERAL DUCTLINE DUCT SECTION NOTES:

- If trench is located on unpaved area, the Contractor shall replace 10" A.C. Base Course and 4" A.C. Pavement with Type "A" backfill material.
- The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1' min thick foil core. For the State DOT traffic signal and highway lighting ducts, the message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW," utilizing 1 1/2 inches series "C" block lettering. The message will be repeated with a 4 1/4" spacing between top line of message and start of next repeat.
 - For the respective utility company ducts, provide metal detectable warning tape over respective utility company ducts per respective utility company requirements and approval.
- The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
- Maximum four (4) Conduits per row for multiple conduit duct section.
- Clearances: Refer to HECo Note No. 14 for clearance requirements between all ductlines and all adjacent structures (charted and uncharted) near the trench.
- See General Construction Note L. on sheet EA-2 for ductline depth requirements where ductline crosses guard rail locations.
- All concrete must comply with the concrete CO2 footprint reduction requirements of Section 601.



License Exp. Date: <u>04.30.2024</u>

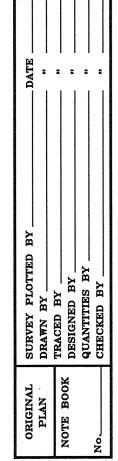
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

DUCT SECTION DETAILS

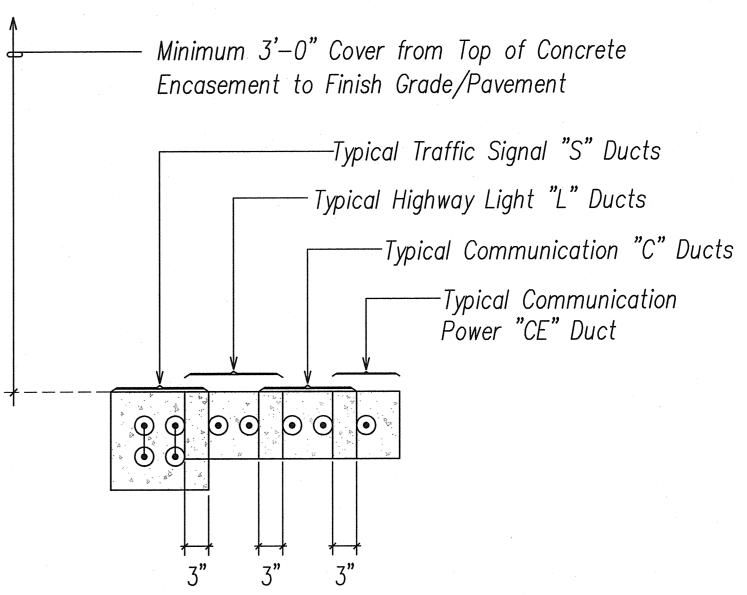
<u>INTERSTATE ROUTE H-1</u> ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3 Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

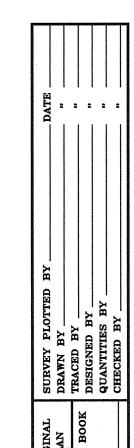
SHEET No. EA-5 OF 167 SHEETS



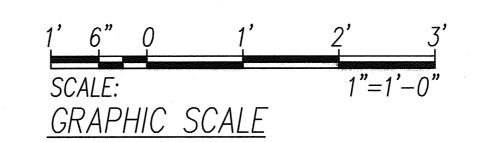
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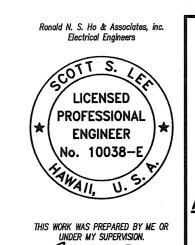


TYPICAL SPACING DETAIL BETWEEN HIGHWAY LIGHT AND TRAFFIC SIGNAL DUCT SECTIONS
Not To Scale



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HIGHWAYS DIVISION

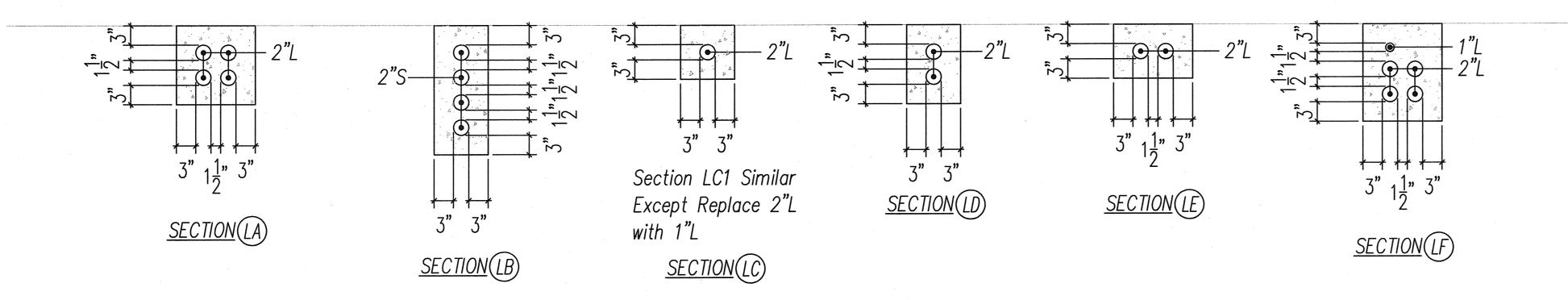
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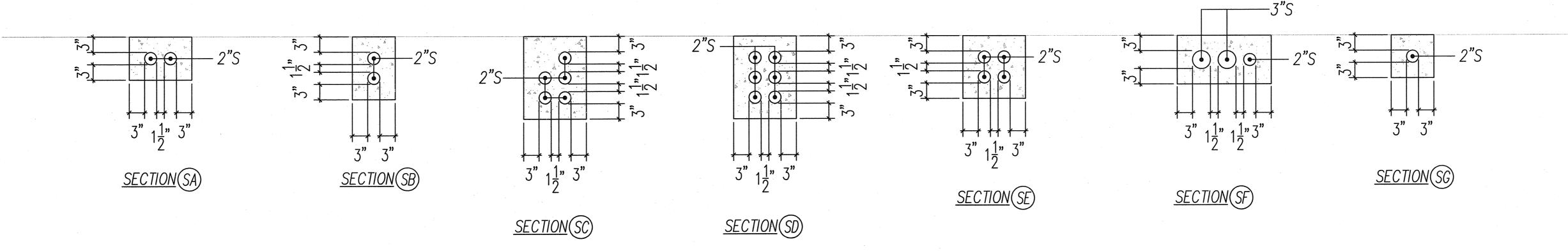
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DEPARTMENT OF TRANSPORTATION

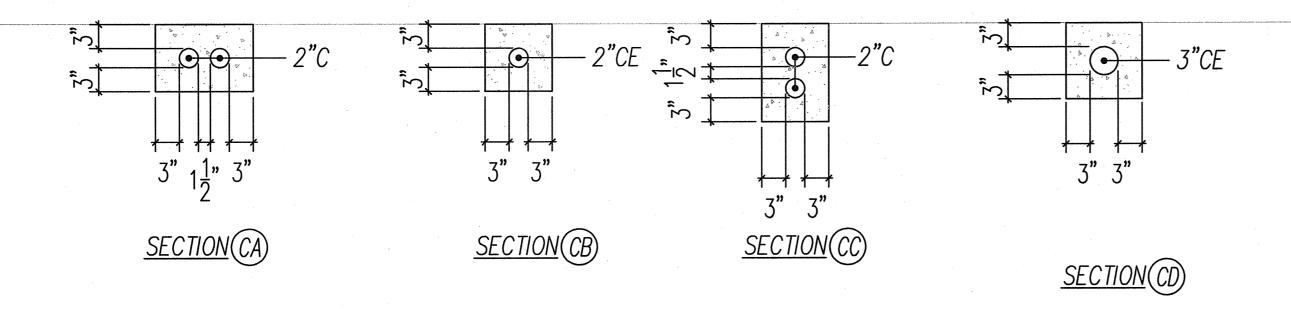
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271) Date: August 2022

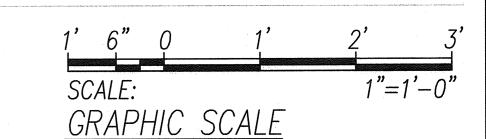
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FED. ROAD STATE		FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	142	<i>167</i>







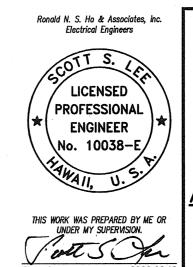




- 1. For Typical Duct Section Backfill Detail and Notes, See the Following Sheets: EA-5.
- 2. For Typical Spacing Detail Between Highway Light, Traffic Signal, and Communication Duct Sections, See Sheet EA-6.
- 3. See General Construction Note L. on sheet EA-2 for ductline depth requirements where ductline crosses guard rail locations.

HIGHWAY LIGHT, TRAFFIC SIGNAL AND COMMUNICATION DUCT SECTION DETAILS

Scale: 1"=1'-0"



STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

DUOT CECTION DETAILS S

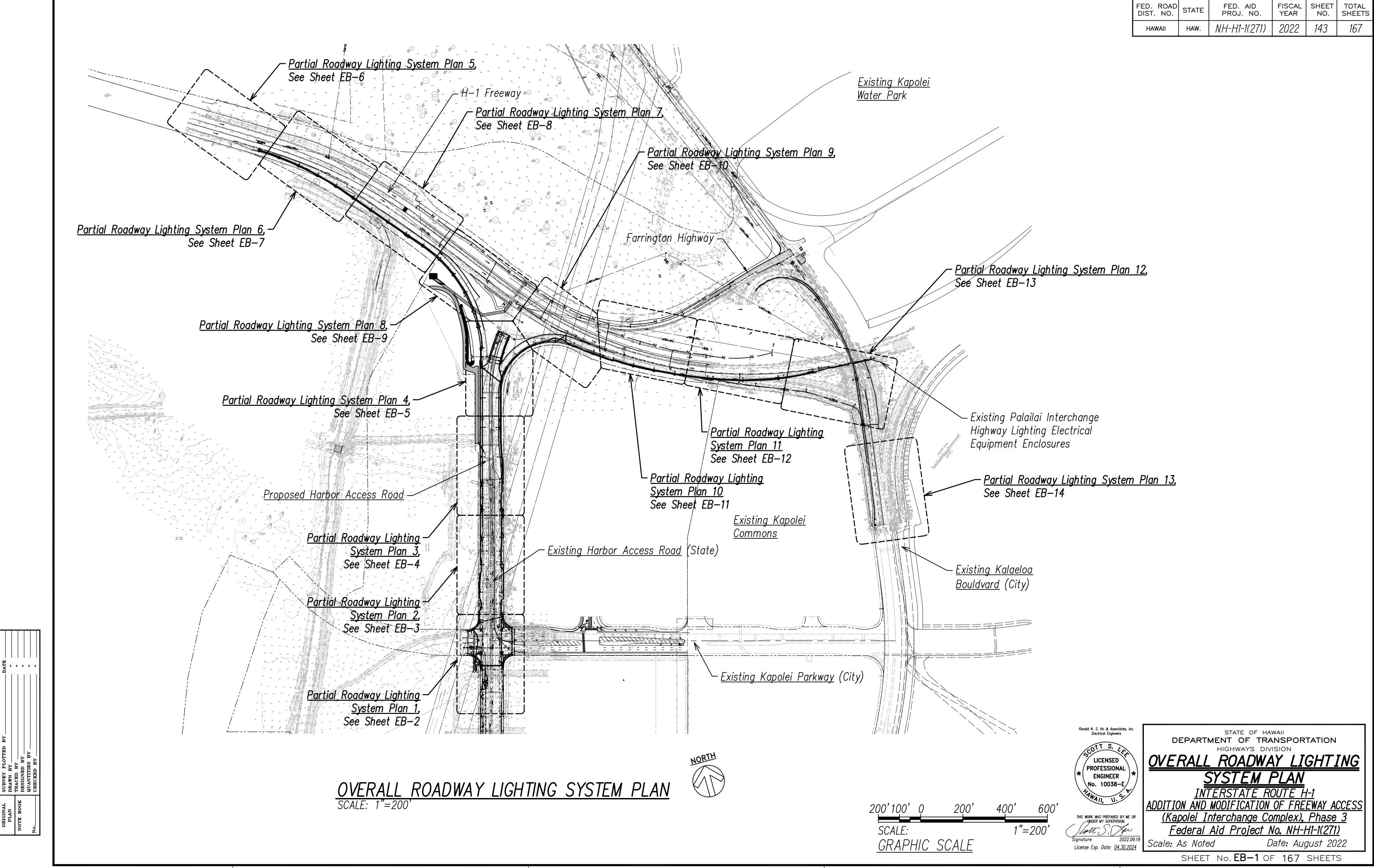
DUCT SECTION DETAILS 3

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)
Scale: As Noted Date: August 2022

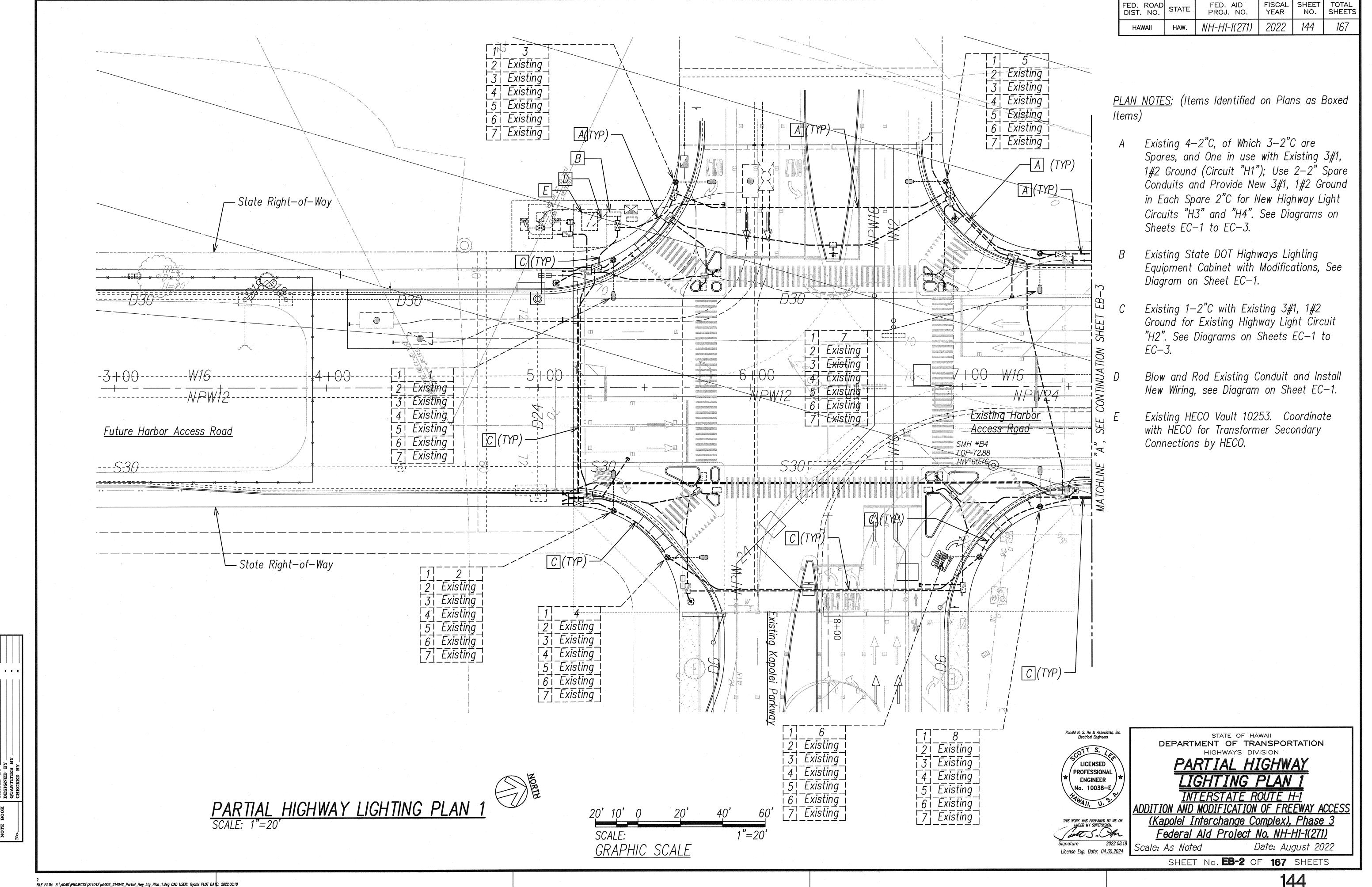
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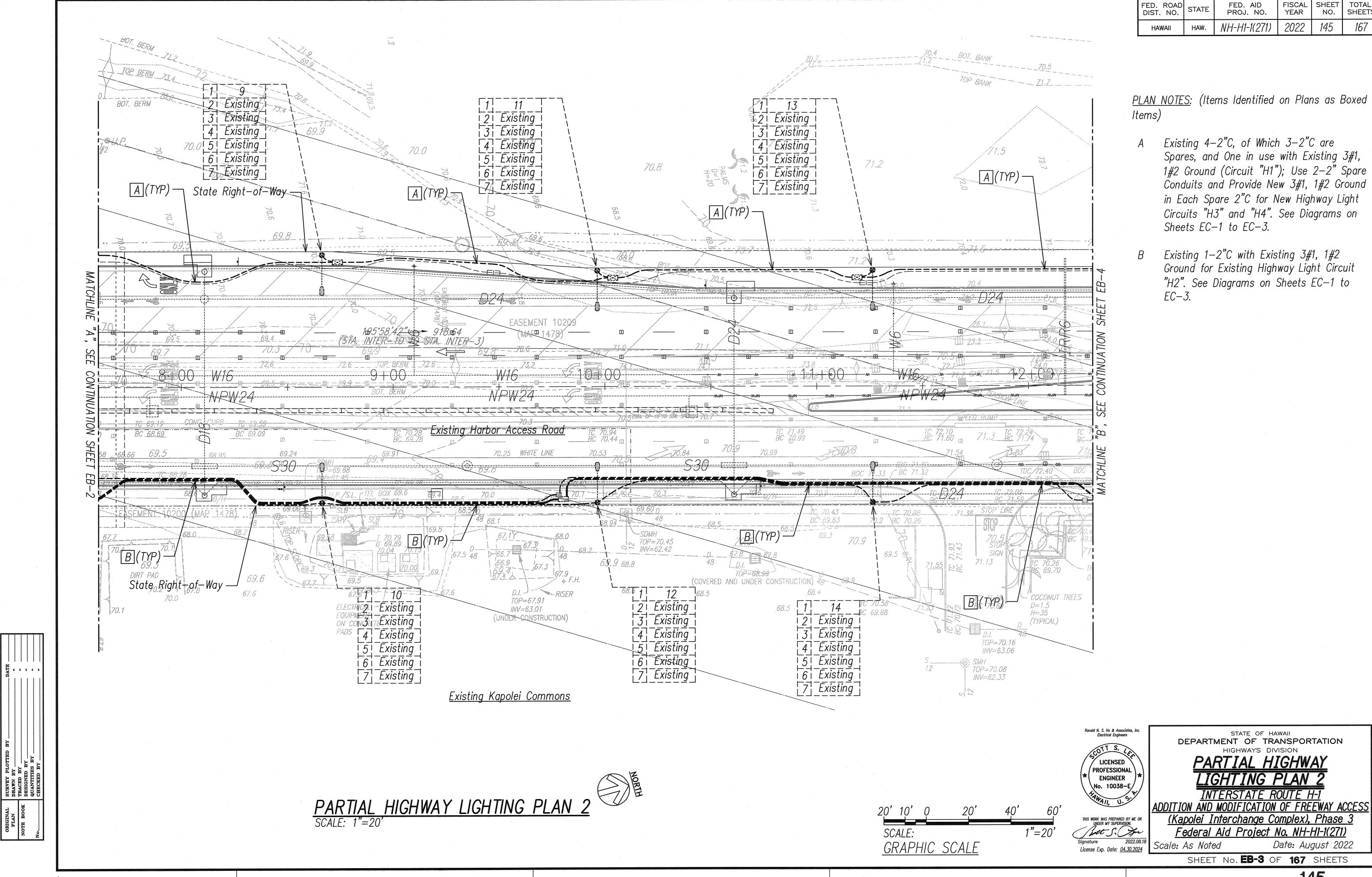
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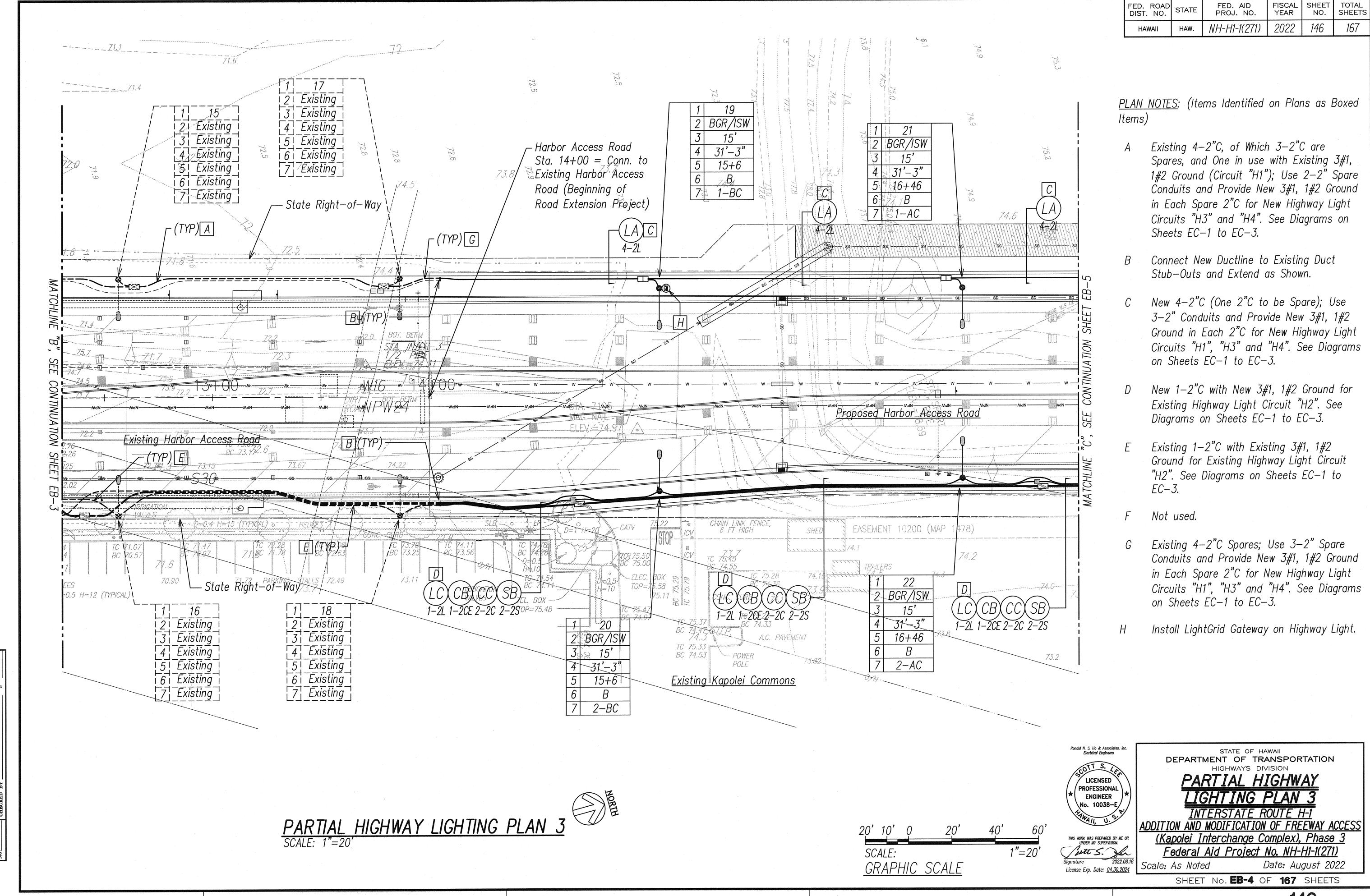


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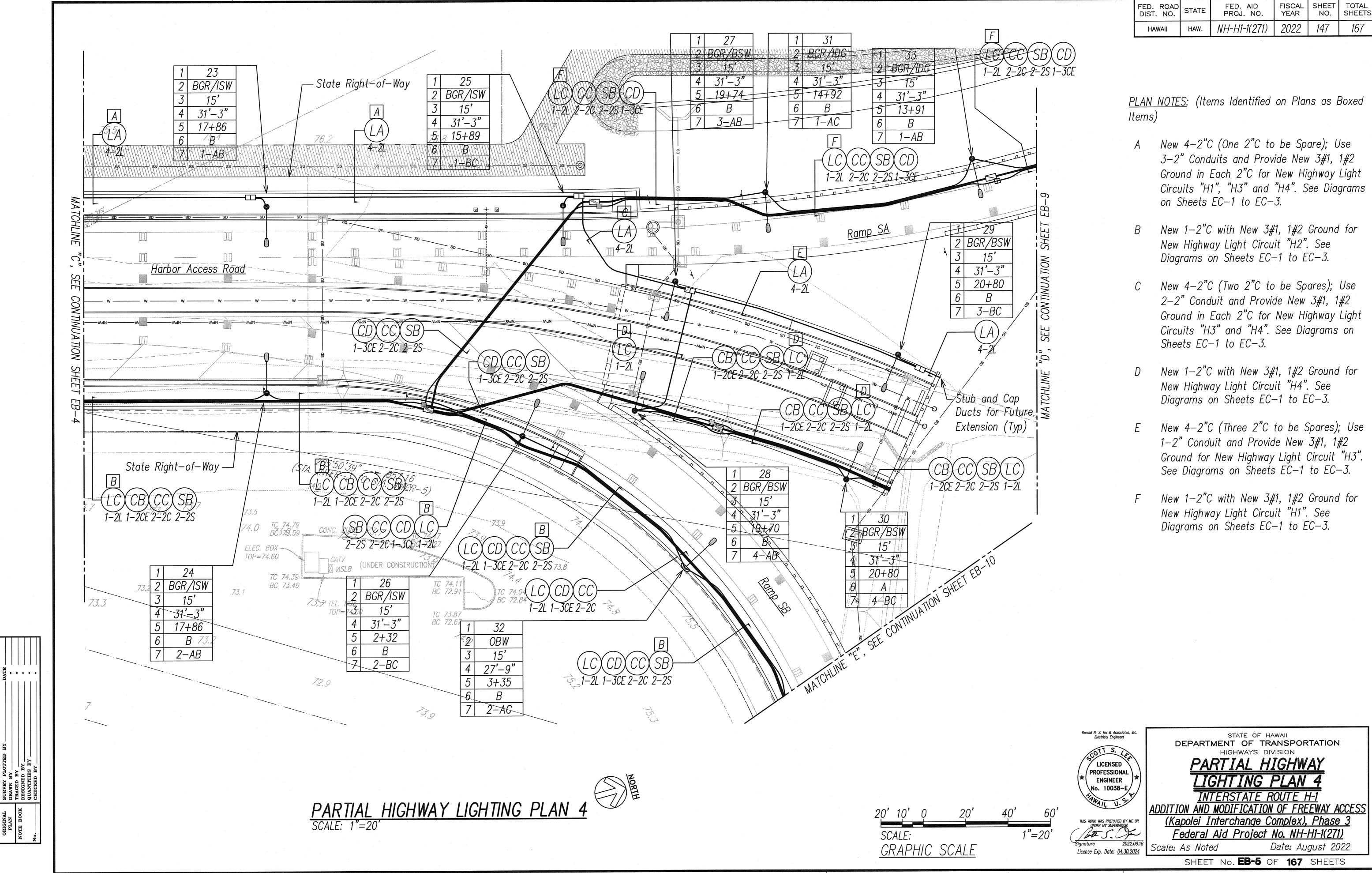




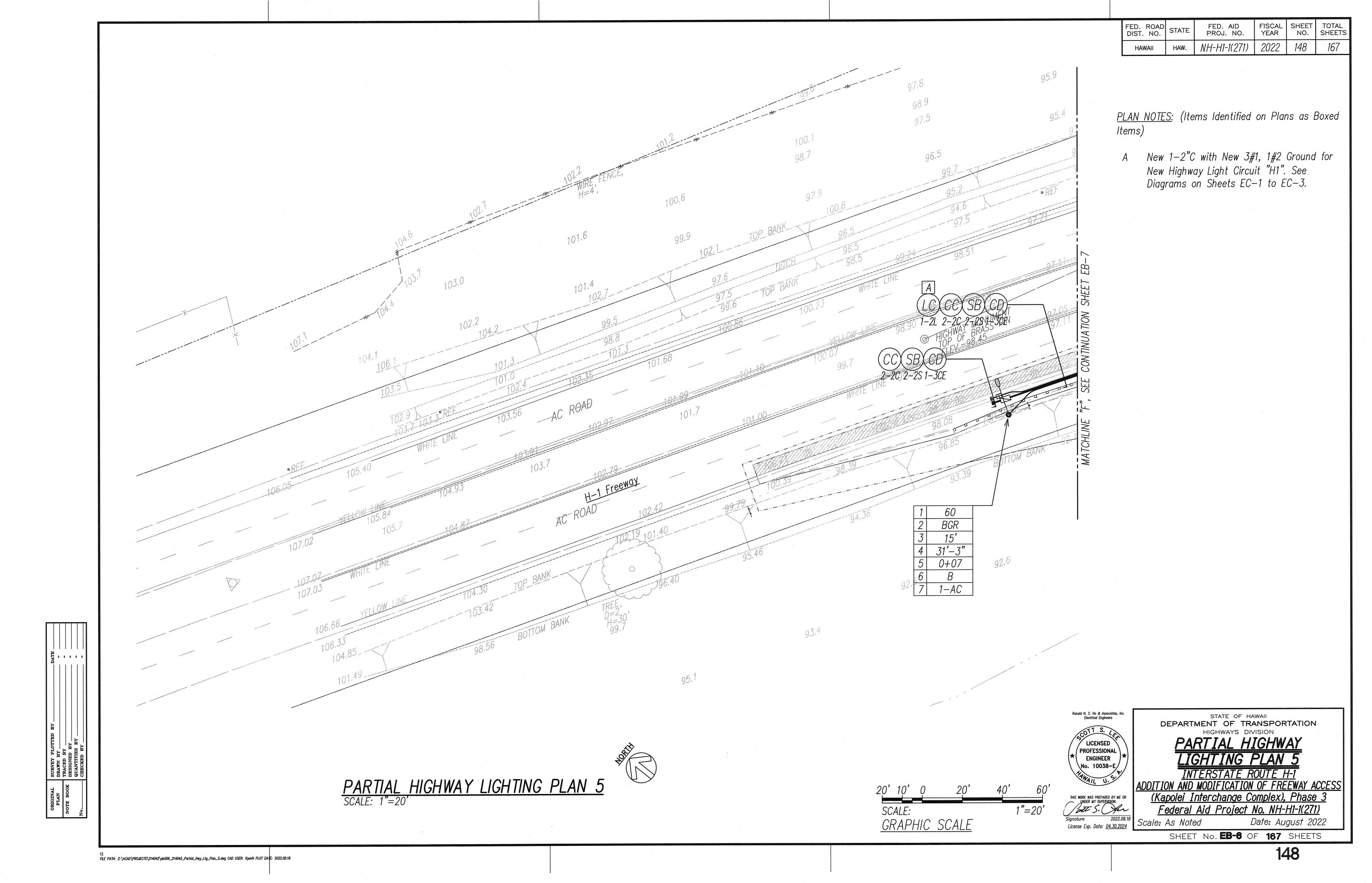
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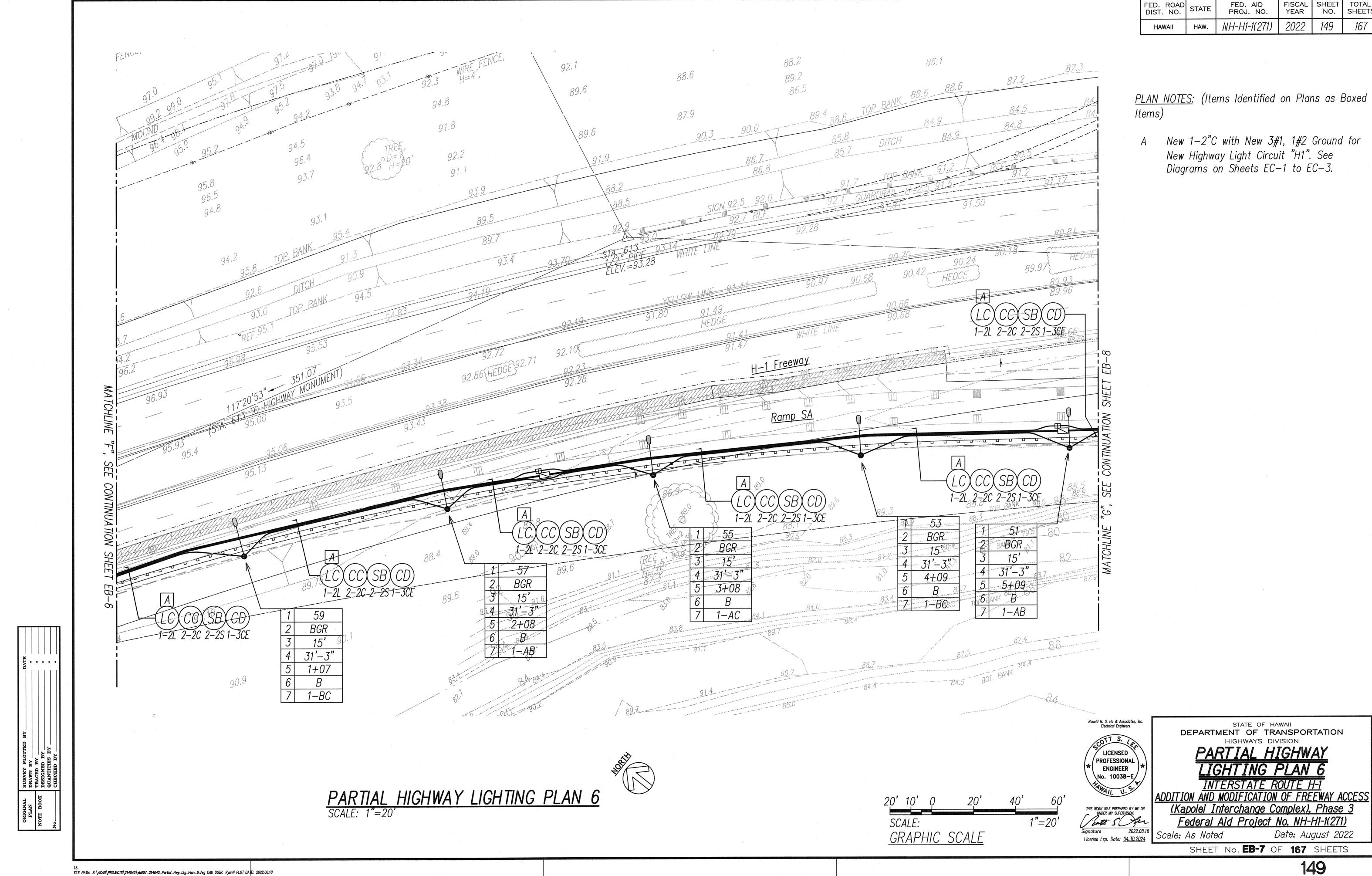


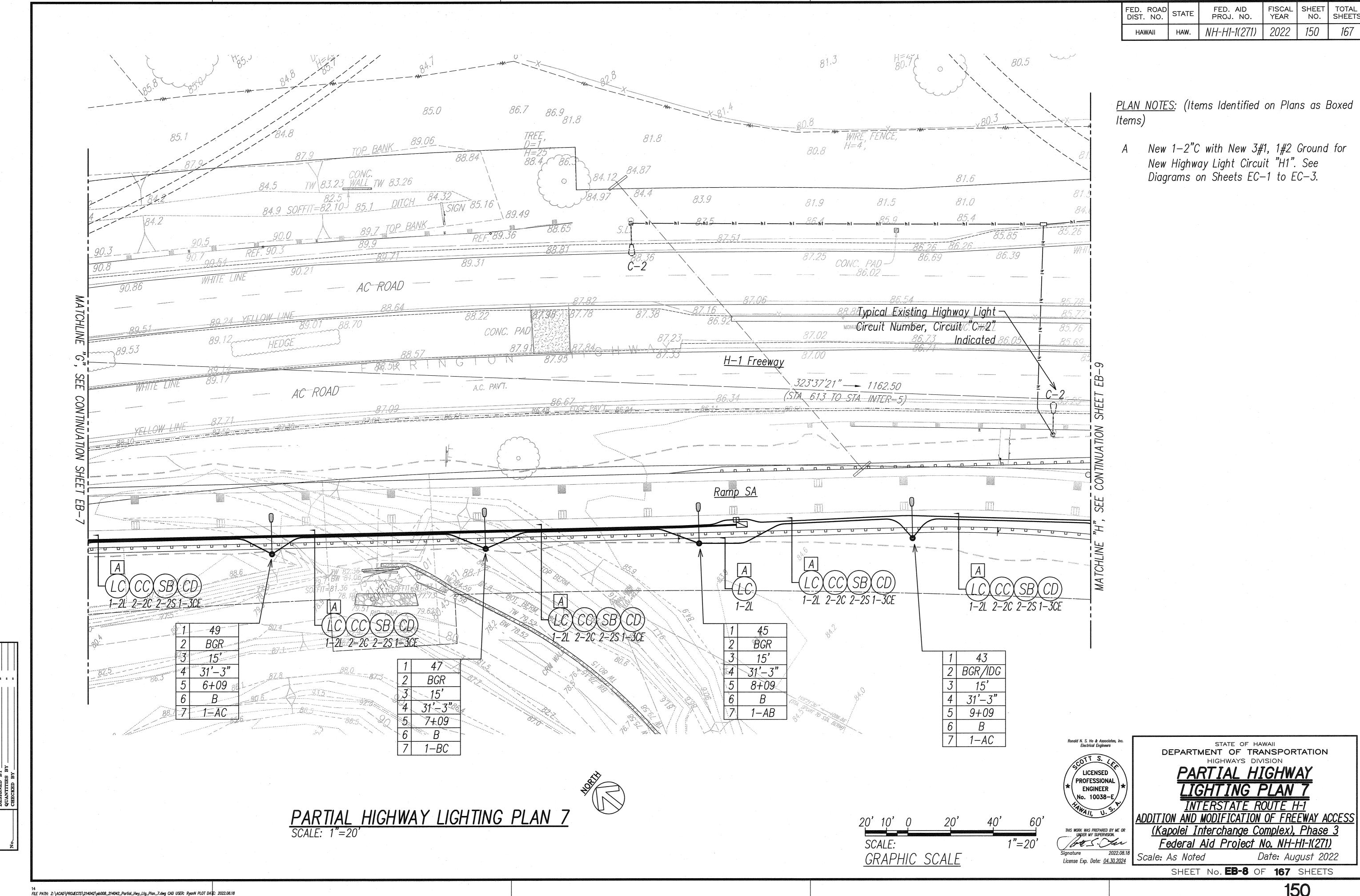
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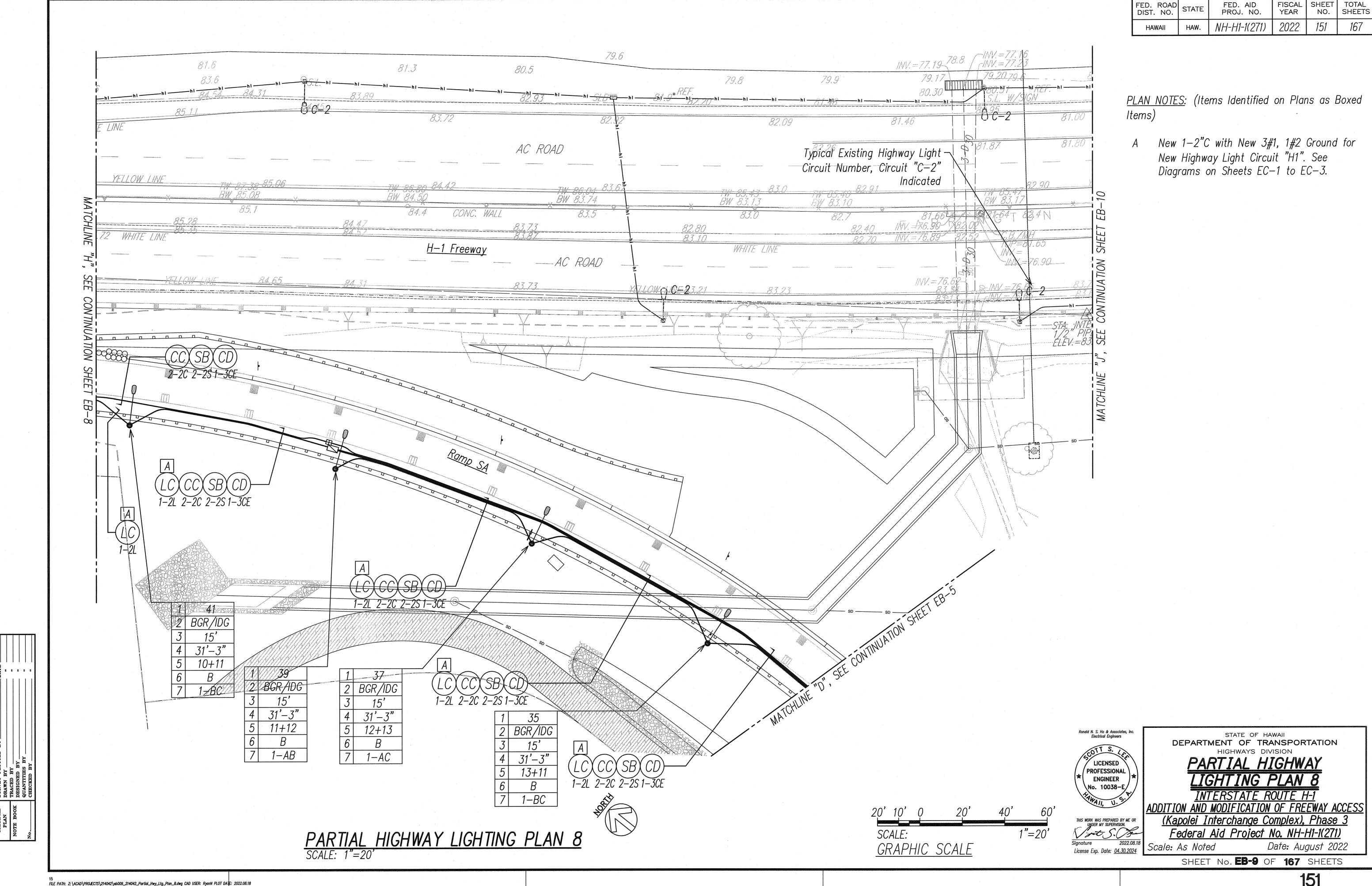


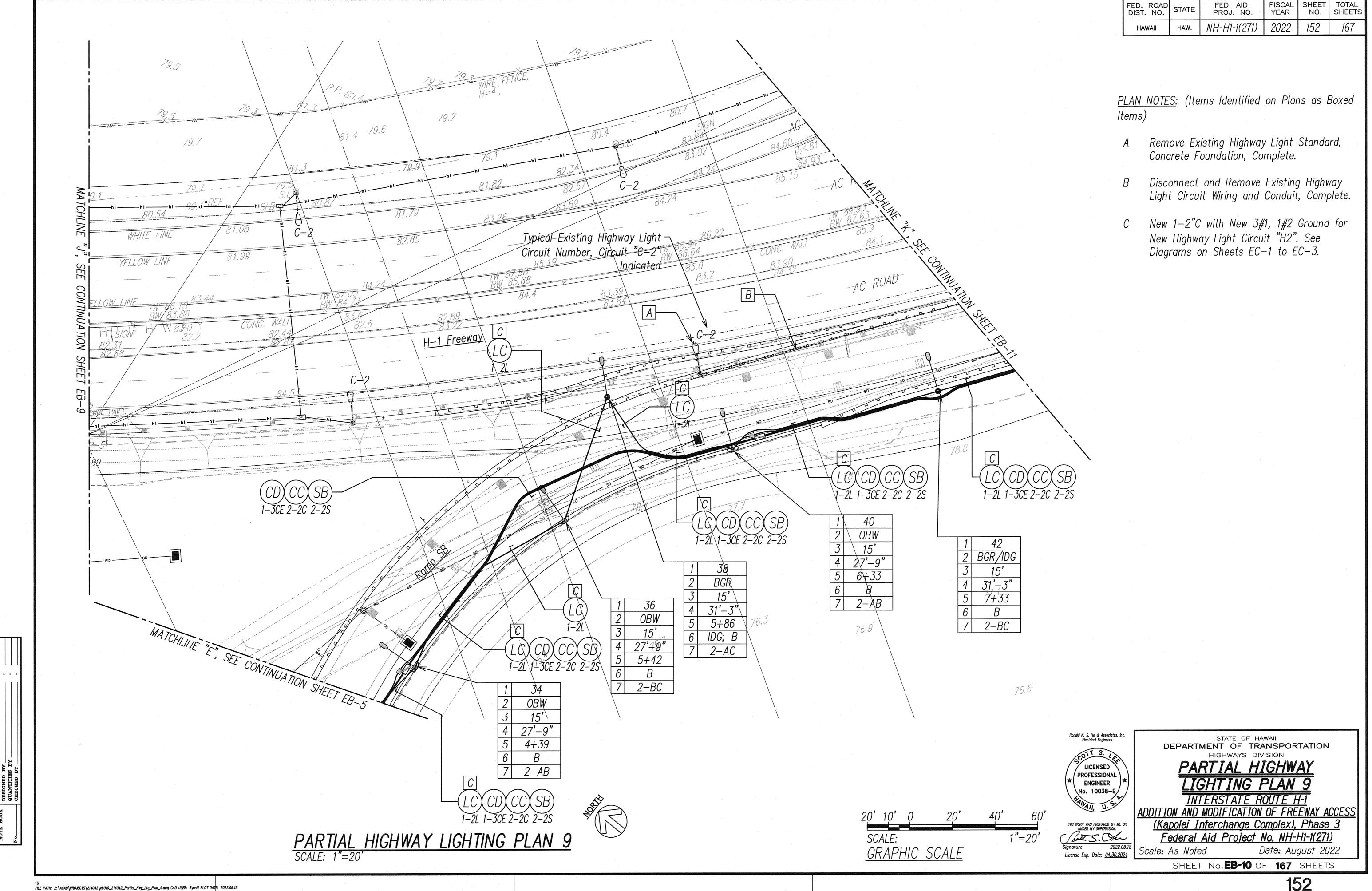
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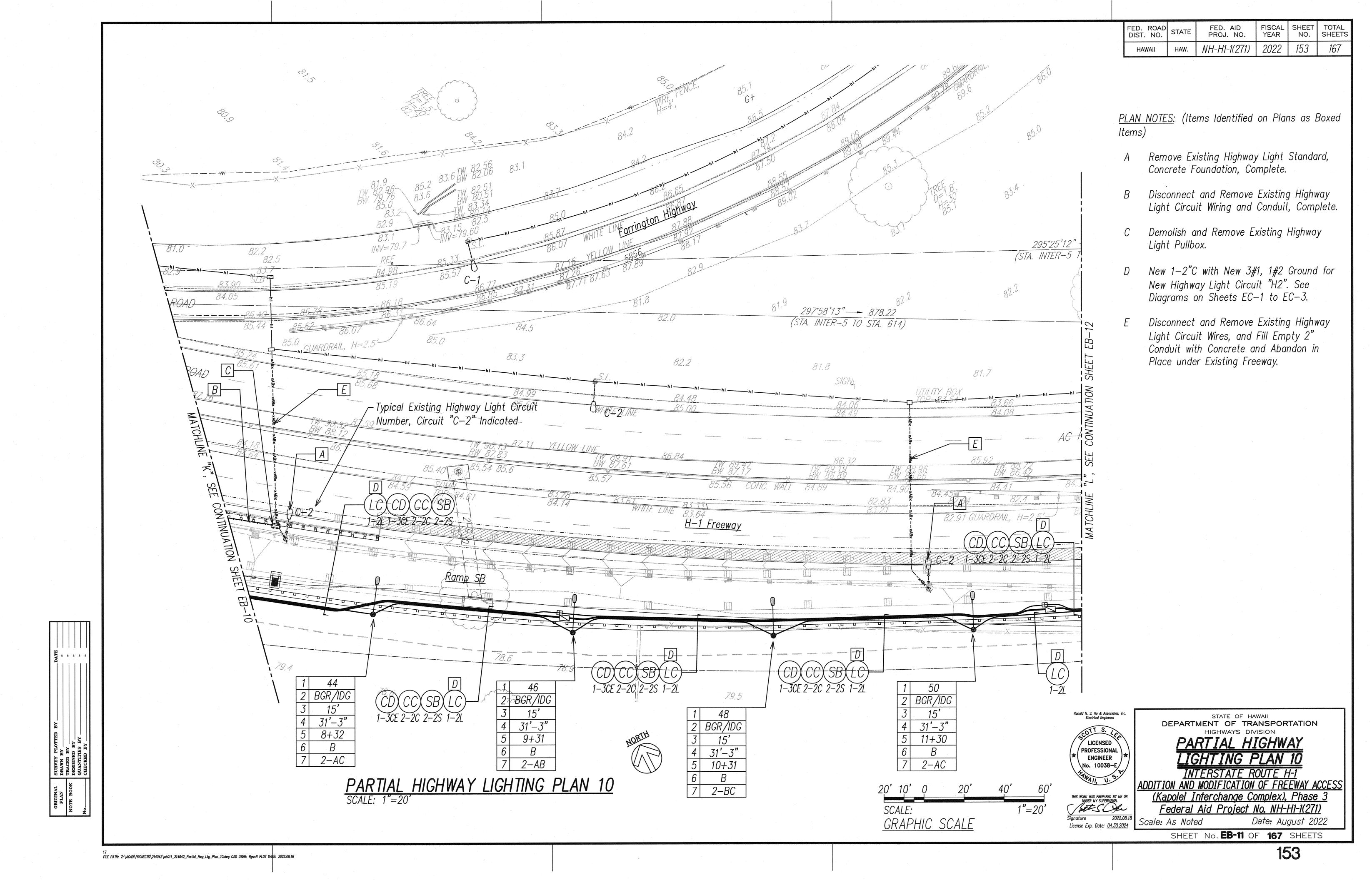


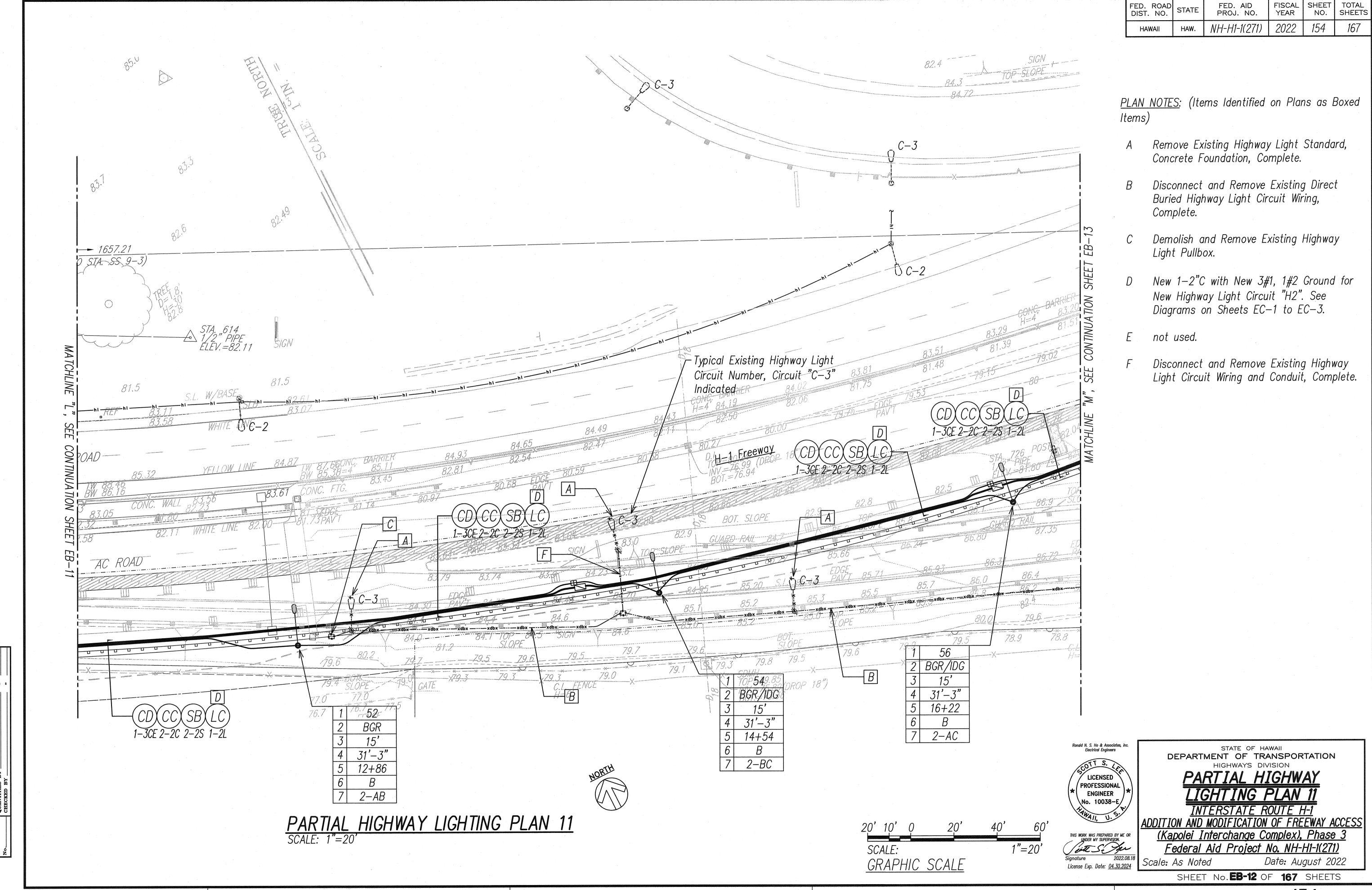




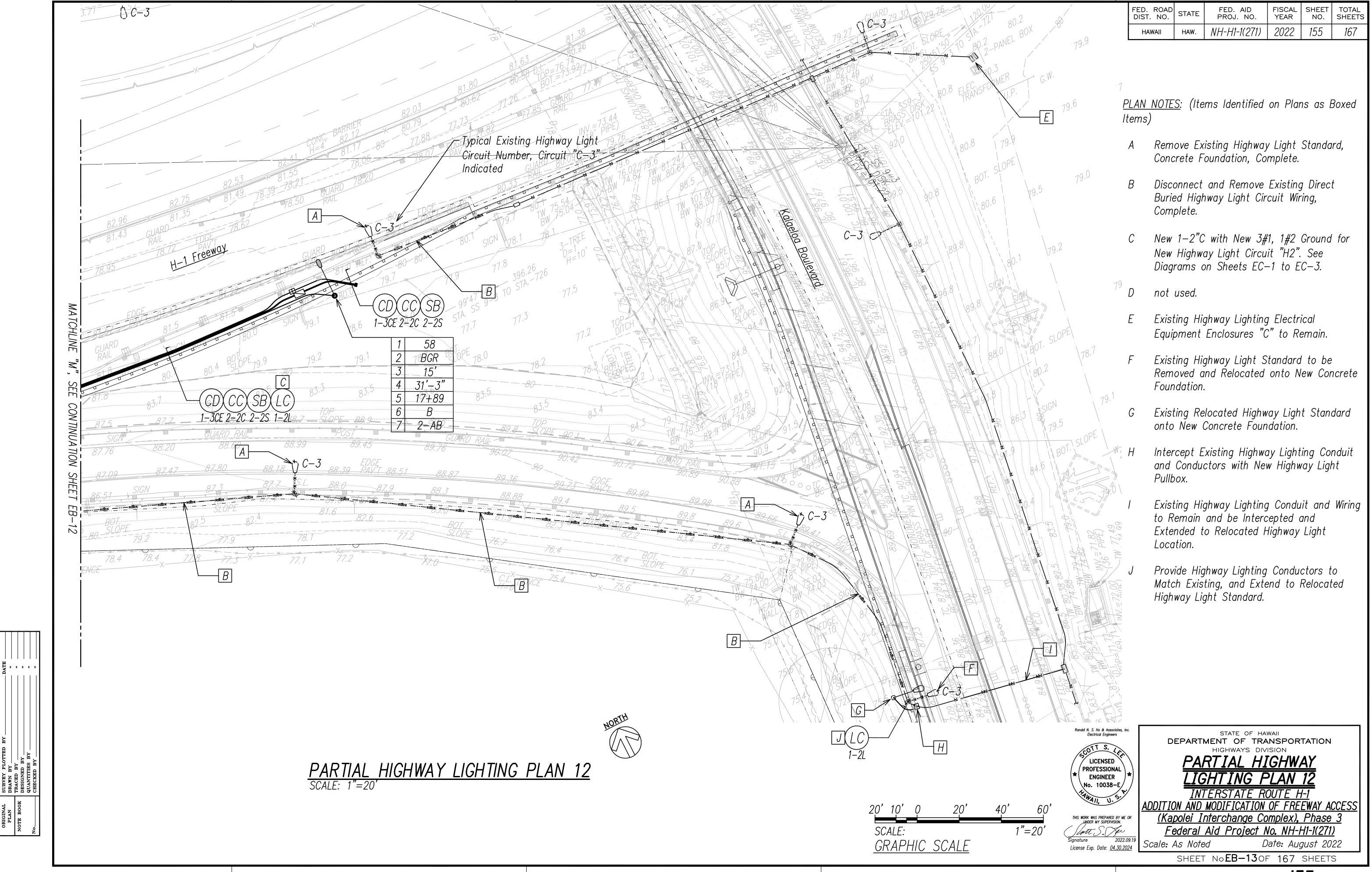








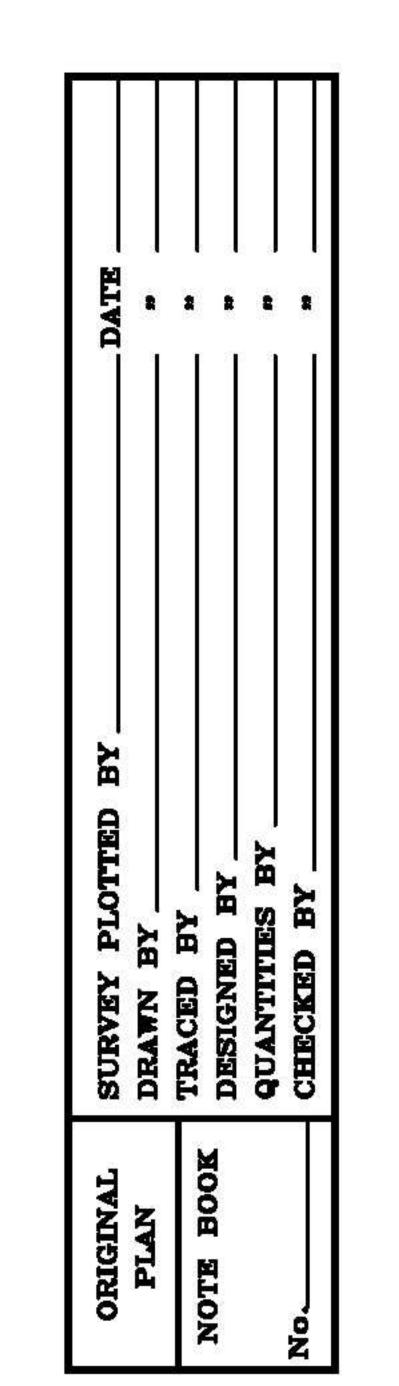
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL
HAWAII	HAW.	NH-H1-1(271)	2022	ADD. 156	167

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DATE REVISION

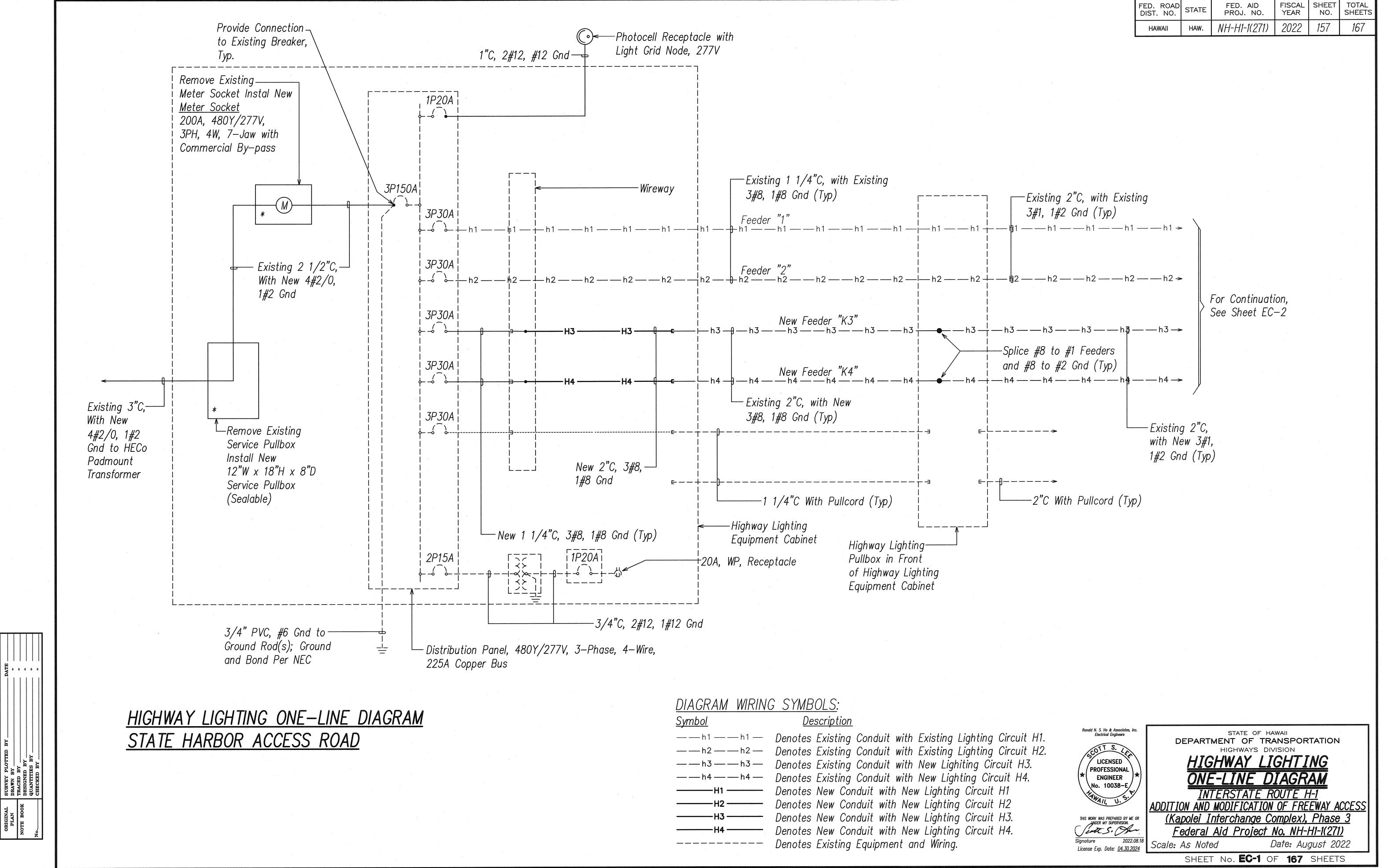
STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

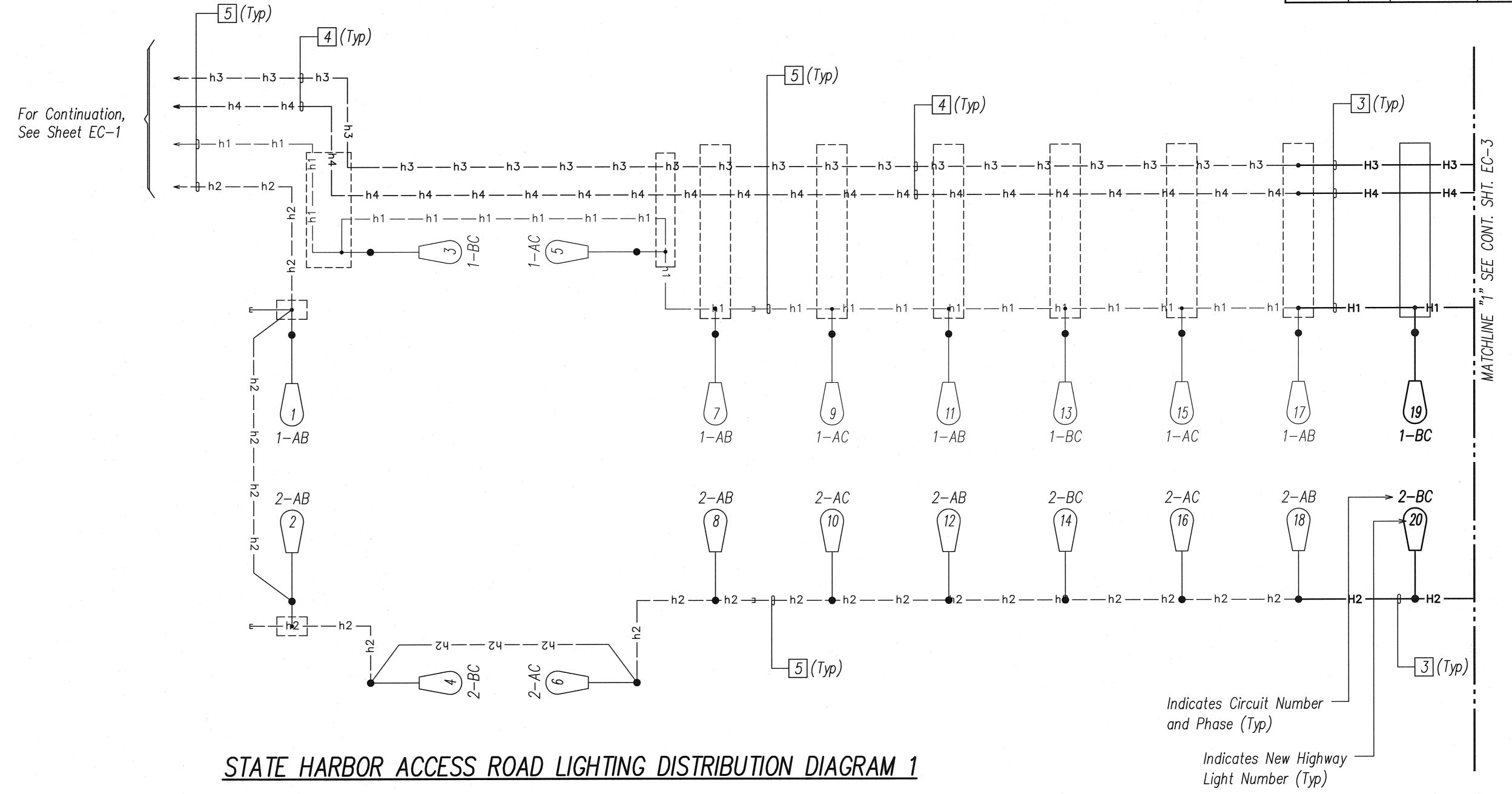
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. EB-14 OF 167 SHEETS



FED. ROAD DIST. NO. FED. AID PROJ. NO. 158

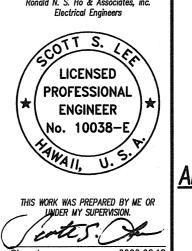


<u>DIAGRAM NOTES</u>: (Items in () Identified on Diagrams as Boxed Items)

- The Contractor Shall Verify Light Grid Node ID Numbers for all Existing and New Highway Lights Connected to Controller and Coordinate Integration of All Lights onto The State DOT's Light Grid System.
- not used.
- New 2"C, 3 No. 1, 1 No. 2 Ground.
- Existing 2"C, with New 3 No. 1, 1 No. 2 Ground.
- Existing 2"C, with Existing 3 No. 1, 1 No. 2 Ground.
- not used.
- not used.

SURVEY PLOTTI
DRAWN BY ____
TRACED BY ___
DESIGNED BY _
QUANTITIES BY

- not used. General Notes:
 - a. Not all Highway Light Pullboxes are shown; See Highway Lighting Plans for Conduit and Pullbox Requirements. b. For Typical Highway Lighting Standard Wiring Connection Diagram, See Sheet EC—4. Pullboxes and Junction Boxes Are Not Shown on Diagram for Clarity.
- See Sheet EC-1 for Diagram Wiring Symbols.



STATE OF HAWAII

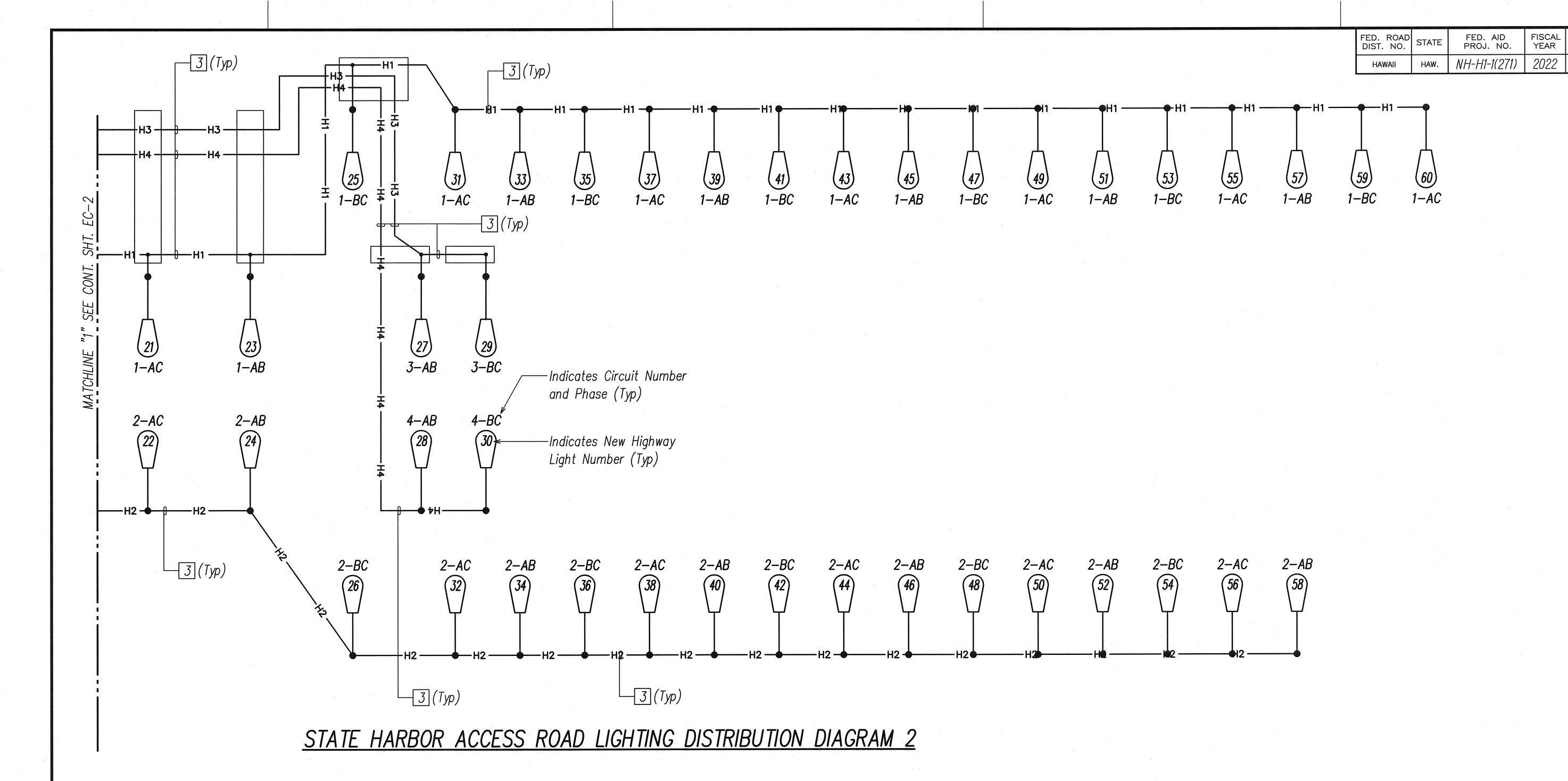
DEPARTMENT OF TRANSPORTATION HIGHWAY LIGHTING DISTRIBUTION DIAGRAM 1

INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3

Federal Aid Project No. NH-H1-1(271) Date: August 2022 Scale: As Noted

SHEET No. EC-2 OF 167 SHEETS

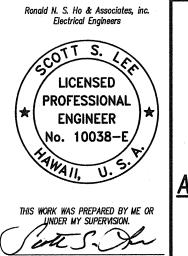
FILE PATH: Z:\ACAD\PROJECTS\214042\ec002_214042_hwy It distrib-H one-line diagram II.dwg CAD USER: RyanN PLOT DATE: 2022.08.18



<u>DIAGRAM NOTES:</u> (Items in () Identified on Diagrams as Boxed Items)

- The Contractor Shall Verify Light Grid Node ID Numbers for all Existing and New Highway Lights Connected to Controller and Coordinate Integration of All Lights onto The State DOT's Light Grid System.
- not used.
- New 2"C, 3 No. 1, 1 No. 2 Ground.
- not used.
- General Notes:
- a. Not all Highway Light Pullboxes are shown; See Highway Lighting Plans for Conduit and Pullbox Requirements.
 b. For Typical Highway Lighting Standard Wiring Connection Diagram, See Sheet EC-4.
 Pullboxes and Junction Boxes Are Not Shown on Diagram for Clarity.

- See Sheet EC-1 for Diagram Wiring Symbols.



License Exp. Date: <u>04.30.2024</u>

STATE OF HAWAII

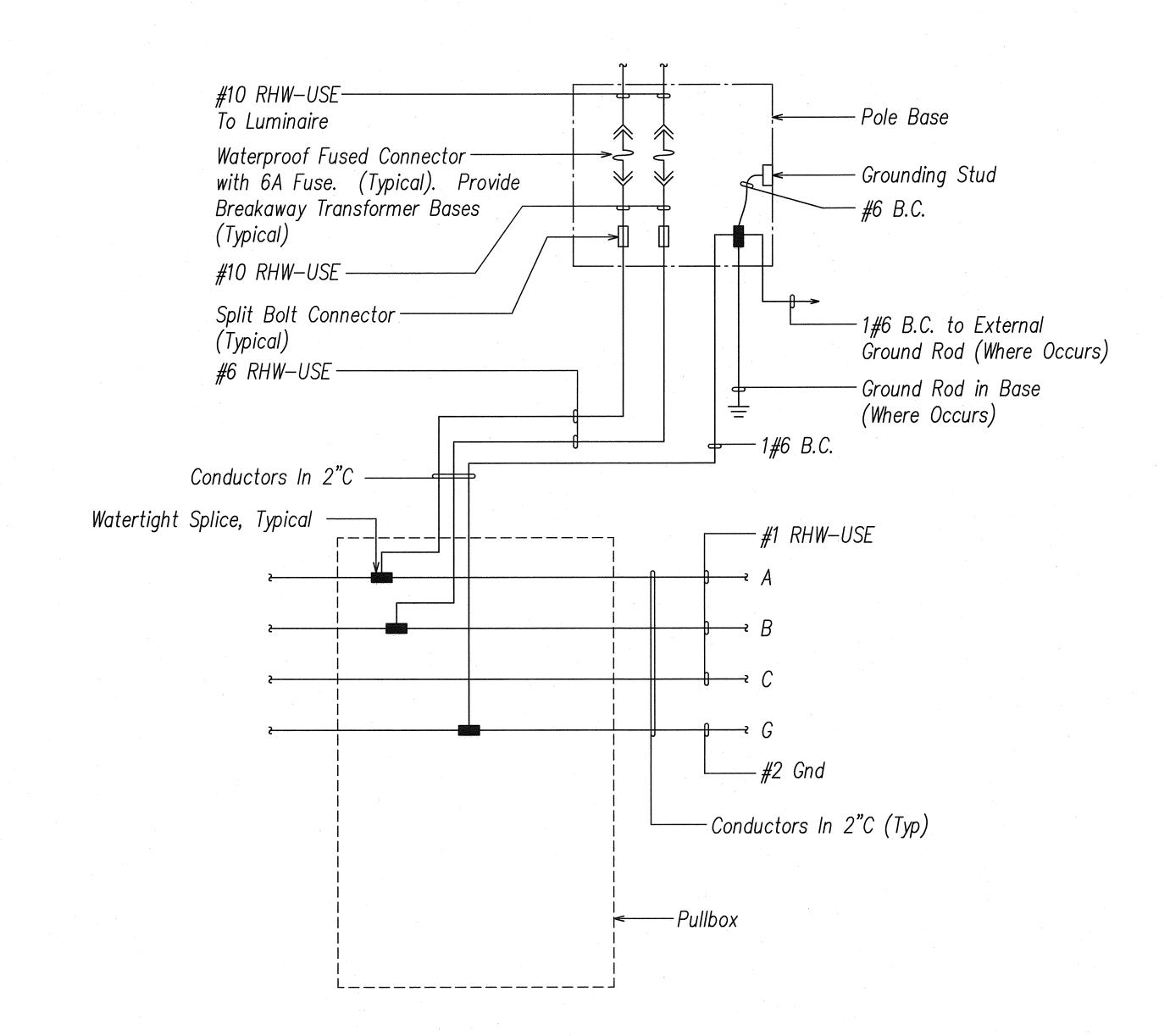
DEPARTMENT OF TRANSPORTATION HIGHWAY LIGHTING DISTRIBUTION DIAGRAM 2 INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS

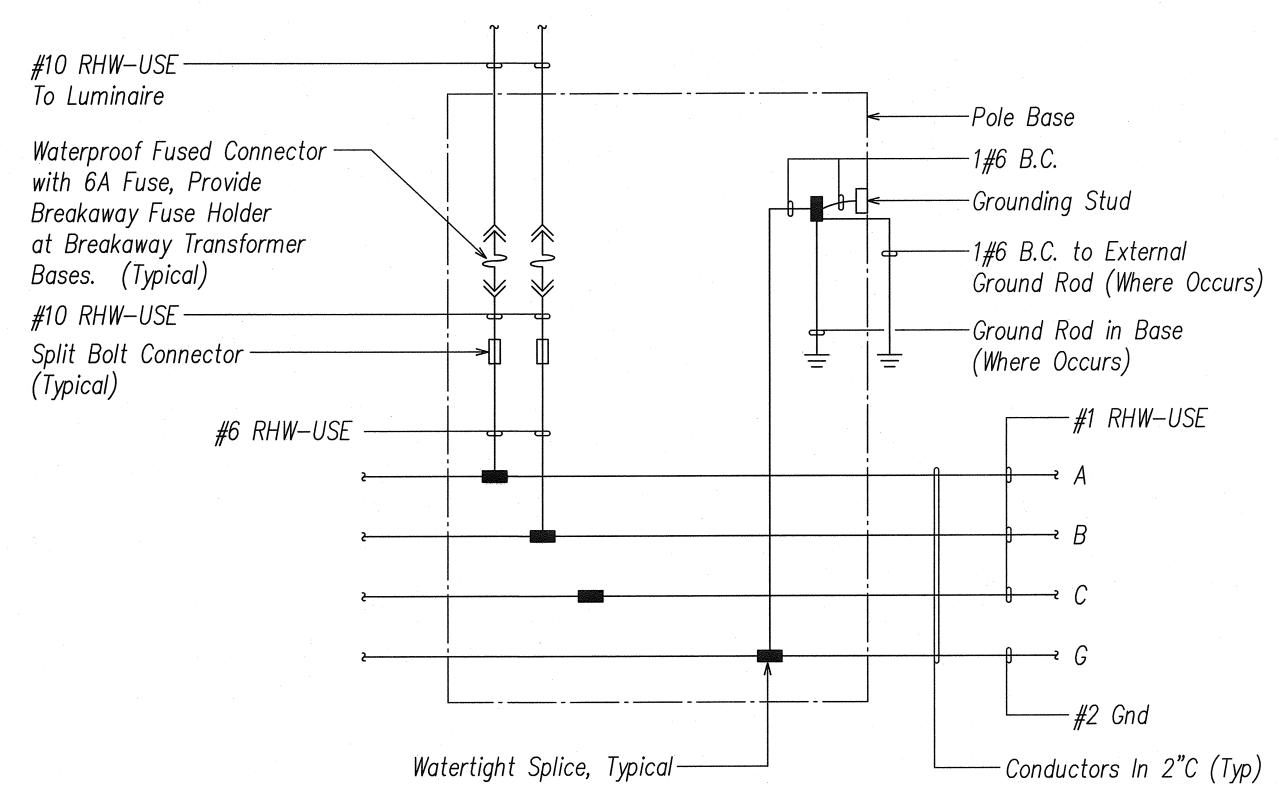
(Kapolei Interchange Complex), Phase 3 Federal Aid Project No. NH-H1-1(271)

Date: August 2022 Scale: As Noted

SHEET No. EC-3 OF 167 SHEETS

FED. ROAD		FED. AID	FISCAL	SHEET	TOTAL
DIST. NO. STATE		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII HAW.		NH-H1-1(271)	2022	160	167



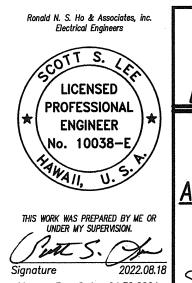


WIRING CONNECTION DIAGRAM

TYPICAL HIGHWAY LIGHTING STANDARD

WIRING CONNECTION DIAGRAM — HIGHWAY

LIGHTING STANDARD WHERE PULLBOX INSTALLED

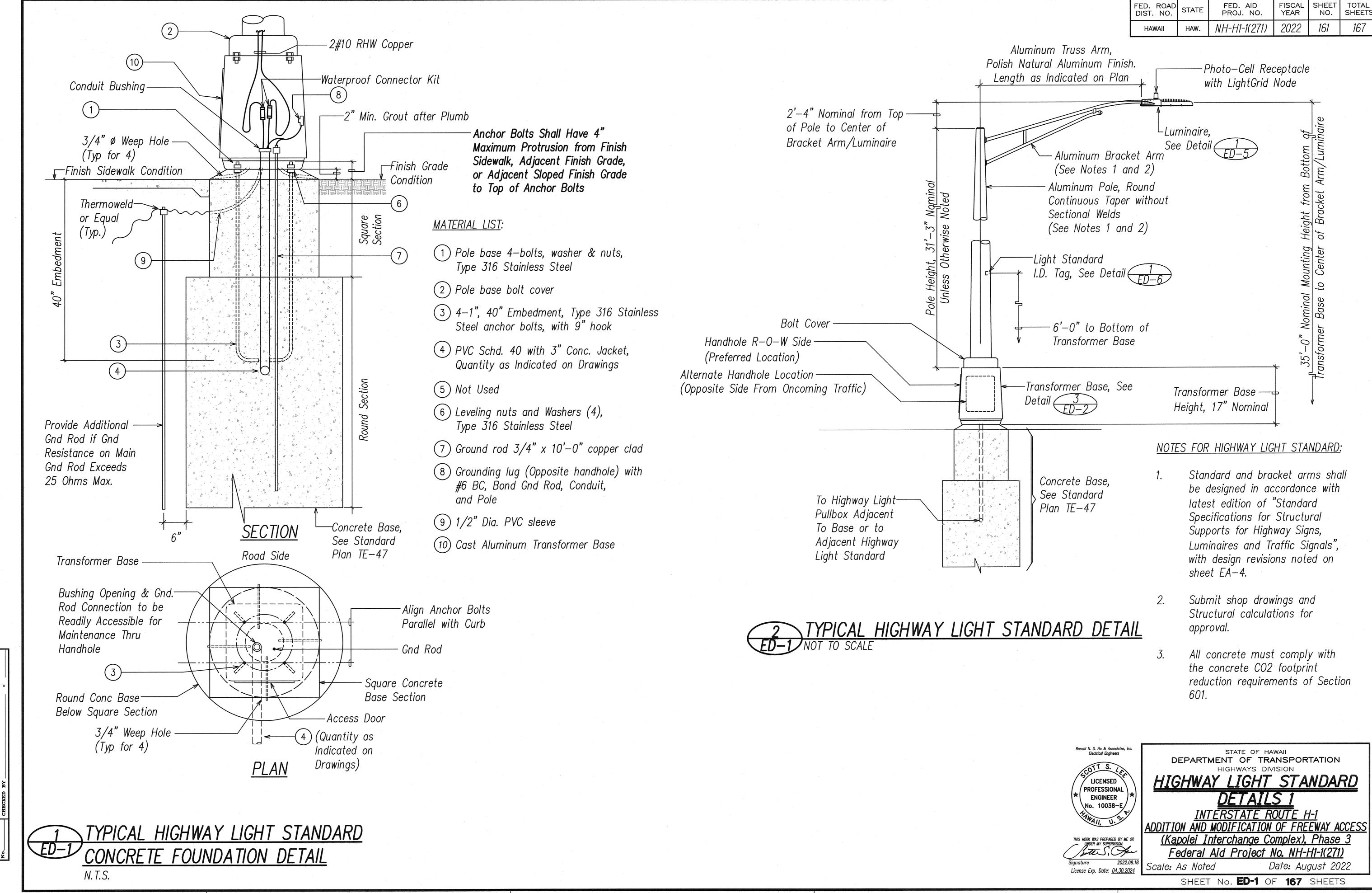




Federal Aid Project No. NH-H1-1(271)

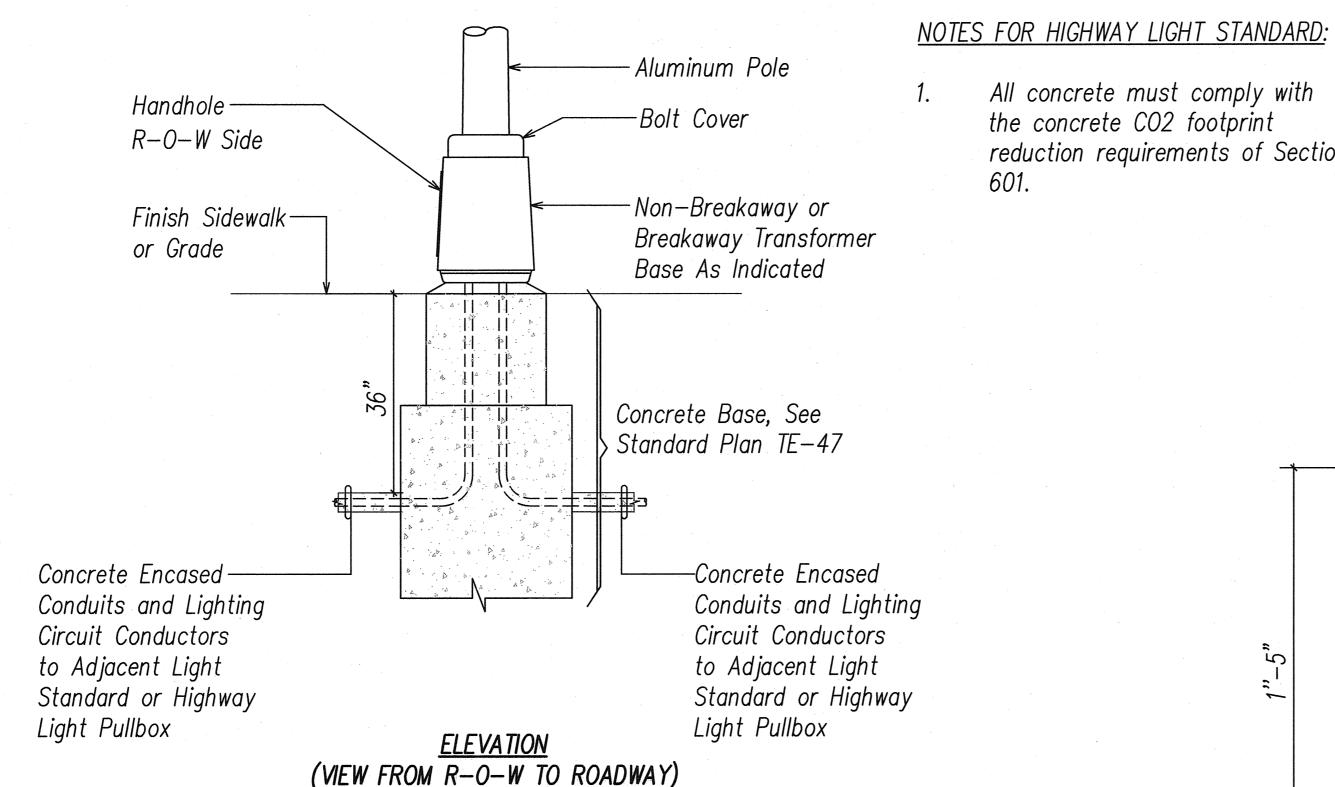
Ale: As Noted Date: August 2022

SHEET No. EC-4 OF 167 SHEETS



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All concrete must comply with the concrete CO2 footprint reduction requirements of Section

- Aluminum Pole

-Bolt Cover

13 1/2" Sq. 9 1/4" 0 0 9 3/4" 1/2"-13NC---Tapped Hole 15 3/8" Sq.

BASE SHALL BE SUPPLIED WITH:

- 1. Door and 1/4"-20NC S.S. screw
- 2. Eight 1" washers 1/2" thick x 2 3/4" O.D. (Washers mechanical galvanized per ASTM A153 or ASTM B454)
- 3. Four 1"-8NC x 3 3/4" long galvanized steel hex. hd. bolts
- 4. Four 1"-8NC galvanized steel hex. nuts
- 5. Four 1" galvanized stl. lock washers
- 6. Four 1" x 2" O.D. galvanized stl. flatwashers

1/4"-20NC Tapped Hole (Back Wall)

10 1/2" to 13 1/2" Dia. Bolt Circle

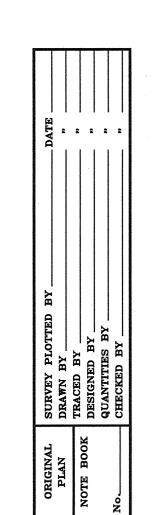
4043 Weld Wire (Heat Treat After Welding)

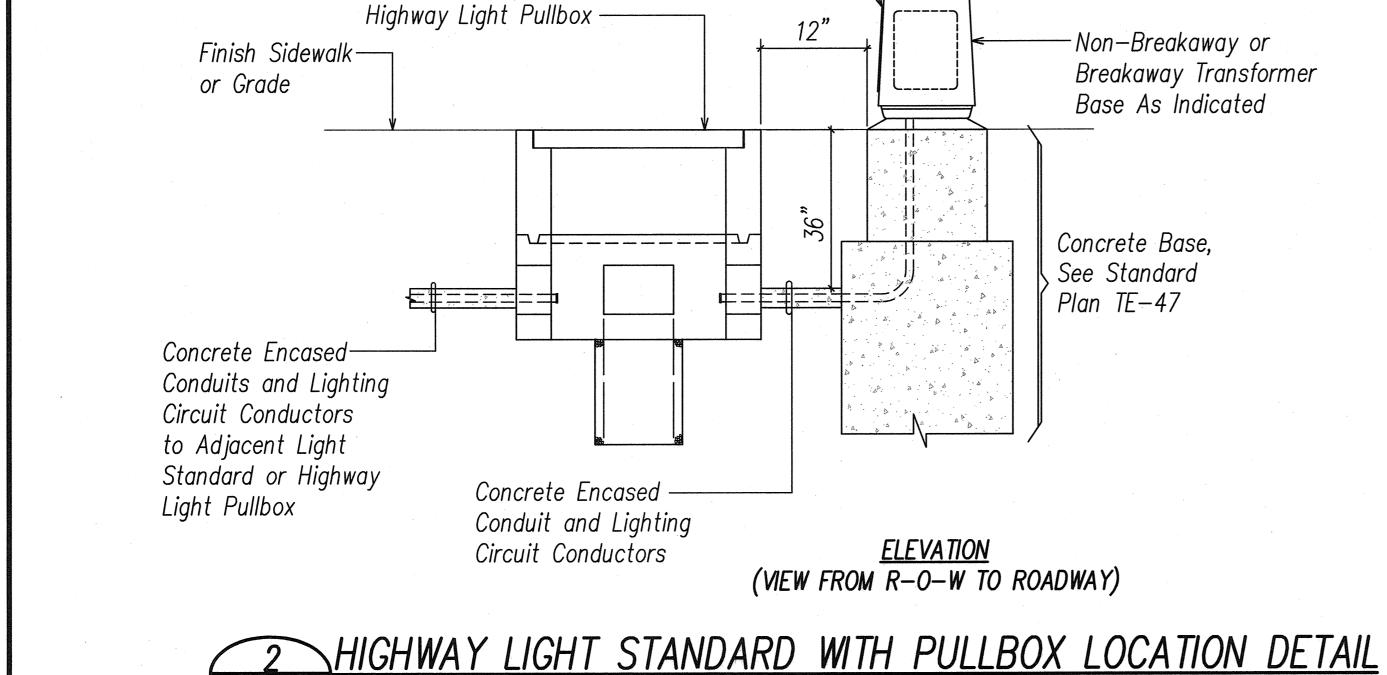
Akron Foundry Breakaway: <u>TB1-AF 1315-17 I.W. OR Equal</u> (Plus Hardware) Non-Breakaway: <u>TB1-AF 1315 I.W. OR Equal</u> (Plus Hardware)

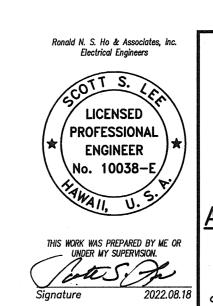
Material: Alum. Alloy 356-T6

15" Dia. Bolt Circle BREAKAWAY AND NON-BREAKAWAY TRANSFORMER BASE DETAIL

ED-2 NOT TO SCALE







License Exp. Date: <u>04.30.2024</u>

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION HIGHWAY LIGHT STANDARD DETAILS 2

<u>INTERSTATE ROUTE H-1</u> ADDITION AND MODIFICATION OF FREEWAY ACCESS (Kapolei Interchange Complex), Phase 3 Federal Aid Project No. NH-H1-1(271)

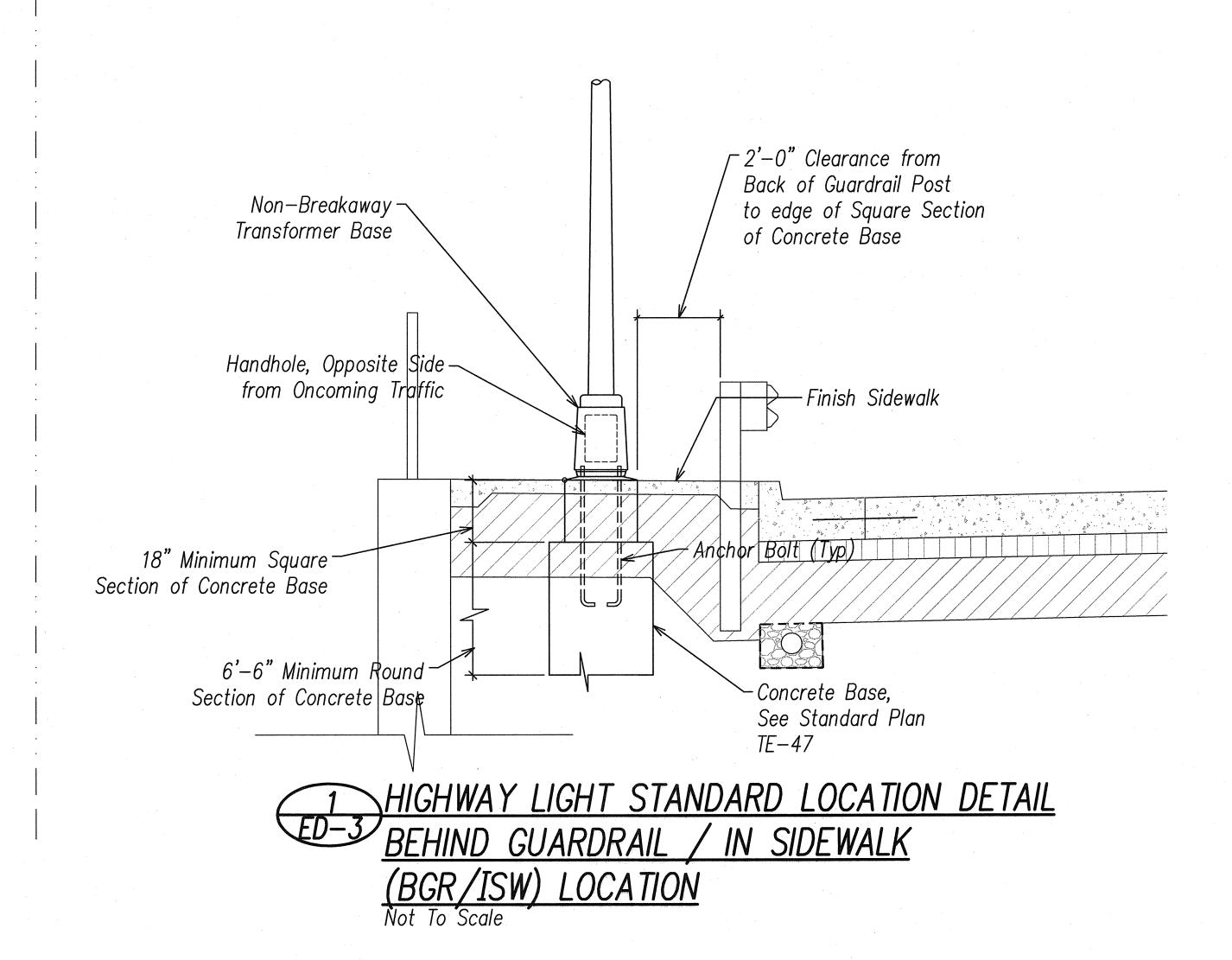
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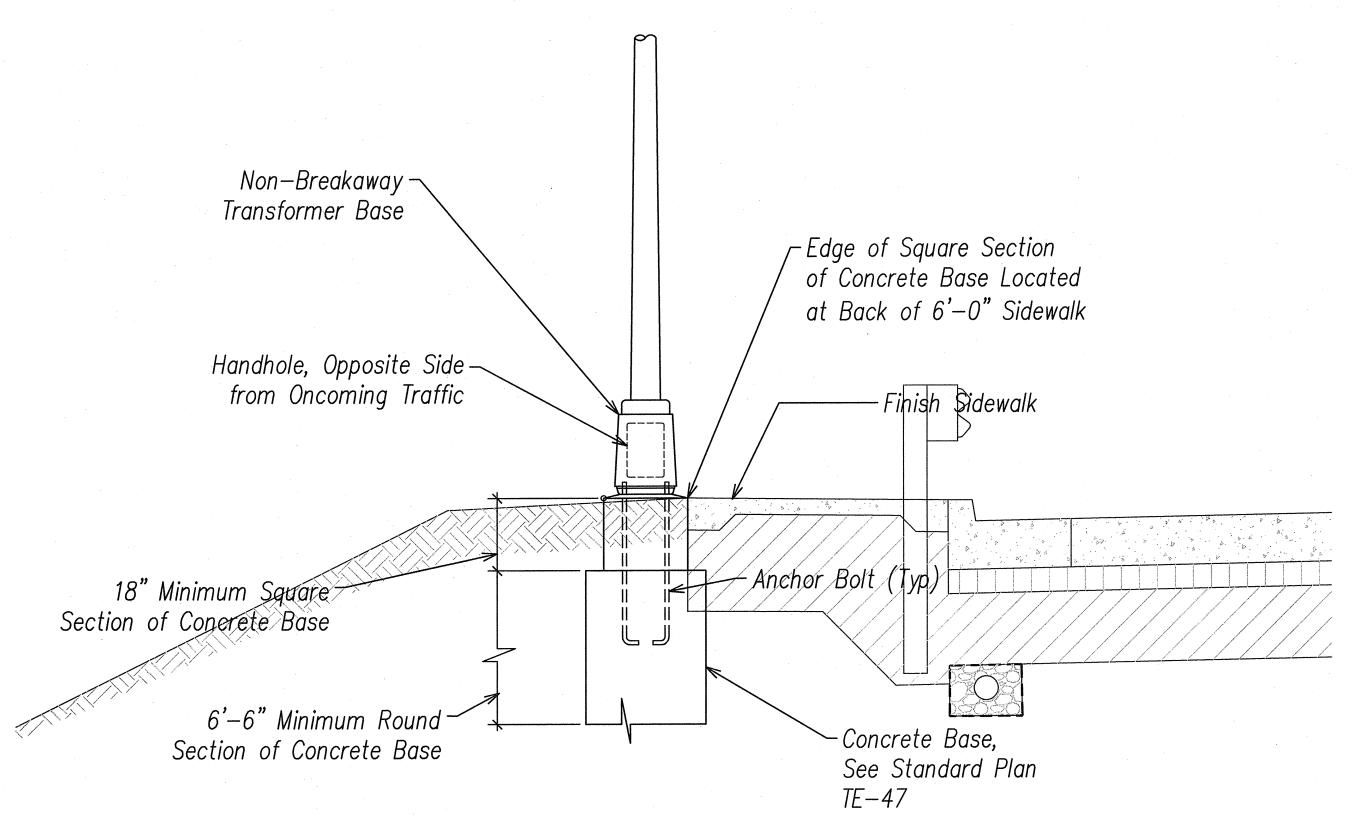
Date: August 2022 SHEET No. ED-2 OF 167 SHEETS

ED-2 NOT TO SCALE

Handhole R-O-W Side

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	163	167





HIGHWAY LIGHT STANDARD LOCATION DETAIL

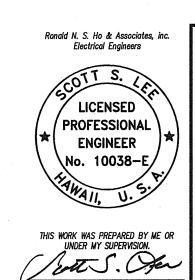
BEHIND GUARDRAIL / BEHIND SIDEWALK

(BGR/BSW) LOCATION

Not To Scale

NOTES FOR HIGHWAY LIGHT STANDARD:

1. All concrete must comply with the concrete CO2 footprint reduction requirements of Section 601.



DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HIGHWAY LIGHTING SYSTEM

DETAILS 3

INTERSTATE ROUTE H-1

ADDITION AND MODIFICATION OF FREEWAY ACCESS

(Kapolei Interchange Complex), Phase 3

Federal Aid Project No. NH-H1-1(271)

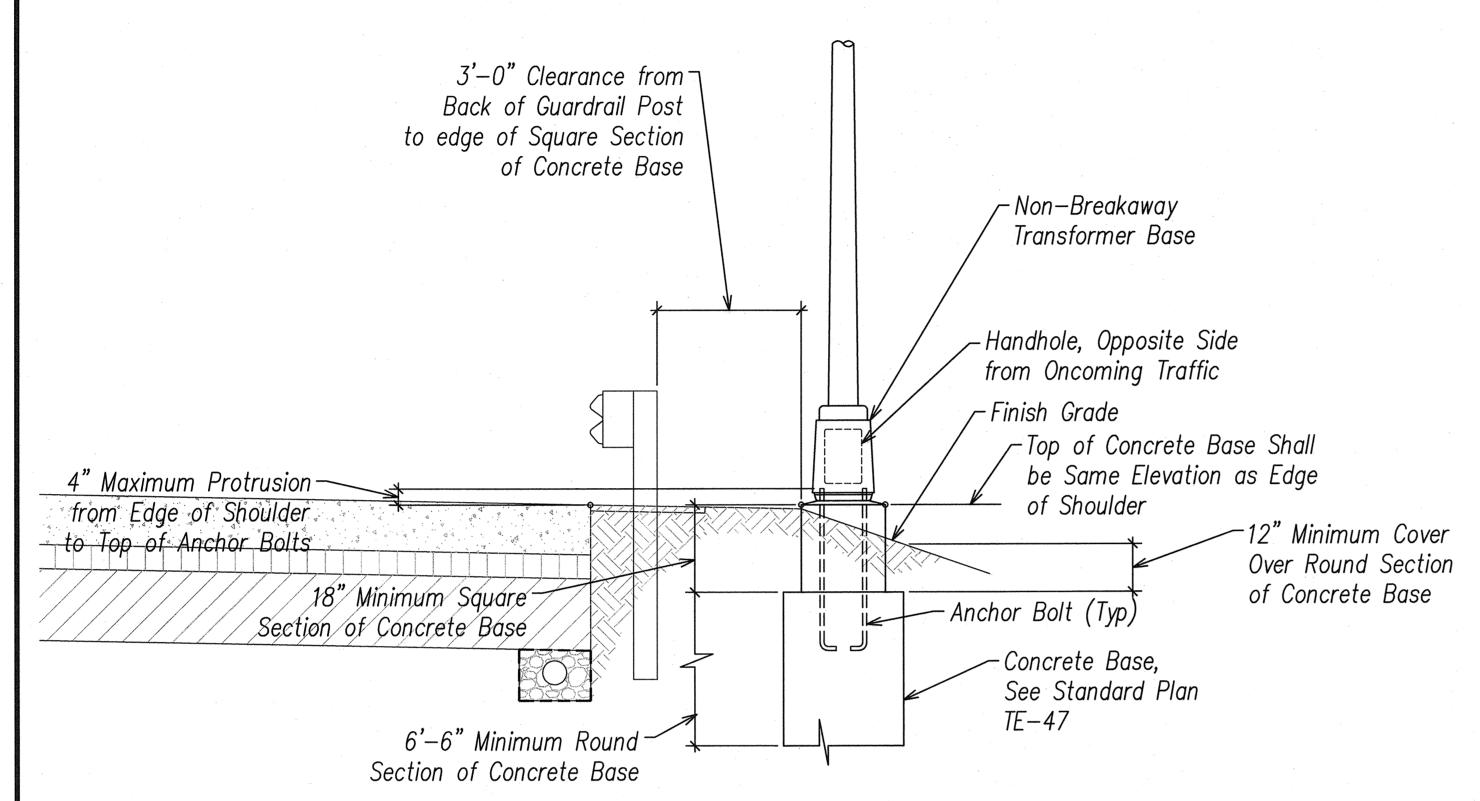
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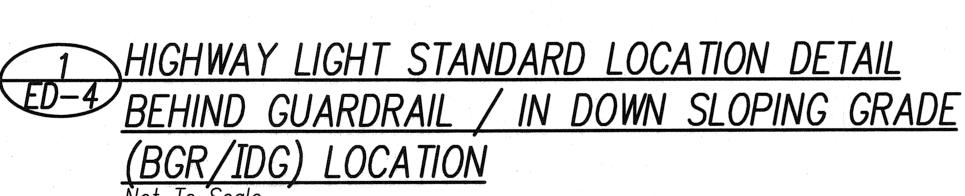
Date: August 2022

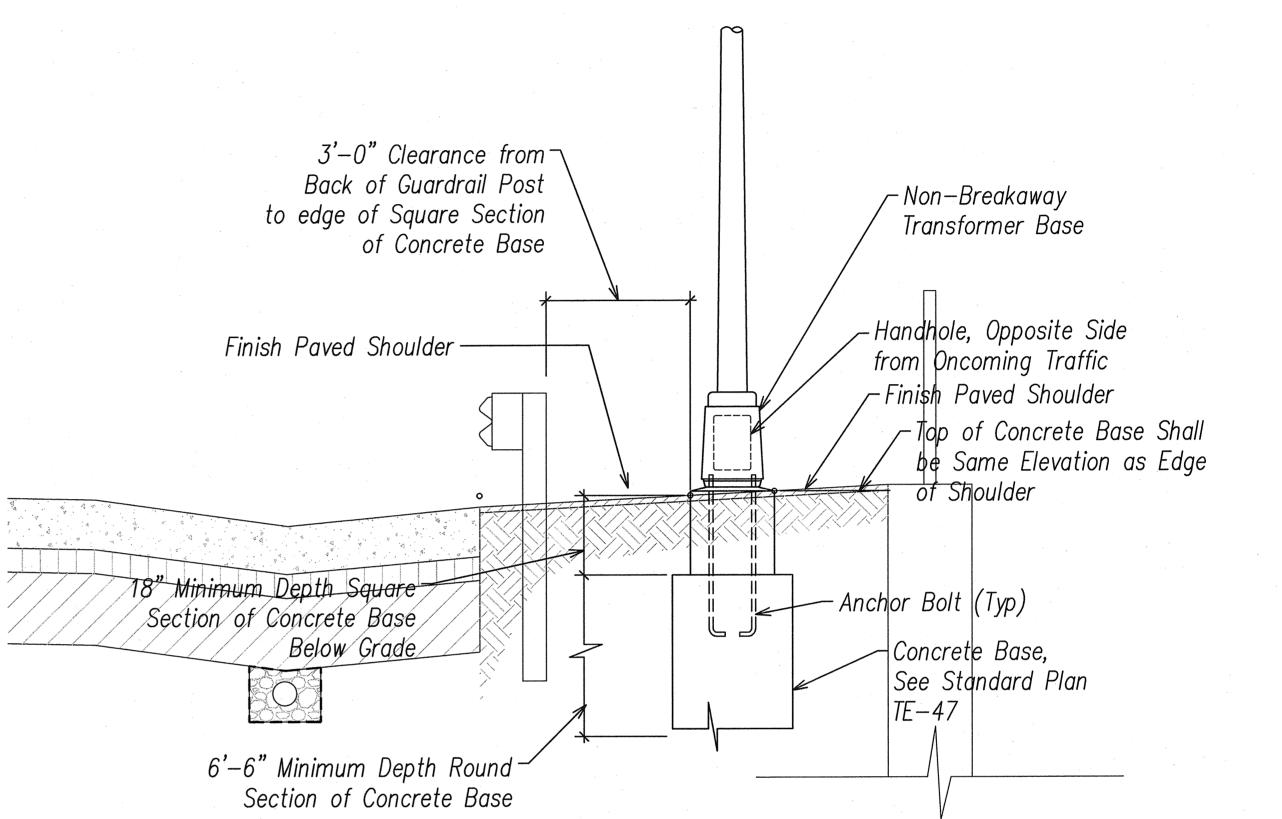
SHEET No. ED-3 OF 167 SHEETS

3
FILE PATH: Z:\ACAD\PROJECTS\214042\ed003_214042_hwy_light_details_3.dwg CAD USER: RyanN PLOT DATE: 2022.08.18

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.			TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	164	167







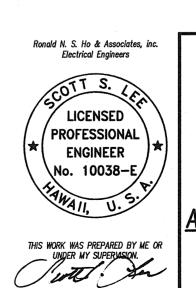
HIGHWAY LIGHT STANDARD LOCATION DETAIL

BEHIND GUARDRAIL / BEHIND PAVED SHOULDER

(BGR/BPS) LOCATION

NOTES FOR HIGHWAY LIGHT STANDARD:

1. All concrete must comply with the concrete CO2 footprint reduction requirements of Section 601.



STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HICHWAY I ICHTING CYCTEN

HIGHWAY LIGHTING SYSTEM
DETAILS 4

<u>DETAILS 4</u>

<u>INTERSTATE ROUTE H-1</u>

<u>ADDITION AND MODIFICATION OF FREEWAY ACCESS</u>

(Kapolei Interchange Complex), Phase 3

Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

SHEET No. **ED-4** OF **167** SHEETS

ED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	165	167

480V System, Unless Otherwise Noted

15,860

All dimensions shown are nominal.

185

Photometric Type: S3-Asymmetric Forward

LED ROADWAY LUMINAIRE SPECIFICATIONS:

<u>Housing</u>

- Die cast aluminum housing.
- A modern design preserving the aesthetic look of traditional roadway Cobrahead fixtures and shall incorporate the heat sink directly into the unit ensuring maximum heat transfer and long LED life.
- Shall meet 2G vibration per C136.31—2010 For 3G rating contact manufacturer.
- Power door assembly with removable retention latch.

LED & Optical Assembly

- Structured LED array shall be provided for optimized roadway photometric distribution.
- Evolve light engine consisting of scalable reflective technology designed to optimize application efficiency and minimize glare.
- Shall utilize high brightness LEDs, 70 CRI at 4000K.
- LM-79 tests and reports shall be performed in accordance with IESNA standards.

<u>Ratings</u>

- UL listed, suitable for wet locations per UL 1598.
- IP65 rated optical enclosure per ANSI C136.25—2009.
- Temperature rated at -40° to 50° C (-40° to 45° C for ERS4 347-480V fixtures).
- Upward Light Output Ratio (ULOR) = 0.

<u>Lumen Maintenance</u>

• System rating is L85 at 50,000 hours.

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop feature.
- Wildlife intrusion protection at mounting pipe entry.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Finish

- Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
- Standard color: Gray.

Electrical

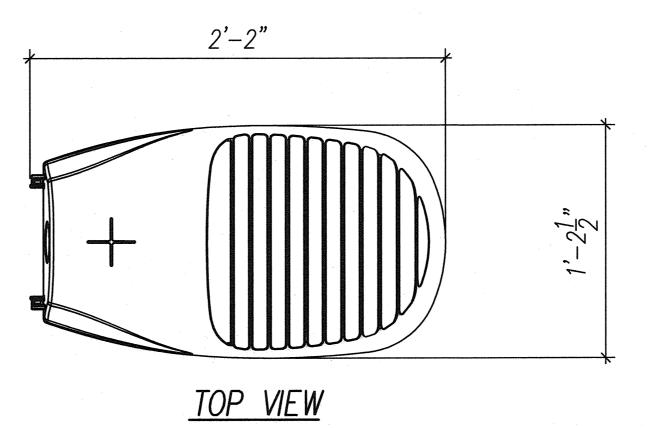
- 480 volt.
- System power factor is >90% and THD <20%.
- Class "A" audible sound rating.
- Integral surge protection:
 - For 120-277VAC per IEEE/ANSI C62.41.-1991, 6kV/3kA Location Category B3 (120 Events).
- Optional high capability surge protection per IEEE/ANSI C62.41.2-2002.
 - Rating 1 10kV/5kA Location Category (120 events).
 - Rating 2 6kV/3kA Location Category C-Low (5000 events).
- EMI: Title 47 CFR Part 15 Class A.
- Photo electric receptacle with LightGrid Node. LightGrid Node shall be compaitble with HDOT Highways Network.

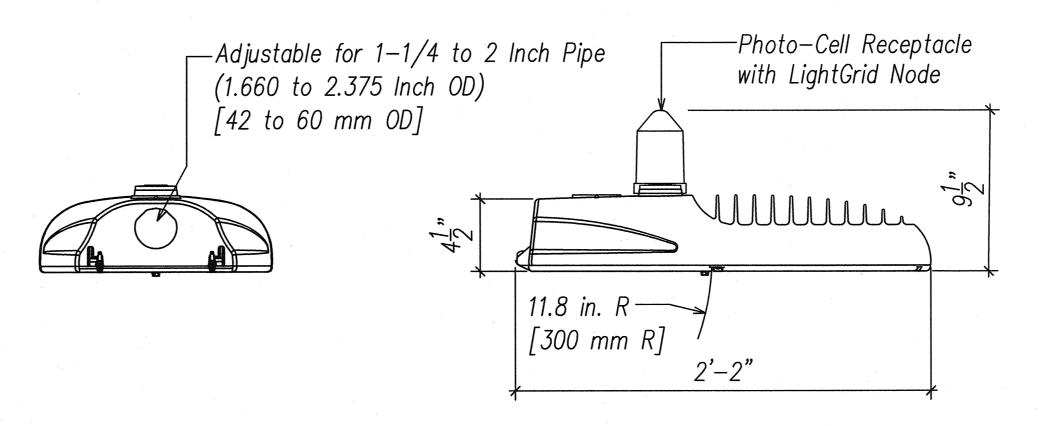
<u>Warranty</u>

SURVEY PLOTTE
DRAWN BY ____
TRACED BY ___
QUANTITIES BY ___
CHECKED BY ___

• 5—year limited system warranty standard.

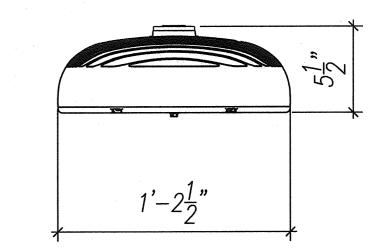
<u>Manufacturer or Approved Equal</u>: GE Evolve LED Roadway Lighting ERL2 Series.







SIDE VIEW



Lamp:

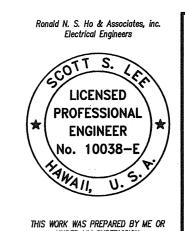
Voltage:

Lumens:

Watts:

FRONT VIEW

1 LED HIGHWAY LUMINAIRE DETAIL
ED-5 N.T.S.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Signature 2022.08.18

License Exp. Date: 04.30.2024

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LED HIGHWAY
LUMINAIRE DETAIL
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS

(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

Scale: As Noted Date: August 2022

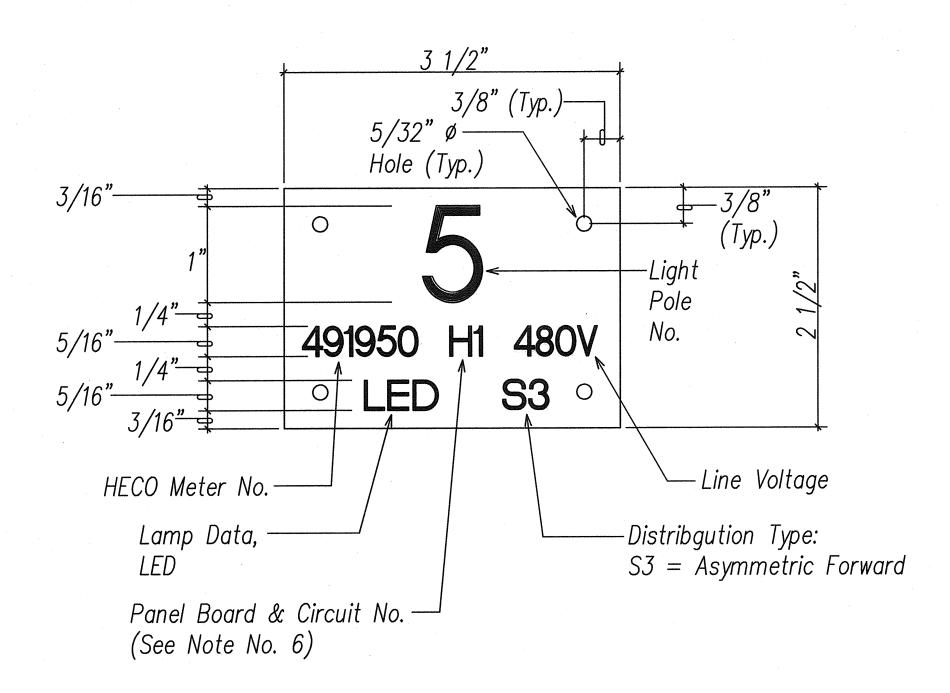
SHEET No. ED-5 OF 167 SHEETS

		ID TAC	G ITEMS			ID TAG ITEMS					
LIGHT POLE NO. (NOTE 1)	HECO METER NO.	CIRCUIT NO.	LINE VOLTAGE	LAMP DATA	REFRACTOR DATA	LIGHT POLE NO. (NOTE 1)	HECO METER NO.	CIRCUIT NO.	LINE VOLTAGE	LAMP DATA	REFRACTOR DATA
19	Note 2	1-BC	480V	LED	S3	49	Note 2	1-AC	480V	LED	S3
20		2-BC				50		2-AC			
21		1-AC				51		1-AB			
22		2-AC				52		2-AB			
23		1-AB				53		1-BC			
24		2-AB				54		2-BC			
25		1–BC				55		1-AC			
26		2-BC				56		2-AC			
27		3–AB		444444444444444444444444444444444444444		57		1-AB		·	
28		4-AB				58		2-AB			
29		3–BC		·		59	\	1-BC	V	V	V
30		4-BC				60	Note 2	1-AC	480V	LED	S3
31		1-AC				Andrew Control of the					
32		2-AC									·
33		1-AB									
34		2-AB							·	***************************************	
35		1-BC									·
36		2-BC									
37		1-AC									
38		2-AC	<u> </u>							in the second se	
39		1-AB				·					
40		2-AB		-							
41		1-BC				- The state of the		****			
42		2-BC									
43		1-AC									
44		2-AC	1								
45		1-AB									
46		2-AB	<u> </u>								
47		1–BC									
48	Note 2	2-BC	480V	LED	S3			·			

NO	TES:	

- 1. Verify Highway Light Pole Number with State D.O.T. Prior to Fabrication of I.D. Tags.
- 2. Verify HECo Meter Number with State D.O.T. and HECO Prior to Fabrication of I.D. Tags.

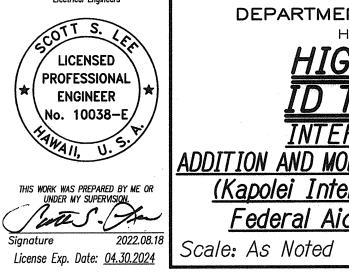
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.			TOTAL SHEETS
HAWAII	HAW.	NH-H1-1(271)	2022	166	167



<u>NOTES</u>:

- 1. Use 3 ply laminated flexible plastic, black—white—black. thickness: black cap sheet—0.010", white base sheet—0.052", black base sheet—0.010".
- 2. Light pole number size shall be 1" high and engraved 1/8" wide, white in color (number as required).
- 3. Nomenclature size shall be 5/16" high and engraved 1/32" wide, white in color (meter number, panel board & circuit number, line voltage, lamp data and refractor data as required).
- 4. Attach to aluminum pole with no. 8 stainless steel, 1/2" long drive screws in 1/8" drill hole.
- 5. Numbers and letters are inscribed by cutting through "black cap sheet" to expose "white letters".
- 6. Assign circuit number (letter indicates panelboard, number indicates circuit).
- 7. Light Numbers shall be obtained from the State. Use Alphabet Suffix to designate lights mounted on the same pole (e.g. 123A & 123).
- 8. Contractor to verify all items of I.D. tag with State D.O.T. prior to fabrication.

HIGHWAY LIGHT POLE ID TAG DETAIL FOR METERED SYSTEM ED-6 NOT TO SCALE



DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY LIGHT
ID TAG DETAILS
INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS

(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271)

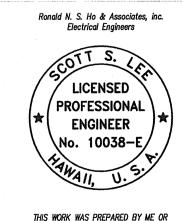
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SHEET No. ED-6 OF 167 SHEETS

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									DIST.	NO. STATE	
Kapolei Interchange Complex Phase 3		•							HAWA	AII HAW.	NH-H1-1(271) 2022 167
2016-03-10											
Pn 214042/K											
Roadway Optimized Illumination Calculations Summary using LED Roadway Luminaires											
Roadway Illumination Requirements:	Interstate	Interstate freeway / Intermediate									
Average Maintained fc:	0.6 to 0.9										
Minimum fo:	0.2	•				•					
Avg to Min Uniformity ratio:	3:1	.									
		•		•							
	Pole	Pole	Pole	Pole	Pole						
							e mounting height, 15' bracket arm				
Roadway Locations			Inside	Outside	Туре						
			Curve	Curve	1S, SS, OS	<u></u>					
			0.55	0.70	See Note		footcandle	s	uniformit		Photometric Data
										avg /	
			(Note *)	(Note **)				Conference of the second control of the seco	max / min		054500000400450004
Ramp-1-16' Lane	10	147	81	103	18	1.34	2.87	0.49	5.86		GE456288 219B 15860.IE
Ramp-1-12' Lane	10	164	90	115	1S	1.16	2.67	0.39	6.85	2.97	GE456288 219B 15860.IE
							<u> </u>		<u> </u>		
	<u> </u>	<u> </u>									
Roadway Illumination Requirements:	Minor Arterials / Intermediate										
		1.0									
Average Maintained fo:	1.0	•									
Avg to Min Uniformity ratio:	3:1										
Avg to will officially facto.		•									
	Pole	Pole	Pole	Pole	Pole	T				***************************************	
		'	Spacing (ft)		1		35'	· luminaire	mounting h	eiaht 15	bracket arm
Various Roadway Conditions	Colbdon	Cpaomy (it)	Inside	Outside	Type					3	
Various readway Conditions			Curve	Curve	18						
			0.55	0.70			footcandle	es ·	uniformit	ty ratio	Photometric Data
										avg /	1
			(Note *)	(Note **)		average	maximum	minimum	max / min		
Hanua Street-2-12' Lanes with Bike Lanre, Curb and Gutter, 6' Sidewalk	15.5'	168	92	118	OS	2.26	4.99	0.79	6.32	Annual Assessing Assessing Committee	GE456288 219B 15860.IE
Hanua Street-1-12' Lanes with Bike Lanre, Curb and Gutter, 6' Sidewalk	12.5	197	108	138	os	2.06	5.25	0.70	7.50		GE456288 219B 15860.IE
			,								
	NAMES OF THE PROPERTY OF THE P										

- * Pole located on the inside curve so calculated pole spacing was multiplied by 0.55.
- ** Pole located on the outside curve so calculated pole spacing was multiplied by 0.70.
- *** 1S = One Row One Side Spacing; SS = Two Rows Staggared Spacing; OS = Two Rows Opposite Spacing.

For the Roadway Luminaire Shop Drawings, Contractor shall provide roadway optimization illumination calculations using AGI Roadway Optimizer software (or equal) for the various roadway locations noted above to confirm pole spacing will meet or exceed the pole spacing noted above.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Signature 2022.08.18

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION ROADWAY ILLUMINATION CALCULATIONS SUMMARY INTERSTATE ROUTE H-1
ADDITION AND MODIFICATION OF FREEWAY ACCESS
(Kapolei Interchange Complex), Phase 3
Federal Aid Project No. NH-H1-1(271) Date: August 2022 Scale: As Noted

SHEET No. ED-7 OF 167 SHEETS