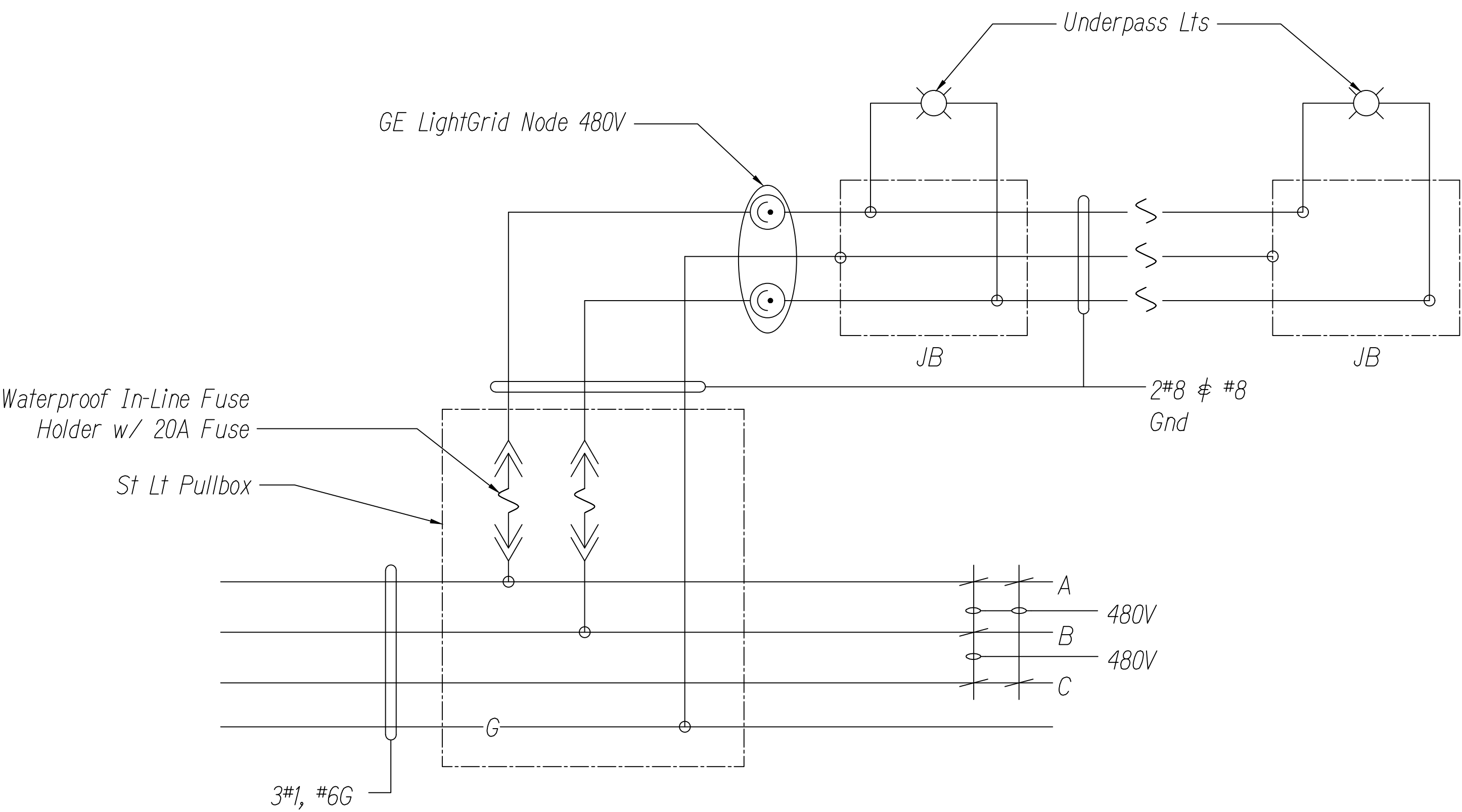
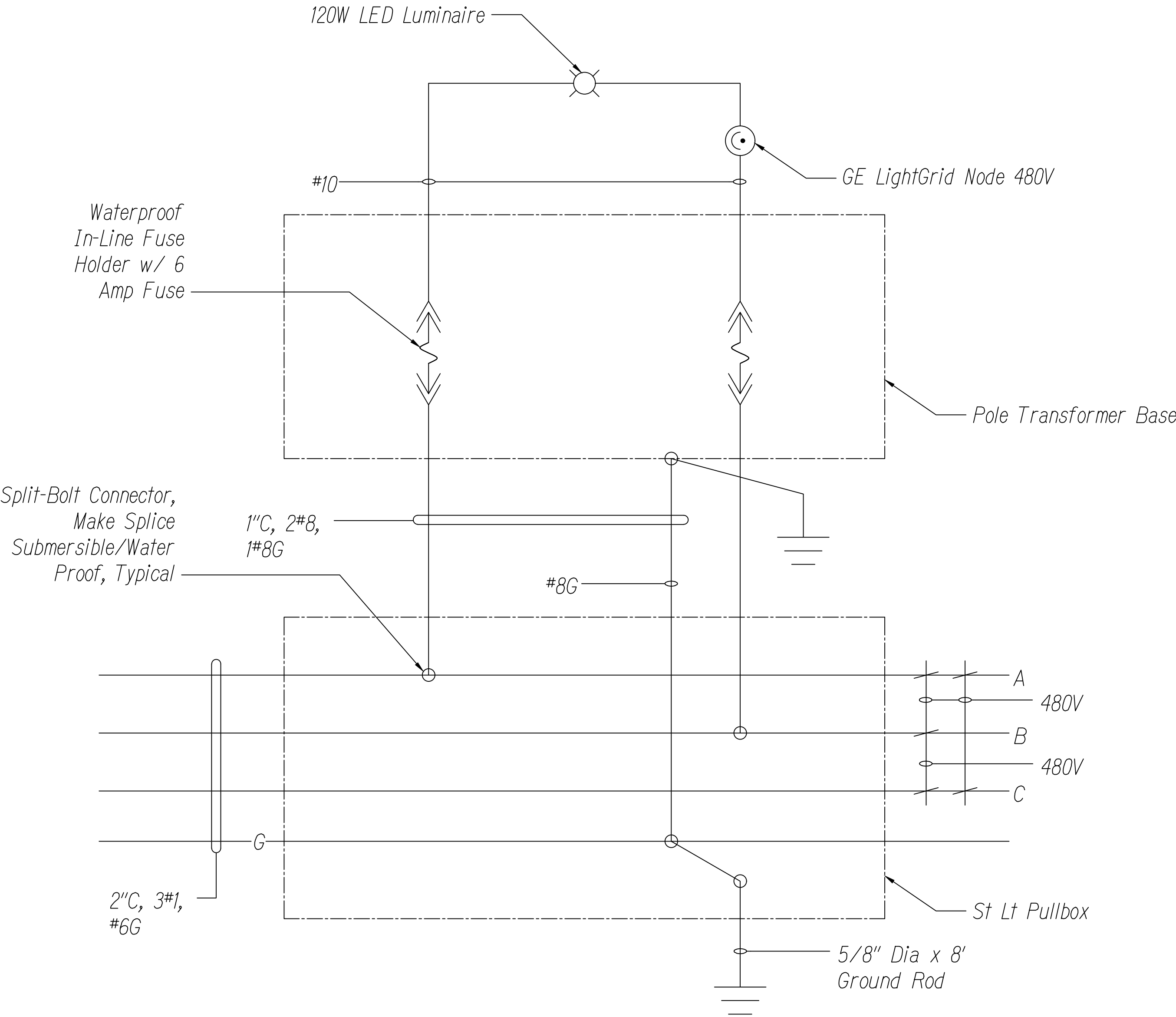


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	133	140

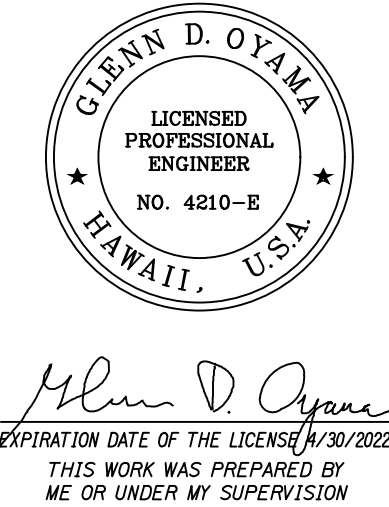


TYPICAL UNDERPASS LIGHT WIRING DIAGRAM  
NO SCALE



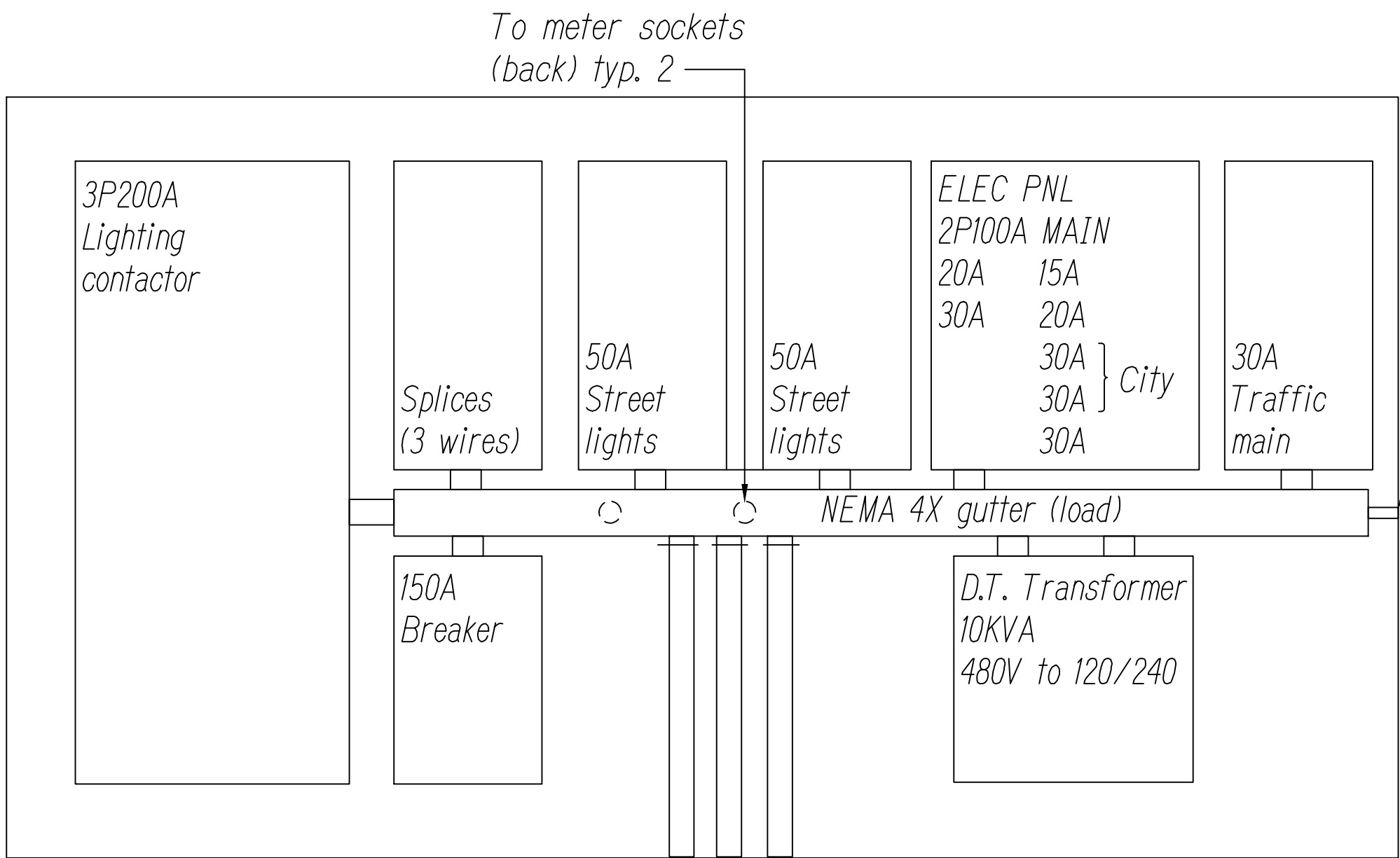
TYPICAL STREET LIGHT WIRING DIAGRAM  
NO SCALE

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



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
TYPICAL UNDERPASS AND STREET  
LIGHT WIRING DIAGRAMS  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2  
Scale: Date: July 2020  
SHEET No. E-32 OF 39 SHEETS  
133

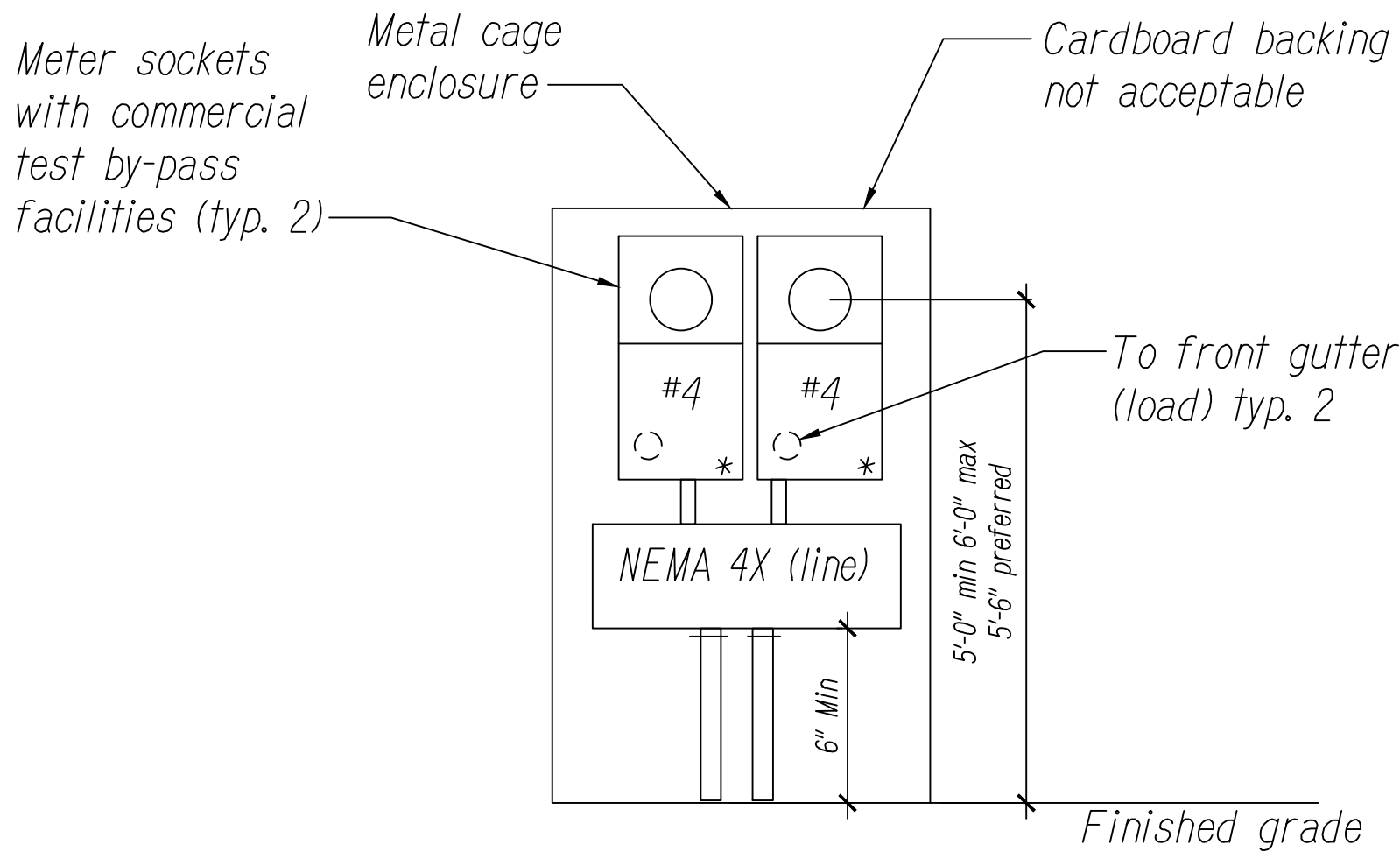
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	134	140



PU'ULOA EQUIPMENT ELEVATION - FRONT  
SCALE: NTS

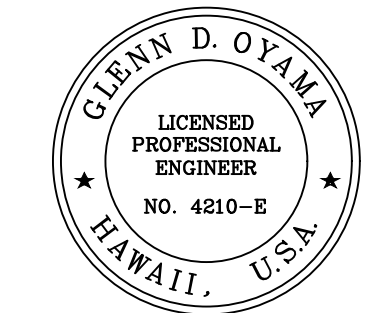
NOTES:

1. Equipment elevation is provided for street light power information purposes only.



PU'ULOA EQUIPMENT ELEVATION - BACK  
SCALE: NTS

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

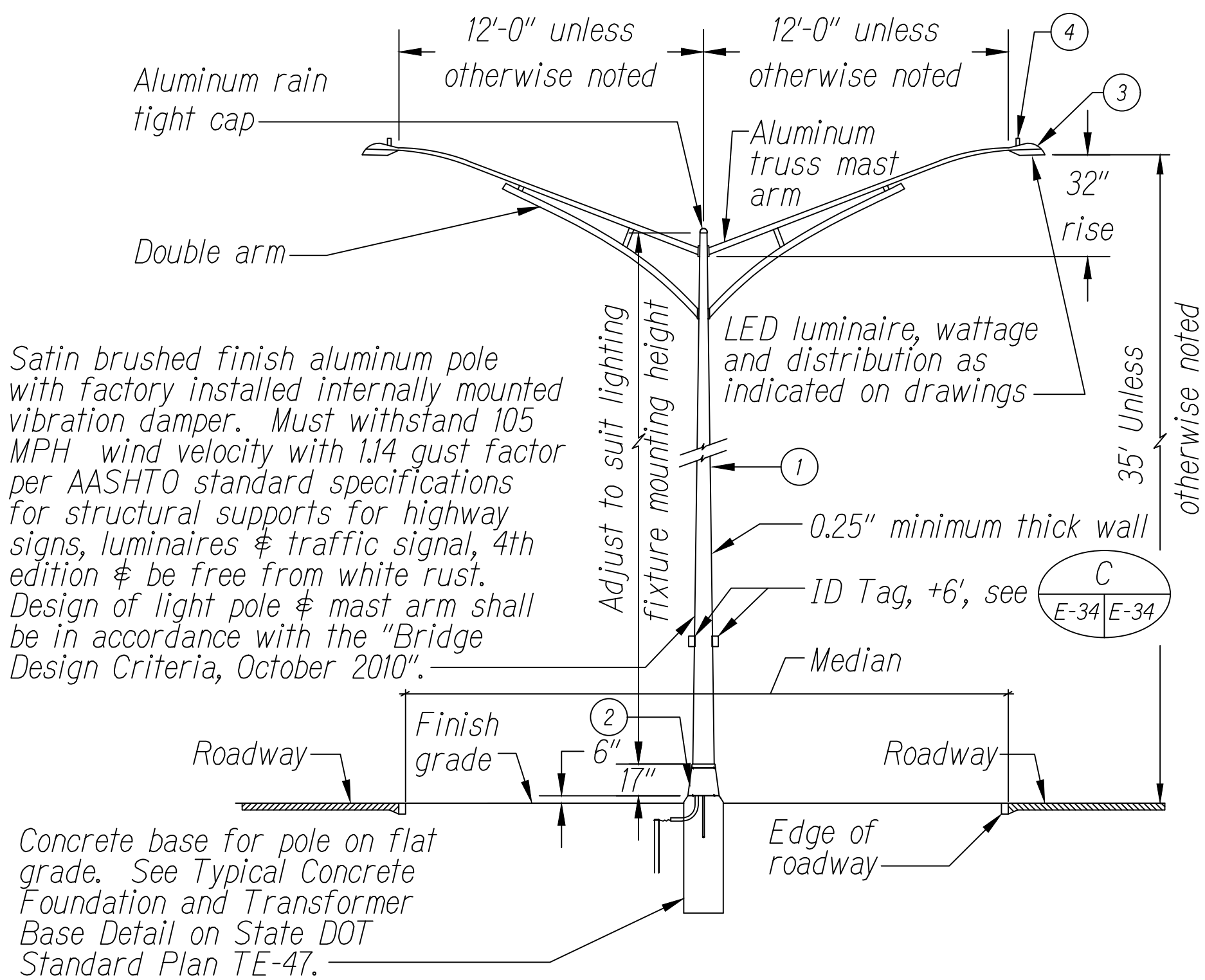


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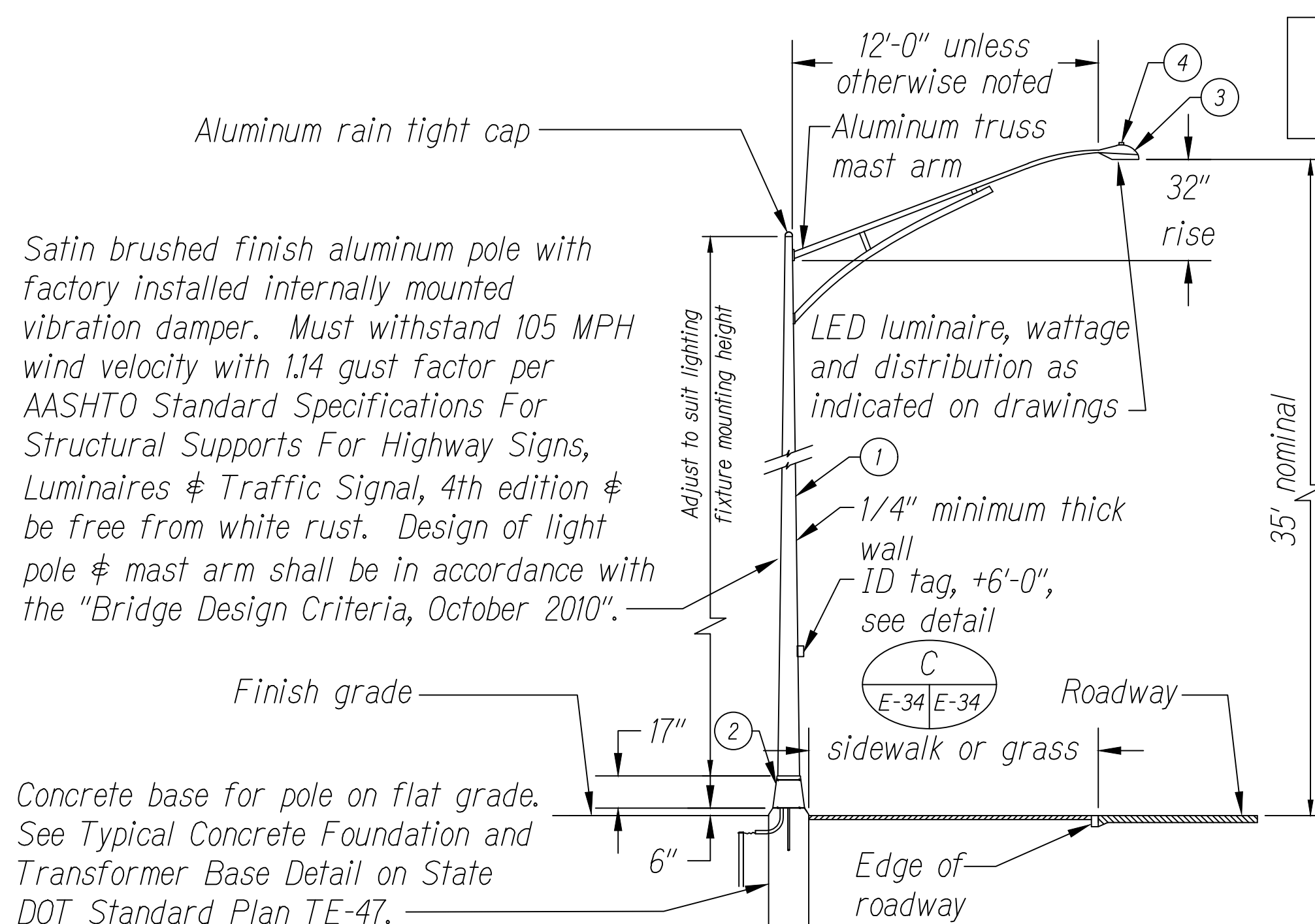
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**PU'ULOA EQUIPMENT  
ELEVATIONS**  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2

Scale: Date: July 2020

SHEET No. E-33 OF 39 SHEETS

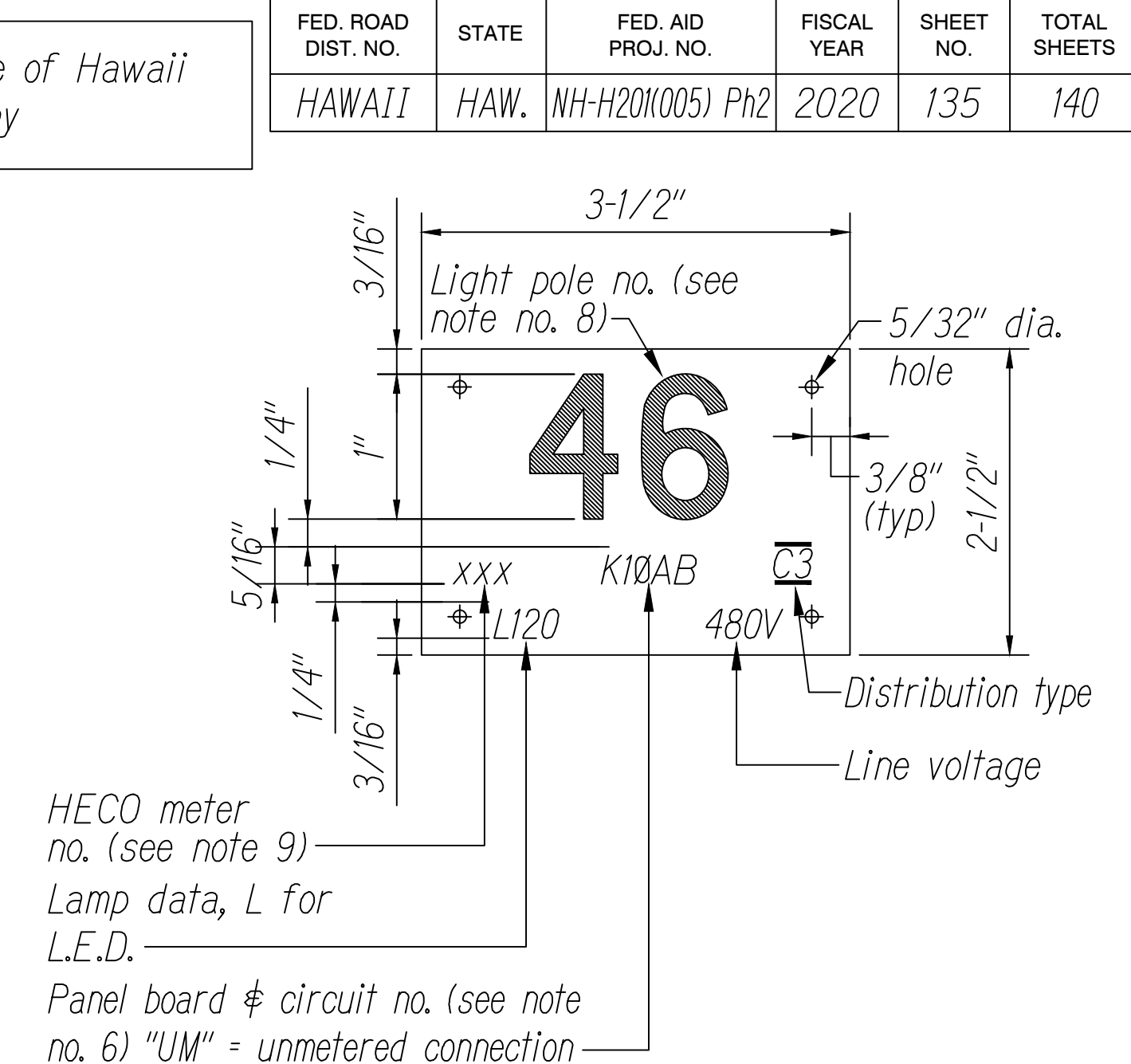


STREET LIGHT STANDARD DETAIL A  
SCALE: NTS E-34



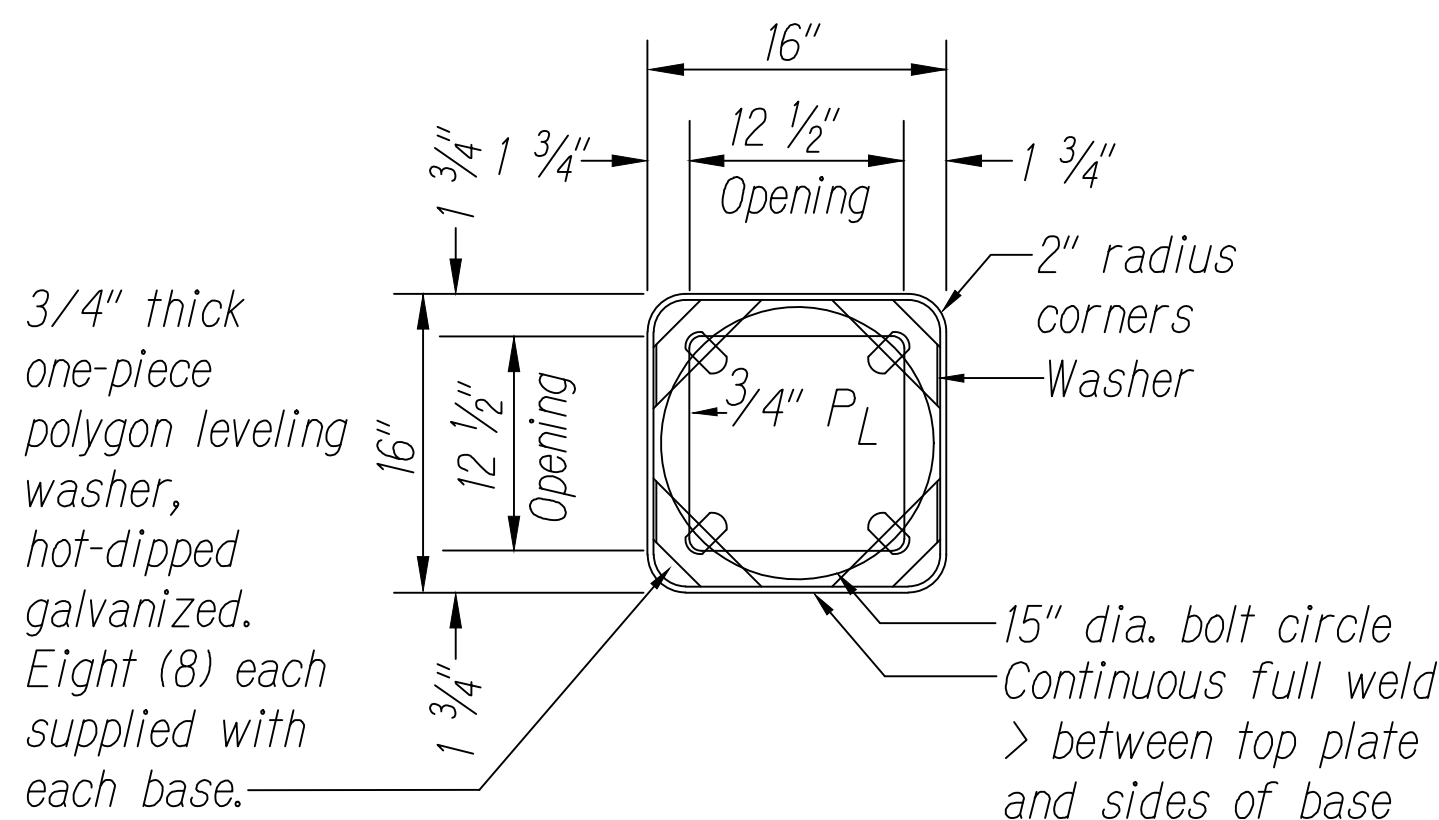
STREET LIGHT STANDARD DETAIL B  
SCALE: NTS E-34

MATERIAL LIST		
Item	Description	Manufacturer
①	Light Pole, Alum	General Electric Company
②	Transformer Base (Alum) (Breakaway Type)	
③	Luminaire, 120W LED, unless otherwise noted Smart Photo-Cell, LightGrid Node 21, ELWN 1 A 8 U B X XX AD	General Electric Company
④		

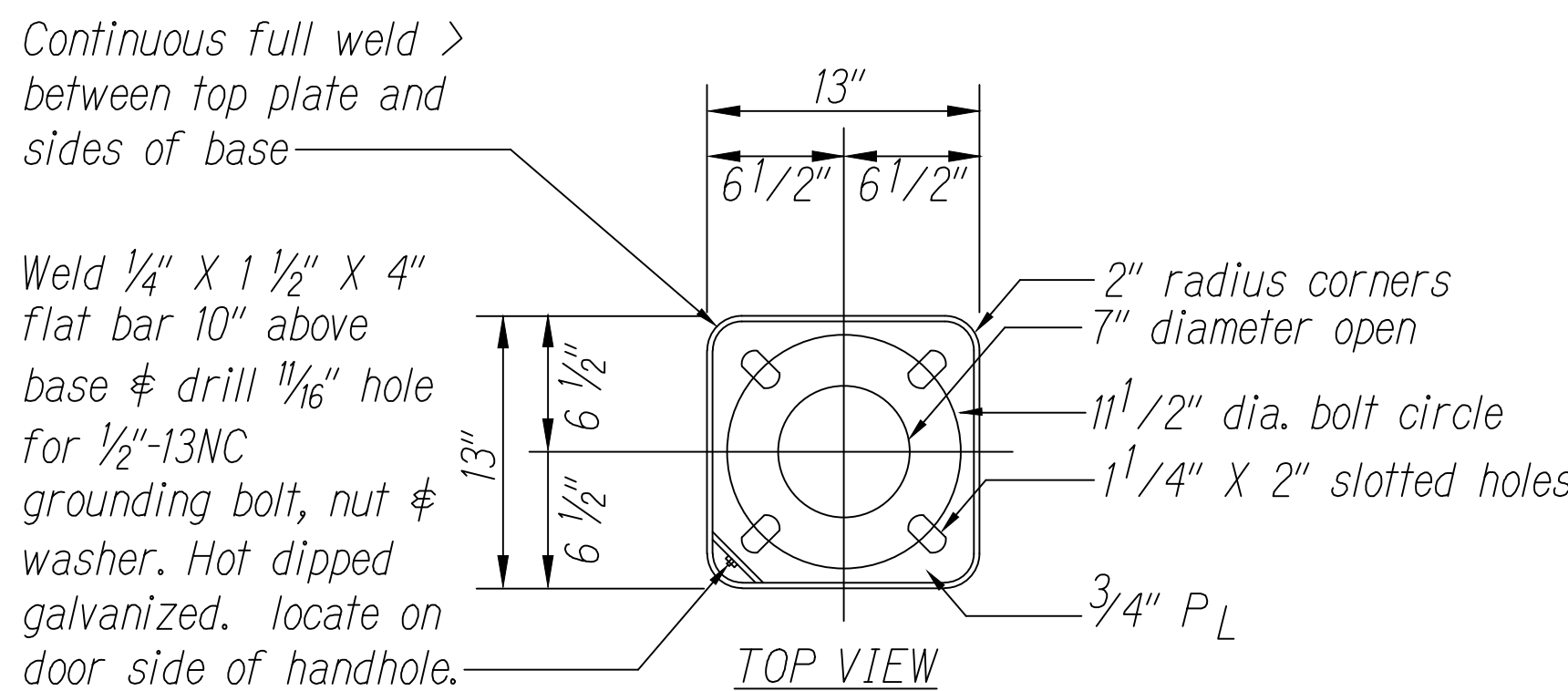


STREET LIGHT POLE TAG DETAIL C  
SCALE: NTS E-34

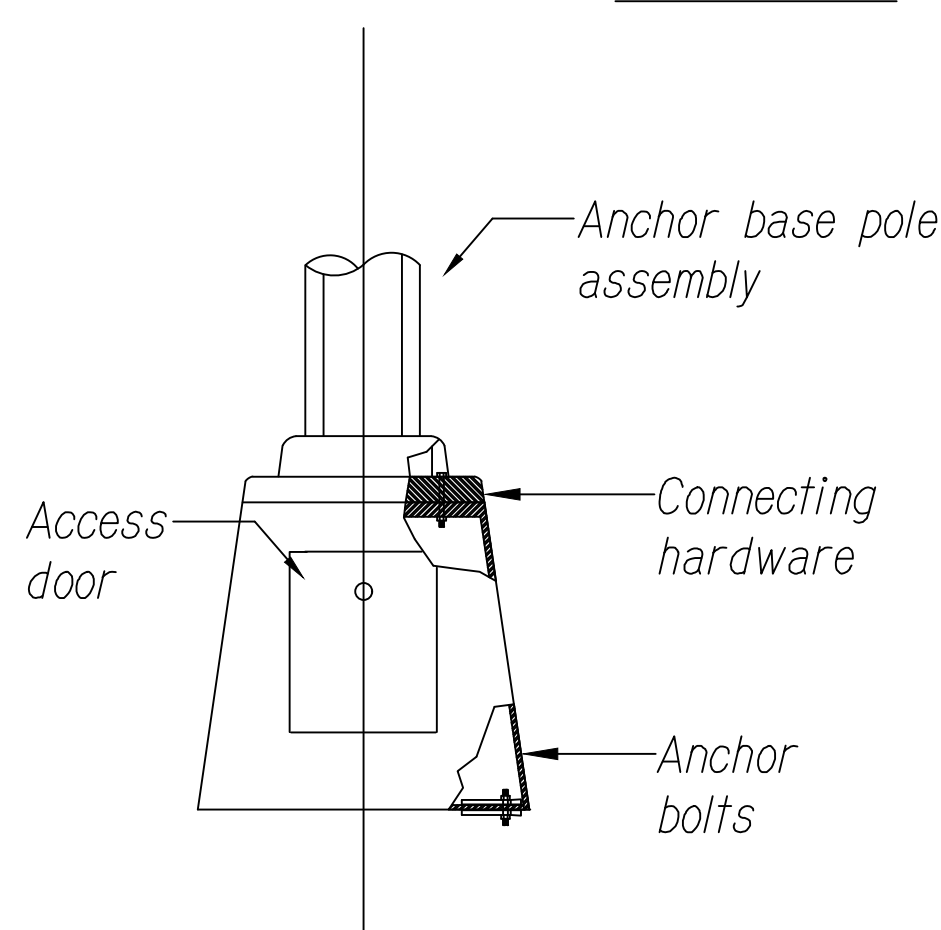
- NOTES:
- Use 3 ply laminated flexible plastic black-white-black thickness black cap sheet-0.010", white base sheet-0.052", black base sheet-0.010".
  - Light pole number size shall be 1" high and engraved 1/8" wide, white in color (number as required).
  - Nomenclature size shall be 5/16" high and engraved 1/32" wide, white in color (HECO meter number panel board and circuit number, line voltage, lamp data and refractor data as required).
  - Attach to aluminum and steel post with no. 8 stainless steel, 1/2" long drive screws in 1/8" drill hole. Attach to wood poles with 4D aluminum nail.
  - Numbers are inscribed by cutting through "Black Cap Sheet" to expose "White Letters."
  - Nomenclature required for systems with two or more circuits (letter indicates panel board, number indicates circuit).
  - For light poles installed on ramp, assign numbers to include ramp I.D. and light number. Legend may be less than one (1) inch in height.
  - Light numbers shall be obtained from the state. Use an alphabet suffix to designate lights mounted on the same pole (e.g. 123A & 123B).
  - For non-metered system, call out the contract number.



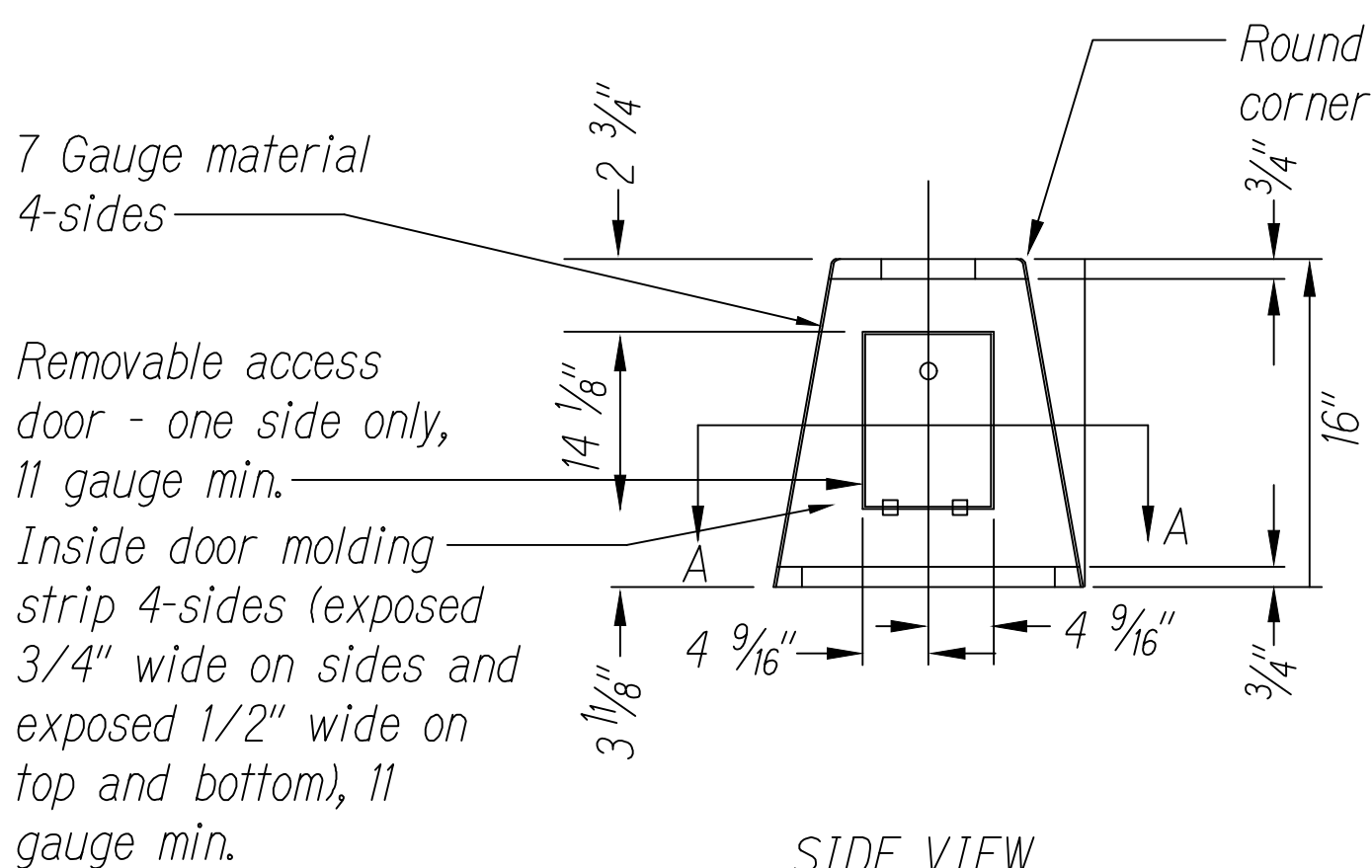
SECTION "A"



TOP VIEW

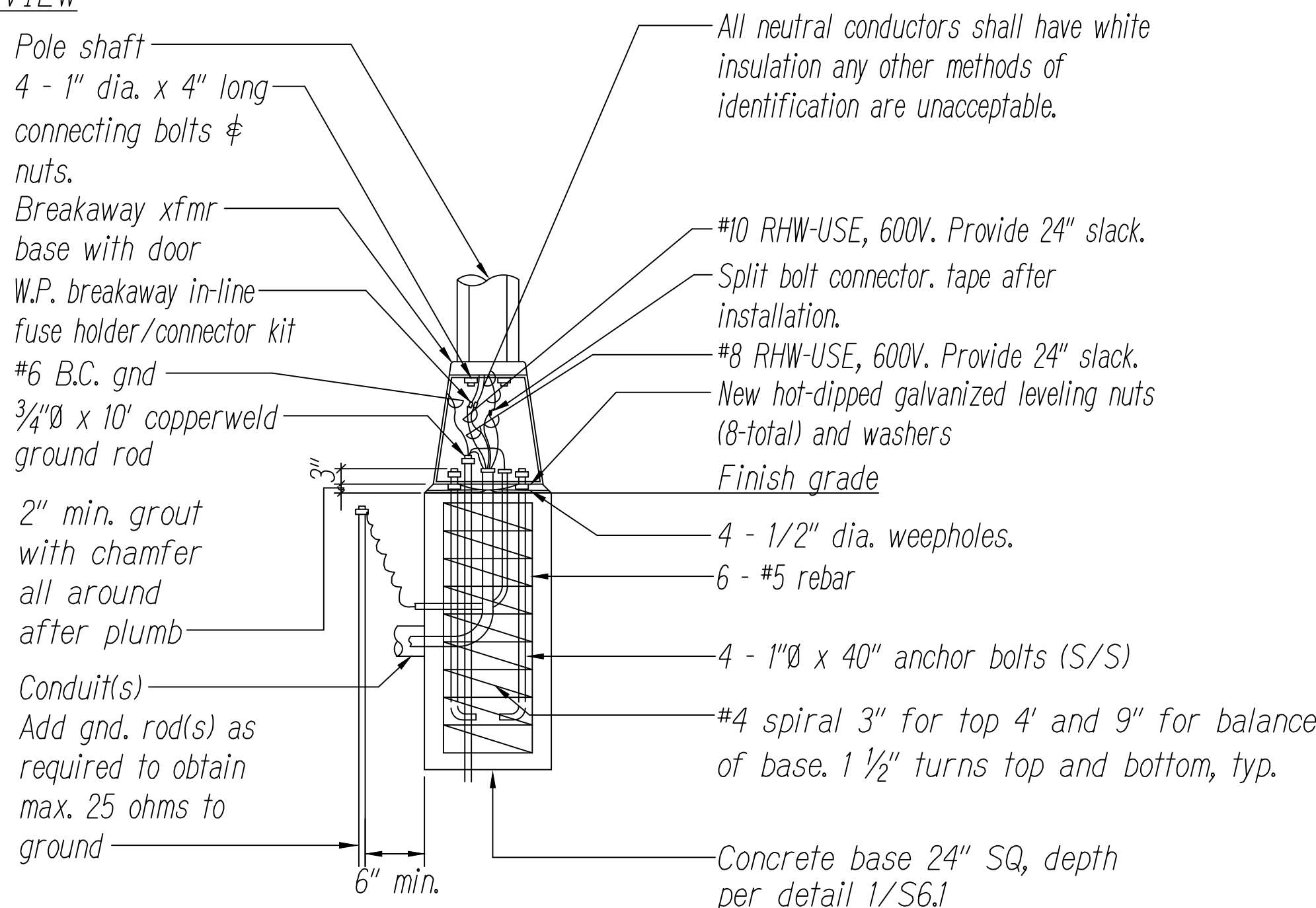


ANCHOR BASE POLE ASSEMBLY



SIDE VIEW

LIGHT POLE BASE DETAIL D  
SCALE: NTS E-34



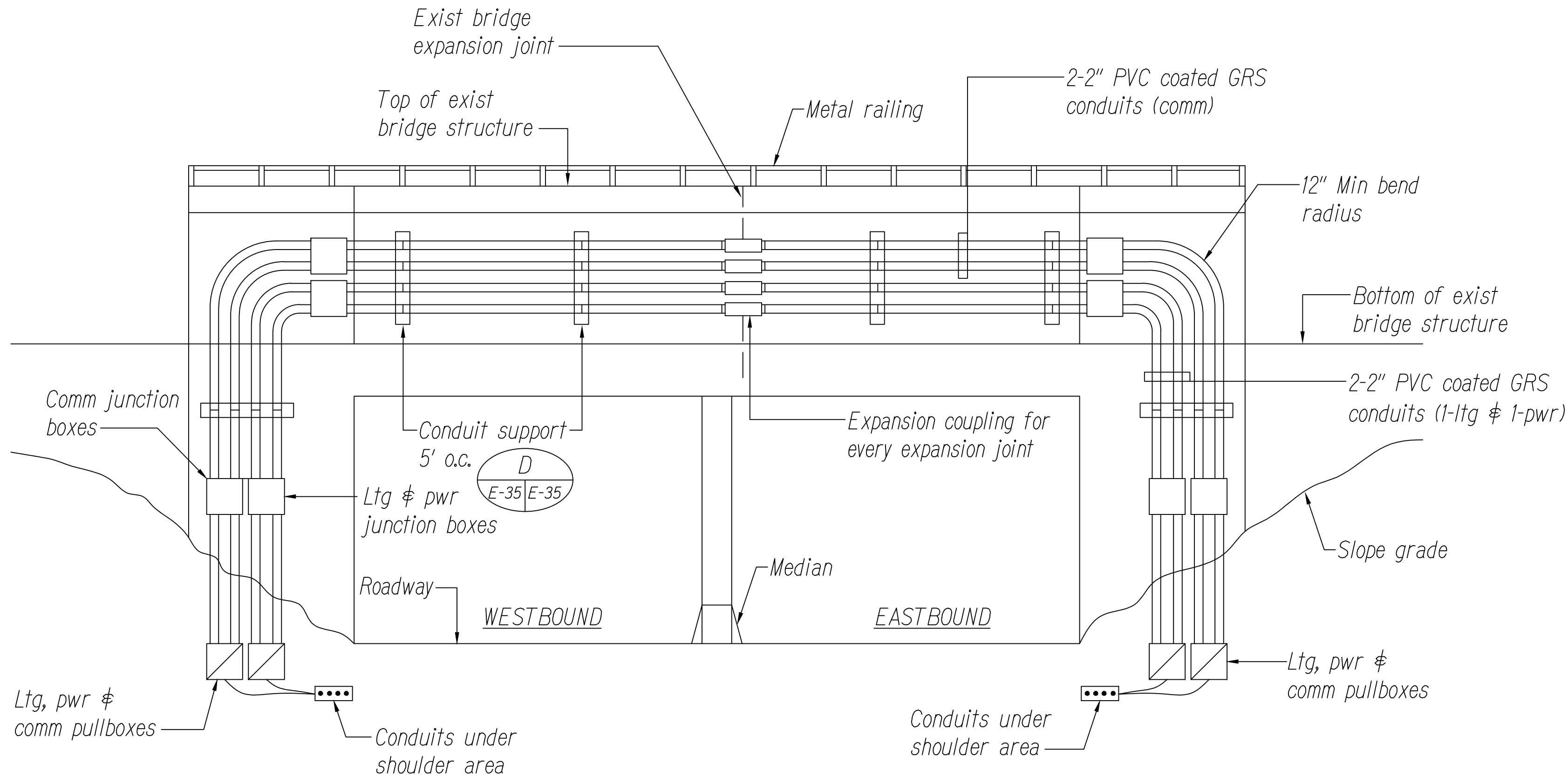
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STREET LIGHT DETAILS**  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2  
Scale: NTS Date: July 2020  
SHEET No. E-34 OF 39 SHEETS

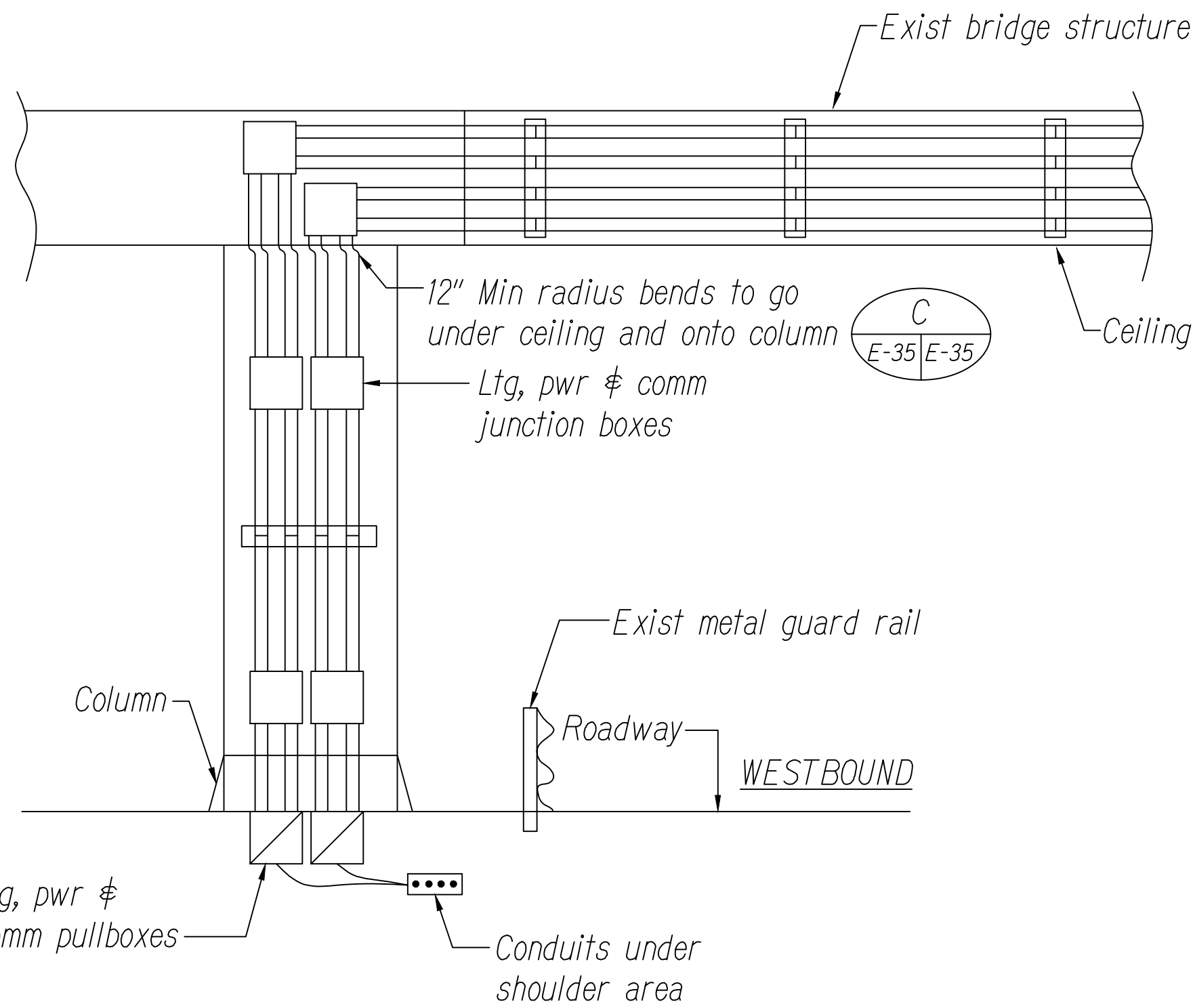
SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	136	140

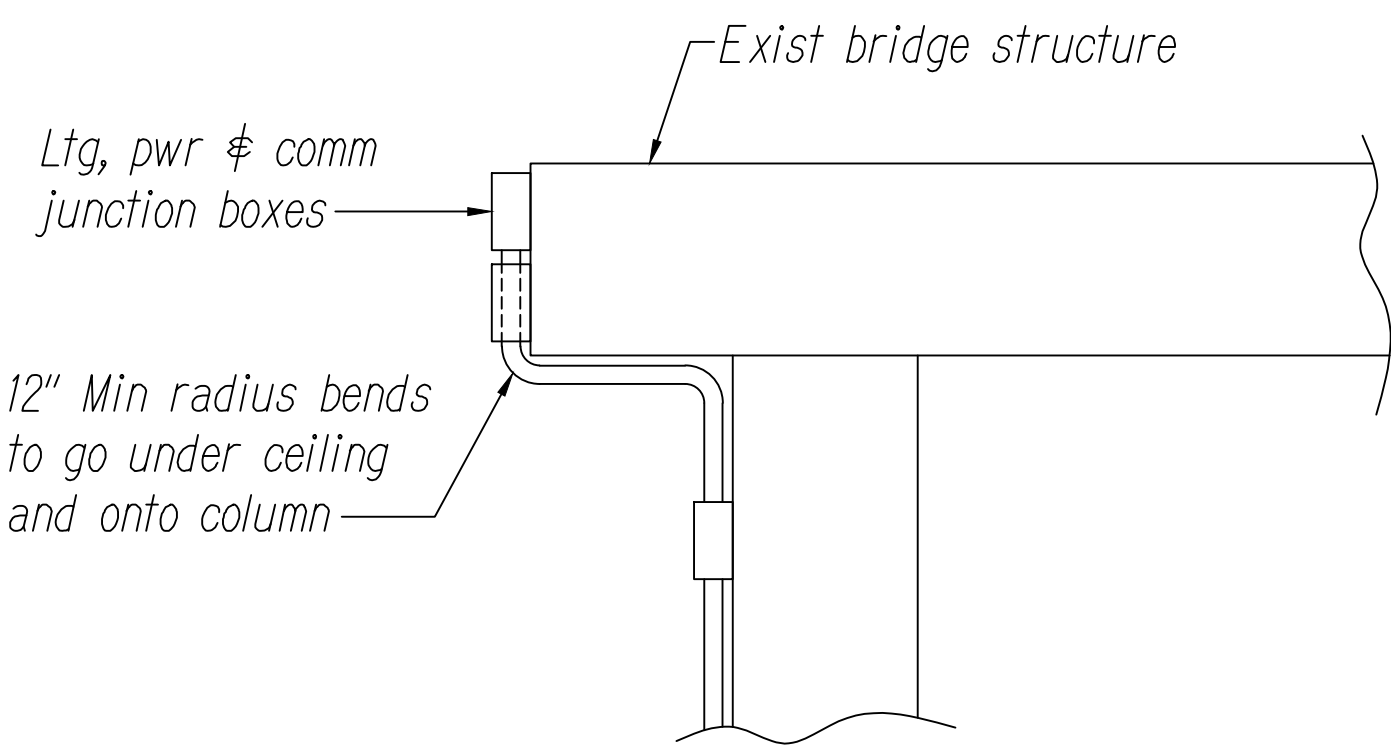
For use within State of Hawaii  
right-of-way



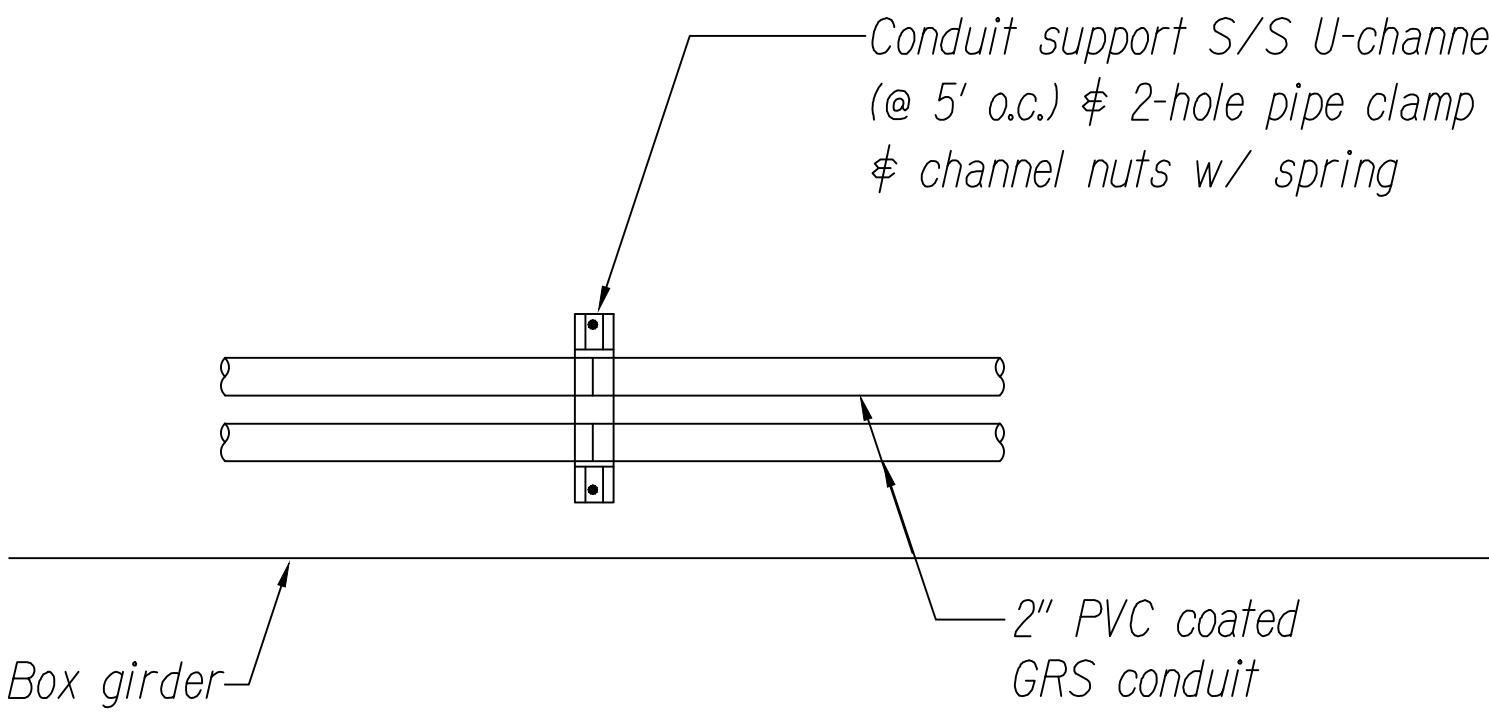
**A**  
E-35/E-35  
NTS  
CONDUIT INSTALLATION AT BRIDGE STRUCTURE



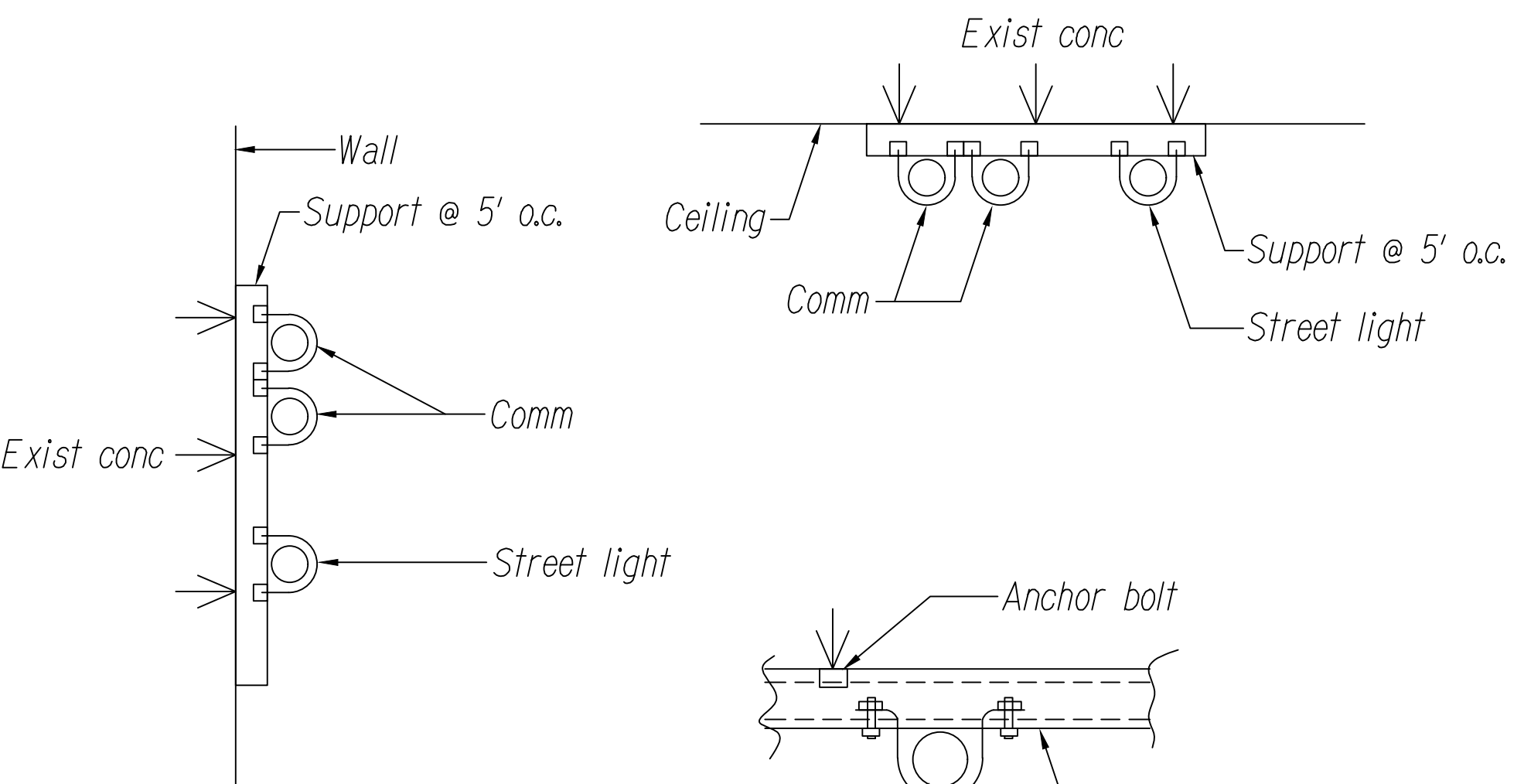
**B**  
E-35/E-35  
NTS  
ALTERNATE CONDUIT INSTALLATION (PUULOA RD)



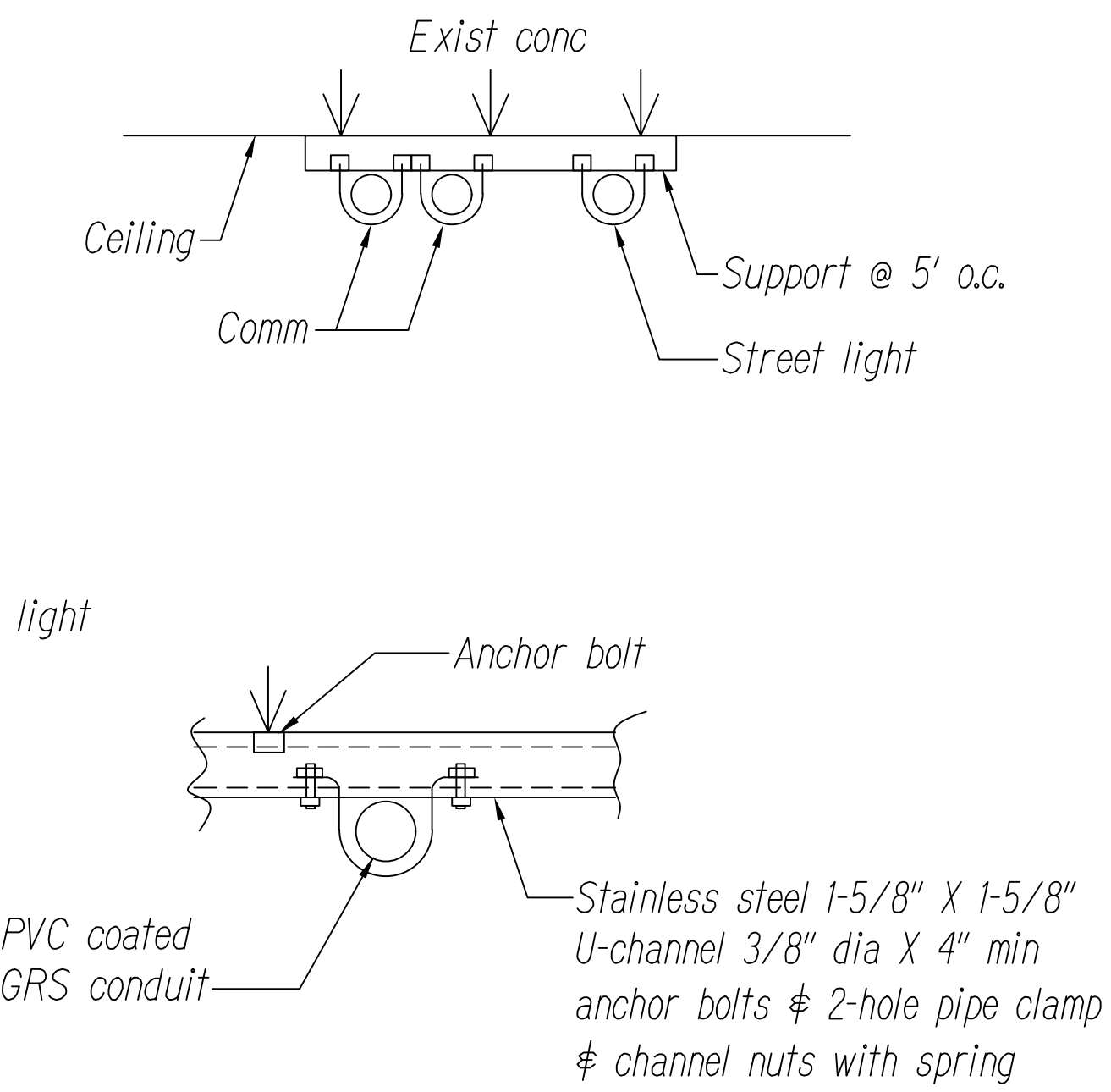
**C**  
E-35/E-35  
NTS  
CONDUIT INSTALLATION ONTO COLUMN



**D**  
E-35/E-35  
NTS  
CONDUIT INSTALLATION AT EXISTING GIRDER



WALL MOUNTED



**E**  
E-35/E-35  
NTS  
CONDUIT MOUNTING DETAIL



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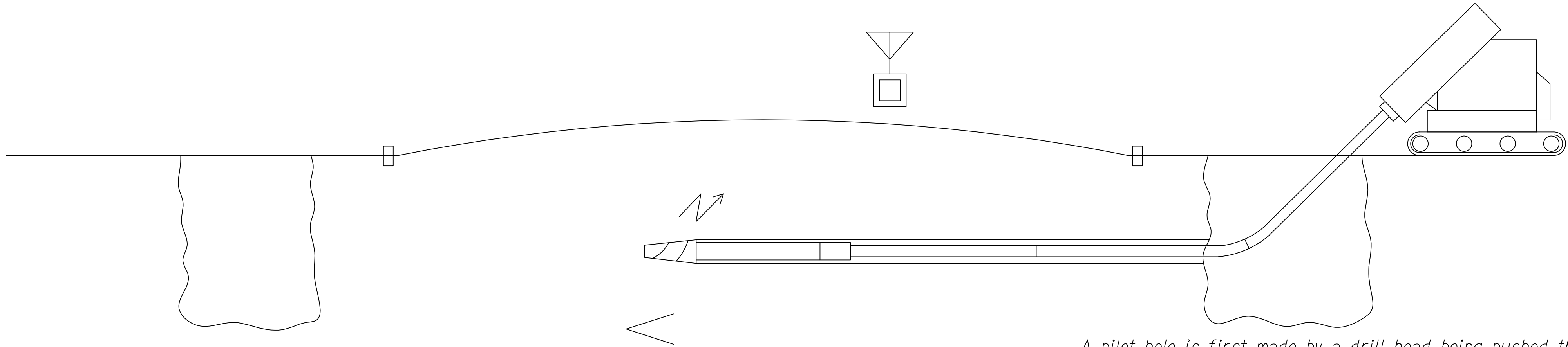
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**CONDUIT INSTALLATION,  
MOUNTING ON BRIDGE DETAIL**  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2  
Scale: \_\_\_\_\_ Date: July 2020  
SHEET No. E-35 OF 39 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	137	140

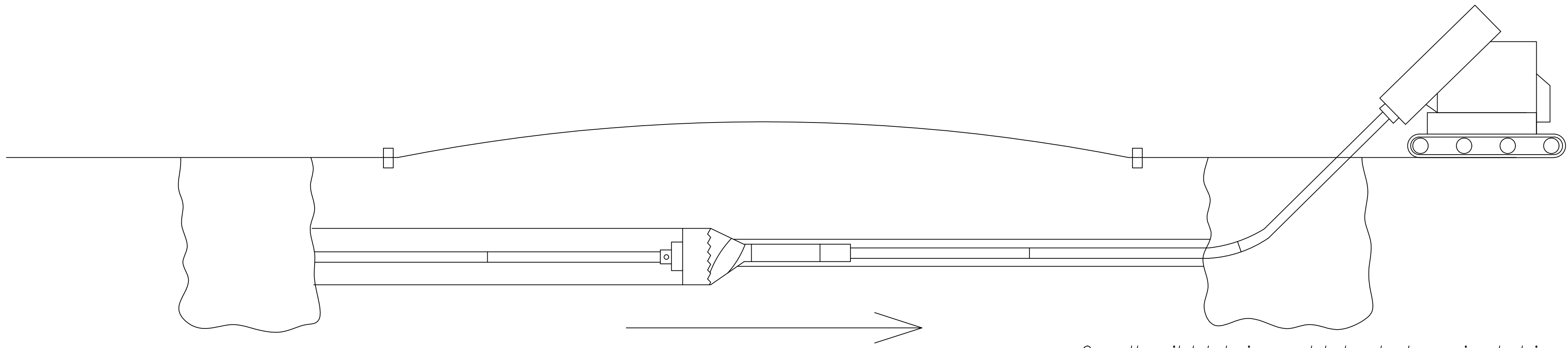
NOTES:

- Horizontal directional drilling shall be used for all highway road crossings to avoid trenching.
- This detail is provided as a guide only, but the actual drilling method used should be similar.
- NESC & DOT standards for ductline installation must be adhered to.



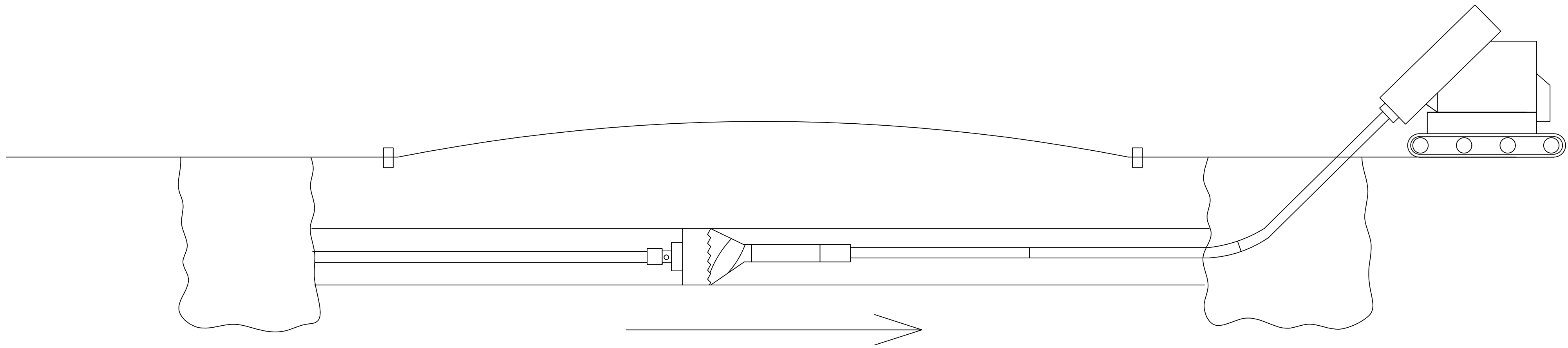
PILOT (GUIDE) HOLE

A pilot hole is first made by a drill head being pushed through the ground with the addition of rods one after another to reach the desired drilled length. Also directly behind the drill head is a location system that is used to guide the depth, pitch & direction of the drill head.



ENLARGING HOLE

Once the pilot hole is completed, a back reaming tool is pulled in the reverse direction to enlarge the hole while rods are being continuously added to the back reaming tool. Drilling liquid is also introduced into the bore hole for removal of mud & strengthening of the walls of the hole.



PIPE PULLING

After the back reaming tool is pulled back to the drilling rig, the pipe can be pulled. A swivel head is attached between the pipe and the end of the rods that were connected to the back reaming tool, and is pulled back to the drilling rig. The pipe & voids are then filled with cementitious material.



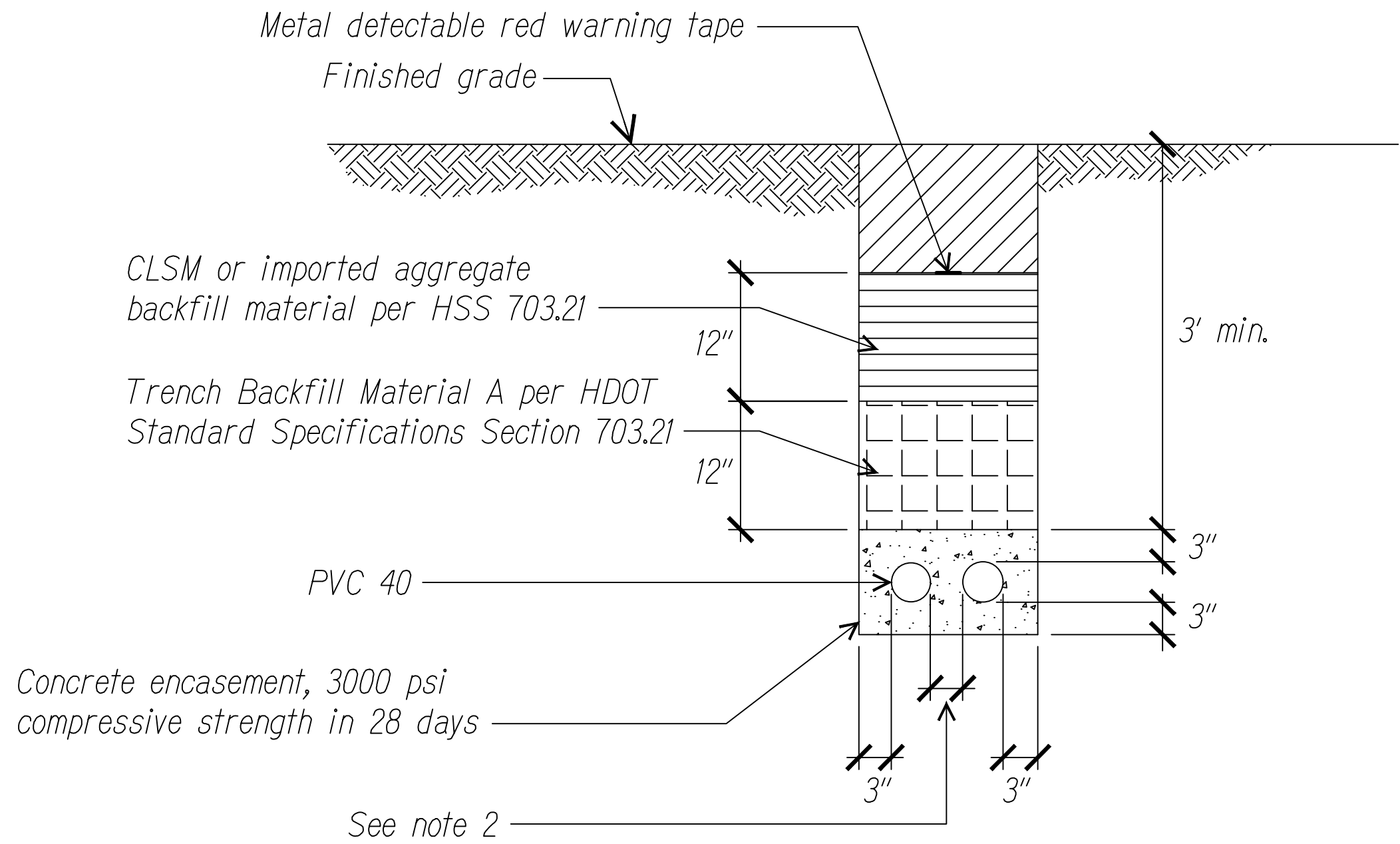
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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**DIRECTIONAL DRILLING**  
**DETAILS**  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2  
Scale: \_\_\_\_\_ Date: July 2020  
SHEET No. E-36 OF 39 SHEETS

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



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	138	140

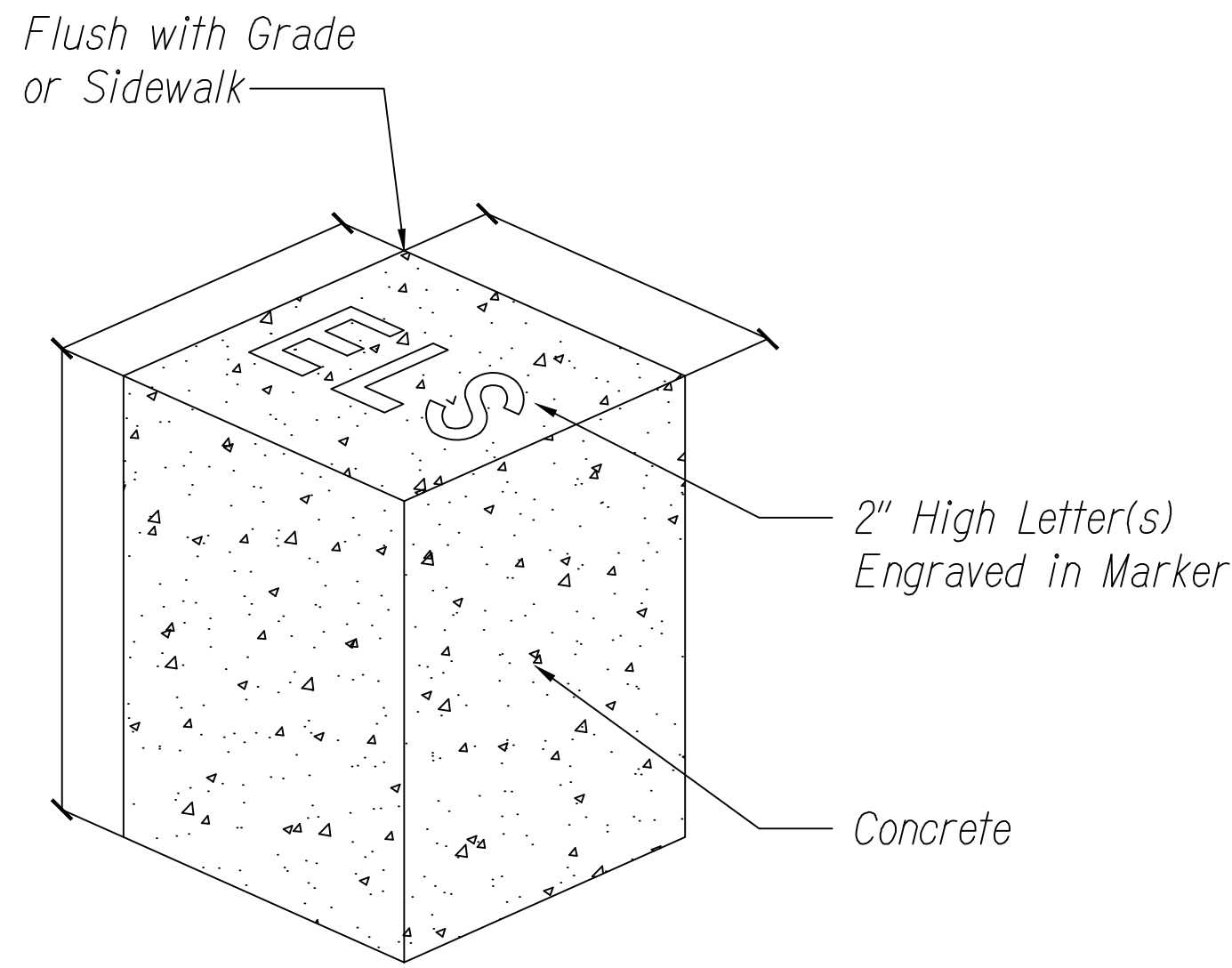


## TYPICAL DUCT SECTION (CONCRETE ENCASED)

SCALE: NTS

### NOTES:

- Electrical and communication ducts similar.
- Provide 2" separation between ducts of same system and 3" between ducts of different systems (6" between ducts when placed next to an existing system).
- Concrete pavement shall be replaced by removing existing pavement to the nearest joint. AC pavement shall be overcut by 12" from the edge of the trench or disturbed base after backfilling of the trench has reached the bottom of the pavement. Saw cut pavement to the trench's overcut limit on both sides of the trench. Remove existing pavement and recompact the base. Apply tackcoat on all surfaces that will contact the new AC pavement, e.g., base, edge of AC pavement at edge of trench. Pave as soon as possible.
- When ground water is encountered in trenches, backfill with gravel conforming to ASTM C-33, size 67 material until one foot above the water level. Encapsulate the size 67 material with a permeable separator that lines the bottom and sides of the trench and overlaps at the top of the material for the width of the trench. Complete backfilling the trench per detail.
- See Duct Sections for conduit arrangement.

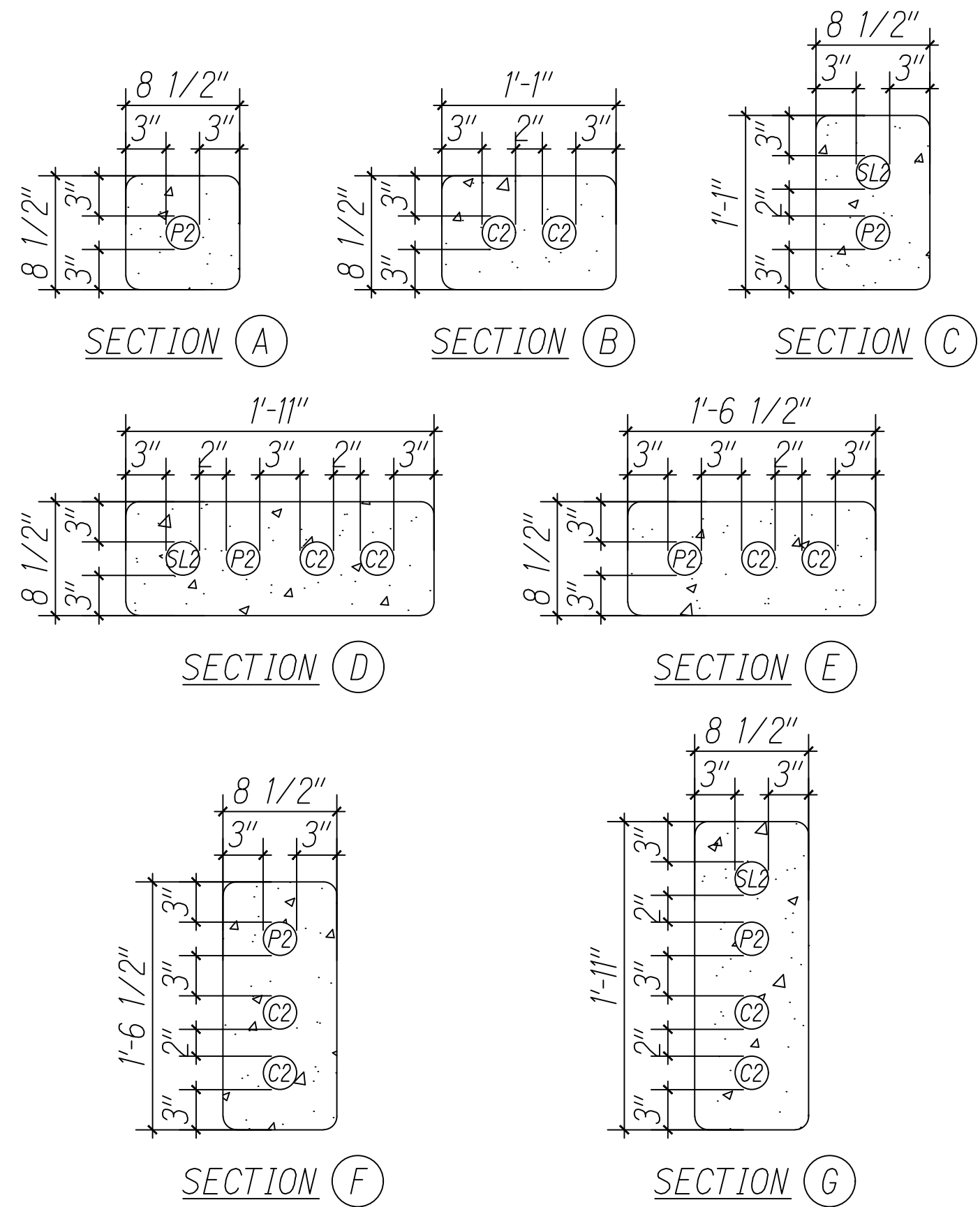


## CONDUIT STUB-OUT MARKER

Scale: NTS

### NOTES:

- "E"=Electric  
"L"=Light  
"S"=Traffic Signal  
"ITSP"=ITS Power  
"ITSC"=ITS Comm

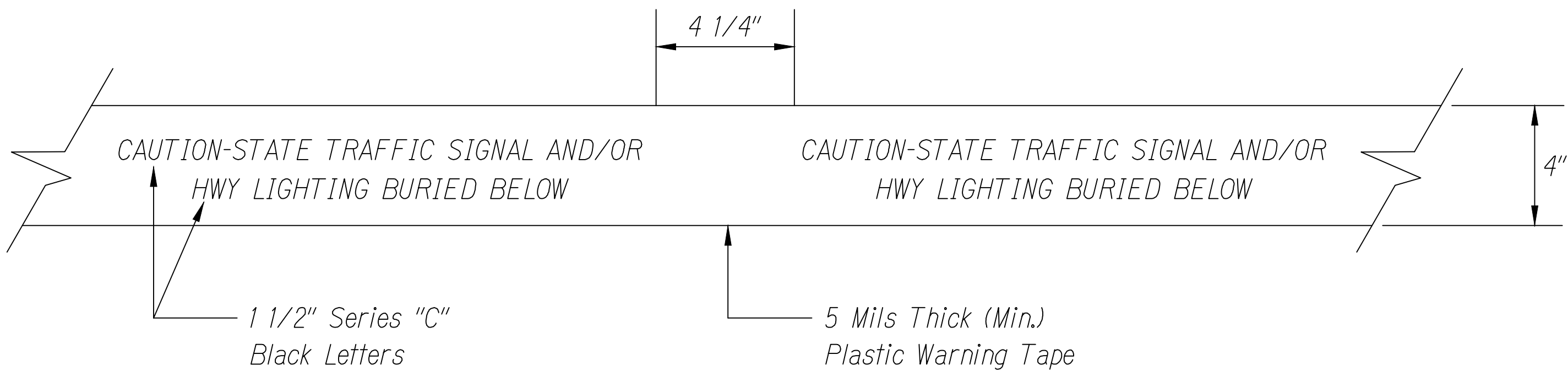


## DUCT SECTIONS

Scale: NTS

### NOTES:

- Duct sections for ducts mounted on median walls, retaining walls, or side of bridges are only meant to show the order and layout of the ducts.



## METAL DETECTABLE RED PLASTIC WARNING TAPE

SCALE: NTS



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HIGHWAYS DIVISION

## DUCT DETAILS

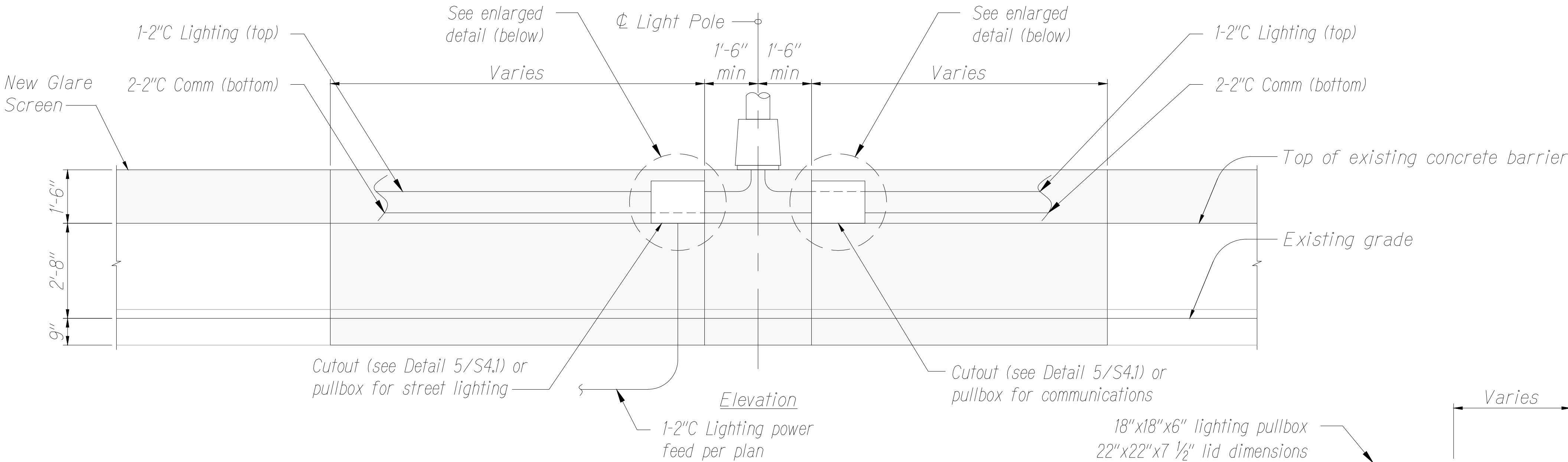
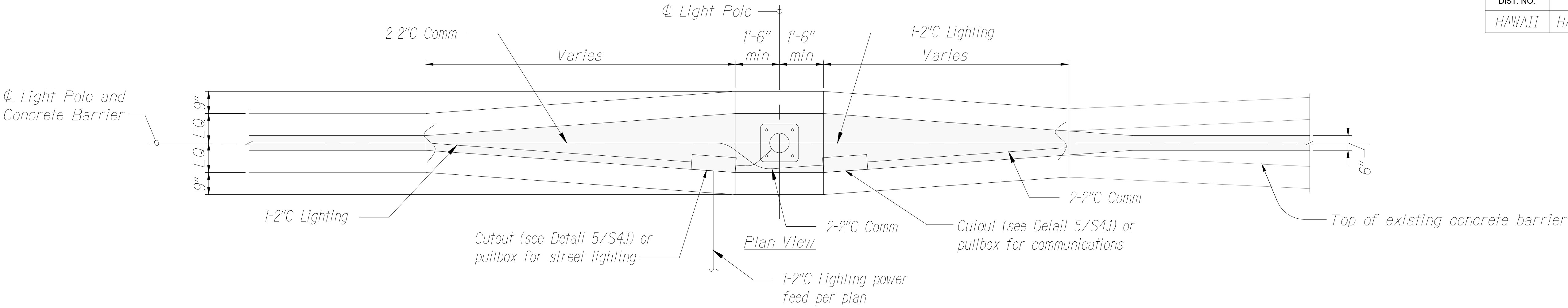
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2

Scale:

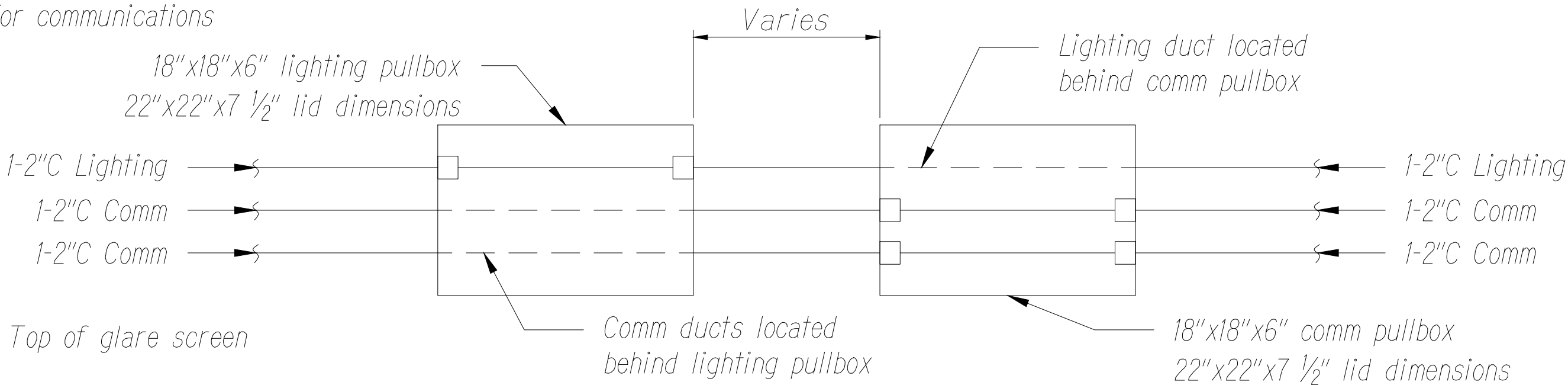
Date: July 2020

SHEET No. E-37 OF 39 SHEETS

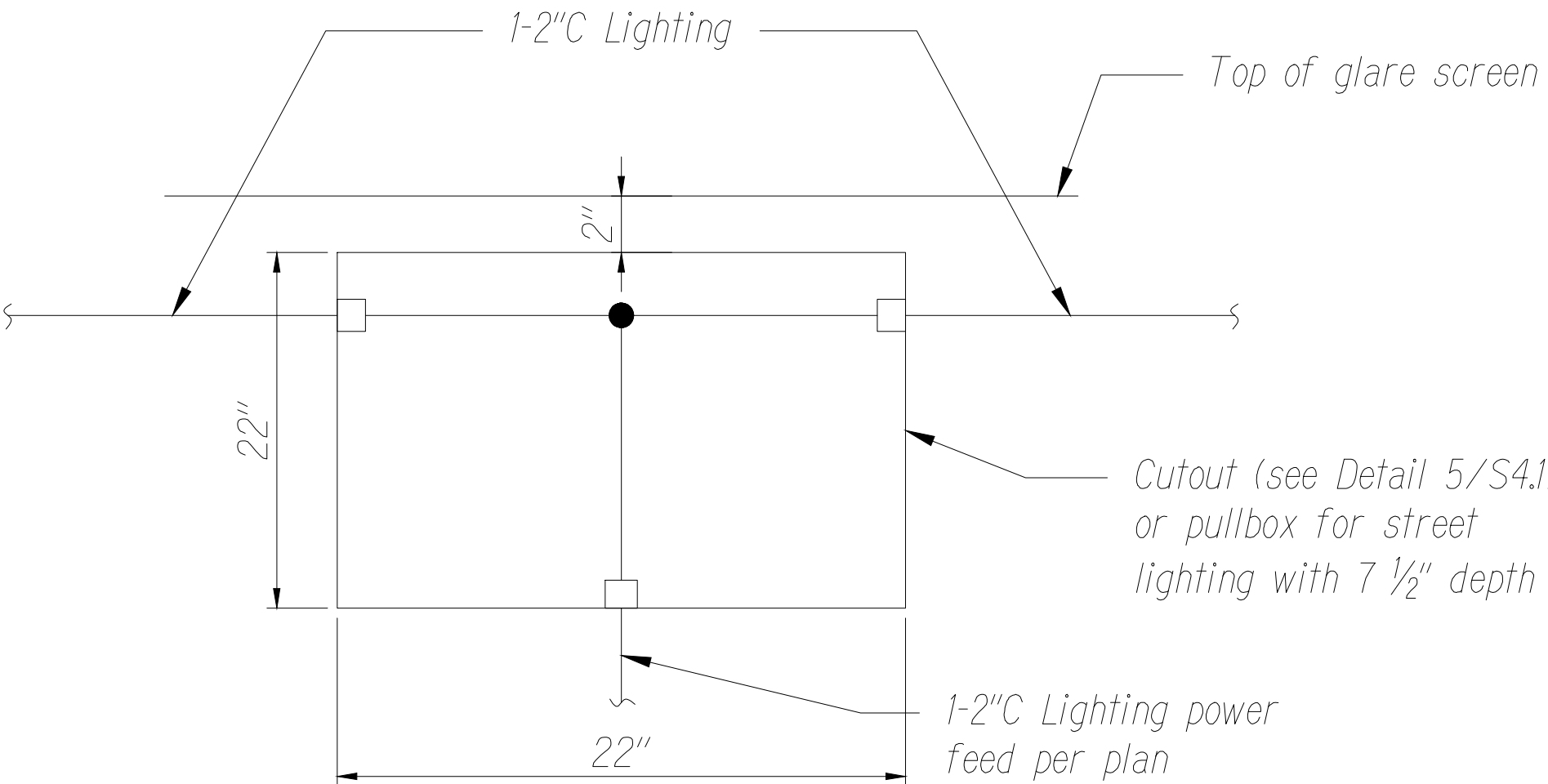
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	139	140



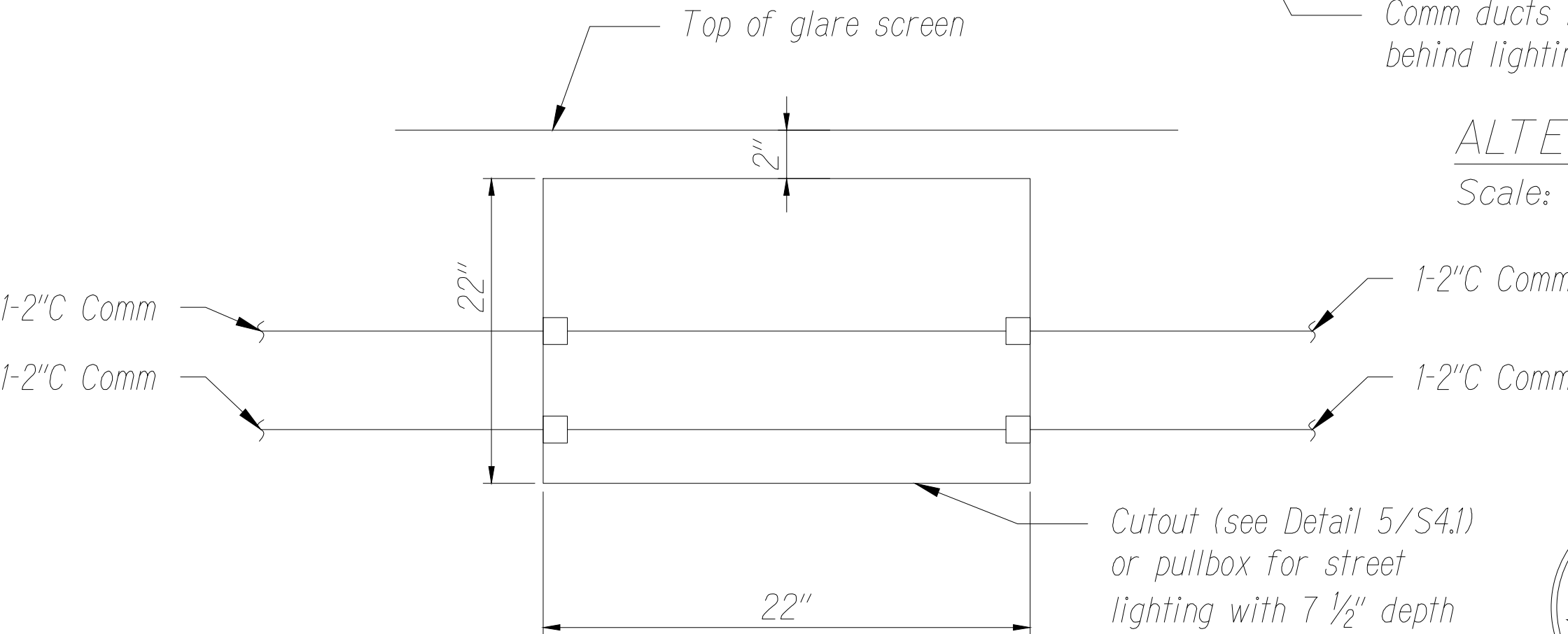
MEDIAN BARRIER CONDUIT DETAIL  
Scale: NTS



ALTERNATIVE PULLBOX DETAIL TYPICAL  
Scale: NTS



ENLARGED CUTOUT/PULLBOX FOR STREET LIGHT DETAIL  
Scale: NTS



ENLARGED CUTOUT/PULLBOX FOR COMMUNICATIONS DETAIL  
Scale: NTS



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
MEDIAN WALL CUTOUT &  
PULLBOX DETAIL  
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS  
Halawa Heights Off-ramp to Middle St. Overpass  
FAP NO. NH-H201(005) PHASE 2  
Scale: Date: July 2020  
SHEET No. E-38 OF 39 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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