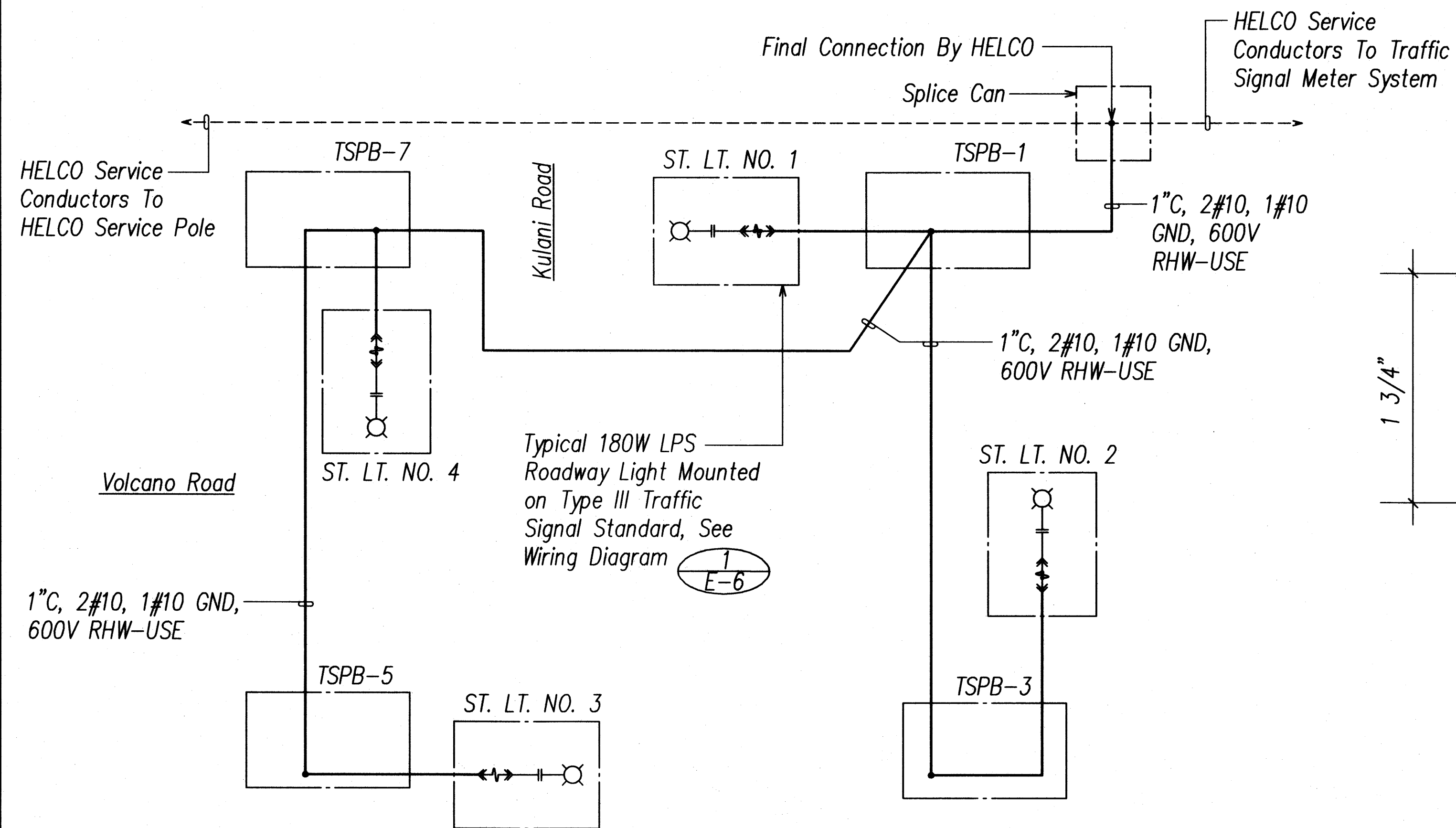
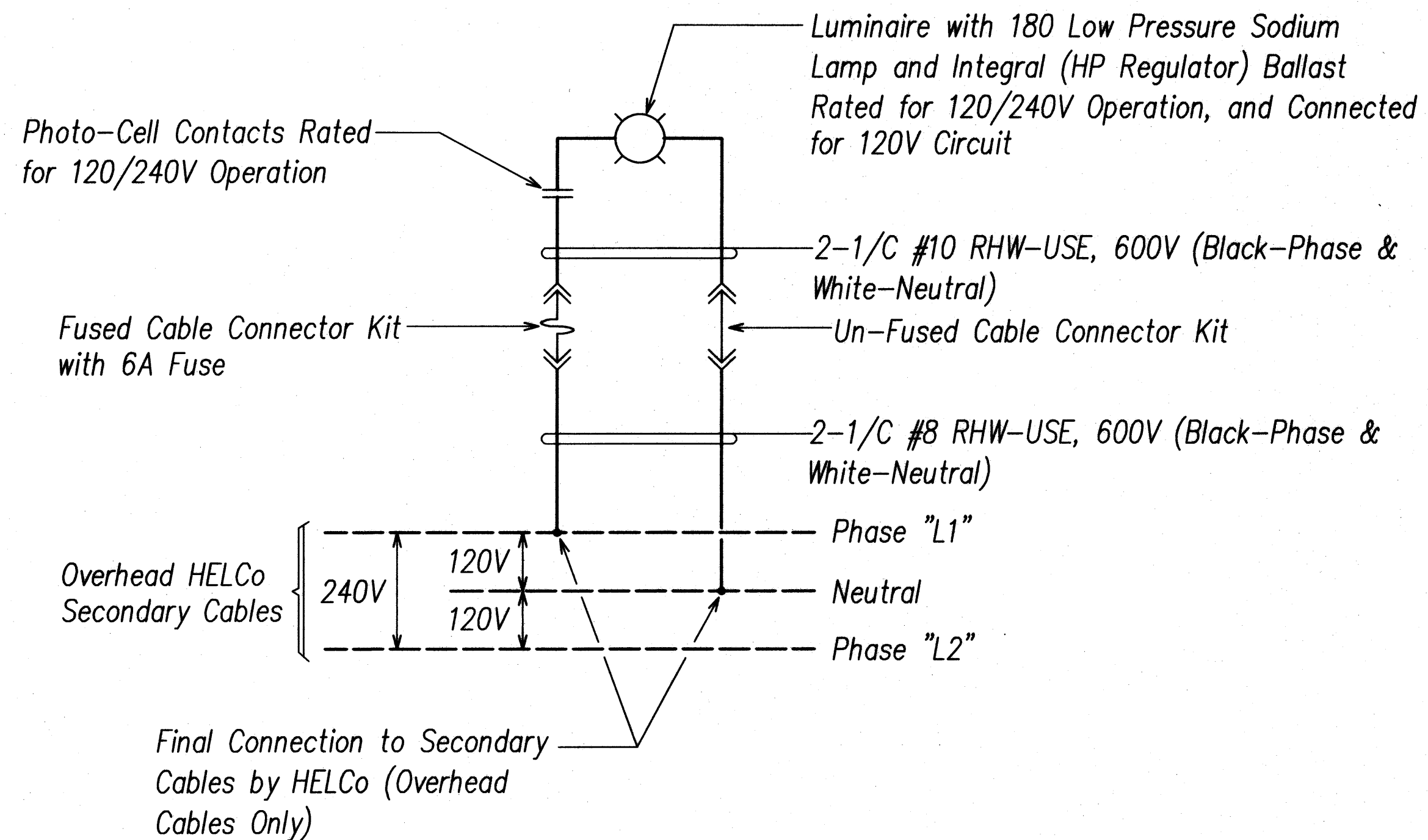


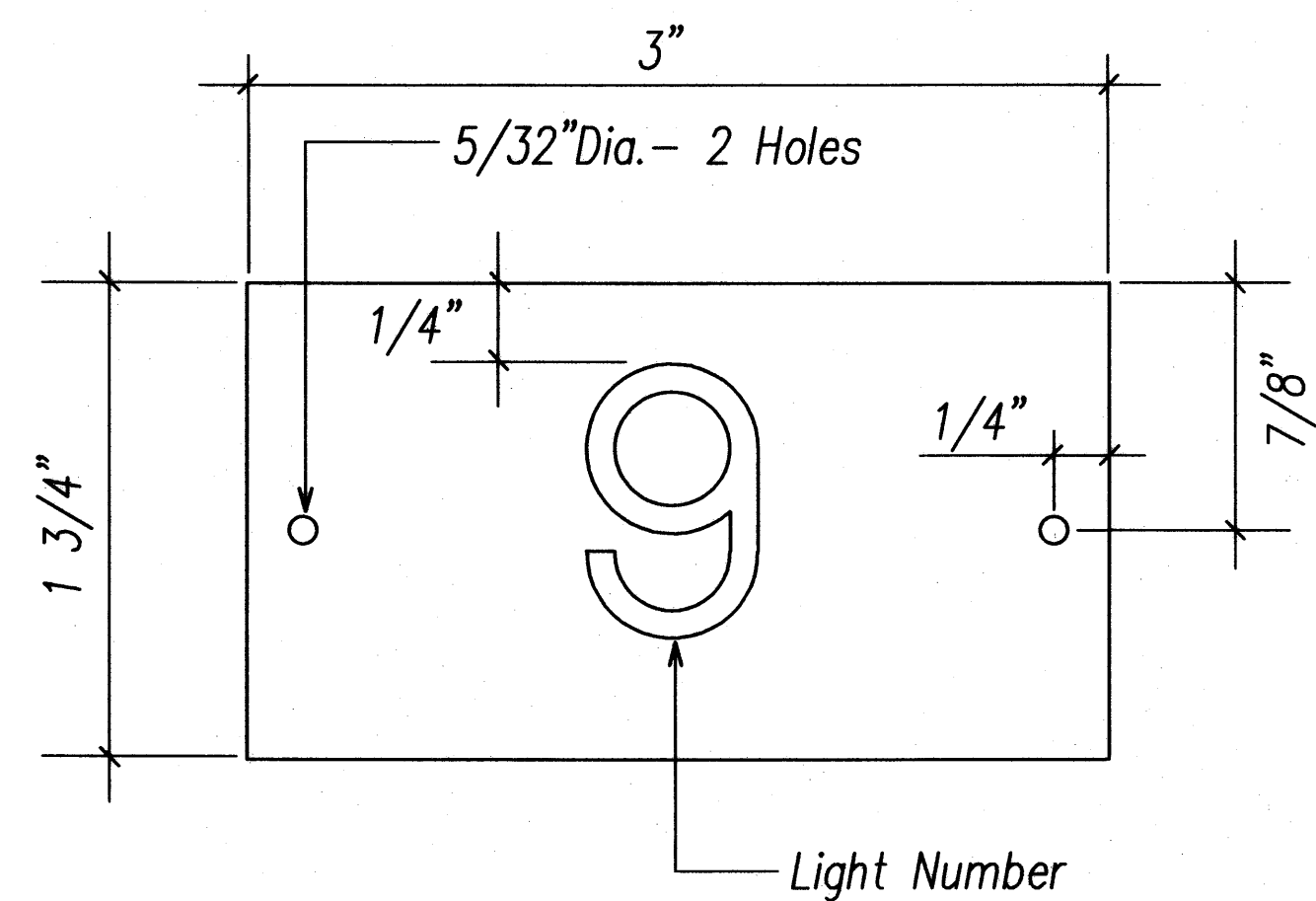
1
E-7 TYPICAL UNDERGROUND ROADWAY LIGHT CONNECTION DIAGRAM
(120/240V Unmetered System)



2
E-7 UNMETERED ROADWAY LIGHTING SYSTEM ONE-LINE DIAGRAM



3
E-7 TYPICAL OVERHEAD ROADWAY LIGHT CONNECTION DIAGRAM

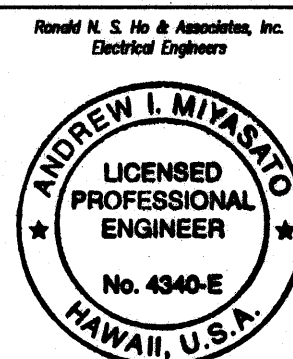


4
E-7 ROADWAY LIGHT I.D. TAG DETAIL
Not to Scale

NOTES:

1. Use 2 Ply Plastic - Black, White.
2. Light Number Size Shall be 1" High and Engraved 1/8" Wide, White in Color, (Number as Indicated on Plan).
3. Attach to Aluminum and Steel Poles with No. 8 Stainless Steel, 1/2" Long Drive Screws in 1/8" Drill Hole. Attach to Wood Poles with 4D Aluminum Nails.
4. Use "N" for Sodium Lamps.

| ORIGINAL PLAN | DATE |
|-------------------|------|
| SURVEY PLOTTED BY | |
| DESIGNED BY | |
| NOTED BY | |
| CHECKED BY | |
| NO. | |



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Me or Under My Supervision

Signature
License Exp. Date: 04/30/2012

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

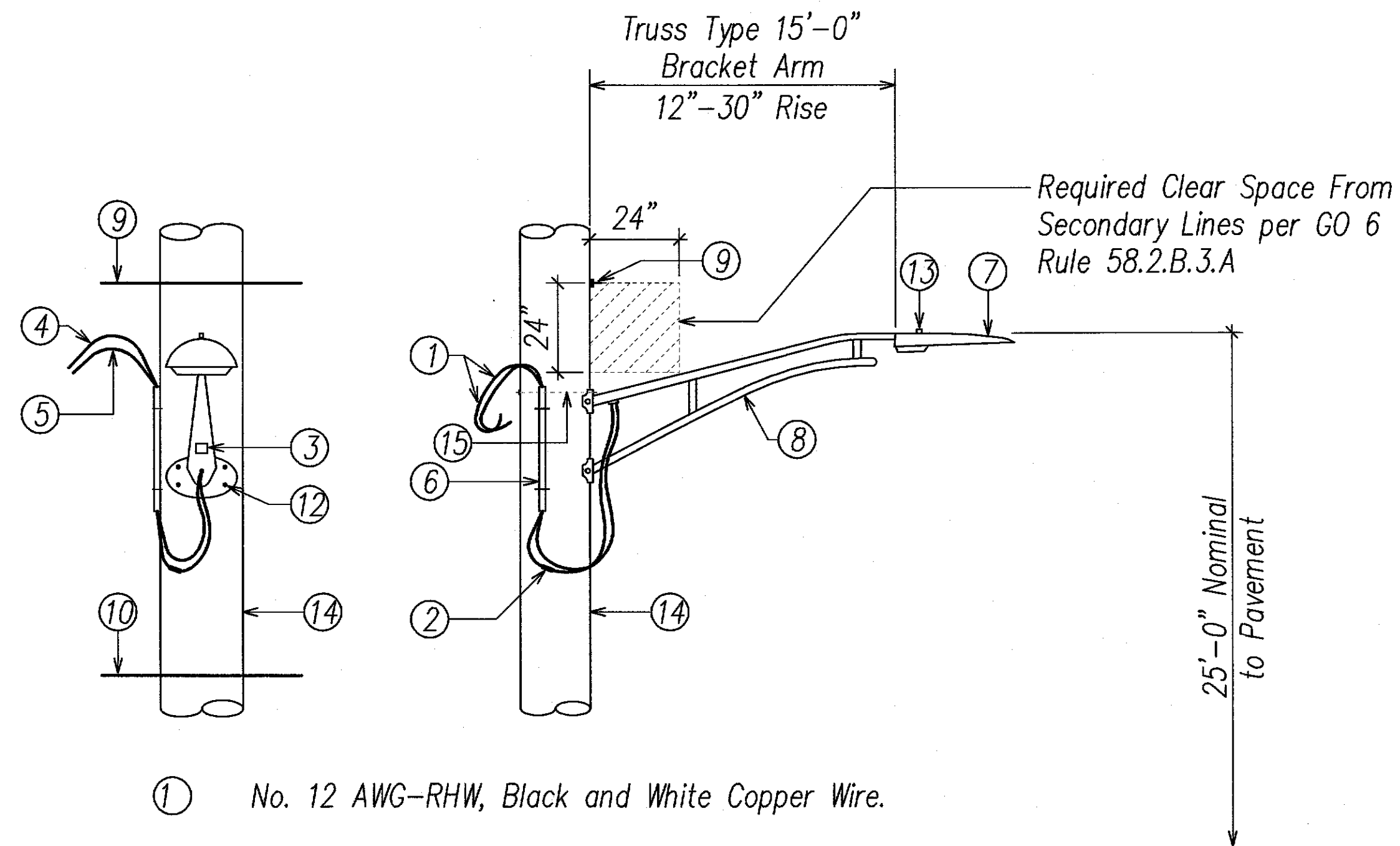
ROADWAY LIGHTING
ONE-LINE DIAGRAM

Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

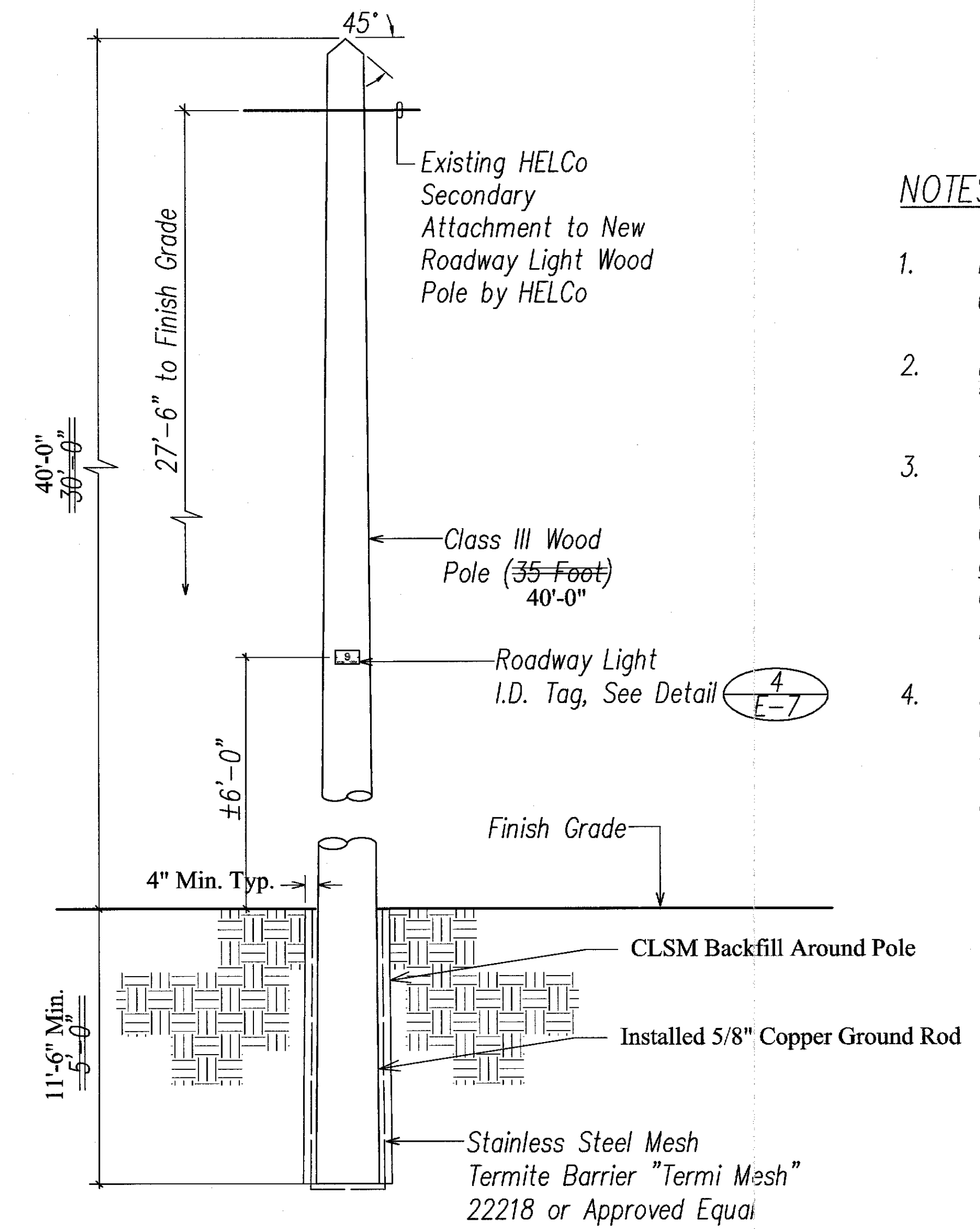
SHEET No. E-7 OF 26 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 123 | 141 |



- ① No. 12 AWG-RHW, Black and White Copper Wire.
- ② In-Line Fuse Holder and Fuse (6 Amp) for No. 12 AWG Copper Wire on Load Side.
- ③ 2" x 2" Reflectorized Green Sticker, Signifying that Street Lights are Bonded.
- ④ No. 10 AWG-RHW Black, Single Conductor Copper Wire, Minimum 3'.
- ⑤ No. 10 AWG-RHW White, Single Conductor Copper Wire, Minimum 3'.
- ⑥ 3/4" Schedule 80 PVC with Conduit Straps.
- ⑦ 180W Low Pressure Sodium Luminaire.
- ⑧ 15'-0" Tapered Elliptical Alluminum Truss Arm.
- ⑨ Secondary by HELCo on Existing HELCo Wood Utility Pole or New Roadway Light Wood Pole.
- ⑩ HCo Lines.
- ⑪ Machine Bolt, 5/8" x Required Length.
- ⑫ Lag Screw, 1/2" x 4".
- ⑬ Photocell.
- ⑭ Existing Joint Utility Pole or New Roadway Light Pole. Provide Roadway Light I.D. Tag Per Detail 4/E-7.
- ⑮ Thru Bolt Mounting per Truss Arm Manufacturer's Recommendation.

1
E-8 ROADWAY LIGHTING OVERHEAD WIRING INSTALLATION
Not to Scale



2
E-8 ROADWAY LIGHTING WOOD POLE INSTALLATION DETAIL
N.T.S.

NOTES:

1. Minimum Top Circumference is 23" Minimum Circumference at 6'-0" from Butt is 34".
2. Pole Shall be Treated with Pentachlorophenol Using the "Celon" Process, by a Licensed Termite Treatment Company.
3. Termite Treat the Bottom of the Hole and Backfill Material with Aqueous Chemical Solution Consisting of 0.5% Aldrin or 0.5% Dursban. Minimum 5 Gallons of the Solution shall be Used for Each Hole. Application Shall be Performed by Contractor Licensed for this Type of Work. Treatment Shall be Done as the Hole is Being Backfilled.
4. New and Existing Wood Poles Affected by This Project Shall Comply with "Hawaii Administrative Rules Chapter 6-73 "Installation, Operation, and Maintenance of Overhead and Underground Electrical Supply and Communication Lines".

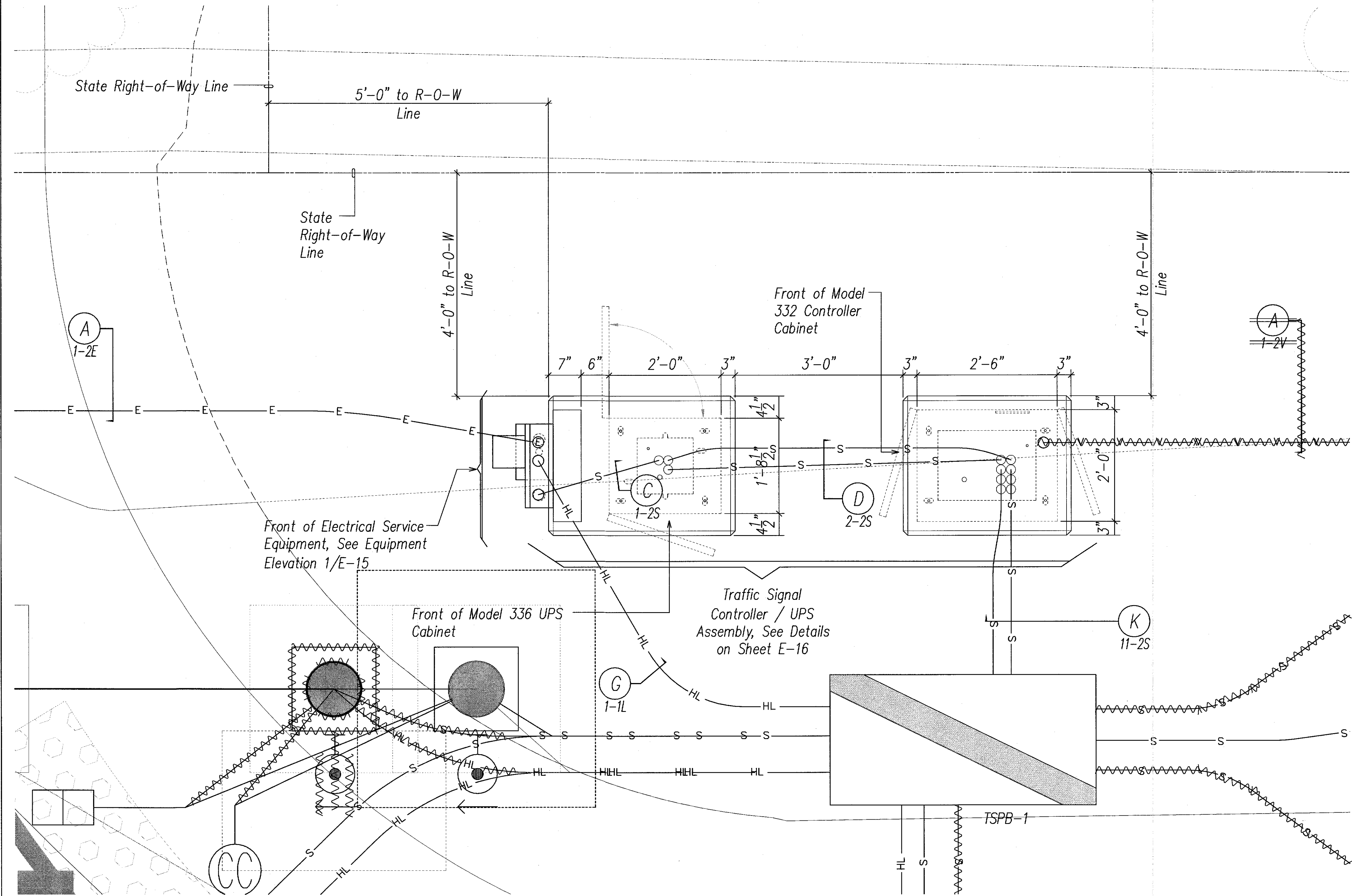
| LEGEND FOR AS-BUILT POSTINGS | |
|------------------------------|-------------------------------------|
| | Squiggly line for as-built deletion |
| | Double line for as-built deletion |
| Roadway | Text for as-built posting |

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ROADWAY LIGHTING
DETAILS I
Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)
Scale: AS NOTED Date: November 2010
SHEET No. E-8 OF 26 SHEETS

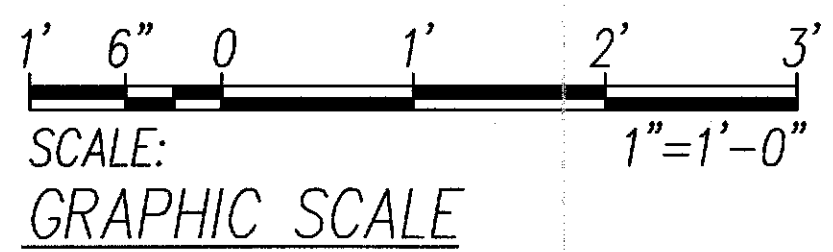
Andrew L. Miyasato
LICENSED PROFESSIONAL ENGINEER
No. 4340-E
HAWAII, U.S.A.
This Work was Prepared by
Me or Under My Supervision
Signature
License Exp. Date: 04/30/2014

"AS-BUILT"

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 126 | 141 |



TRAFFIC SIGNAL CONTROLLER / UPS CABINET DETAL PLAN
Scale: 1"=1'-0"



| LEGEND FOR AS-BUILT POSTINGS | |
|------------------------------|-------------------------------------|
| | Squiggly line for as-built deletion |
| | Double line for as-built deletion |
| | Text for as-built posting |

| | |
|-------------------|------|
| SURVEY PLOTTED BY | DATE |
| DRAWN BY | |
| DESIGNED BY | |
| QUANTITIES BY | |
| CHECKED BY | |

| | |
|---------------|-----|
| ORIGINAL PLAN | No. |
| NOTE BOOK | |

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ANDREW I. MIYASATO
LICENSED PROFESSIONAL ENGINEER
No. 4340-E
HAWAII, U.S.A.

This Work was Prepared by
Me or Under My Supervision

Signature: *Andrew I. Miyasato*
2014.02.04
License Exp. Date: 04.30.2018

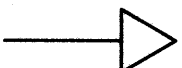
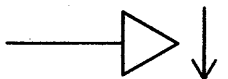

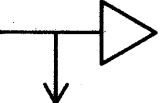

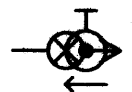



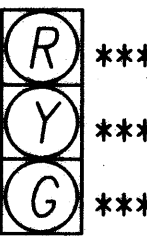
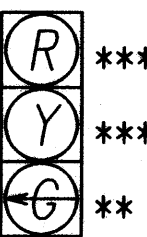
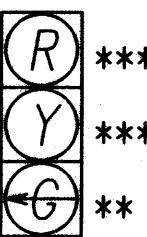
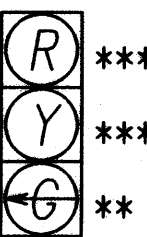
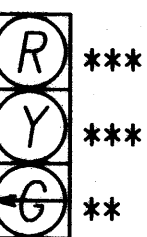
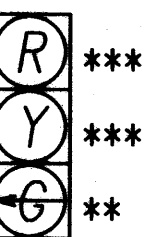
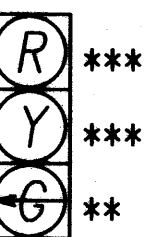
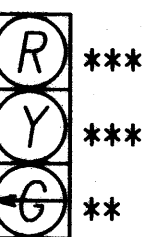
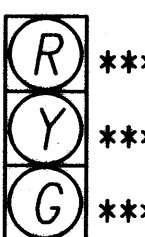
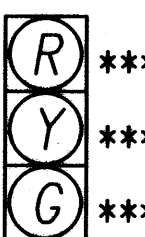
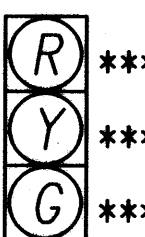
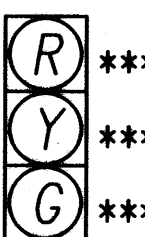
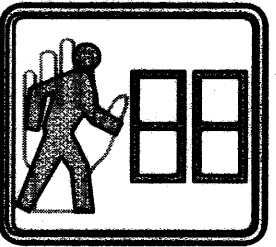
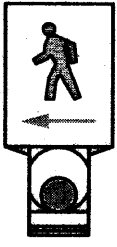
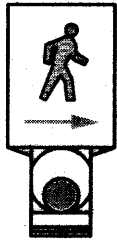
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL CONTROLLER / UPS CABINET DETAIL PLAN

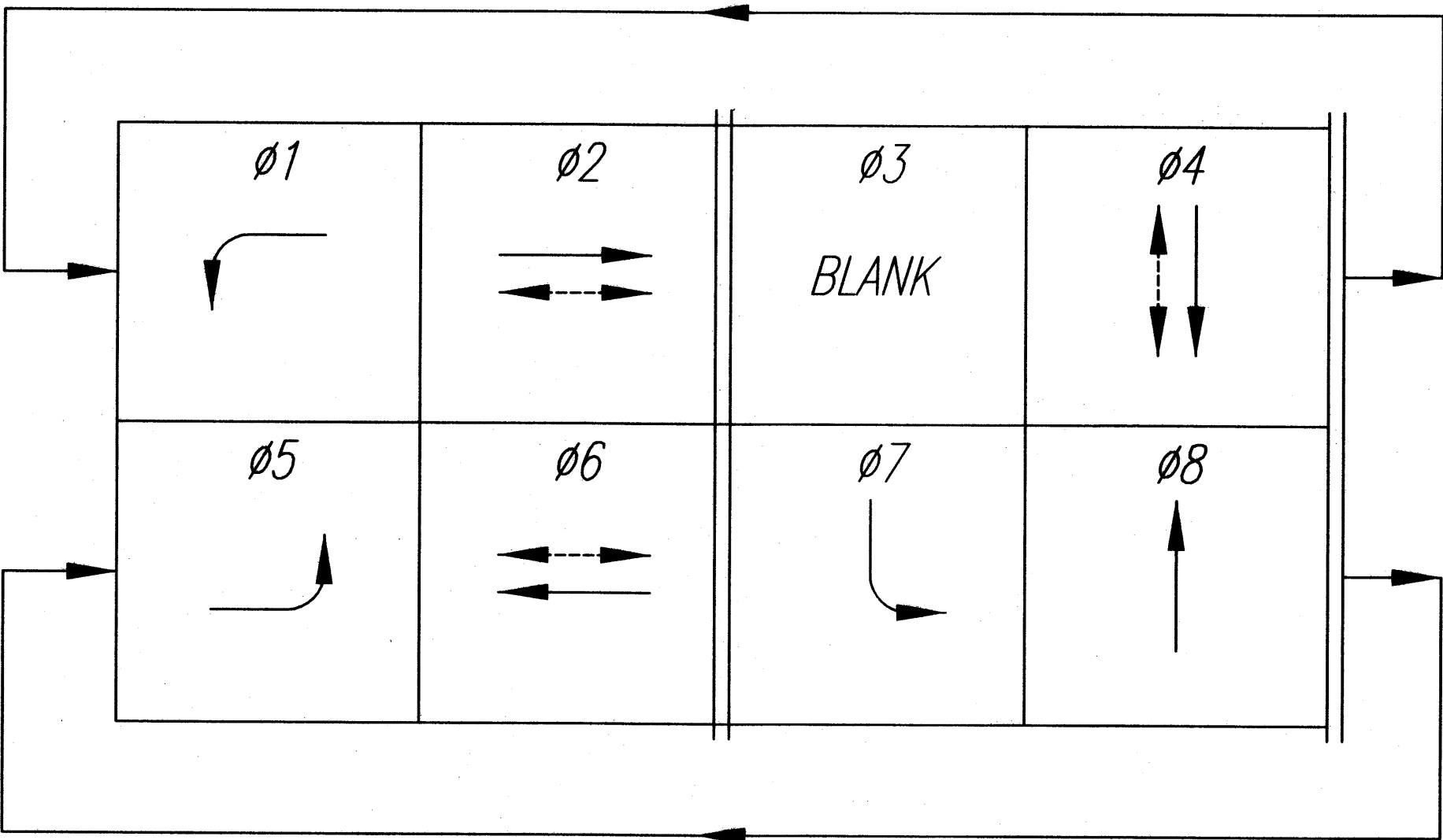
Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

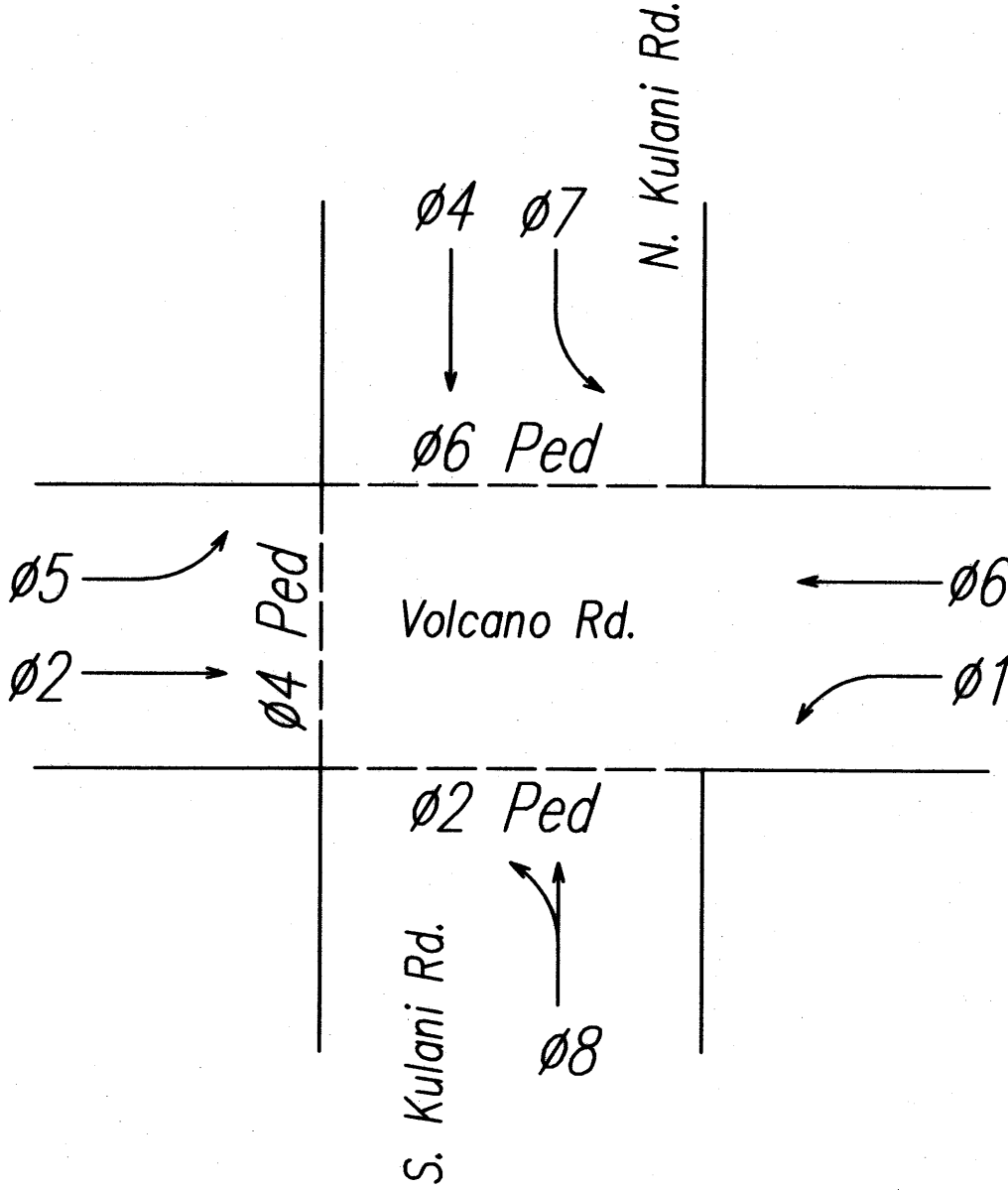
SHEET No. E-11 OF 26 SHEETS

| TRAFFIC SIGNAL HEAD SCHEDULE | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|--|--|--------------------------|---|---|-------------------------------------|
| SYMBOL |  |  |  |  |  |  |  | |  |  | |
| SIGNAL HEAD TYPE |  ***  ***  ***  ** |  ***  ***  ***  ** |  ***  ***  ***  ** |  **** Pedestrian Signal Head | Opticom Head |  Pedestrian Push Button |  Pedestrian Push Button | CCTV Camera | Video Detection Camera | | |
| DESIGNATOR | A-1 A-3 A-5 C-3 C-4 | E-3 E-4 G-3 G-4 H-1 | B-1 F-1 | C-1 G-1 | D-1 E-1 | A-4 D-2 F-2 F-3 | G-5 H-2 | A-2 C-2 E-2 G-2 | PB-1 PB-3 PB-5 | PB-2 PB-4 PB-6 | A-7 A-6 C-5 E-5 G-6 |

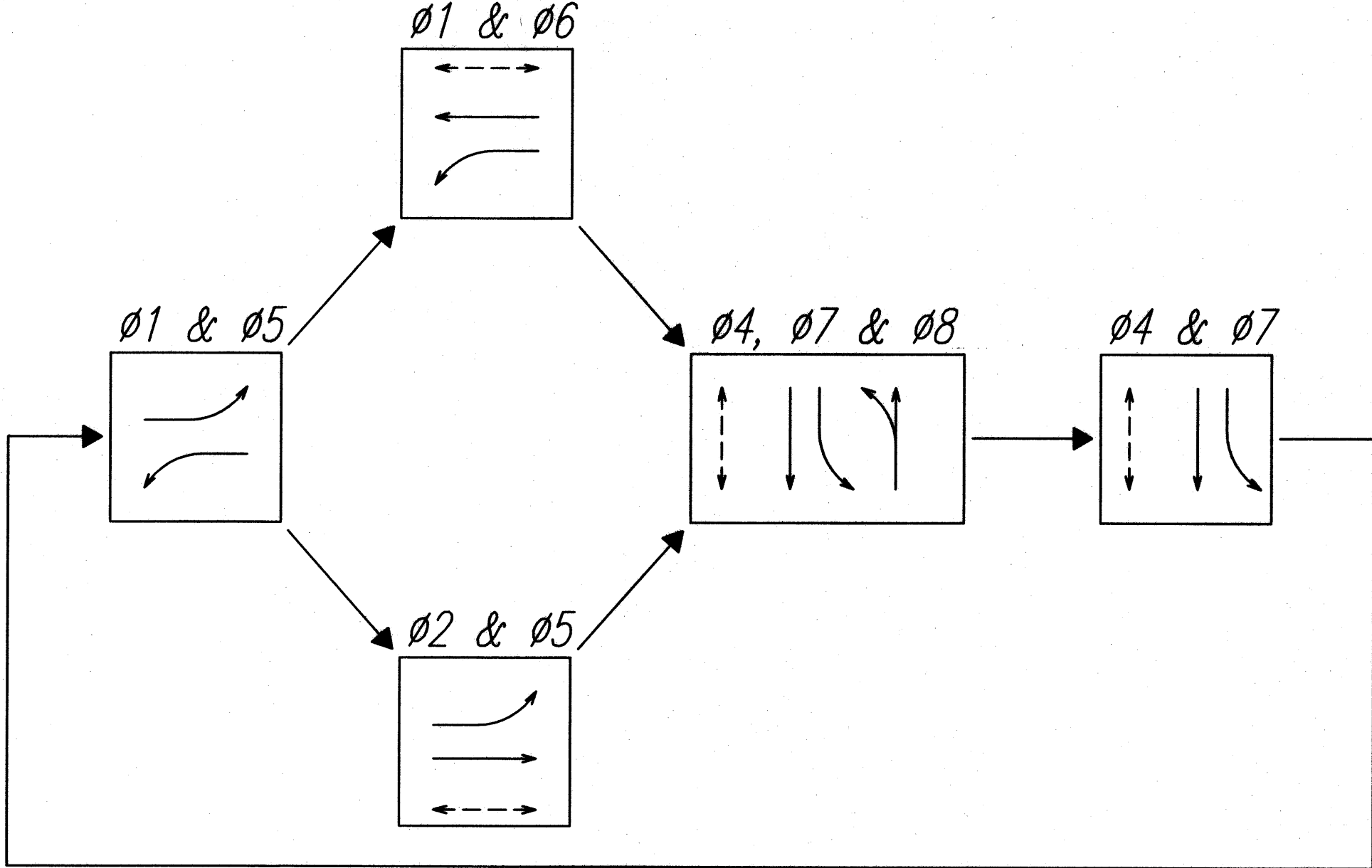
Traffic Signal Head Schedule Notes:
* Programmed Visibility Head
** Fiber Optic Arrow
*** LED Lamp
**** LED Ped Signal with Countdown Timer



CONTROLLER PHASING



PHASE ASSIGNMENTS



PHASING SEQUENCE DIAGRAM

NEW PHASE SEQUENCE DIAGRAMS

Model 170 Controller
Model 332 Cabinet

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

Andrew I. Miyasato
Signature
License Exp. Date: 04.30.2012

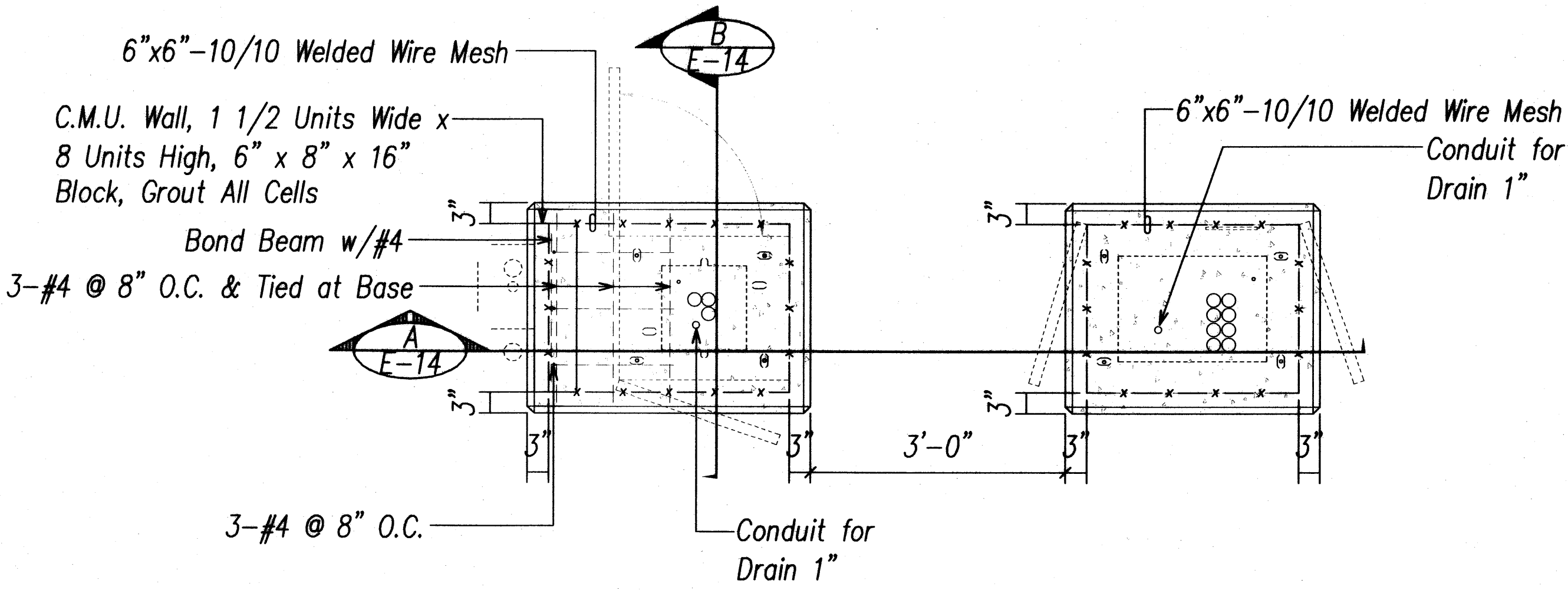
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL HEAD SCHEDULE,
LEGEND, PHASE DIAGRAM
Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

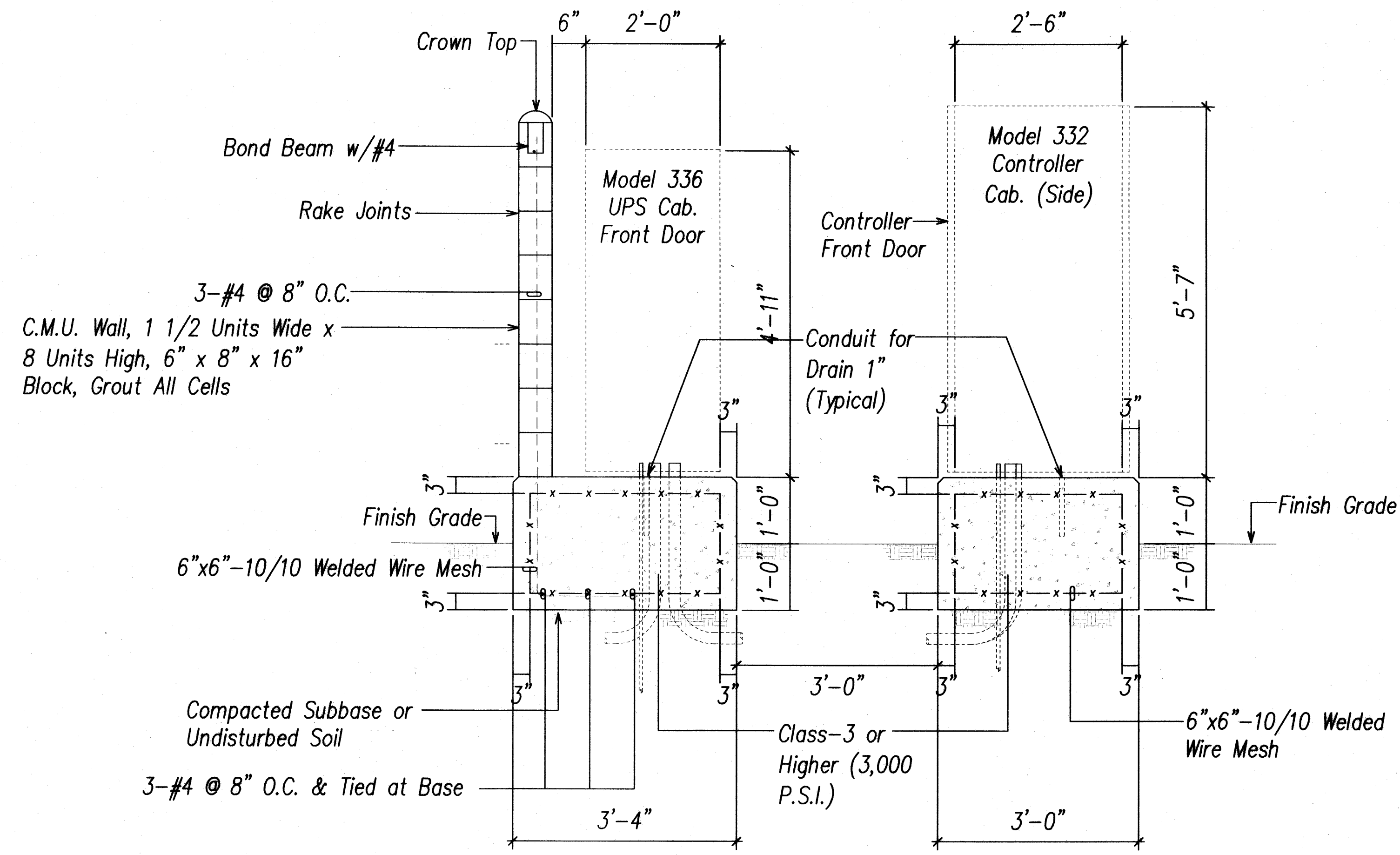
Scale: AS NOTED Date: November 2010

SHEET No. E-13 OF 26 SHEETS

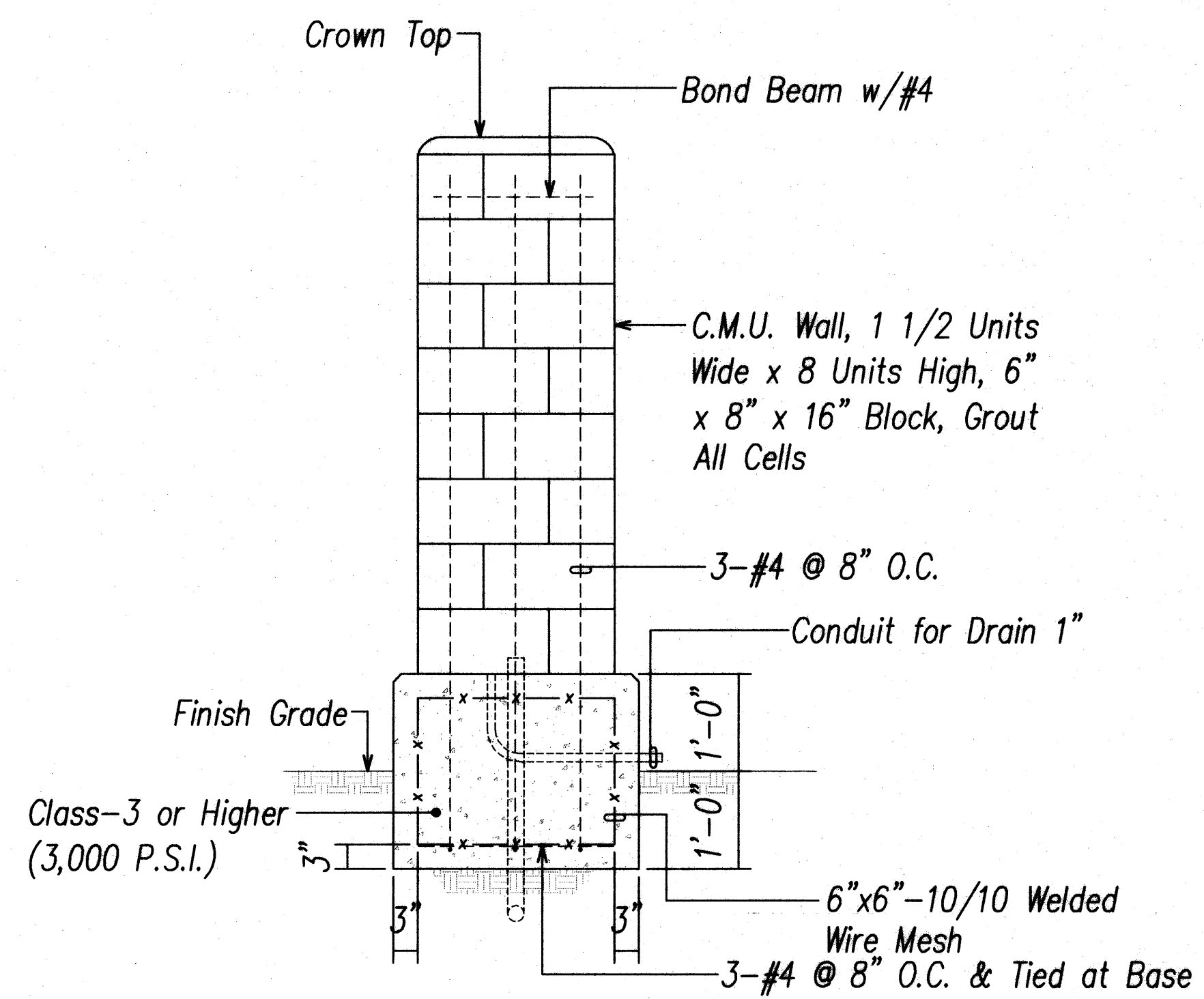
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 129 | 141 |



PLAN



A SECTION "A"



B SECTION "B"

1 CONTROLLER/UPS ASSEMBLY FOUNDATION DETAILS

E-14 Not To Scale

| | |
|---------------|------|
| DESIGNED BY | DATE |
| CHECKED BY | |
| NOTED BY | |
| QUANTITIES BY | |
| TRACED BY | |
| PLANNED BY | |
| ORIGINAL PLAN | |
| NO. | |

FILE PATH: Z:\WORK\PROJECTS\2009\011-2(38)-to details\Draw CAD USER: Model PLOT DATE: 2010.11.30 REF: 1-2009-20 controller-ups pad detail
LAST SAVE: 11/22/10 @ 08:25:28 BY: AM PLOT SC: 3/4"=1"

Signature: *Andrew L. Miyamoto*
License Exp. Date: 04.30.2012

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

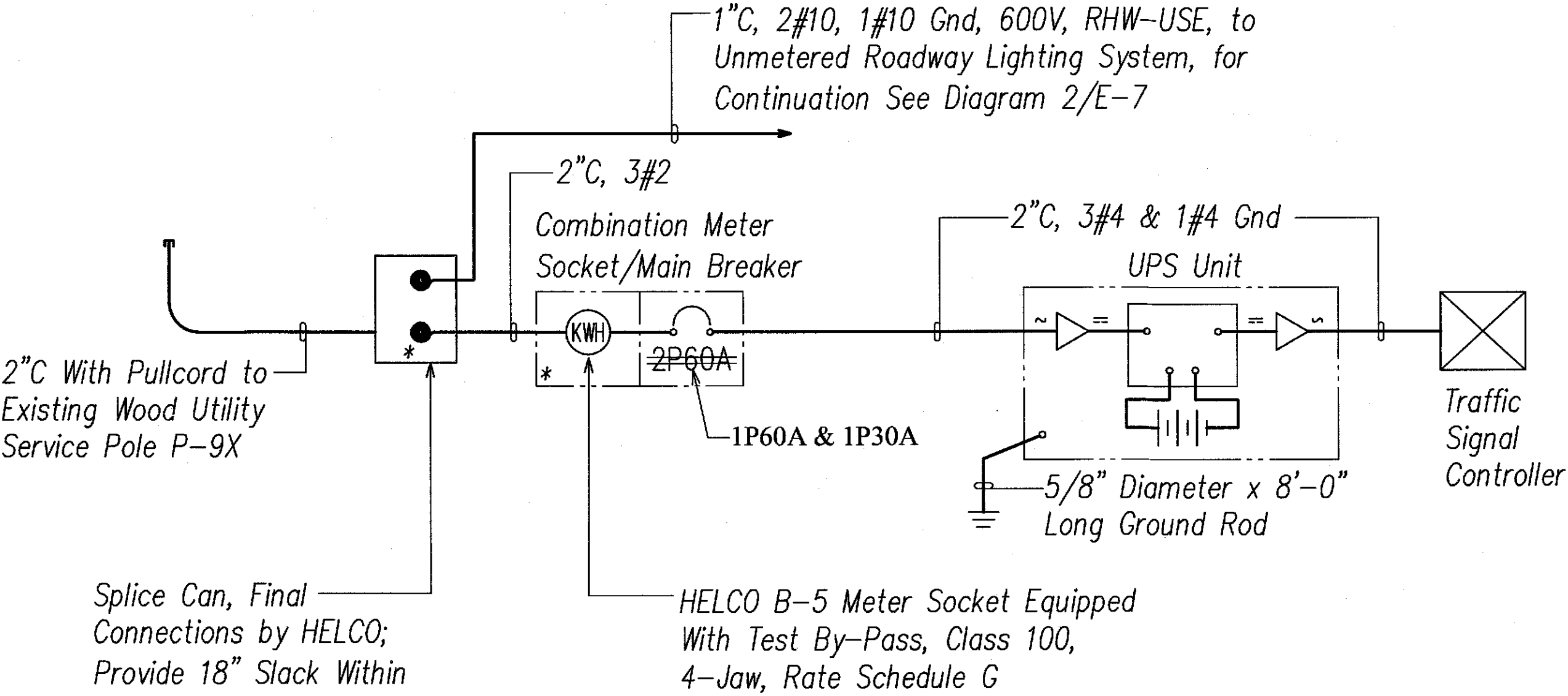
**TRAFFIC SIGNAL
DETAILS I**

*Volcano Road Intersection and
Drainage Improvements*

Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

SHEET No. E-14 OF 26 SHEETS



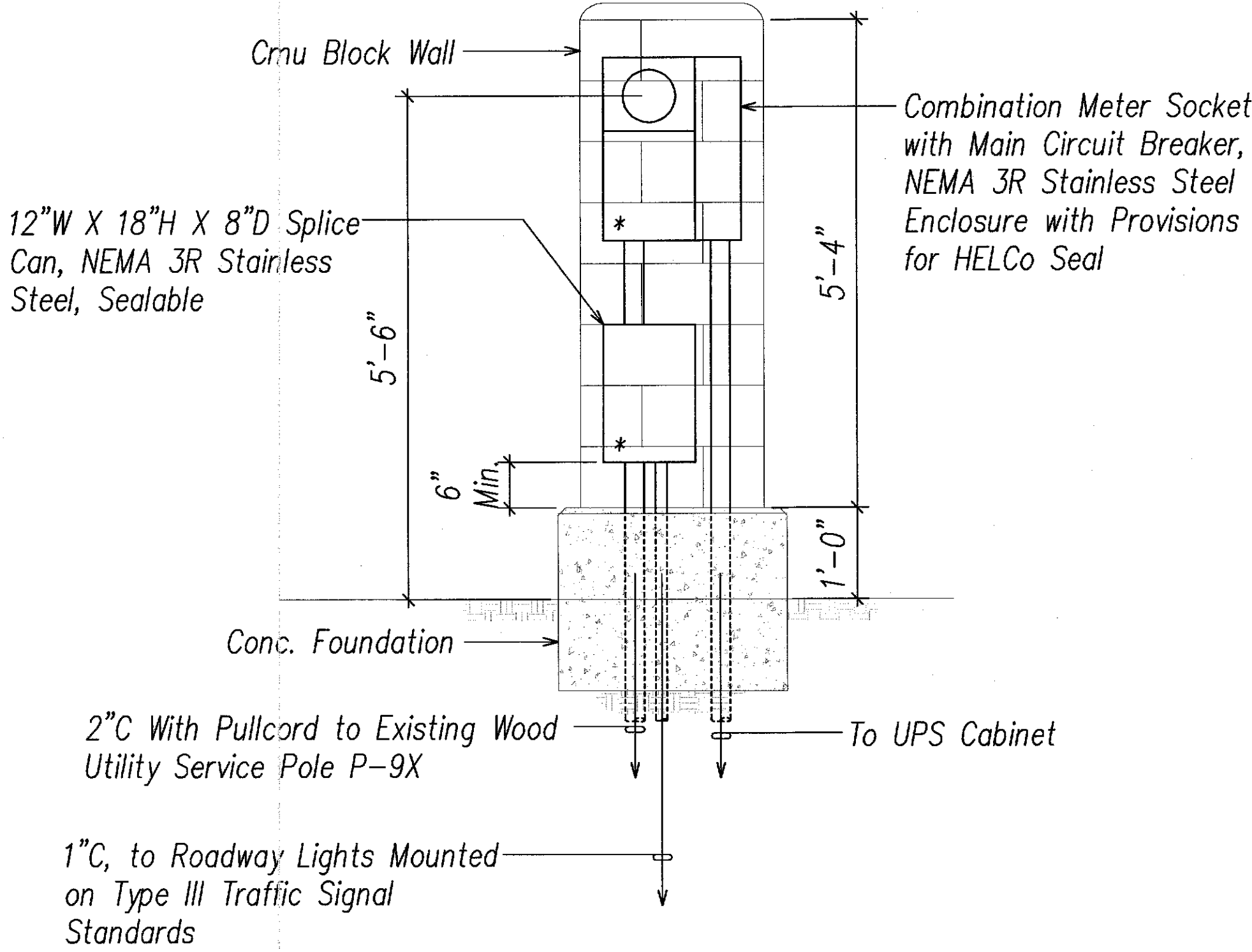
Note:

1. * Indicates Provisions for HELCO Seal.

SERVICE DATA:

- Service Voltage: 120 / 240 Volts; Single Phase; Three Wire
- Load Data: Connected = 10 KVA
Estimated Demand = 10 KVA
- Service Conductors: 3 No. 2
- Metering: HELCO Std. B-5; RATE G
- TYPE: Underground
- Billing Information: Hawaii State Department of Transportation

TRAFFIC SIGNAL SYSTEM ONE-LINE DIAGRAM



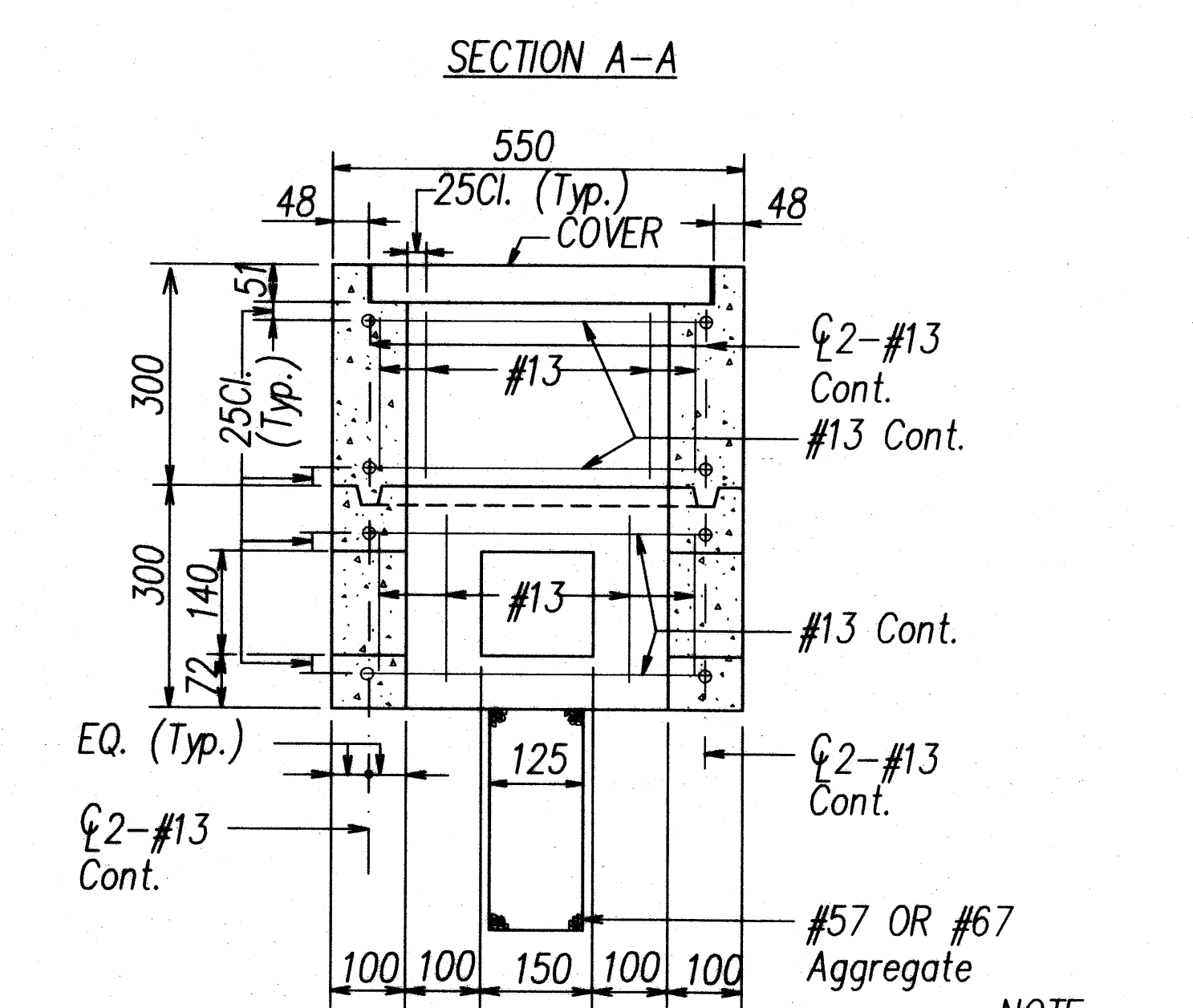
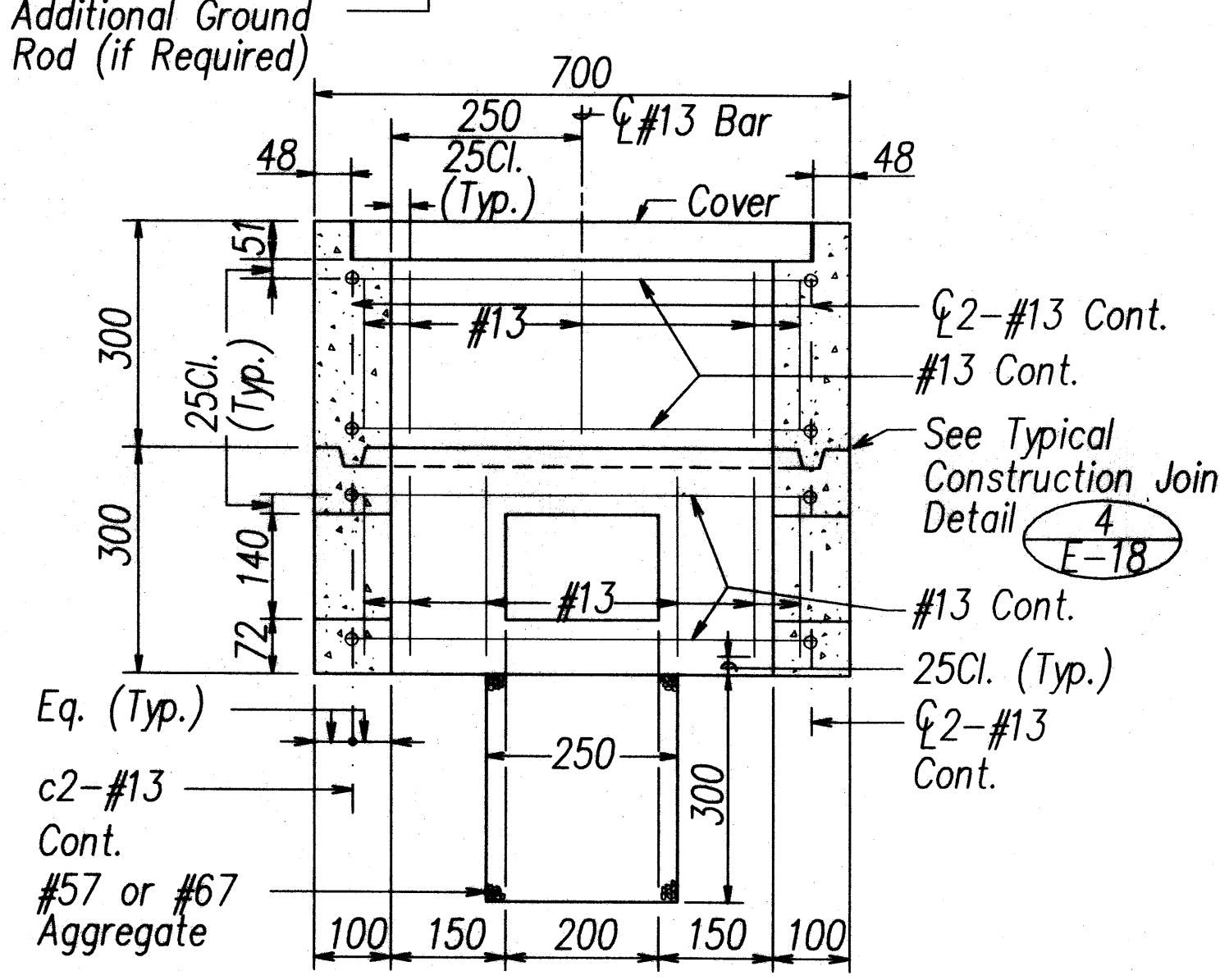
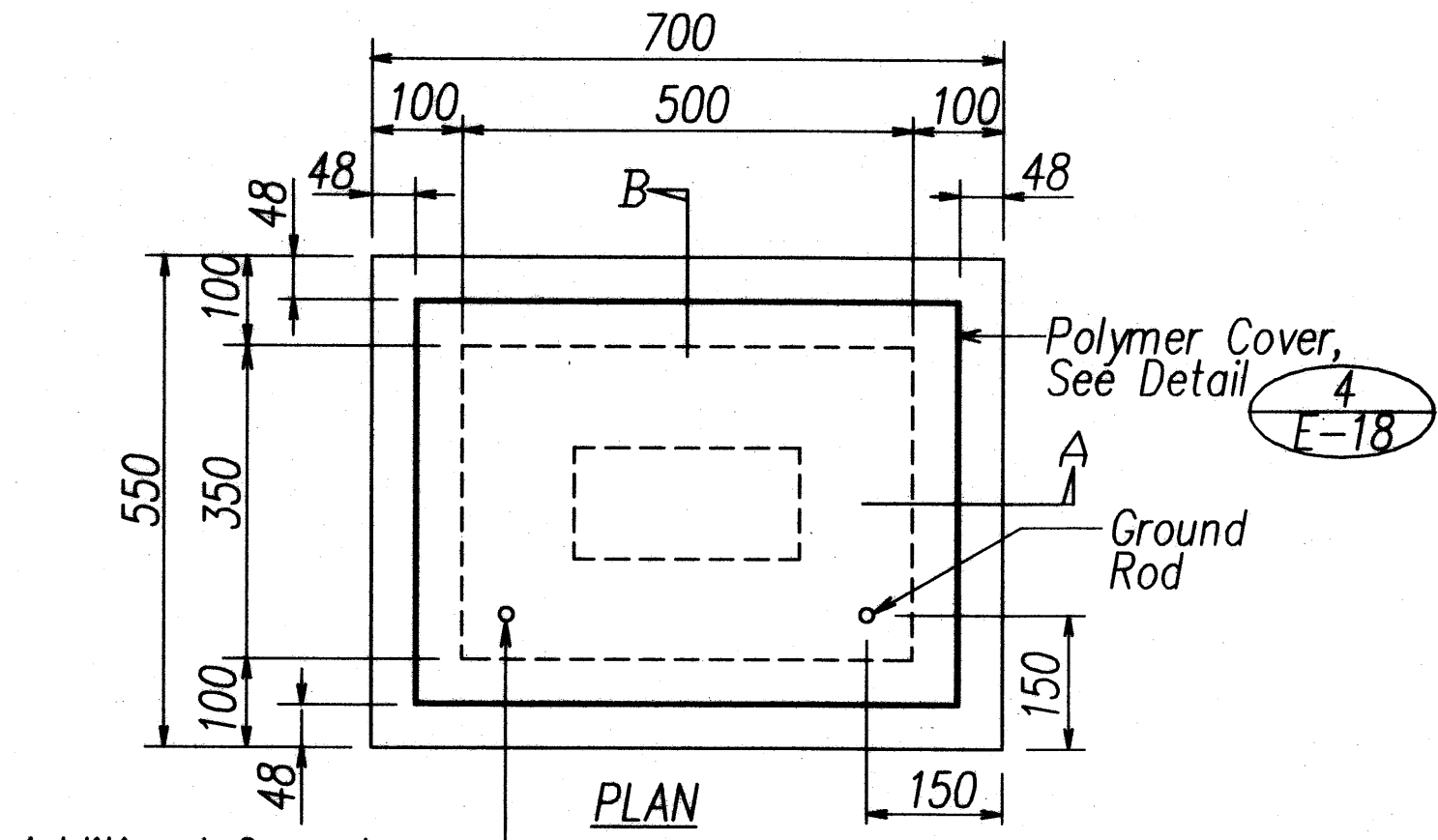
1 SERVICE EQUIPMENT ELEVATION
E-15 Not To Scale

| LEGEND FOR AS-BUILT POSTINGS | |
|------------------------------|-------------------------------------|
| ~~~~~ | Squiggly line for as-built deletion |
| ±00.00 | Double line for as-built deletion |
| Roadway | Text for as-built posting |

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

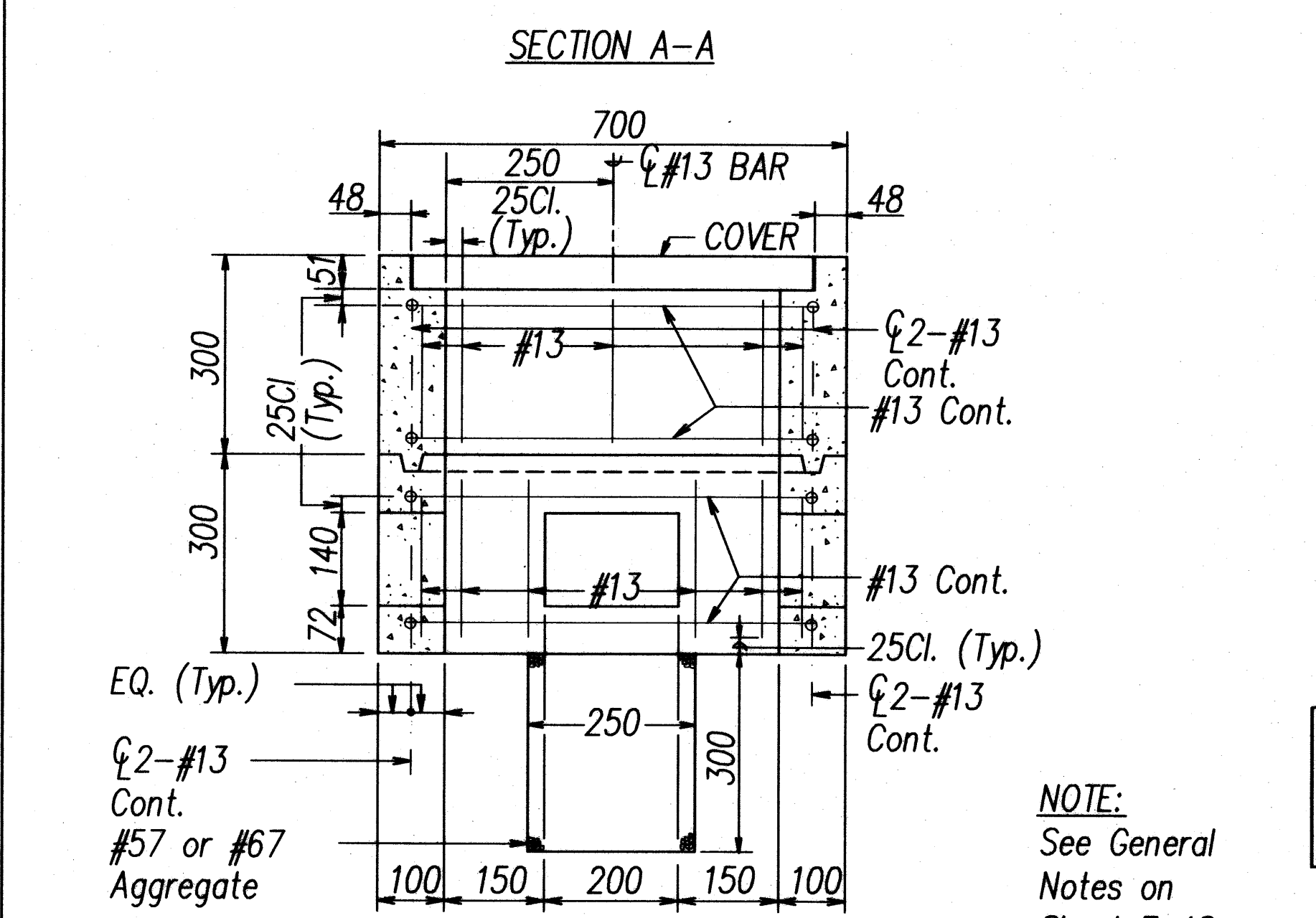
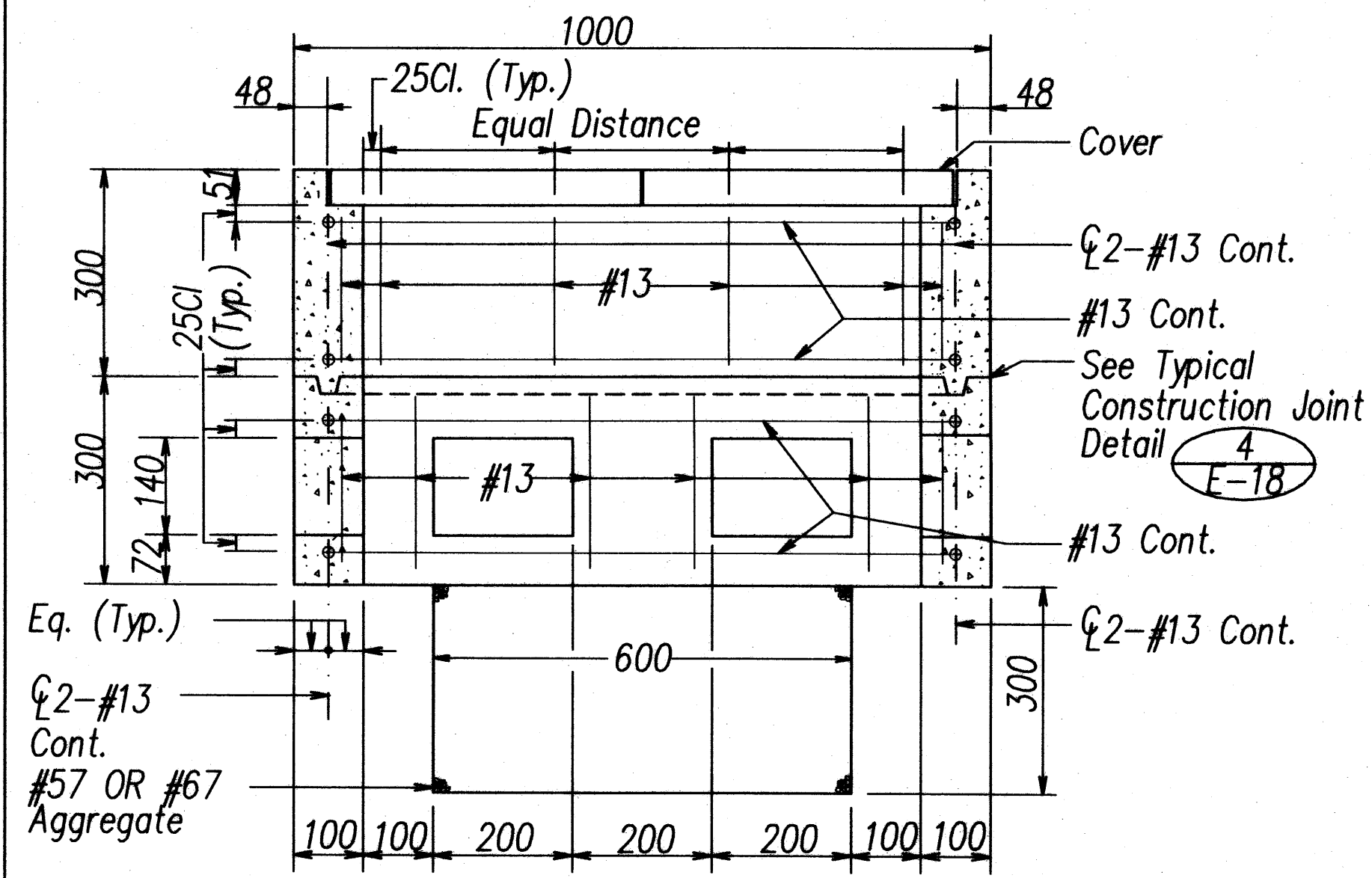
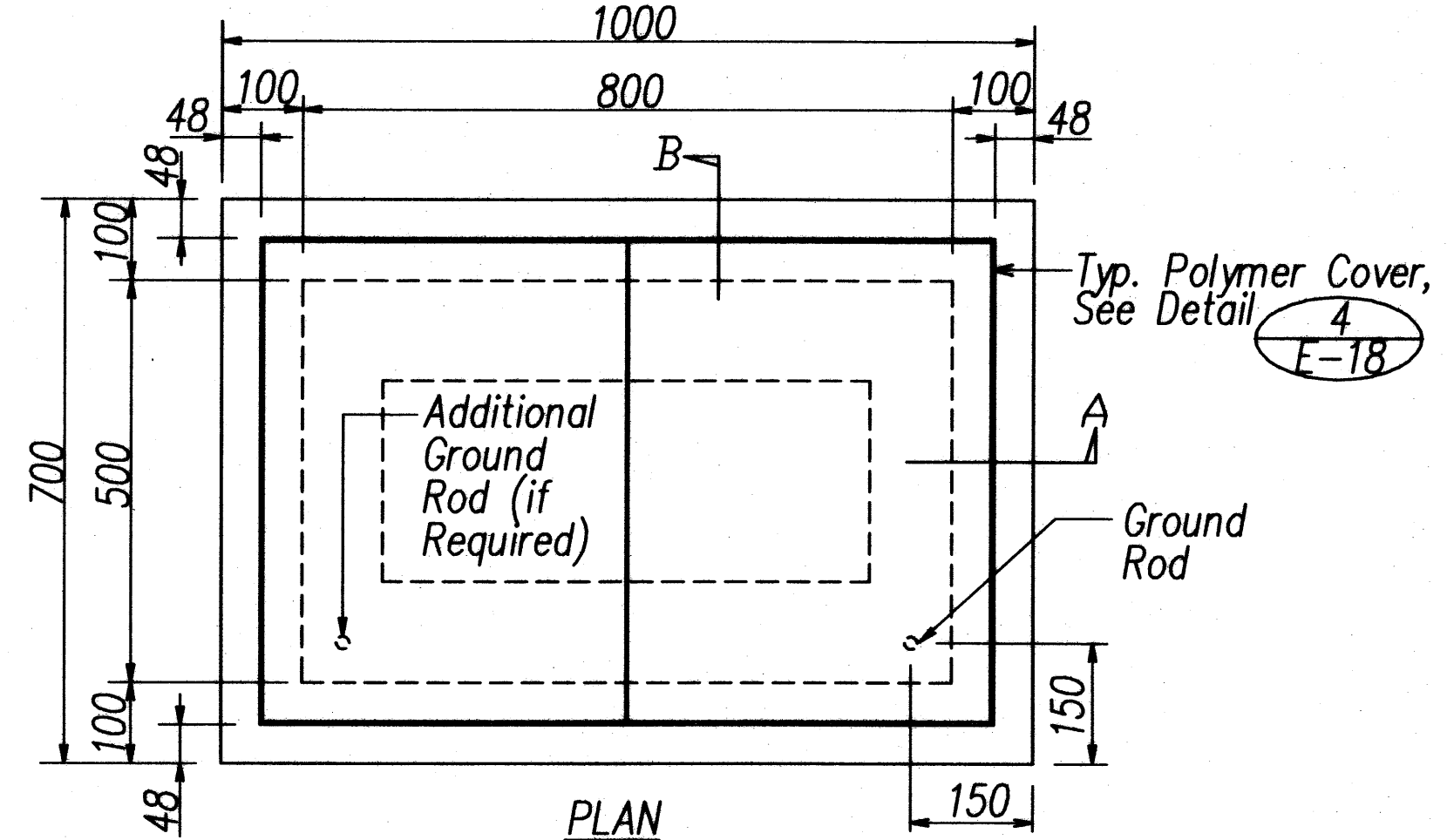
| | |
|--|---|
| <p>STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION</p> <p><u>TRAFFIC SIGNAL</u> <u>DETAILS II</u></p> <p><u>Volcano Road Intersection and</u> <u>Drainage Improvements</u></p> <p>Federal-Aid Project No. <u>HS-STP-011-2(38)</u></p> <p>Scale: <u>AS NOTED</u> Date: <u>November 2010</u></p> <p>SHEET No. <u>E-15</u> OF <u>26</u> SHEETS</p> | <p>Andrew L. Miyasato LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.</p> <p>This Work was Prepared by Me or Under My Supervision</p> <p>Signature: <i>Andrew L. Miyasato</i> 2014.02.04 License Exp. Date: 04.30.2014</p> |
|--|---|

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 132 | 141 |



1
E-17 **TYPE "A" PULLBOX (OLD TYPE "B")**
NOT TO SCALE

NOTE:
See General
Notes on
Sheet E-18



1
E-17 **TYPE "B" PULLBOX (OLD TYPE "C")**
NOT TO SCALE

NOTE:
See General
Notes on
Sheet E-18

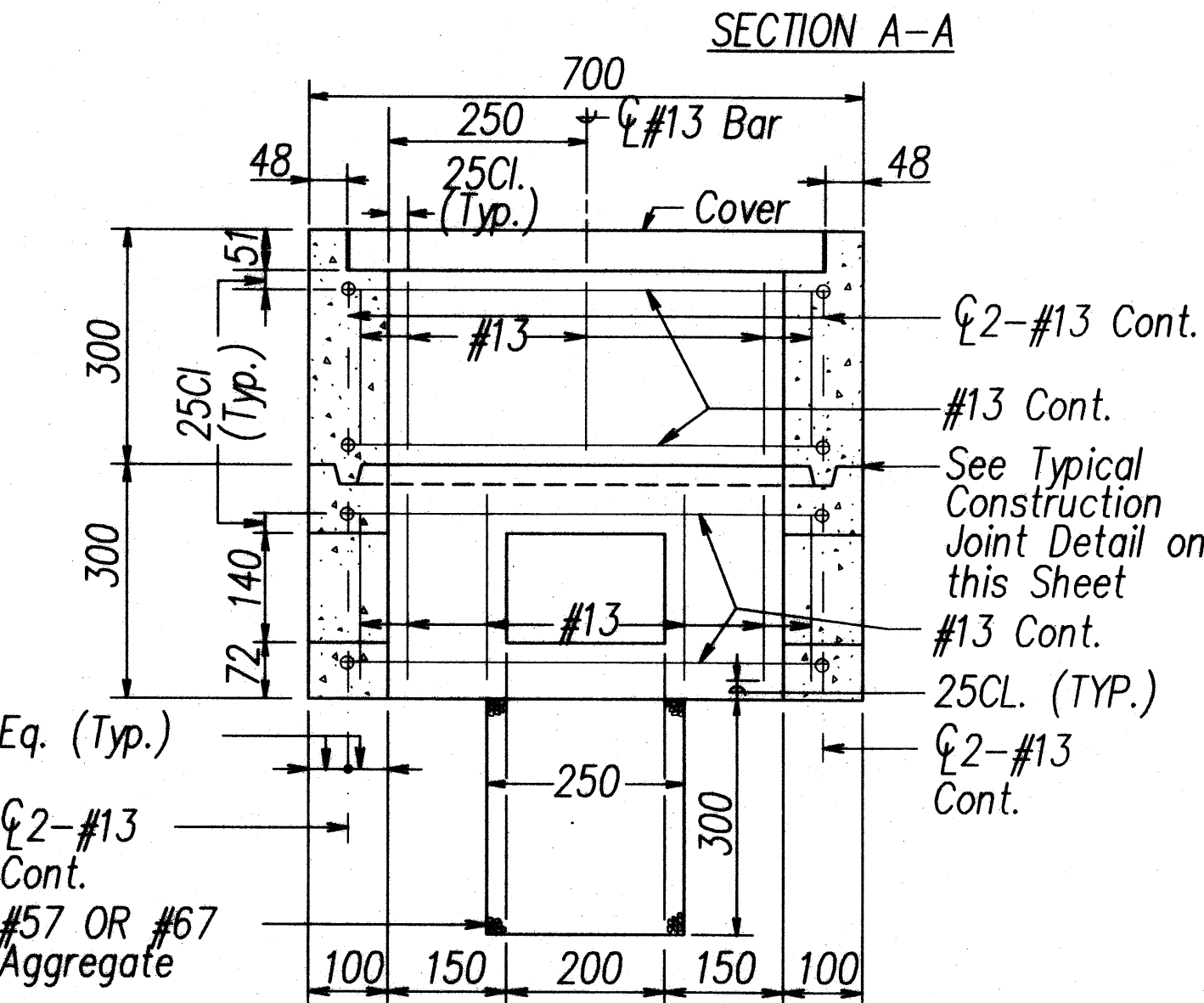
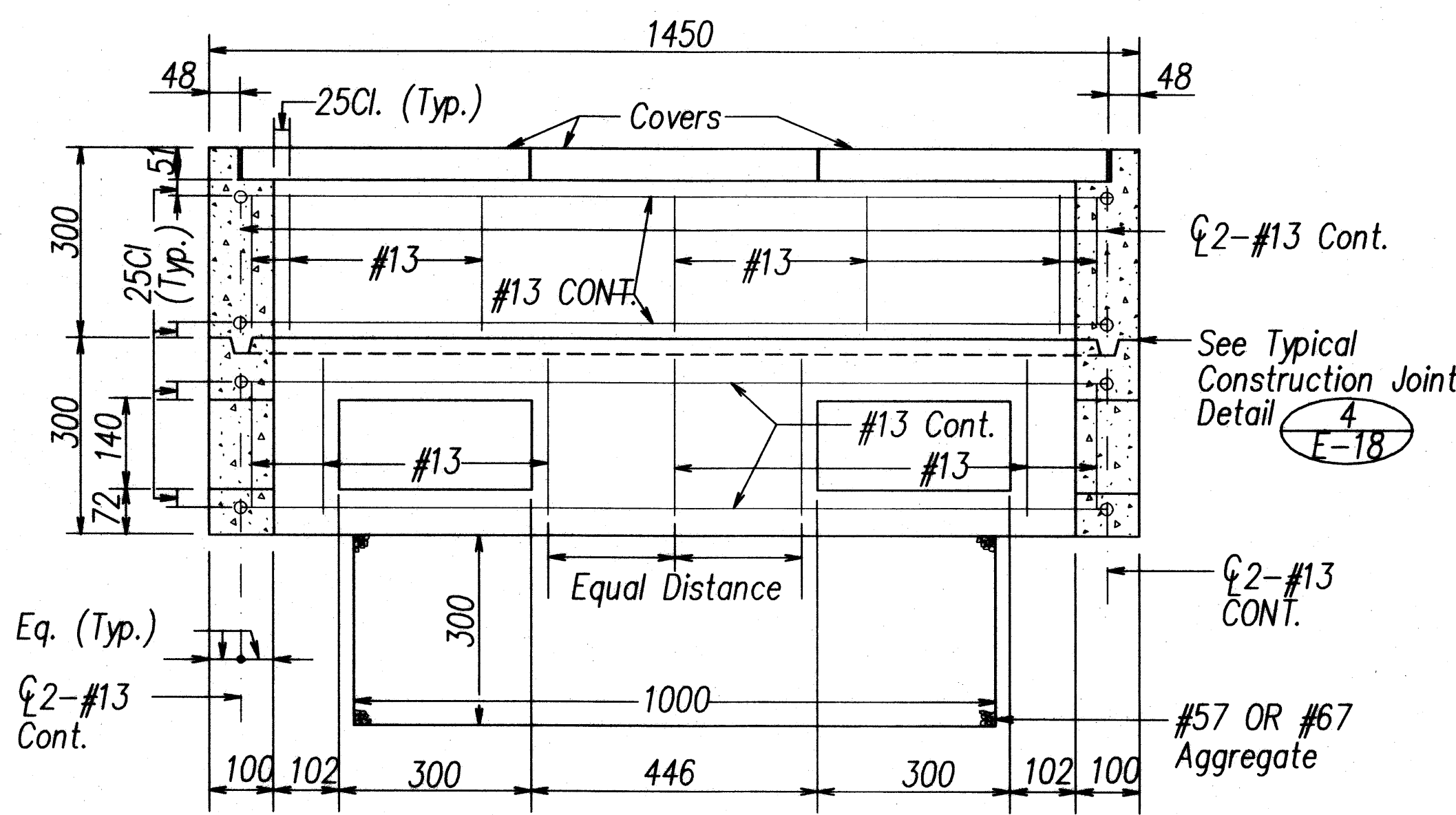
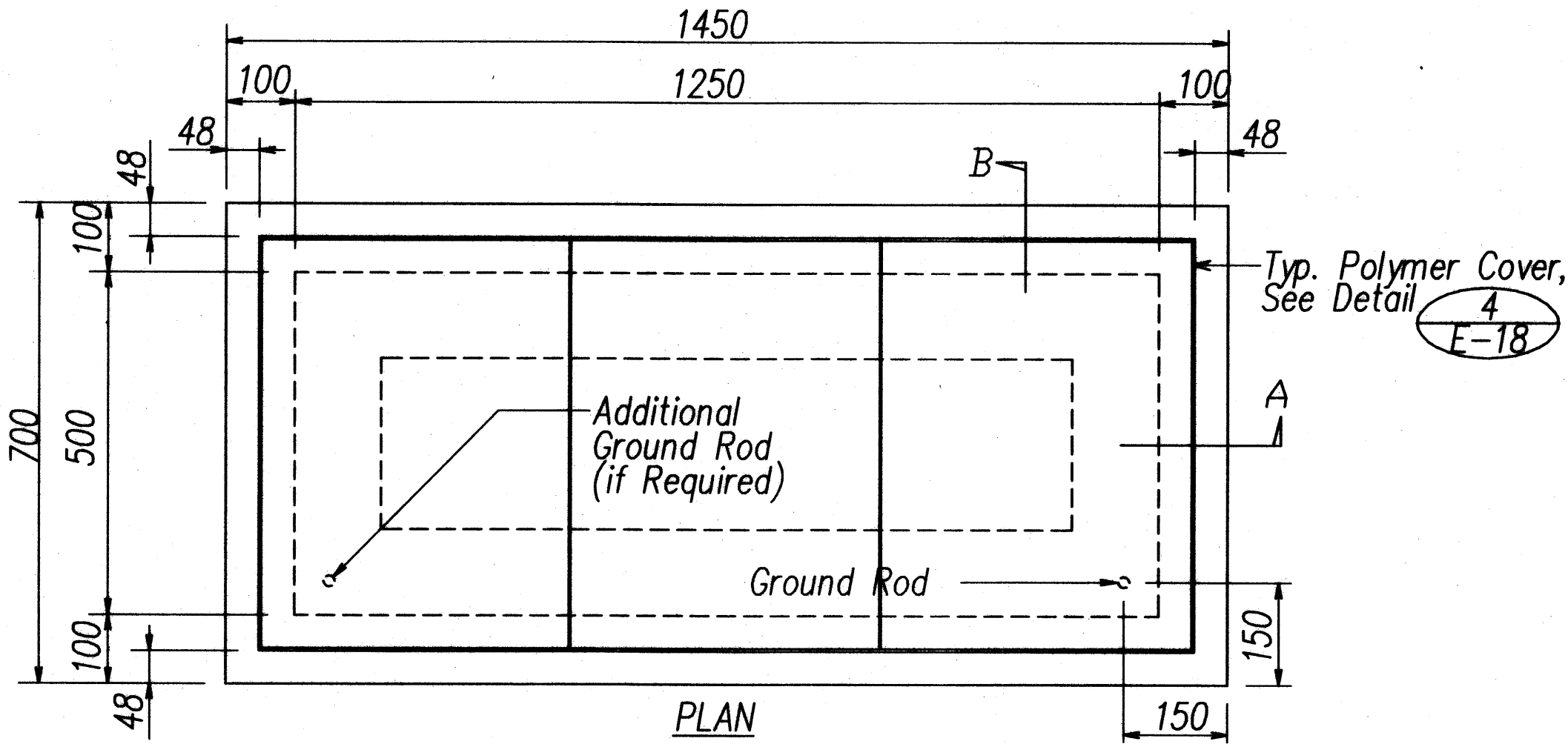
All Dimensions on this
Sheet are in Millimeters



This Work was Prepared by
Me or Under My Supervision
Andrew I. Miyasato
Signature
License Exp. Date: 04/30/2012

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TRAFFIC SIGNAL
DETAILS IV
Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)
Scale: AS NOTED Date: November 2010
SHEET No. E-17 OF 26 SHEETS

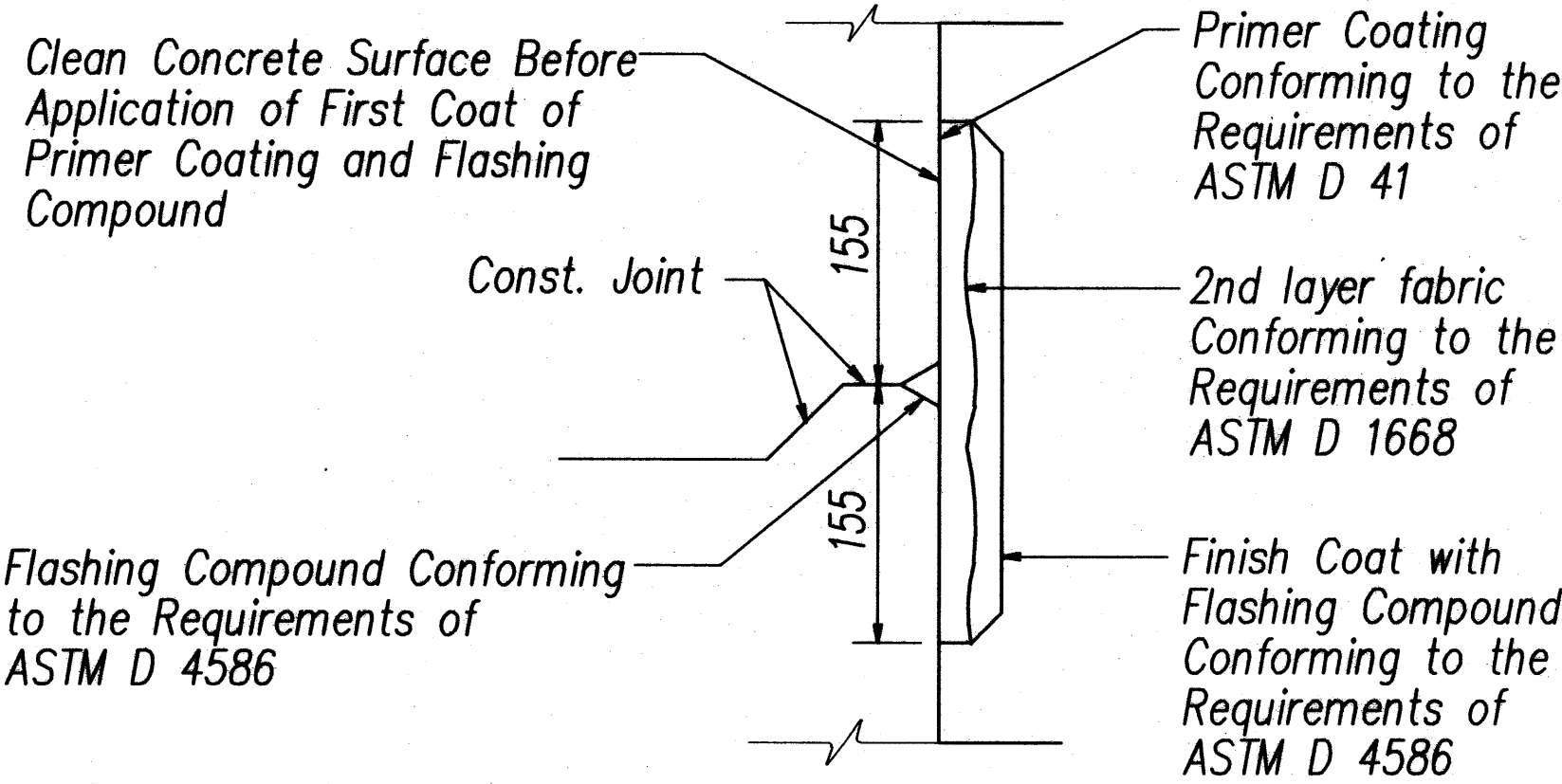
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 133 | 141 |



1
E-18 NOT TO SCALE
TYPE "C" PULLBOX (OLD TYPE "D")

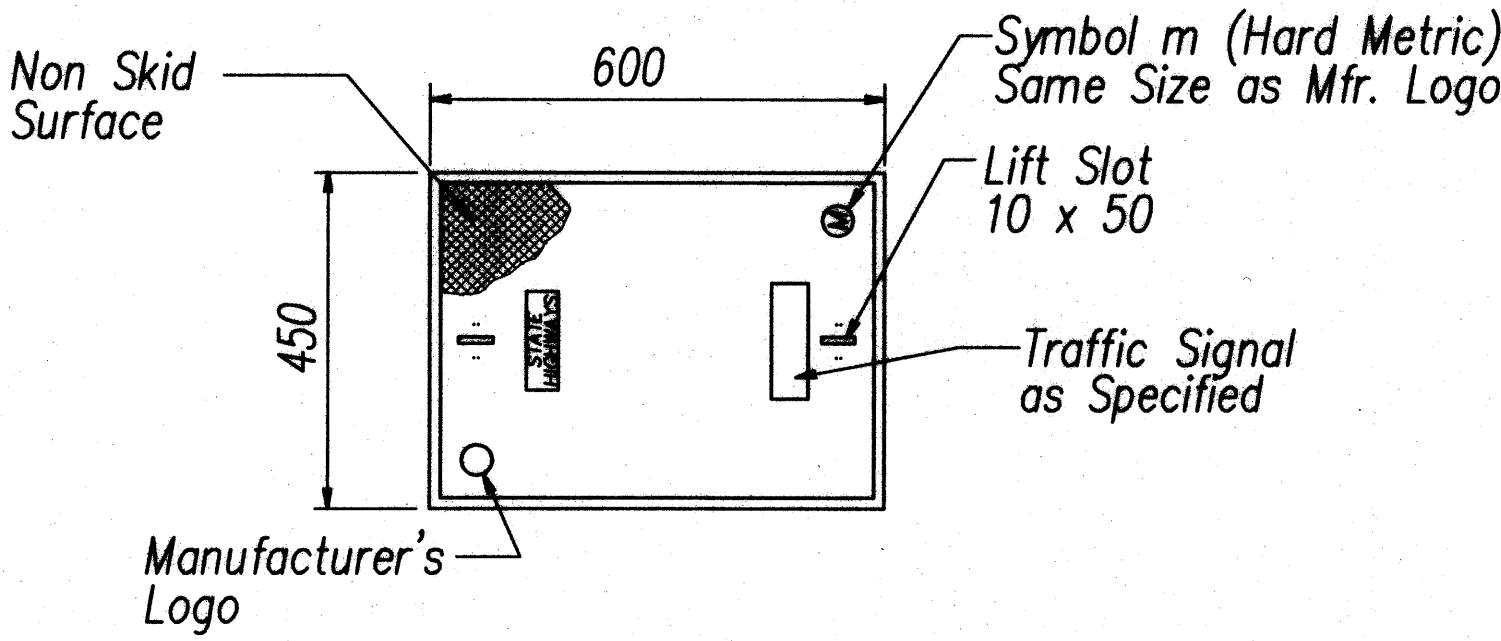
GENERAL NOTES FOR TRAFFIC SIGNAL PULLBOX DETAILS

- Provide a minimum of one 16 x 2.5m copperweld ground rod in each pullbox. When directed by the traffic signal inspector/engineer, install additional ground rods. Cost of ground rods shall be incidental to the pullboxes.
- All pre-cast concrete pullboxes shall be manufactured in two pieces.
- The pullbox with cover shall be capable of supporting an ms 18 loading.
- The maximum weight of the pullbox cover shall not exceed 27 kilograms.
- The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
- After installing the conduits in the openings of the pullboxes, the Contractor shall fill the excess opening in the pre-cast knockouts with concrete mortar.
- Prior to installing the pullboxes, the Contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
- All concrete shall be class A (25MPA, min.)
- Rebars shall be grade 300 and all lapped splices shall be 360mm minimum.
- The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
- Type "C" pullbox shall be installed in a location protected from vehicular traffic (i.e. raised sidewalk, behind a.c. curbs, traffic signal standard or pipe guards).

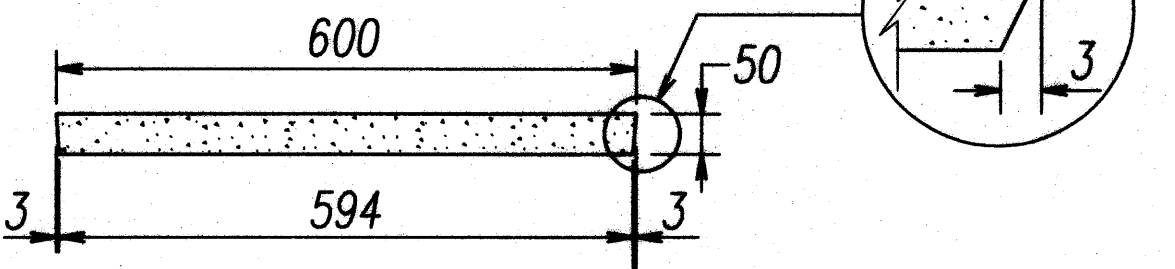


2
E-18 NOT TO SCALE
TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

All Dimensions on this Sheet are in Millimeters Unless Otherwise Shown



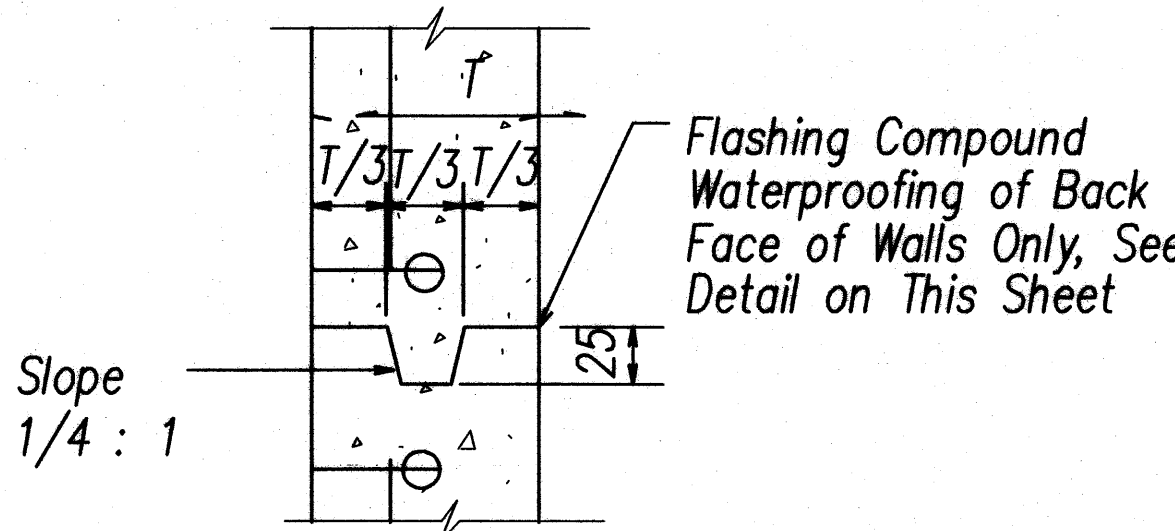
PLAN VIEW



ELEVATION

Note: See Traffic Signal Pullbox Details, This Sheet and Sheet E-17

3
E-18 NOT TO SCALE
POLYMER CONCRETE COVER



Note: See Traffic Signal Pullbox Details, This Sheet and Sheet E-17

4
E-18 NOT TO SCALE
TYPICAL CONSTRUCTION JOINT DETAIL

| | |
|---------------|-------|
| DATE | _____ |
| DESIGNED BY | _____ |
| CHECKED BY | _____ |
| NOTED BY | _____ |
| QUANTITIES BY | _____ |
| NO. | _____ |

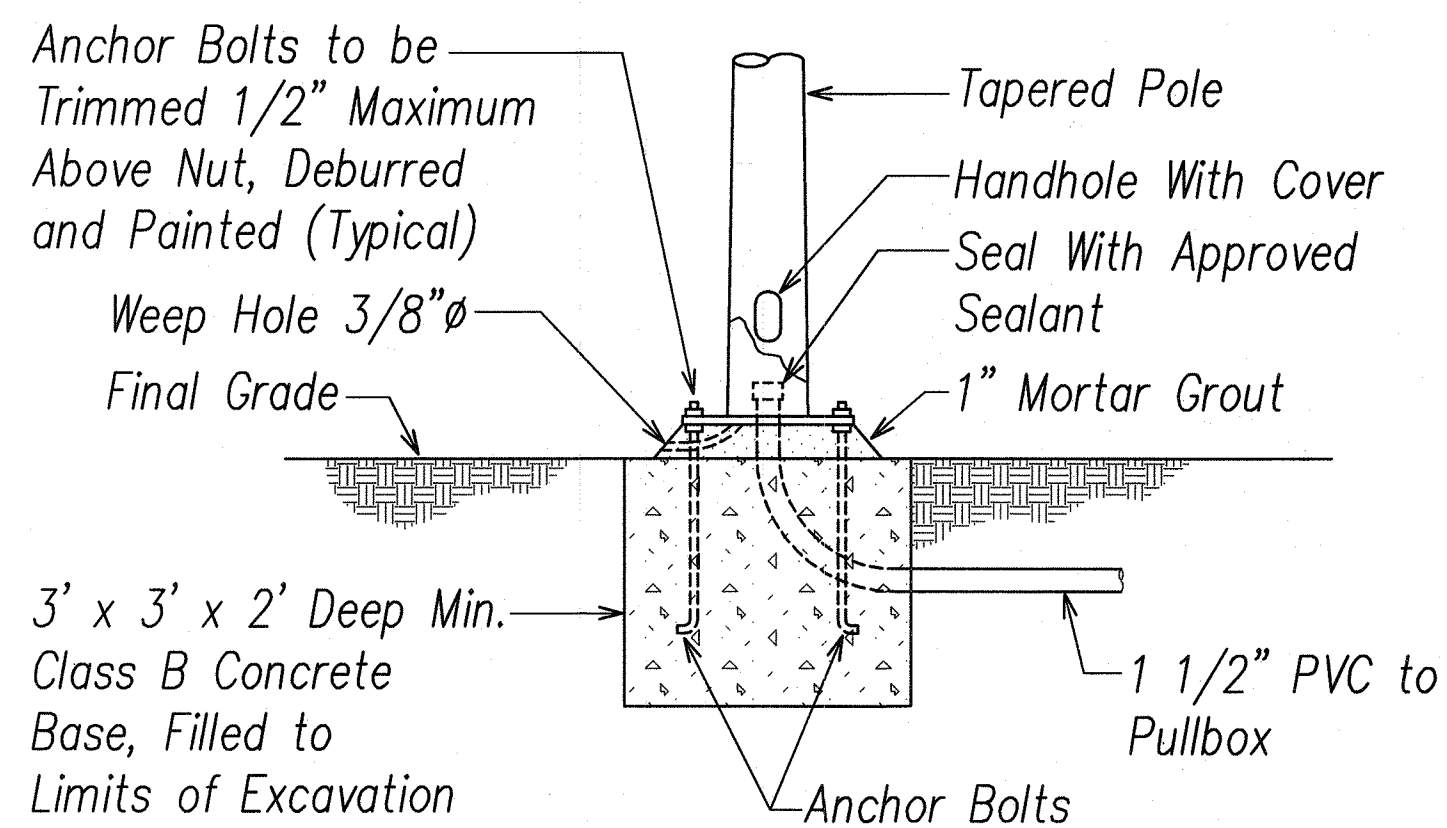
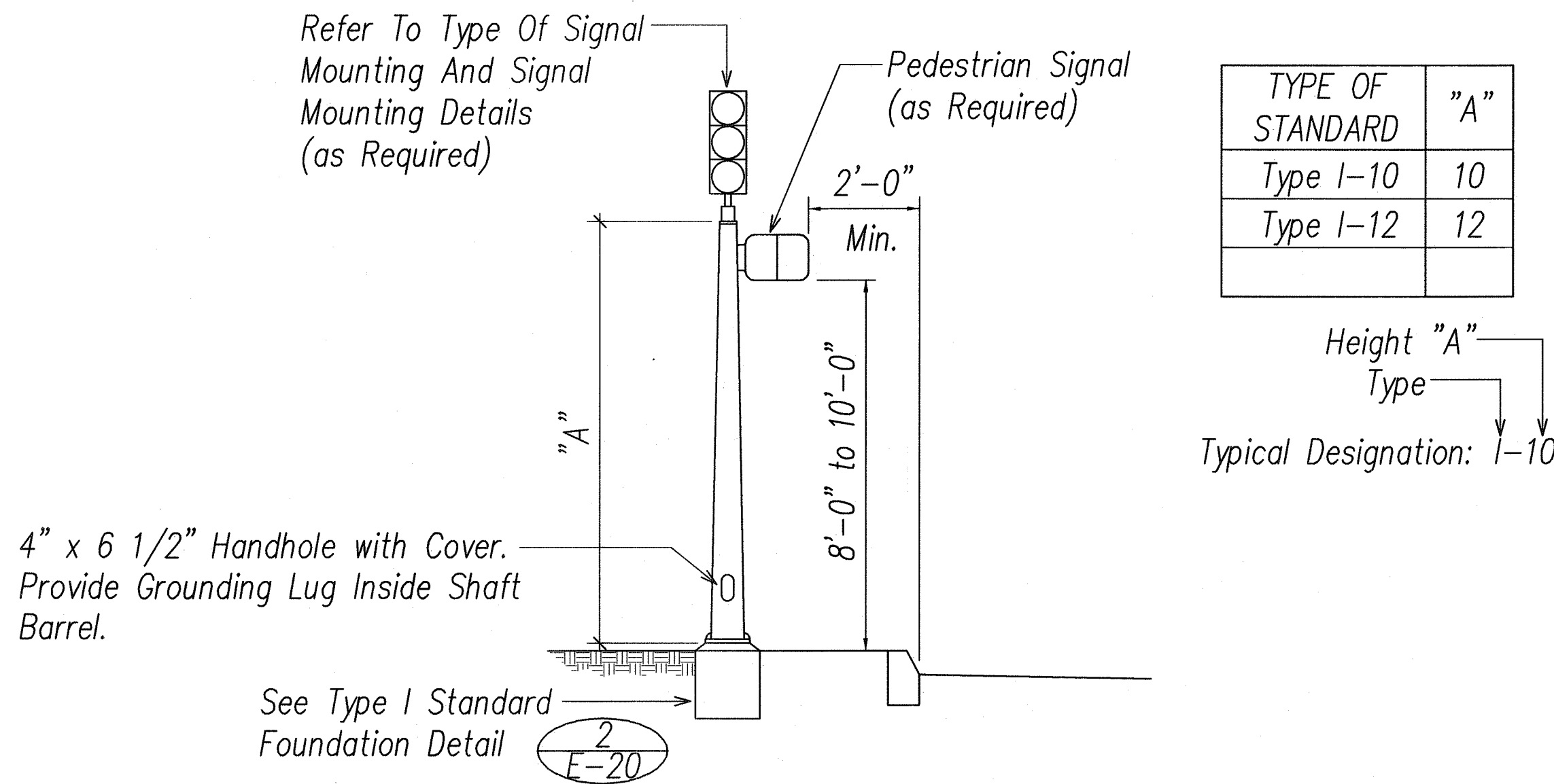
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TRAFFIC SIGNAL
DETAILS V**

Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

SHEET No. E-18 OF 26 SHEETS



Note:

- For Additional Type I Signal Standard Footing Details, See Standard Plan Sheet TE-32.

2 TYPE I STANDARD FOUNDATION DETAIL

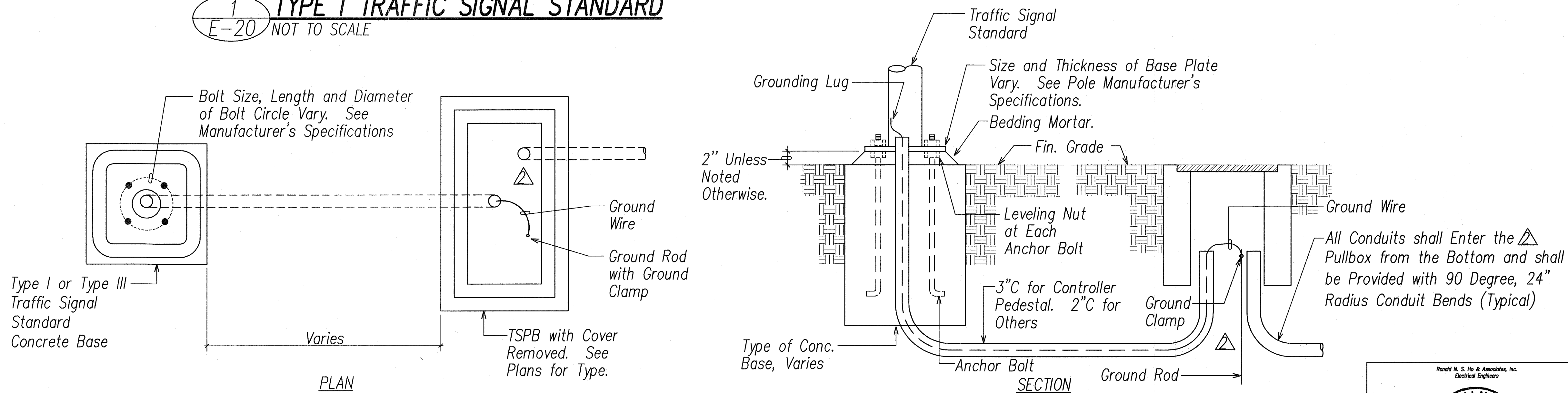
E-20 Not to Scale

NOTES FOR TYPE I STANDARD:

- Standards Shall be Designed in Accordance With the Latest Edition of "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", with Design Revisions Noted on Sheet E-19.
- Submit Shop Drawings and Structural Calculations for Approval,
- For Additional Type I Traffic Signal Standard Details, See Standard Sheet TE-32.

1 TYPE I TRAFFIC SIGNAL STANDARD

E-20 NOT TO SCALE



3 TYPICAL STANDARD & PEDESTAL DETAIL

E-20 NOT TO SCALE

1/27/11

Revised Duct Entry Into Traffic Signal Pullbox

DATE

REVISION



This Work was Prepared by Me or Under My Supervision

Signature

2011.02.03

License Exp. Date: 04.30.2014

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

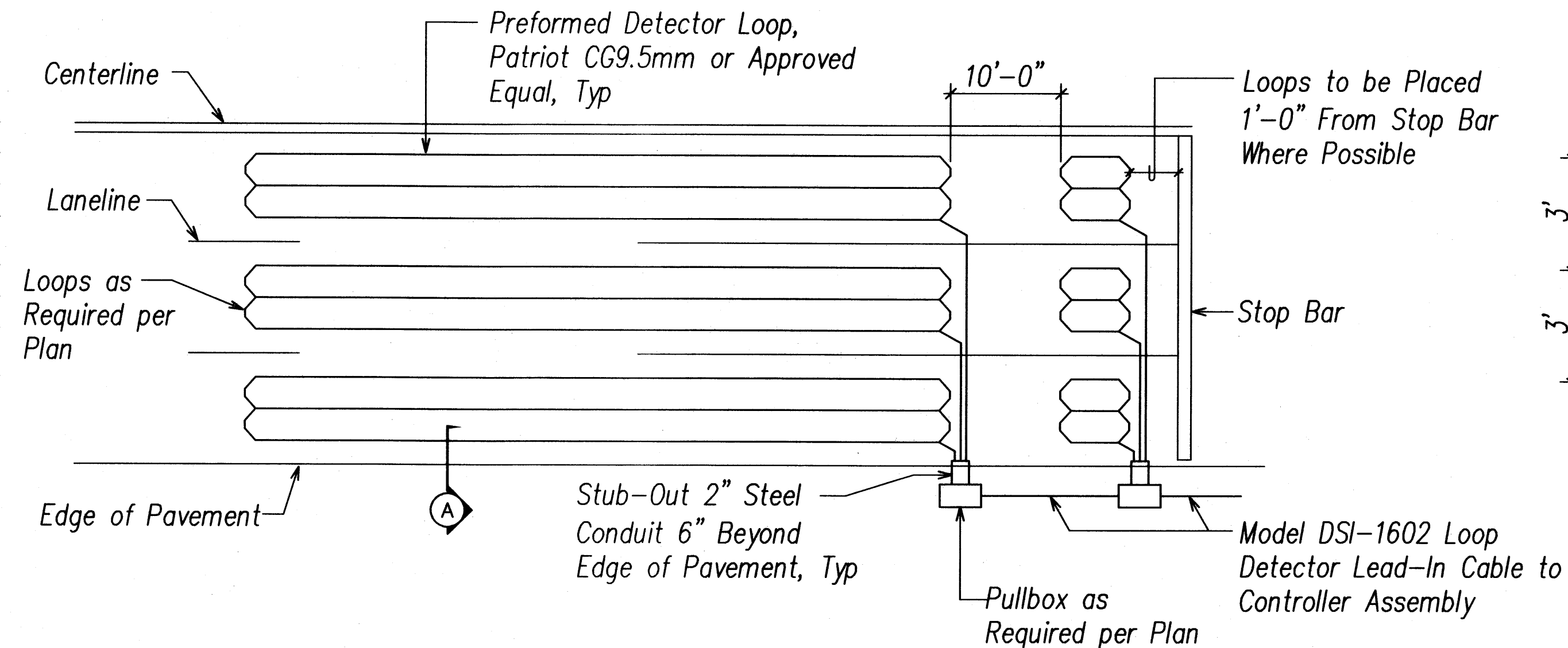
TRAFFIC SIGNAL
DETAILS VII

Volcano Road Intersection and
Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

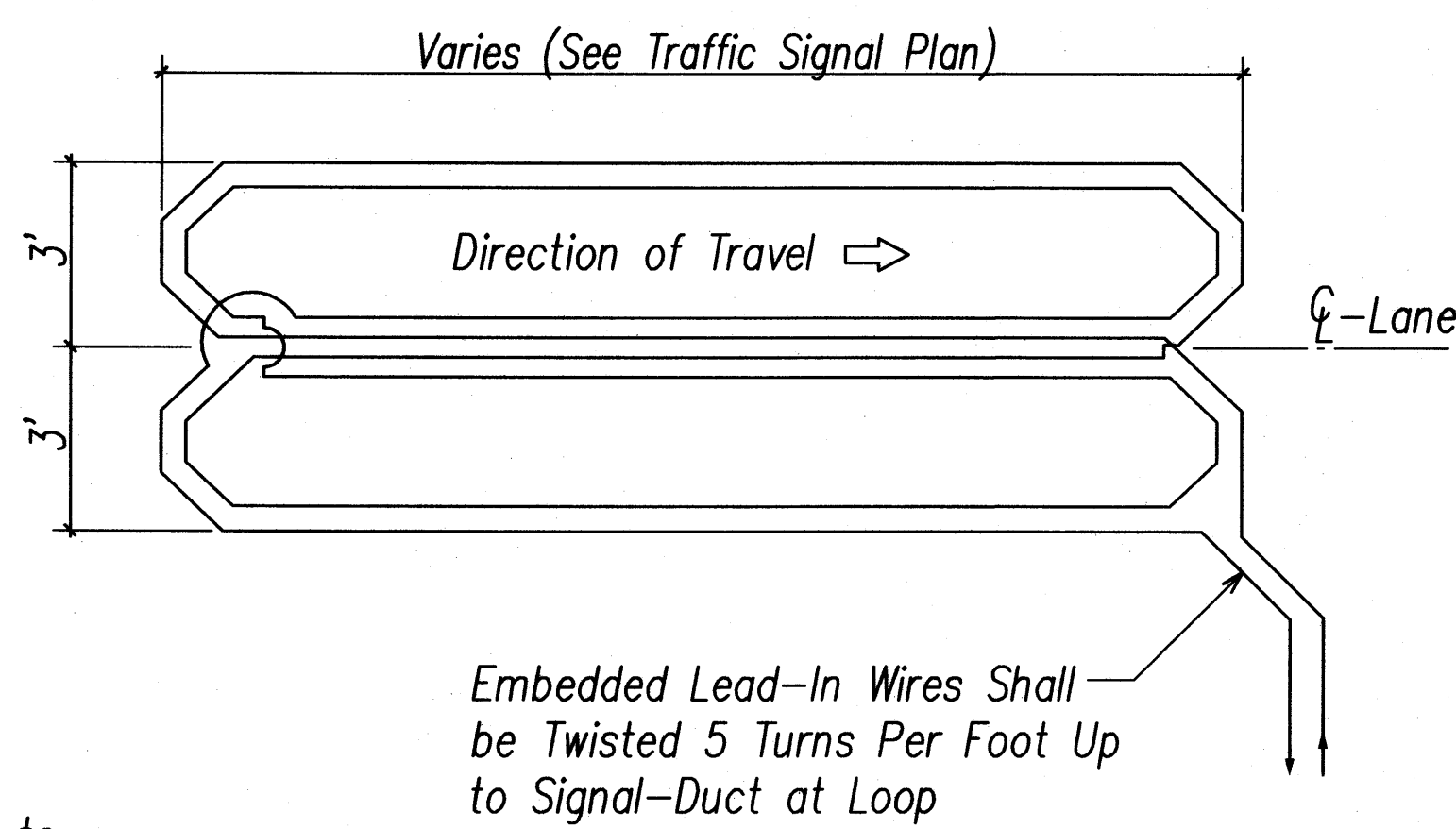
Scale: AS NOTED Date: November 2010

SHEET No. E-20 OF 26 SHEETS

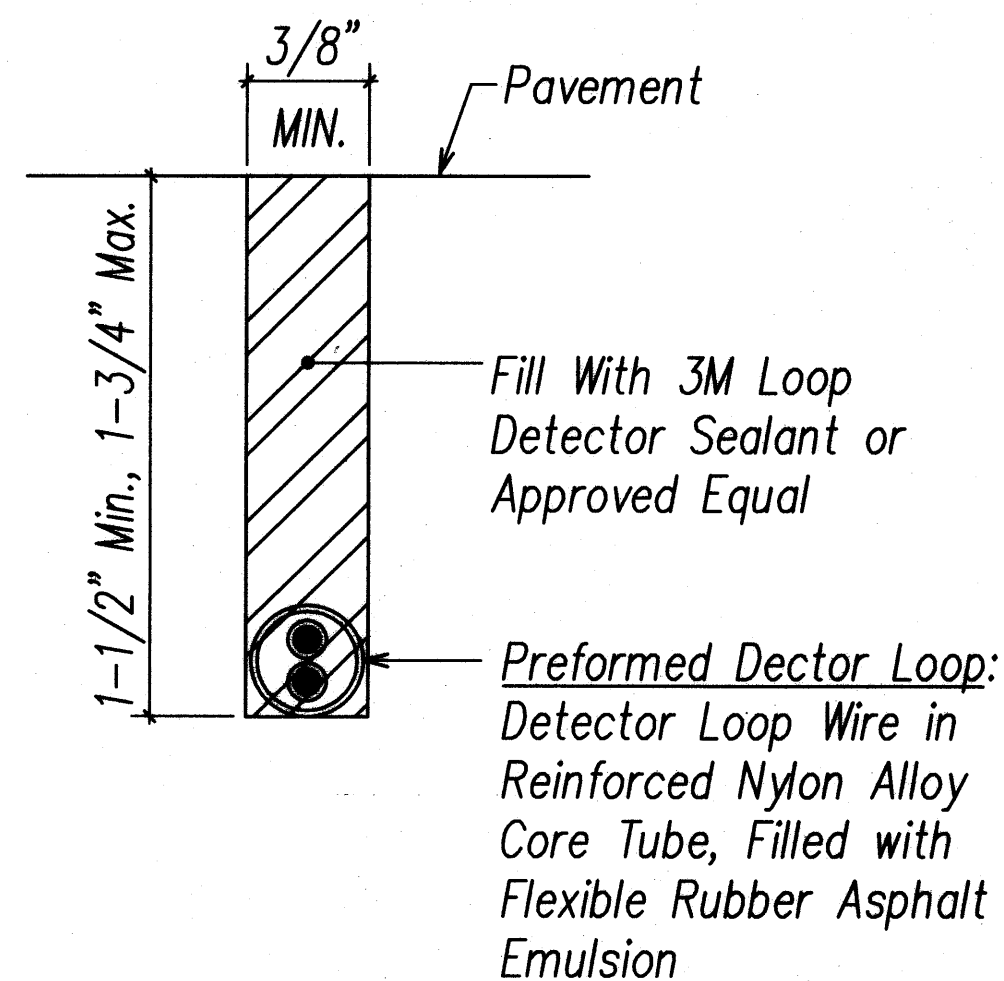
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 139 | 141 |



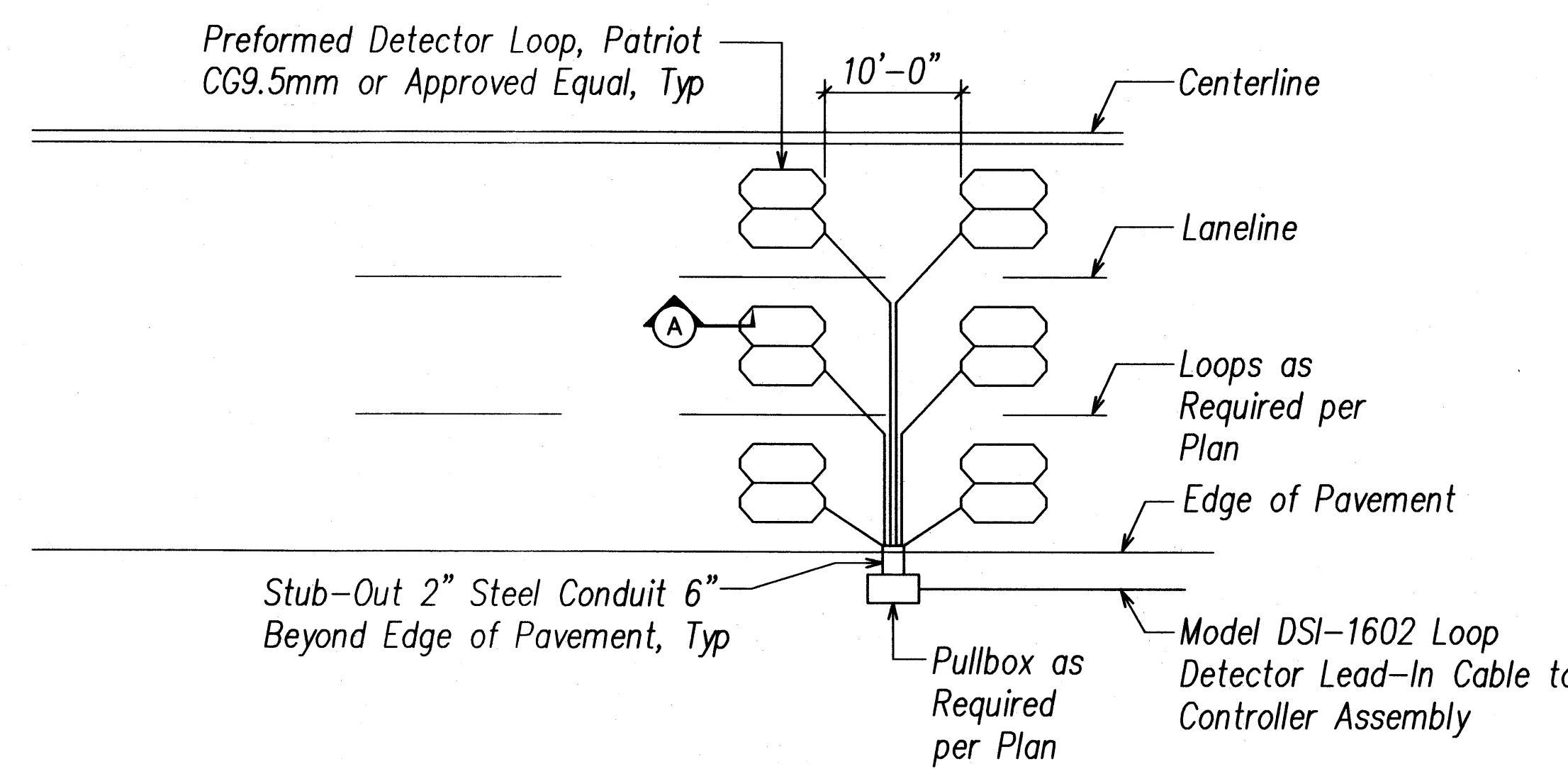
LOOP LAYOUT AS INTERSECTION



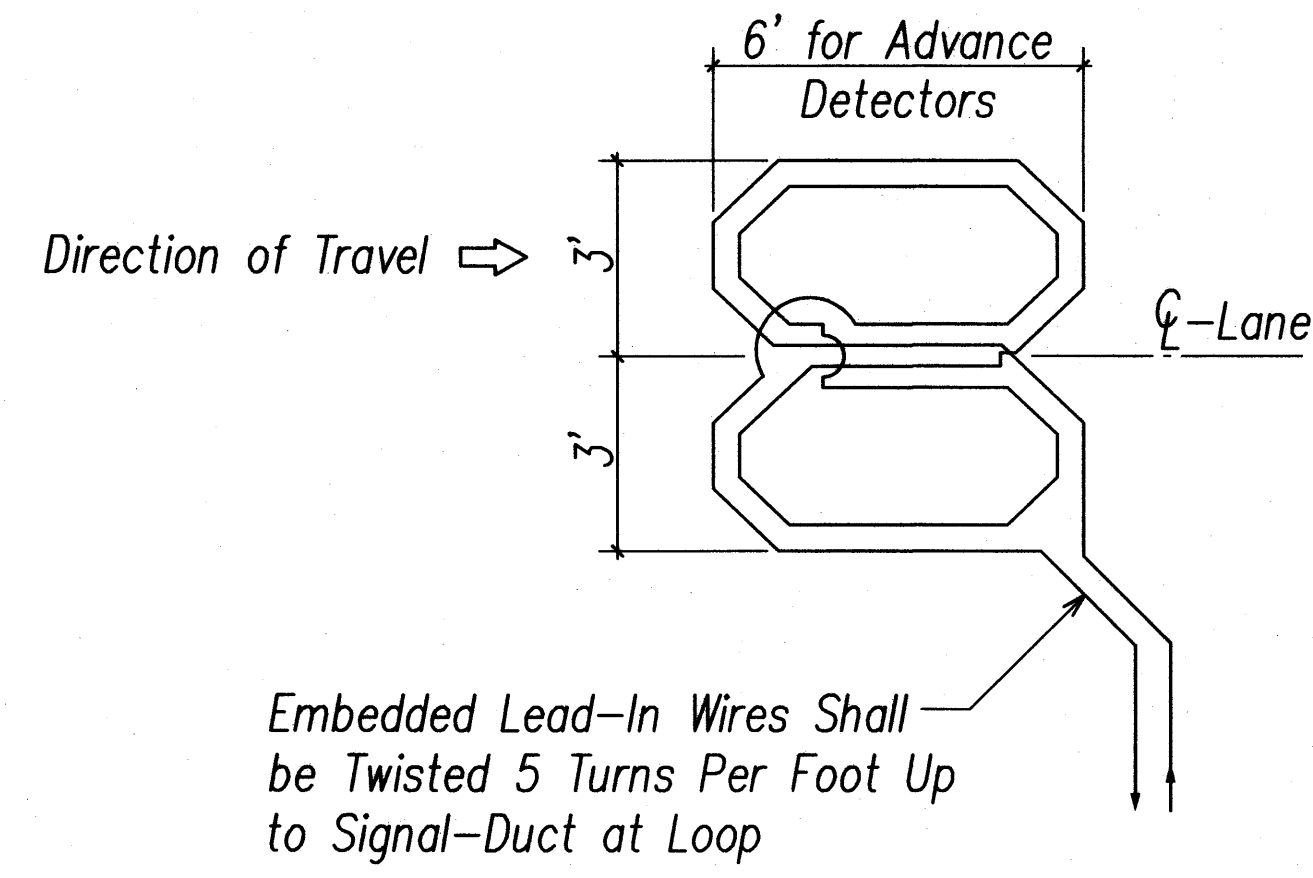
WIRING DIAGRAM



SECTION (A)



LOOP LAYOUT AT HIGH SPEED APPROACH
ADVANCE DETECTORS TO INTERSECTION



WIRING DIAGRAM

1
E-24 LOOP DETECTOR DETAILS
Not to Scale

| | |
|-------------------|------|
| ORIGINAL PLAN | DATE |
| SURVEY PLOTTED BY | |
| DESIGNED BY | |
| NOTED BY | |
| CHECKED BY | |

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TRAFFIC SIGNAL
DETAILS XI**

*Volcano Road Intersection and
Drainage Improvements*

Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

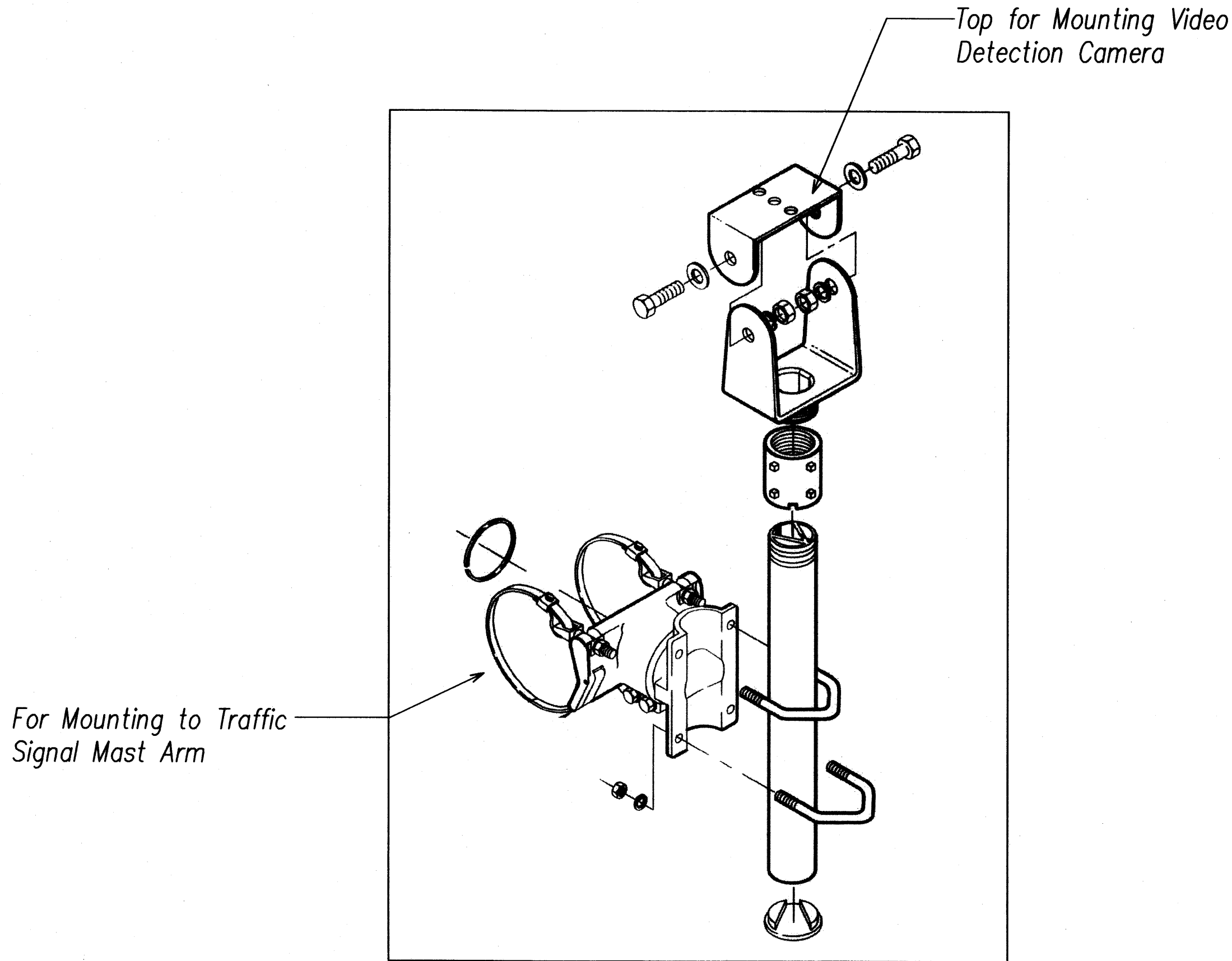
SHEET No. E-24 OF 26 SHEETS

Andrew I. Miyasato
LICENSED PROFESSIONAL ENGINEER
No. 4340-E
HAWAII, U.S.A.

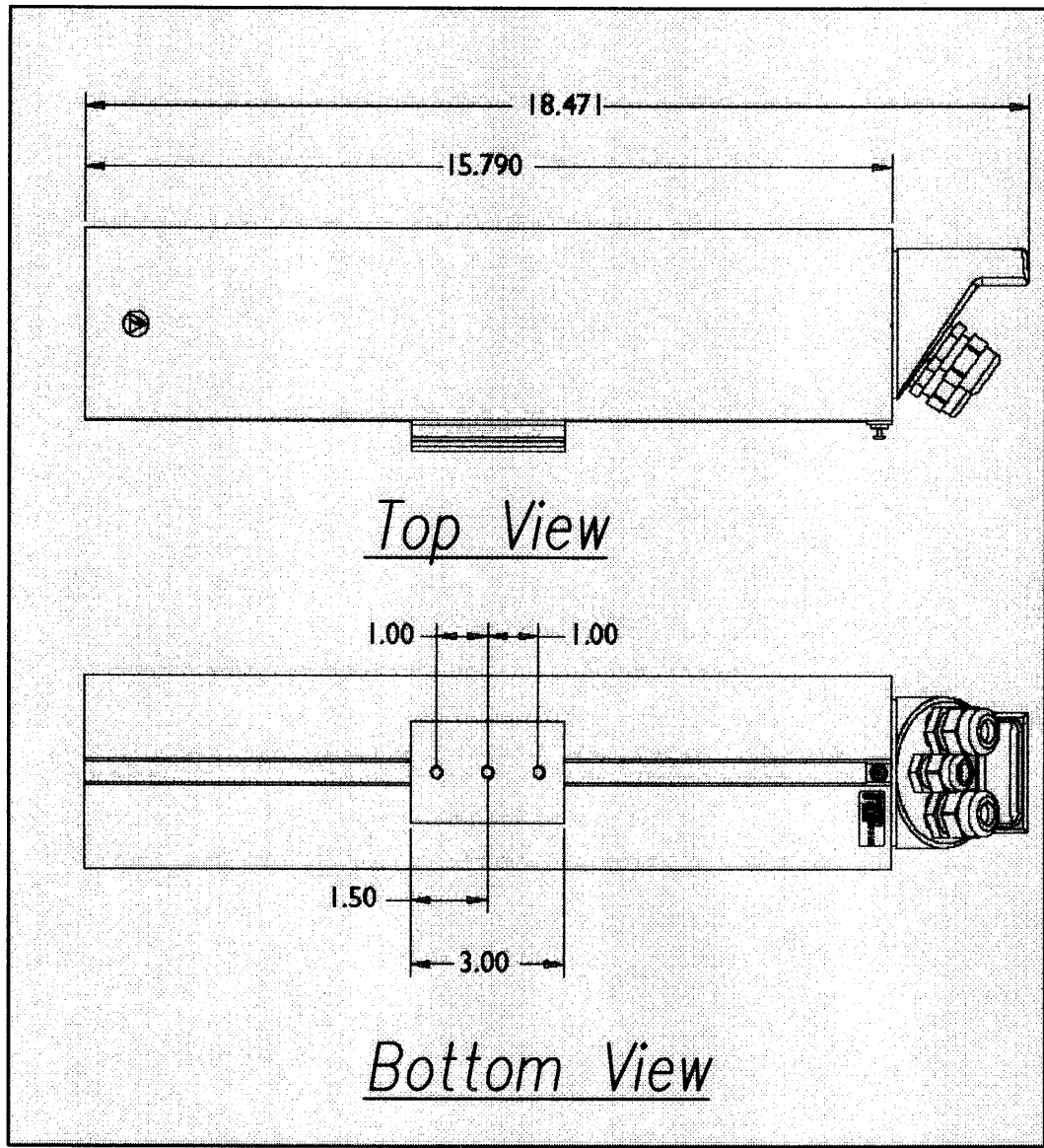
This Work was Prepared by
Me or Under My Supervision

Signature License Exp. Date: 04.30.2012

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|------------------------|-------|-----------------------|----------------|--------------|-----------------|
| HAWAII | HAW. | HS-STP-011-2(38) | 2010 | 141 | 141 |



ASTRO BRAC VIDEO DETECTION CAMAERA MOUNT DETAIL
Not to Scale




VIDEO DETECTION CAMERA DETAIL
Not to Scale

Notes:

1. Coordinate Aiming of All Cameras with the Hawaii County Department of Public Works Traffic Division

1 VIDEO DETECTION CAMERA AND MOUNING HARDWARE DETAILS
E-26 Not to Scale

| | | |
|------------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DESIGNED BY | " " |
| No. | CHECKED BY | " " |

| | |
|---|--|
|  This Work was Prepared by Me or Under My Supervision <i>Andrew I. Miyasato</i> Signature License Exp. Date: 04.30.2012 | STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <u>TRAFFIC SIGNAL</u> <u>DETAILS XIII</u> <u>Volcano Road Intersection and</u> <u>Drainage Improvements</u> <u>Federal-Aid Project No. HS-STP-011-2(38)</u> Scale: AS NOTED Date: November 2010 SHEET No. E-26 OF 26 SHEETS |
|---|--|