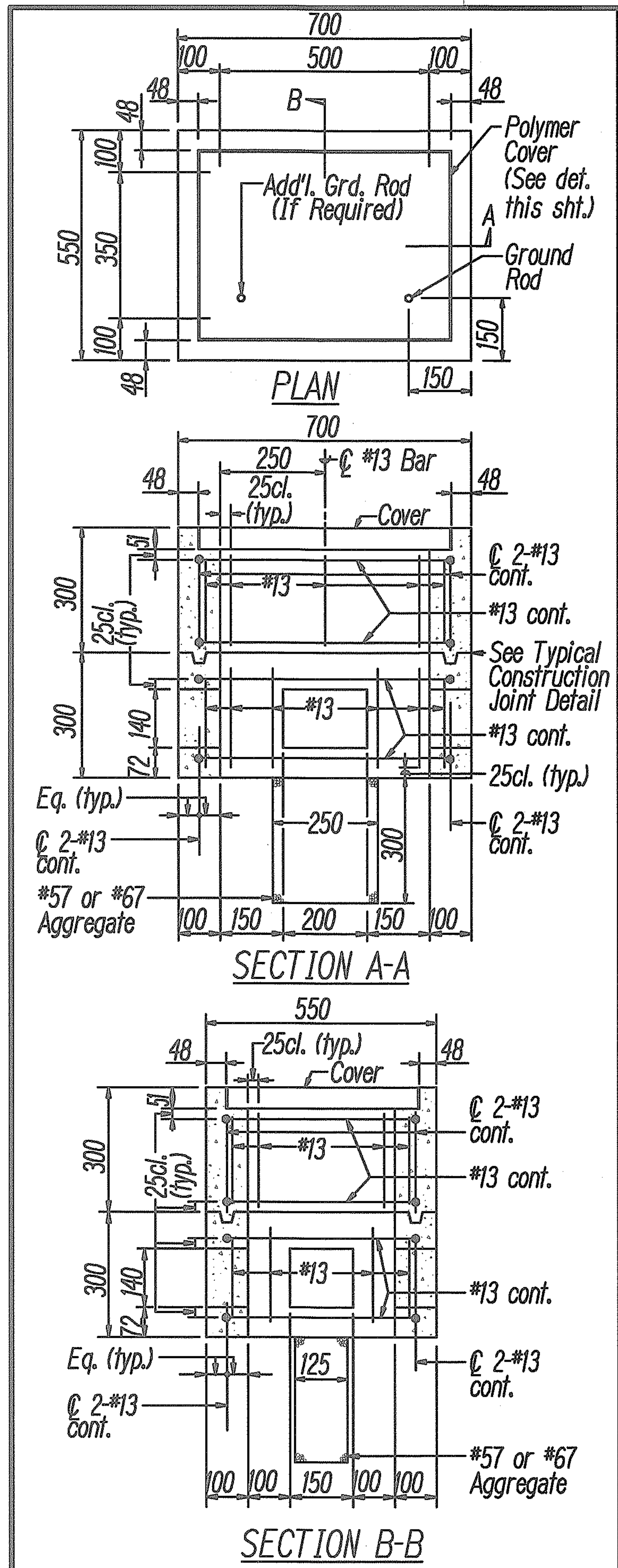
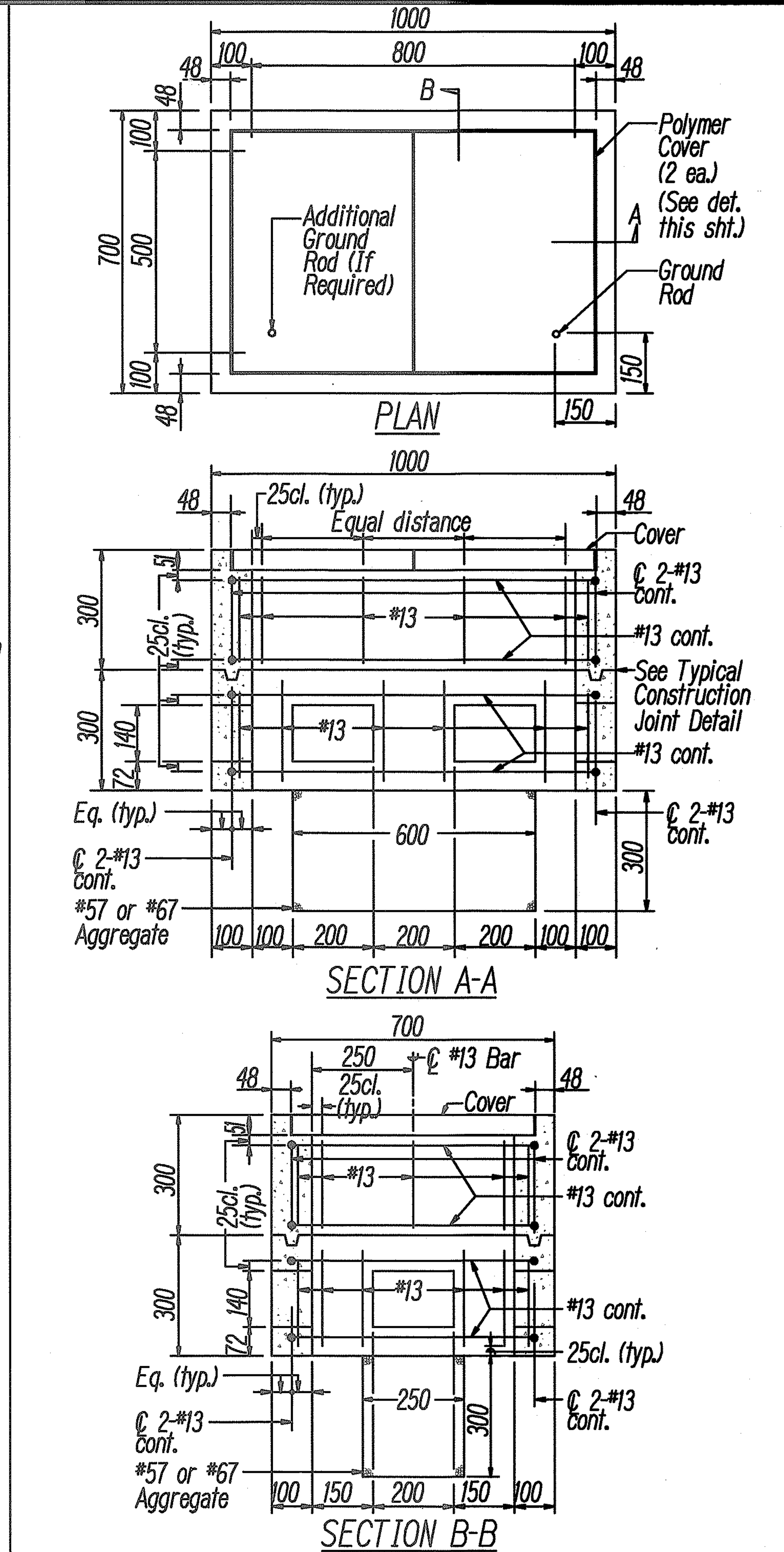
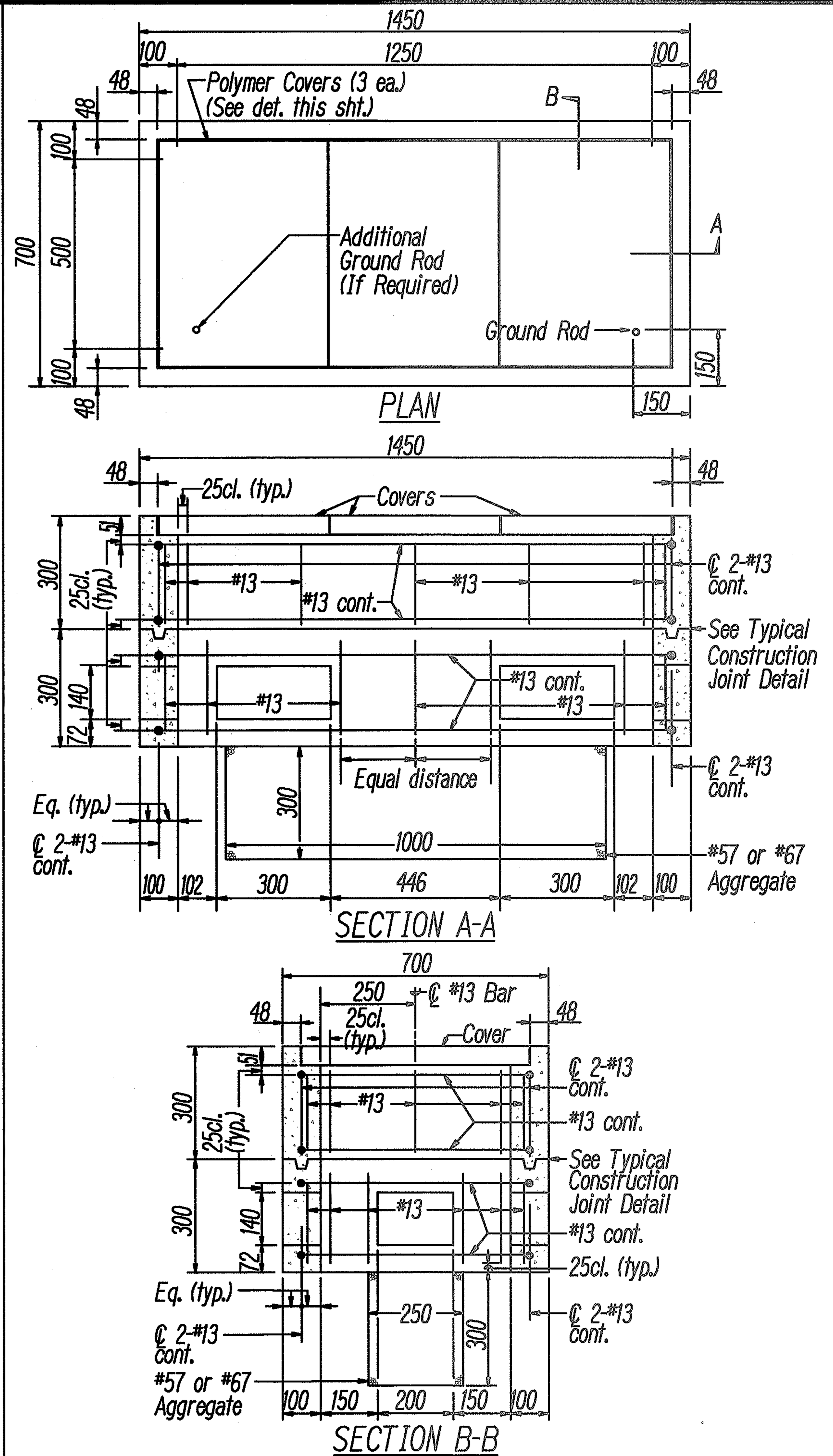
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	15	33



A E-1|E-6 TYPE "A" PULLBOX (Old Type "B")
N.T.S.



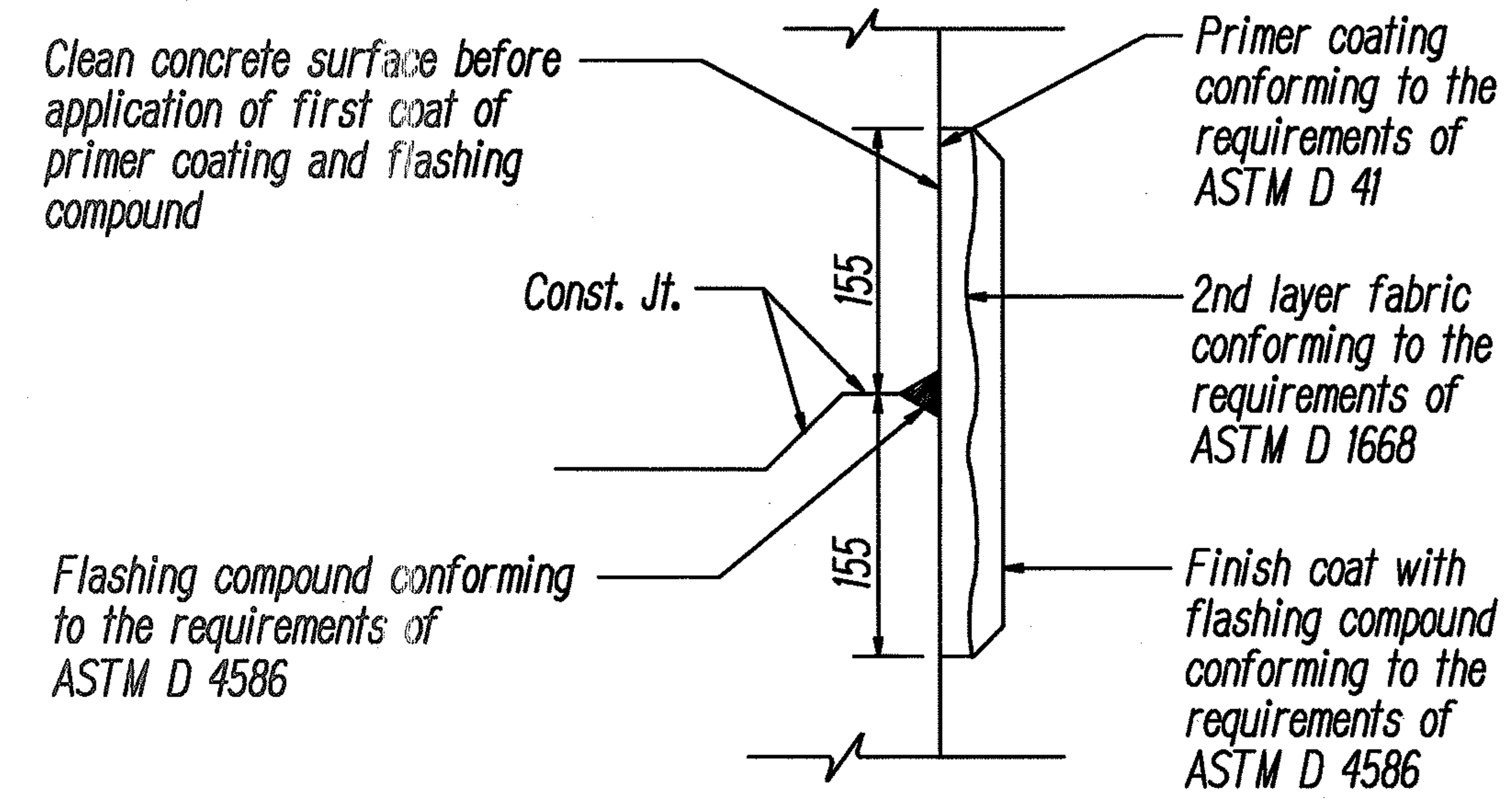
C E-1|E-6 TYPE "B" PULLBOX (Old Type "C")
N.T.S.



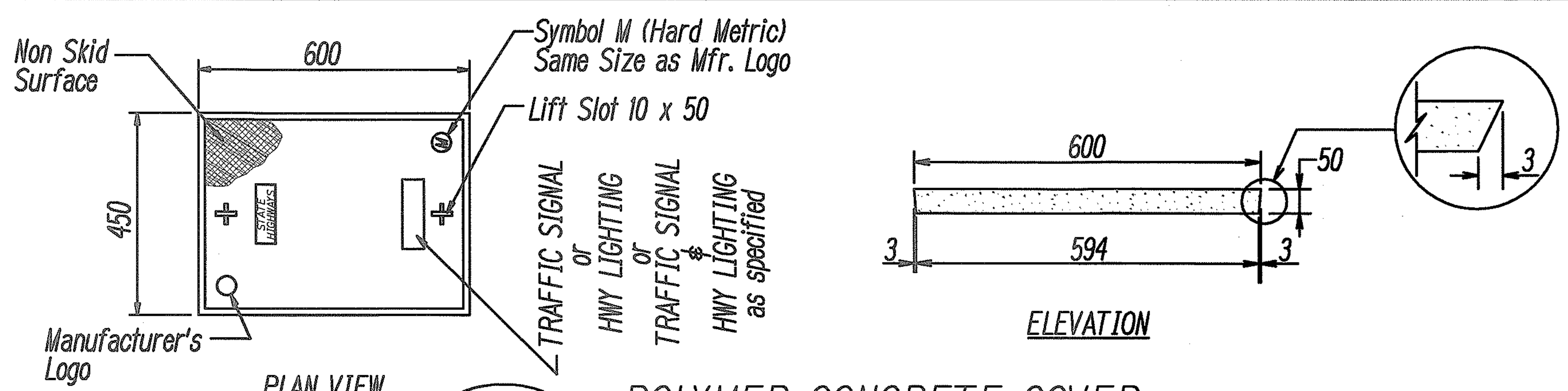
D E-1|E-6 TYPE "C" PULLBOX (Old Type "D")
N.T.S.

GENERAL NOTES

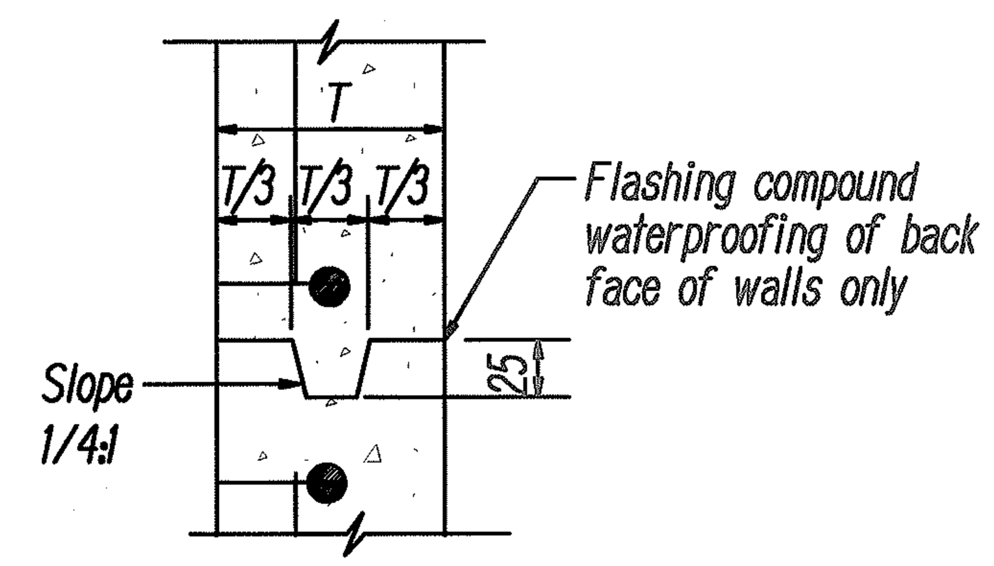
1. Provide a minimum of one 16 dia. x 2.5m Copperweld Ground Rod in each pullbox. When directed by the Traffic Signal Inspector/Engineer, install additional Ground Rods. Cost of Ground Rods shall be incidental to the pullboxes.
2. All pre-cast concrete pullboxes shall be manufactured in two pieces.
3. The pullbox with cover shall be capable of supporting an MS 18 Loading.
4. The maximum weight of the pullbox cover shall not exceed 27 kilograms.
5. The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
6. 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.
7. 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.
8. All concrete shall be Class A (25MPa, min.)
9. Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
10. The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
11. 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).



F E-6|E-6 TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS
N.T.S.



B E-6|E-6 POLYMER CONCRETE COVER
N.T.S.



E E-6|E-6 TYPICAL CONSTRUCTION JOINT DETAIL
N.T.S.

All Dimensions are in Millimeters unless otherwise shown

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

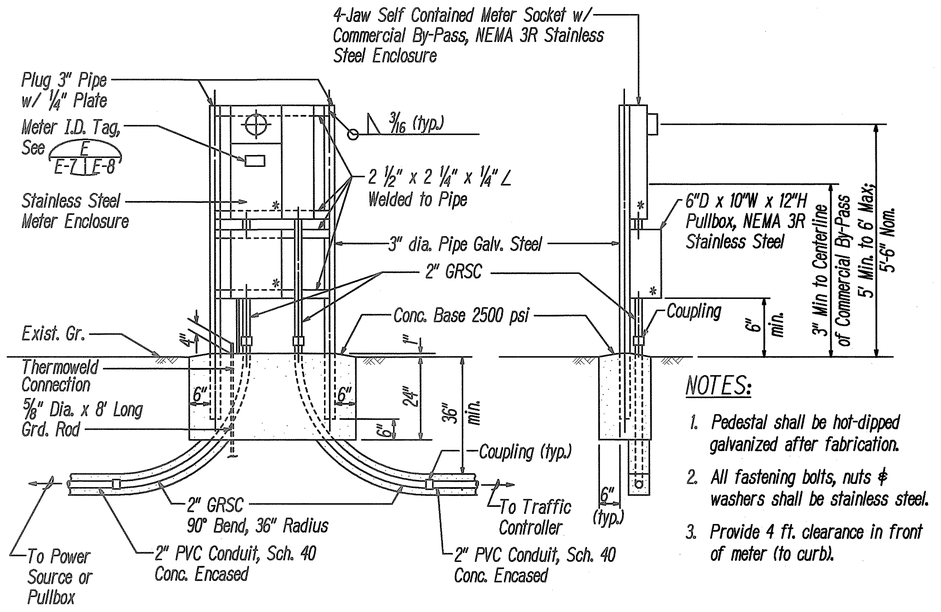
PULLBOX DETAILS

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PIILANI HIGHWAY AT KANANI ROAD

Scale: AS NOTED   Date: MAY 2004

SHEET No. E-6 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	16	33



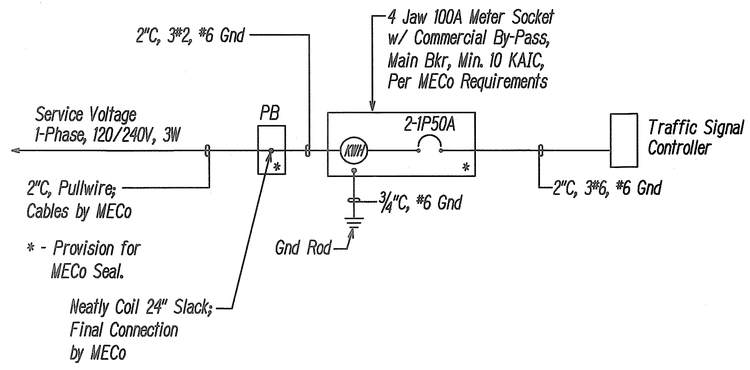
NOTES:

1. Pedestal shall be hot-dipped galvanized after fabrication.
2. All fastening bolts, nuts & washers shall be stainless steel.
3. Provide 4 ft. clearance in front of meter (to curb).

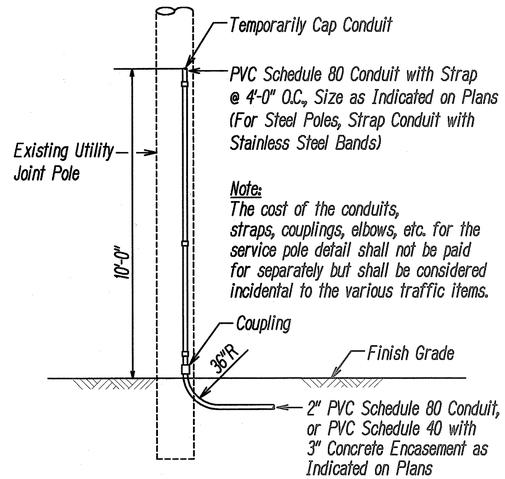
FRONT ELEVATION SIDE ELEVATION *-Provision for MECo Seal

A E-1 | E-7 METER PEDESTAL FOR UNDERGROUND SERVICE

N.T.S.

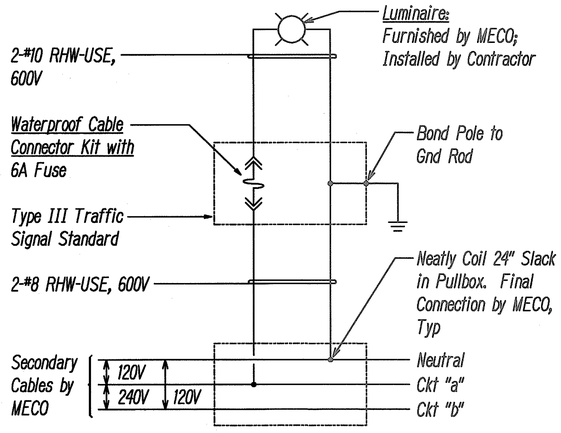


ONE LINE DIAGRAM



B E-3 | E-7 SERVICE RISER POLE DETAIL

N.T.S.



HIGHWAY LIGHT CONNECTION DIAGRAM

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK dd.x No. dddd

$DATE$ $TIME$ $USERNAME$

STEVEN H. SAKAI LICENSED PROFESSIONAL ENGINEER No. 7837-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

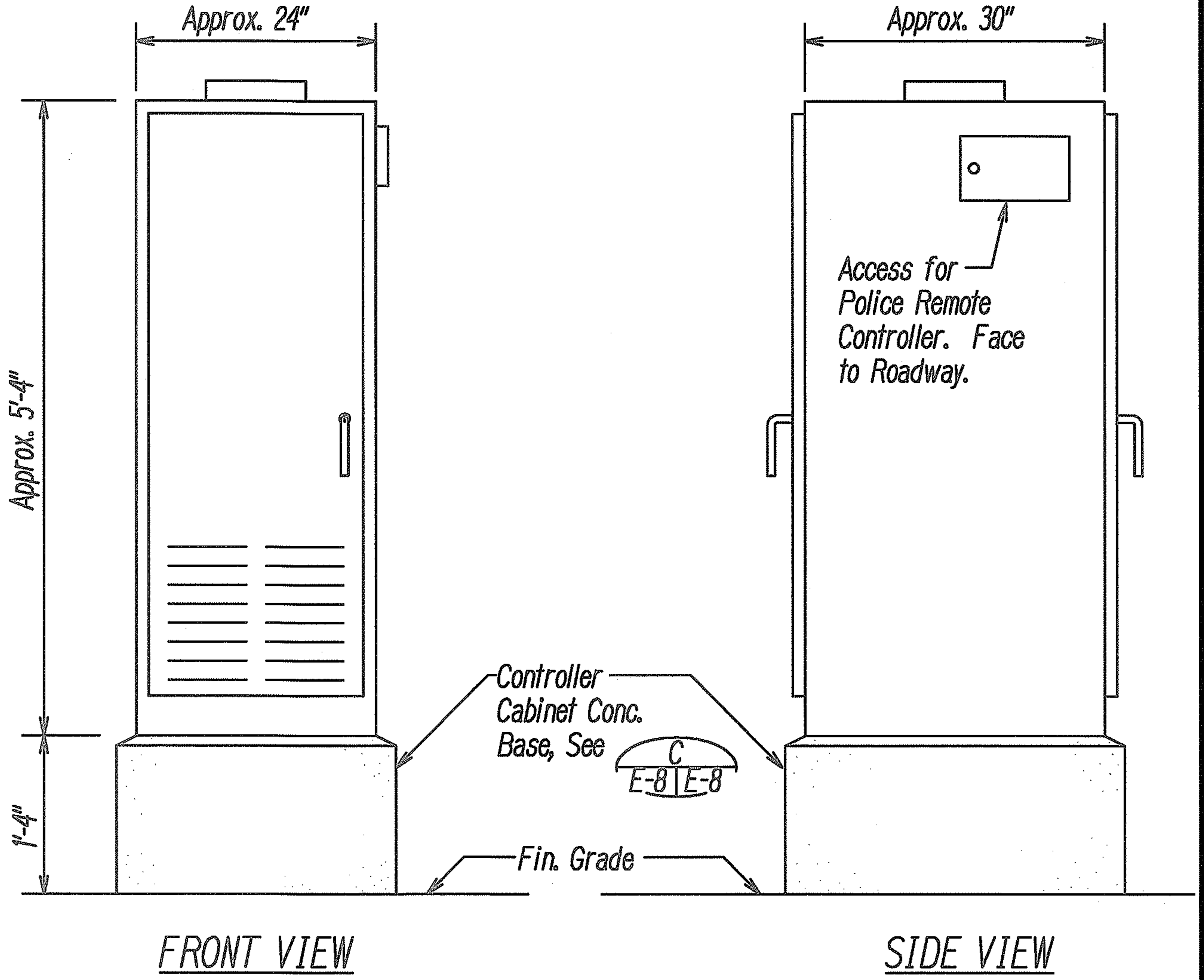
TRAFFIC SIGNAL DETAILS I

TRAFFIC OPERATIONAL IMPROVEMENTS
AT VARIOUS LOCATIONS
PIILANI HIGHWAY
AT KANANI ROAD

Scale: AS NOTED Date: MAY 2004

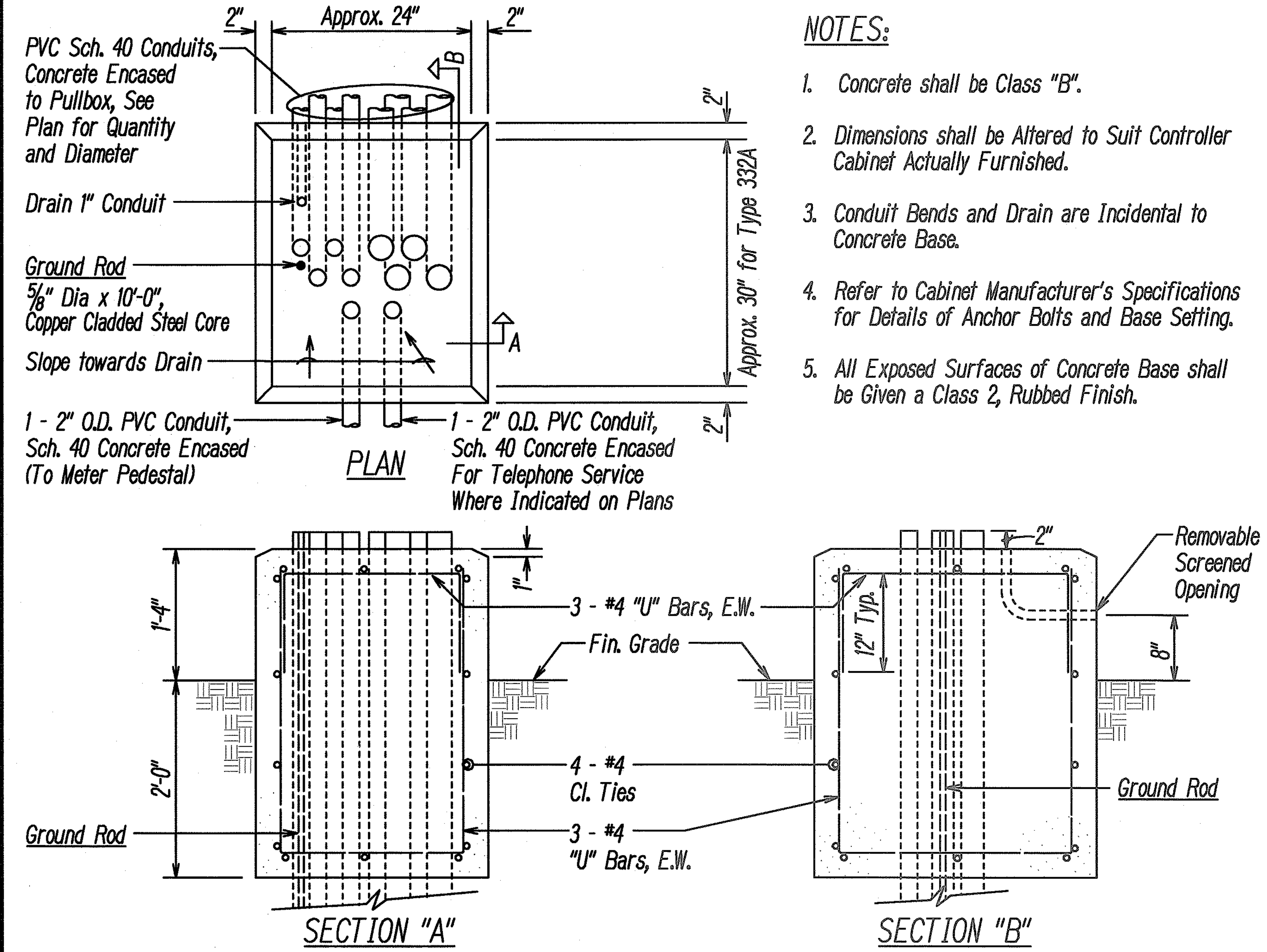
SHEET No. E-7 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	17	33



A E-1 E-8 TYPE 332A TRAFFIC SIGNAL CONTROLLER CABINET DETAIL

N.T.S.

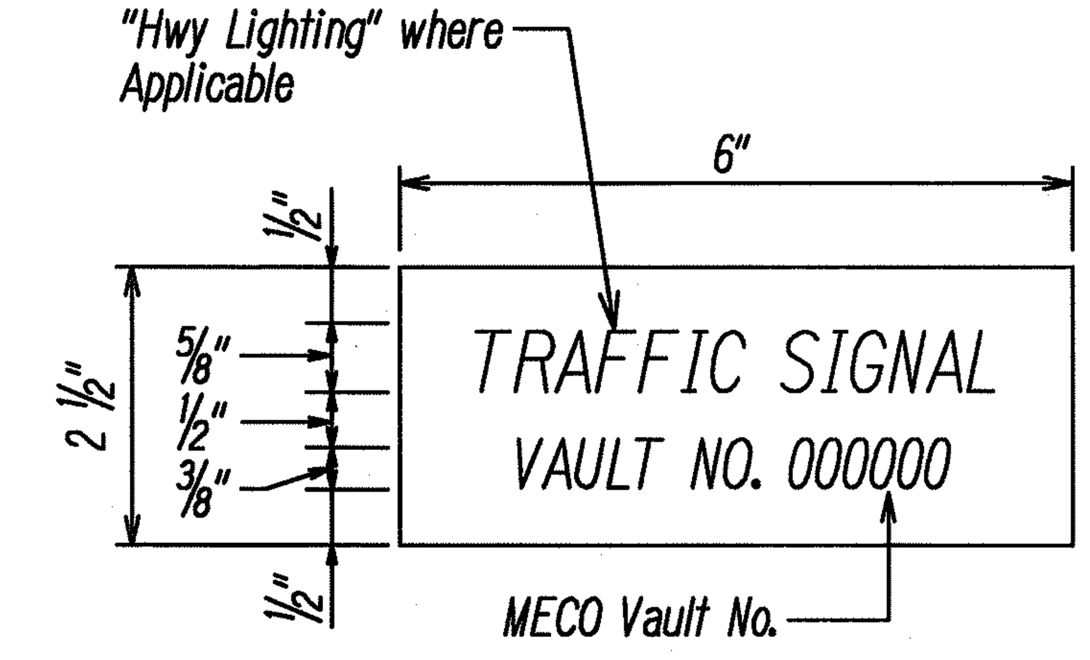


NOTES:

1. Concrete shall be Class "B".
2. Dimensions shall be Altered to Suit Controller Cabinet Actually Furnished.
3. Conduit Bends and Drain are Incidental to Concrete Base.
4. Refer to Cabinet Manufacturer's Specifications for Details of Anchor Bolts and Base Setting.
5. All Exposed Surfaces of Concrete Base shall be Given a Class 2, Rubbed Finish.

C E-8 E-8 CONTROLLER CABINET CONCRETE BASE

N.T.S.

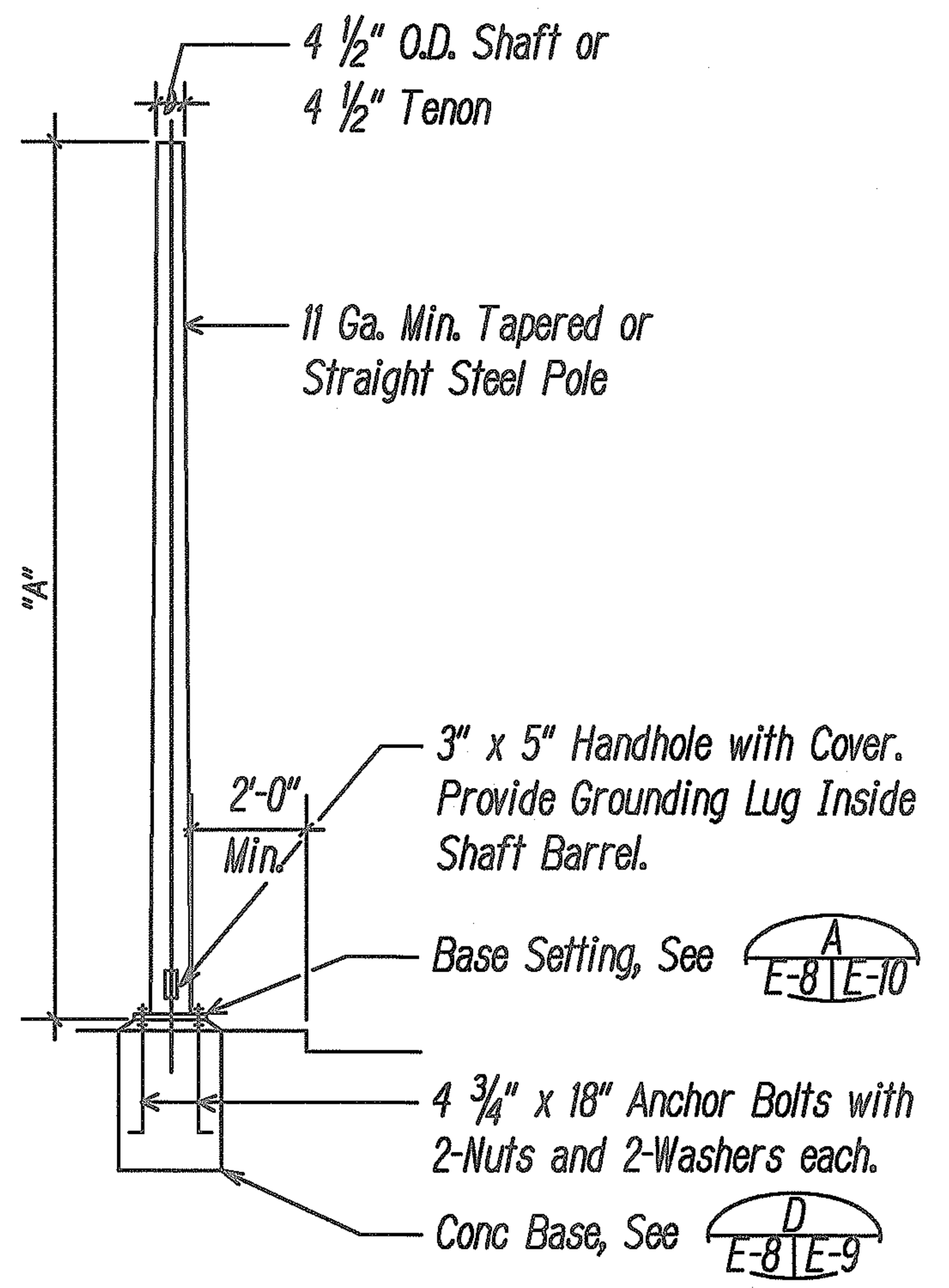


NOTES:

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. Attach to Meter Socket Using Scotch 3M Brand Very High Bond (VHB) Double Coated Acrylic Foam Tape or Equivalent.
3. Letters/Numbers shall be 1/16" Stroke, (White in Color).
4. Letters/Numbers Area Inscribed by Cutting Through "Black Cap Sheet" to Expose White Letters/Numbers.

E E-7 E-8 METER I.D. TAG DETAIL

N.T.S.



Notes:

1. Standard shall be Designed in Accordance with AASHTO "Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Dated 2001. Traffic Signal Standard and Arm Assembly shall Withstand 105 M.P.H. Sustained Winds with 1.14 Gust Factor without Permanent Deformation. For Additional Design Requirements, See Specifications
2. Submit Shop Drawings for Approval.

TYPE OF STANDARD	"A"
TYPE I-13	13
TYPE I-10	10
TYPE I-8	8
TYPE I-3	3

Typical Designation: I-7 (Type — I; Height "A" — 7)

B E-1 E-8 TYPE I STANDARD AND PEDESTAL INSTALLATION

N.T.S.

STEVEN H. SAKAI LICENSED PROFESSIONAL ENGINEER No. 7637-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS II

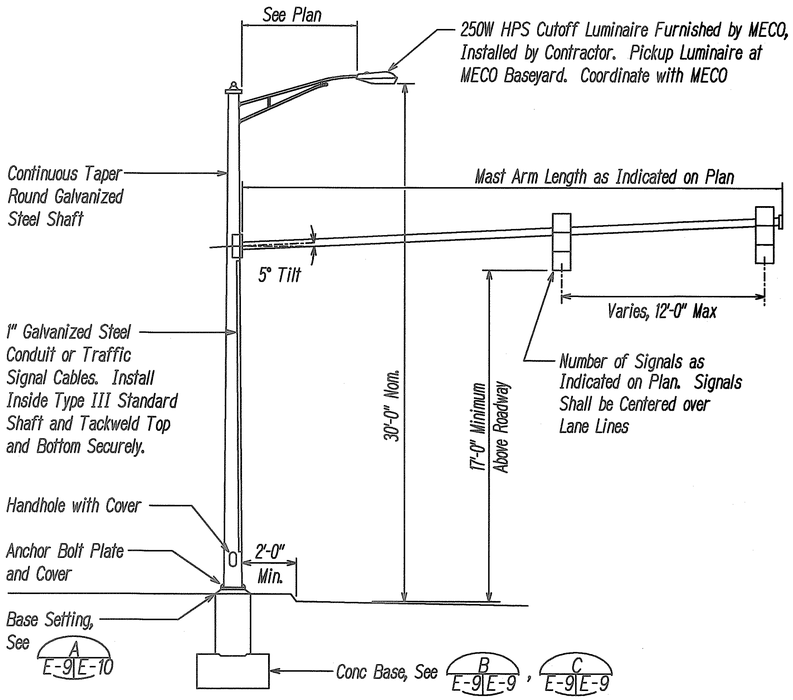
TRAFFIC OPERATIONAL IMPROVEMENTS
AT VARIOUS LOCATIONS
PIILANI HIGHWAY
AT KANANI ROAD

Scale: AS NOTED Date: MAY 2004

SHEET No. E-8 OF 12 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	18	33



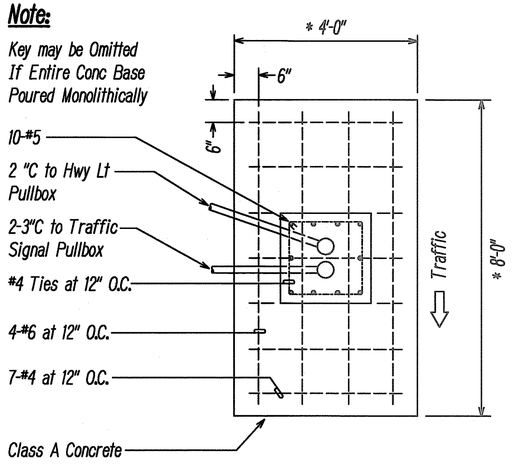
ELEVATION

Notes:

1. Standard shall be Designed in Accordance with AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Dated 2001. Traffic Signal Standard and Arm Assembly shall Withstand 105 M.P.H. Sustained Winds with 1.14 Gust Factor without Permanent Deformation. For Additional Design Criteria, See Specifications.
2. Item for Type III Traffic Signal Standard with Mast Arm and Foundation includes Highway Lighting Bracket Arm.
3. Highway Lighting Luminaire to be Paid for by the State and Utility Co. Under the Executed Utility Agreement.
4. For Additional Details See Standard Plan TE-38.
5. Size, Length and Diameter of Anchor Bolts shall be as Recommended by the Manufacturer. Contractor shall Submit Catalog Cuts to the Engineer for Approval.
6. Handhole shall be Opposite of Traffic Flow.

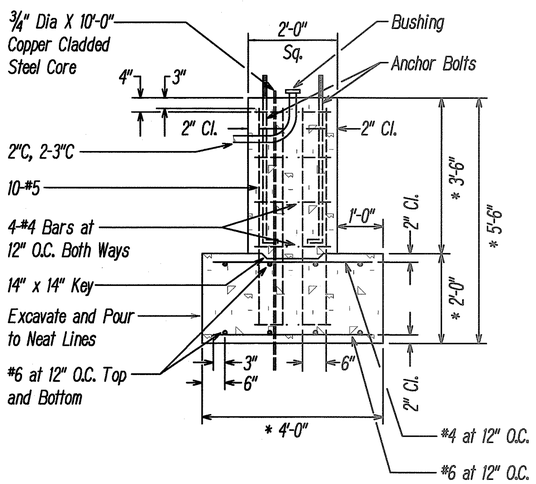
A E-1|E-9 TRAFFIC SIGNAL TYPE III STANDARD
NOT TO SCALE

Note:
Key may be Omitted If Entire Conc Base Poured Monolithically



* - Dimensions Shall Be Modified Per Equipment Being Provided to Meet Current AASHTO Requirements.

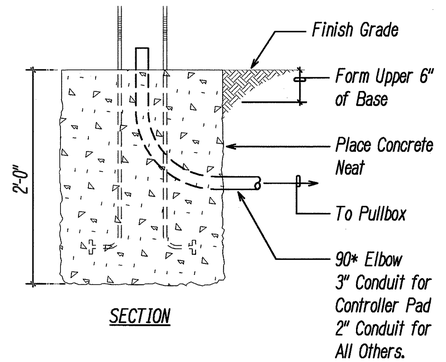
B E-9|E-9 CONCRETE BASE PLAN
NOT TO SCALE



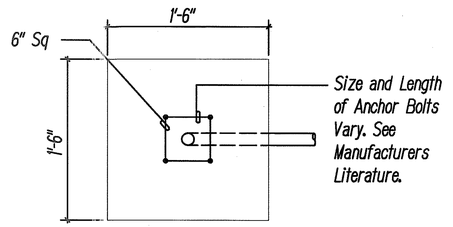
Note: See Detail B E-9|E-9

* - Dimensions Shall Be Modified Per Equipment Being Provided to Meet Current AASHTO Requirements.

C E-9|E-9 CONCRETE BASE ELEVATION
NOT TO SCALE



SECTION



PLAN

NOTES:
1. Concrete shall be Class "B".
2. Conduit Bend is Incidental to Concrete Base Construction.

D E-8|E-9 CONCRETE BASE DETAIL
NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS III

TRAFFIC OPERATIONAL IMPROVEMENTS
AT VARIOUS LOCATIONS
PIILANI HIGHWAY
AT KANANI ROAD

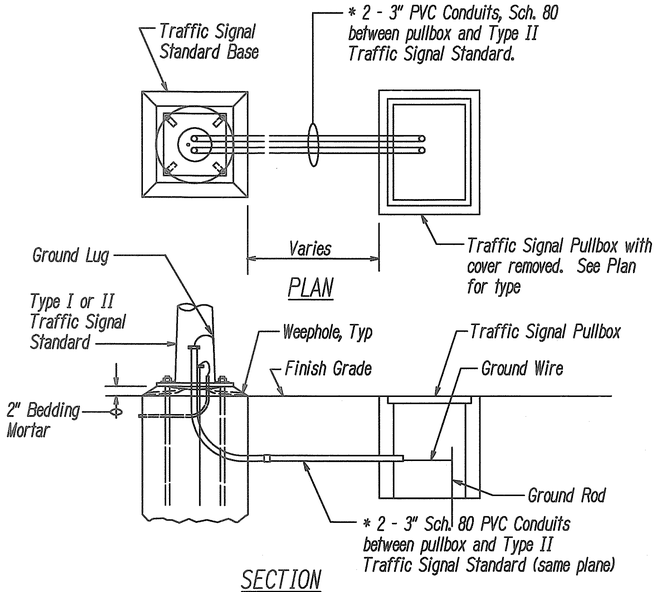
Scale: AS NOTED Date: MAY 2004

STEVEN H. SAKAI LICENSED PROFESSIONAL ENGINEER No. 7637-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. E-9 OF 12 SHEETS

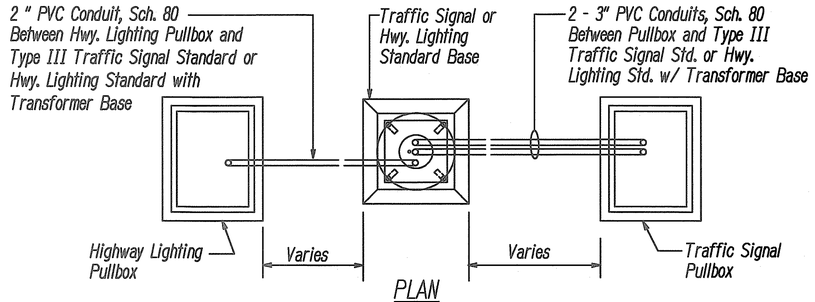
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE



* - 1 - 2" Sch. 80 PVC Conduits between pullbox and Type I Traffic Signal Standard

SECTION

CONDUIT FOR TYPE I OR II TRAFFIC SIGNAL STD.

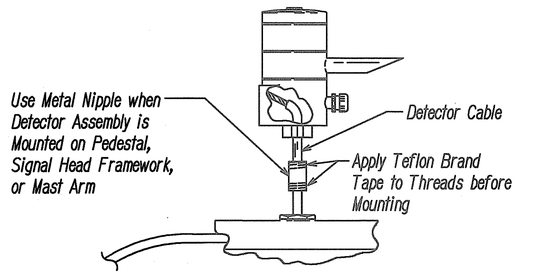


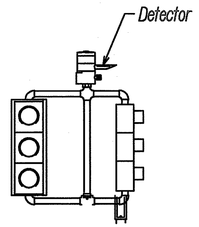
CONDUIT FOR TYPE III TRAFFIC SIGNAL STD. OR HWY. LT'G. STD.

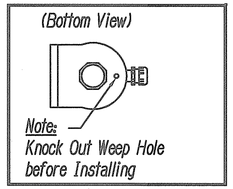
A E-9 E-10 E-8

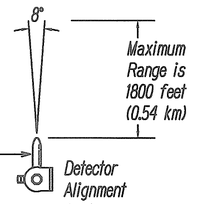
CONDUIT DETAILS FOR TRAFFIC SIGNAL/HWY. LIGHTING STANDARD

Not to Scale



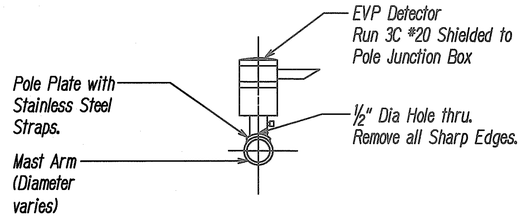






Note:
Detector Reception Angle varies with Distance. It is Approximately 8° at 1800 Feet (0.54km). Due to Reflection, Reception Angle is Increased at Close Range. The Detector must be Aligned within 8° of the Farthest Point where Priority Vehicle is to be Sensed.

TYPICAL PEDESTAL/TYPE T.S.S. MOUNTING OF EVP DETECTOR



TYPICAL MAST ARM MOUNTING OF EVP DETECTOR

B E-1 E-10

EVP DETECTOR MOUNTING

Not to Scale

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	19	33

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

NOTE BOOK

$DATE$ $TIME$ $USER$ $FILE$

STEVEN R. SAKAI LICENSED PROFESSIONAL ENGINEER No. 7837-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

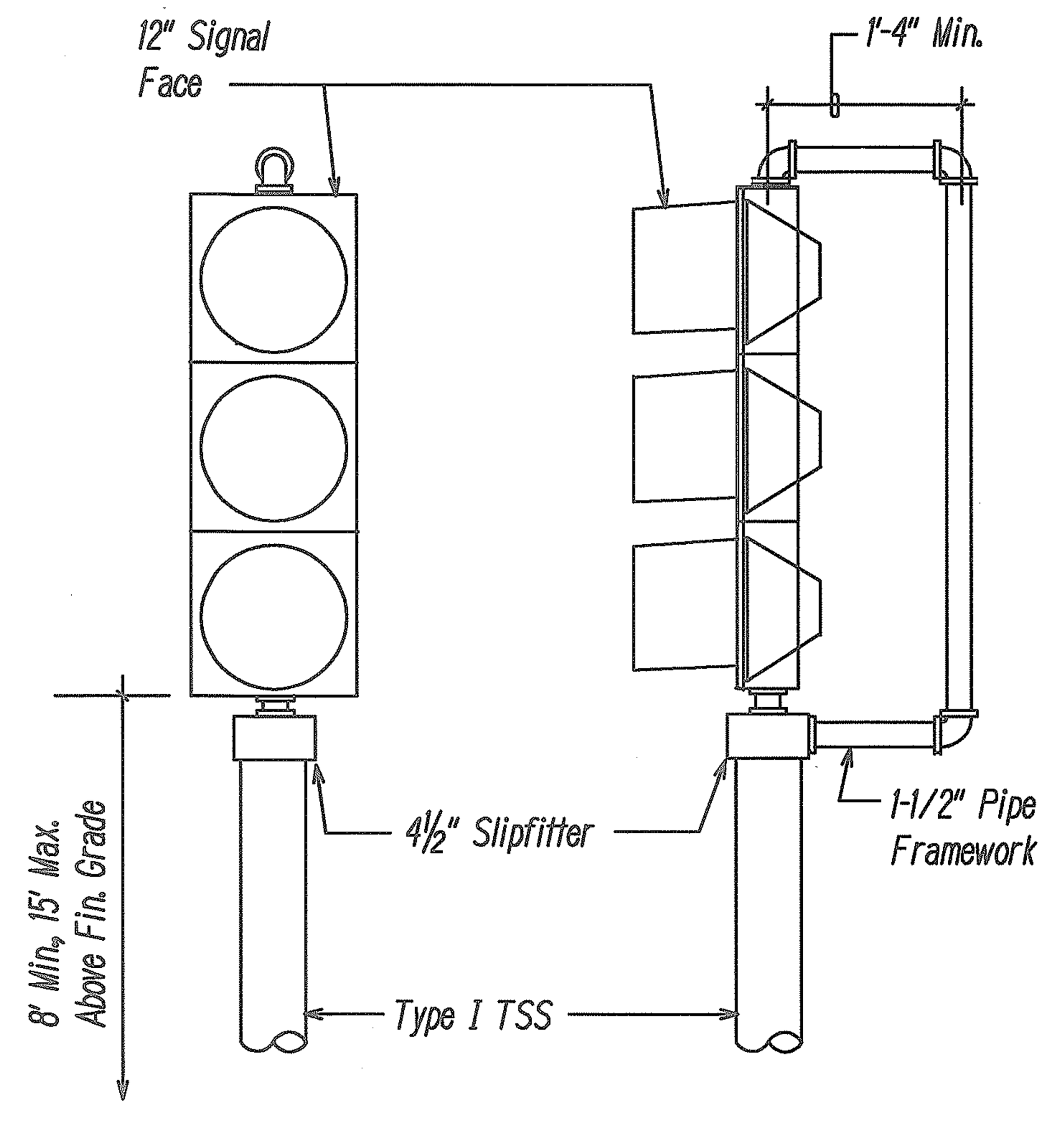
TRAFFIC SIGNAL DETAILS IV

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PIILANI HIGHWAY AT KANANI ROAD

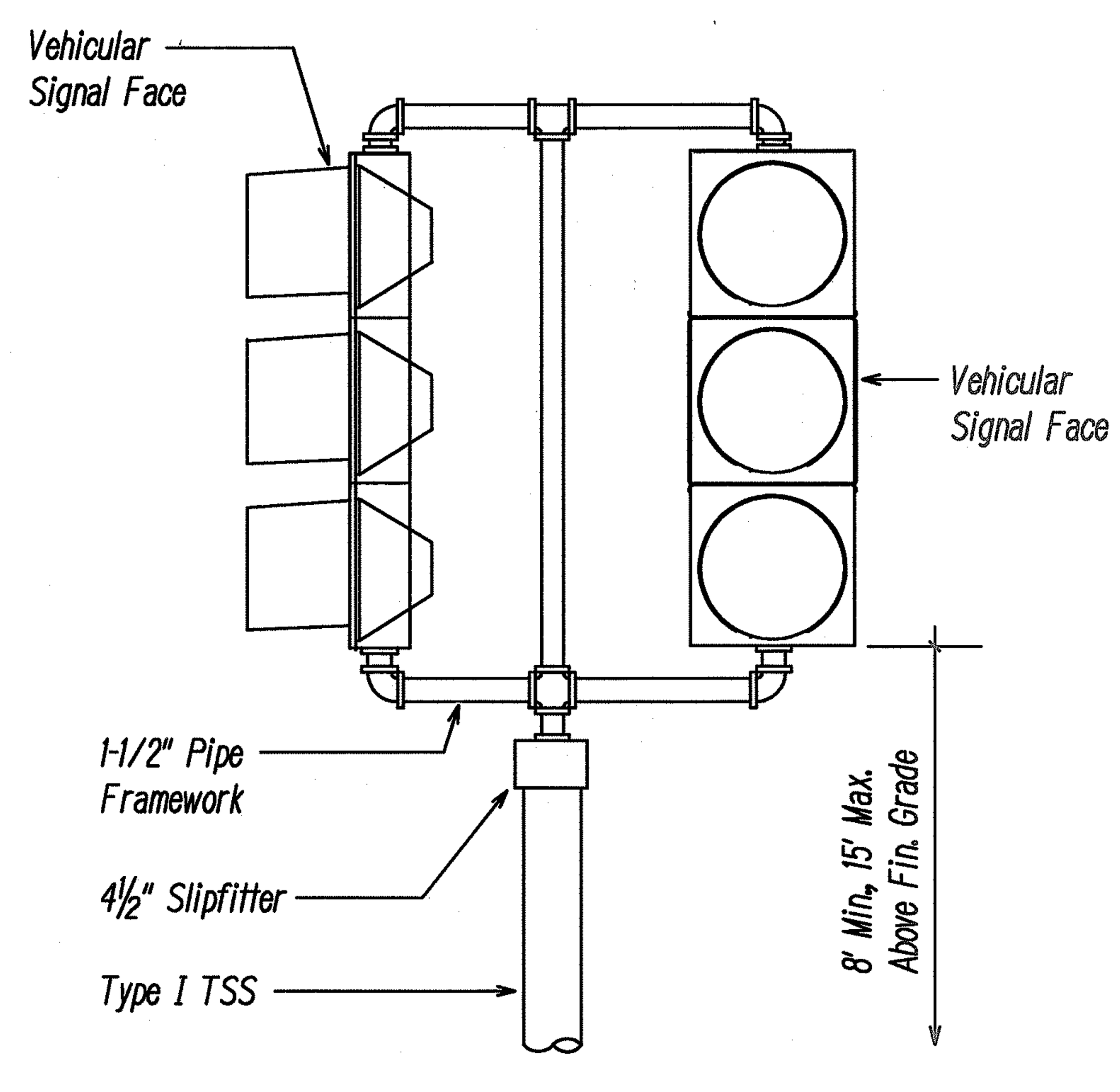
Scale: AS NOTED Date: MAY 2004

SHEET No. E-10 OF 12 SHEETS

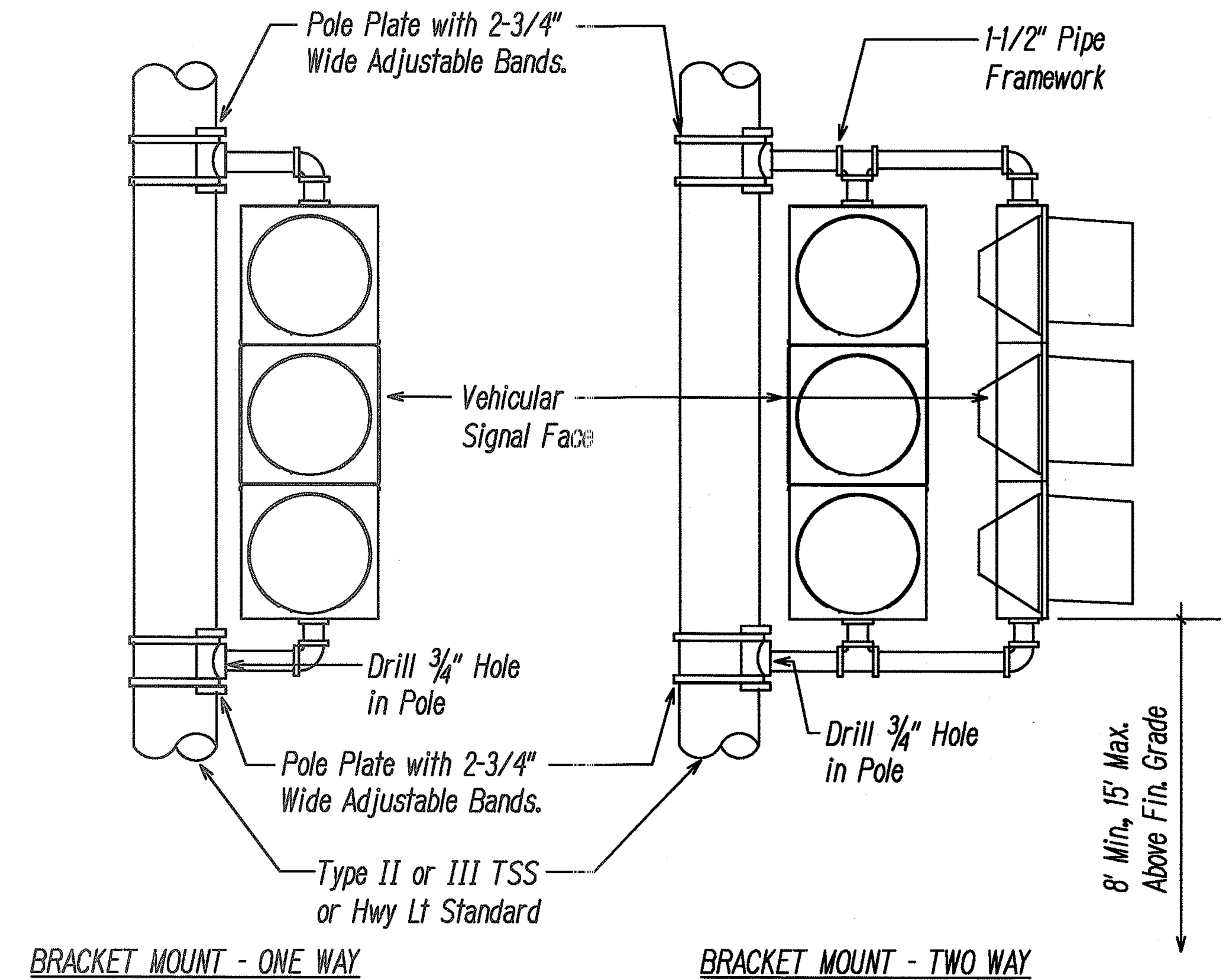
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-05-04	2004	20	33



TOP OF POLE - ONE WAY MOUNTING



TOP OF POLE - TWO WAY MOUNTING

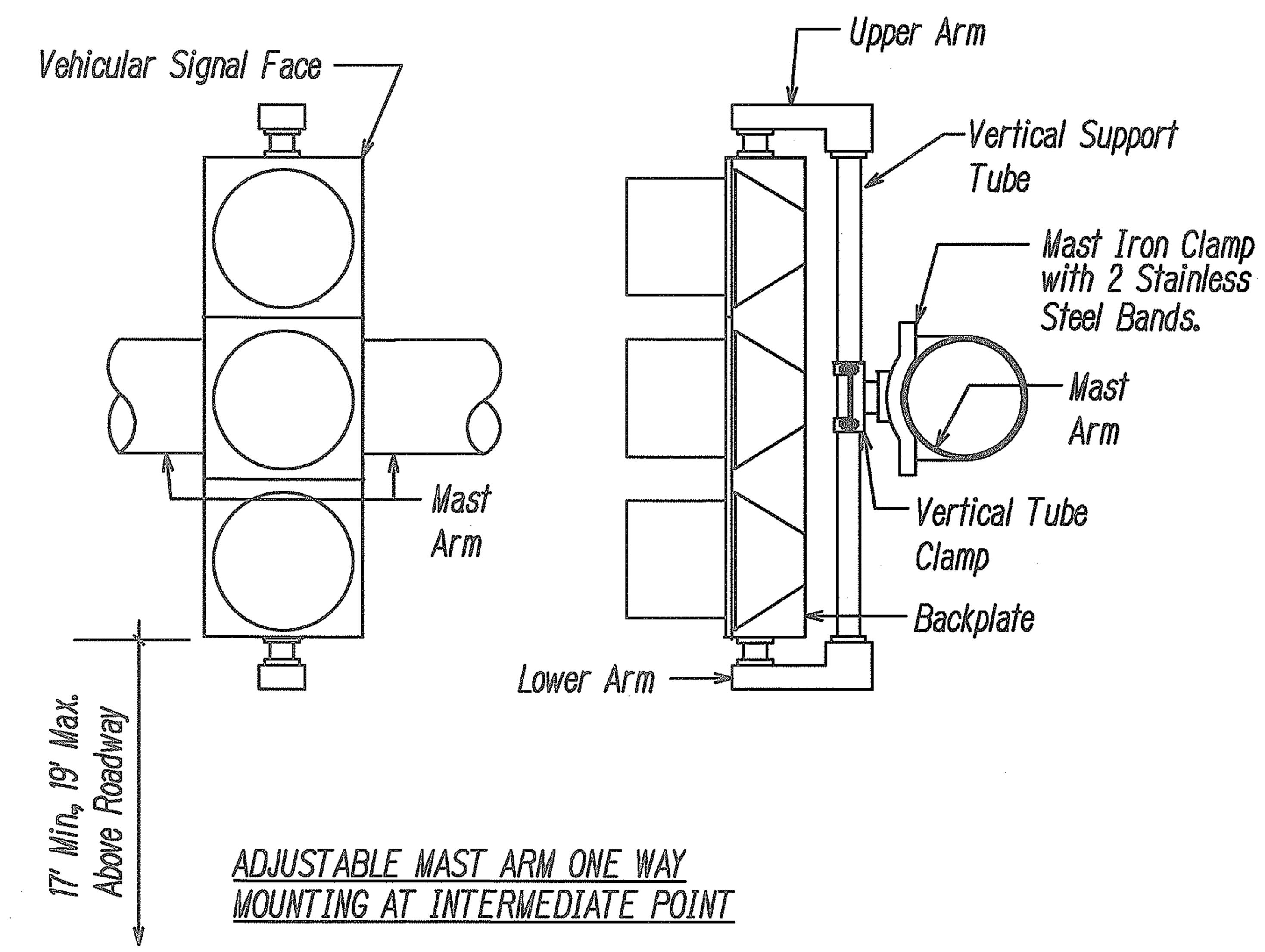


BRACKET MOUNT - ONE WAY

BRACKET MOUNT - TWO WAY

NOTES:

1. Stainless Steel Bands shall be ½" Wide x .050" Thick, Minimum. Tensile Strength shall be 100,000 PSI Minimum.
2. Upper Arm, Lower Arm and Vertical Support Tube shall be of 356 Cast Aluminum.
3. All Wiring shall be Concealed.
4. Vertical Tube Clamp shall be of Malleable Iron, Grade 32510.
5. All Aluminum Parts shall have an Alodine 1200 Finish.
6. Signal as Noted on Plans.
7. Maintain 16" Min. Clearance at Rear of All Programmed Faces.



ADJUSTABLE MAST ARM ONE WAY MOUNTING AT INTERMEDIATE POINT

A
E-1 | E-11

VEHICULAR SIGNAL MOUNTING DETAILS

Not to Scale

STEVEN H. SAKAI LICENSED PROFESSIONAL ENGINEER No. 7837-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS V

TRAFFIC OPERATIONAL IMPROVEMENTS
AT VARIOUS LOCATIONS
PIILANI HIGHWAY
AT KANANI ROAD

Scale: AS NOTED   Date: MAY 2004

SHEET No. E-11 OF 12 SHEETS