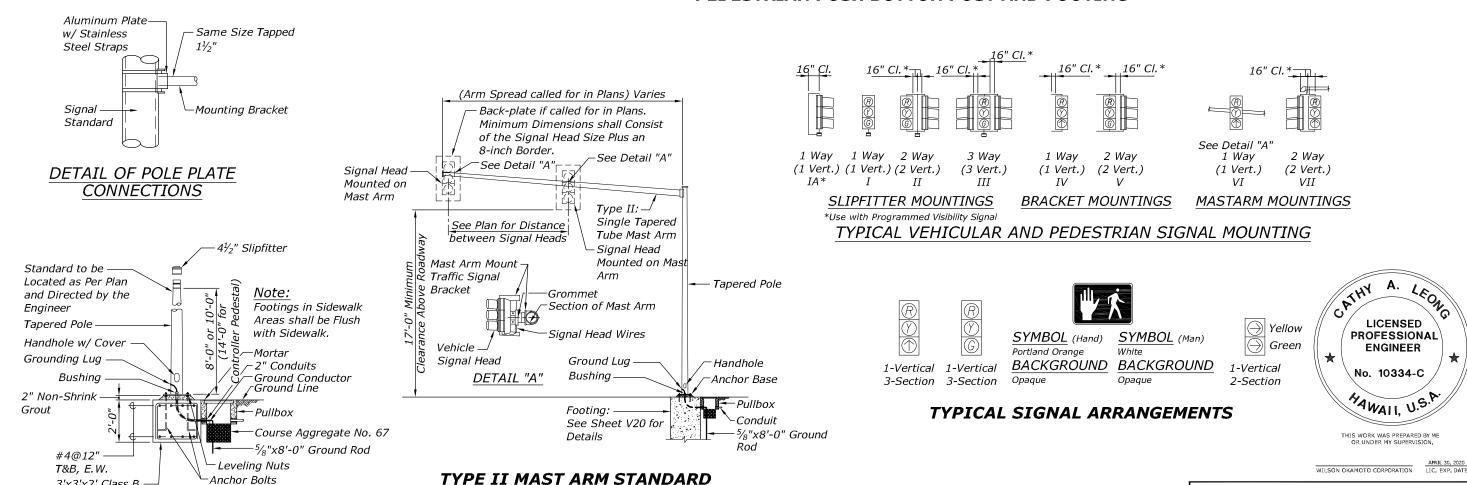


PEDESTRIAN PUSH BUTTON POST AND FOOTING



Notes For Type I And Type II Signal Standard:

2. All Accessories, Fittings, Connection Details, and Stiffener Details (as Required) shall be

Designed for the Loads Specified in the General Notes on Sheet V5 and submitted to the

1. See Notes on Sheet V5 for Additional Information.

Engineer for Approval 20 days Prior to Installation.

3'x3'x2' Class B

TYPE I SIGNAL STANDARD

OR CONTROLLER PEDESTAL

AND FOOTING

Concrete Base

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

TRAFFIC SIGNAL DETAILS 1

TATE	PROJECT	SHEET NO.
HI	HI STP SR 30(1)	V5

TYPE II TRAFFIC SIGNAL:

1. Design Specification:

- A. Design shall Conform w/ the Latest AASHTO Standard Specifications for the Structural Supports for Highway Signs, Luminaries & Traffic Signals and its Interim Supplements and Modifications by the Highways Division, Department of Transportation State of Hawaii.
- B. Latest HDOT Memorandum with Subject Title "Design Criteria for Bridges and Structures."

Loads:

- A. Basic Wind Speed: 105 MPH.
- B. Recurrence Interval of 50 Years.
- C. Fatigue Importance Factor, IF, shall be Based on Fatigue Category I for Cantilevered Traffic Signal Structures.
- D. Vortex Shedding Induced Loads shall be Considered for Cantilevered Mast Arms and Pole Shafts that do not have Tapers or Have Tapers of less than 0.14 In./Ft.
- E. Traffic Signal Structures shall be Designed for a Truck Induced Gust Based on a Truck Speed of 20 MPH Over the Posted Speed.
- F. Galloping and Natural Wind Gusts shall be Considered for Cantilevered Traffic Signal Structures.

3. <u>Materials:</u>

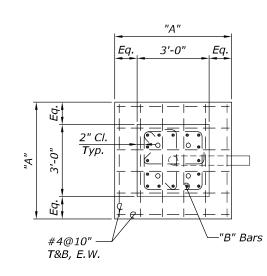
A. All Concrete Strengths shall be as noted below Unless Other Noted:

<u>Item</u>		<u>Class Of</u>	Specified Compressive
No.	Structural Parts	Concrete	Strength F'c (28 Days)
(1)	Footing And Pedestal	-	4,500 PSI

- See Specifications for Drilled Shaft Concrete. All Concrete with 28 Day Compressive Strength of 4,000 PSI or Greater shall have a Maximum W/C Ratio of .045.
- B. All Connection Bolts shall be AASHTO M164 Bolts and Anchor Bolts shall be AASHTO M314-105 Bolt.
- C. Aluminum Members and Surfaces in Contact with Structural Steel shall be Isolated with Neoprene Materials as Approved by the Engineer.

4. General:

- A. See V4 for Additional Information.
- B. The Recommendations of the Traffic Pole Manufacturer Shall be Followed. Manufacturer shall Select Pole, Anchor Bolts, etc. Based on Criteria given in the Contract Documents. The Contractor shall Submit Catalog Cuts and Calculations to the Engineer for Approval.
- C. Alternate Designs in Accordance with the Plans and Specifications shall use the Service Load Design Method and shall be Stamped by a Registered Engineer of the State of Hawaii in the Related Discipline and Submitted to the Engineer for Approved.
- D. The Contractor shall use Templates while Installing the Anchor Bolts. Anchor Bolts shall be Vertical.
- E. Excavation and Backfill shall be Considered Incidental to the Cost of the Traffic Signal Foundation.

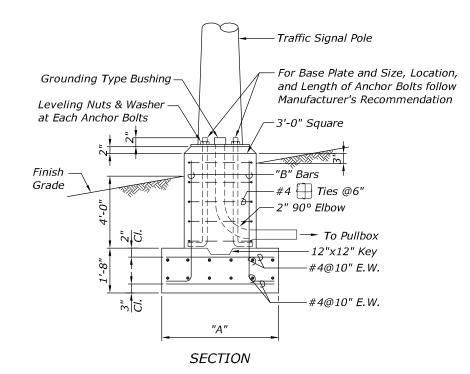


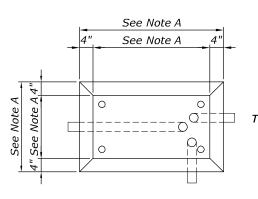
PLAN - SECTION

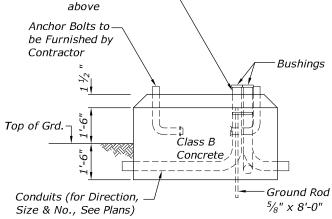
Soil Type	Mast Arm Length	"A"	"B" Bars
Stiff Clays	16' - 18'	3'-6"	16-#5
	20'	3'-6"	16-#5
	25'	3'-6"	16-#5
	30'	4'-0"	16-#6
	35'	4'-3"	16-#6
	40'	4'-6"	16-#6
Sand &	16' - 18'	3'-6"	16-#5
Gravel	20'	3'-6"	16-#5
	25'	3'-6"	16-#5
	30'	3'-6"	16-#6
	35'	3'-9"	16-#6
	40'	4'-0"	16-#6
Rock	16' - 18'	3'-6"	16-#5
	20'	3'-6"	16-#5
	25'	3'-6"	16-#5
	30'	3'-6"	16-#6
	35'	3'-9"	16-#6
	40'	4'-0"	16-#6

TYPE II SPREAD FOOTING SCHEDULE

SPREAD FOOTING FOR TYPE II MAST ARM STANDARD



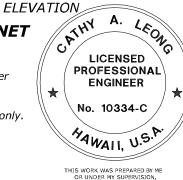




Conduit Extended

PLAN CONCRETE BASE FOR CONTROLER CABINET

- A. Dimensions to be Determined by the Size of the Controller Cabinet to be Furnished Under this Contract.
- B. Details of Conduits, Anchor Bolts, etc., are Approximate only. Manufacturer's Recommendations shall be followed. Contractor shall Submit Catalog Cuts to the Engineer for Approval.



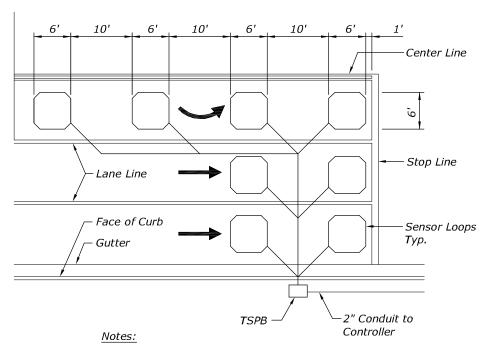
WILSON OKAMOTO CORPORATION APRIL 30, 2020
LIC. EXP. DATE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY

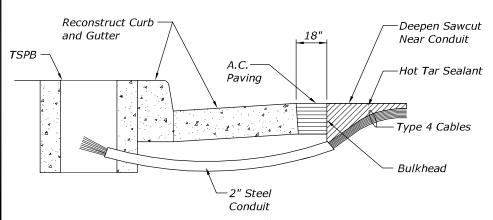
TRAFFIC SIGNAL DETAILS 2

NO SCALE



- 1. Center Sensor Loops in Lanes.
- 2. Collector Cables shall be Twisted 2 Turns Per Foot.
- 3. Number of Loops and Locations Vary. See Project Plans.
- 4. Number and Locations of Collector Sawcuts may be Varied in the Field to Suit.

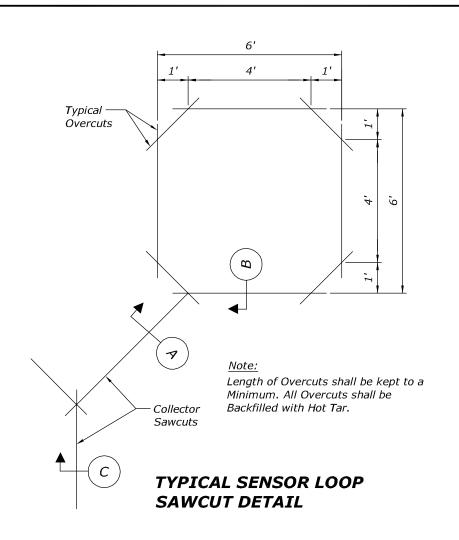
TYPICAL SENSOR LOOP DETAIL

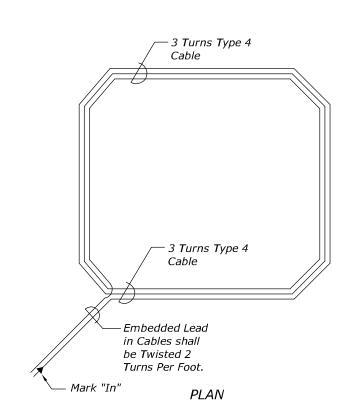


Notes on Construction at End of Sawcut:

- 1. Seal Roadway end of Conduit after Installation of Conductors.
- 2. Install Bulkhead Across Conduit Trench.
- 3. Place Hot Tar in Sawcut.
- 4. Backfill Over Conduit with New A.C.
- 5. Reconstruct Curb and Gutter as Required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY





TYPICAL SENSOR LOOP WIRING DIAGRAM

SHEET NO. STATE PROJECT 3/8" Typ. HI STP SR 30(1) Top of Pavement 1/4" Typ. -Hot Tar -Hot Tar Sealant Sealant 2-Type 4 -3-Type 4 -Type 4 Cables Cables to Cables to IMSA Spec to IMSA IMSA 51-5. 2 X No. of Spec 51-5 Spec 51-5 Loops "Upstream"

SECTION A SECTION B SECTION C

TYPICAL SECTION THROUGH SENSOR LOOP



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TRAFFIC SIGNAL DETAILS 3

NO SCALE

RAWING NO.:

STATE RIGHT-OF-WAY BACKFILL NOTES



Trench Backfill Material "A":

Beach Sand, Earth, or Earth and Gravel. If Earth and Gravel used, the Maximum shall contain not more than 50% by Volume of Rock Particles. Maximum 8" Loose Fill Per Lift. Obtain 95% Compaction for each.



Concrete:

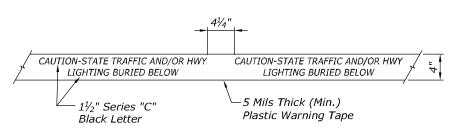
3000 PSI Compressive Strength at 3 Days.

Note:

Base Course & Sub-base Course Per 1994 State Standard Specifications for Highway Construction.

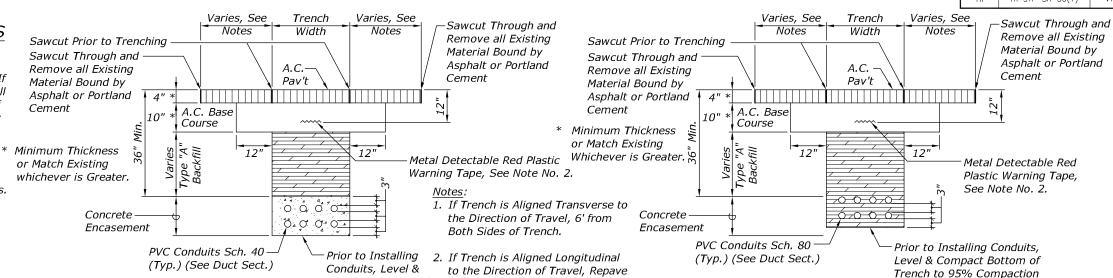
General Notes:

- 1. 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.
- 2. 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± Mil Thick Foil Core. The Message on the Tape shall Read, "CAUTION STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW, "Utilized 1½ Inches Series "C" Black Lettering. The Message will be Repeated with a 4¼ Spacing Between Top Line of Message and Start of Next Repeat.
- 3. The Contractor may begin Backfilling the Conduit Trench when the Concrete Reaches 3000 PSI Compressive Strength after 3 days.
- 4. Maximum Four (4) Conduits Per Row for Multiple Conduit Duct Section.
- 5. For Direct Buried Duct Sections, the Concrete Jacket required at the Conduit By-pass for Various Utilities, shall not be Paid for Separately but Considered Incidental to the Direct Buried Conduits.
- 6. After Installing all the Traffic Signal Cables, the Contractor shall Duct Seal all Conduits in the Pullboxes, Traffic Signal Standards and Traffic Signal Controller Cabinet Concrete Base. The Duct Seal Material shall be Approved by the Traffic Signal Inspector/Engineer and shall not be Paid for Separately but Considered Incidental to the Direct Buried and/or Concrete Encased Conduits.



FOR ADDITIONAL INFORMATION SEE NOTE NO. 2

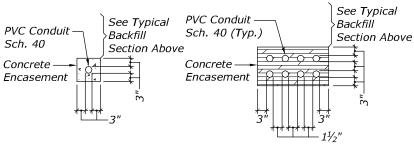
METAL DETECTABLE RED PLASTIC WARNING TAPE



the Entire Lane where the Travel

is Located.

TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS



Compact Bottom of

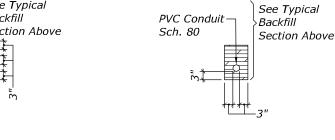
Trench to 95%

Compaction

SINGLE CONDUIT

MULTIPLE CONDUIT

DUCT SECTIONS - CONC. ENCASED

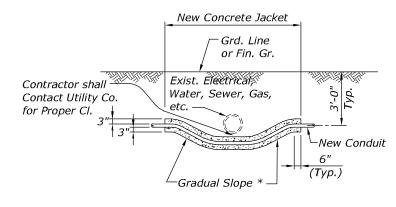


See Typical

SINGLE CONDUIT MULTIPLE CONDUIT **DUCT SECTIONS - DIRECT BURIED**

TYPICAL BACKFILL SECTION

DIRECT BURIED DUCTS



* TO BE DETERMINED BY COUNTY ELECTRICAL INSPECTOR/ENGINEER

CATHY A. LEON New Concrete Jacket -Grd. Line or Fin. Gr. LICENSED **PROFESSIONAL** ENGINEER No. 10334-C MANAII, U.S.P New Conduit Contractor shall Contact Utility Co. THIS WORK WAS PREPARED BY ME $\overline{(Typ.)}$ for Proper Cl. Gradual Slope Exist. Electrical, Water,-WILSON OKAMOTO CORPORATION LIC. EXP. DATE Sewer, Gas, etc.

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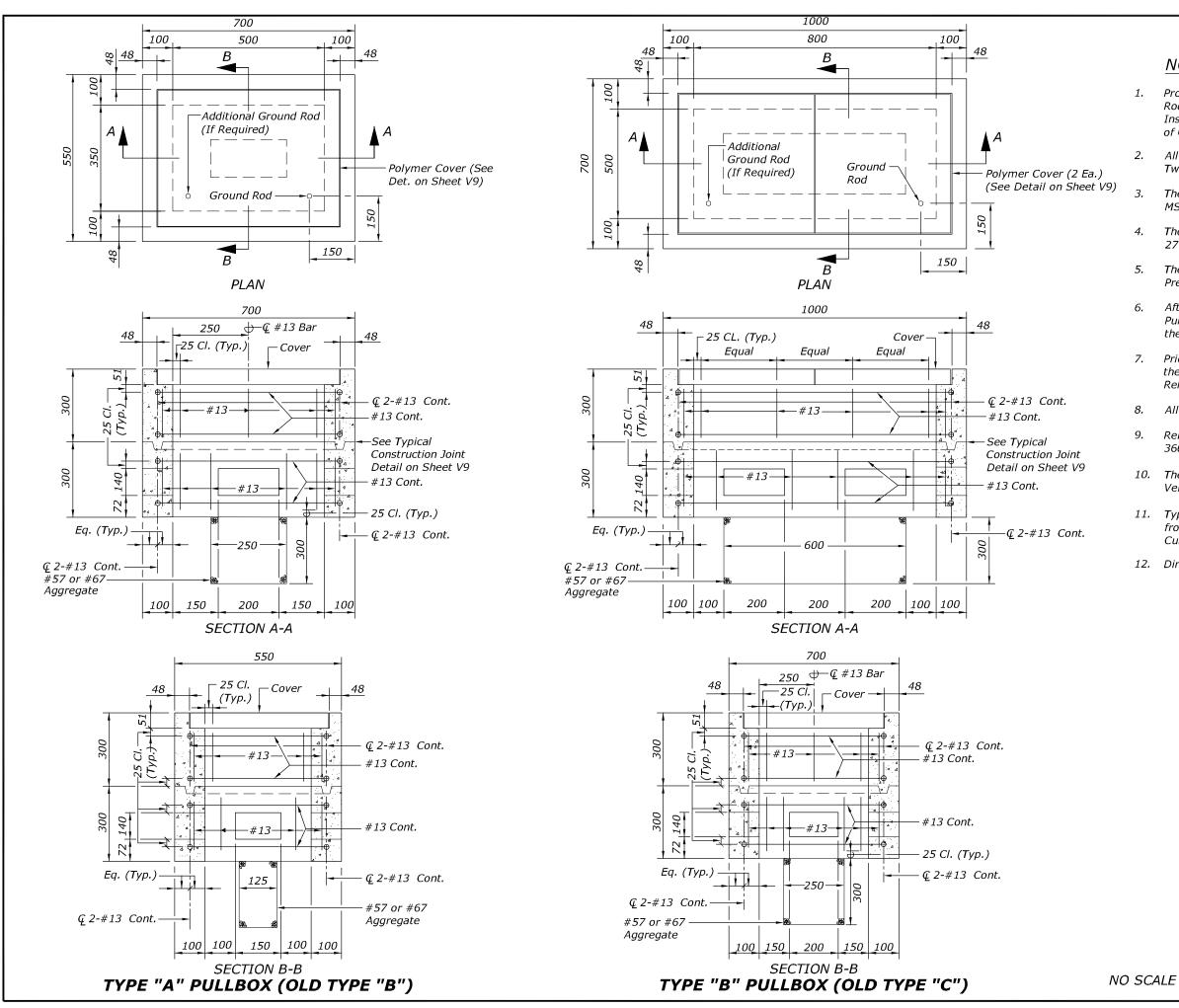
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CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

NO SCALE

TRAFFIC SIGNAL DETAILS 4

RAWING NO



 STATE
 PROJECT
 SHEET NO.

 HI
 HI STP SR 30(1)
 V8

NOTES:

- 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.
- 3. All Concrete shall be Class A (21MPA (3,000 psi), Min.)
- 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).
- 12. Dimensions are in Millimeters, Unless Otherwise Noted.



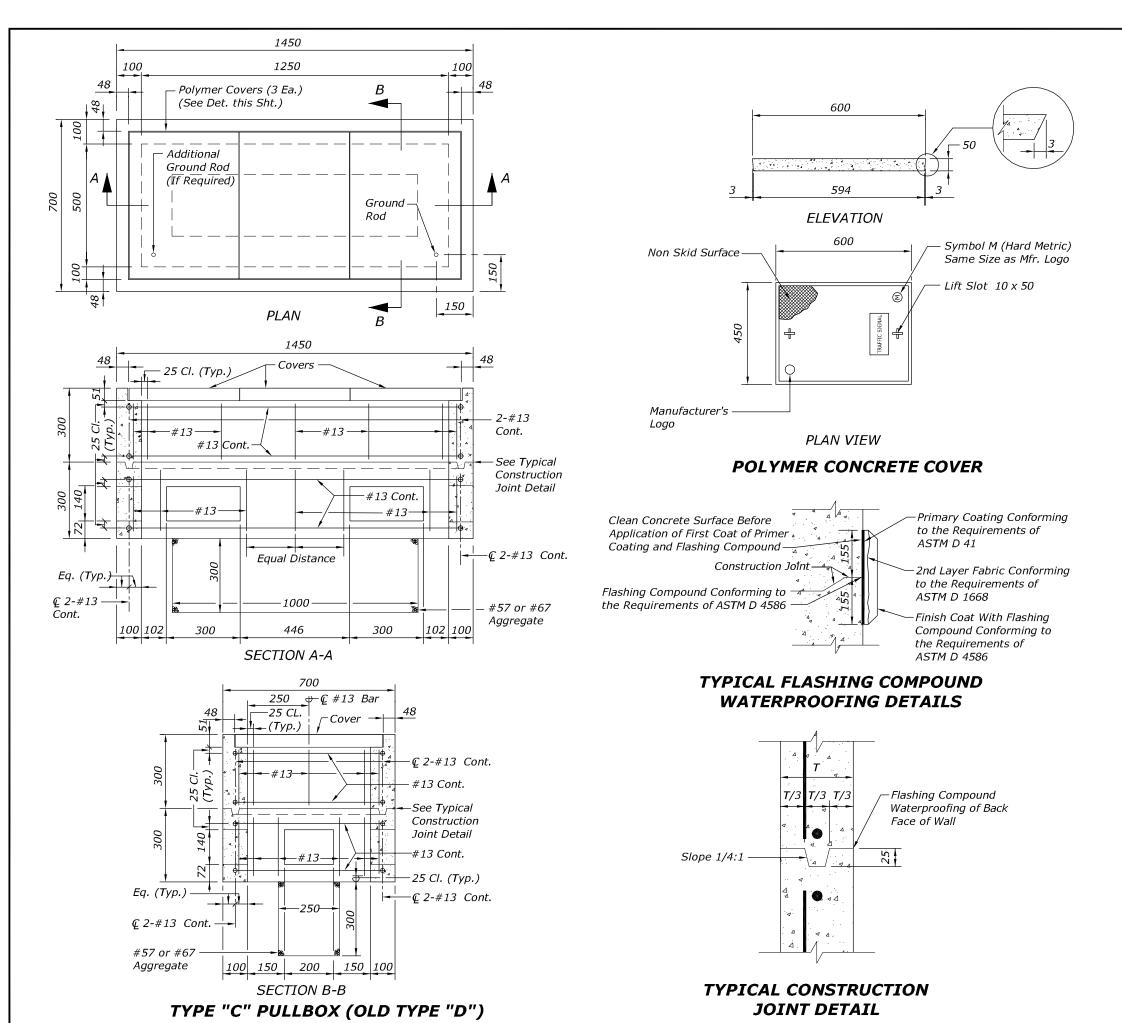
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TRAFFIC SIGNAL DETAILS 5

RAWING NO.:

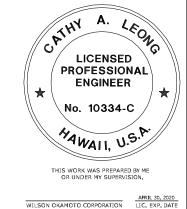


STATE PROJECT SHEET NO.

HI HI STP SR 30(1) V9

NOTES:

- 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.
- 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.
- 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 (21MPa (3000 psi), Min.)
- 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).
- 12. Dimensions are in Millimeters, Unless Otherwise Noted.

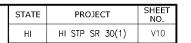


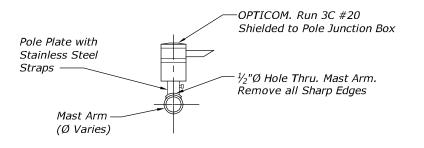
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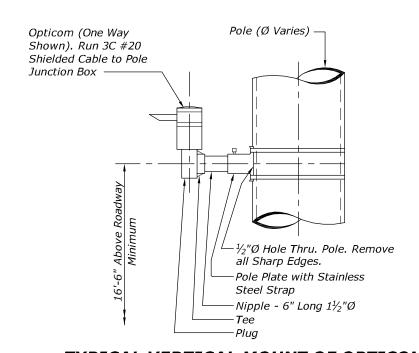
TRAFFIC SIGNAL DETAILS 6

NO SCALE





TYPICAL HORIZONTAL MOUNT OF OPTICOM



Use Metal Nipple when

Opticom Cable

Apply Teflon Brand Tape to

(Bottom View)

Note: Knock Out

before Installing

Weep Hole

Maximum Range is

1800 Feet (0.54 KM)

Opticom

Angle

Alignment

TYPICAL PEDESTAL/MAST ARM INSTALLATION OF

OPTICOM

Threads before Mounting

Opticom Assembly is

Mounted on Pedestal, Signal Head Framework,

Opticom -

Opticom Reception Angle Varies with Distance. It is

Reflection, Reception Angle is Increased at Close Range.

The Opticom must be Aligned within 8° of the Farthest

Approximately 8° at 1800 Feet (0.54 KM). Due to

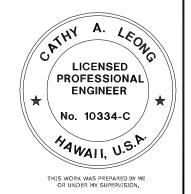
Point where Priority Vehicles is to be Sensed.

0

0

or Mast Arm

TYPICAL VERTICAL MOUNT OF OPTICOM



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LIC. EXP. DATE

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TRAFFIC SIGNAL DETAILS 7

