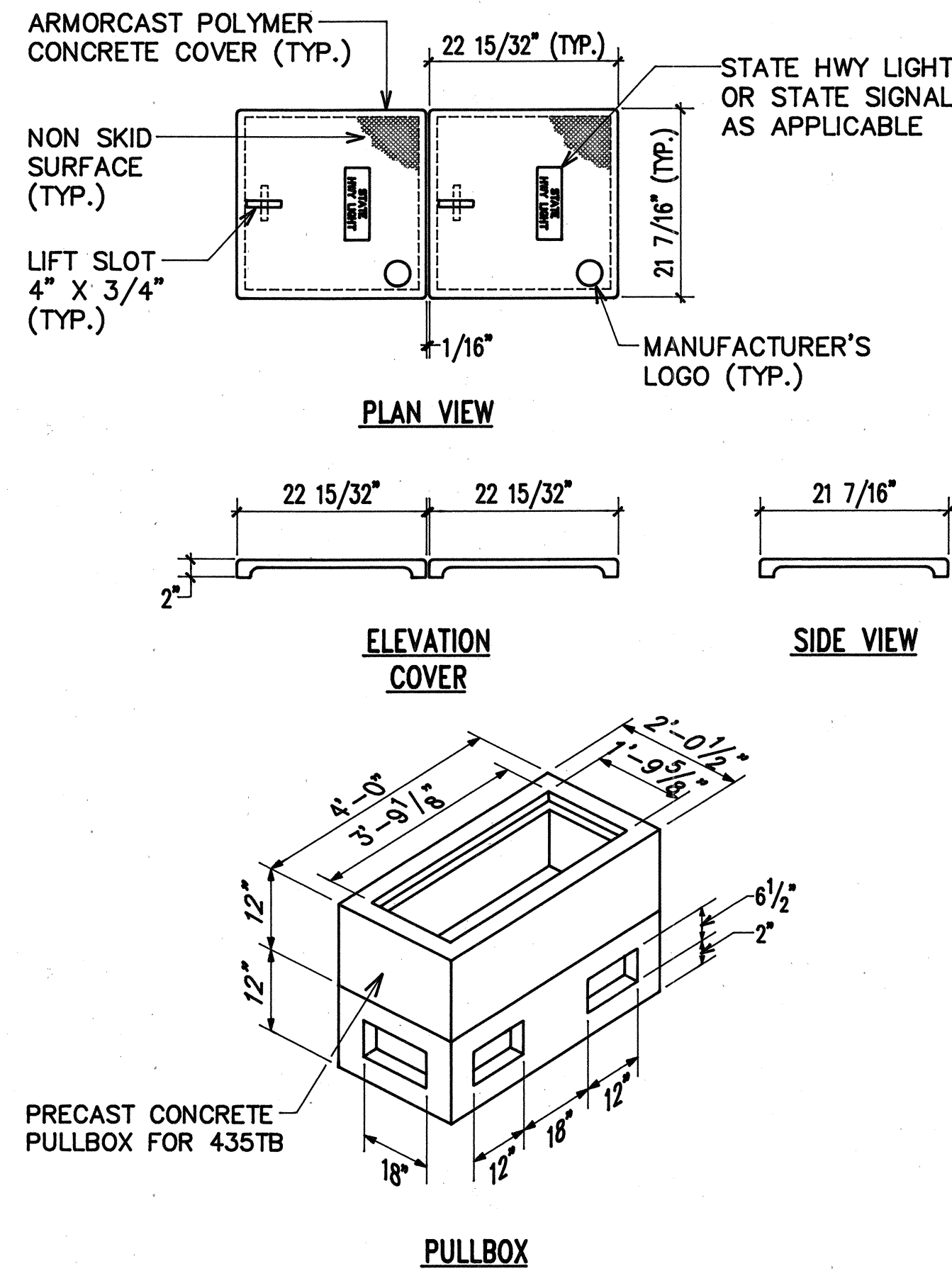


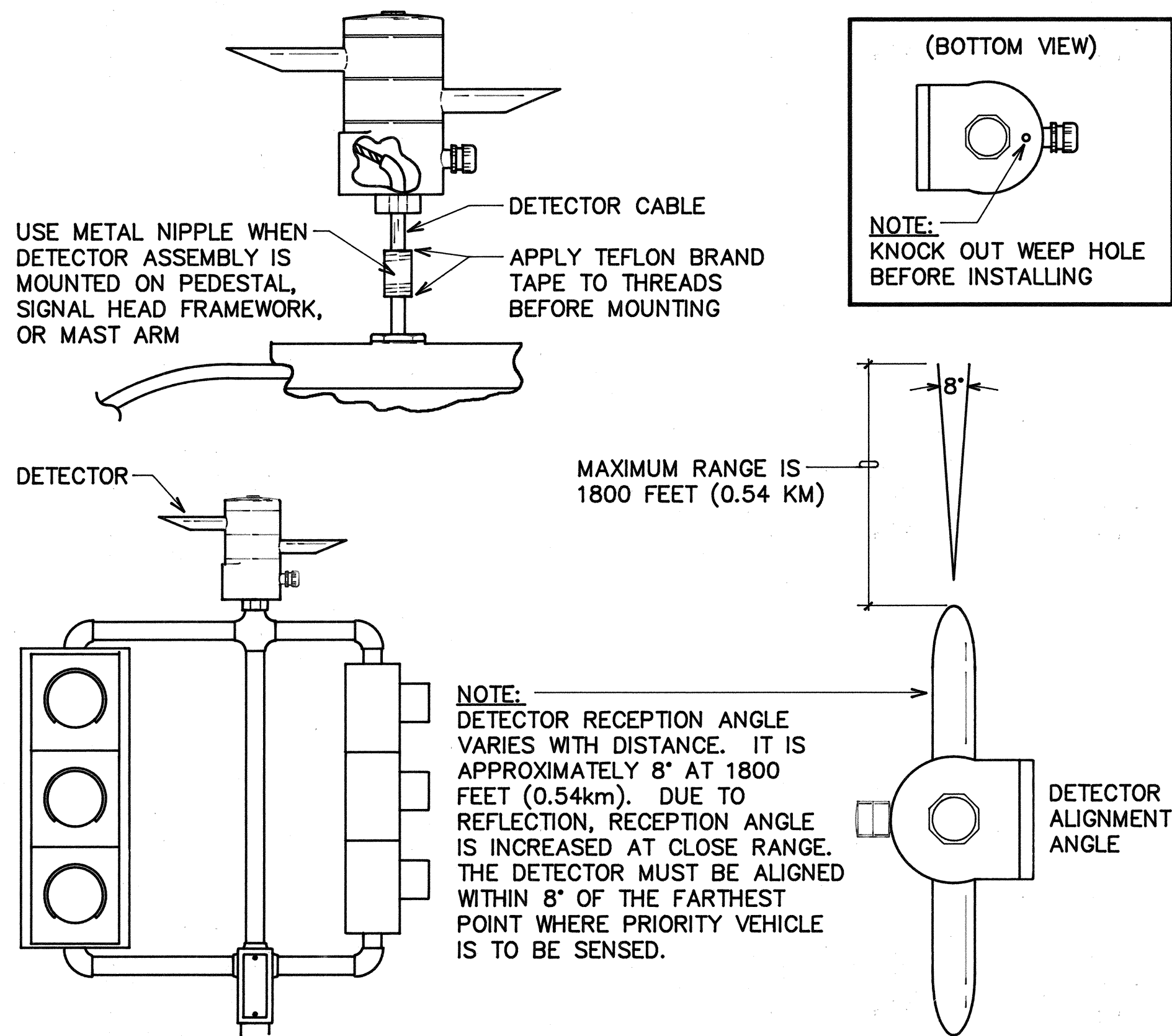
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1999	63	97



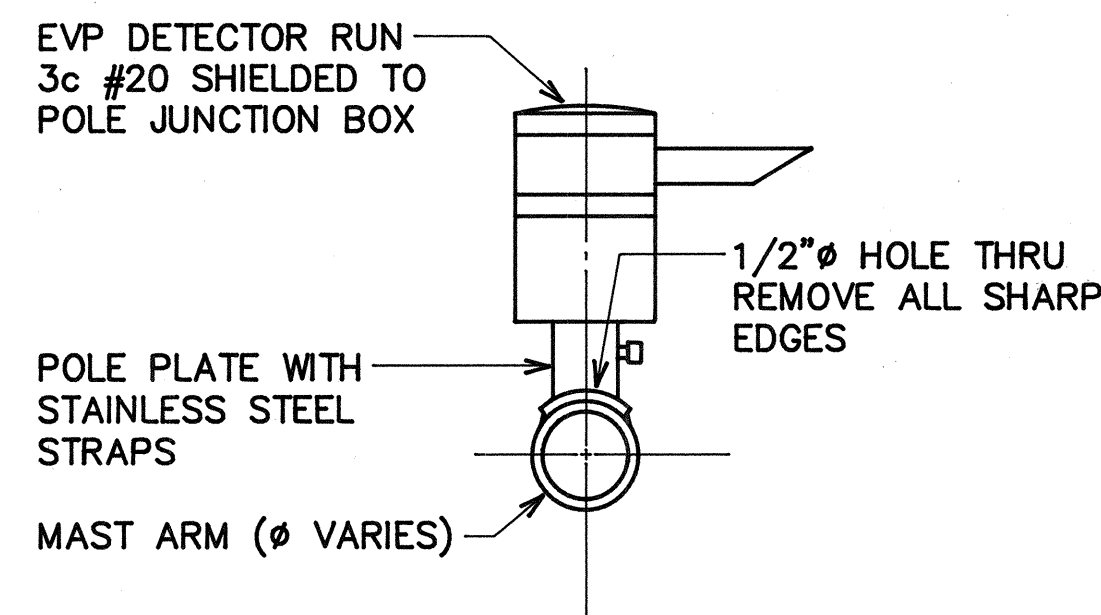
NOTES:

1. PROVIDE ARMORCAST POLYMER CONCRETE COVER.
2. INSTALL ON 6" BED OF #3 CRUSHED ROCK.
3. PROVIDE SUFFICIENT AMOUNT OF 5/8"  $\phi$  X 8' COPPERWELD GROUND RODS AS DIRECTED BY THE TRAFFIC SIGNAL INSPECTOR/ENGINEER. COST SHALL BE INCIDENTAL TO THE VARIOUS TRAFFIC SIGNAL ITEMS.

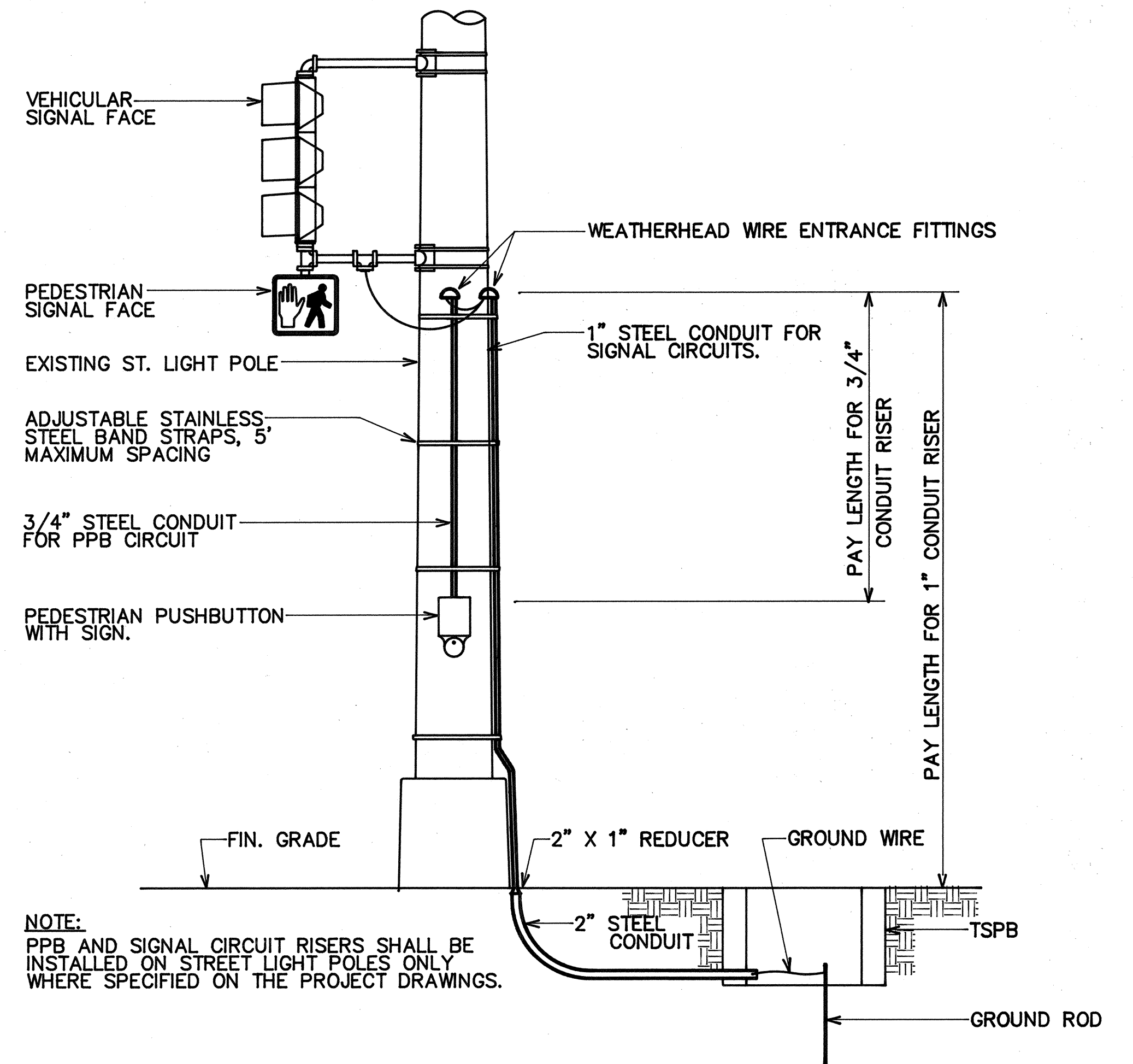
**A TYPE "D" PULLBOX**  
36/63 NOT TO SCALE



**C TYPICAL PEDESTAL/MAST ARM INSTALLATION OF EVP DETECTOR**  
36/63 NOT TO SCALE



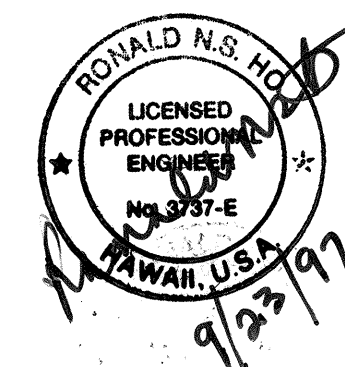
**E TYPICAL HORIZONTAL MOUNT OF EVP DETECTOR**  
36/63 NOT TO SCALE



**F STREET LIGHT POLE RISER DETAIL**  
57/63 NOT TO SCALE

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

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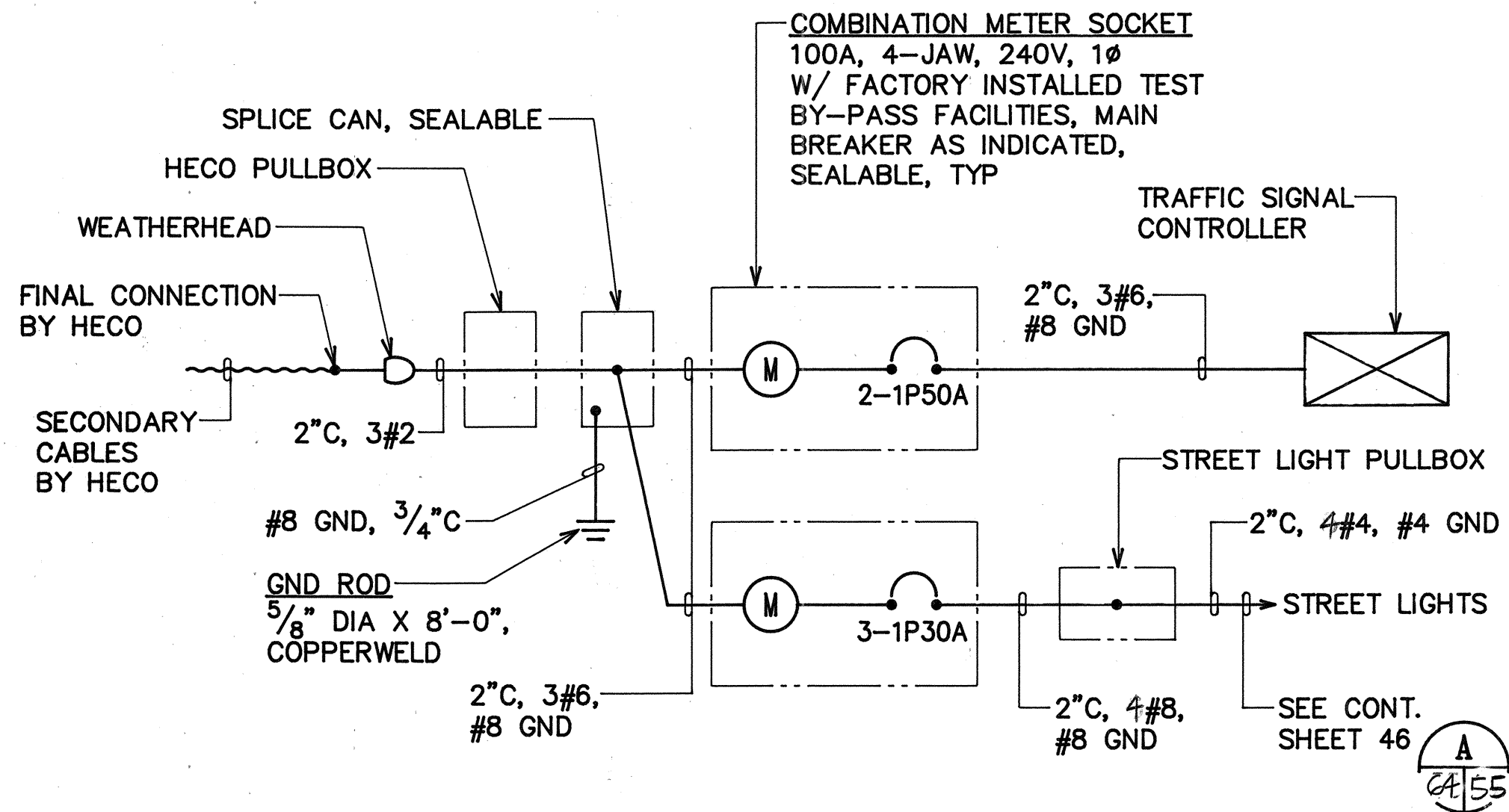
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**MISCELLANEOUS TRAFFIC SIGNAL DETAILS**

KUNIA ROAD WIDENING; AND  
H-1, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)

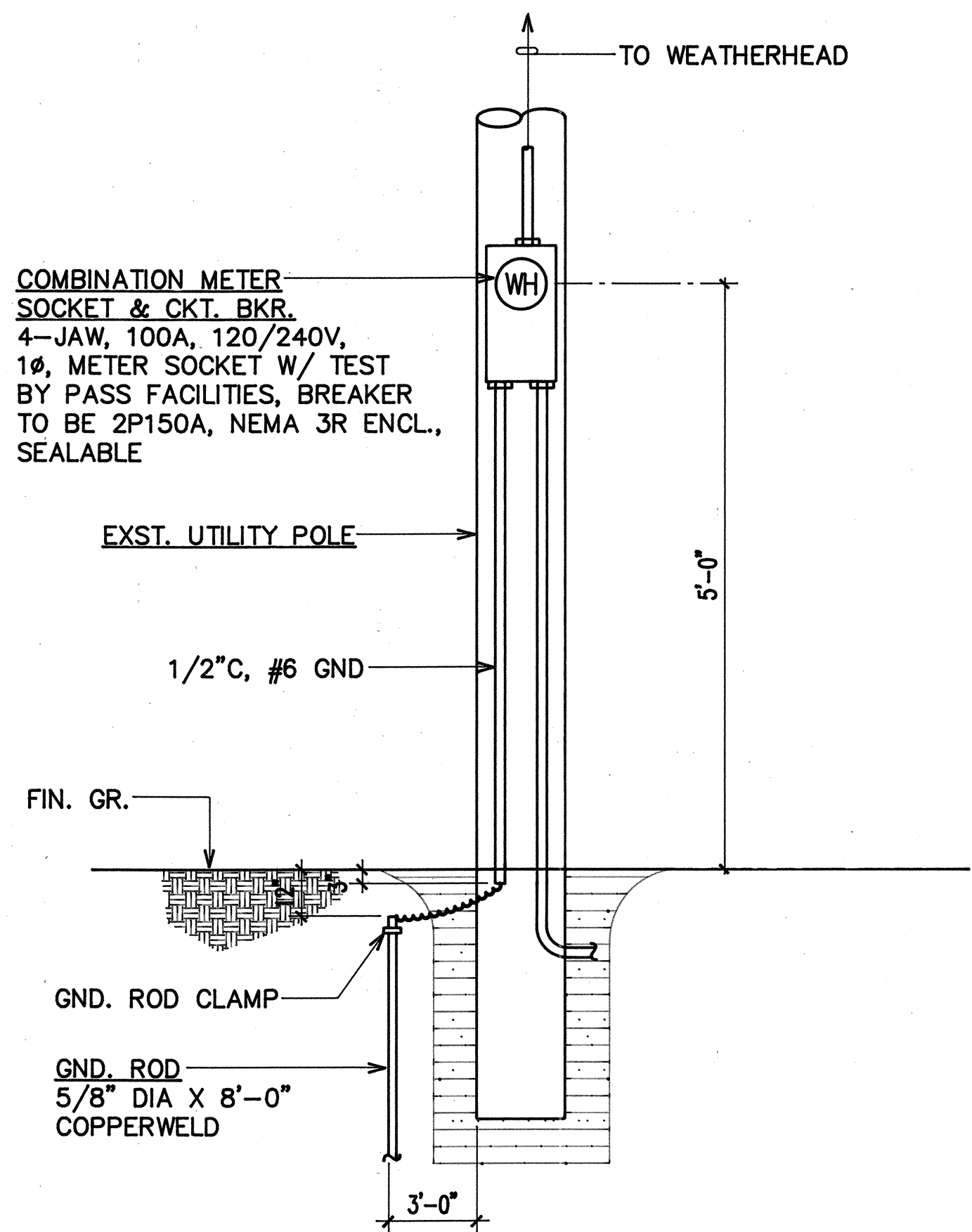
SCALE: AS NOTED DATE: APRIL 1999

SHEET No. 1 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1999	64	97

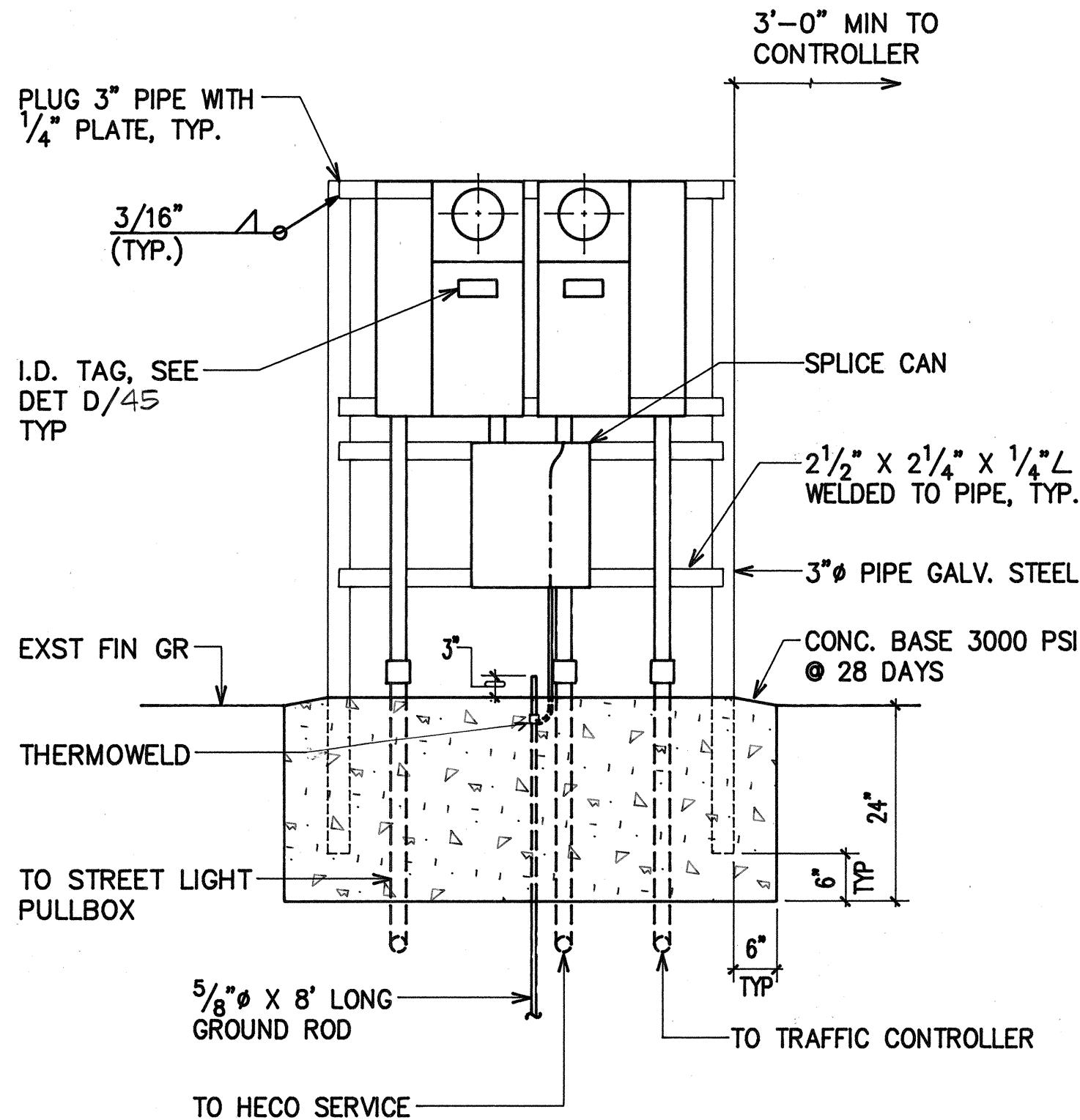


**A ONE-LINE DIAGRAM**  
57/64

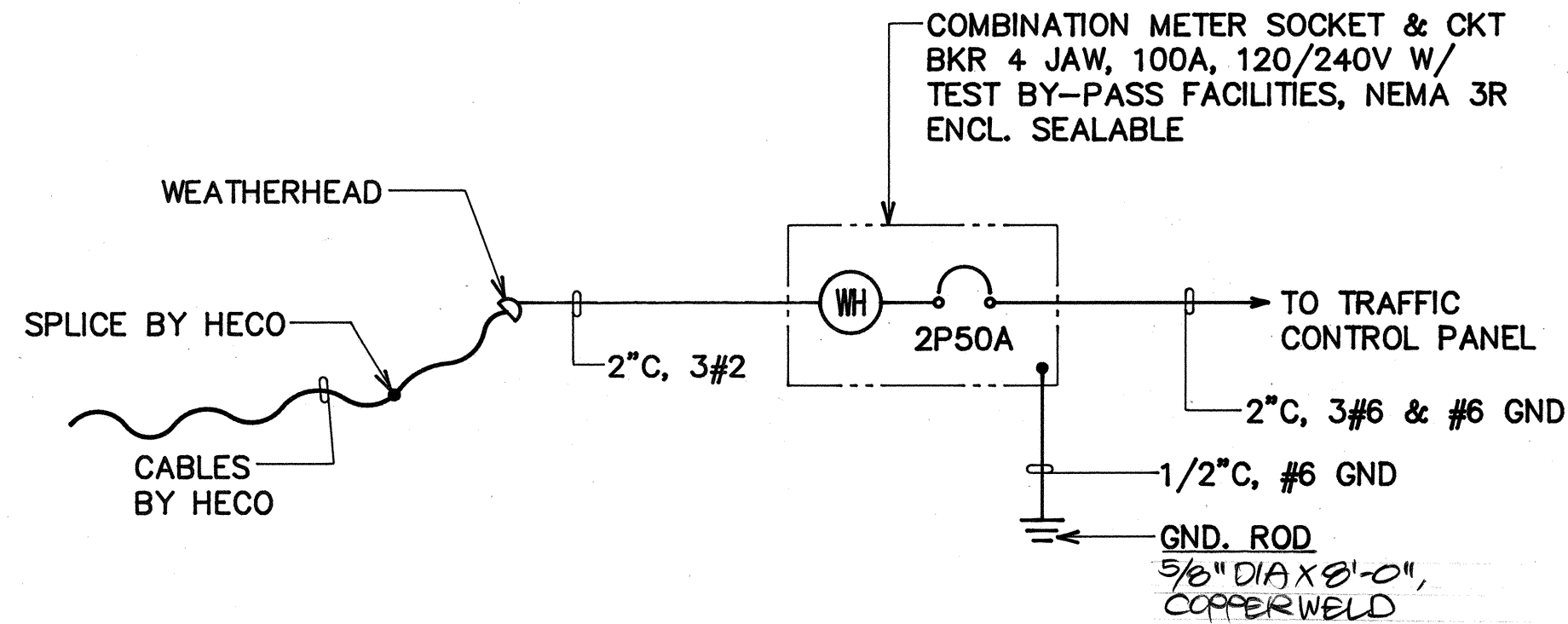


**B SERVICE EQUIPMENT ELEVATION**  
57/64 NOT TO SCALE

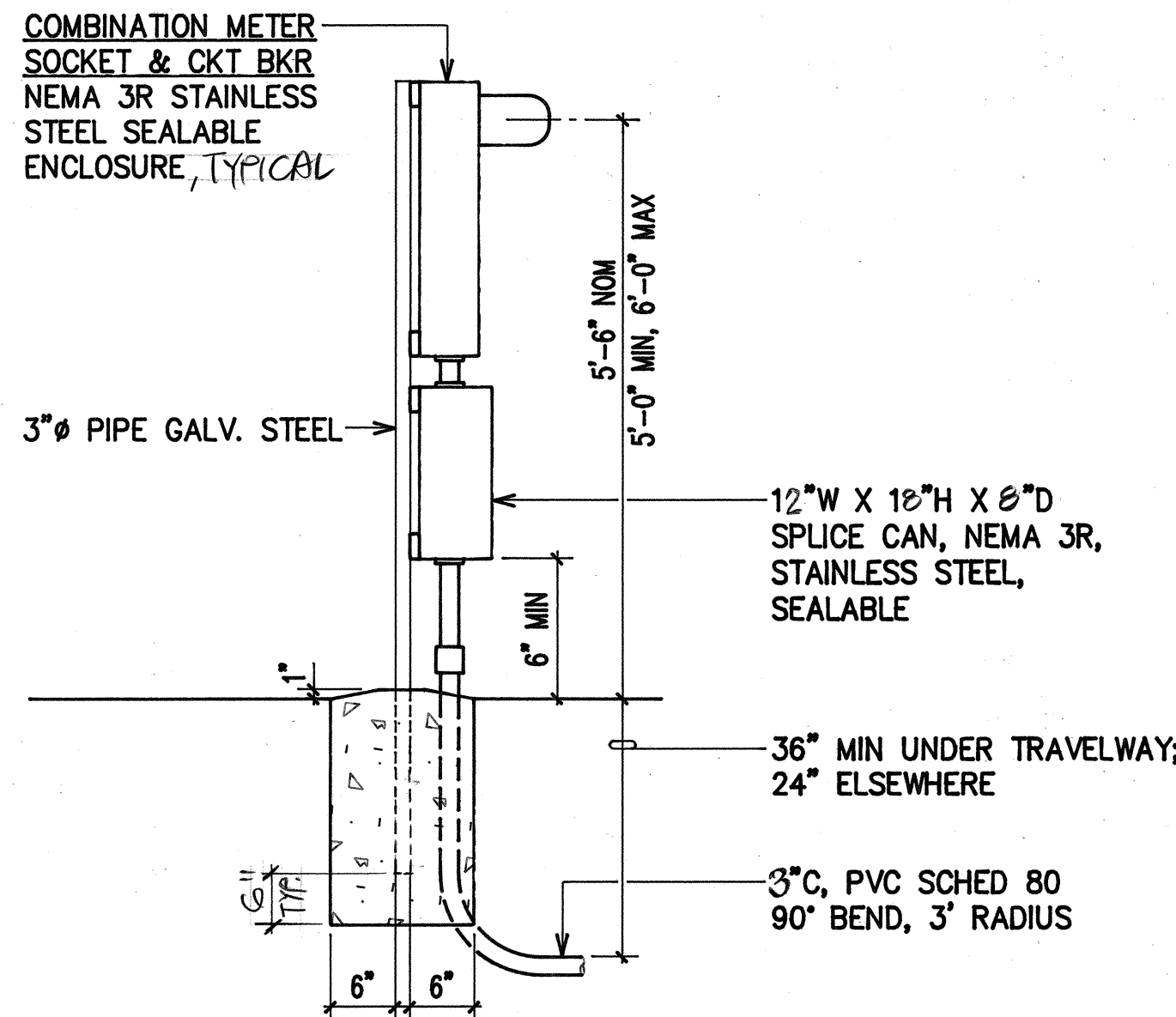
- NOTES:**
- CONTRACTOR SHALL MAKE ALL ELECTRICAL CONNECTION TO CONTROLLER, PROVIDE 2-1P50A BREAKER, GROUND AND 2" CONDUIT.
  - ALL CONDUITS TO CONTAIN A POLYOLEFIN PULL LINE. (JET LINE CAT #232 OR EQUIV)
  - PEDESTAL SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
  - ALL FASTENING BOLTS, NUTS & WASHERS SHALL BE STAINLESS STEEL. PROVIDE ONE COAT SHOP PRIMER & TWO COATS OF ACRYLIC ENAMEL FINISH, COLOR TO MATCH CONTROLLER CABINET.
  - PROVIDE 4 FT CLEARANCE IN FRONT OF METER.
  - SEE PIPE GUARD DETAIL C/57.



**FRONT ELEVATION**

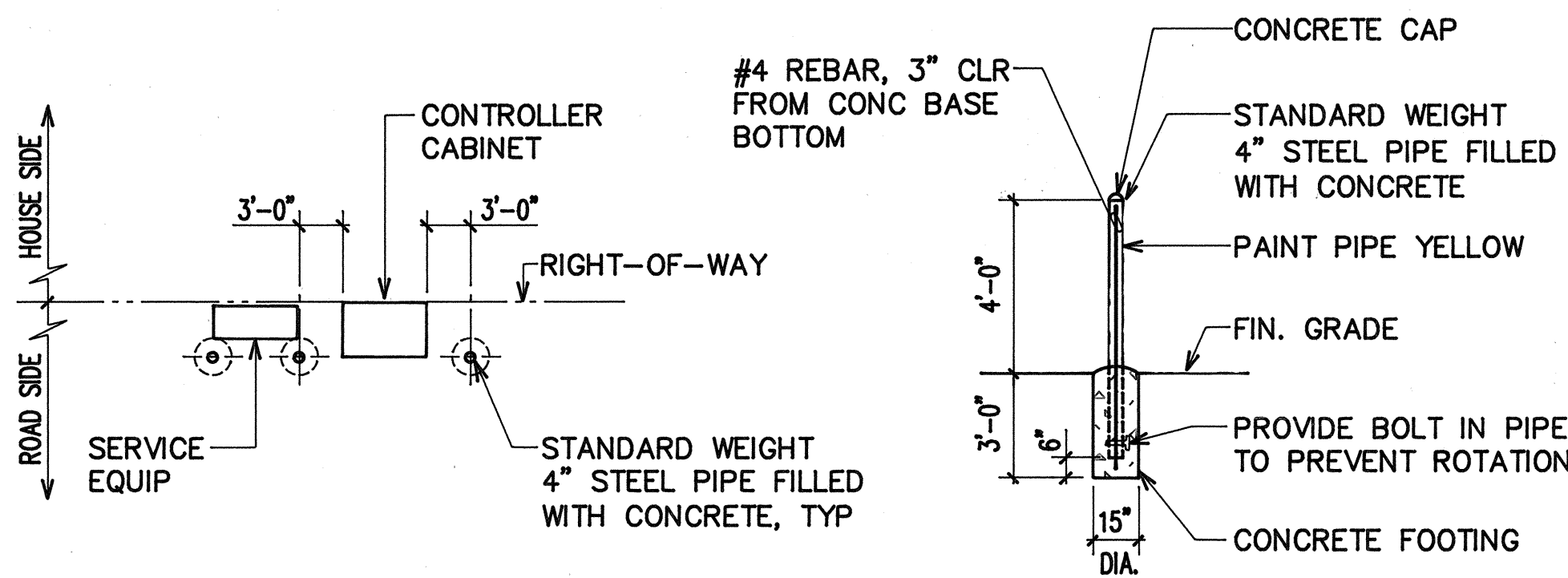


**E TRAFFIC SIGNAL SYSTEM ONE-LINE DIAGRAM**  
57/64



**SIDE ELEVATION**

**C ELECTRICAL SERVICE DETAIL**  
58/64 NOT TO SCALE



**PLAN**

**TYPICAL ELEVATION**

- NOTE:**
- COST OF CONC. FILLED GALVANIZED POSTS SHALL BE INCIDENTAL TO OTHER ITEMS OF WORK.

**D PIPE GUARD DETAIL**  
58/64 NOT TO SCALE

APPROVED:

HAWAIIAN ELECTRIC CO. DATE

HAWAIIAN TELEPHONE CO. DATE

**DRAWING REVIEW:**  
Reviewed for HECO's Facilities Only  
Date 2/12/99 By [Signature]  
Distribution Engineering Department  
Hawaiian Electric Company, Inc.  
HECO's review of these drawings shall in no way relieve the Customer, its Consultant, its Contractor or anyone acting on Customer's behalf from the responsibility for engineering, design, materials and any liability associated with this project.

**STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
TRAFFIC SIGNAL ONE-LINE DIAGRAM,  
SERVICE EQUIPMENT ELEVATION**

**KUNIA ROAD WIDENING; AND  
H-1, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)**

SCALE: AS NOTED DATE: APRIL 1999

SHEET No. 2 OF 6 SHEETS

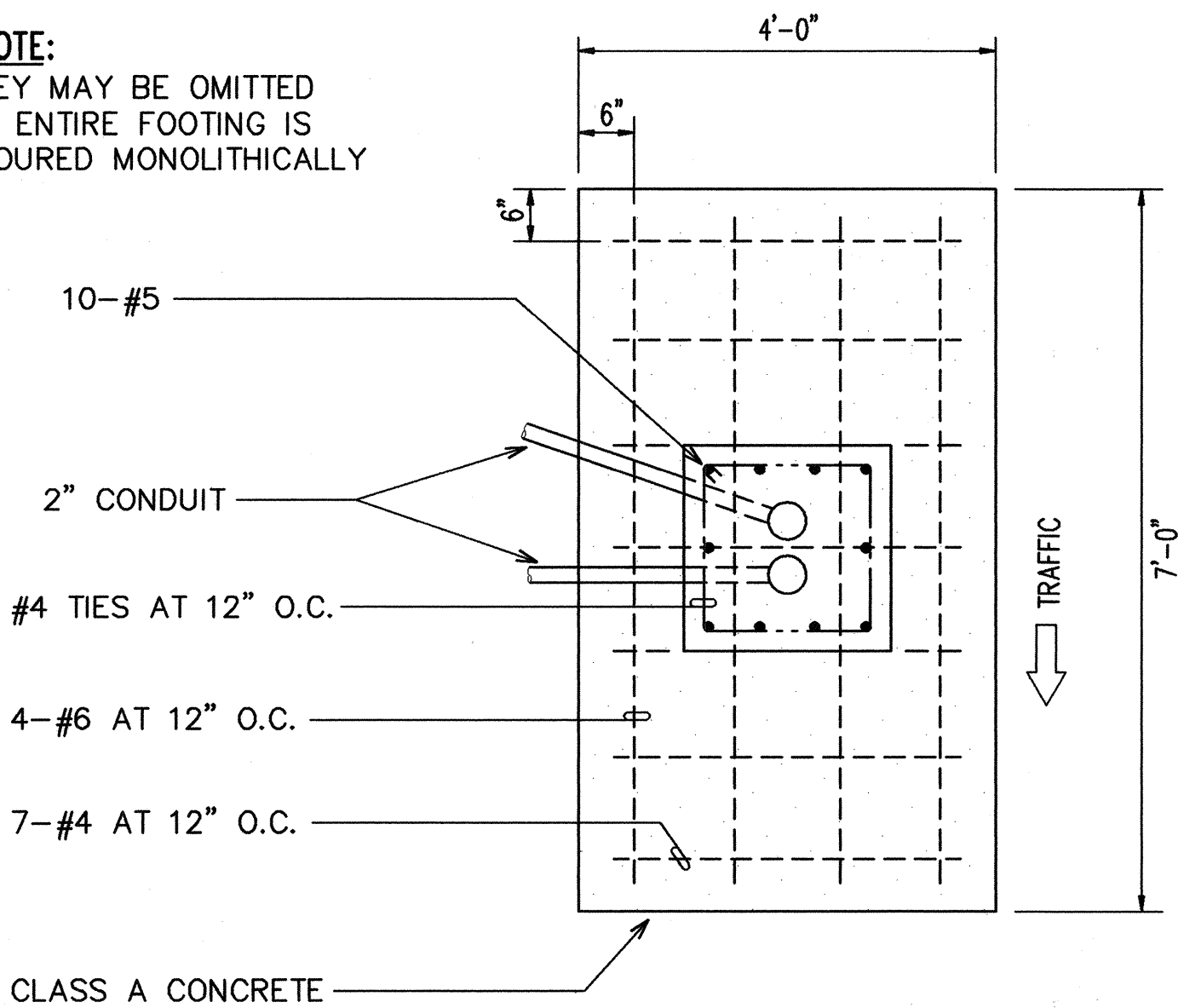


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1994	65	97

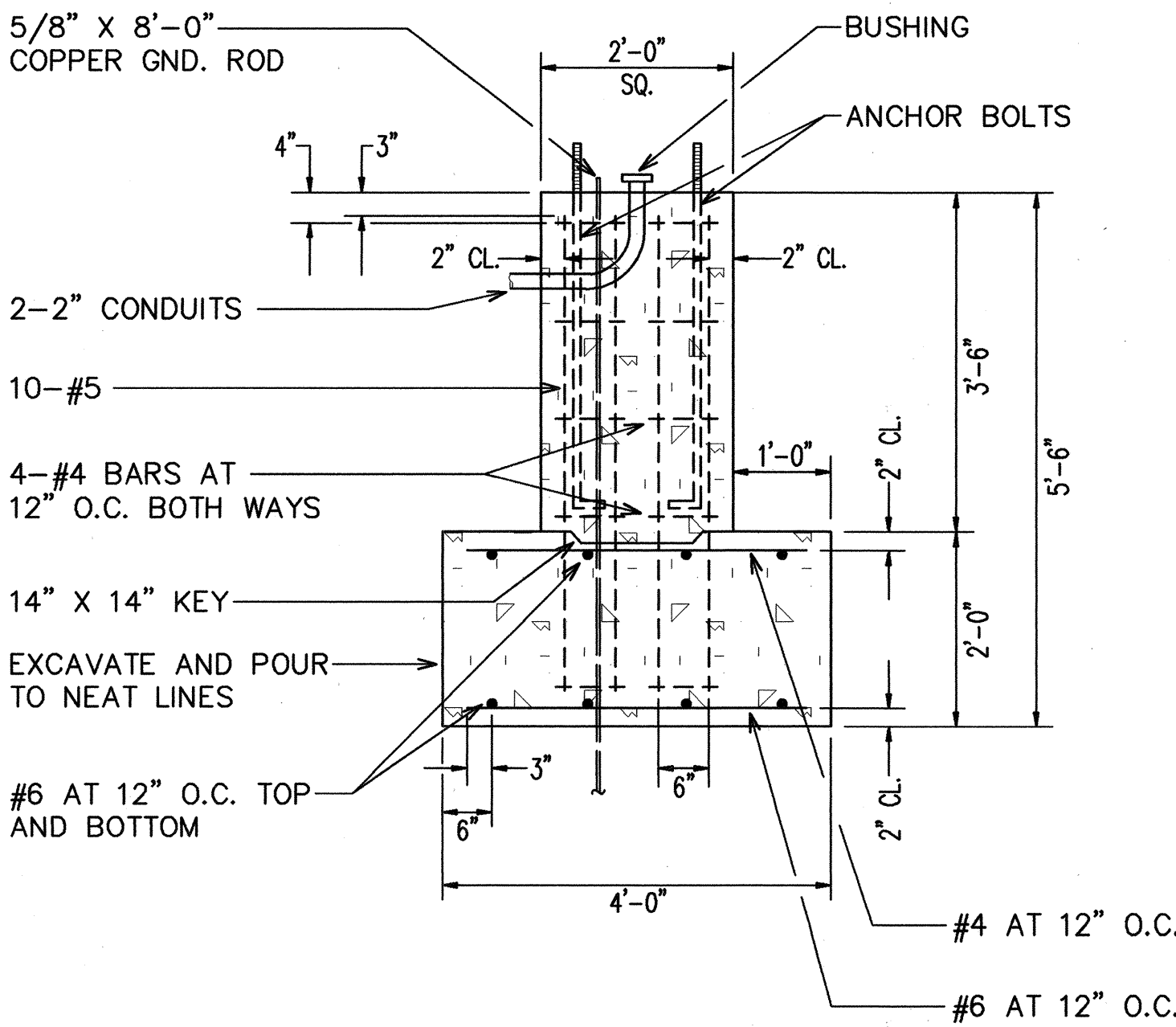
TRAFFIC SIGNAL NOTES:

1. LOCATIONS OF EXISTING UNDERGROUND STRUCTURES AND UTILITIES SUCH AS PIPELINES, CONDUITS, CABLES, ETC., SHOWN ON PLANS ARE APPROXIMATE ONLY. IT IS NOT THE INTENT OF THESE PLANS TO SHOW THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES WITH THE RESPECTIVE OWNERS. EXISTING UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN COST.
2. THE LOCATIONS OF THE TRAFFIC SIGNAL STANDARDS, TRAFFIC SIGNAL STANDARDS WITH MAST-ARM, PEDESTRIAN PUSH BUTTONS, TRAFFIC CONTROLLER CABINET, PULL-BOXES, CONDUITS AND LOOP DETECTORS SHALL BE STAKED OUT IN THE FIELD BY THE CONTRACTOR AND APPROVAL OF THE LOCATIONS SHALL BE OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION AND INSTALLATION.
3. ALL TRAFFIC SIGNAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", FEDERAL HIGHWAY ADMINISTRATION (1984) AND AMENDMENTS.
4. LOCATIONS OF TRAFFIC MARKINGS AND MARKERS (LANE LINES, STOP LINES, CROSS-WALK, ETC.) SHOWN ON THE PLANS SHALL BE VERIFIED WITH THE ENGINEER PRIOR TO THE INSTALLATION OF THE TRAFFIC SIGNAL SYSTEM.
5. MAINTENANCE OF TRAFFIC THROUGH THE CONSTRUCTION AREA SHALL BE IN ACCORDANCE WITH PART VI OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", FEDERAL HIGHWAY ADMINISTRATION (1984) AND AS SPECIFIED IN THE SPECIAL PROVISIONS. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ADEQUATE BARRICADES, BLINKERS, CONSTRUCTION SIGNS, ETC., FOR THE SAFETY OF THE PUBLIC.
6. ALL TRAFFIC SIGNAL CONTROLLER EQUIPMENT SHALL BE COMPLETELY WIRED IN THE CABINET AND SHALL CONTROL THE TRAFFIC SIGNALS AS CALLED FOR IN THE PLANS.
7. SIGNAL INDICATIONS DURING CLEARANCE INTERVAL:
  - A. IF A SIGNAL IS G OR  $\neg G$  AND WILL REMAIN G OR  $\neg G$  DURING THE NEXT PHASE, IT SHALL BE G OR  $\neg G$  DURING THE CLEARANCE INTERVAL.
  - B. IF A SIGNAL IS G OR  $\neg G$  AND WILL BECOME R OR EXTINGUISHED DURING THE NEXT PHASE, IT SHALL BE Y OR  $\neg Y$  DURING THE CLEARANCE INTERVAL.
  - C. IF THE SIGNAL IS R AND WILL REMAIN R OR BECOMES G DURING THE NEXT PHASE, IT SHALL REMAIN R DURING THE CLEARANCE INTERVAL.
8. A SOLID #8 BARE COPPER WIRE SHALL BE PULLED WITH THE TRAFFIC CONTROL CABLE FOR EQUIPMENT GROUND. COST SHALL BE INCIDENTAL TO THE INSTALLATION OF THE CONTROL CABLE.
9. CONTRACTOR SHALL INSTALL METER SOCKET AND BREAKER ON TRAFFIC SIGNAL CABINET AS SHOWN ON PLANS. METER SHALL BE MOUNTED BETWEEN 5 FEET AND 7 FEET ABOVE GROUND. METER SOCKET SHALL BE 4-PRONG, COMPLETE WITH A MANUAL CIRCUIT CLOSING DEVICE.
10. THE FOLLOWING STATE STANDARD DETAILS SHALL BE USED:  
TE-38, TE-39, TE-41, TE-42

NOTE:  
KEY MAY BE OMITTED  
IF ENTIRE FOOTING IS  
POURED MONOLITHICALLY

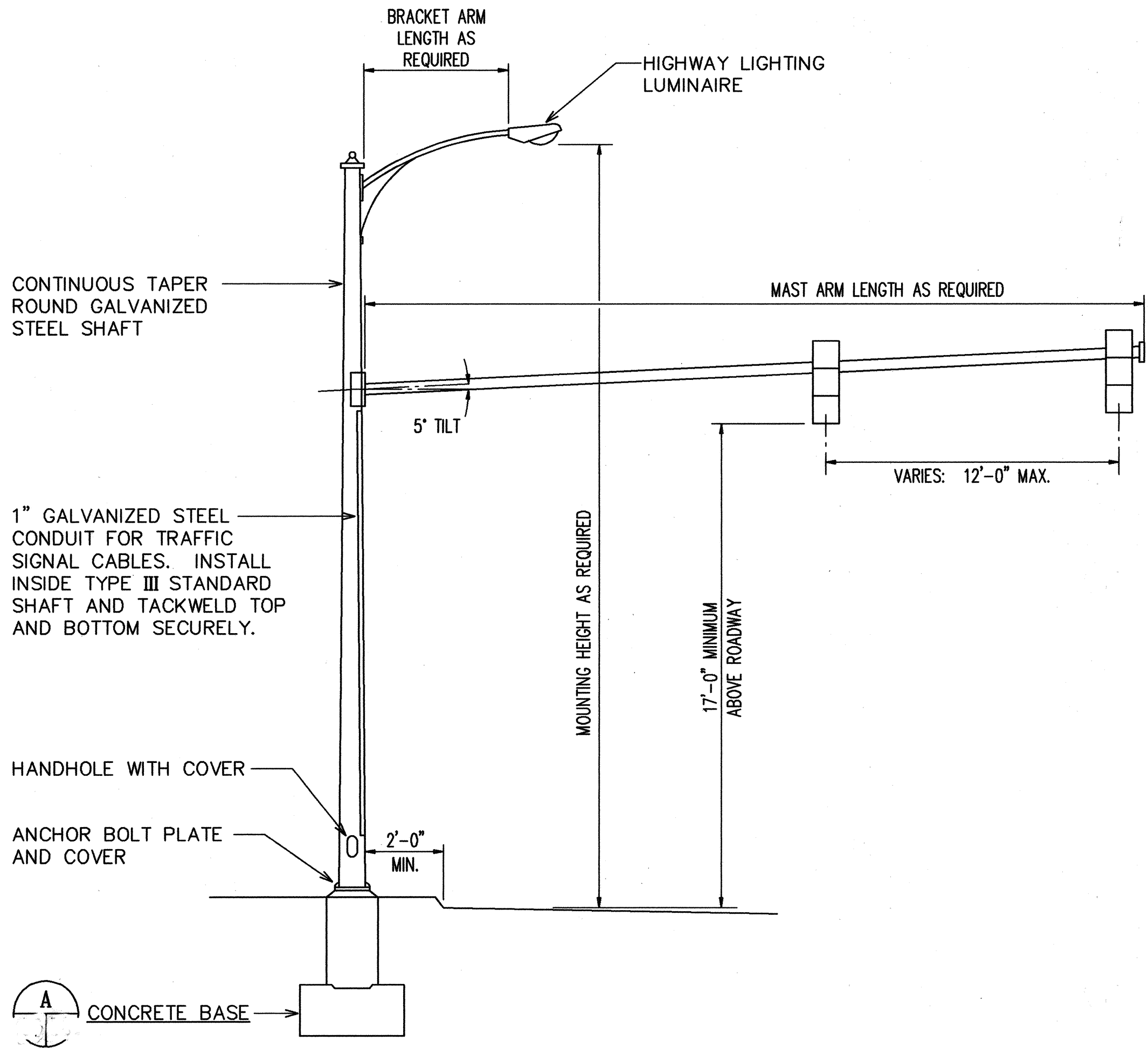


TOP VIEW



ELEVATION

**A** CONCRETE BASE FOR TYPE III STANDARD  
65/65 NOT TO SCALE



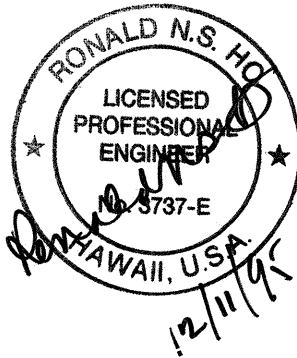
NOTES:

1. ITEM FOR TYPE III TRAFFIC SIGNAL STANDARD WITH MAST ARM AND FOUNDATION INCLUDES HIGHWAY LIGHTING BRACKET ARM.
2. HIGHWAY LIGHTING LUMINAIRE TO BE PAID FOR UNDER RESPECTIVE ITEMS IN SECTION 622.
3. FOR ADDITIONAL DETAILS SEE STANDARD PLAN TE-38.
4. SIZE, LENGTH, AND DIAMETER OF ANCHOR BOLTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER. CONTRACTOR SHALL SUBMIT CATALOG CUTS TO THE ENGINEER FOR APPROVAL.

**B** TRAFFIC SIGNAL/ST. LT. STANDARD  
36/65 NOT TO SCALE

DESIGNED BY	DATE
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

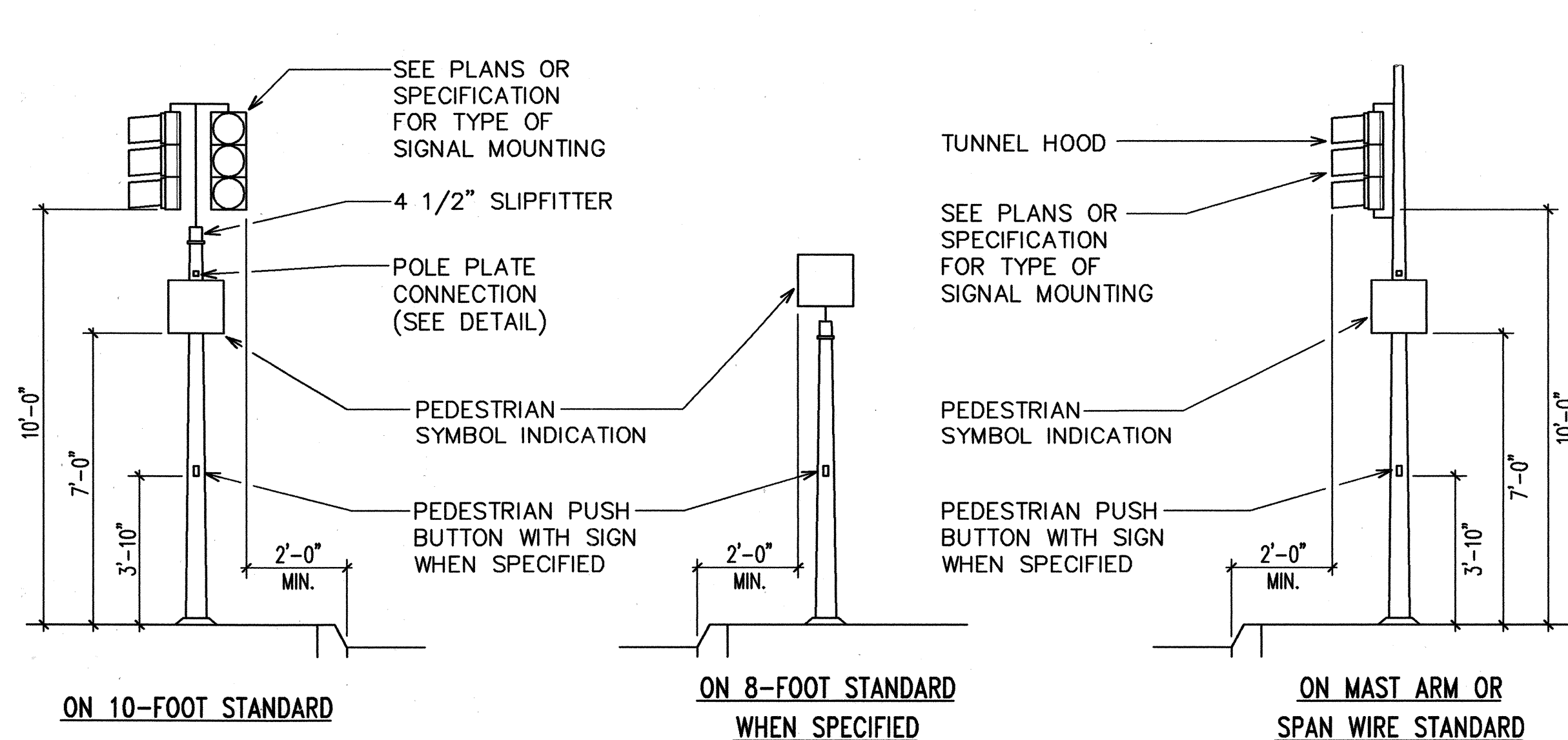
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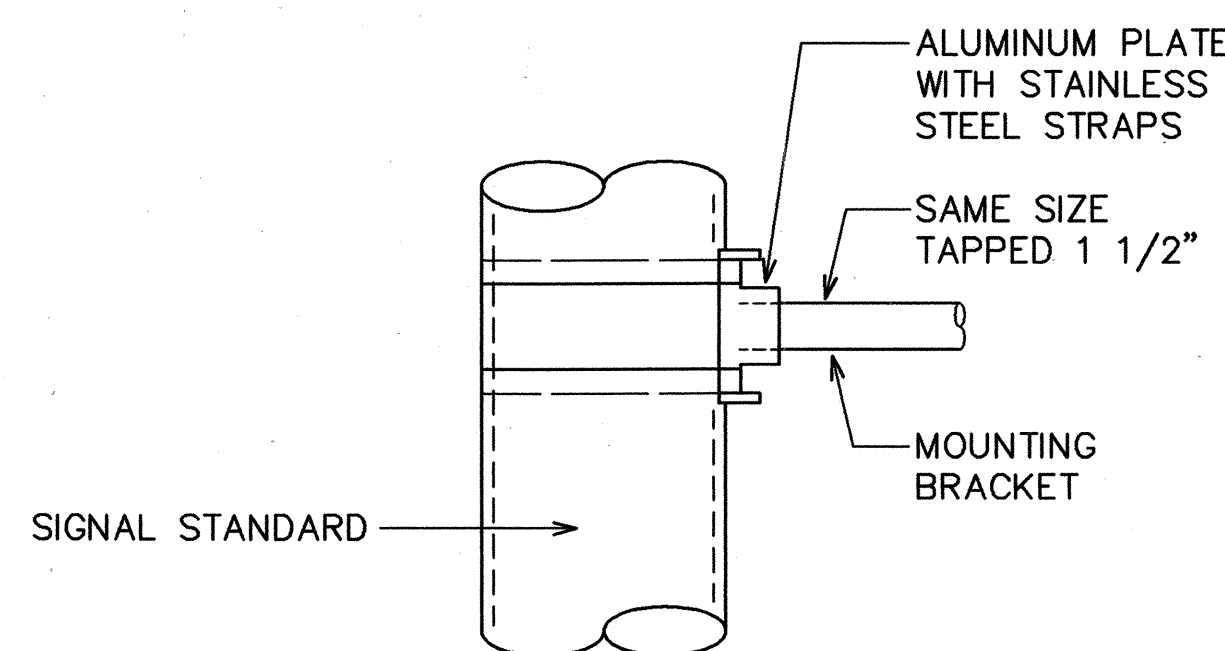
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**TRAFFIC SIGNAL NOTES,  
MISCELLANEOUS TRAFFIC  
SIGNAL DETAILS**  
KUNIA ROAD WIDENING; AND  
H-1, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)  
SCALE: AS NOTED  
DATE: APRIL 1994

SHEET No. 3 OF 6 SHEETS

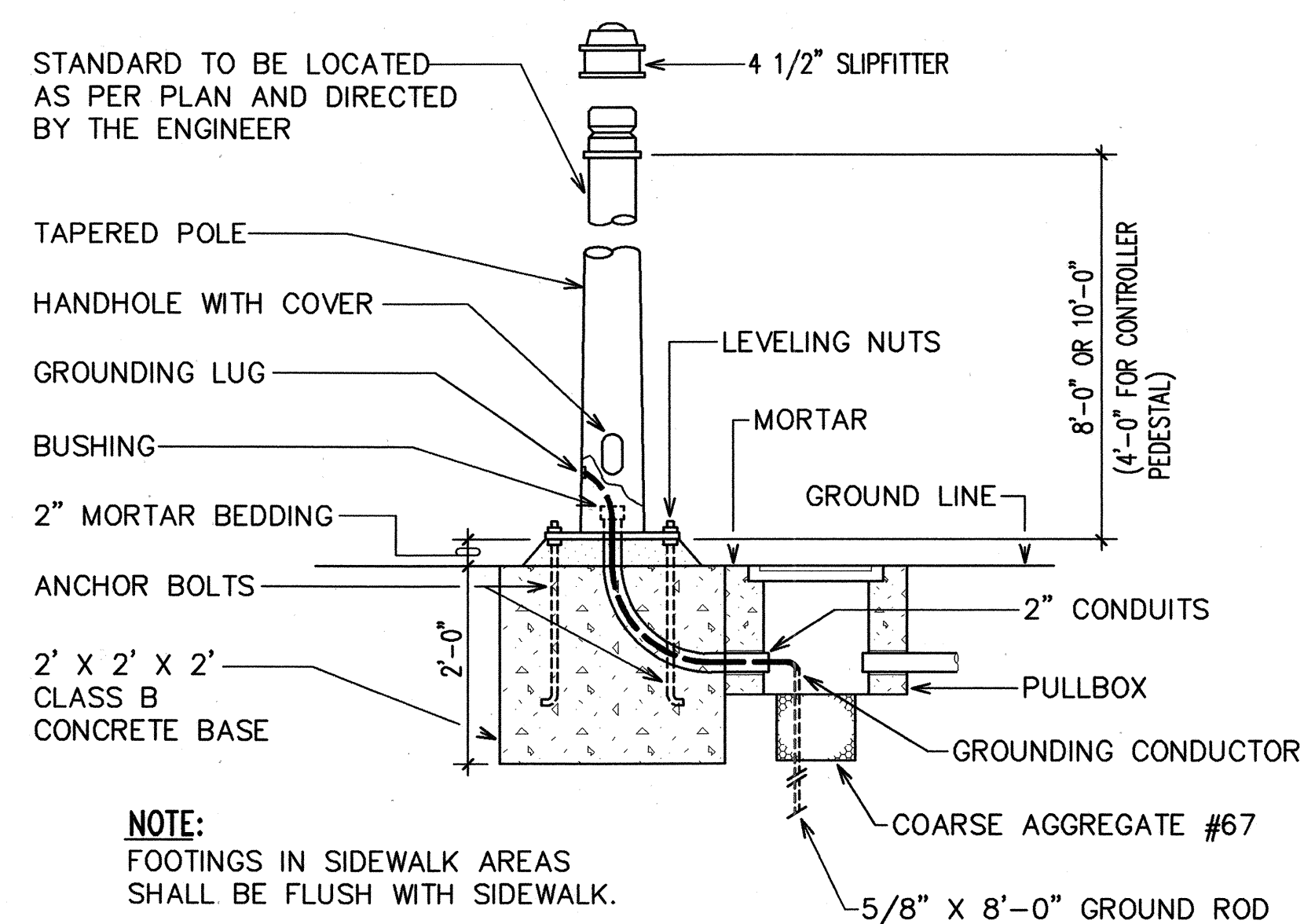
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1999	66	97



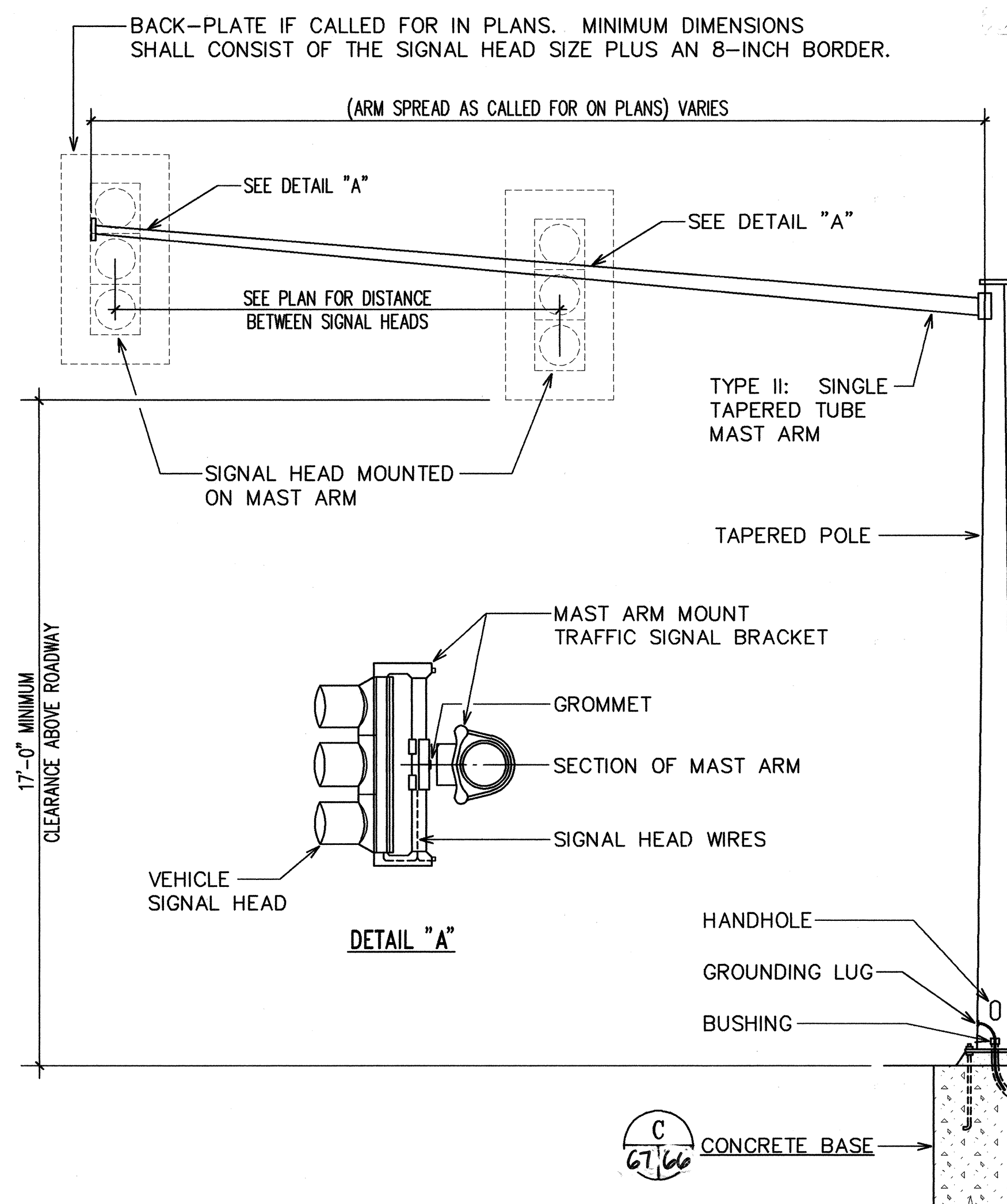
**A** TYPICAL EQUIPMENT MOUNTINGS  
59/66 NOT TO SCALE  
57,58



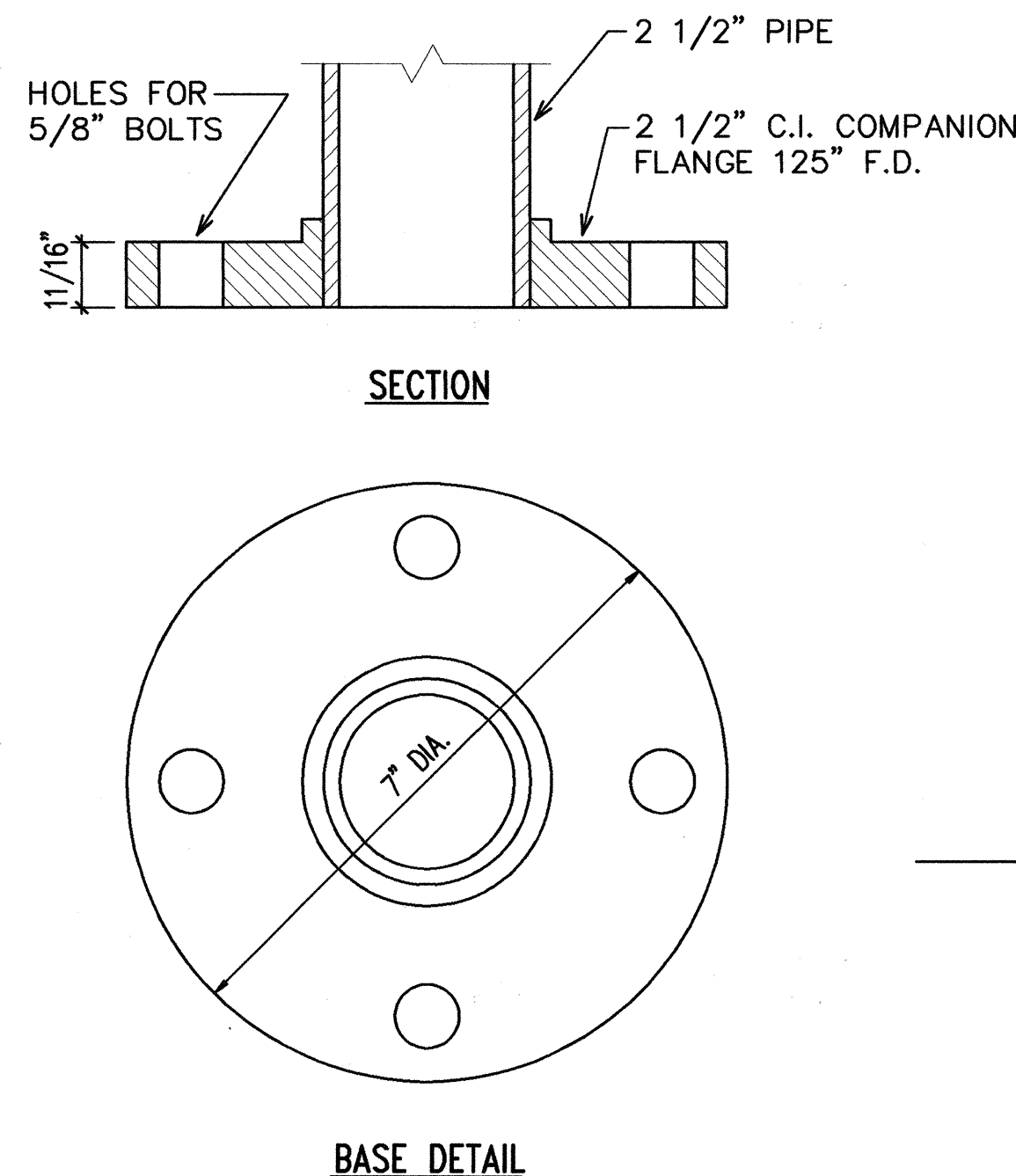
**B** DETAIL OF POLE PLATE CONNECTIONS  
66/66 NOT TO SCALE



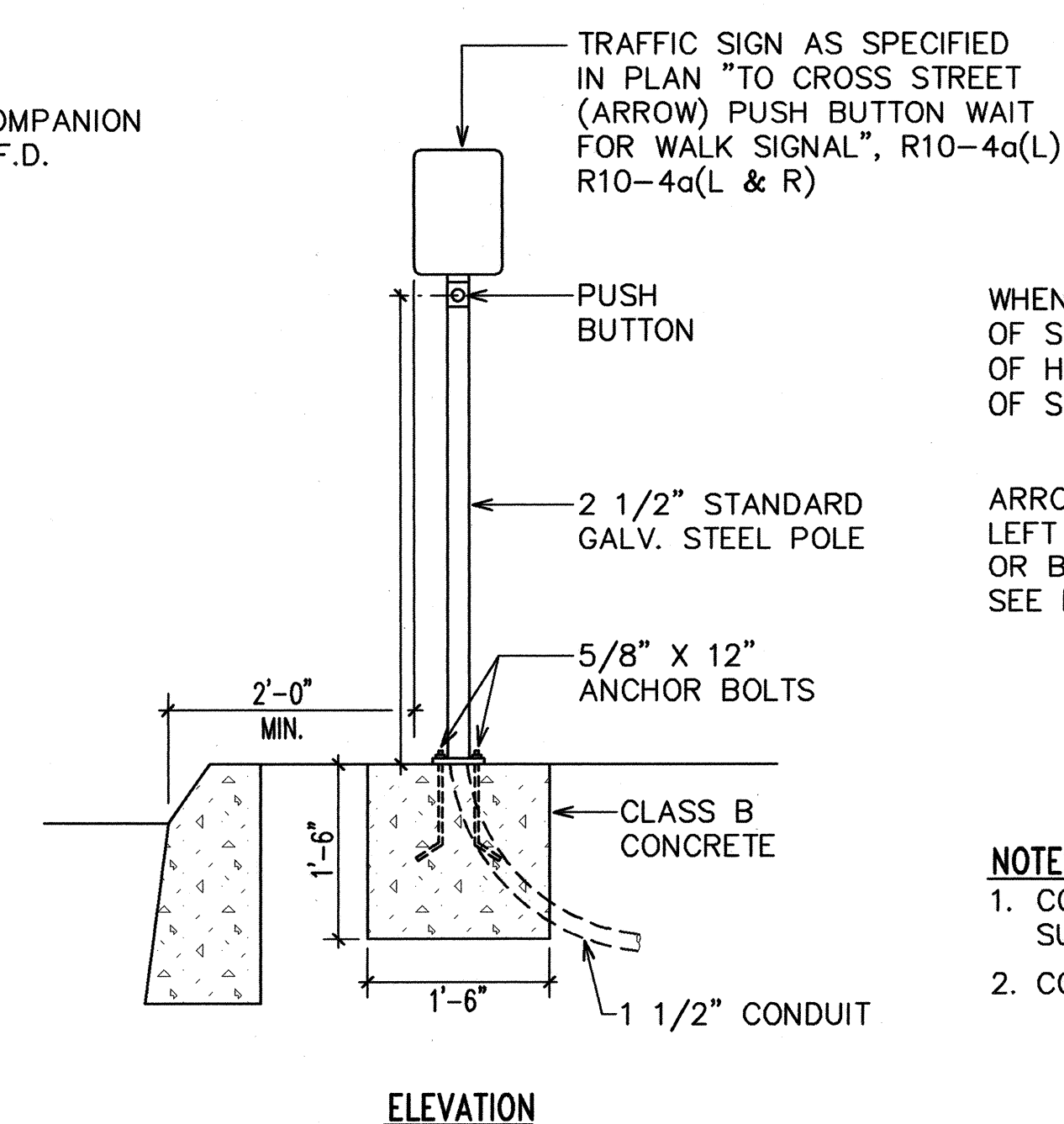
**C** TYPE I SIGNAL STANDARD OR CONTROLLER PEDESTAL AND FOOTING  
59/66 NOT TO SCALE  
37,51,58



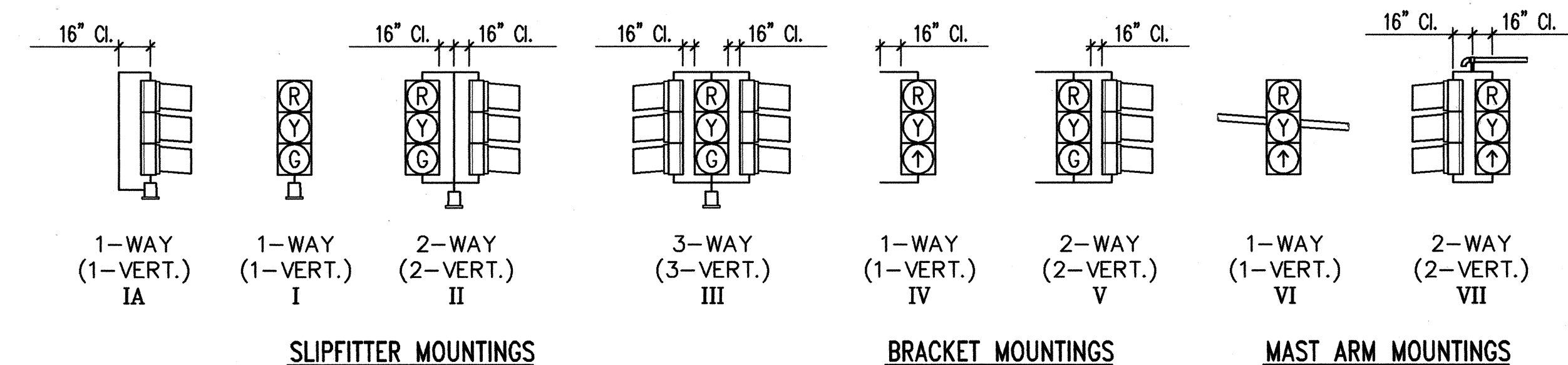
**E** TYPE II MAST ARM AND STANDARD  
66/66 NOT TO SCALE



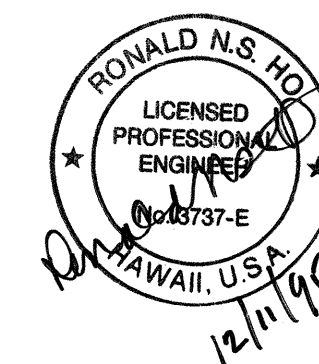
**D** PEDESTRIAN PUSH BUTTON POST AND FOOTING  
59/66 NOT TO SCALE  
51,58



- NOTES:**
- CONDUITS SHALL PROTRUDE 2" MAX. ABOVE FINISHED SURFACE OF FOUNDATION.
  - CONDUITS SHALL SLOPE AWAY FROM POLE FOUNDATION.



**F** TYPICAL VEHICULAR AND PEDESTRIAN SIGNAL MOUNTINGS  
59/66 NOT TO SCALE  
57,58



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

MISCELLANEOUS TRAFFIC  
SIGNAL DETAILS

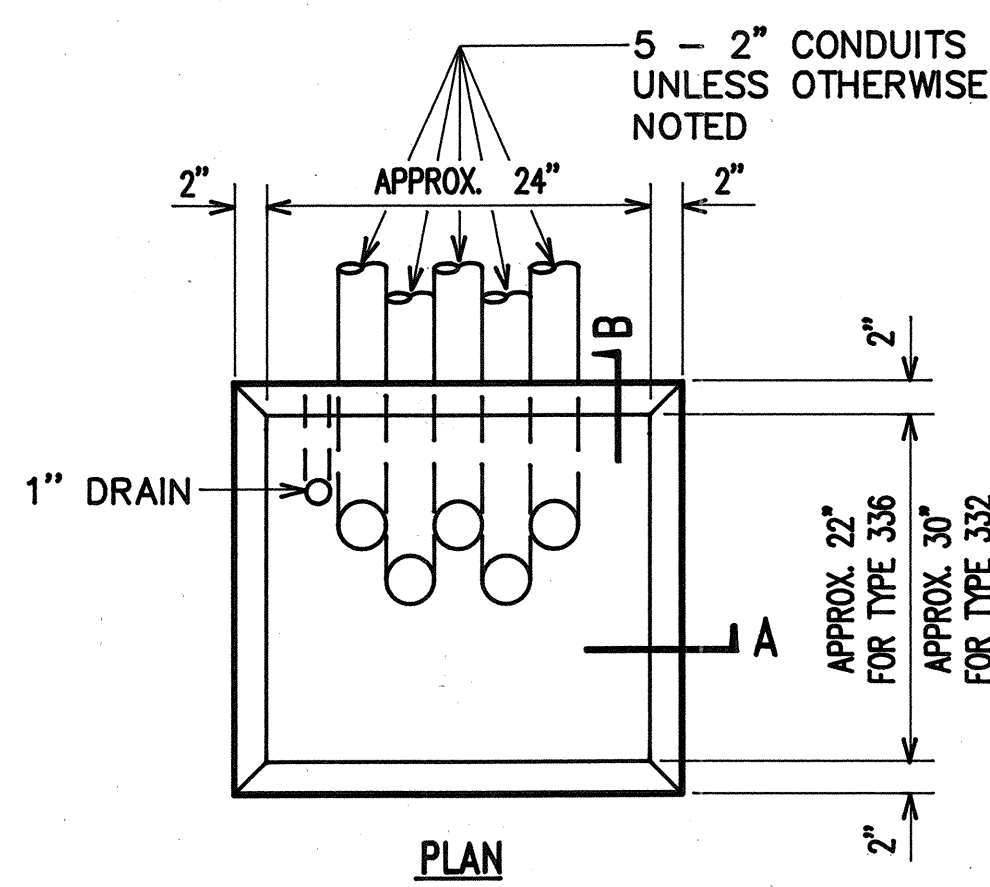
KUNIA ROAD WIDENING; AND  
H-I, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)

SCALE: AS NOTED DATE: APRIL 1999

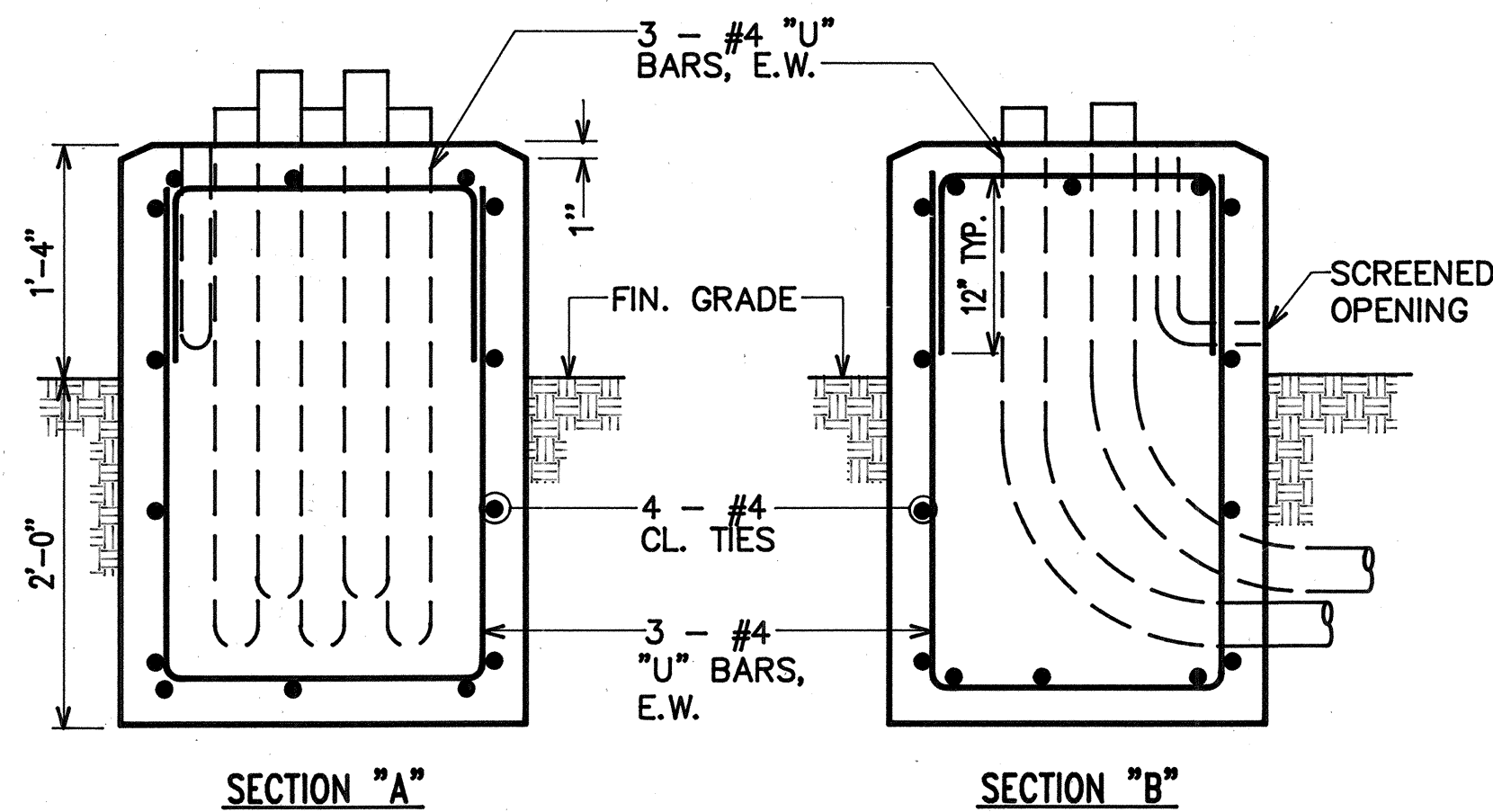
SHEET No. 4 OF 6 SHEETS



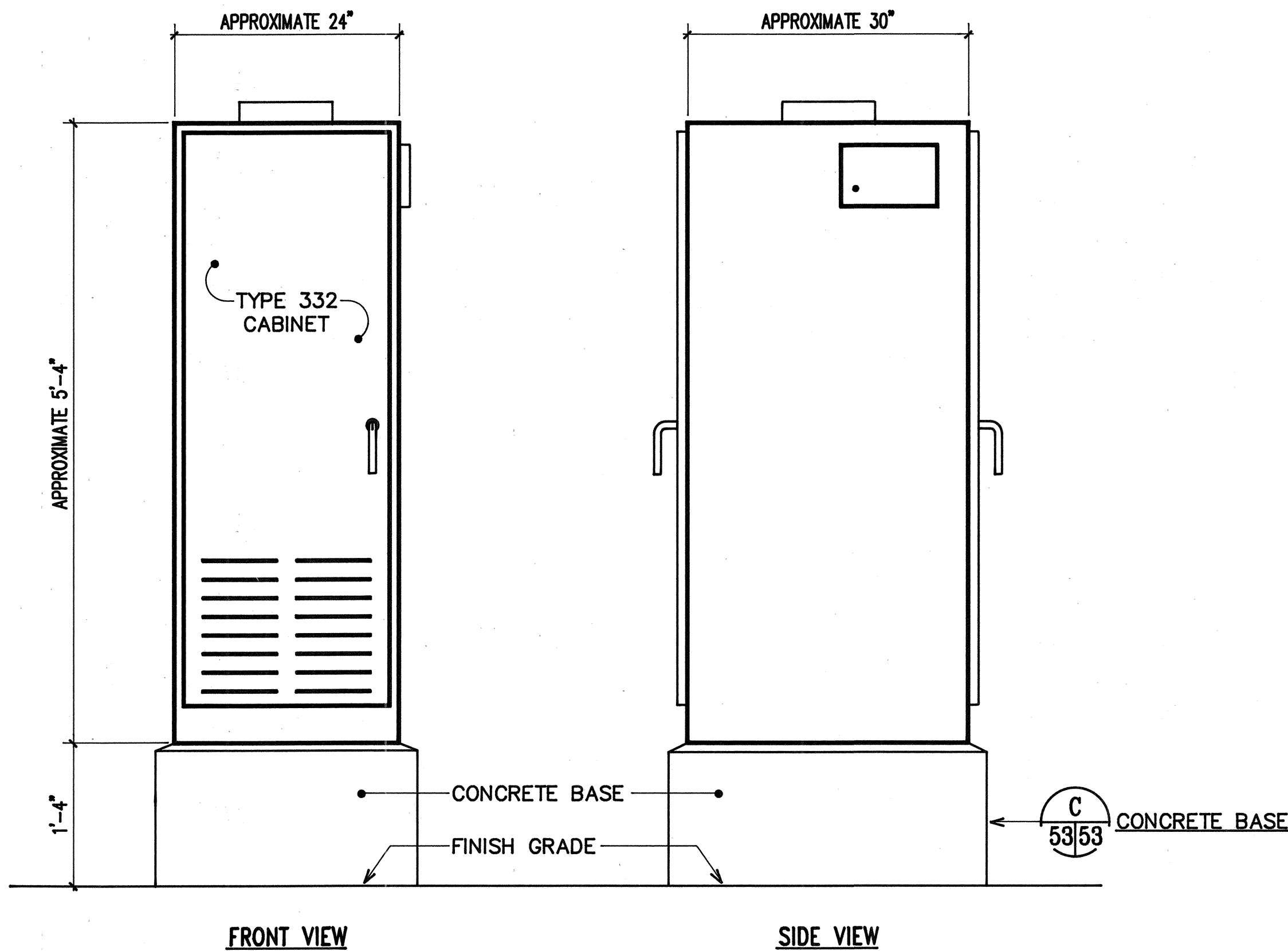
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1999	61	97



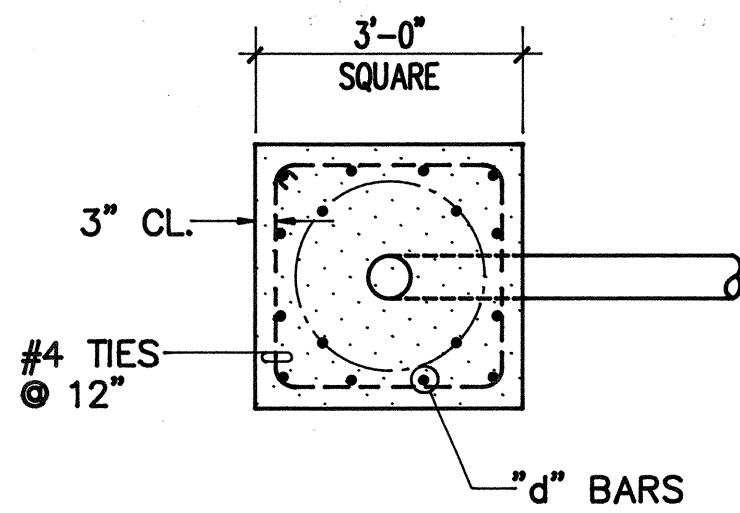
- NOTE(S):
1. CONCRETE SHALL BE CLASS "B".
  2. DIMENSIONS SHALL BE ALTERED TO SUIT CONTROLLER CABINET ACTUALLY FURNISHED.
  3. CONDUIT BENDS AND DRAIN ARE INCIDENTAL TO CONCRETE BASE.
  4. REFER TO CABINET MANUFACTURER'S SPECIFICATIONS FOR DETAILS OF ANCHOR BOLTS AND BASE SETTING.
  5. ALL EXPOSED SURFACES OF CONCRETE BASE SHALL BE GIVEN A CLASS 2, RUBBED FINISH.



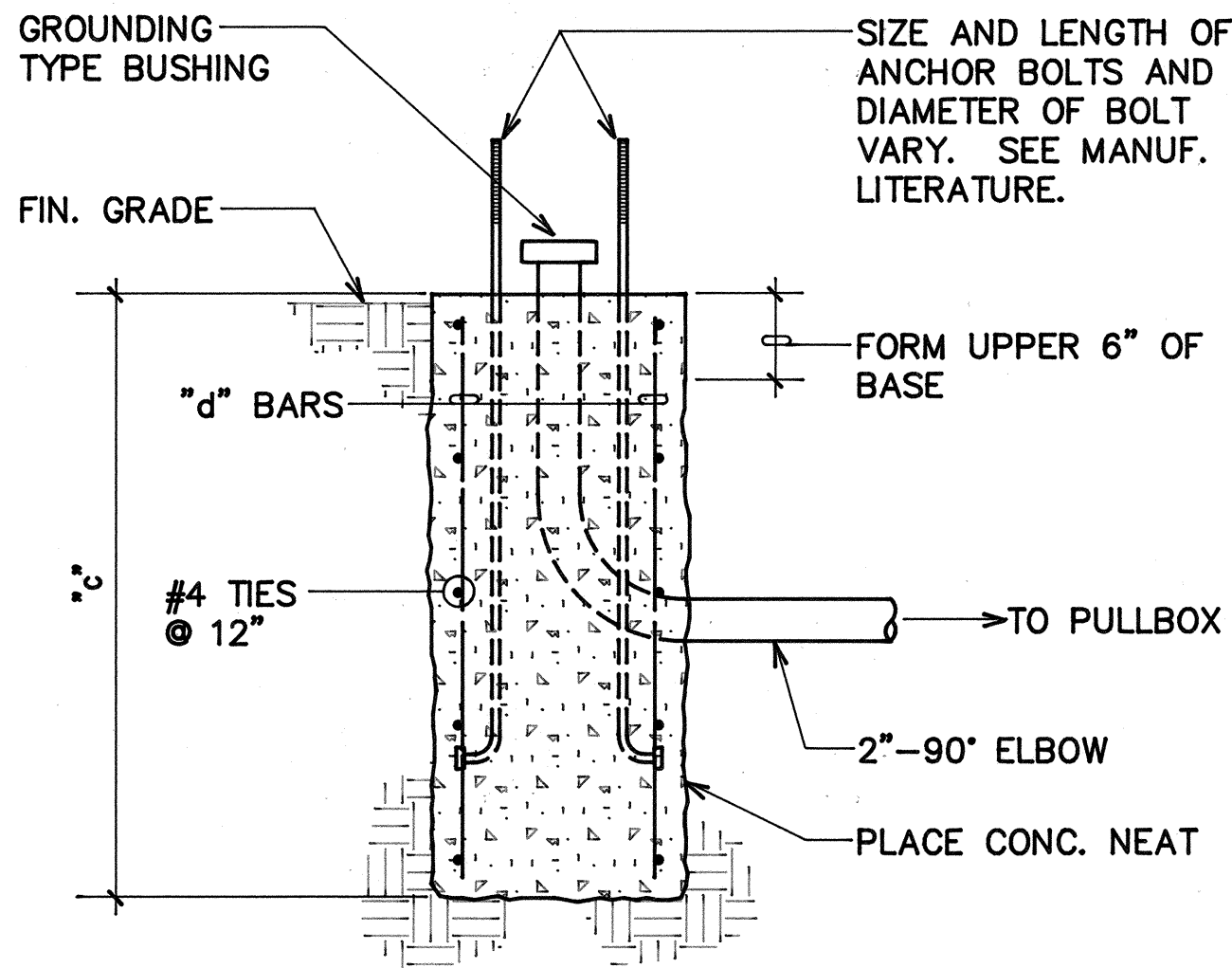
**A TYPE "D" CONCRETE BASE CONTROLLER CABINET**  
61/67 NOT TO SCALE



**B TYPE 332 TRAFFIC CONTROLLER**  
36/67 NOT TO SCALE



PLAN-SECTION



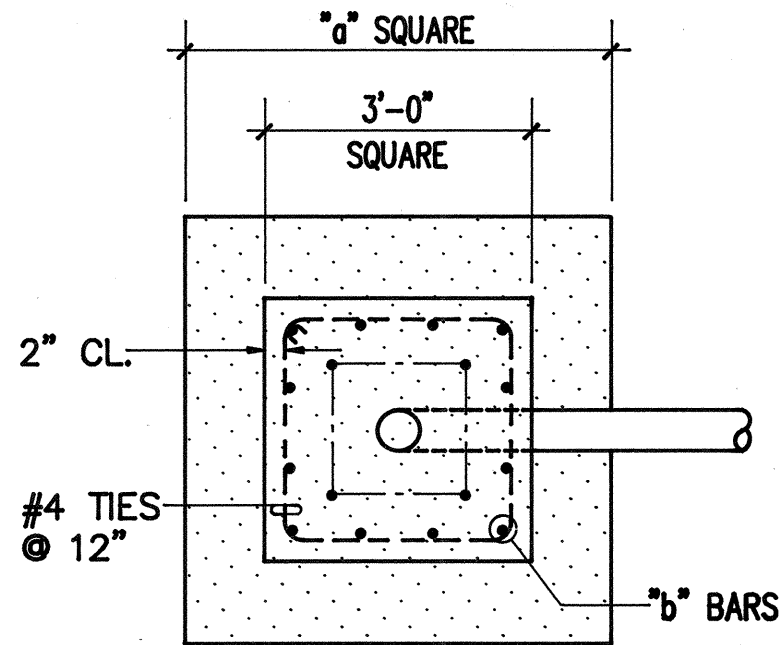
NOTES: CONCRETE SHALL BE CLASS B.

SECTION

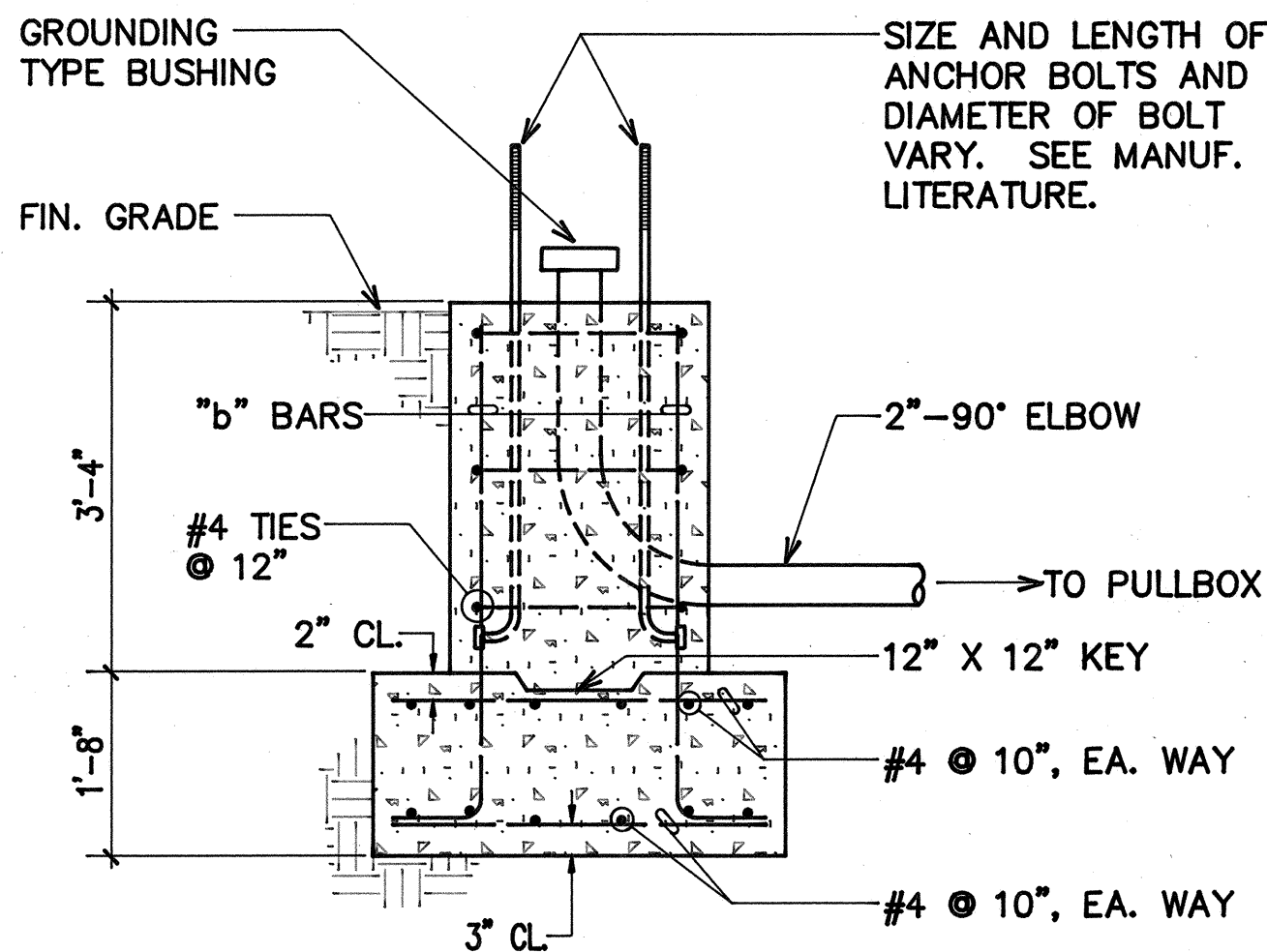
MAST ARM LENGTH	"c"	"d" BARS
16'-18'	5'-0"	12-#6
20'	5'-6"	12-#6
25'	6'-0"	12-#6
30'	6'-6"	12-#6
35'	7'-0"	12-#8
40'	8'-0"	12-#8

TYPE II

**C CONCRETE BASE FOR MAST ARM STANDARD**  
65/67 NOT TO SCALE



PLAN-SECTION



NOTES: CONCRETE SHALL BE CLASS B.

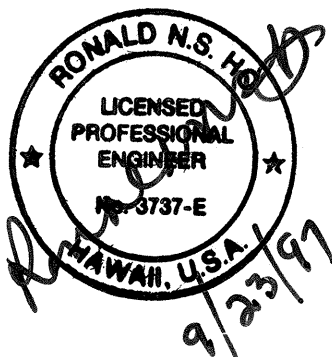
SECTION

MAST ARM LENGTH	"a"	"b" BARS
16'-18'	5'-0"	12-#6
20'	5'-6"	12-#6
25'	6'-0"	12-#6
30'	6'-6"	12-#8
35'	6'-6"	12-#8
40'	7'-0"	12-#8

TYPE IIA

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

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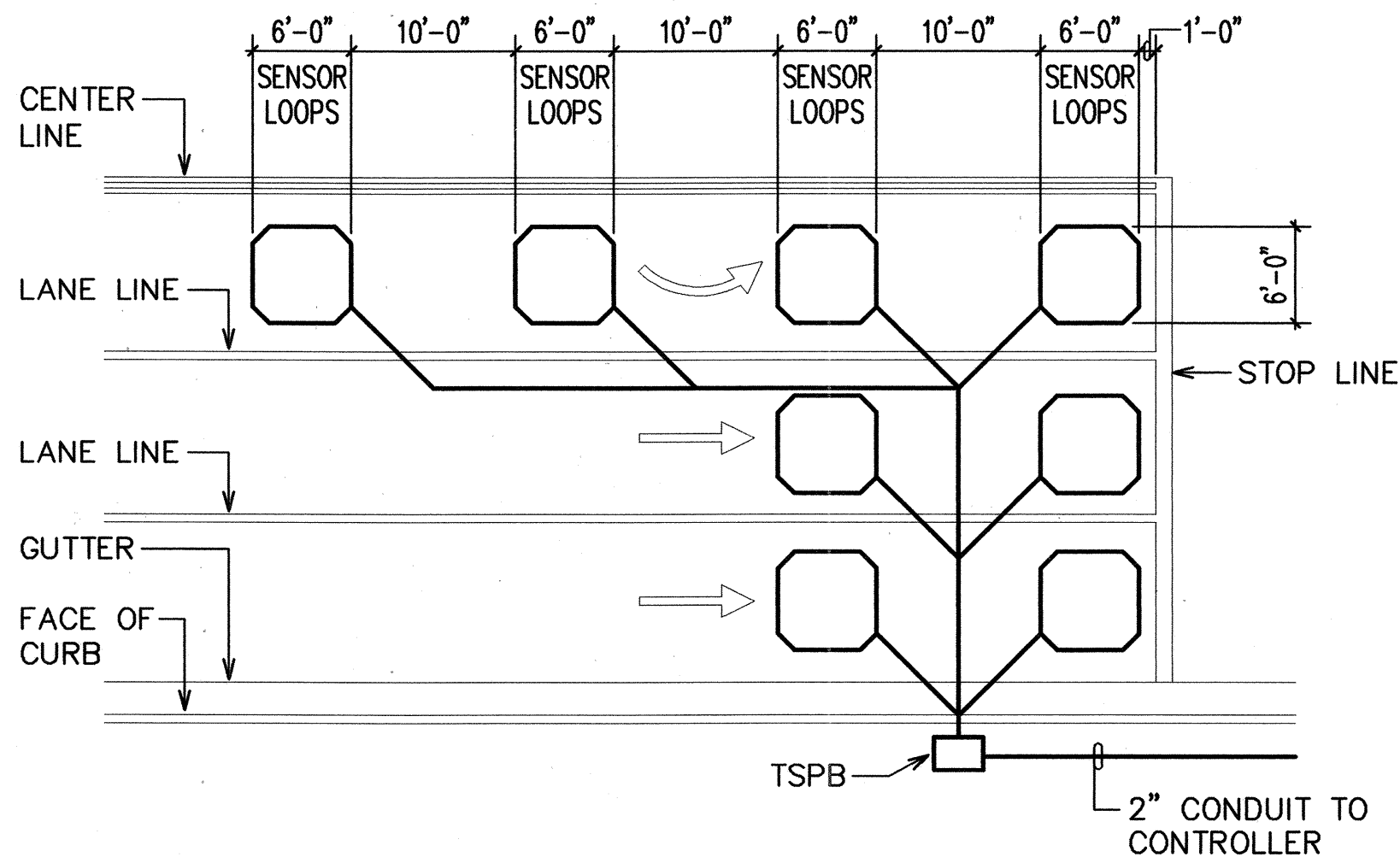
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

MISCELLANEOUS TRAFFIC  
SIGNAL DETAILS

KUNIA ROAD WIDENING; AND  
H-1, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)  
SCALE: AS NOTED DATE: APRIL 1999

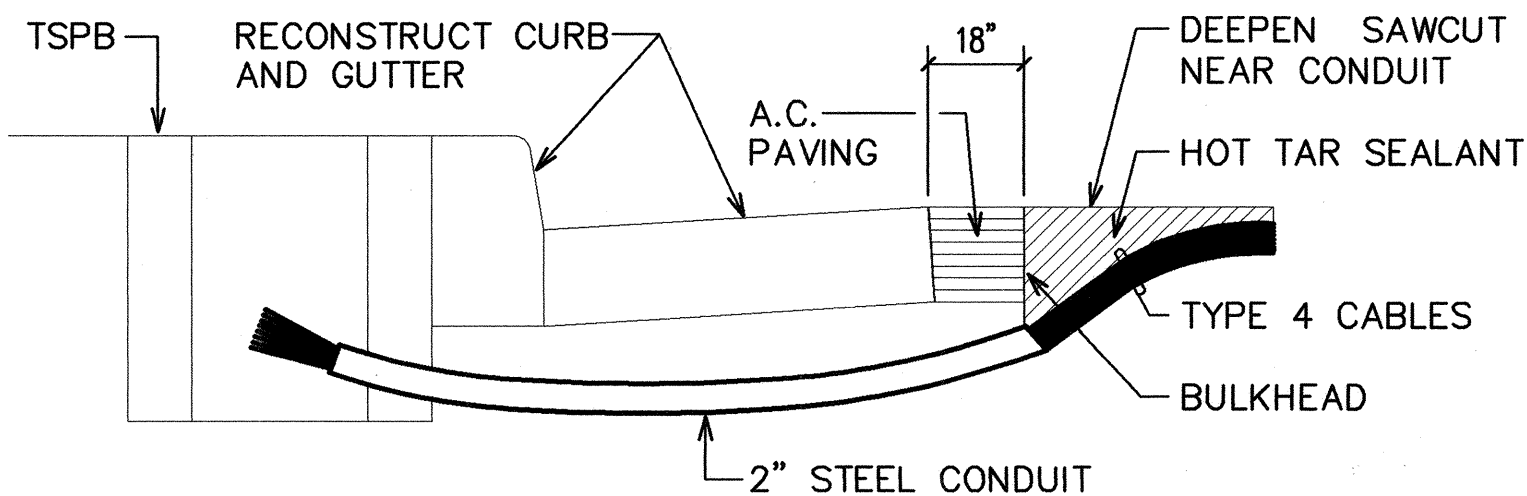
SHEET No. 5 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-STP-0750(10)	1999	68	97



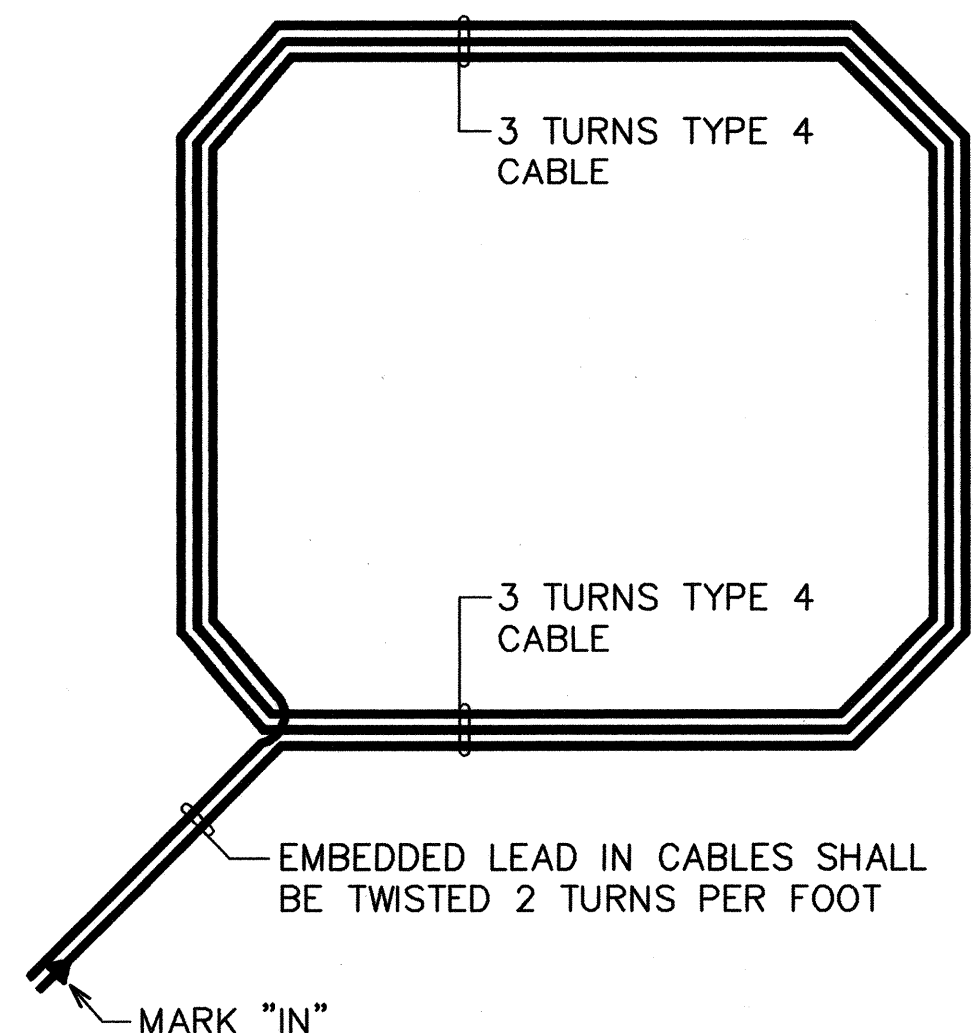
- NOTES:**
1. CENTER SENSOR LOOPS IN LANES.
  2. COLLECTOR CABLES SHALL BE TWISTED 2 TURNS PER FOOT.
  3. NUMBER OF LOOPS AND LOCATIONS VARY. SEE PROJECT PLANS.
  4. NUMBER AND LOCATIONS OF COLLECTOR SAWCUTS MAY BE VARIED IN THE FIELD TO SUIT.

TYPICAL SENSOR LOOP LAYOUT



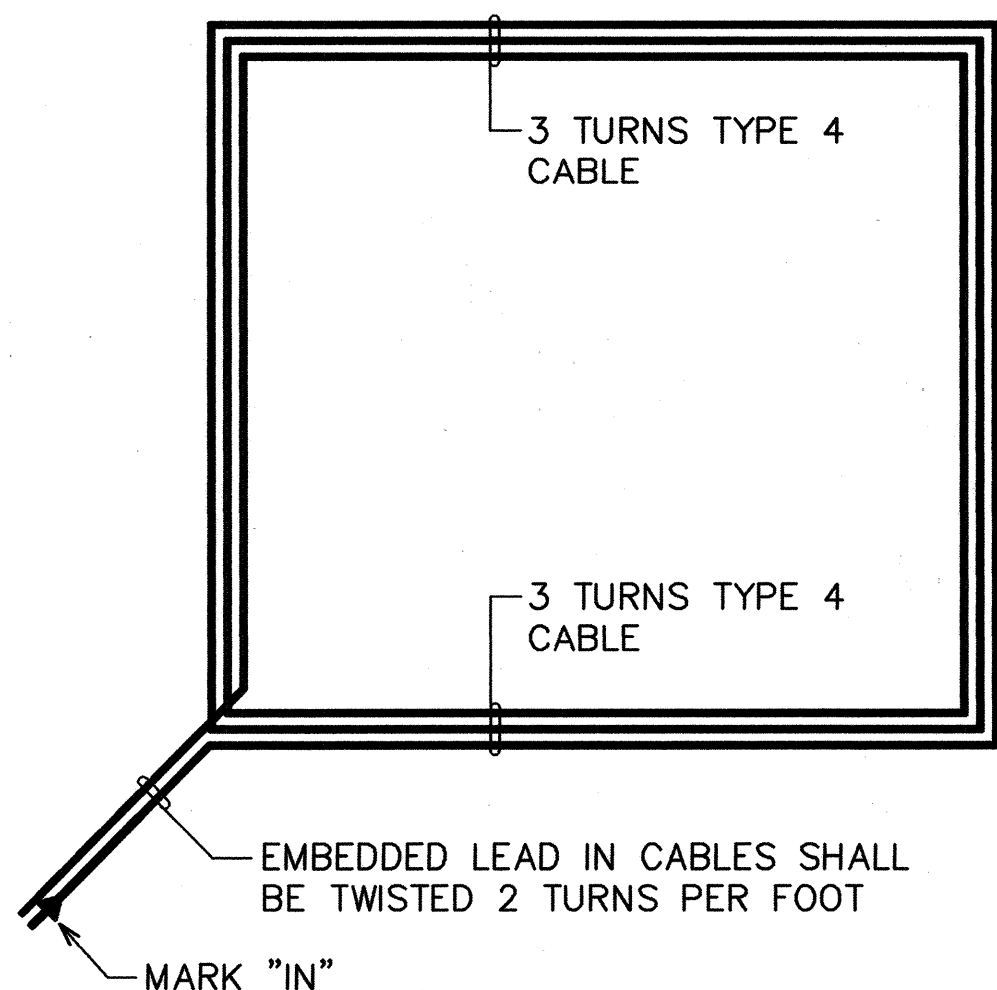
- NOTES ON CONSTRUCTION AT END OF SAWCUT**
1. SEAL ROADWAY END OF CONDUIT AFTER INSTALLATION OF CONDUCTORS.
  2. INSTALL BULKHEAD ACROSS CONDUIT TRENCH.
  3. PLACE HOT TAR IN SAWCUT.
  4. BACKFILL OVER CONDUIT WITH NEW A.C.
  5. RECONSTRUCT CURB AND GUTTER AS REQUIRED.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



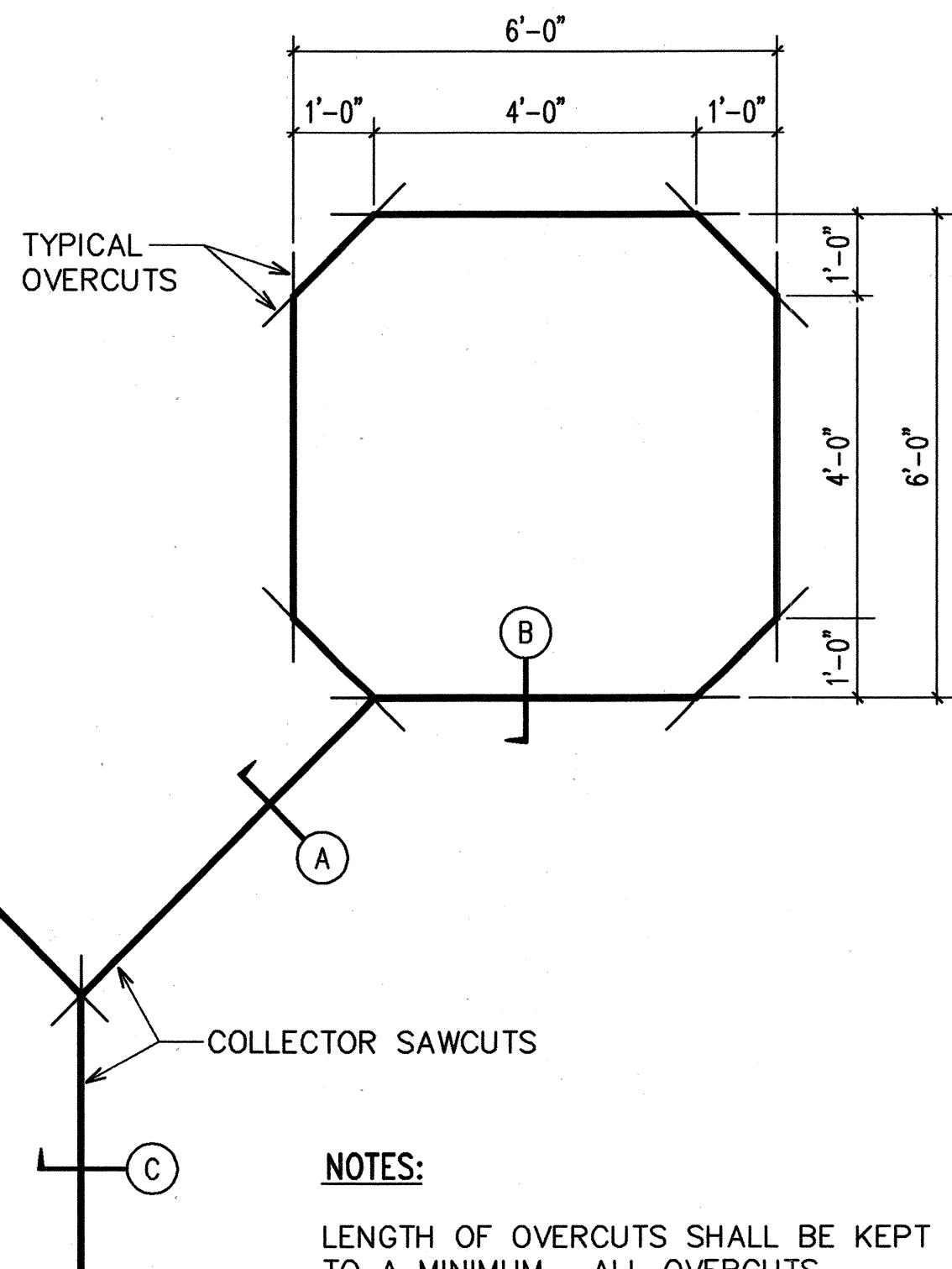
PLAN

TYPICAL SENSOR LOOP WIRING DIAGRAM

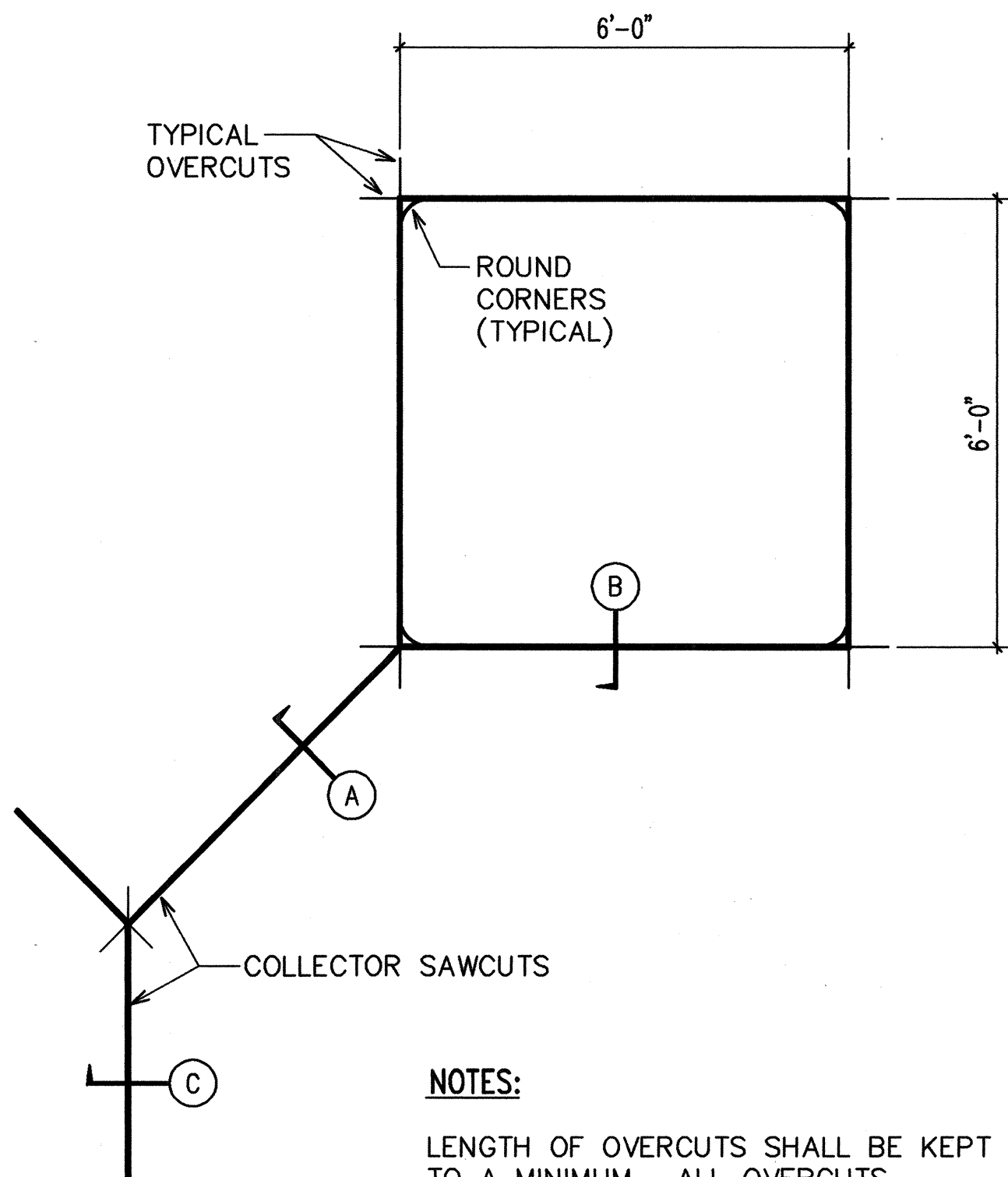


PLAN

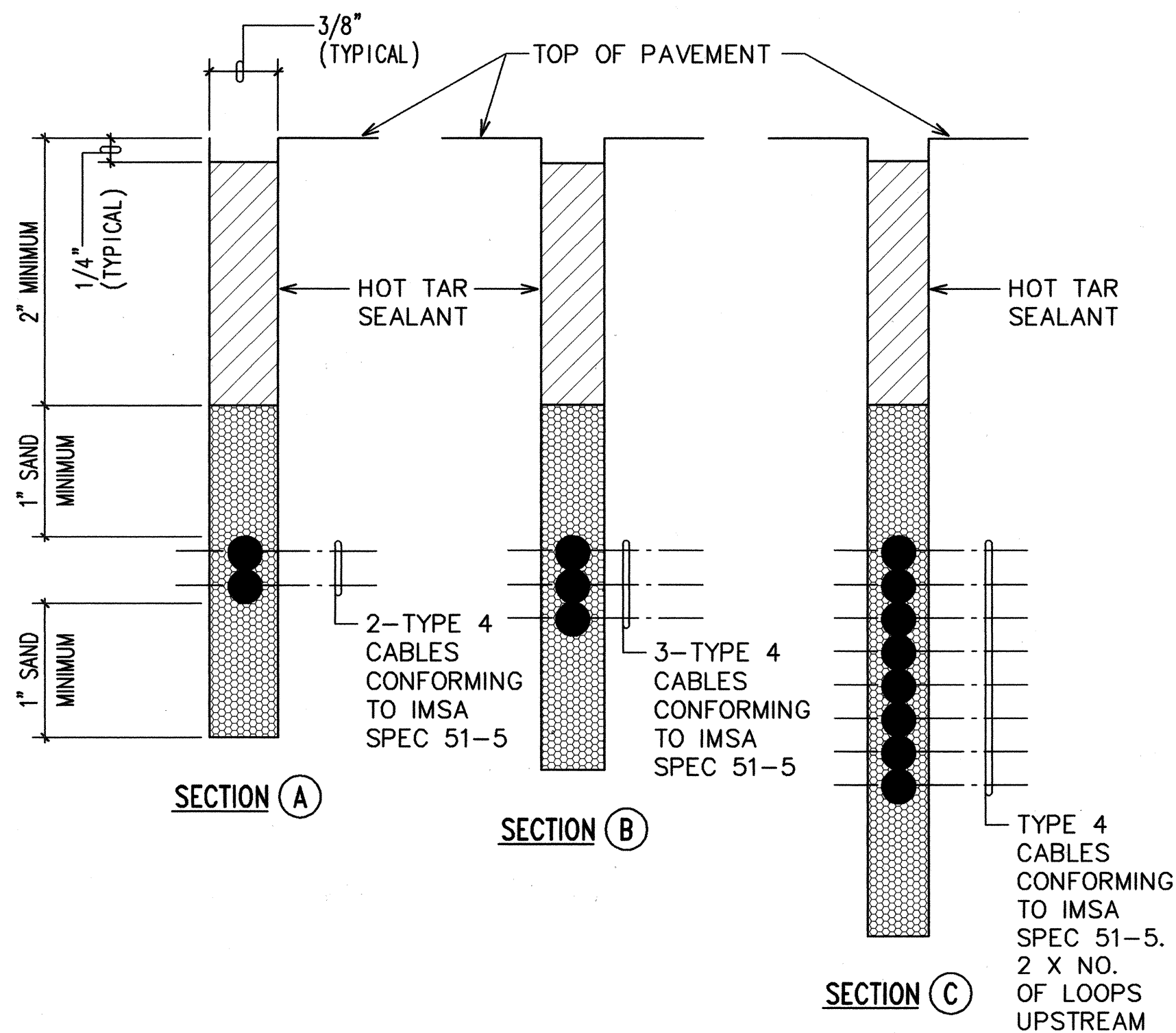
ALTERNATE SENSOR LOOP WIRING DIAGRAM



TYPICAL SENSOR LOOP SAWCUT DETAIL



ALTERNATE SENSOR LOOP SAWCUT DETAIL



SECTION A

SECTION B

SECTION C



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

## LOOP DETECTOR DETAILS

KUNIA ROAD WIDENING; AND  
H-1, KUNIA I.C., RAMP KO WIDENING  
F.A.I. PROJECT NO. IM-STP-0750(10)

SCALE: AS NOTED DATE: APRIL 1999

SHEET No. 6 OF 6 SHEETS