

STANDARD TO BE LOCATED AS PER PLAN AND DIRECTED BY THE ENGINEER

4 1/2" SLIPFITTER

TAPERED POLE

HANDHOLE WITH COVER

GROUNDING LUG

BUSHING

LEVELING NUTS

MORTAR

GROUND LINE

2" MORTAR BEDDING

2'-0"

ANCHOR BOLTS

2" CONDUITS

PULLBOX

GROUNDING CONDUCTOR

COARSE AGGREGATE #67

5/8" X 8'-0" GROUND ROD

10'-0", TYPICAL

UNLESS OTHERWISE NOTED

BACK-PLATE IF CALLED FOR IN PLANS. MINIMUM DIMENSIONS SHALL CONSIST OF THE SIGNAL HEAD SIZE PLUS AN 8-INCH BORDER.

(ARM SPREAD AS CALLED FOR ON PLANS) VARIES

SEE DETAIL "A"

SEE DETAIL "A"

SEE PLAN FOR DISTANCE BETWEEN SIGNAL HEADS

SIGNAL HEAD MOUNTED ON MAST ARM

TYPE II: SINGLE TAPERED TUBE MAST ARM

TAPERED POLE

20'-0"

17'-0" MINIMUM CLEARANCE ABOVE ROADWAY

DETAIL "A"

VEHICLE SIGNAL HEAD

MAST ARM MOUNT TRAFFIC SIGNAL BRACKET

GROMMET

SECTION OF MAST ARM

SIGNAL HEAD WIRES

HANDHOLE

GROUNDING LUG

BUSHING

TYPE "C" CONCRETE BASE, SEE SHEET E-9

ANCHOR BASE

PULLBOX

CONDUIT

5/8" X 8'-0" GROUND ROD

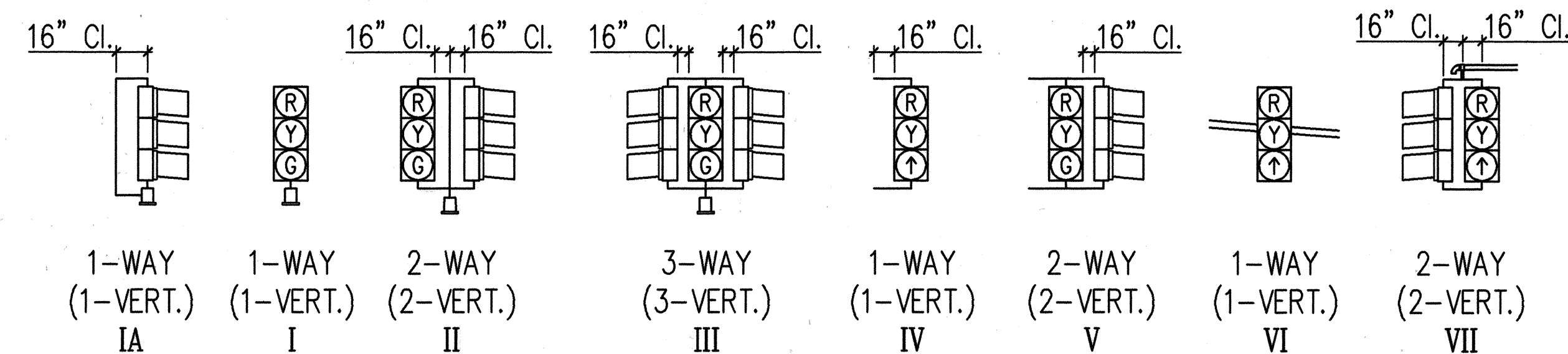
PROVIDE 4-2" CONDUITS BETWEEN MAST ARM POLE & TSPB

6" CL. 16" CL. 16" CL.

TYPE II MAST ARM AND STANDARD

NOT TO SCALE


NOT TO SCALE



MAST ARM MOUNTINGS

R
Y
←

RY↑



SYMBOL (MAN)
WHITE
BACKGROUND
OPAQUE

Technical drawings of the Type 332 cabinet, showing front and side views.

FRONT VIEW:

- Overall width: APPROX. 24"
- Overall height: APPROX. 5'-4"
- Label: TYPE 332 CABINET
- Base material: TYPE "D" CONC. BASE, SEE SHEET E-9
- Finish: FIN. GRADE

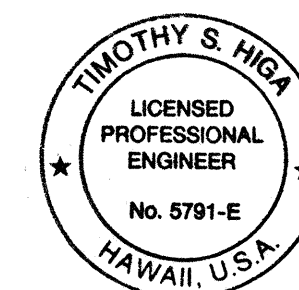
SIDE VIEW:

- Overall width: APPROX. 30"
- Overall height: APPROX. 5'-4"
- Base material: TYPE "D" CONC. BASE, SEE SHEET E-9
- Finish: FIN. GRADE

1
E-8

CONTROLLER CABINET - TYPE 332

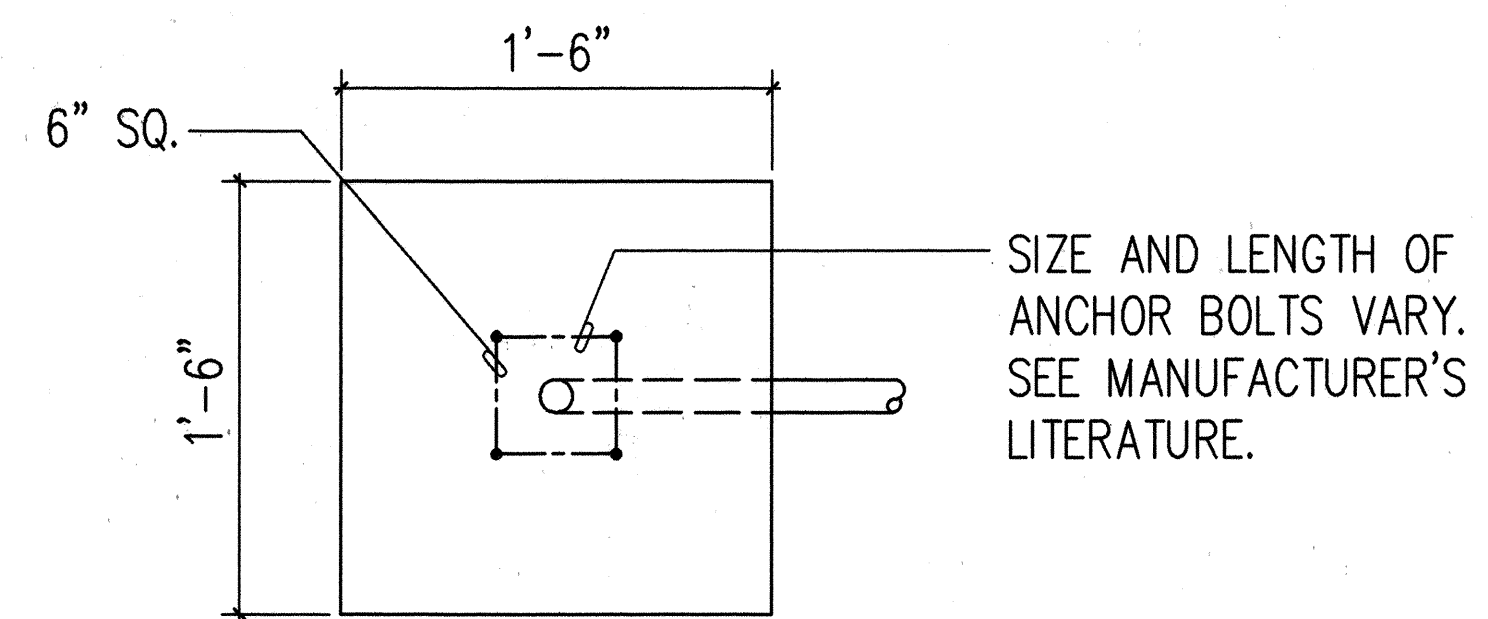
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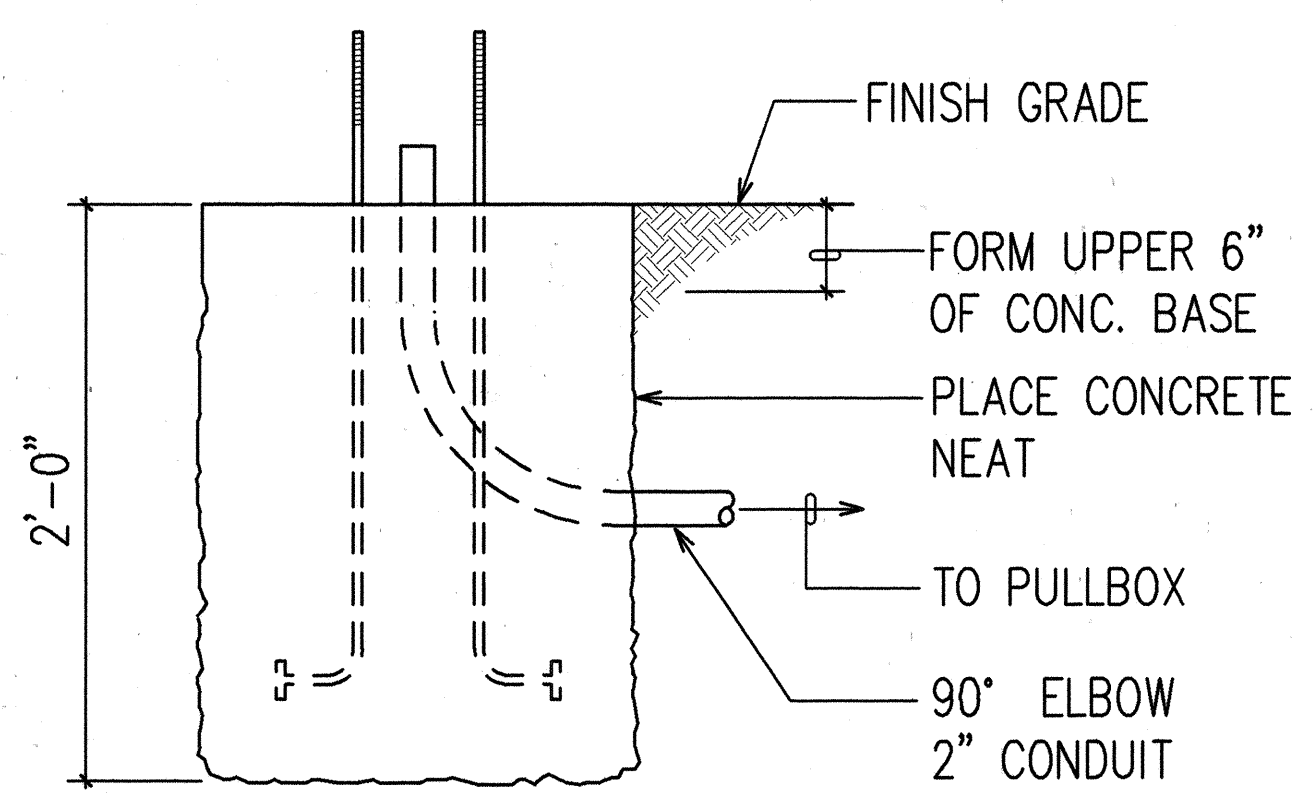
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L. S. Higa
RONALD N.S. HO & ASSOCIATES, INC.
2/16/97

SHEET No. E-8 OF E-13 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-96	1997	14	19



PLAN



SECTION

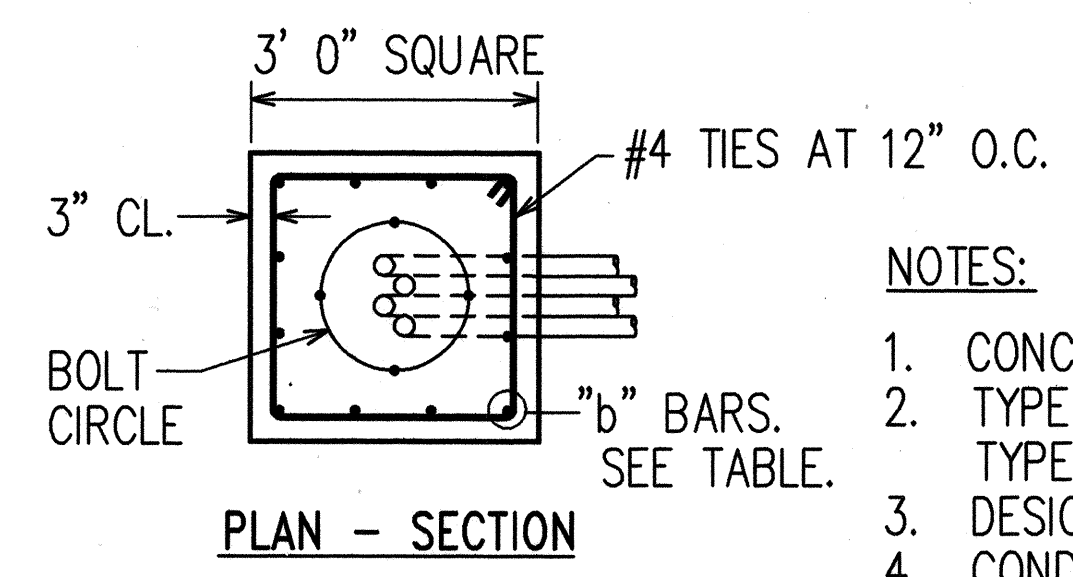
- NOTES:
1. CONCRETE SHALL BE CLASS "B".
 2. TYPE "A" CONCRETE BASE SHALL BE USED FOR TYPE I-10 AND I-8 STANDARDS.
 3. CONDUIT BEND IS INCIDENTAL TO CONCRETE BASE CONSTRUCTION.

TYPE "A" CONCRETE BASE
NOT TO SCALE

TYPE "C" CONCRETE BASE		
TYPE OF STANDARD	"a"	"b" BARS
II - 18	5' - 0"	12 - #6
II - 20	5' - 6"	12 - #6
* II - 25	6' - 0"	12 - #6
II - 30	6' - 6"	12 - #8
II - 35	7' - 0"	12 - #8
* II - 40	8' - 0"	12 - #8
III - 18	5' - 6"	12 - #6
III - 20	6' - 0"	12 - #6
III - 25	6' - 6"	12 - #8
III - 30	6' - 6"	12 - #8
III - 35	7' - 0"	12 - #8
III - 40	8' - 0"	12 - #8

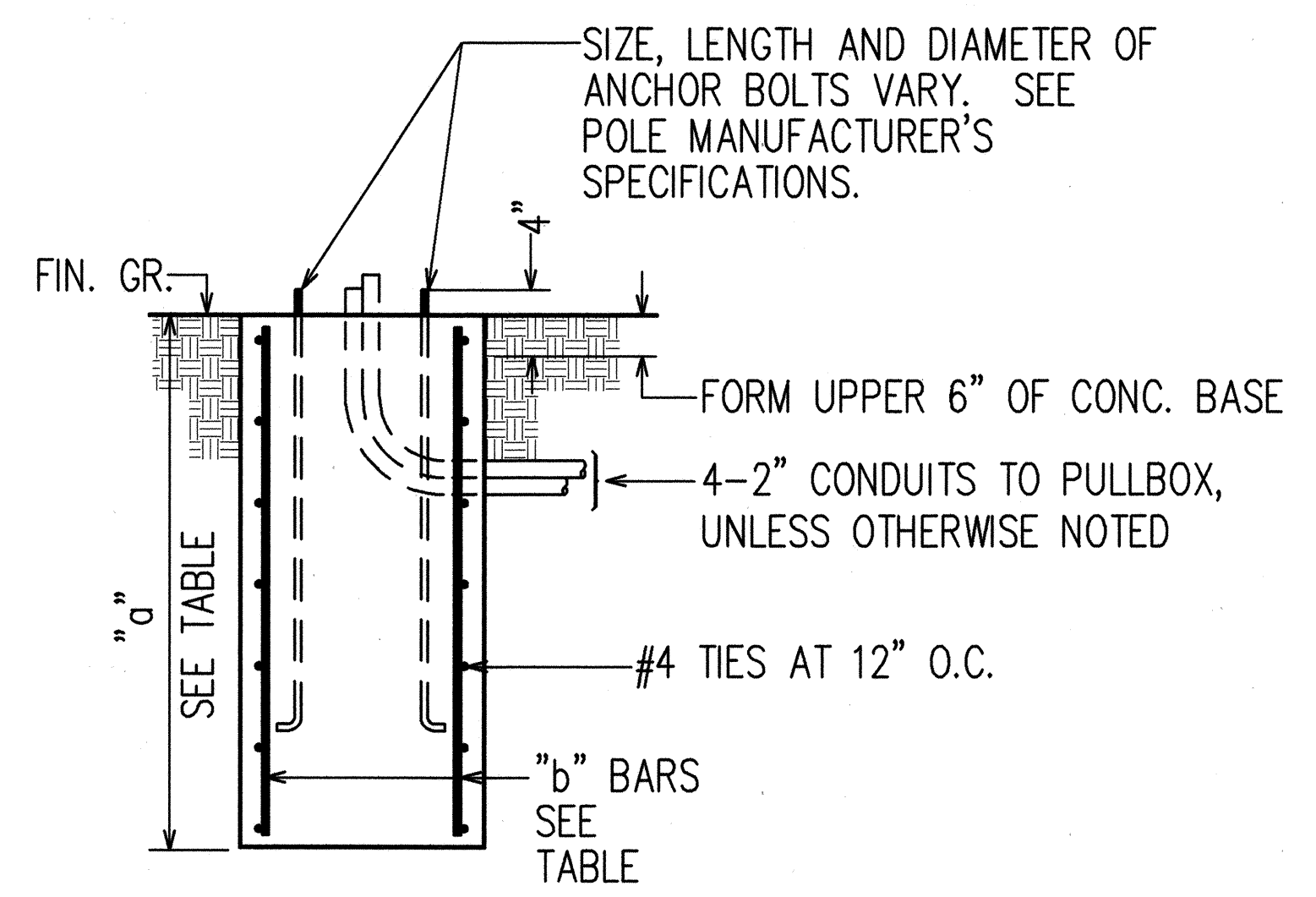
TYPICAL STANDARD DESIGNATION: TYPE II - 25
MAST ARM LENGTH

"*" DENOTES SIZE OF STANDARD APPLICABLE TO THIS PROJECT



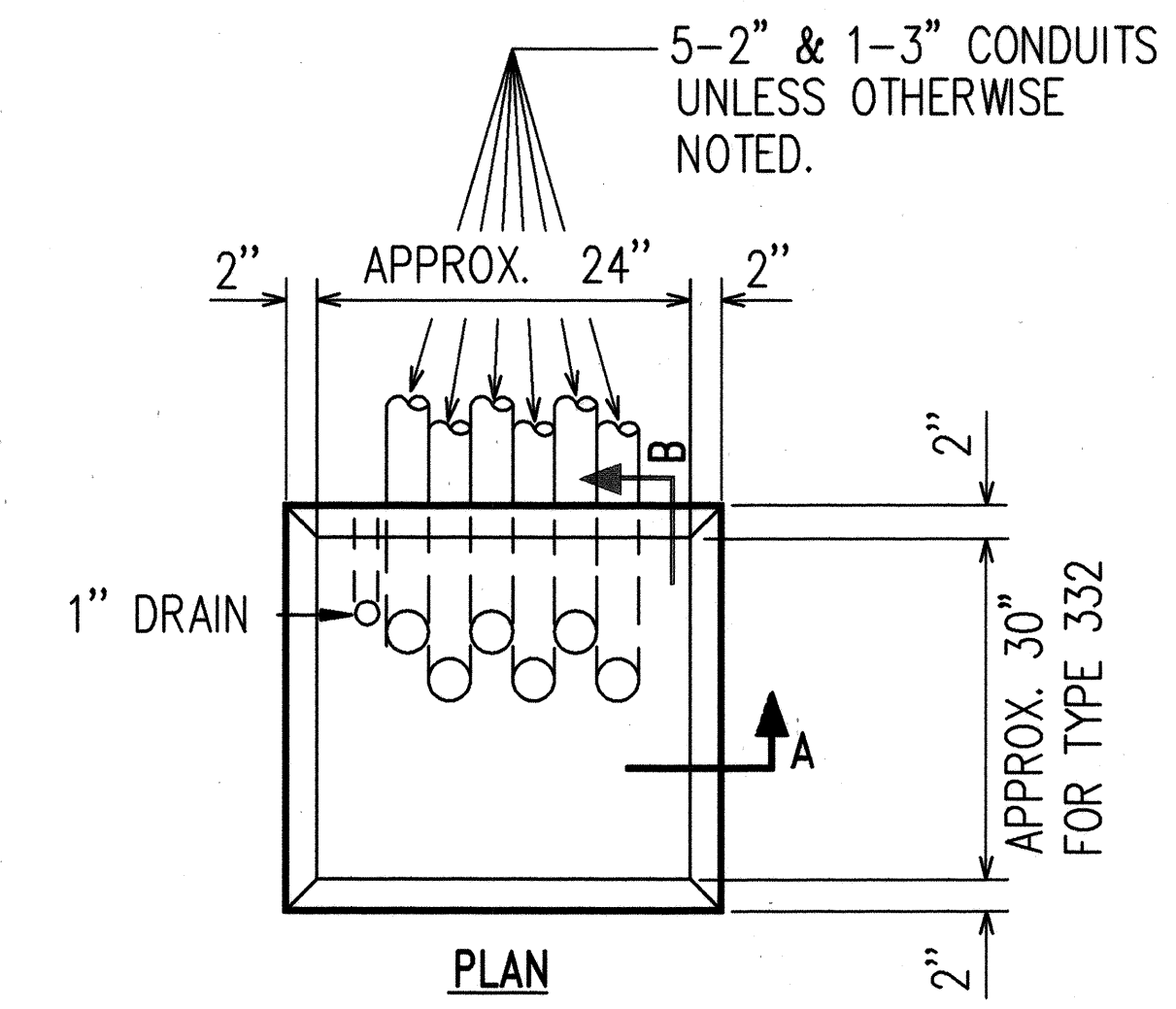
PLAN - SECTION

- NOTES:
1. CONCRETE SHALL BE CLASS "B".
 2. TYPE "C" CONCRETE BASE SHALL BE USED FOR TYPE II TRAFFIC SIGNAL STANDARDS.
 3. DESIGN LATERAL PRESSURE: 1,500 PSF.
 4. CONDUIT BEND IS INCIDENTAL TO CONCRETE BASE.



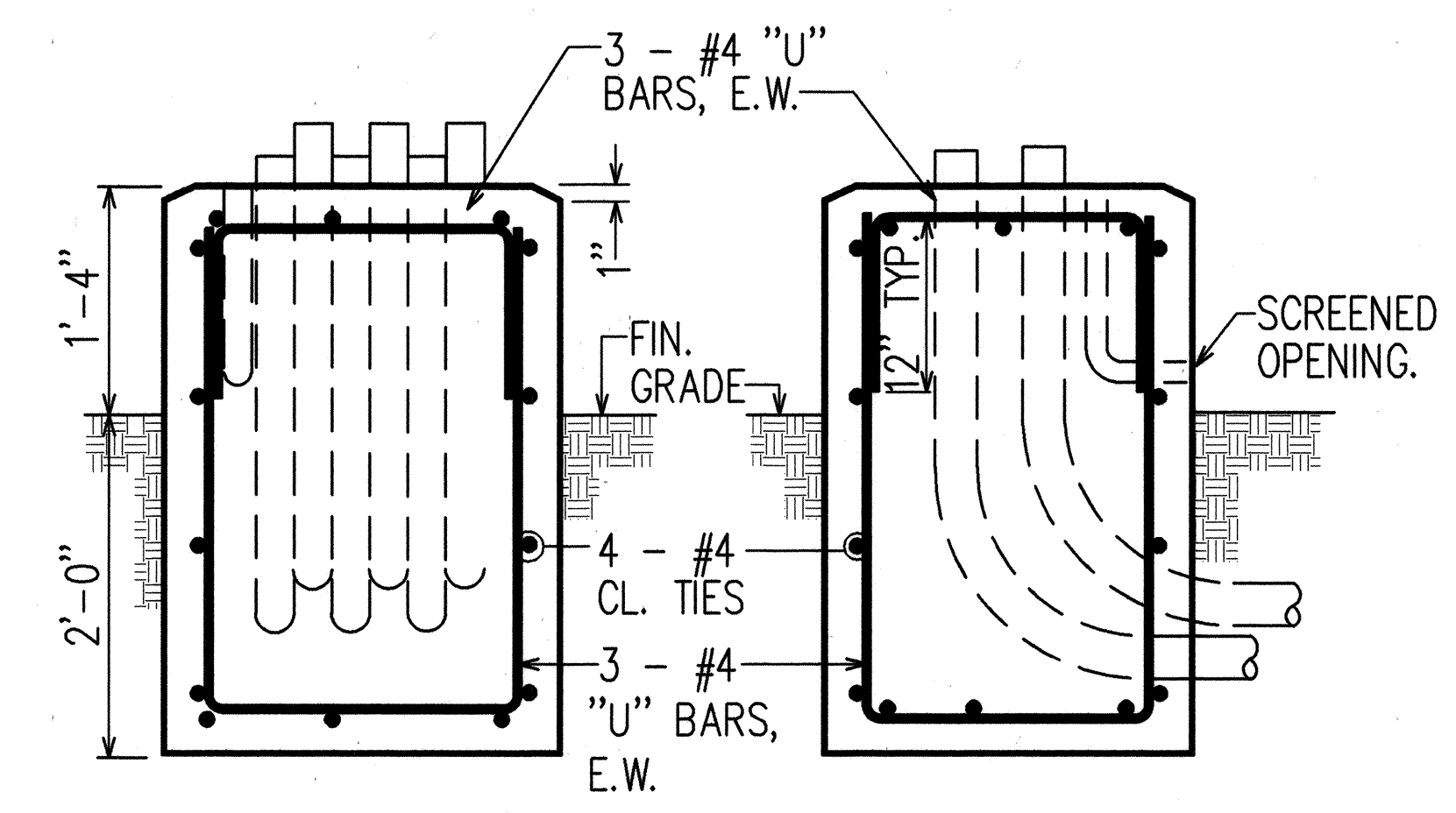
VERTICAL SECTION

TYPE "C" CONCRETE BASE
NOT TO SCALE



PLAN

- 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.

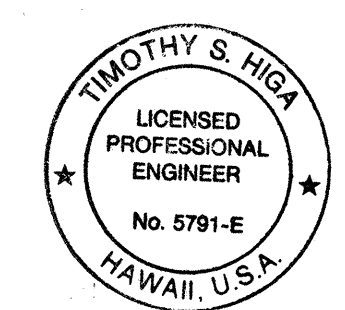
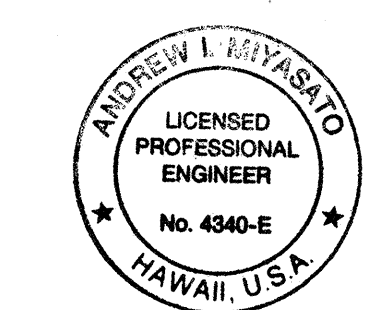


SECTION "A"

SECTION "B"

TYPE "D" CONC. BASE FOR CONTROLLER CABINET
NOT TO SCALE

ORIGINAL PLAN
DATE
SURVEY PLOTTED BY
DRAWN BY
DESIGNED BY
CHECKED BY
No.
LAST SAVE: 02/04/97
G:\CAD\PROJECTS\63A\1997\1997A1



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2/6/97

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

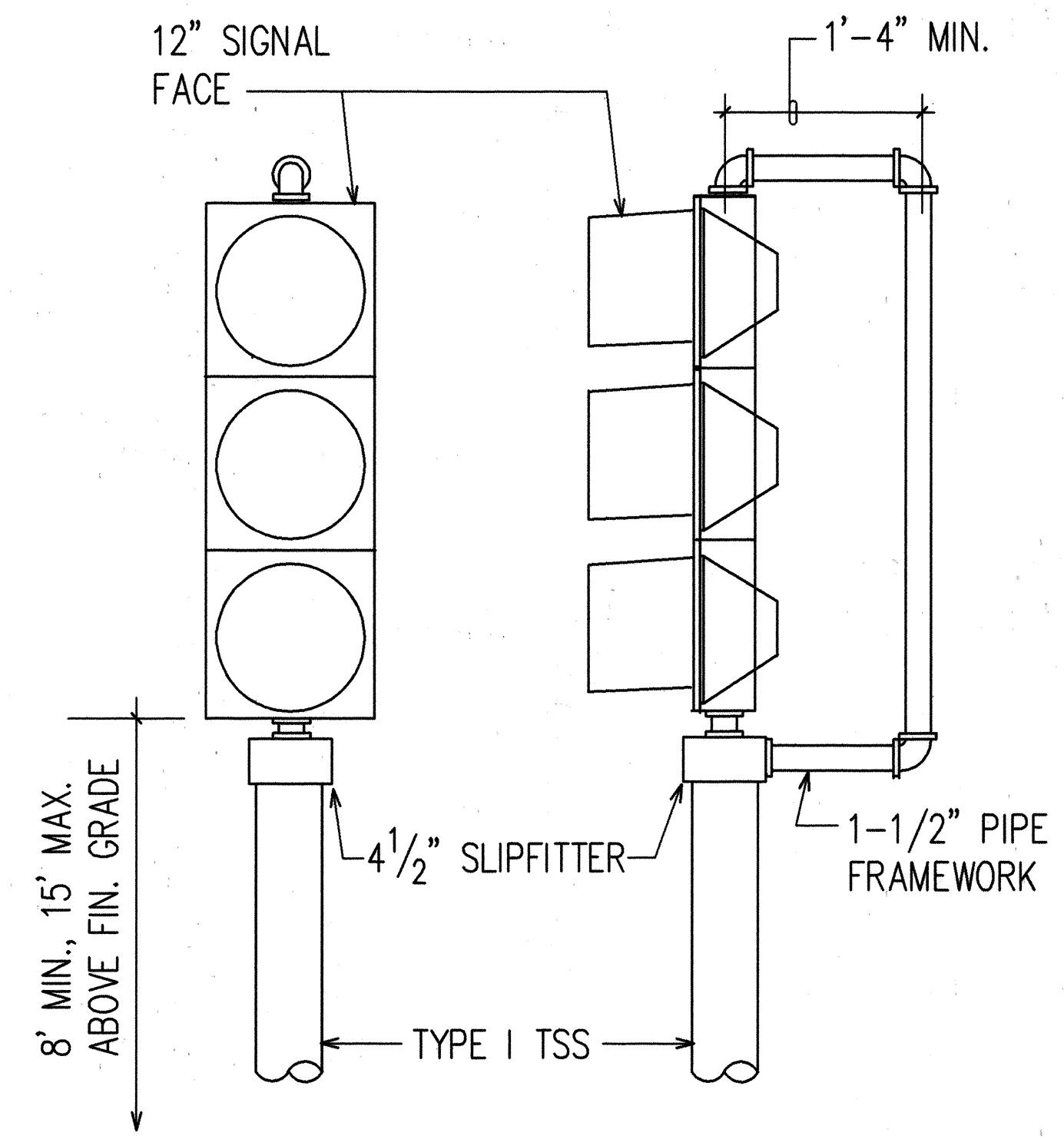
TRAFFIC SIGNAL DETAILS

LIKELIKE HIGHWAY
Inters. Improvements at Alu St.
PROJECT NO. 63A-02-96

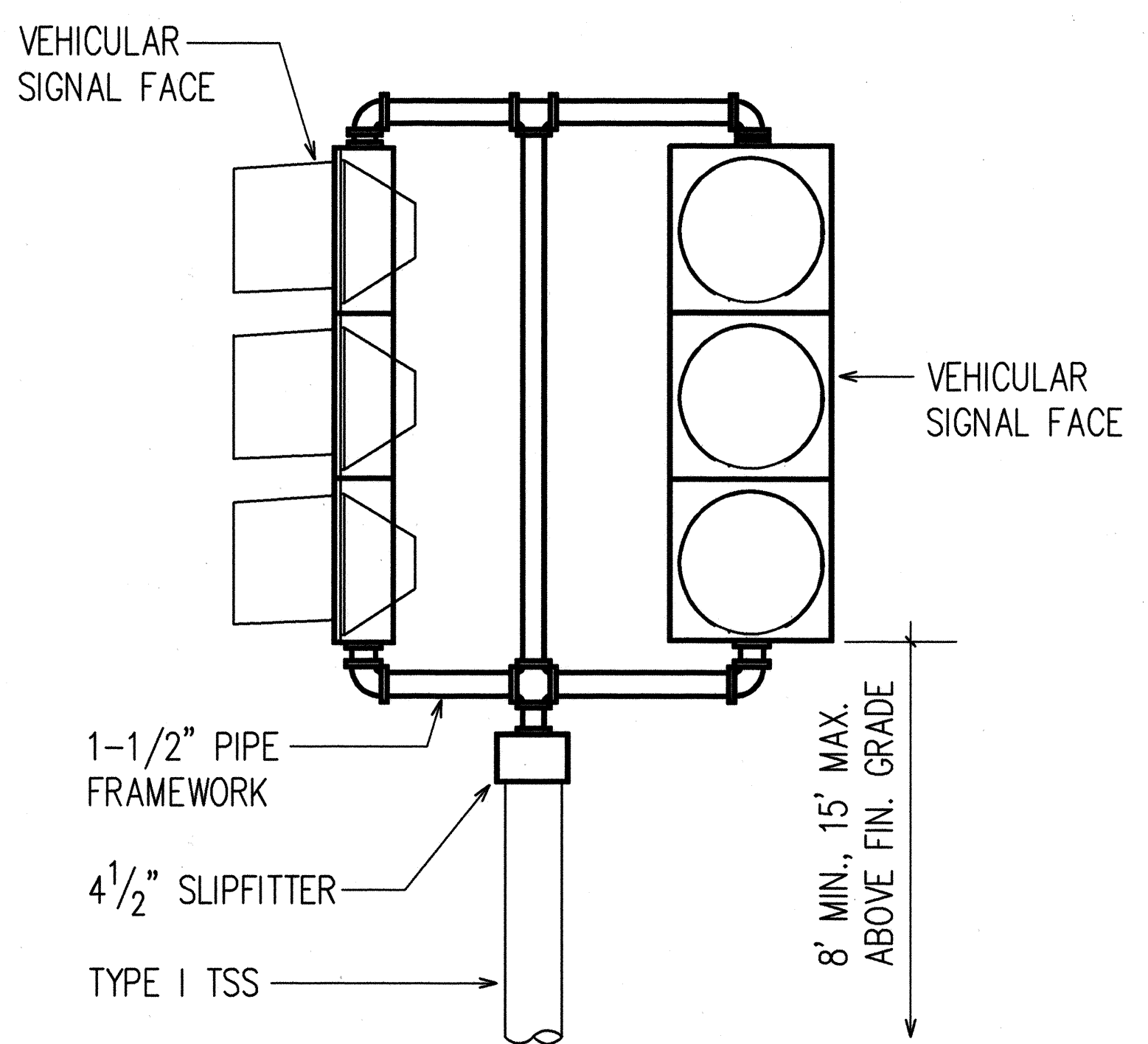
SCALE: AS NOTED
DATE: FEB 1997

SHEET No. E-9 OF E-13 SHEETS

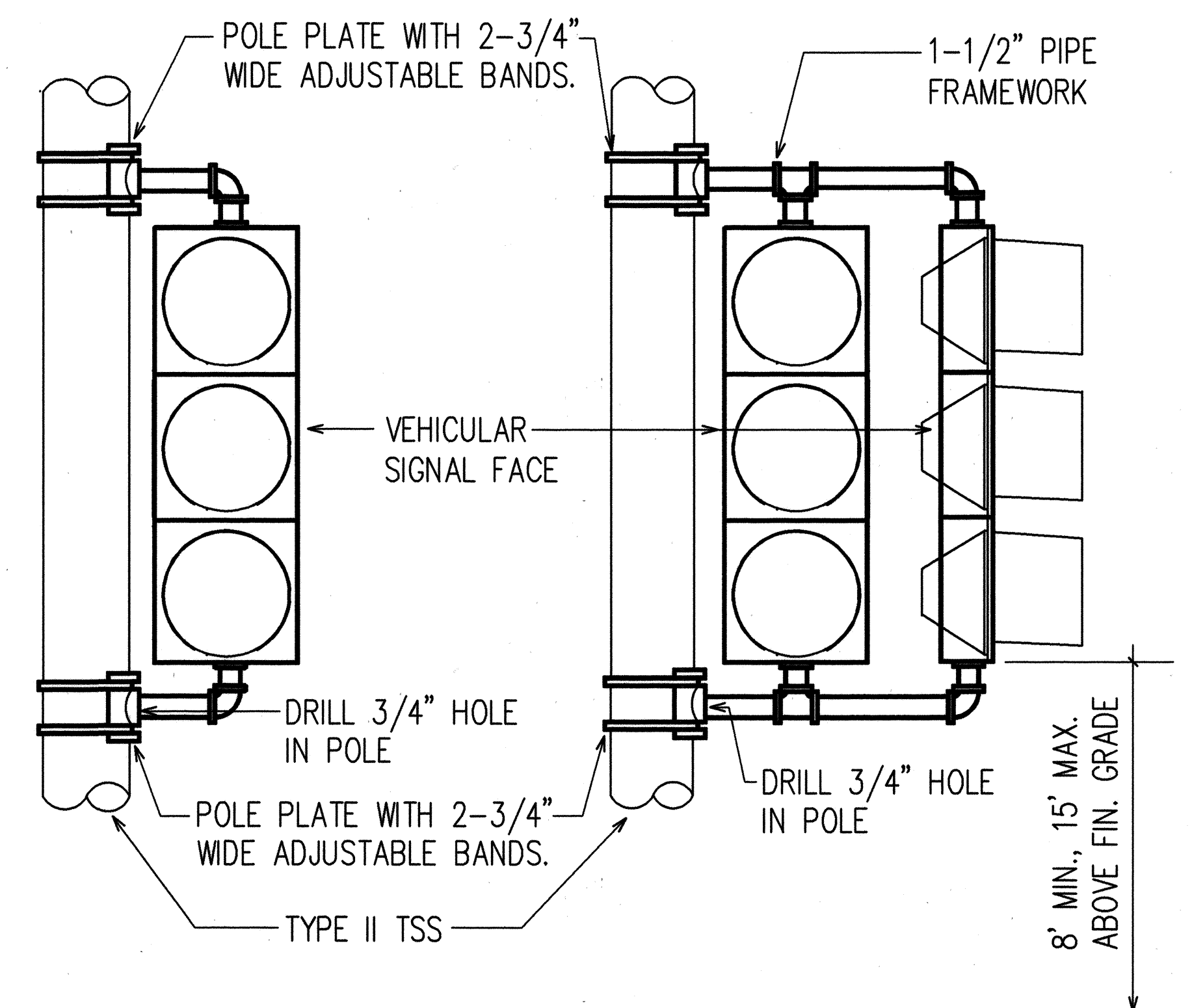
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-96	1997	15	19



TOP OF POLE - ONE WAY MOUNTING



TOP OF POLE - TWO WAY MOUNTING

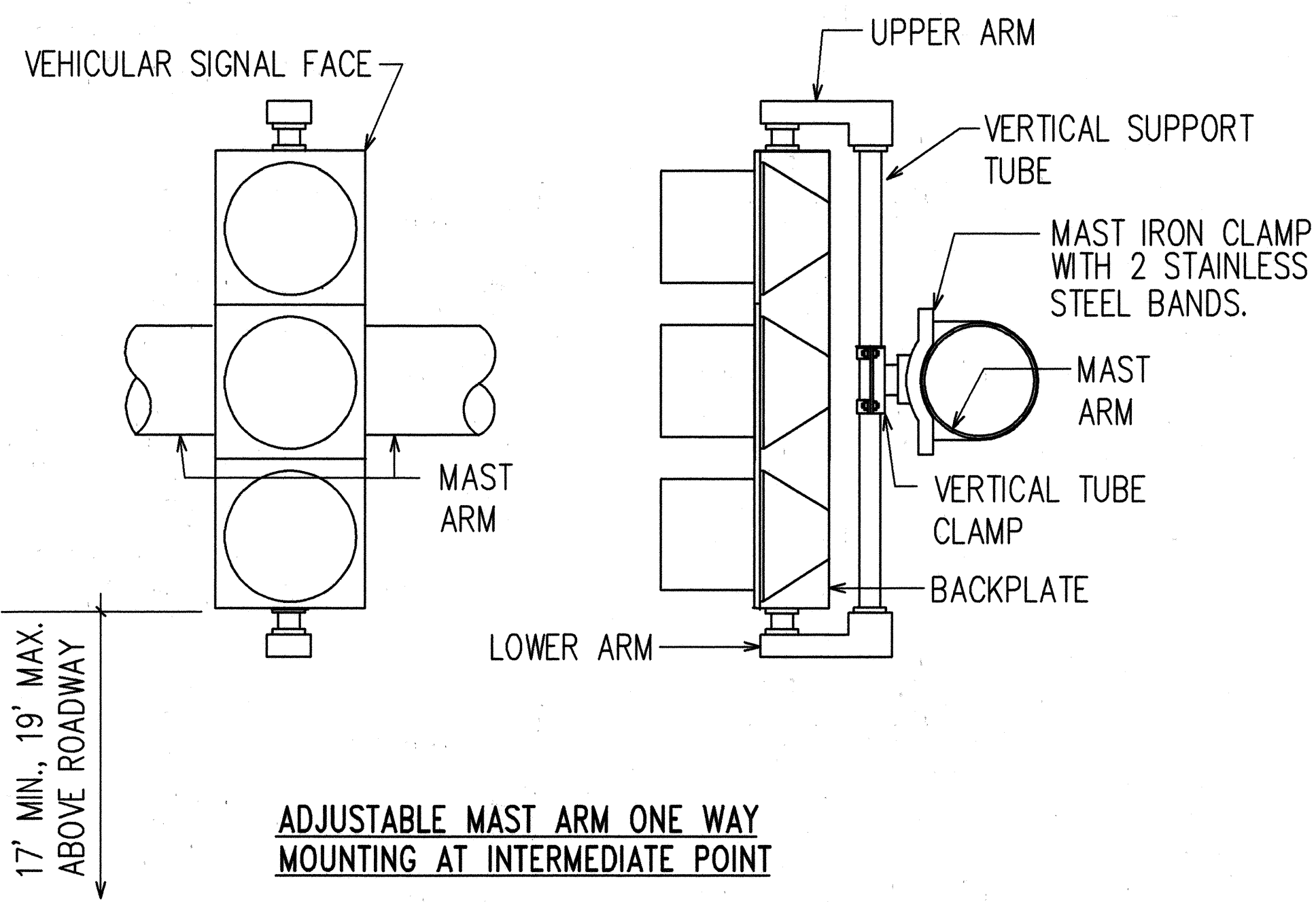


BRACKET MOUNT - ONE WAY

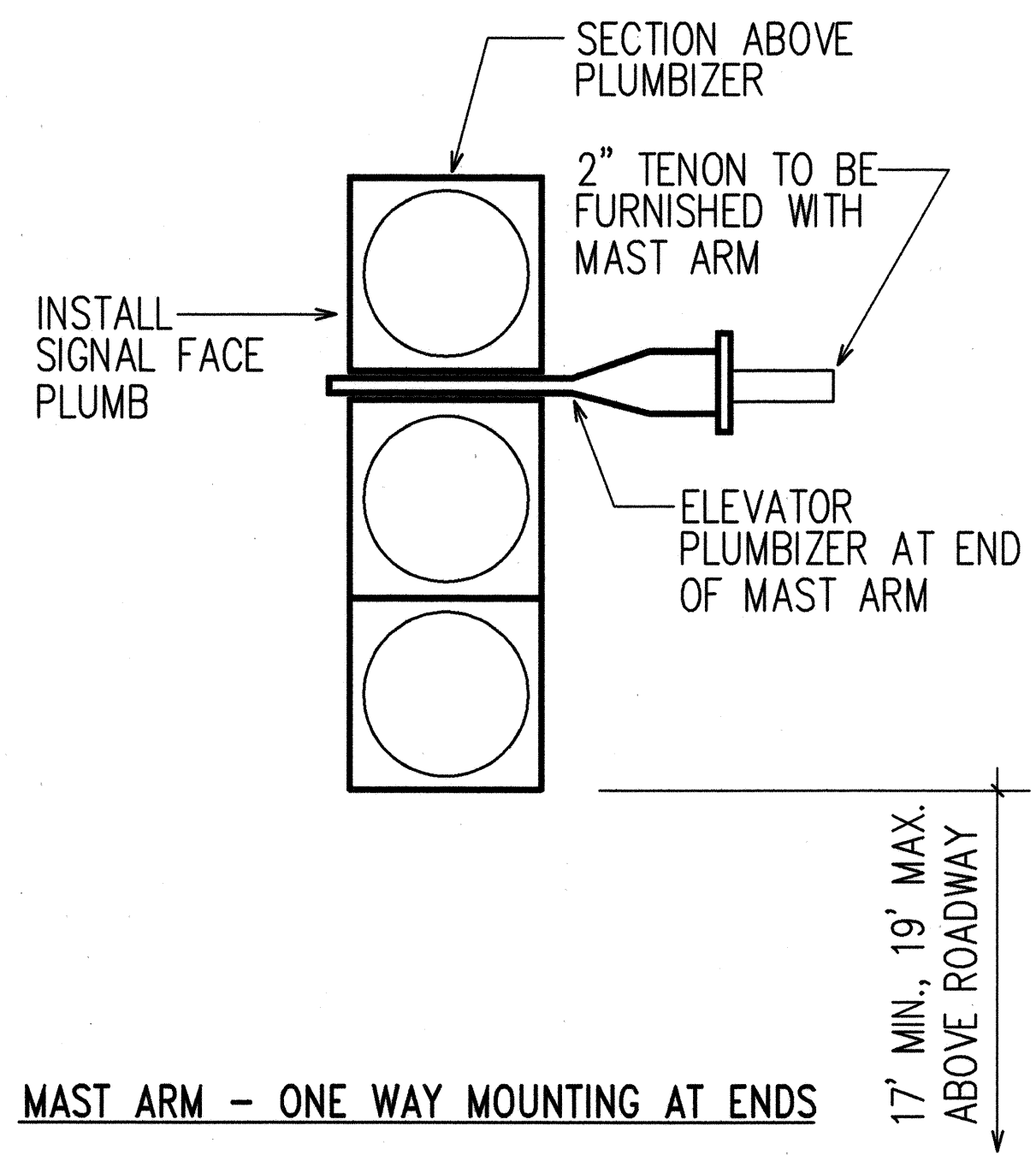
BRACKET MOUNT - TWO WAY

NOTES:

1. STAINLESS STEEL BANDS SHALL BE 1/2" 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



MAST ARM - ONE WAY MOUNTING AT ENDS

VEHICULAR SIGNAL MOUNTING DETAILS
NOT TO SCALE

ORIGINAL PLAN
DATE
DRAWN BY
DESIGNED BY
NOTED BY
CHECKED BY
APPROVED BY
LAST SAVE: 02/01/97 15:00:33 BY: 622101 82 1-0-97
S:\ACAD\PROJECTS\6303A\THEM.DWG

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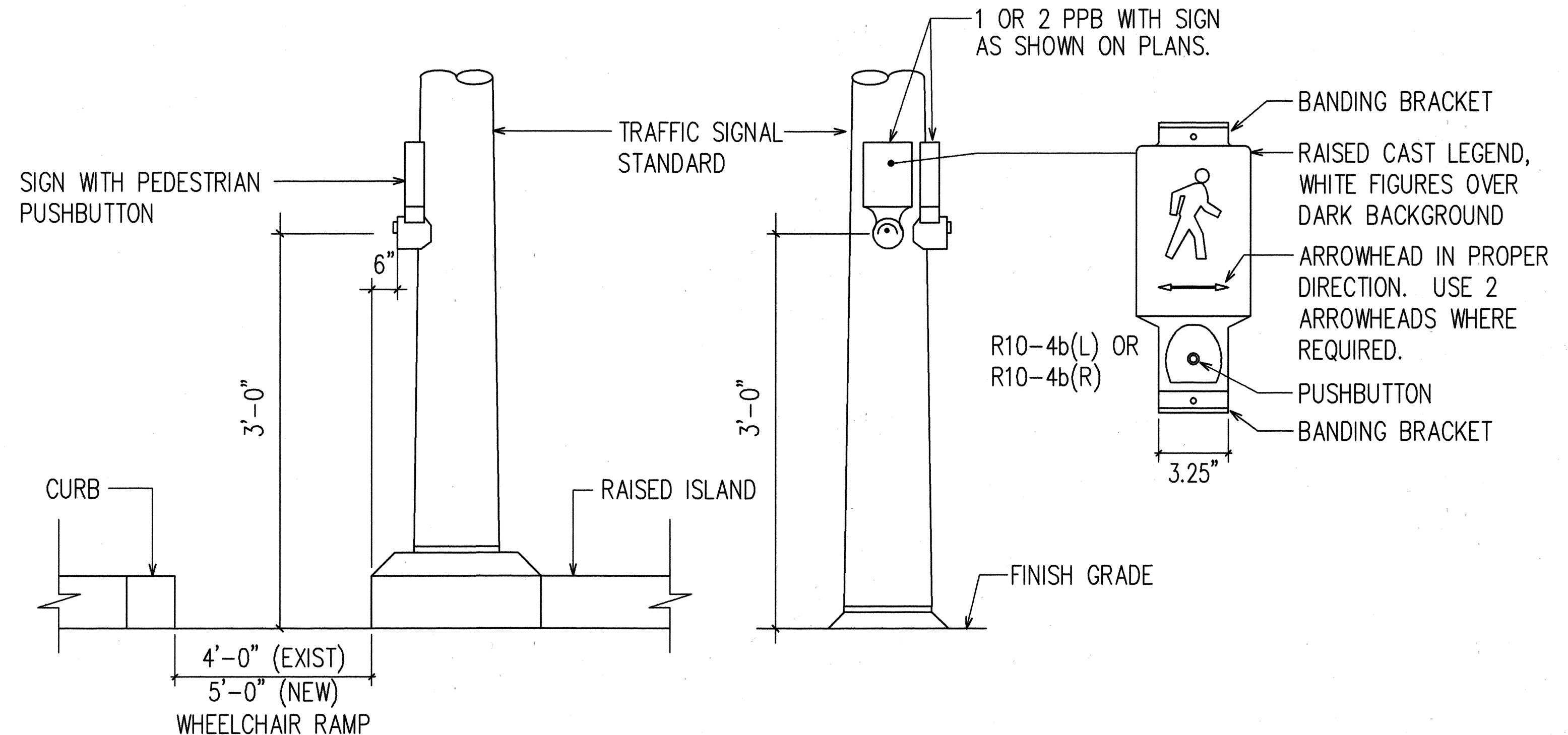
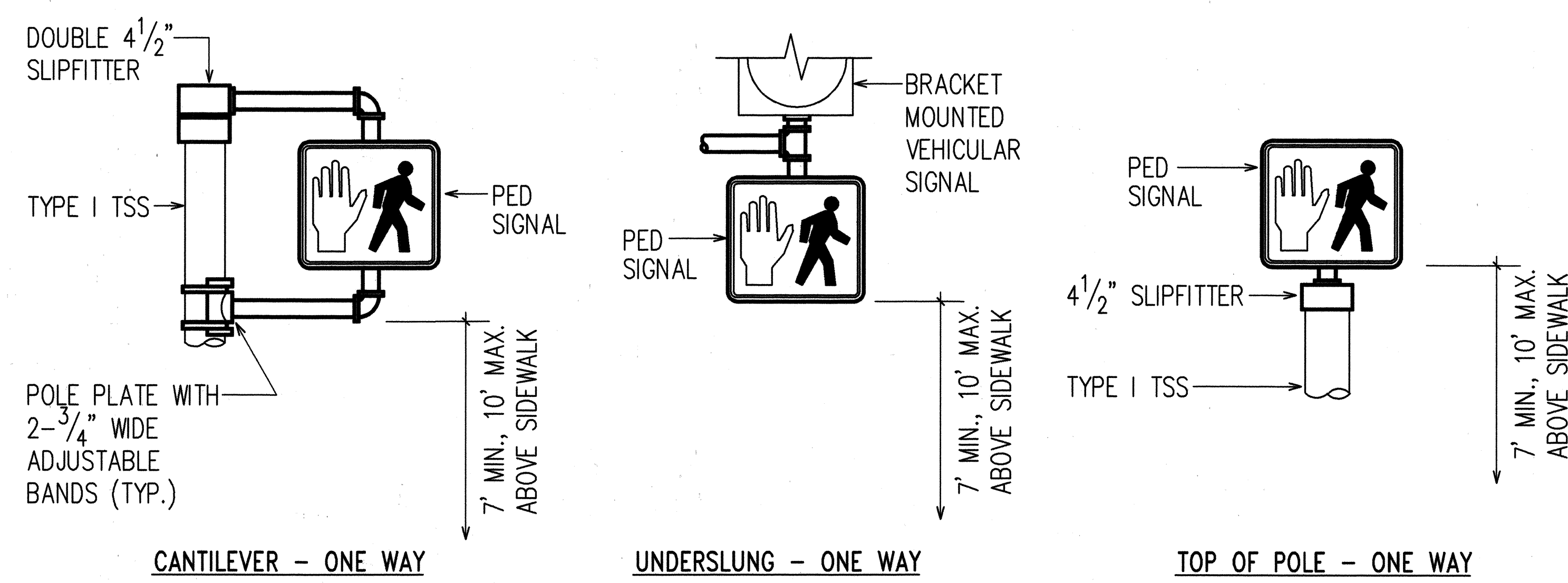
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

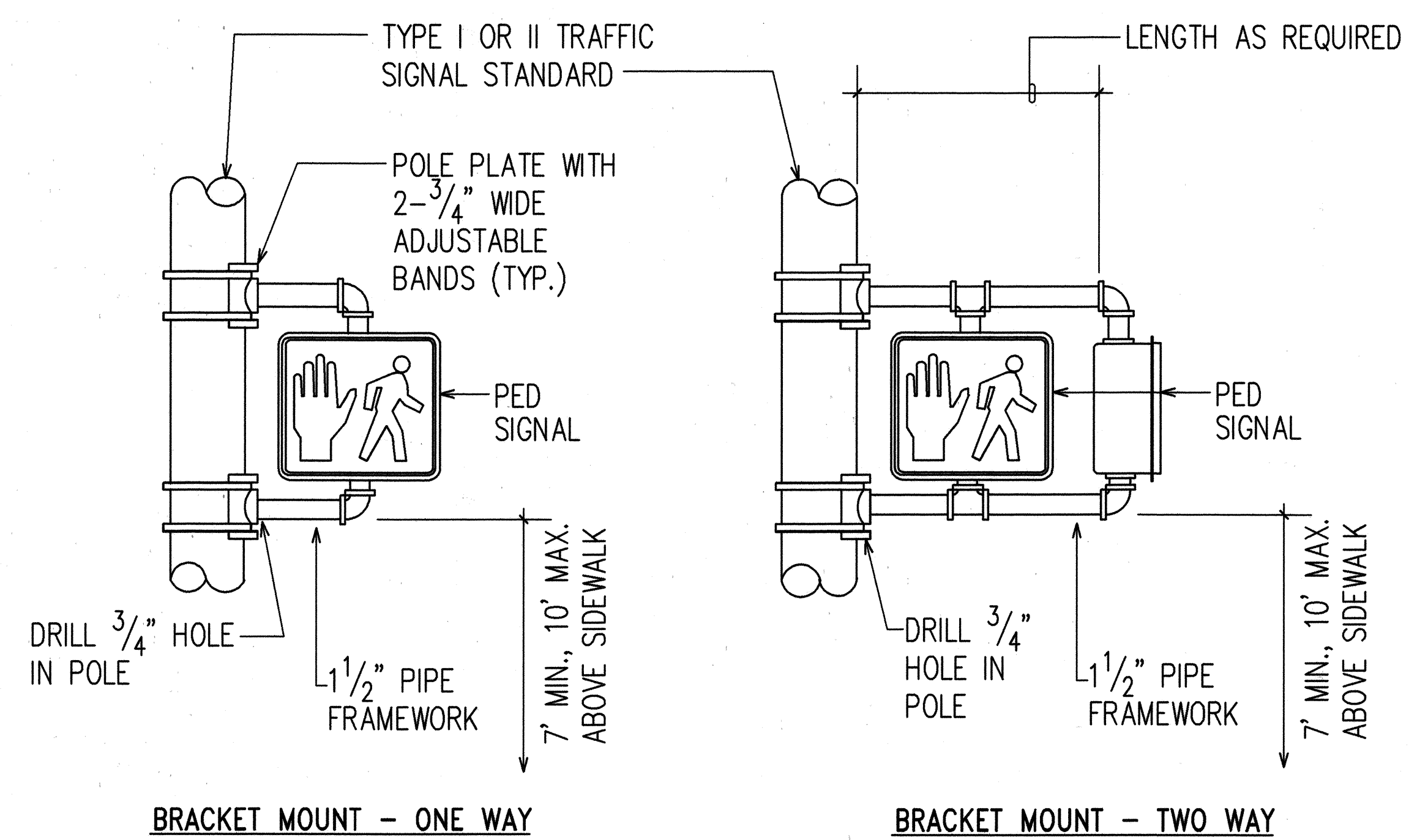
LIKELIKE HIGHWAY
Inters. Improvements at Alu St.
PROJECT NO. 63A-02-96

SCALE: AS NOTED
DATE: FEB 1997
SHEET No. E-10 OF E-13 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-96	1997	16	19



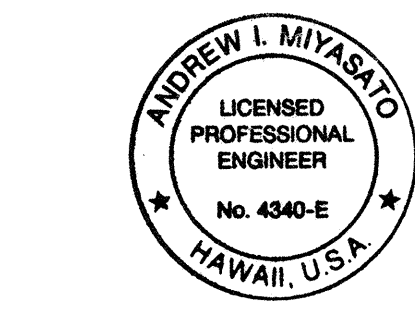
PEDESTRIAN PUSHBUTTON DETAILS
NOT TO SCALE



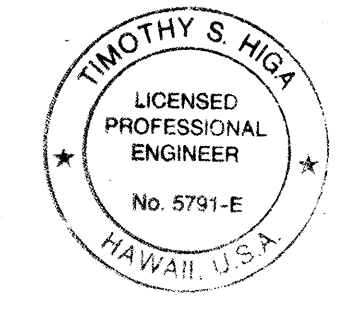
PEDESTRIAN SIGNAL MOUNTING DETAILS
NOT TO SCALE

- NOTES:**
1. STAINLESS STEEL BANDS SHALL BE 1/2" 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.

ORIGINAL PLAN
NOTE BOOK
No. 13.757
LAST SAVE: 02/03/97
S:\ROAD PROJECTS\63030\PEDEST1



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2/6/97



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2/6/97

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

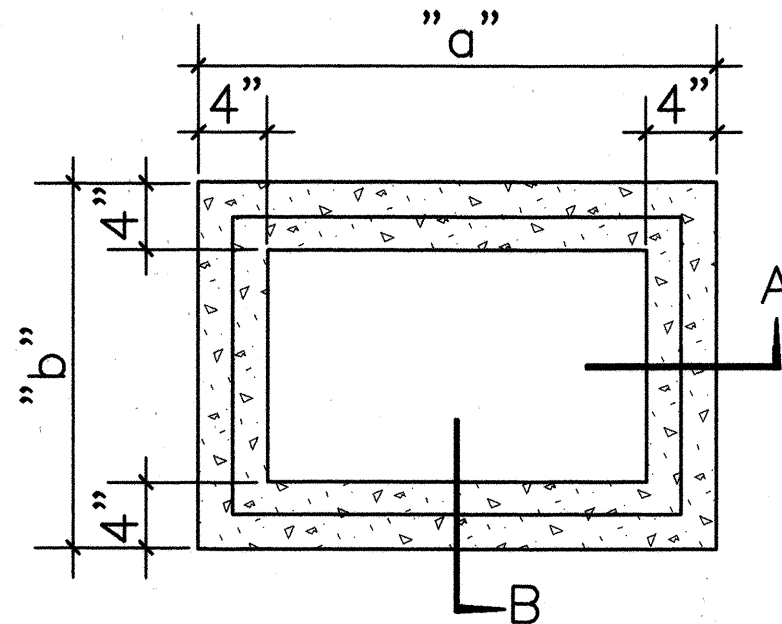
TRAFFIC SIGNAL DETAILS

LIKELIKE HIGHWAY
Inters. Improvements at Alu St.
PROJECT NO. 63A-02-96

SCALE: AS NOTED DATE: FEB 1997

SHEET No. E-11 OF E-13 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-96	1997	17	19

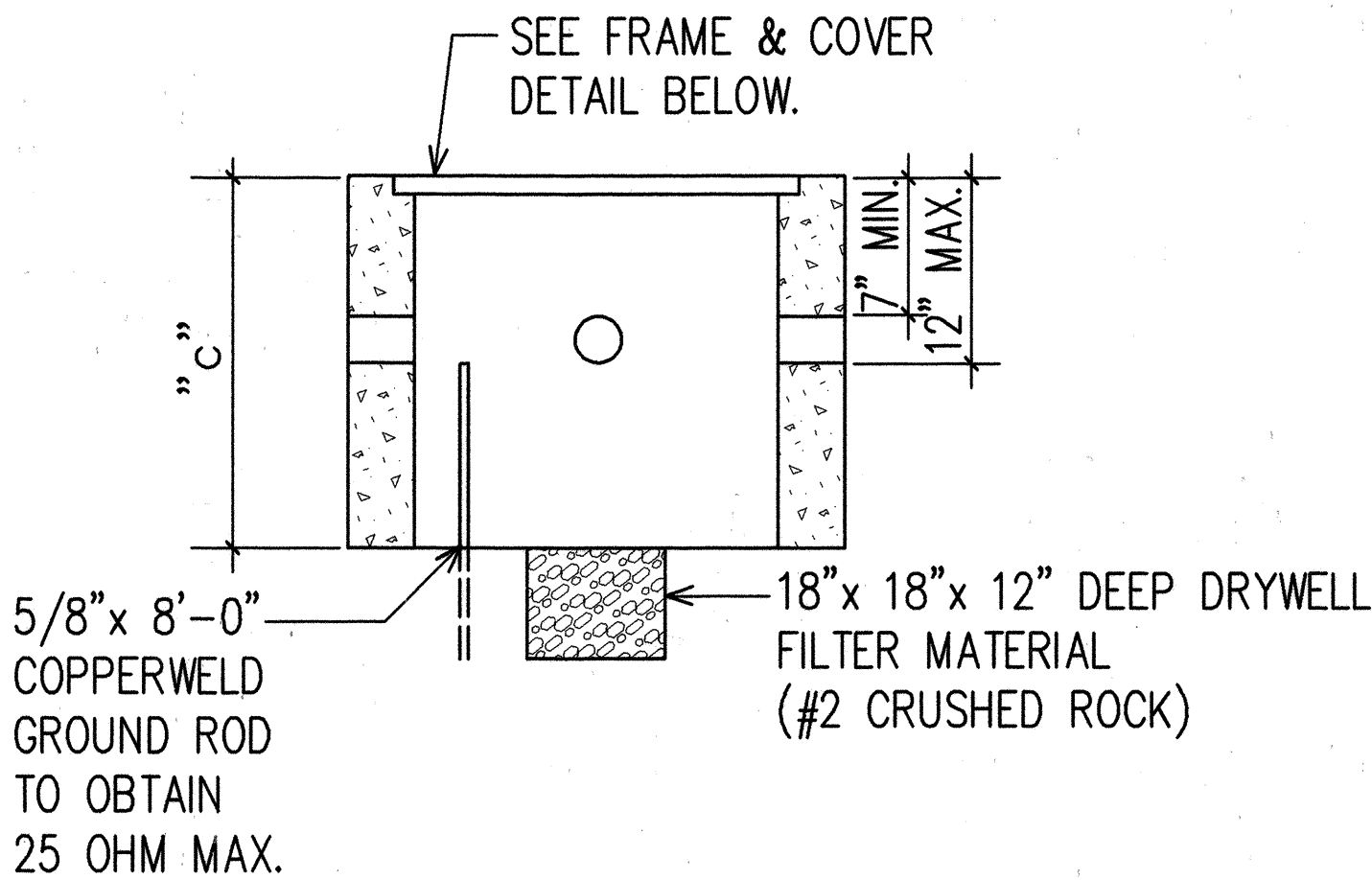


PLAN OF PULLBOX

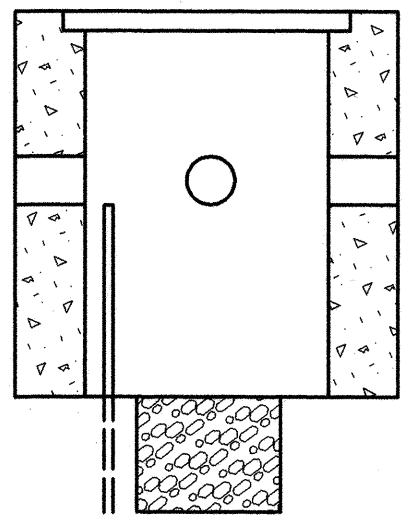
NOTES:

1. CONCRETE BRICKS MAY BE USED IN LIEU OF CONCRETE UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS ARE IN INCHES.
3. ALL CONCRETE SHALL BE 3000 PSI COMPRESSIVE STRENGTH IN 28 DAYS.
4. PROVIDE GROUND ROD IN ALL PULLBOXES ADJACENT TO STANDARDS, PEDESTALS, CONTROLLERS AND OTHER SPECIFIED LOCATIONS.

	TYPE "B"	TYPE "C"
"a"	28	40
"b"	19	28
"c"	18	24



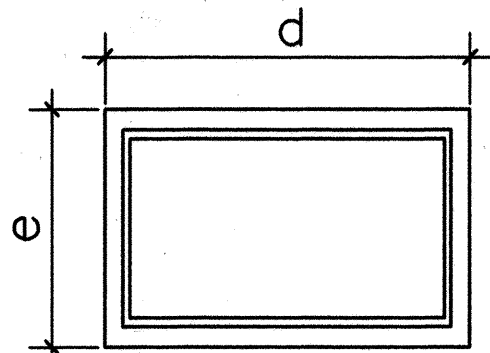
SECTION "A-A"



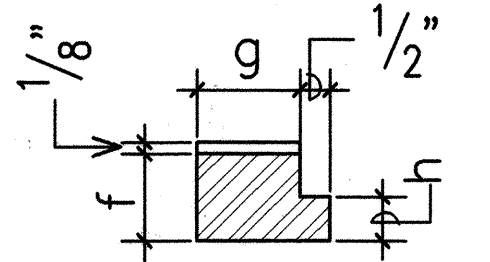
SECTION "B-B"

	TYPE "B"	TYPE "C"
a	19 3/4	30
b	12	20
c	1 1/2	5/8
d	22 1/2	33 3/16
e	14 3/4	23 3/16
f	1	2
g	1 1/4	1 1/2
h	1 1/2	1 3/8

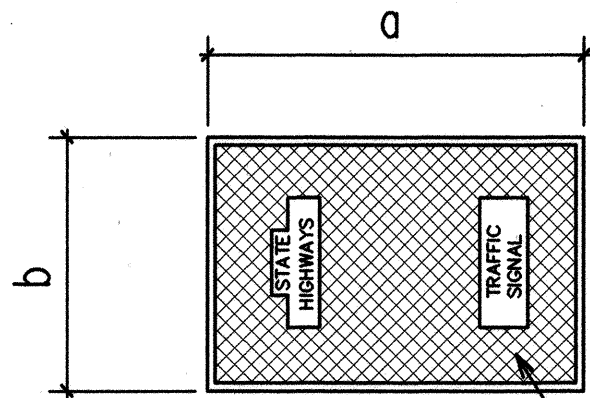
NOTE: STEEL RIM SHALL BE WELDED TO BOTTOM OF STEEL COVER IF NECESSARY SO THAT TOP OF COVER AND FRAME ARE FLUSH.



PLAN OF FRAME

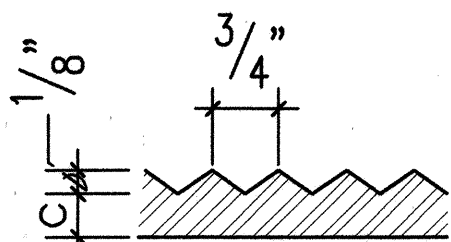


SECTION THROUGH FRAME

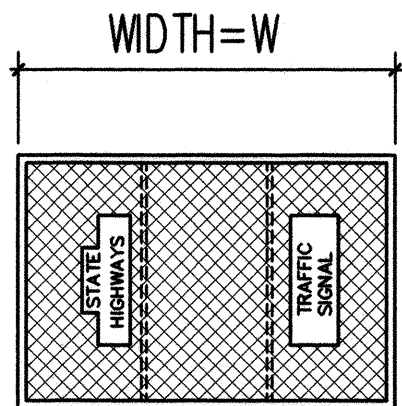


PLAN OF COVER

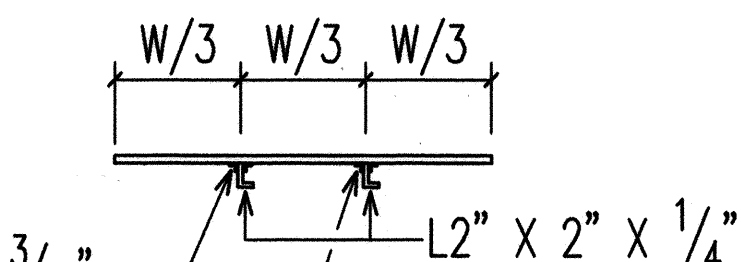
CAST IRON OR 3/8" ROLLED STEEL PLATE WITH NON-SLIP ABRASIVE SURFACING



SECTION THRU COVER



TOP VIEW

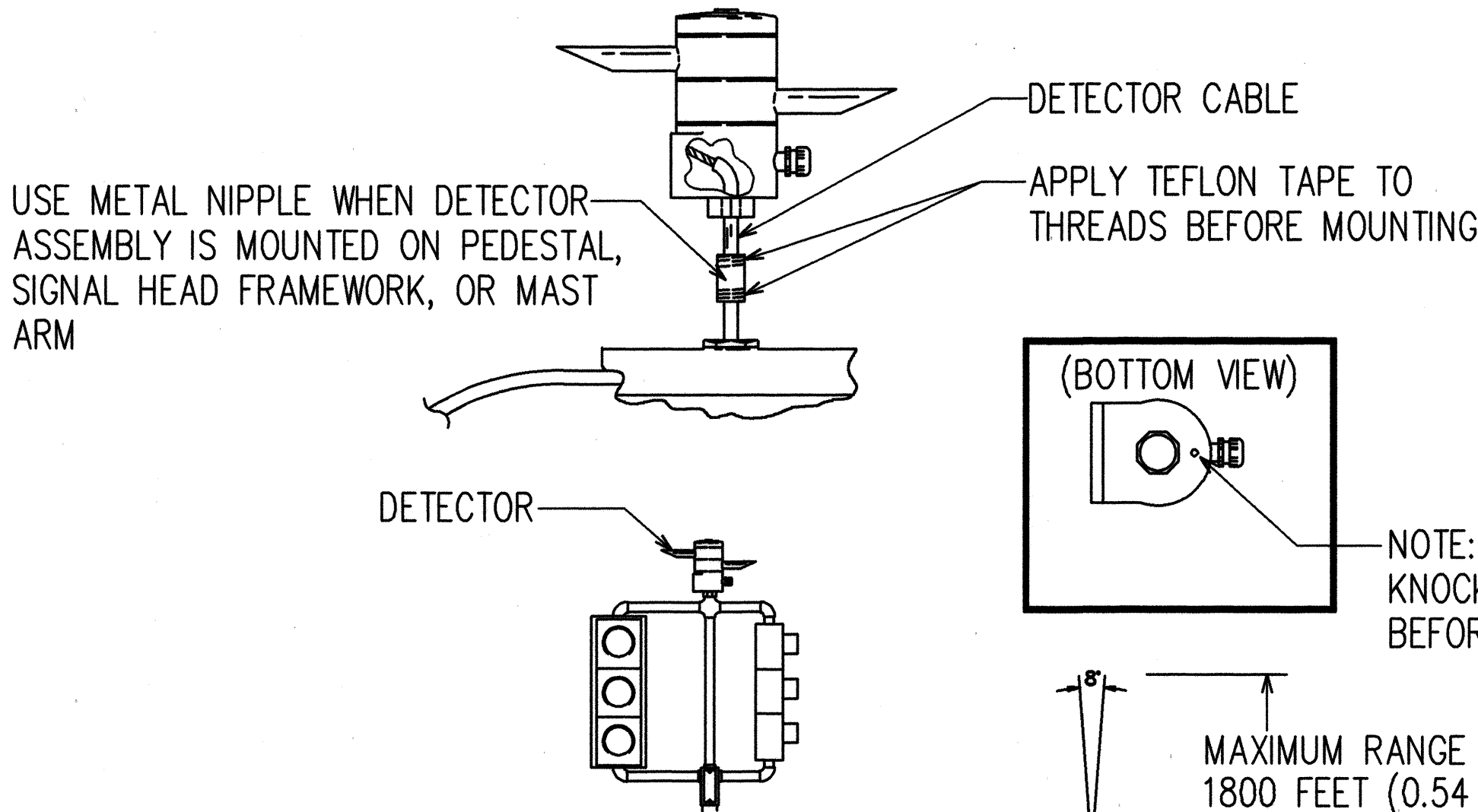


SIDE VIEW

NOTE: HOT DIP GALVANIZE AFTER FABRICATION. MODIFIED COVER SHALL BE FURNISHED WHEN CALLED FOR ON PLANS.

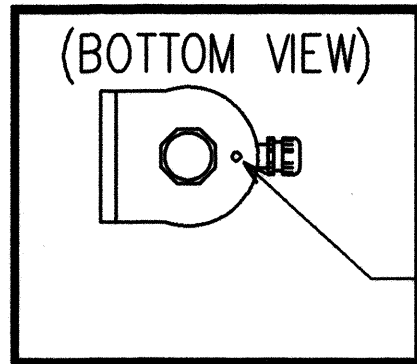
TRAFFIC SIGNAL PULLBOX DETAILS
NOT TO SCALE

MODIFIED COVER DETAIL
NOT TO SCALE

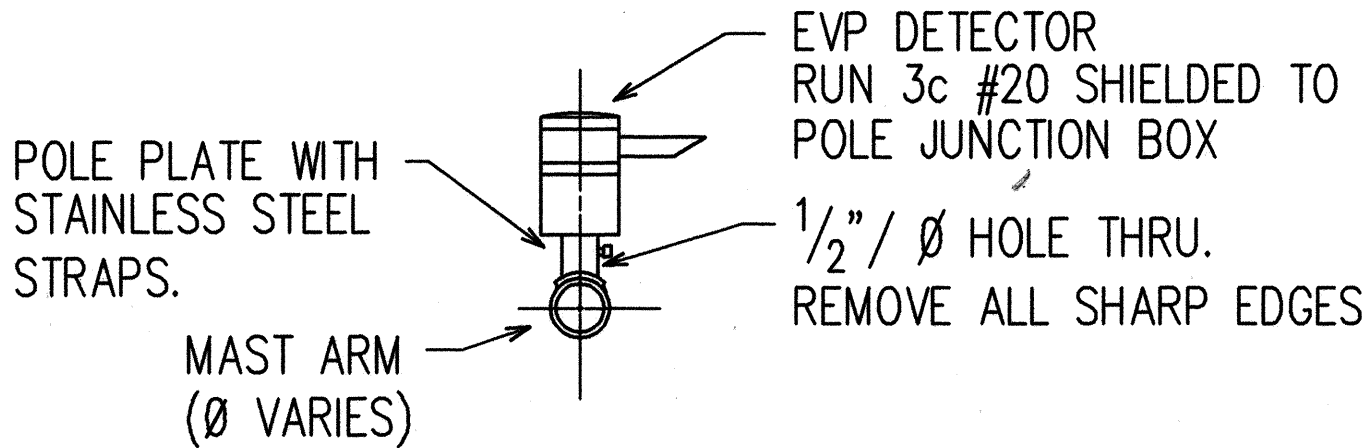
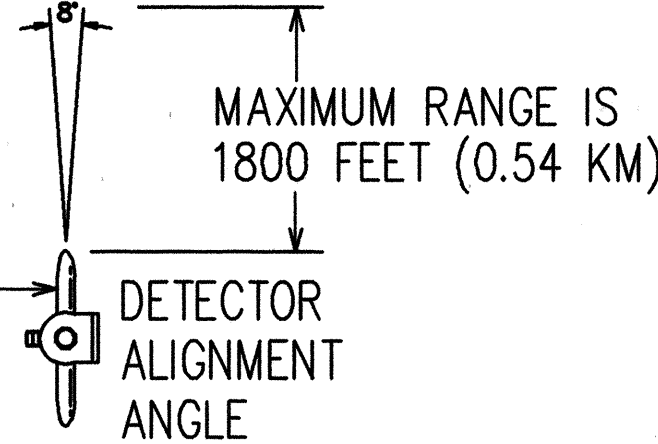


NOTE: DETECTOR RECEPTION ANGLE VARIES WITH DISTANCE. IT IS APPROXIMATELY 8° AT 1800 FEET (0.54km). DUE TO REFLECTION, RECEPTION ANGLE IS INCREASED AT CLOSE RANGE. THE DETECTOR MUST BE ALIGNED WITHIN 8° OF THE FARTHEST POINT WHERE PRIORITY VEHICLE IS TO BE SENSED.

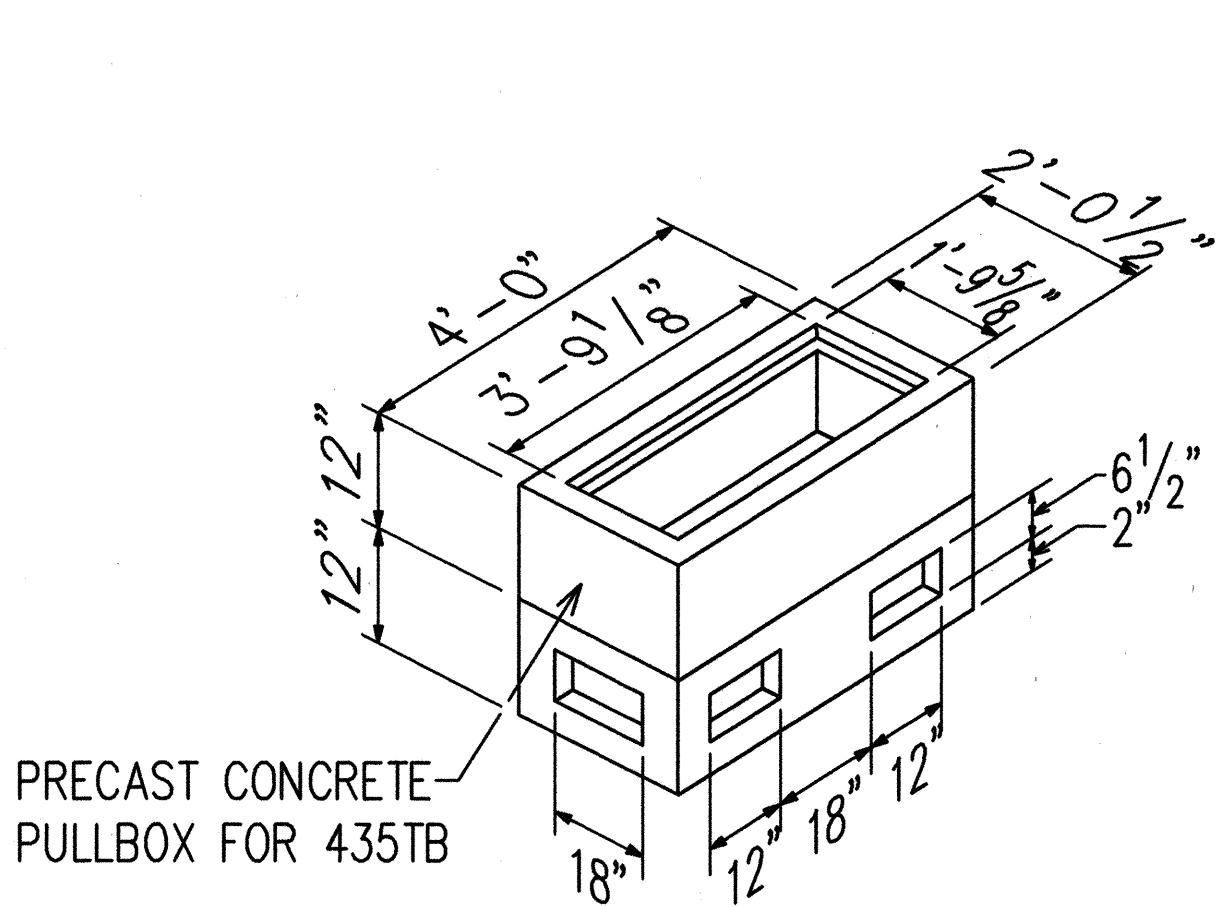
TYPICAL PEDESTAL/MAST ARM
INSTALLATION OF EVP DETECTOR
NOT TO SCALE



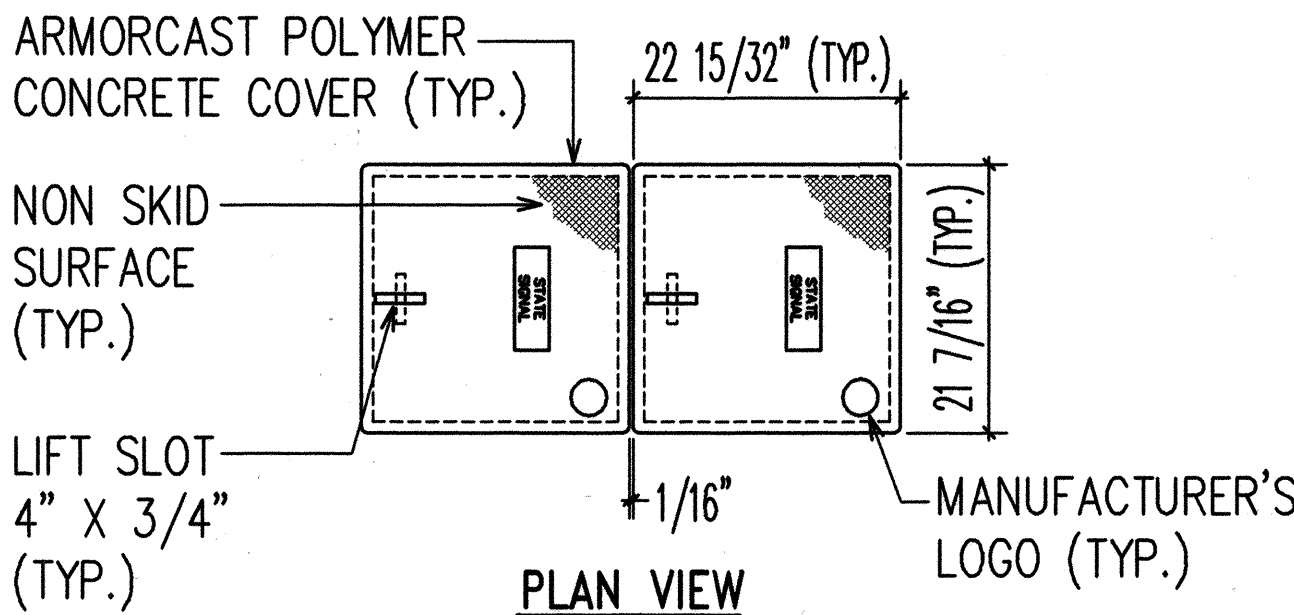
NOTE: KNOCK OUT WEEP HOLE BEFORE INSTALLING



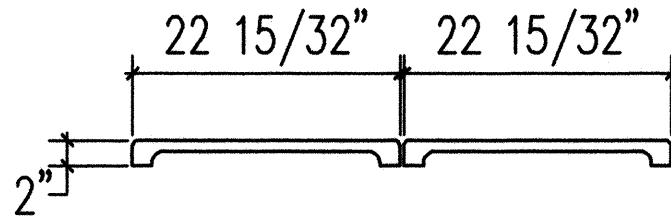
EVP DETECTOR HORIZONTAL
MOUNTING DETAIL
NOT TO SCALE



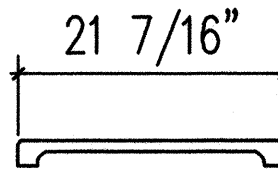
PULLBOX



PLAN VIEW



ELEVATION



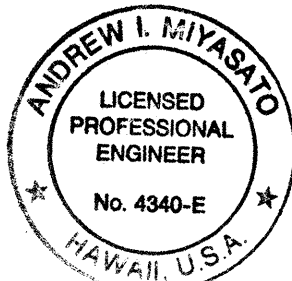
SIDE VIEW

COVER

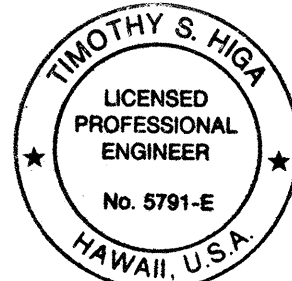
NOTES:

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

TYPE "D" PULLBOX & COVER
NOT TO SCALE



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RONALD N.S. HO & ASSOCIATES, INC.
2/9/97



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2/6/97

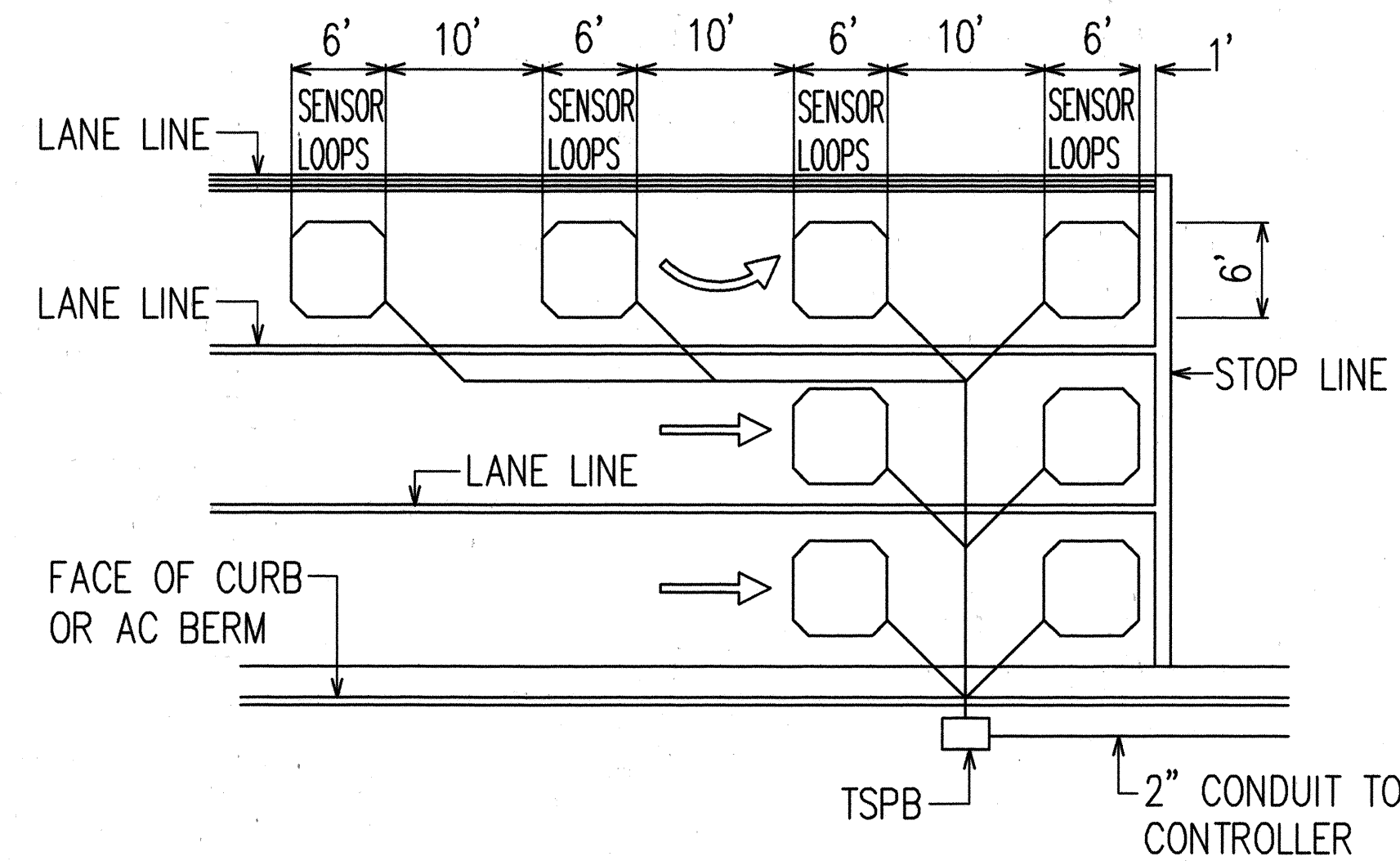
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

LIKELIKE HIGHWAY
Inters. Improvements at Alu St.
PROJECT NO. 63A-02-96

SCALE: AS NOTED DATE: FEB 1997
SHEET No. E-12 OF E-13 SHEETS

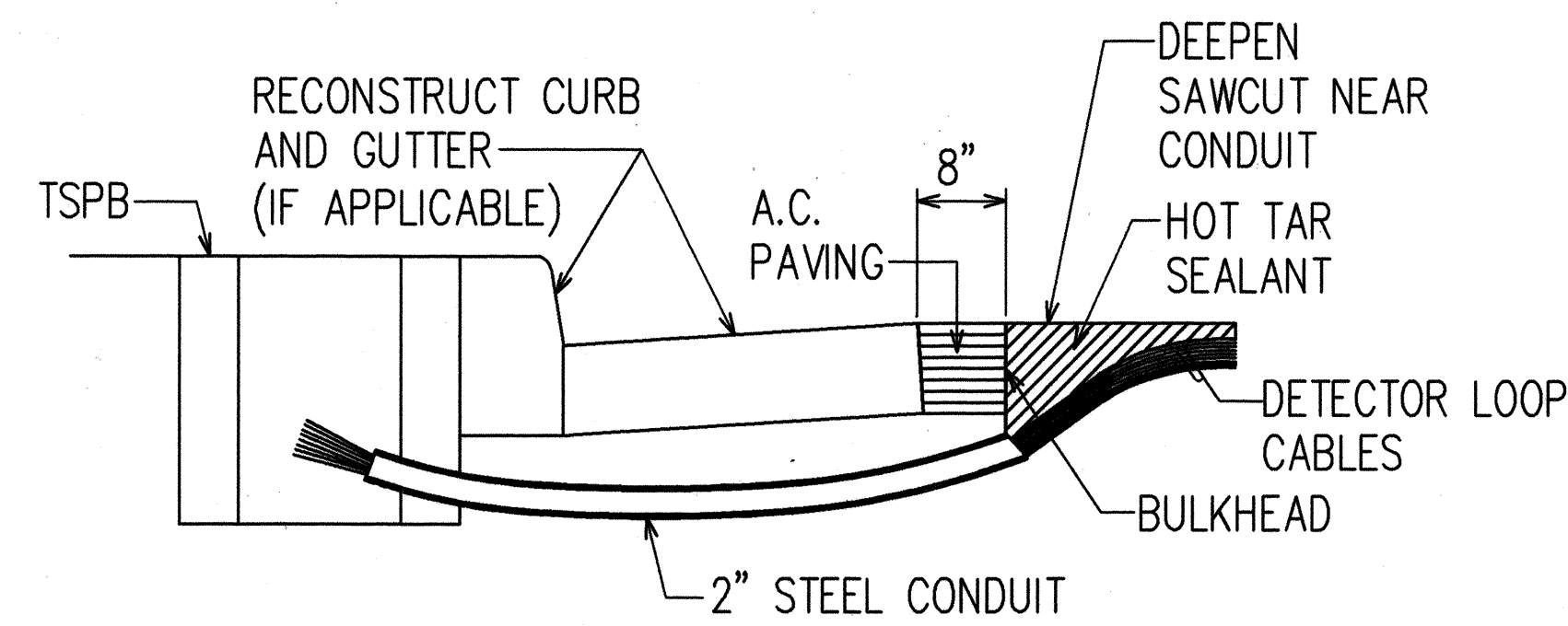
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	63A-02-96	1997	18	19



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.

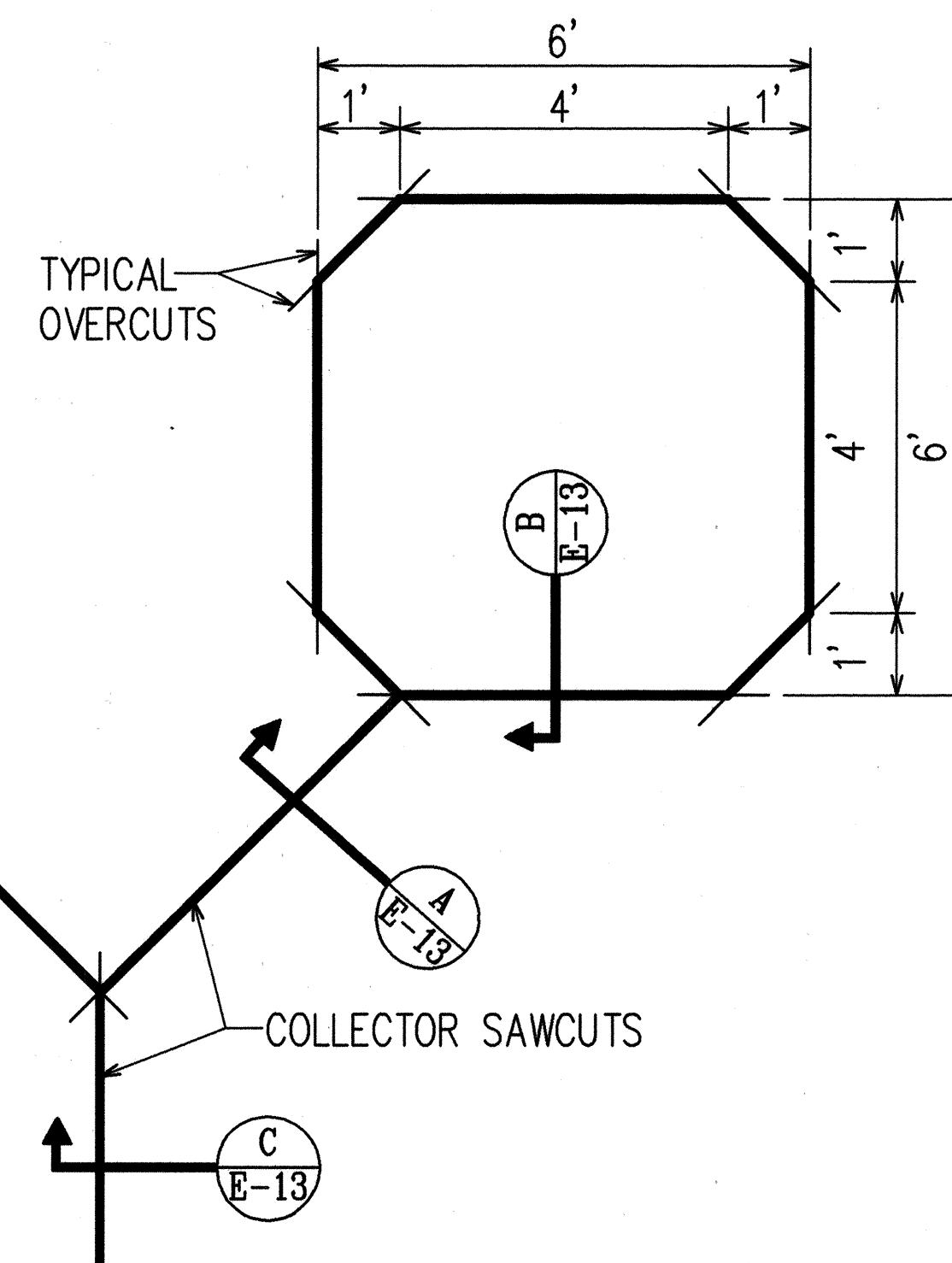
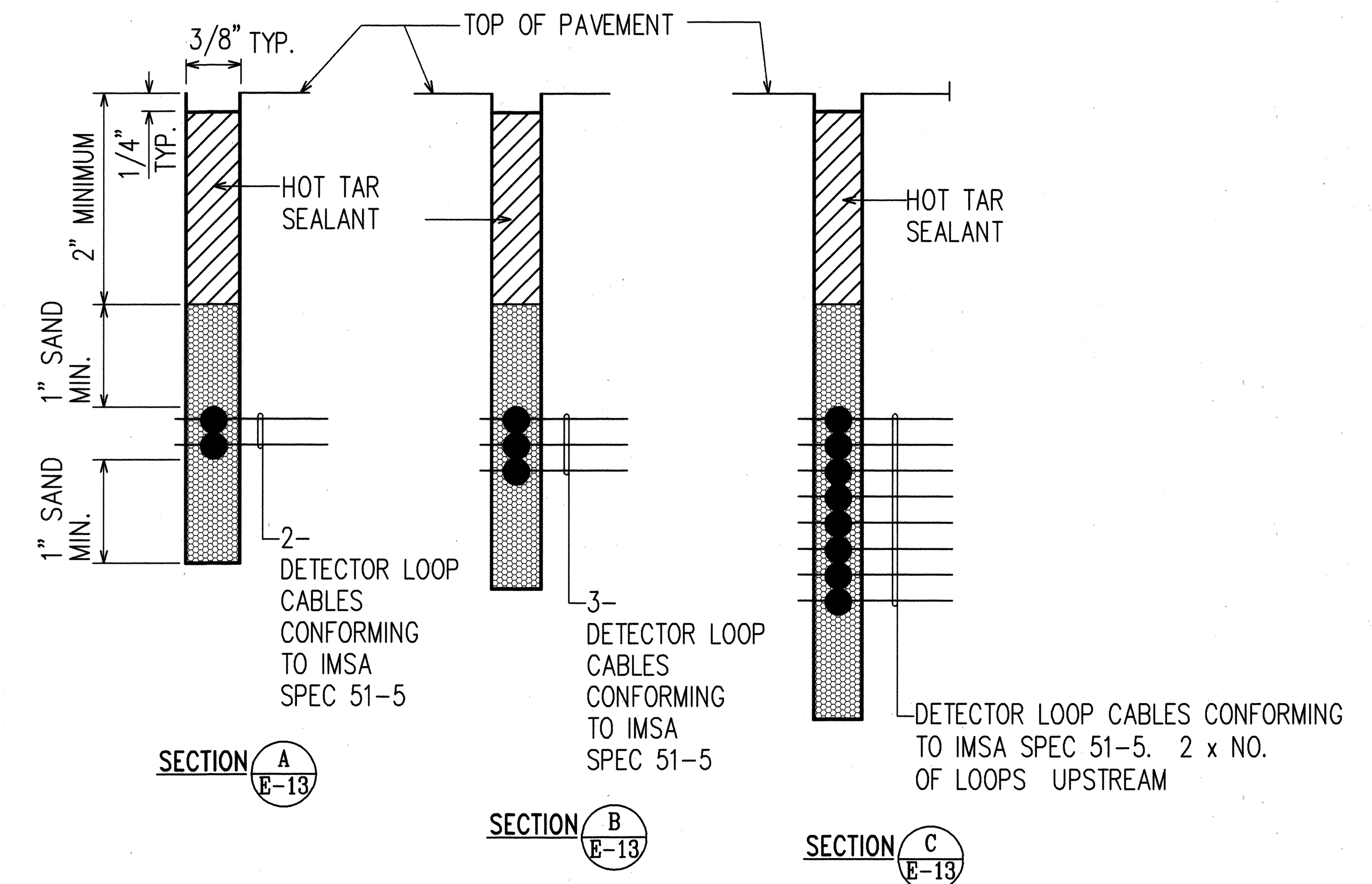
TYPICAL SENSOR LOOP LAYOUT



NOTES ON CONSTRUCTION AT END OF SAWCUT

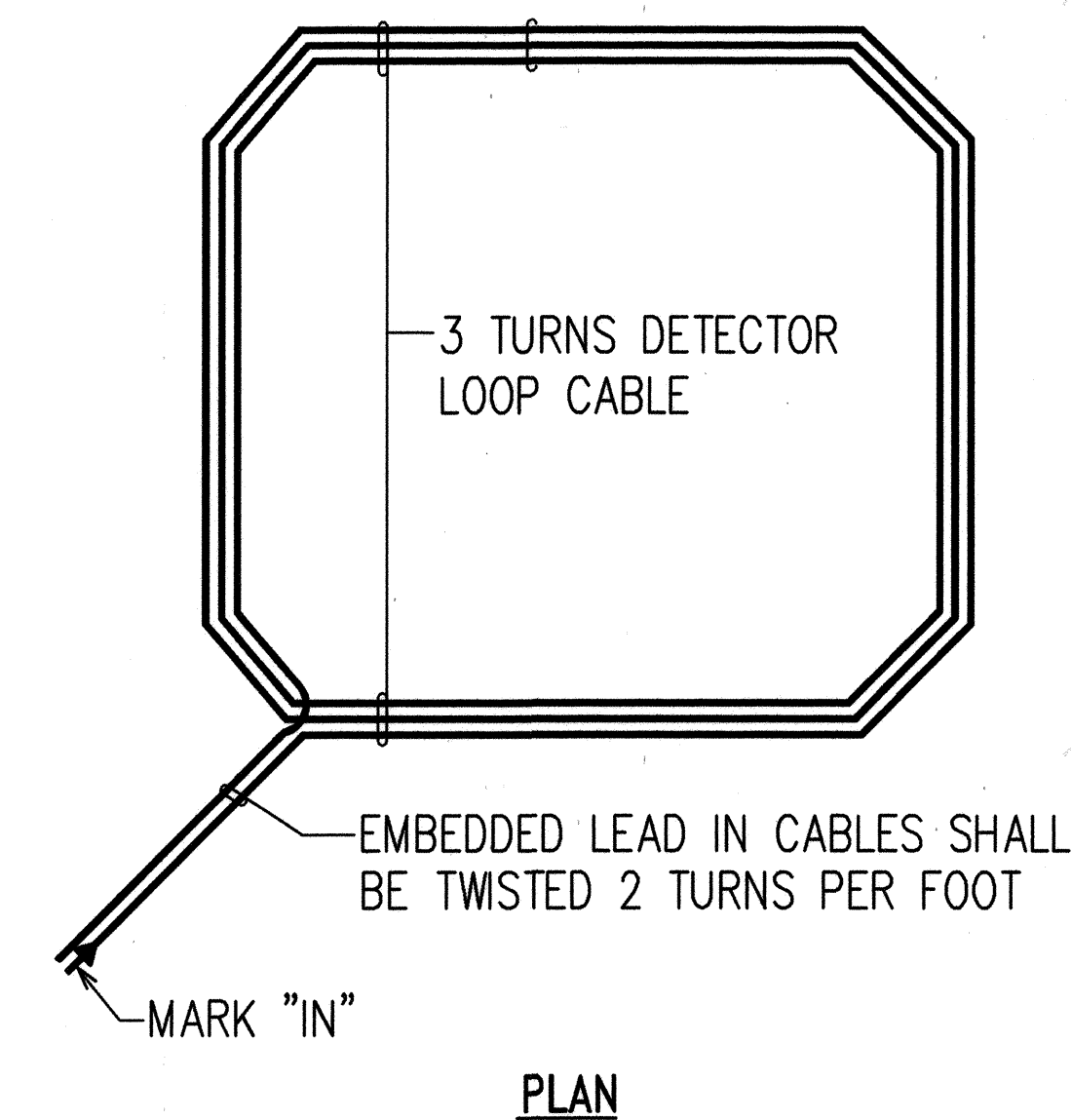
1. SEAL ROADWAY END OF CONDUIT AFTER INSTALLATION OF CONDUCTORS
2. INSTALL BULKHEAD ACROSS CONDUIT TRENCH.
3. PLACE HOT TAR IN SAWCUT.
4. BACKFILL OVER CONDUIT WITH NEW A.C.
5. RECONSTRUCT CURB AND GUTTER AS REQUIRED.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY

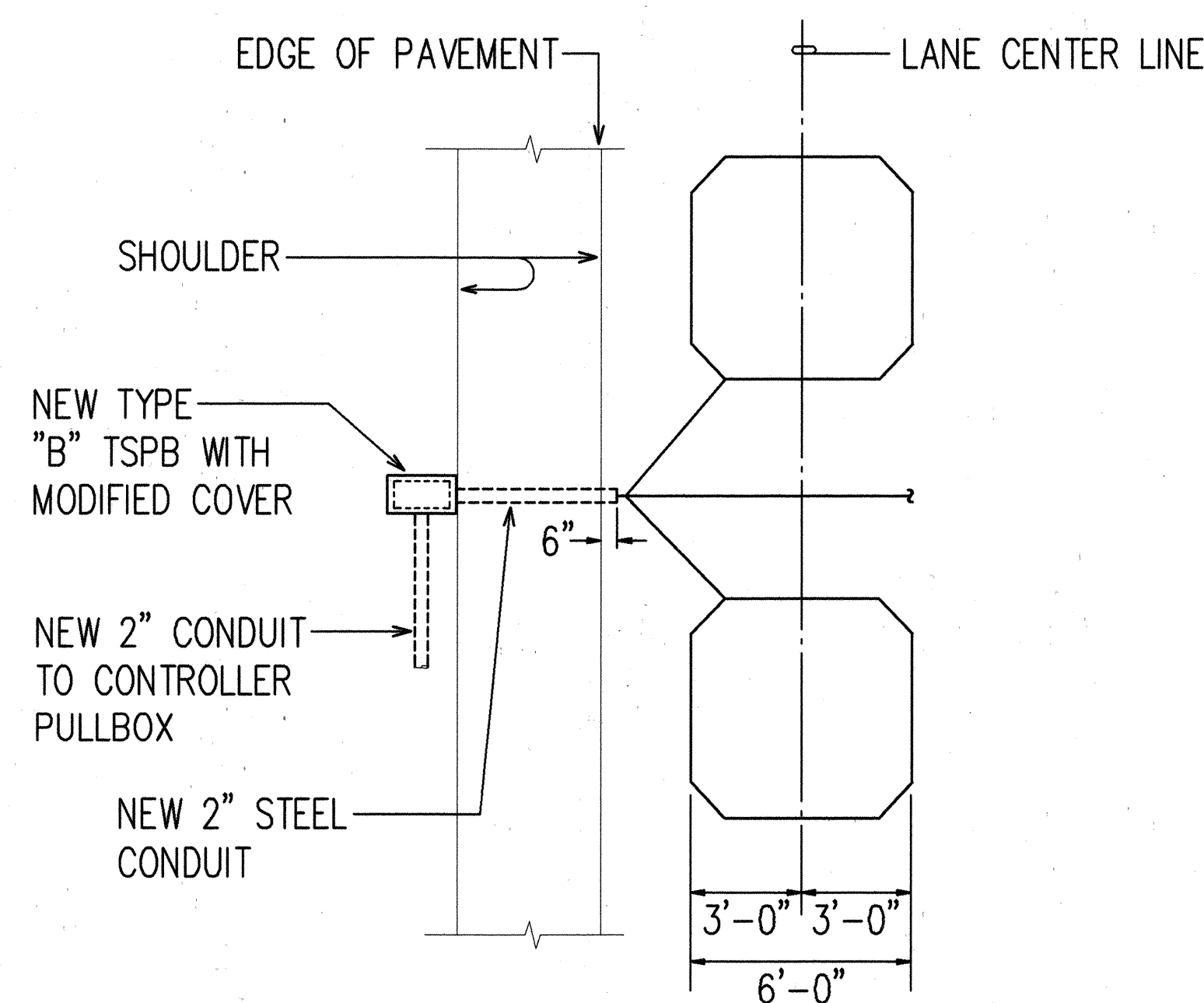


NOTE: LENGTH OF OVERCUTS SHALL BE KEPT TO A MINIMUM.
ALL OVERCUTS SHALL BE BACKFILLED WITH HOT TAR.

TYPICAL SENSOR LOOP SAWCUT DETAIL



TYPICAL SENSOR LOOP WIRING DIAGRAM



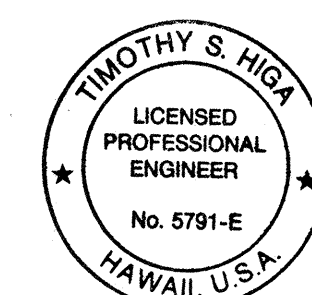
TYPICAL LAYOUT AT SHOULDER AREAS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
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PRINCIPAL-IN-CHARGE
Andrew I. Miyasato
RONALD N.S. HO & ASSOCIATES, INC.
2/6/97



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION:
Timothy S. Higa
RONALD N.S. HO & ASSOCIATES, INC.
2/6/97

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

LIKELIKE HIGHWAY
Inters. Improvements at Alu St.
PROJECT NO. 63A-02-96

SCALE: AS NOTED DATE: FEB 1997

SHEET No. E-13 OF E-13 SHEETS