

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	11RHH(170)-17	1983	84	211

NOTE: ESTIMATED QUANTITY FOR LUMP SUM ITEMS WILL BE USED TO DETERMINE THE THEORETICAL UNIT PRICE AS DEFINED IN SUB-SECTION 104.02(B) OF THE STANDARD SPEC.

LEGEND			
SYMBOLS	REPRESENTS	REFERENCE	DETAIL NOTE
	EXISTING LUMINAIRE		
	PHASE FEEDER		
	METAL LTG. STD. ON STRUCTURE (W/ ANCHORAGE AND 400W. H.P.S. LUMINAIRE TYPE L4-W-S)	4/E6 6/E7 1/E8	
	METAL LTG. STD. ON GRADE (WITH FND AND 250W. H.P.S. LUMINAIRE TYPE L2-W)	4/E6 7/E7 1/E8	
	METAL LTG. STD. ON GRADE, TWIN ARM (W/ FND. AND 150W. H.P.S. LUMINAIRE TYPE L1-W)	4/E6 7/E7 1/E8	
	PARAPET MOUNTED 150 W. H.P.S. LUMINAIRE TYPE B-L1	4/E6 2/E7 1/E8	
	PIER MOUNTED 150 W. H.P.S. LUMINAIRE TYPE B-L1	4/E6 2/E7 1/E8	
	PIER MOUNTED 250 W. H.P.S. LUMINAIRE TYPE P-L2-S	4/E6 1/E7 2/E8	
	RACEWAY RUN IN DECK SLAB; LIGHTING SYSTEM, EXCEPT AS SHOWN	7/E6	3/E1 THRU 6/E1
	RACEWAY RUN EXPOSED ON STRUCTURE; LIGHTING SYSTEM	7/E6	5/E1 THRU 12/E1
	RACEWAY RUN IN PARAPET; LIGHTING SYSTEM, EXCEPT AS SHOWN	2/E6	3/E1 THRU 6/E1
	RACEWAY RUN UNDERGROUND; LIGHTING SYSTEM, EXCEPT AS SHOWN		3/E1 THRU 9/E1
	CAP AND MARK RACEWAY; END RACEWAY	5/E6	
	PULLBOX TYPE CCI, FOR LIGHTING SYSTEM PULLBOX TYPE CCI, FOR TRAFFIC SIGNAL SYSTEM	1/E6	
	TRAFFIC SIGNAL SYSTEM RACEWAY		3/E1 THRU 6/E1
	PULLBOX CAST IRON (SIZE B, ETC.)	1/E1	
	COMMUNICATIONS FACILITY	3/E6	
	PULLBOX TYPE CC4, FOR TRAFFIC SIGNAL SYSTEM	1/E6	
	TRAFFIC COUNT STATION DETECTOR LOOP	SHEET E10	
	VEHICLE DETECTOR LOOP W/ TRAFFIC PHASE I.D.	SHEET DT405	
	TRAFFIC SIGNAL W/ I.D. N.S. AND TRAFFIC PHASE I.D.	SHEET DT400	
	METAL PEDESTAL TYPE TRAFFIC SIGNAL STD. W/ I.D.	SHEET DT400	
	METAL MAST ARM TYPE TRAFFIC SIGNAL STD. W/ I.D.	SHEETS DT400, DT404	11/E1
	PEDESTRIAN PUSHBUTTON AND SIGN	SHEET DT400	
	CONTROLLER	SHEET DT404	

ELECTRICAL				
ITEM NO	ITEM	UNIT	QUANTITIES	
			HIGHWAY	BRIDGE
622.7001	METAL LIGHTING STANDARD ON STRUCTURE	EA		3
622.7002	METAL LIGHTING STANDARD ON GRADE	EA	3	
622.7003	METAL LTG. STD. ON GRADE, TWIN ARM	EA	2	
622.7005	UNDERGROUND RACEWAY, LIGHTING SYSTEM	LS	830'	
622.7013	PULLBOX, CAST IRON	LS		23
622.7016	PULLBOX, TYPE CCI, LIGHTING SYSTEM	EA	6	
622.7023	LUMINAIRE, PIER OR PARAPET MOUNTED	EA		22
622.7024	RACEWAY ON STRUCTURE	LS		2600'
622.7008	WIRE, 600 VOLT, 1/C, #6	LS	1400'	
622.7022	WIRE, 600 VOLT, 1/C, #8	LS	1600'	12,150'
622.7031	MISCELLANEOUS ELECTRICAL WORK	LS	1	
623.9006	MISCELLANEOUS FACILITIES, TRAFFIC	LS	1	
623.9010	PULLBOX TYPE CC, TRAFFIC SIGNAL SYSTEM	EA	30	
623.9015	SIGNAL LOOP CABLE : 26/C, #12, 600V.	LS	1400'	
623.9016	SIGNAL HEAD CABLE : 4/C, #14, 600V.	LS	2600'	
623.9017	DETECTOR LEAD-IN CABLE : 2/C #12, 600V.	LS	4800'	
623.9018	SIGNAL DUCT : ONE 1-INCH	LS	1,100'	
623.9019	SIGNAL DUCT : ONE 2-INCH	LS	2,000'	3,100'
623.9020	SIGNAL DUCT : TWO 2-INCH	LS	950	
623.9023	TRAFFIC SIGNAL SYSTEM No. N4A-1	LS	1	
623.9024	TRAFFIC SIGNAL SYSTEM No. N4A-2	LS	1	
*	CONTROLLER INTERTIE CABLE : 24/C, #18, 600V	*	1,900'	

* PAYMENT INCIDENTAL TO VARIOUS CONTRACT ITEMS.

CAST IRON PULLBOXES IN STRUCTURE		
PLAN SYMBOL	SIZE (INCHES) LXWxD	GENERAL APPLICATION
B ■	8 x 6 x 4	#6 LTG. FEEDERS COMM. LATERALS
G ■	4 x 4 x 2	PIER LUMINAIRES
F ■	6 x 6 x 4	PARAPET LUMINAIRES

NOTE: PROVIDE ALL BOXES WITH INSIDE RECESSED FLANGE.

DETAIL 1/E1 - PULLBOX SCHEDULE

LIST OF ABBREVIATIONS

C	RACEWAY (TYPE AND SIZE AS INDICATED)
NMR	NON-METALLIC RACEWAY (TYPE PVC OR CAD)
RGS	RIGID GALVANIZED STEEL CONDUIT
RAL	RIGID ALUMINUM CONDUIT
PVC	POLYVINYLCHLORIDE CONDUIT
CAD	CEMENT ASBESTOS DUCT
LTG	LIGHTING
LTG STD	LIGHTING STANDARD
BKT	BRACKET ARM
FND	FOUNDATION
CKT	CIRCUIT
FDR	FEEDER (OR BRANCH THEREOF)
GND	GROUND
N.T.S.	NOT TO SCALE
N.I.C.	NOT IN CONTACT
FUT.	FUTURE
(E)	EXISTING
CONC.	CONCRETE
H.P.S.	HIGH PRESSURE SODIUM LAMP
HG	MERCURY VAPOR LAMP
E.T.W.	EDGE OF TRAVELED WAY
P.B.	PULL BOX
A.N.S.I.	AMERICAN NATIONAL STANDARDS INSTITUTE

GENERAL NOTES APPLYING TO ALL ELECTRICAL SHEETS

1/E1. ON PLAN SHEETS EXISTING FACILITIES ARE DESIGNATED BY NOTATION OR BY THE LETTER (E) IN CONJUNCTION WITH THE SYMBOL.

2/E1. DETAIL AND NOTES ARE NUMBERED AS FOLLOWS:

DETAIL OR NOTE NUMBER

1/E3 - ELECTRICAL SHEET ON WHICH DETAIL OR NOTE APPEARS.

3/E1. PROVIDE UNDERGROUND RACEWAYS AND RACEWAYS RUN IN STRUCTURE IN 2" SIZE, EXCEPT AS NOTED, AND OF TYPE NMR, EXCEPT AS NOTED. PROVIDE 1 INCH AND SMALLER SIZE RACEWAYS OF TYPE RGS.

4/E1. NONE.

5/E1. PROVIDE AN EXPANSION-DEFLECTION FITTING IN ALL RACEWAY AT BRIDGE EXPANSION JOINTS.

6/E1. IN TYPE NMR RACEWAY RUN IN STRUCTURE, PROVIDE A#6 BARE COPPER CABLE AND BOND ALL LTG. STANDARDS, PULL BOXES, AND METAL RACEWAY SEGMENTS TO IT. CONNECT CABLE TO GND. ROD IN PULLBOX NOTED ON PLAN.

7/E1. EXTEND ALL PHASES OF FEEDER TERMINATION TO POINT INDICATED ON PLAN.

8/E1. PROVIDE RACEWAYS RUN EXPOSED ON STRUCTURE IN TYPE RGS AND IN 1/4" SIZE, EXCEPT AS NOTED.

9/E1. PROVIDE UNDERGROUND RACEWAYS WHICH RUN ABOVE PIER FOOTINGS IN TYPE RGS TO POINTS 5 FEET BEYOND FOOTING.

10/E1. RACEWAYS MAY BE RUN EXPOSED ONLY WHERE LOCATED AGAINST UNDERSIDE OF BRIDGE DECK, NOT ON PIER LEGS, PIER CAPS, OR ELSEWHERE.

11/E1. USE TYPE IIA FOUNDATIONS FOR MAST ARM TYPE TRAFFIC SIGNAL STANDARD.

8/24/84 REVISED QUANTITY OF ITEMS 623.9010 AND 623.9019, AND ADDED QUANTITY FOR CONTROLLER INTERTIE CABLE IN TABLE 'ELECTRICAL'

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN
LEGEND, NOTES, DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-1R-HI-1(170)-17

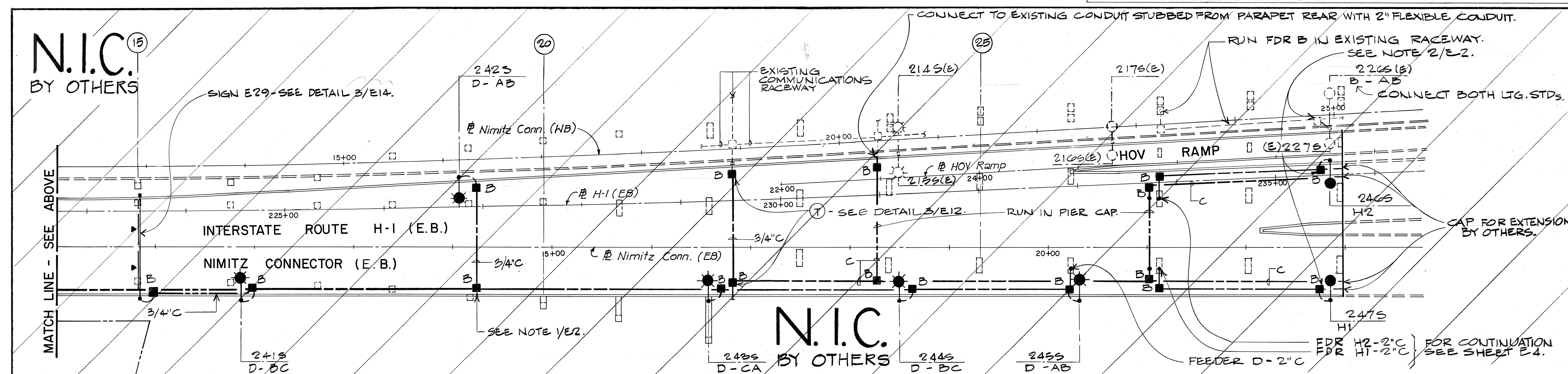
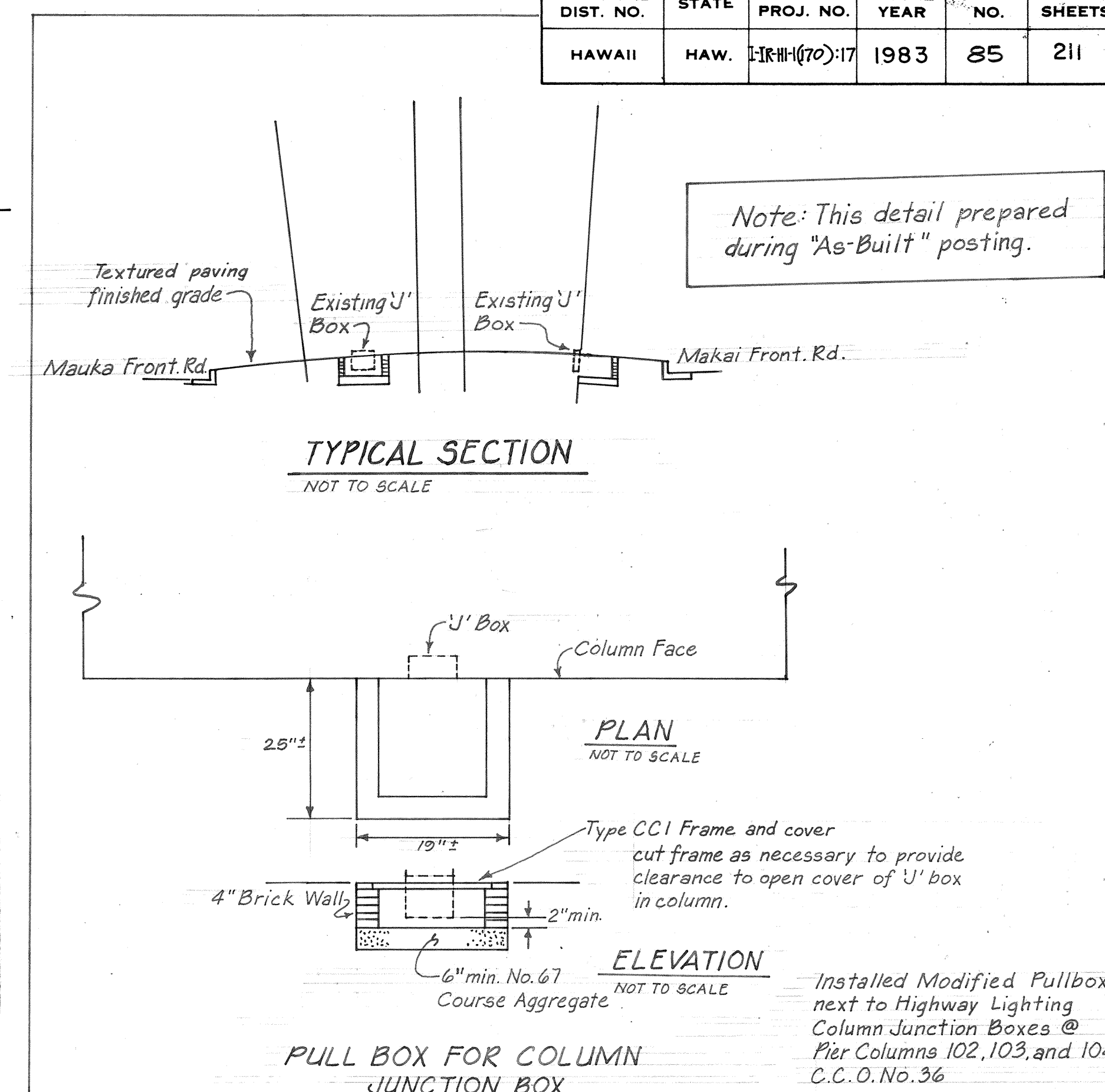
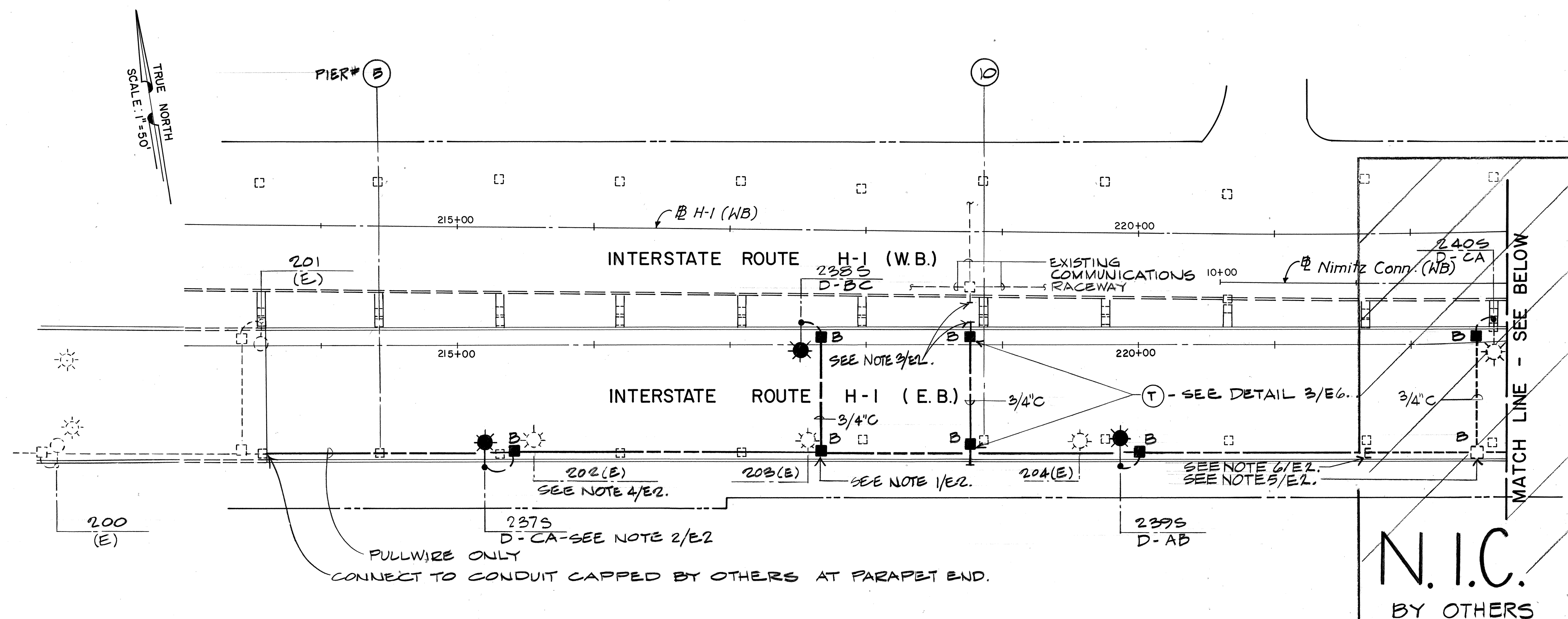
SCALE: DATE: 12/15/81

SHEET No. E1 OF 16 SHEETS

ADD. 84

DATE	
SURVEY PLANNED BY	
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-IR-11(170):17	1983	85	211



- NOTES:
- 1/E2. FOR LATERALLY-FED LTG. STD., PROVIDE FEEDER TAP TO STD. PER DETAIL 4/E6 IN PULLBOX INDICATED.
 - 2/E2. TERMINATE FEEDER AND GROUND WIRE HERE. SEE NOTE 7/E1.
 - 3/E2. FUTURE RACEWAY INTERCONNECTION NOT SHOWN. FUTURE RACEWAY EXTENSIONS TO COMMUNICATION FACILITY NOT SHOWN.
 - 4/E2. LUMINAIRES 202, 203, & 204 ARE LOCATED ON EXISTING TEMPORARY RAMP IV.
 - 5/E2. CONNECT TO FEEDER AND GROUND WIRE TERMINATED HERE BY OTHERS.
 - 6/E2. CONNECT TO RACEWAY TERMINATED HERE BY OTHERS.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

ELECTRICAL PLAN

VIADUCT LIGHTING

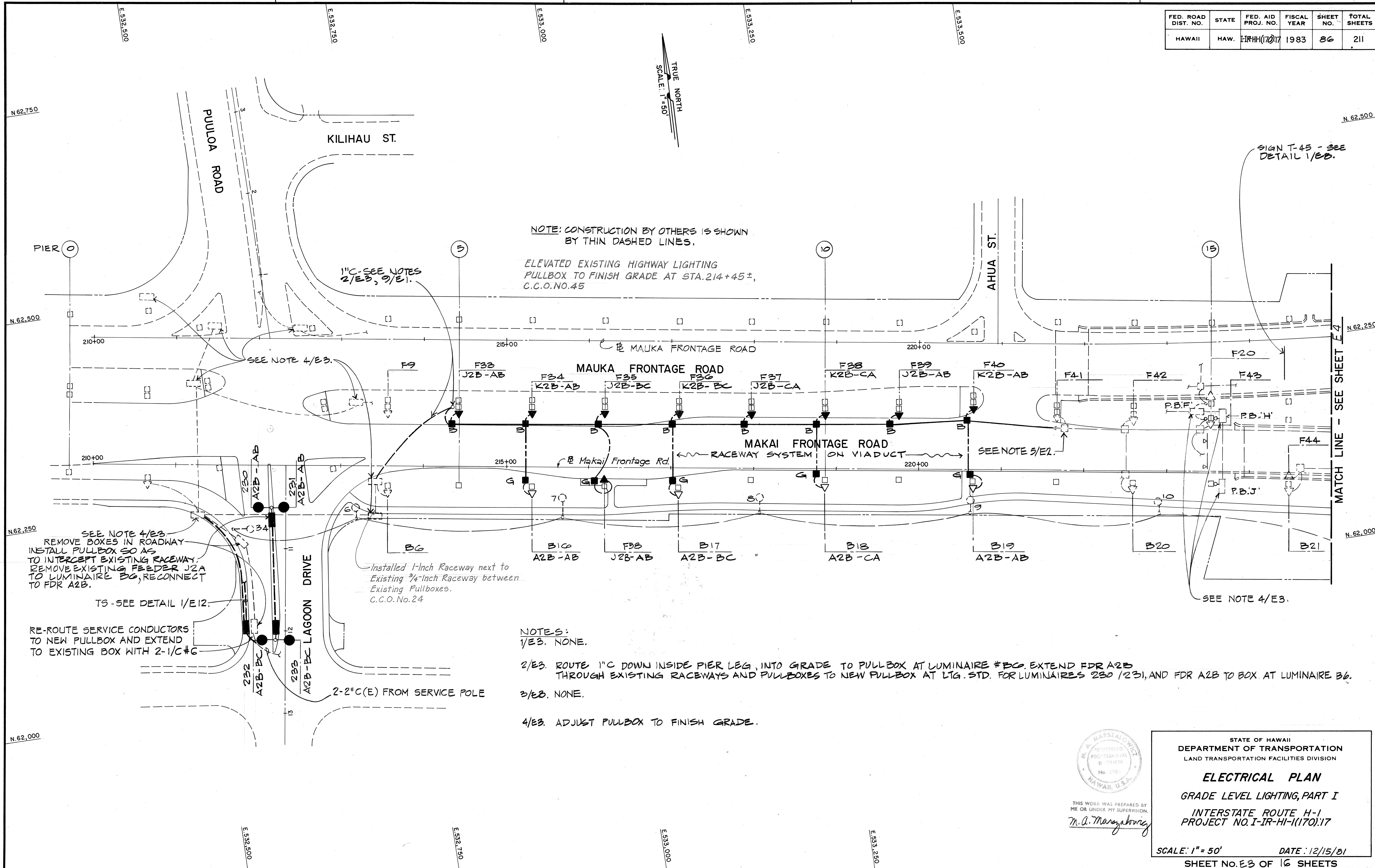
INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170).17

SCALE: 1" = 50'

DATE: 12/15/81

SHEET No. E2 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FIRHH(170)17	1983	86	211



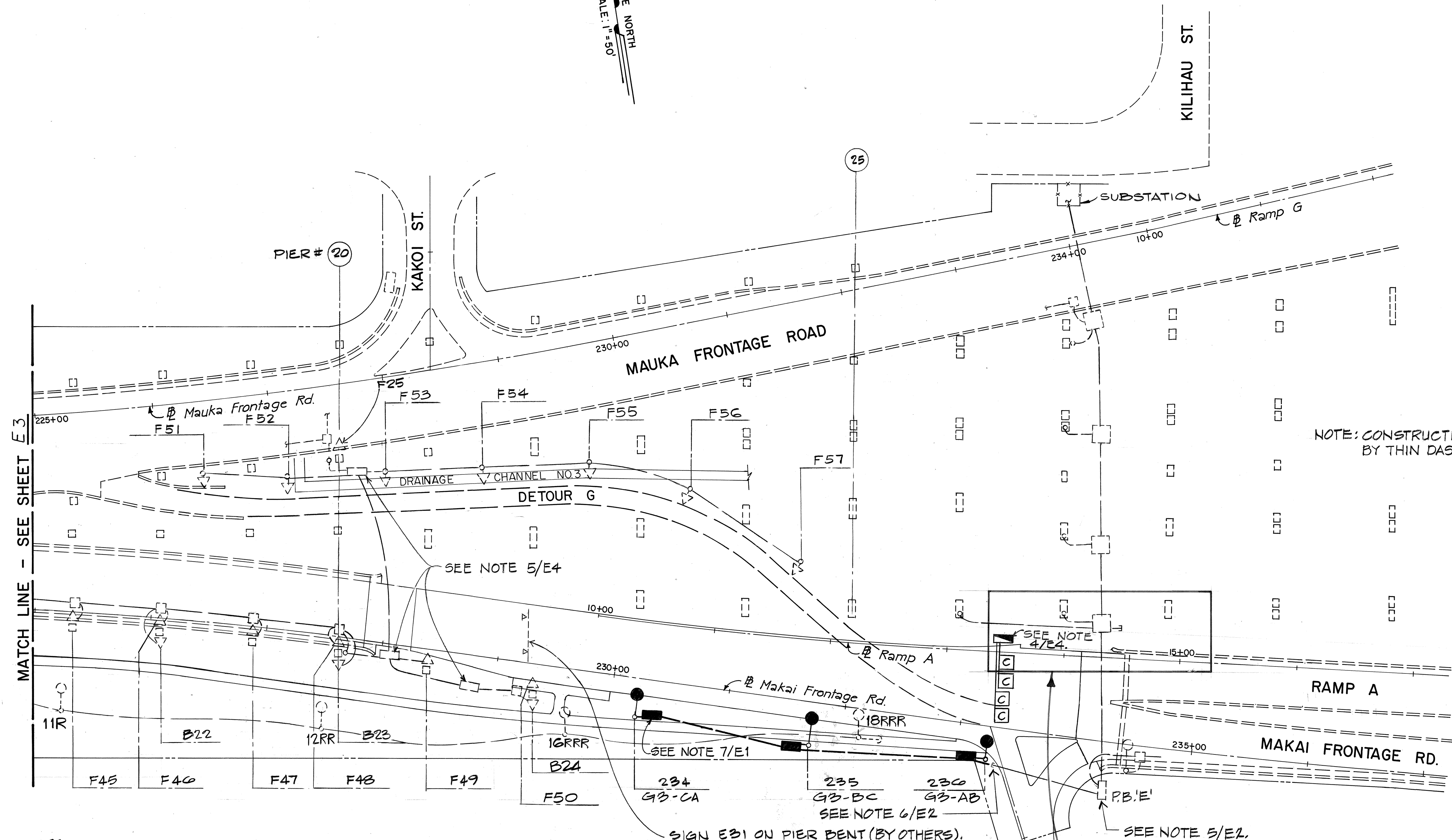
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION
M. A. Marzaboni

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

ELECTRICAL PLAN
GRADE LEVEL LIGHTING, PART I
INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170):17

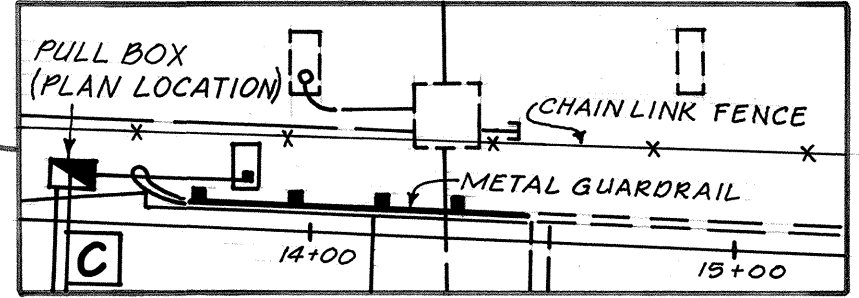
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SHEET No. E-3 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	11R-HI-17	1983	87	211

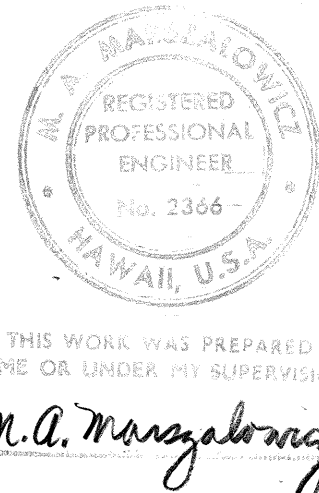


NOTE: CONSTRUCTION BY OTHERS IS SHOWN BY THIN DASHED LINES.

- NOTES:
- 1/E4. NONE.
 - 2/E4. NONE.
 - 3/E4. NONE.
 - 4/E4. PROVIDE DC POWERED TRAFFIC COUNT STATION PER DETAILS ON SHEET E10.
 - 5/E4. ADJUST PULLBOX TO FINISH GRADE.



Not To Scale
Note: This detail prepared during "As-Built" posting.
C.C.O. NO. 40



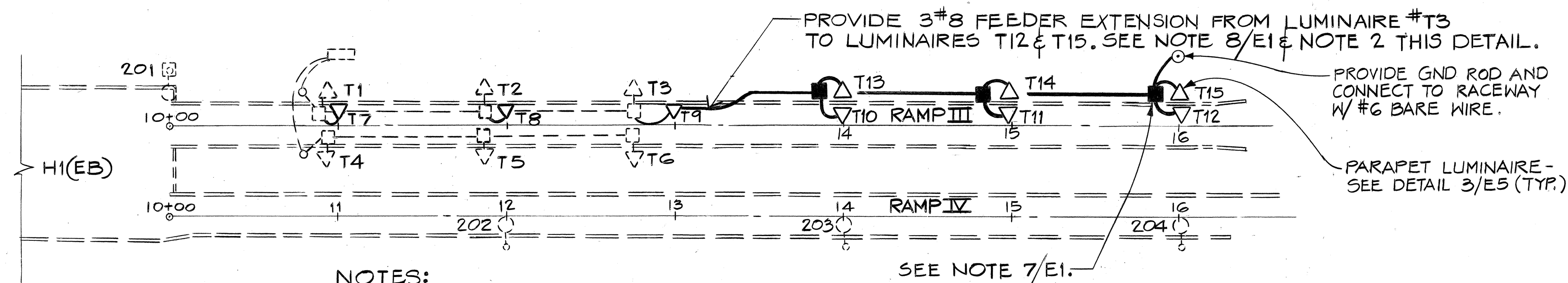
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

ELECTRICAL PLAN
GRADE LEVEL LIGHTING, PART II

INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170):17

SCALE: 1" = 50' DATE: 12/15/81
SHEET NO. 87 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	117-11(170)	1983	88	211

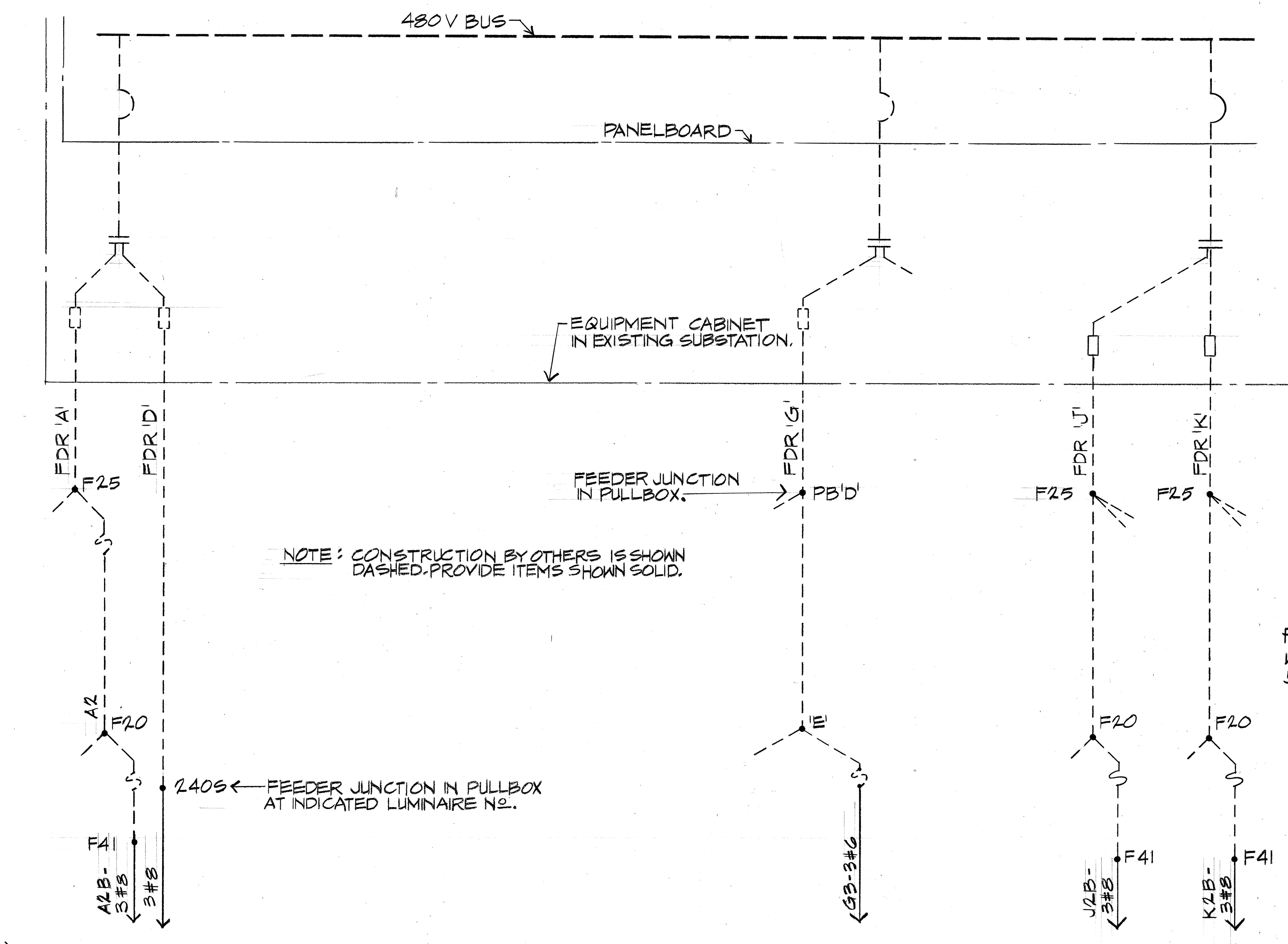


NOTES:

1. FACILITIES SHOWN DASHED ARE EXISTING.
2. WHEN DIRECTED, DISCONNECT LUMINAIRES T1, T2, T3 FROM FEEDER AND CONNECT NEW FEEDER EXTENSION TO EXISTING FEEDER TERMINUS AT LUMINAIRE T3.
3. WHEN DIRECTED, REMOVE AND STOCKPILE LUMINAIRES T1 THRU T15 AND LTG STD-202, 203, 204.

DETAIL 4/E5 RAMP III LIGHTING

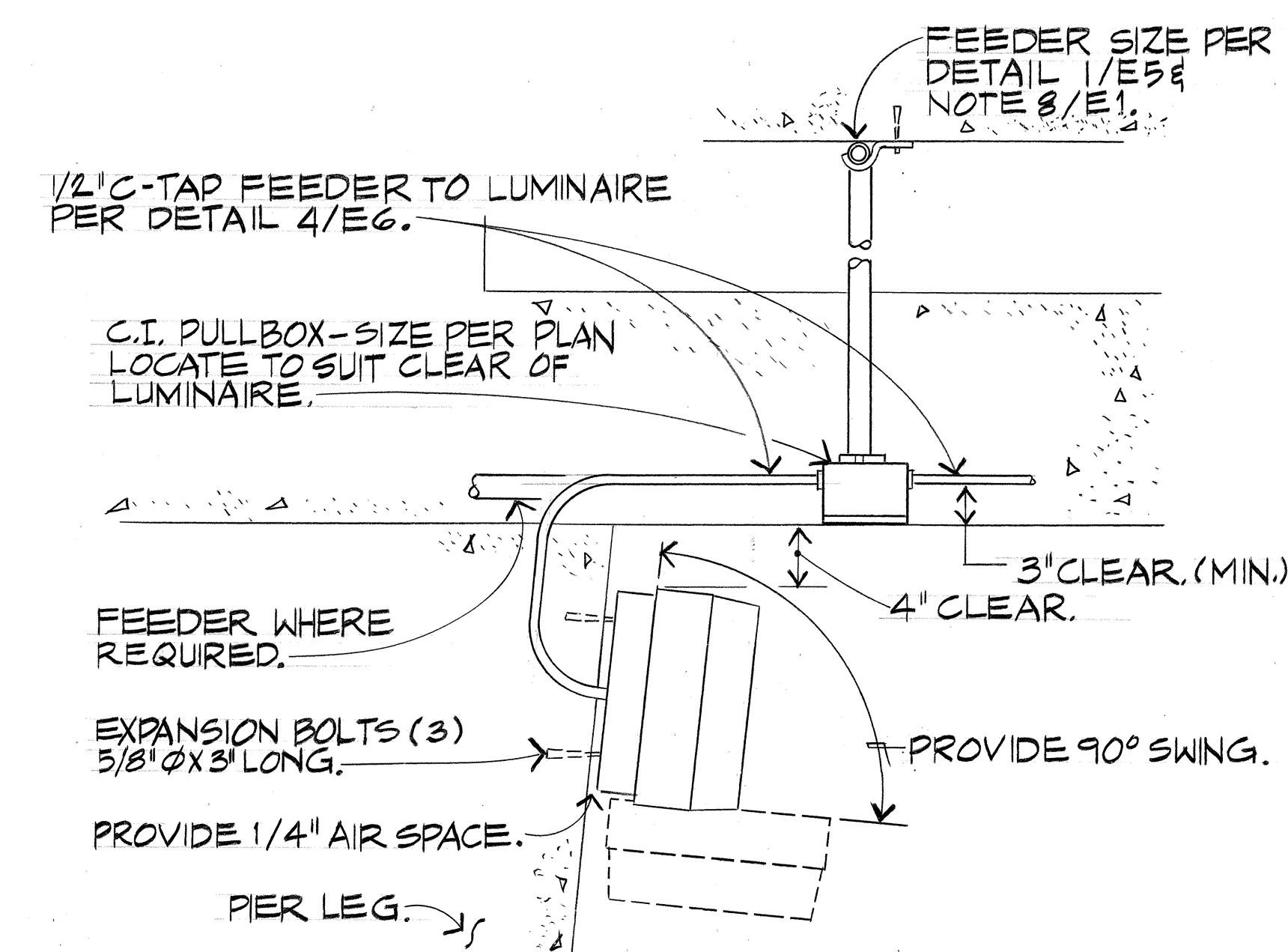
SCALE: 1"=50'



DETAIL 1/E5

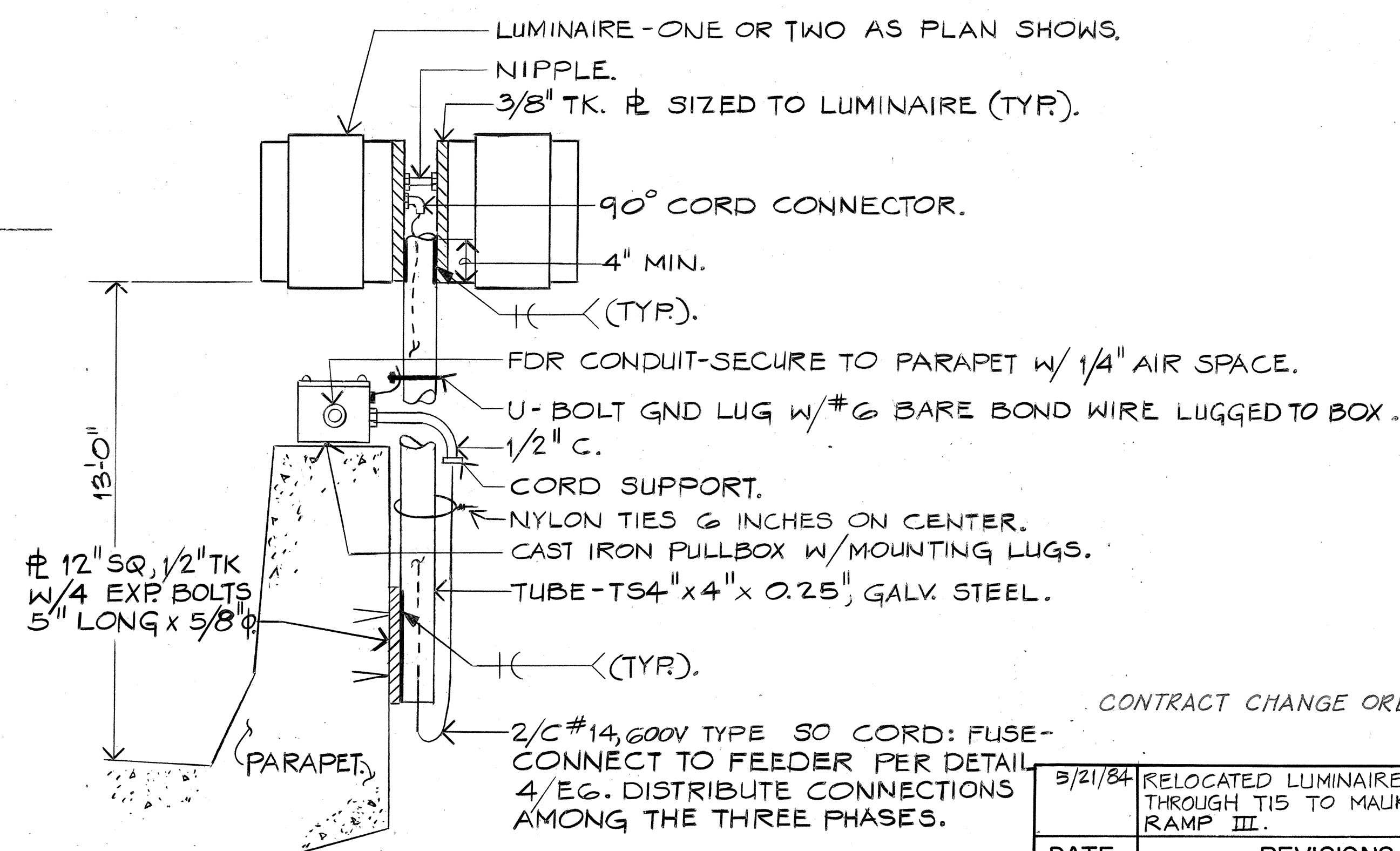
HIGHWAY LIGHTING FEEDER DIAGRAM

N.T.S.



DETAIL 2/E5 - PIER-MOUNTED LUMINAIRE

N.T.S.



DETAIL 3/E5 - PARAPET LUMINAIRE

N.T.S.

CONTRACT CHANGE ORDER NO. 1

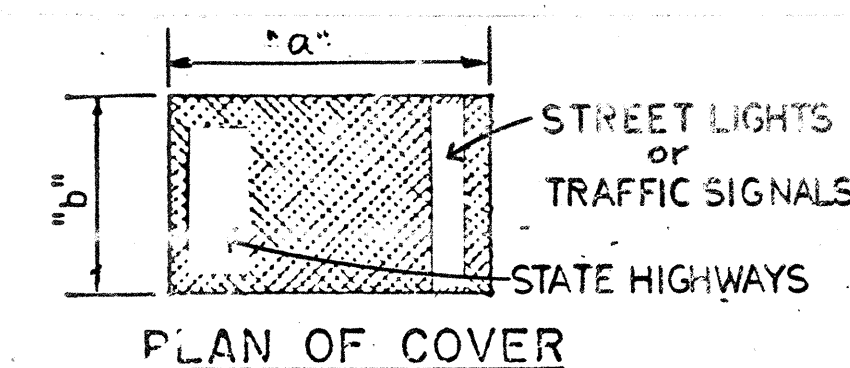
5/21/84	RELOCATED LUMINAIRES T10 THROUGH T15 TO MAUKA SIDE OF RAMP III.
DATE	REVISIONS
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
ELECTRICAL PLAN	
DETAILS - PART I	
INTERSTATE ROUTE H-1 PROJECT NO. I-IR-HI-1(170):17	

SCALE: AS SHOWN DATE: 12/15/81
SHEET NO. 88 OF 16 SHEETS

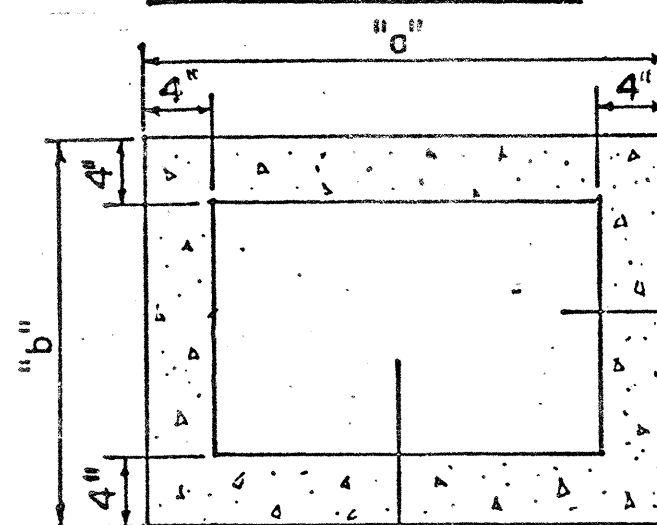
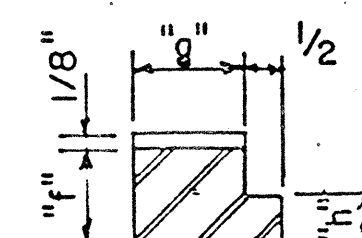
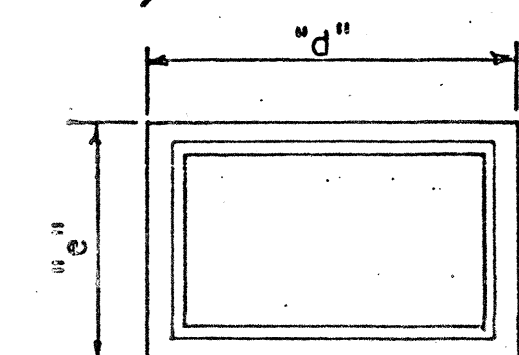
C088

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

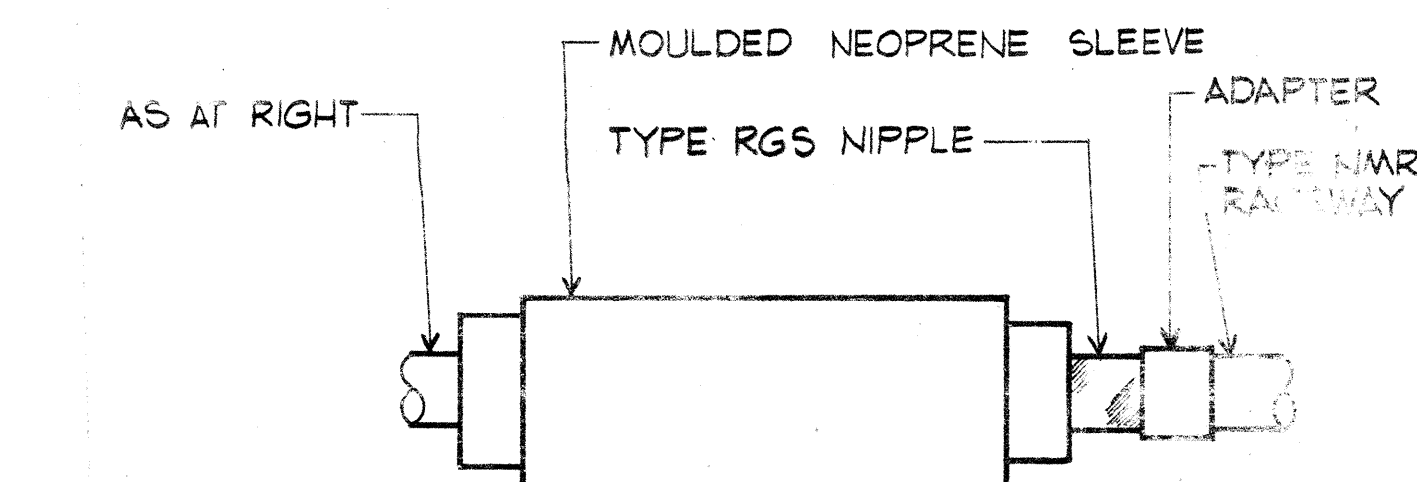
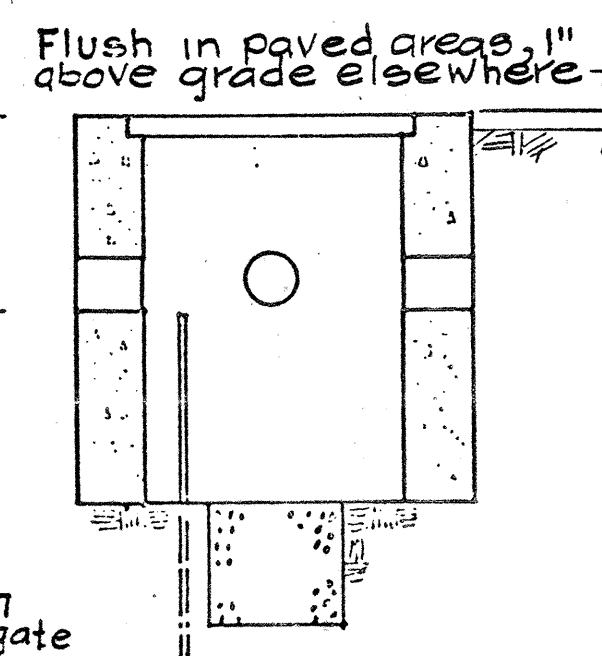
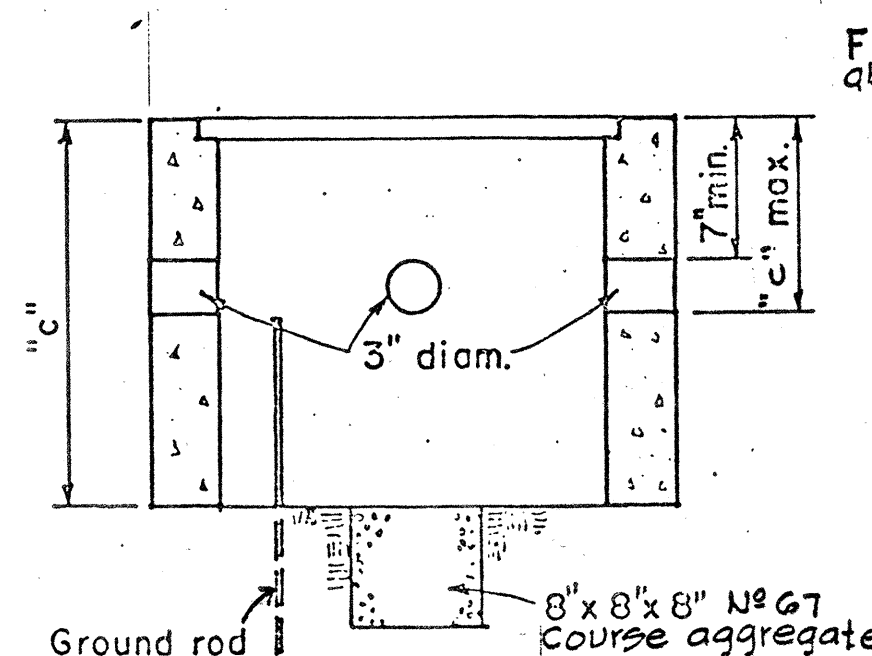
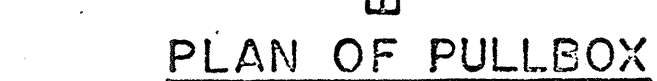
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-11(170):17	1983	89	211



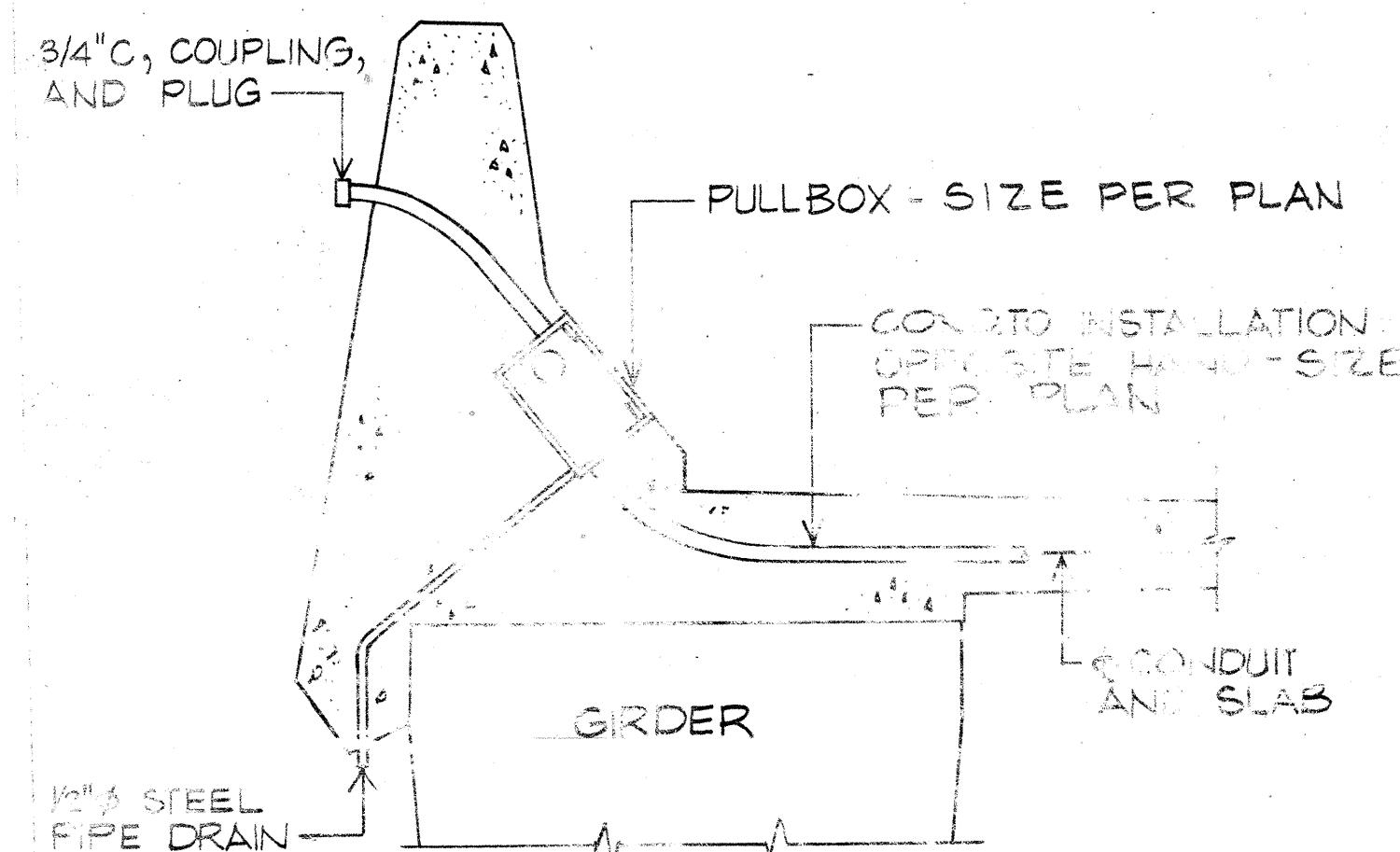
Frame & Cover Size-Inches				
Size	TYPE CC1	TYPE CC2	TYPE CC3	TYPE CC4
"o"	19 3/4	23 1/2	30	60 3/4
"b"	12	15 3/4	20	36 3/4
"c"	1/2	1/2	5/8	3/8
"d"	22 1/2	26 1/4	33 1/8	64
"e"	14 3/4	18 1/2	23 3/8	40
"f"	1	1	2	2
"g"	1 1/4	1 1/4	1 1/2	1 1/2
"h"	1/2	1/2	1 3/8	1 3/8



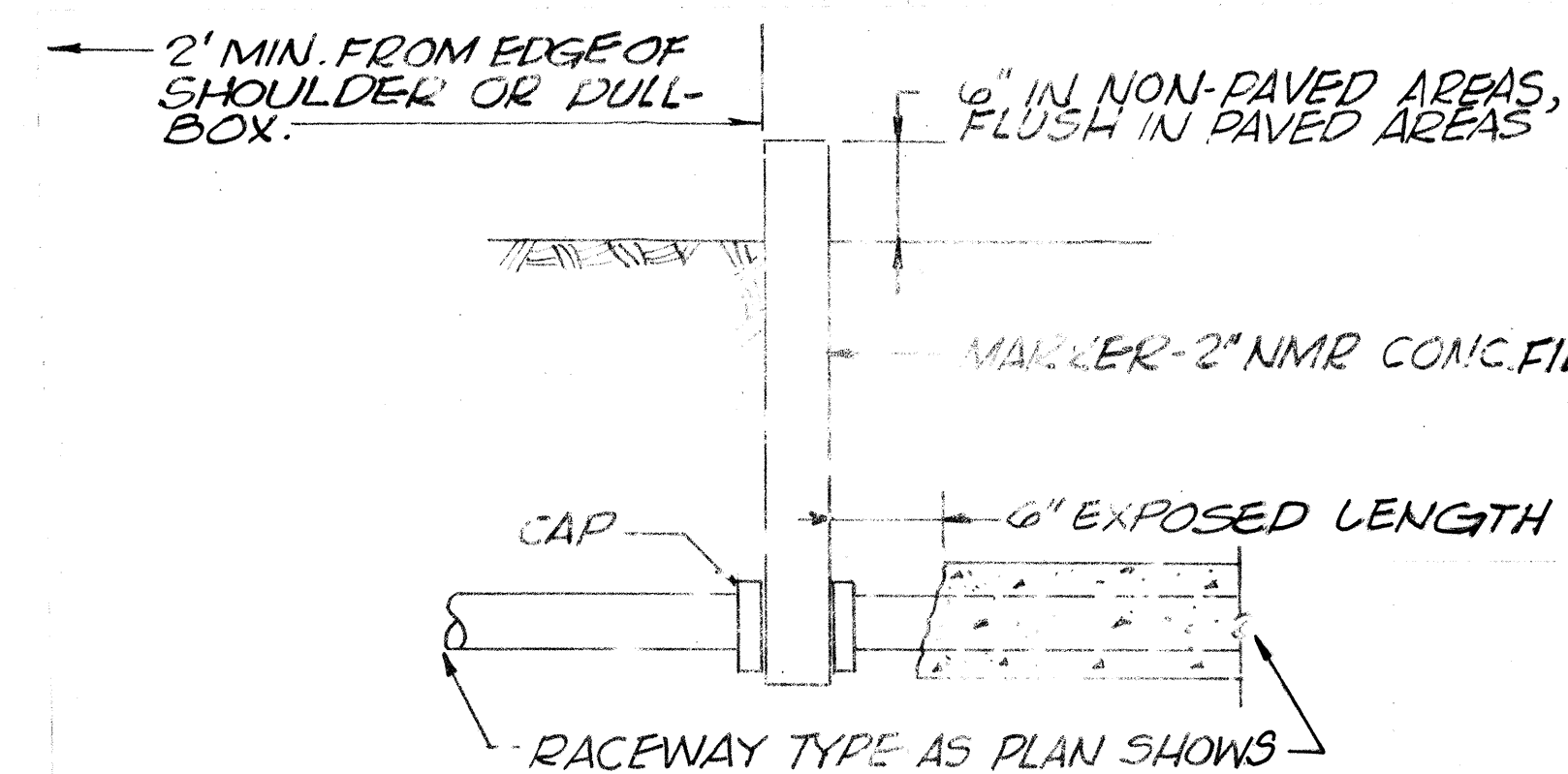
Pullbox size-inches				
TYPE	TYPE	TYPE	TYPE	
CC 1	CC2	CC3	CC4	
"a"	28	32	40	68
"b"	19	24	28	44
"c"	18	24	24	36



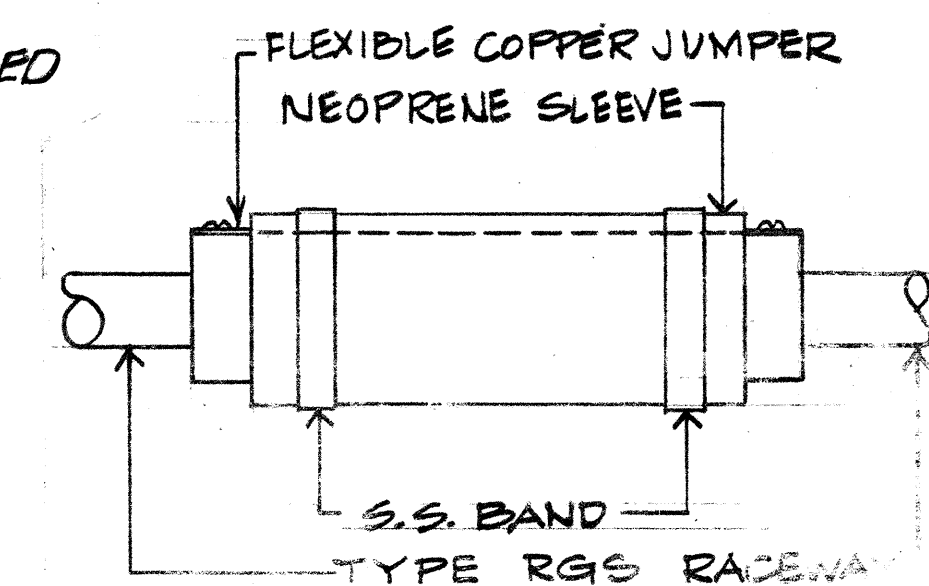
DETAIL 2/E6
EXPANSION - DEFLECTION FITTING



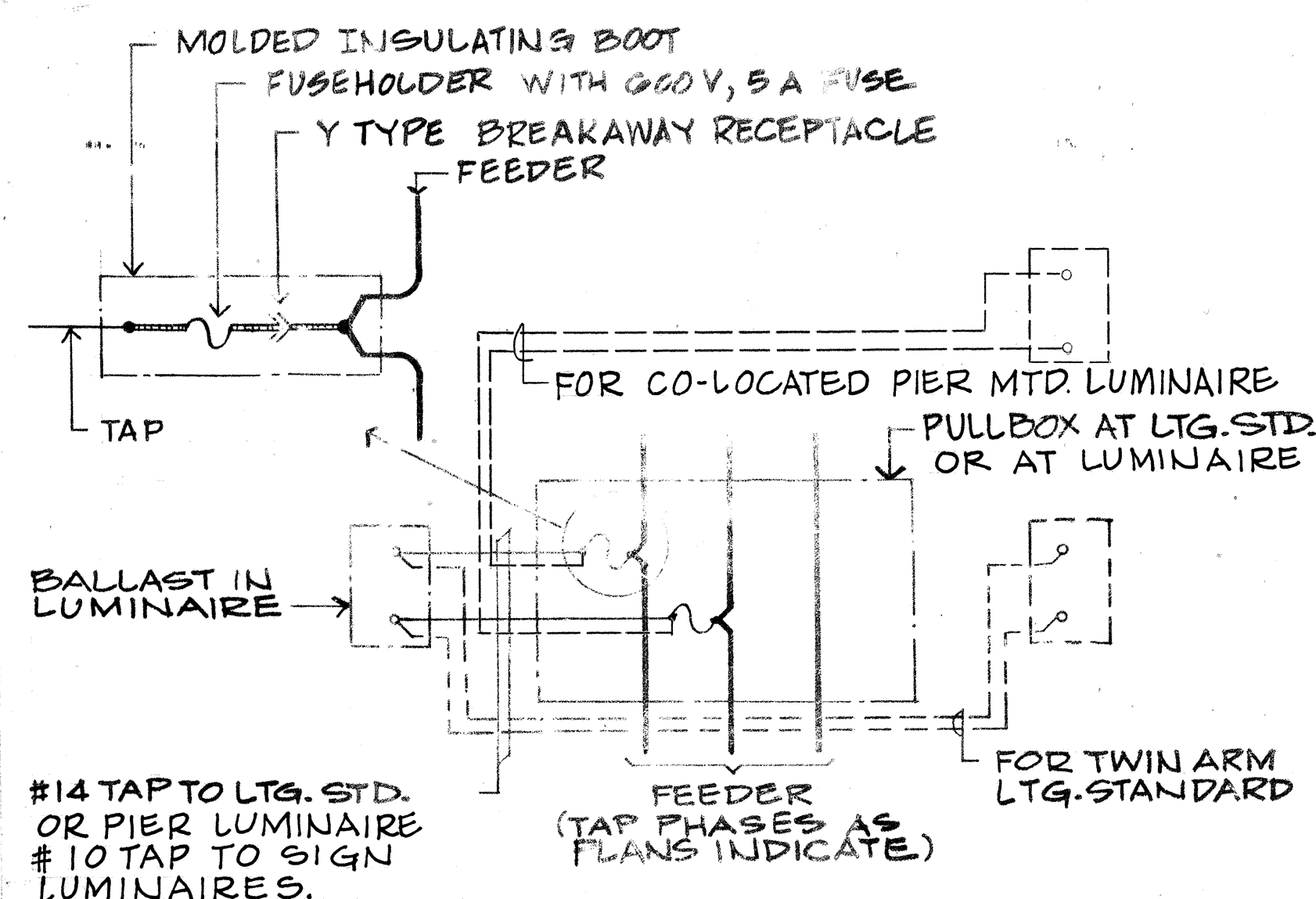
DETAIL 3/E6
COMMUNICATIONS FACILITY ON STRUCTURE
N.T.S.



DETAIL 5/E6
CAP & MARK RLCV



DETAIL 7/E6
EXPANSION-DEFLECTION P LING



DETAIL 4/E6
TAP TO LTG. STD. LUMINAIRE
OR PIER LUMINAIRE

DETAIL 1/E6
PULLBOX TYPES CC

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN

DETAILS - PART II

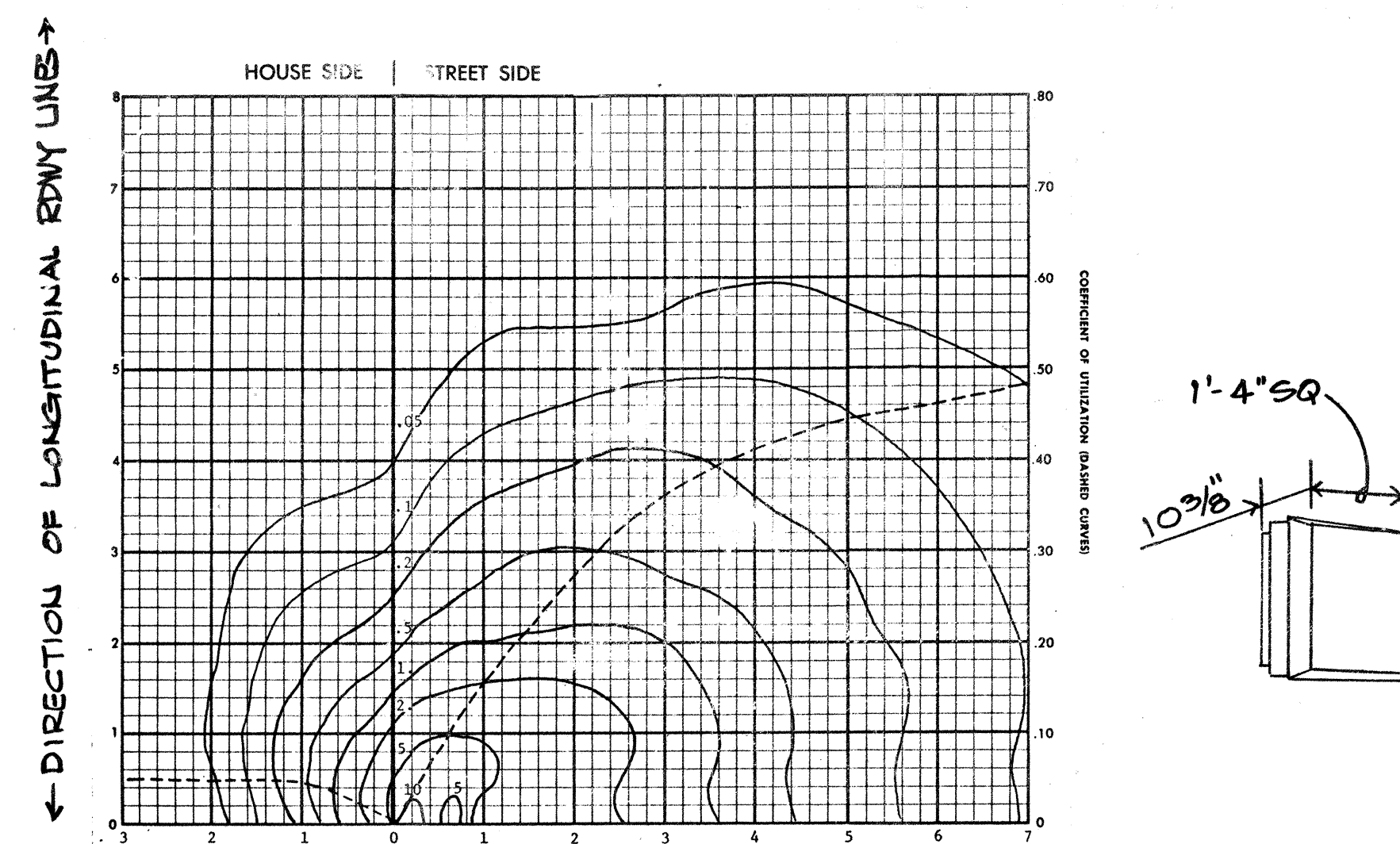
INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170):17

SCALE: NONE DATE: 12/15/81

SHEET No. E6 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FIR-H(170)17	1983	90	211

- NOTES:
- 1/E7 THE FOLLOWING LUMINAIRES ARE ACCEPTABLE AS LUMINAIRE #L4-W-S, BUT DO NOT REQUIRE A SHIELD:
A. WESTINGHOUSE OV-25, TU-DOOR, FLAT GLASS DESIGN, III SCO DISTRIBUTION.
B. GENERAL ELECTRIC M400A CUTOFF (DWG. NO. 35-175867)
- 2/E7. ISOFOOTCANDLE DISTRIBUTION IN THE RIGHT HAND QUADRANT IS AS SHOWN FOR LEFT QUADRANT.
- 3/E7. LIGHT DISTRIBUTION ABOVE THE HORIZONTAL SHALL NOT EXCEED 1 1/2% OF BARE BULB LUMENS ON THE STREET SIDE AND 1% ON THE HOUSE SIDE.



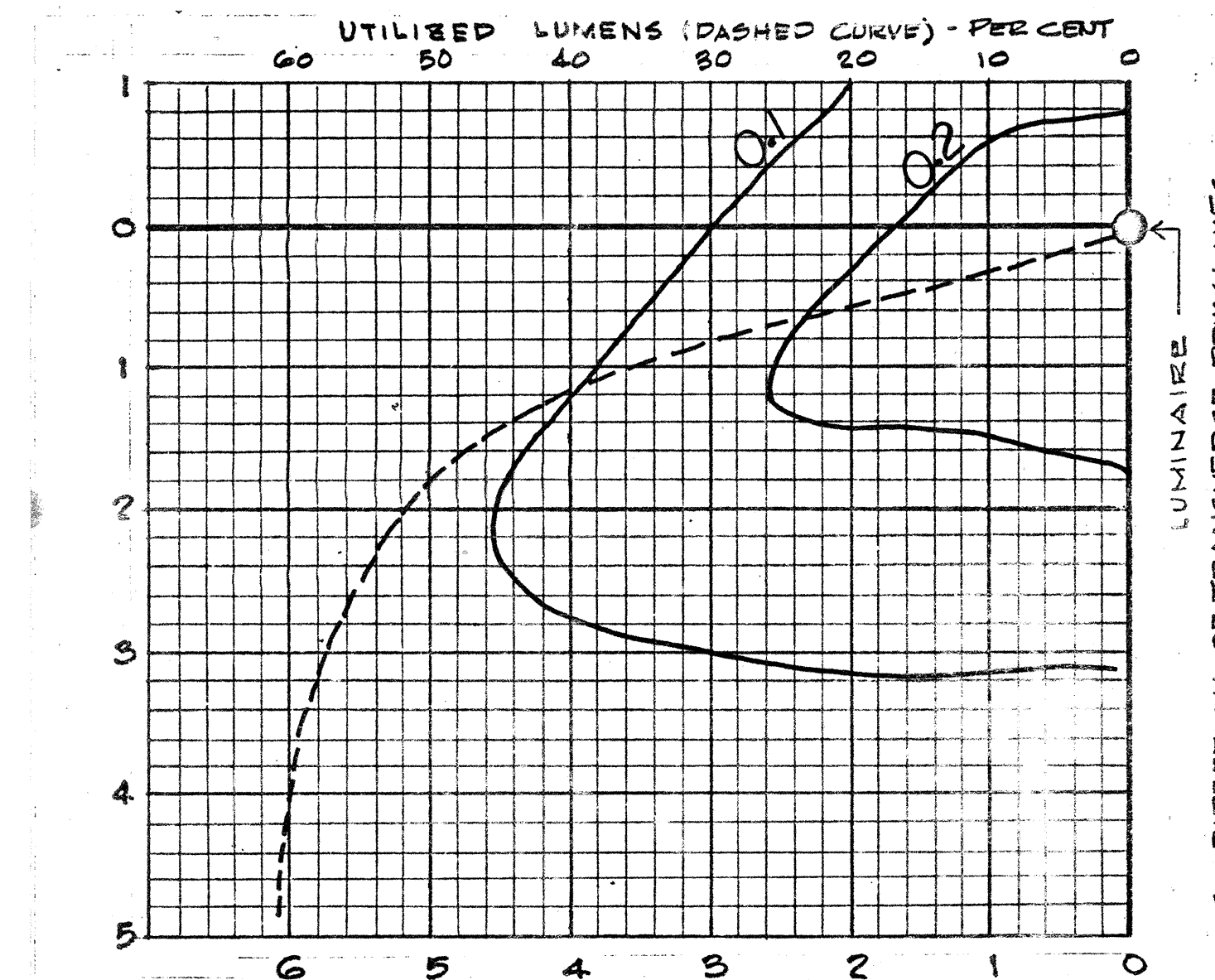
ISOFOOTCANDLE & UTILIZATION CURVES

LUMINAIRE TYPE
#P-L2-S (SYMBOL: ▲)

DATA BASED ON 250-WATT H.P.S. 25,500-LUMEN LAMP @ 15' MTG.
PROVIDE A.N.S.I. LAMP DESIGNATION S50VA-250/S
PROVIDE SHIELD ON SIDE OF APPROACHING TRAFFIC.
NOTE: FOR 30,000-LUMEN LAMP MULTIPLY ISOFOOTCANDLE VALUES BY 1.18.

DETAIL 1/E7

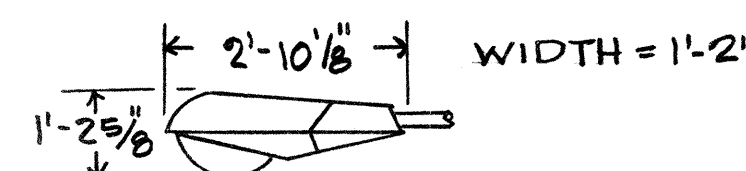
SEE NOTE 3/E7



ISOFOOTCANDLE & UTILIZATION CURVES

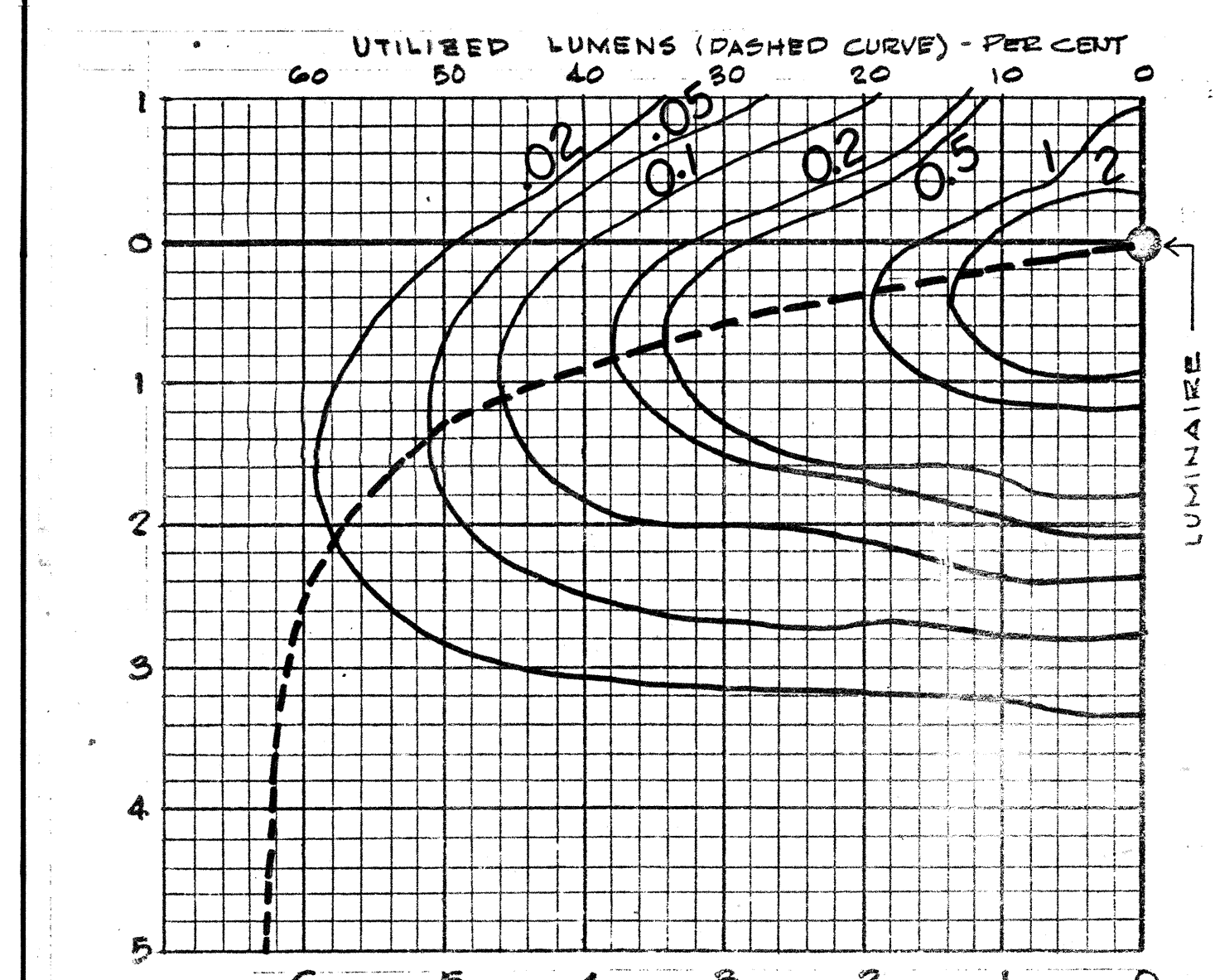
LUMINAIRE TYPE
#L1-W

DATA BASED ON 150-WATT HPS 10,000-LUMEN LAMP @ 30' MTG.
PROVIDE A.N.S.I. LAMP DESIGNATION S55SC-150.



DETAIL 3/E7

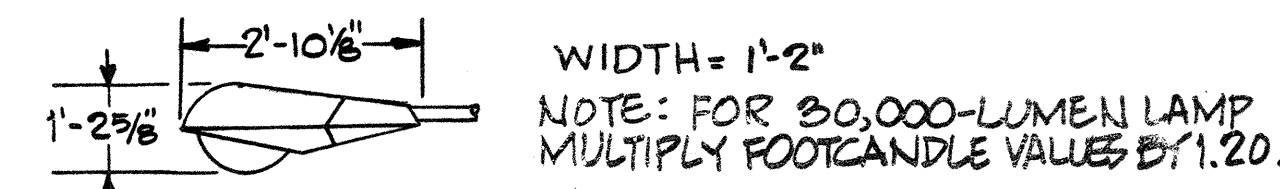
SEE NOTES 2,3/E7.



ISOFOOTCANDLE & UTILIZATION CURVES

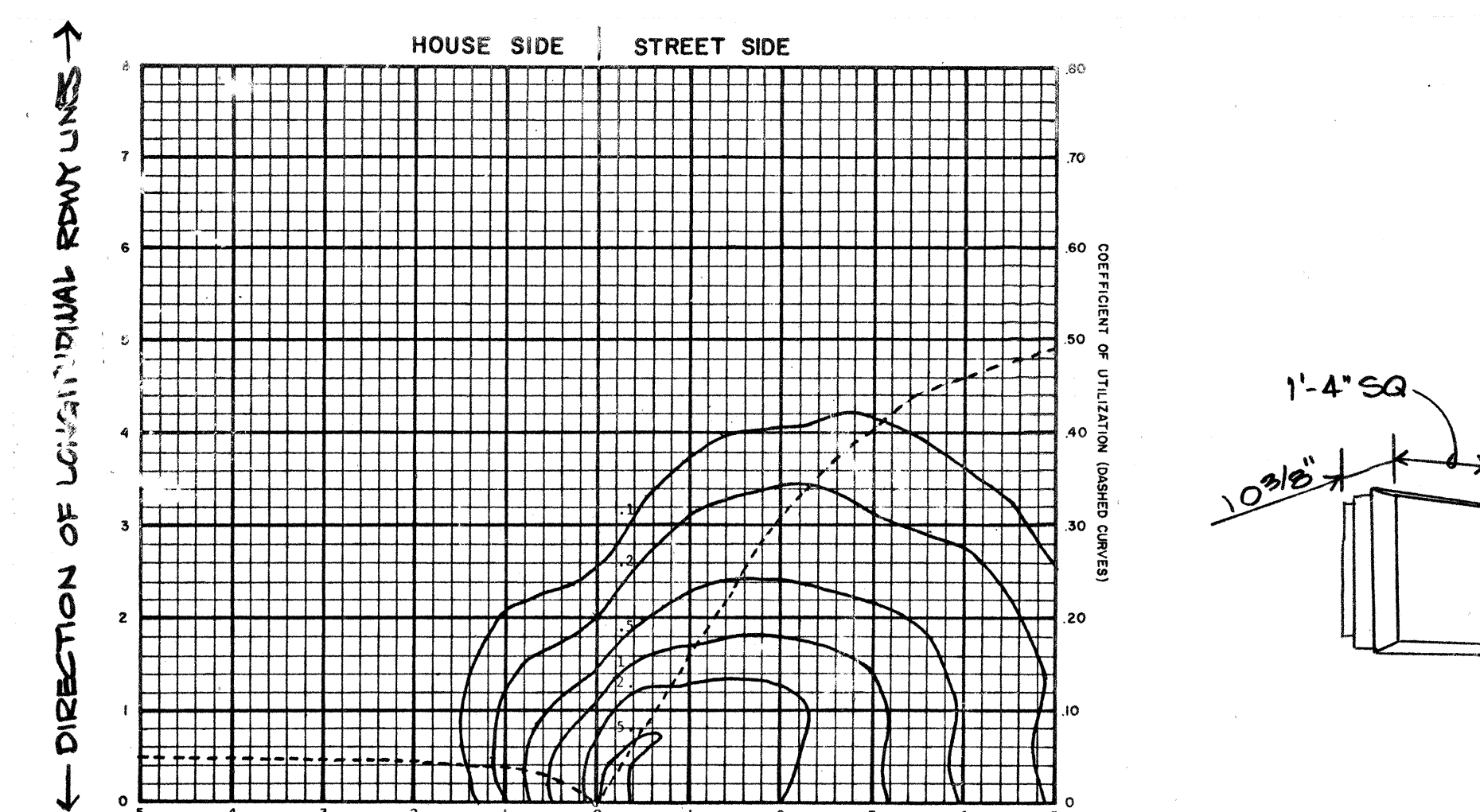
LUMINAIRE TYPE
#L2-W

DATA BASED ON 250-WATT HPS 25,000 LUMEN LAMP @ 30' MTG.
PROVIDE A.N.S.I. LAMP DESIGNATION S50VA-250/S.



DETAIL 5/E7

SEE NOTES 2, 3/E7.



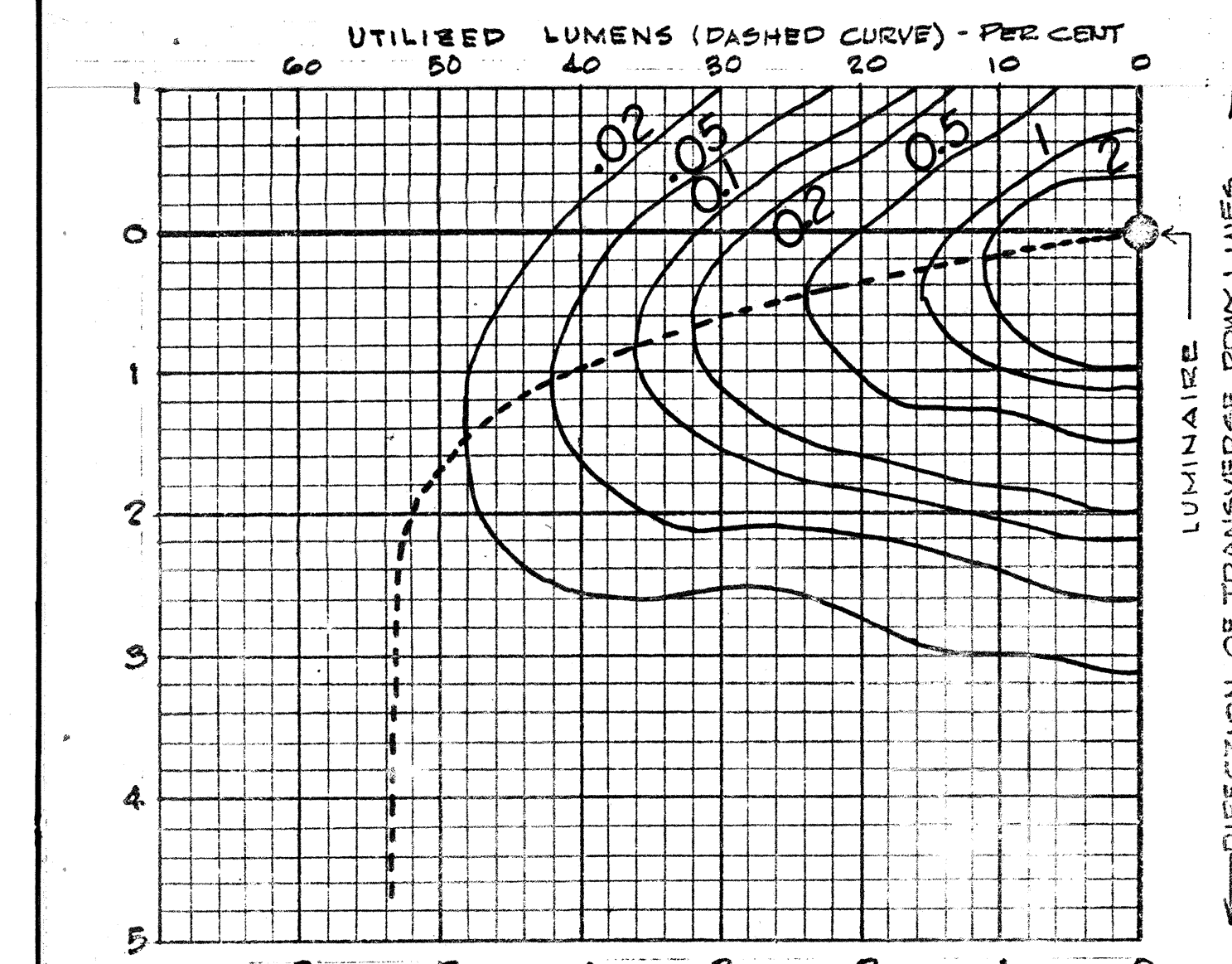
ISOFOOTCANDLE & UTILIZATION CURVES

LUMINAIRE TYPE
#B-L1 (SYMBOL: Δ)

DATA BASED ON 150-WATT H.P.S. 10,000-LUMEN LAMP @ 15' MTG.
PROVIDE A.N.S.I. LAMP DESIGNATION S55SC-150.

DETAIL 2/E7

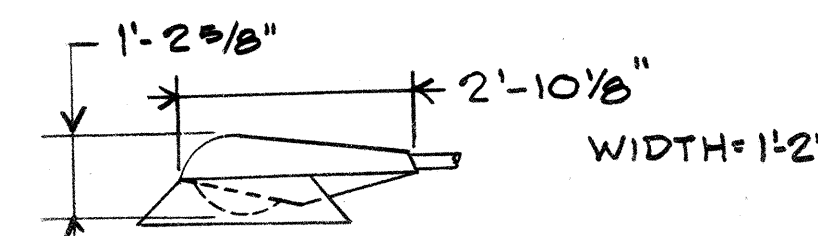
SEE NOTES 2,3/E7.



ISOFOOTCANDLE & UTILIZATION CURVES

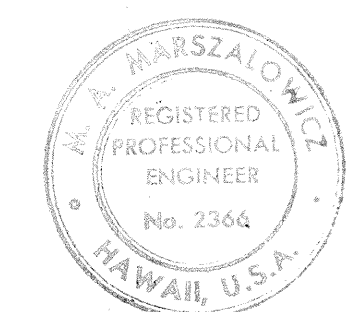
LUMINAIRE TYPE
#L4-W-S

DATA BASED ON 400-WATT HPS 50,000-LUMEN LAMP @ 45' MTG.
PROVIDE A.N.S.I. LAMP DESIGNATION S51WA-400.



DETAIL 6/E7

SEE NOTES 1,2,3/E7.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

M. A. Marszalowicz

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

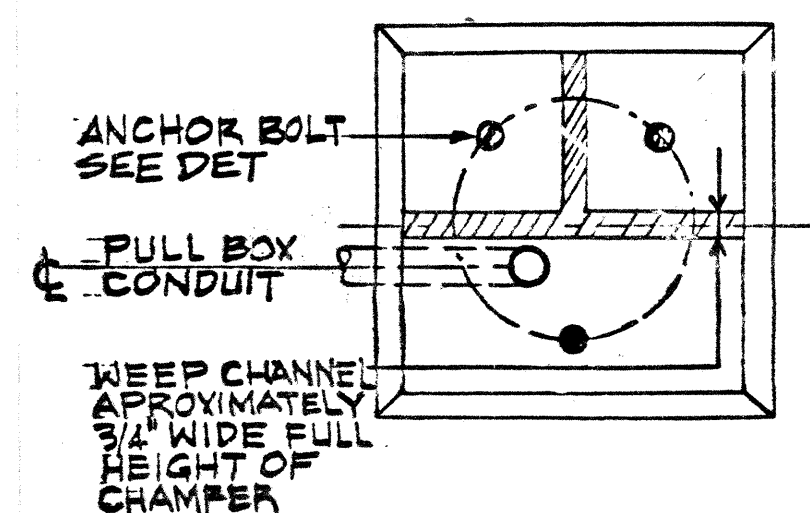
ELECTRICAL PLAN

DETAILS - PART III

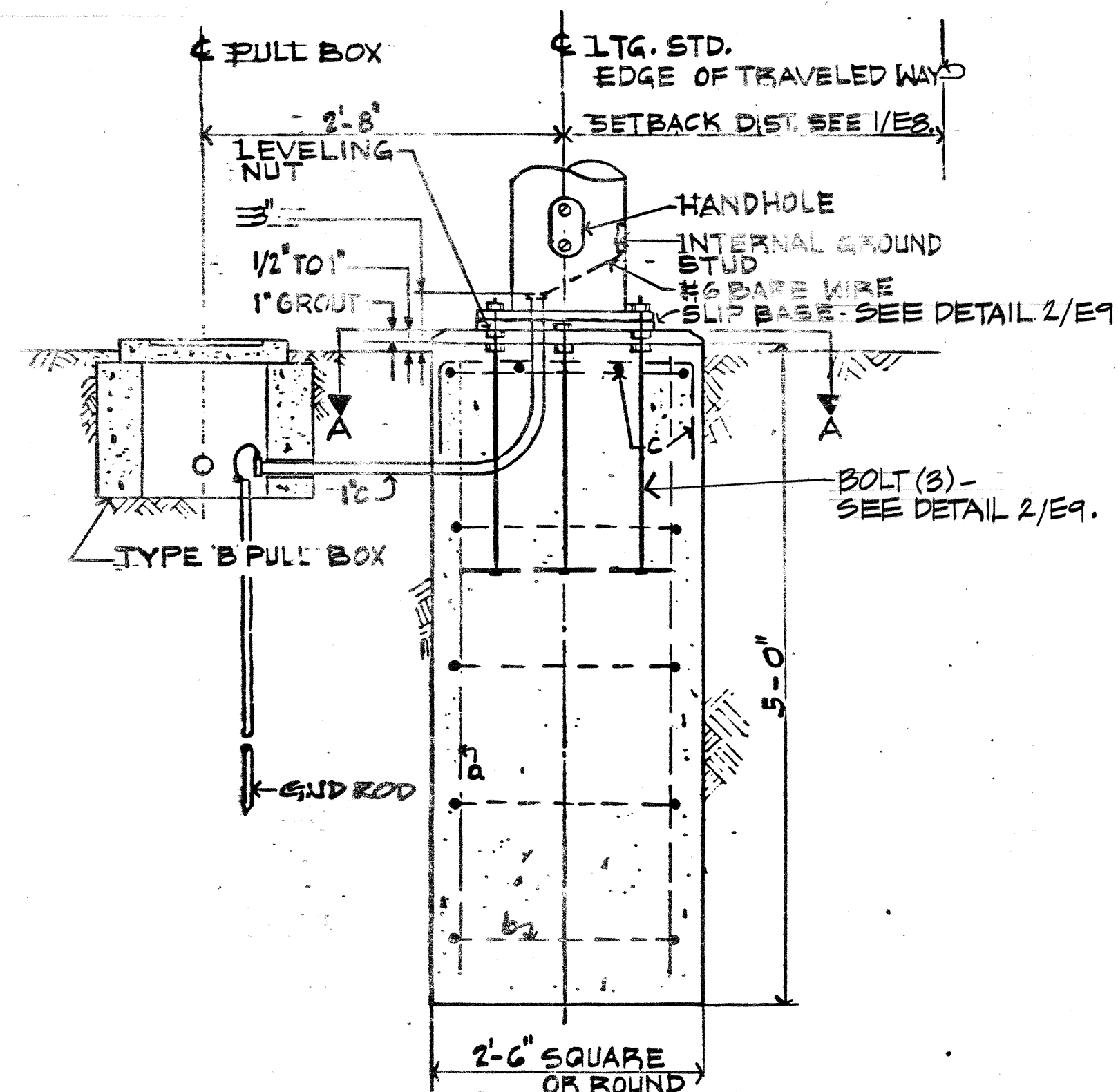
INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170)17

SCALE: NONE DATE: 12/15/81
SHEET No. E7 OF 16 SHEETS

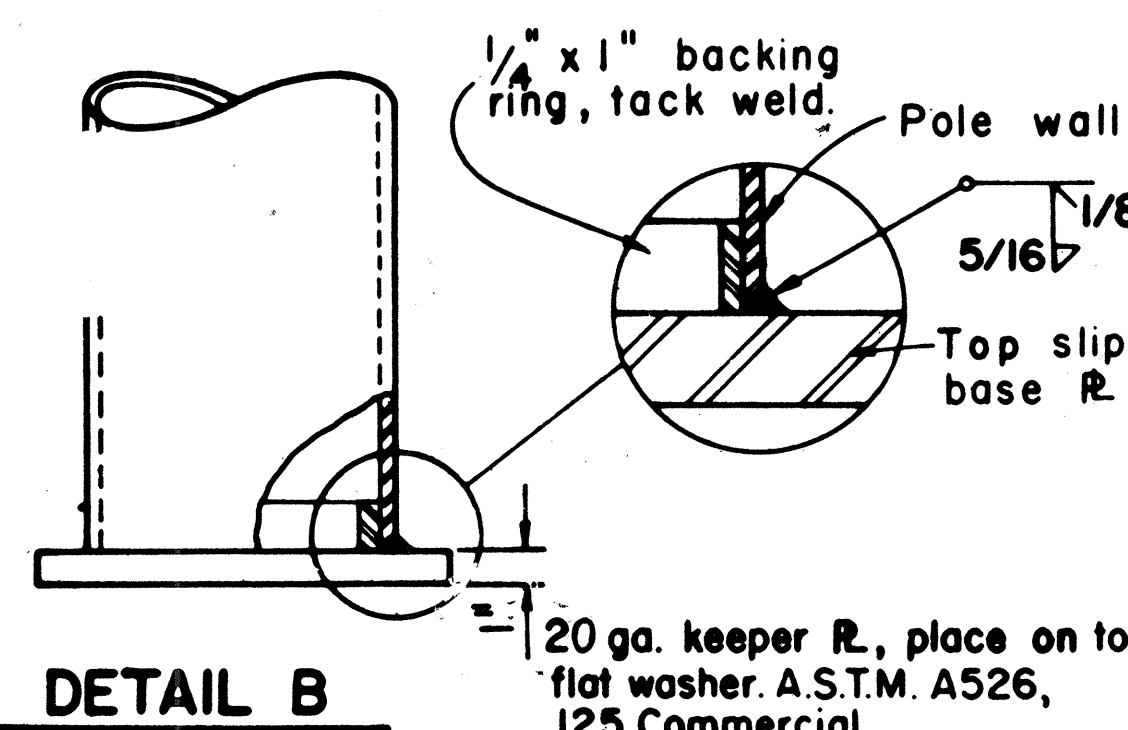
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IRH(170)17	1983	92	211



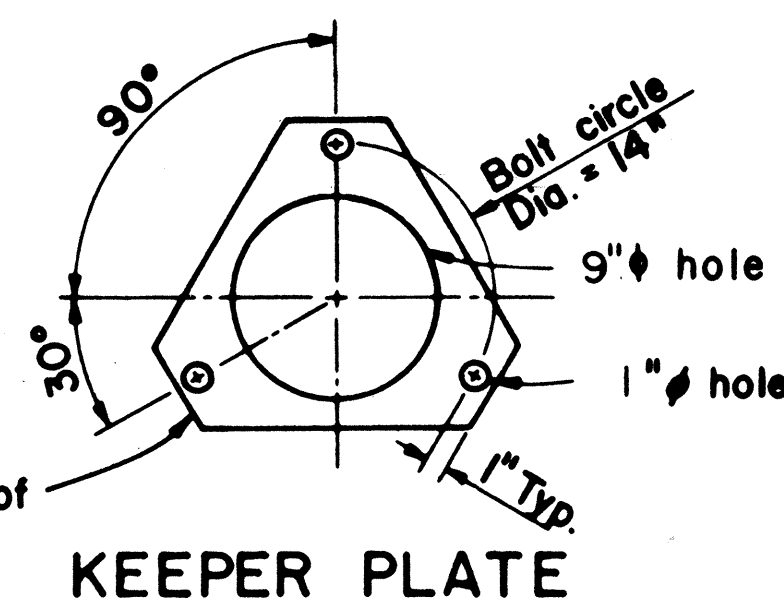
SECTION A-A
FOUNDATION PLAN



DETAIL 1/E9
LIGHTING STANDARD FOUNDATION
TYPE GS/PB
SCALE: 1" = 1'-0"



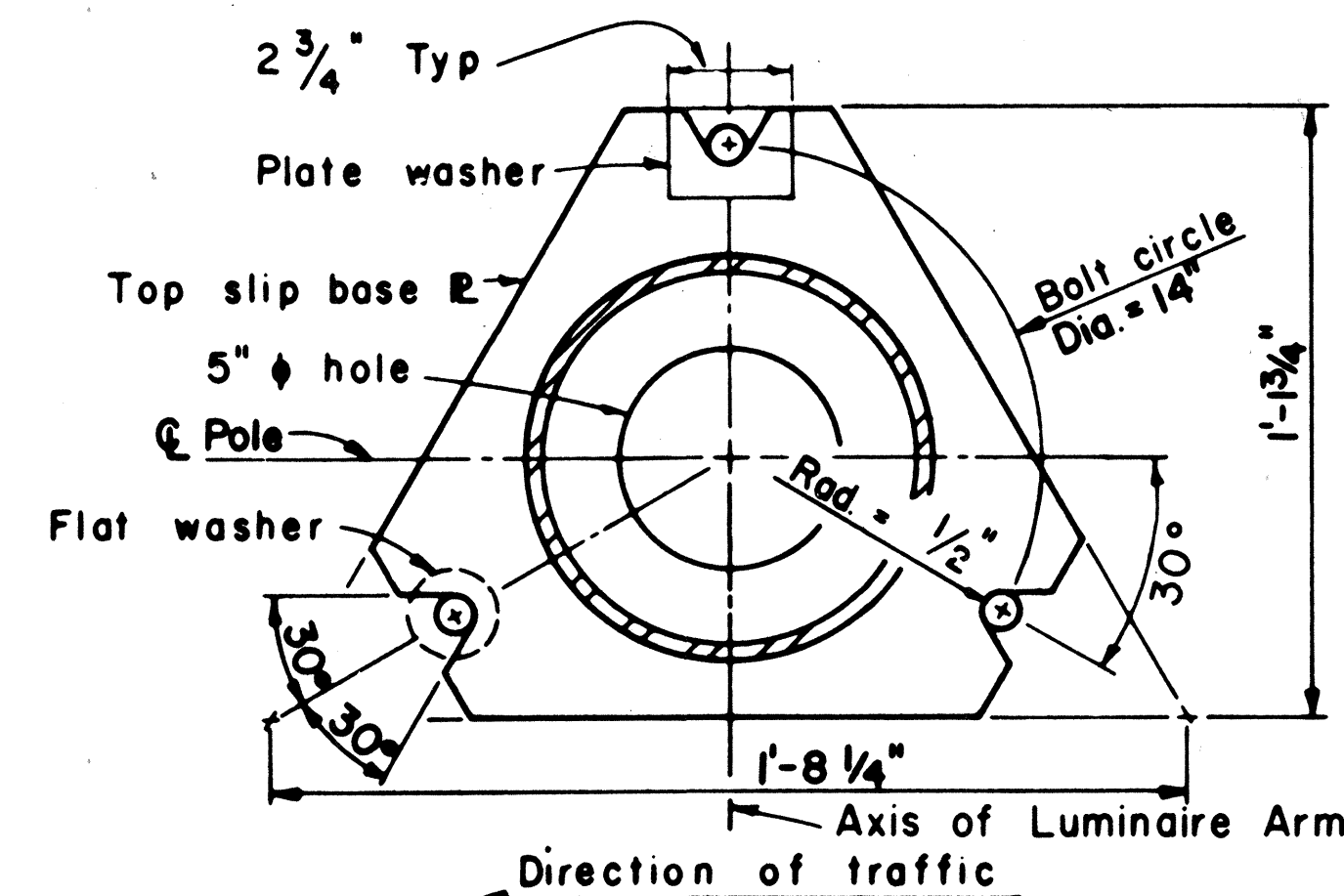
DETAIL B



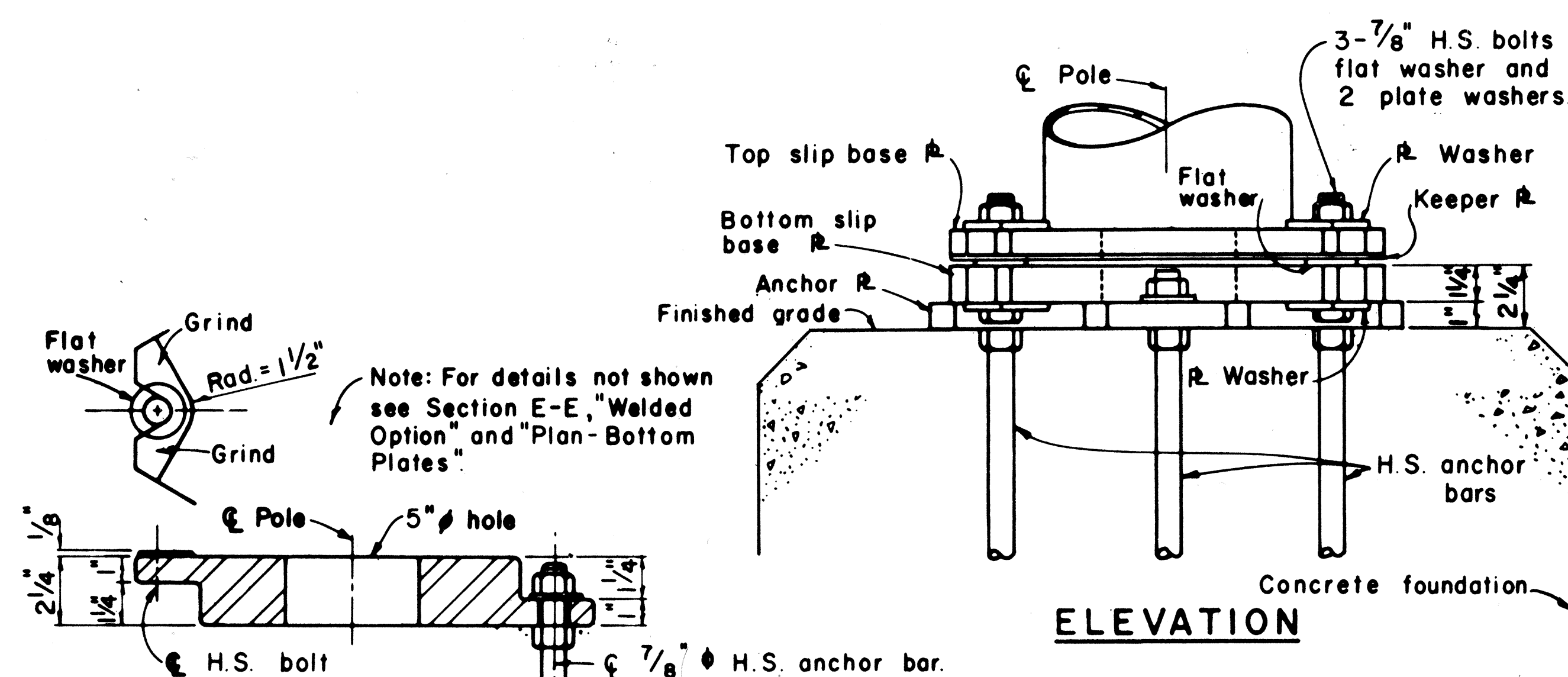
KEEPER PLATE

NOTES:

1. PLATES SHALL CONFORM TO A.S.T.M. A-36, EXCEPT AS NOTED.
2. CAST OPTION SHALL CONFORM TO A.S.T.M. A-27 GRADE 70-40. ALTERNATIVE DETAILS APPROVED BY THE ENGINEER MAY BE SUBSTITUTED FOR THE ARM CONNECTIONS SHOWN.
3. TORQUE 7/8" H.S. BOLTS TO 84 FOOT-POUNDS.
4. 7/8" HIGH STRENGTH ANCHOR BARS, WRENCH TIGHTEN, TORQUE REQUIREMENT WAIVED. FABRICATORS ELECTING TO USE LARGER MINIMUM ARM DIAMETERS MUST ADJUST THE DETAILS AS REQUIRED TO PERMIT SOLID SEATING OF CAP SCREWS. IN LIEU OF THE TORQUE REQUIREMENTS FOR H.S. BOLTS, CAP SCREWS SHALL BE TIGHTENED BY THE TURN-OF-NUT METHOD 1/6 TURN FROM SNUG TIGHT CONDITION. NO WASHER WILL BE REQUIRED.
5. H.S. BOLTS, FLAT WASHERS AND NUTS AND WASHERS FOR H.S. ANCHOR BARS SHALL CONFORM TO A.S.T.M. A-325.

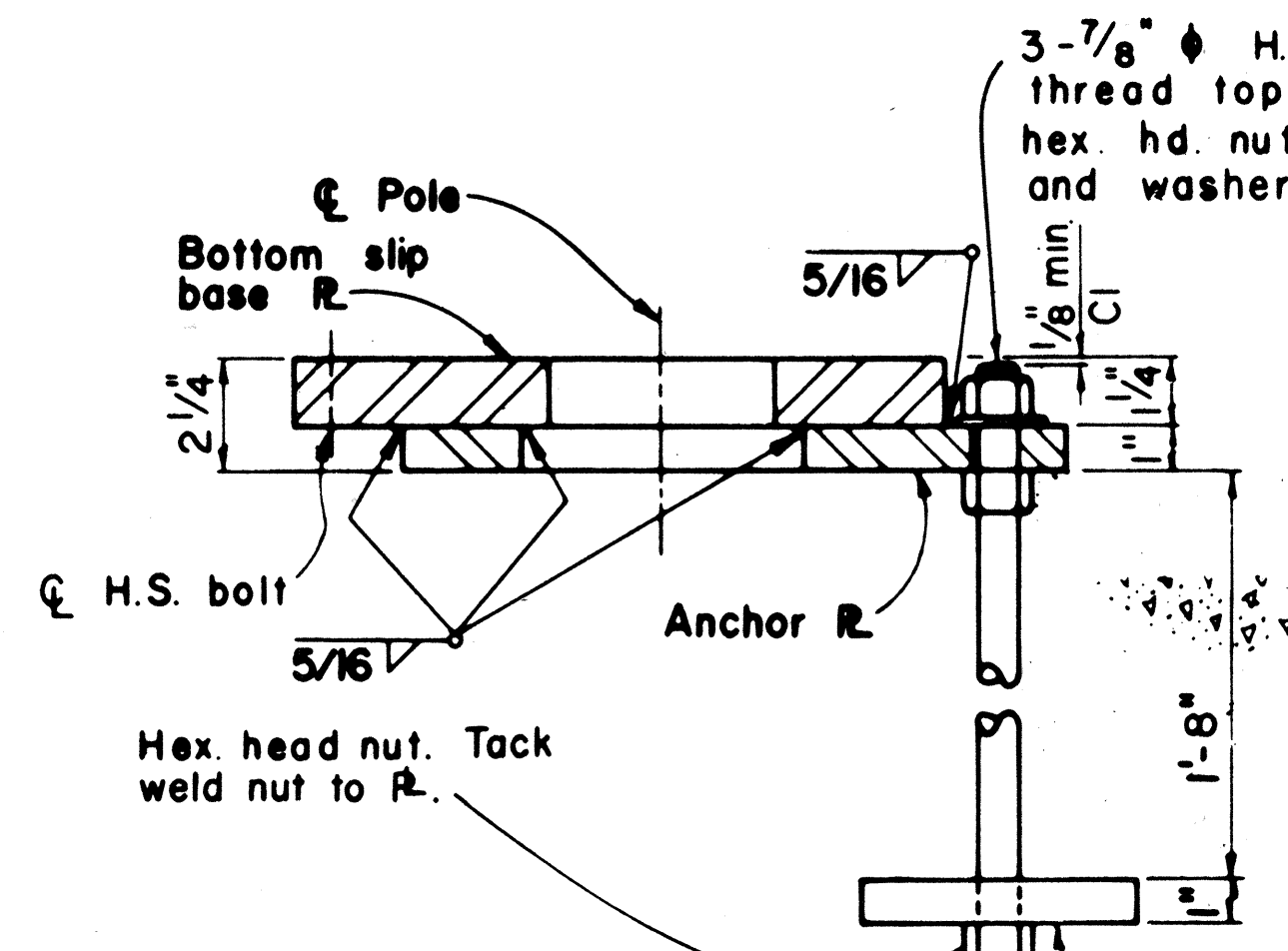


PLAN-TOP PLATE



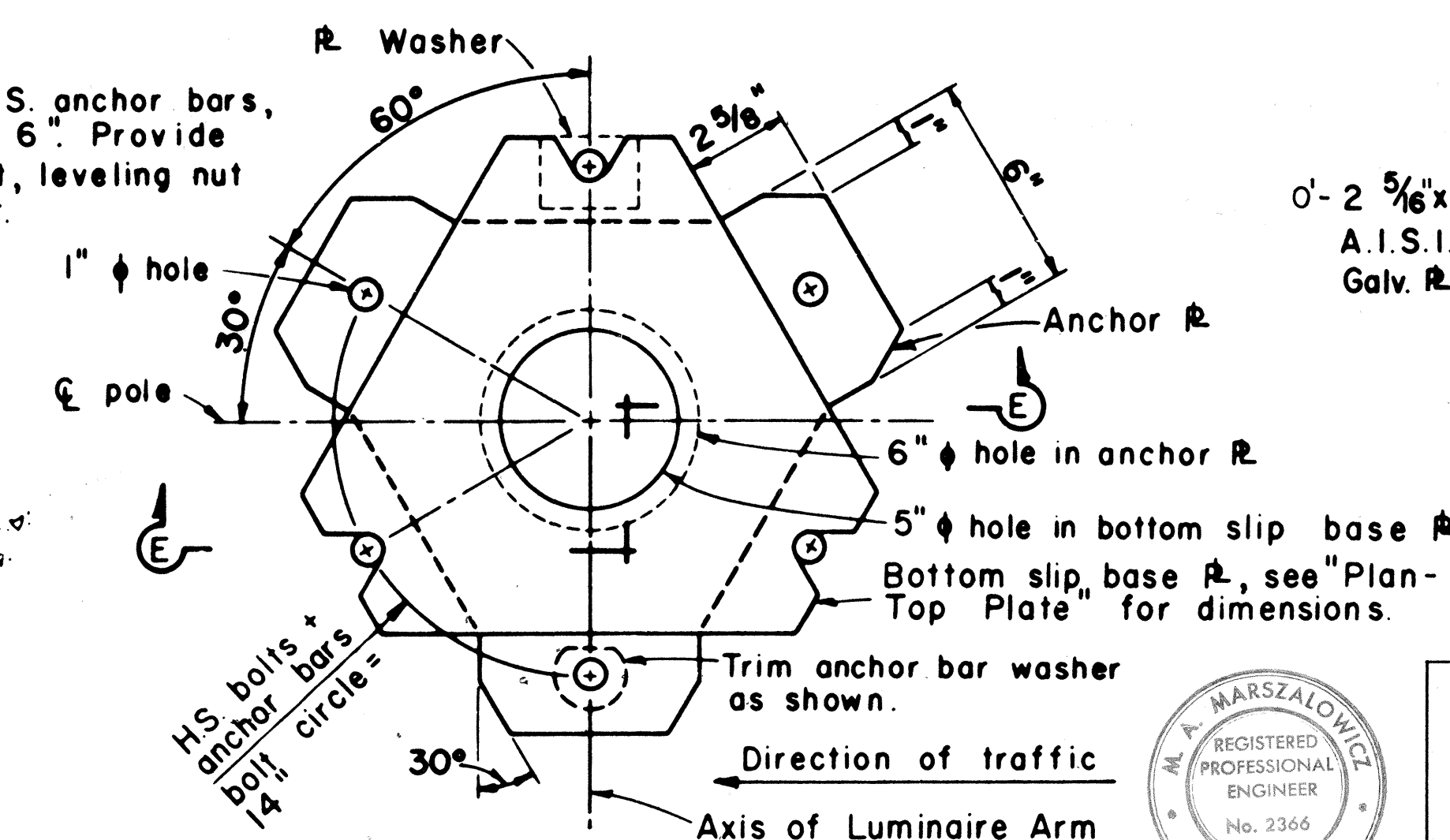
ELEVATION

CAST OPTION



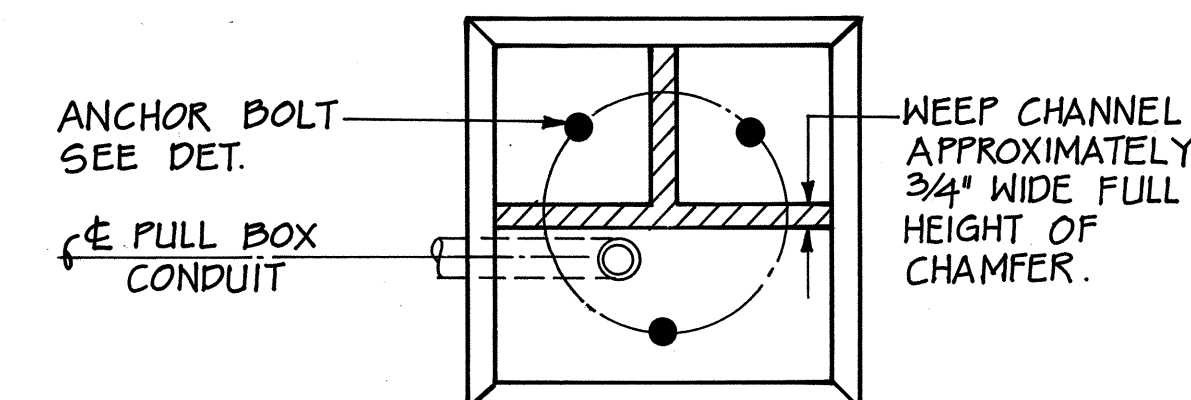
WELDED OPTION

SECTION E-E

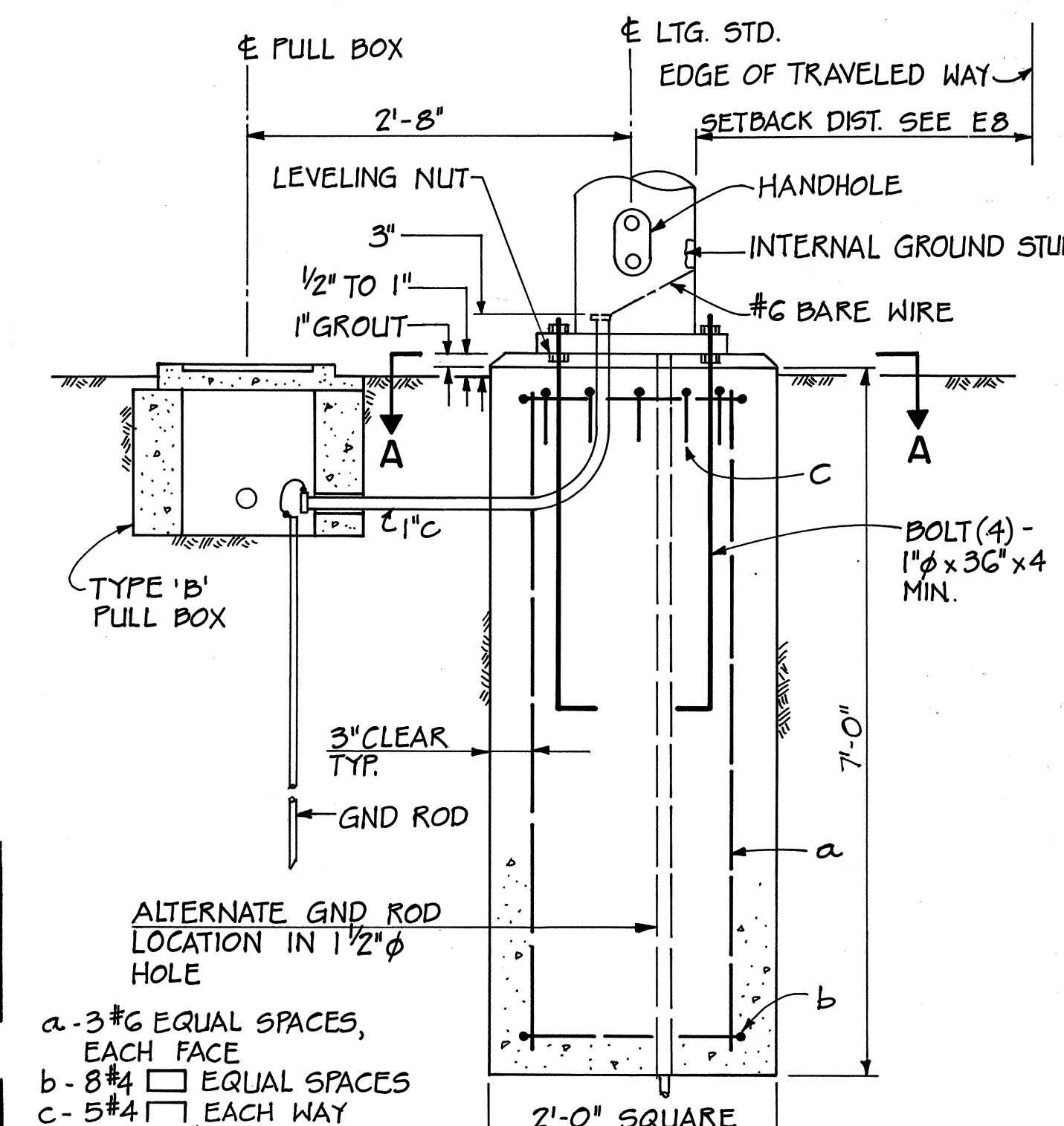


PLAN - BOTTOM PLATES

SLIP BASE PLATE DETAILS



SECTION A-A



TYPE GS/PB (GOOD SOIL / PLAIN BASE)
DETAIL 3/E9 - LG. STD. FND. PLAINBASE

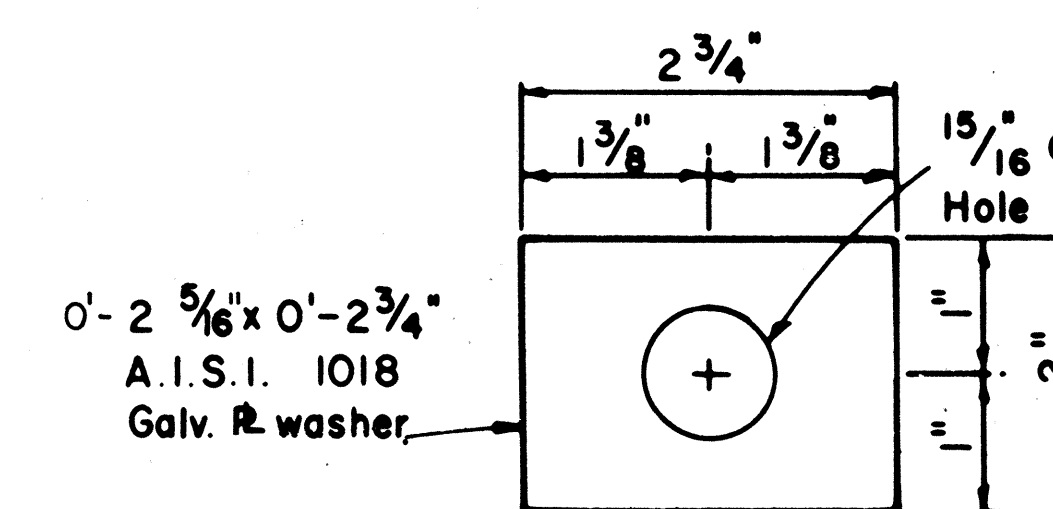


PLATE WASHER



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION,
M.A. Marszalowicz

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN

DETAILS - PART IV

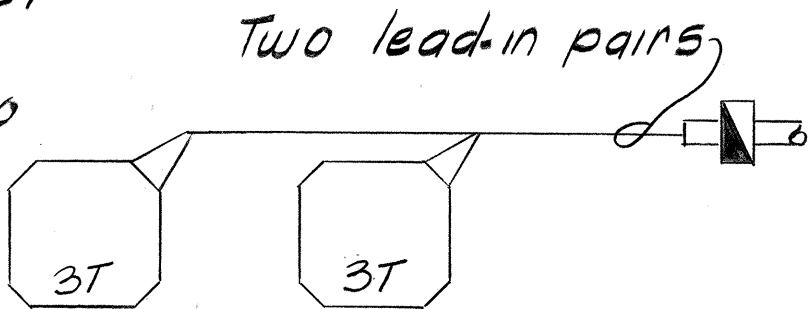
INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170)17

SCALE: NONE DATE: 12/15/81
SHEET No. E9 OF 16 SHEETS

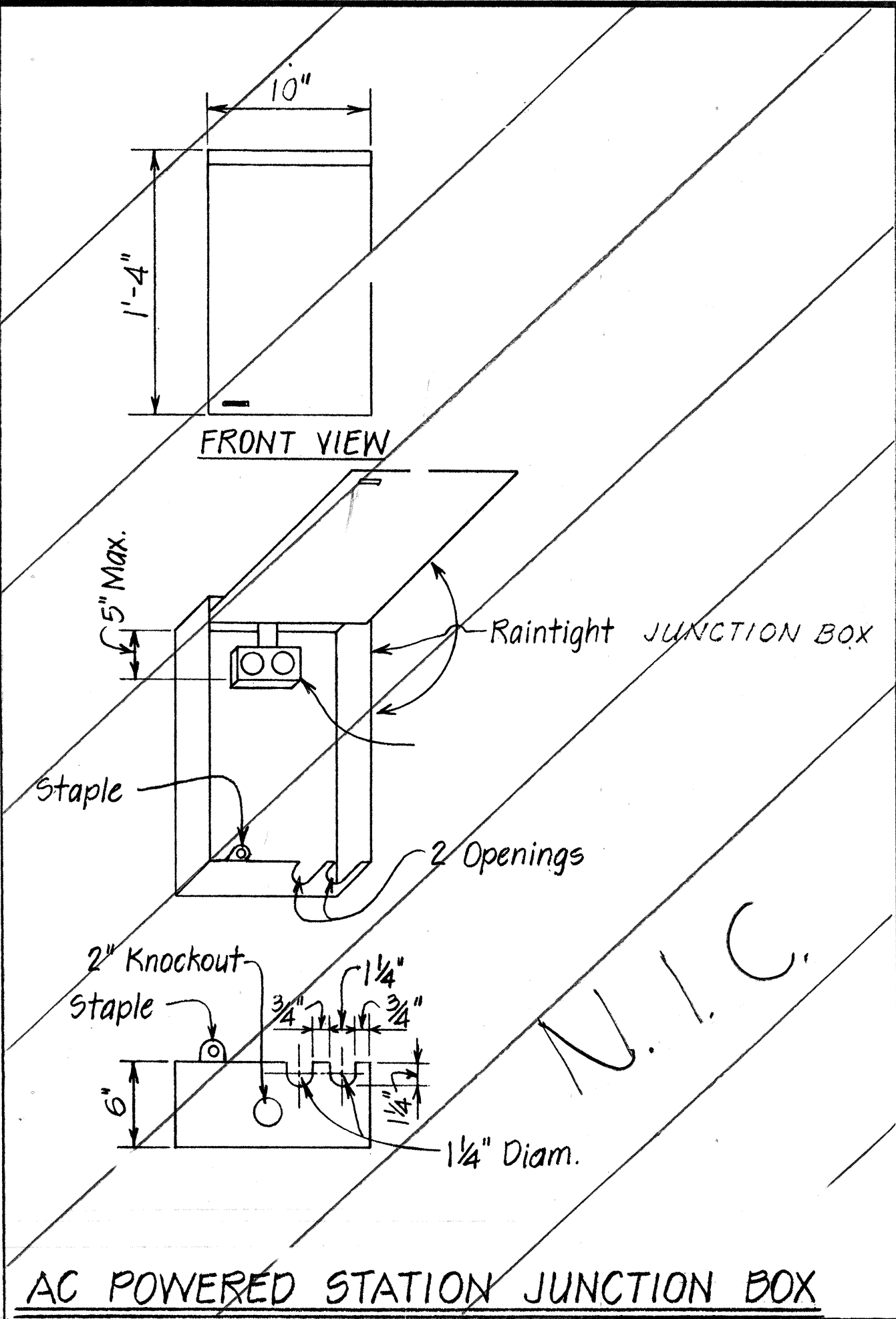
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IRH-1(170):17	1983	93	211

DETECTOR LOOP LAYOUT NOTES

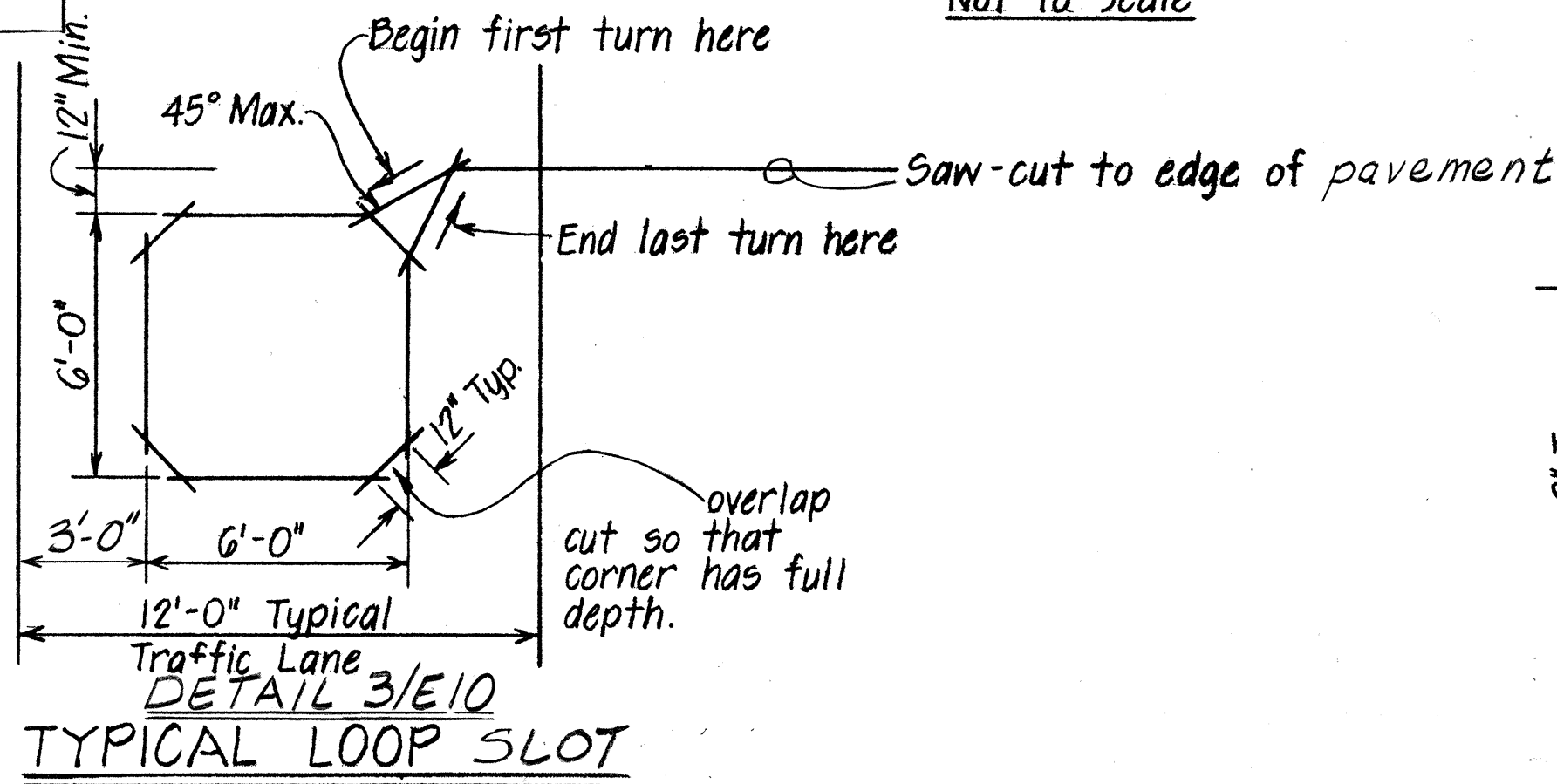
1. Provide loop of three turns (3T) of 1/2", # 14 AWG, type RHW, USE, or XLP wire embedded in saw-cut.
2. Provide loop and lead-in wires to pull box in unspliced length. Twist paired embedded lead-in wires two turns per foot. DO NOT twist pairs together.
3. Identify and tag lane loop on lead-in pair. Identify and tag lead-in wire to first turn - See Detail 4/E10.



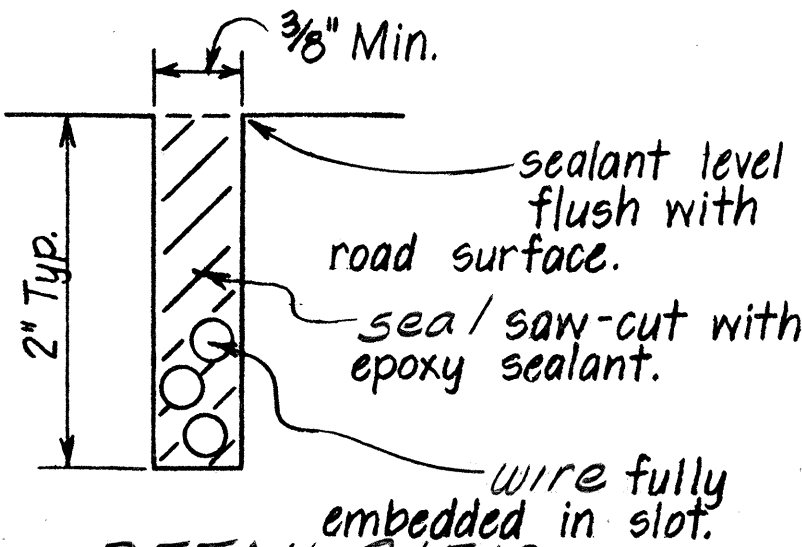
DETAIL 1/E10
DETECTOR LOOP LAYOUT
Not to Scale



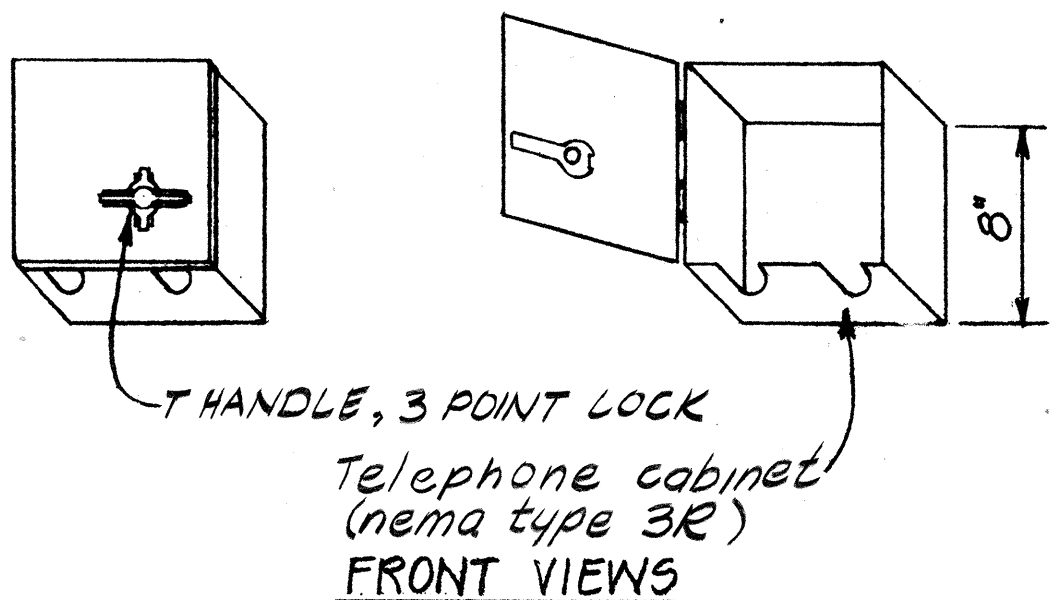
AC POWERED STATION JUNCTION BOX



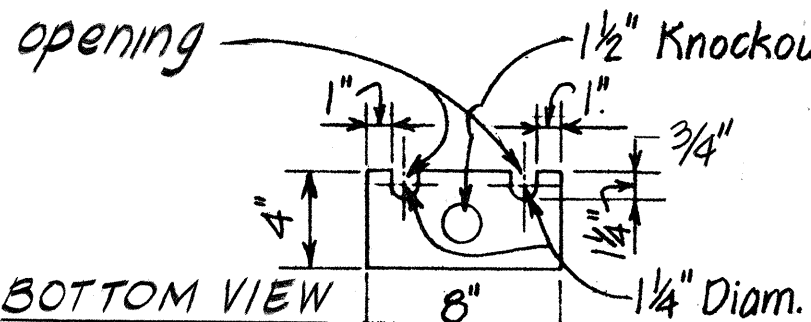
DETAIL 3/E10
TYPICAL LOOP SLOT



DETAIL 2/E10
TYPICAL SAW-CUT
FOR LOOP & LEAD-IN



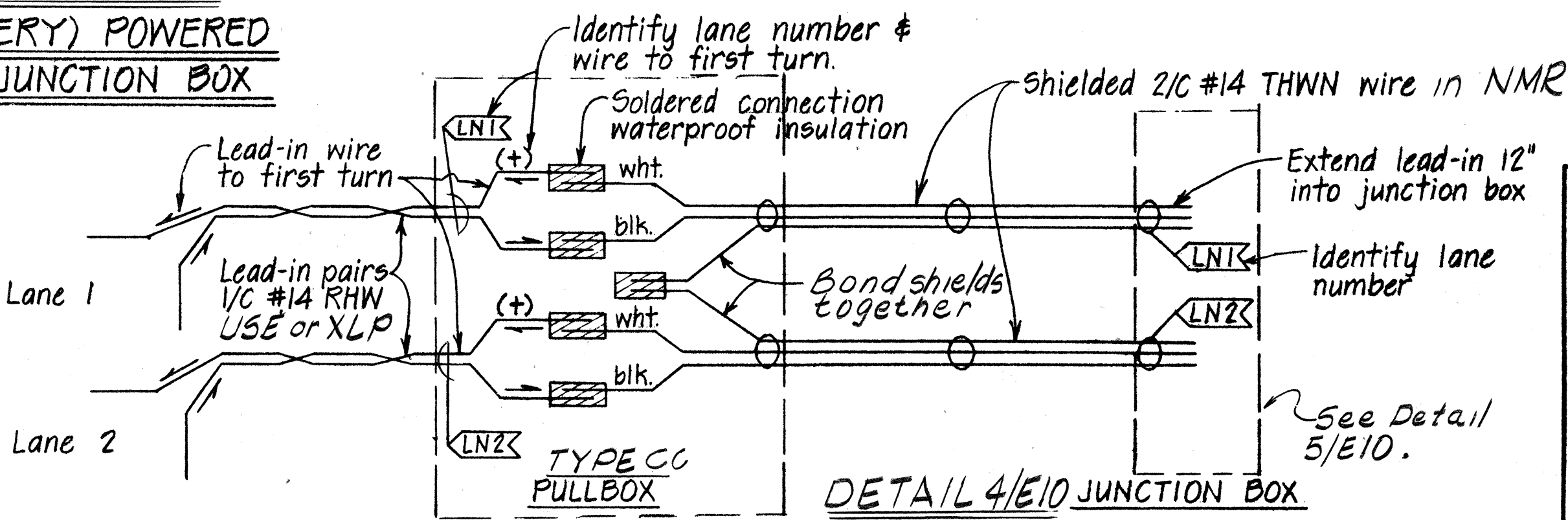
FRONT VIEWS



BOTTOM VIEW

DETAIL 5/E10

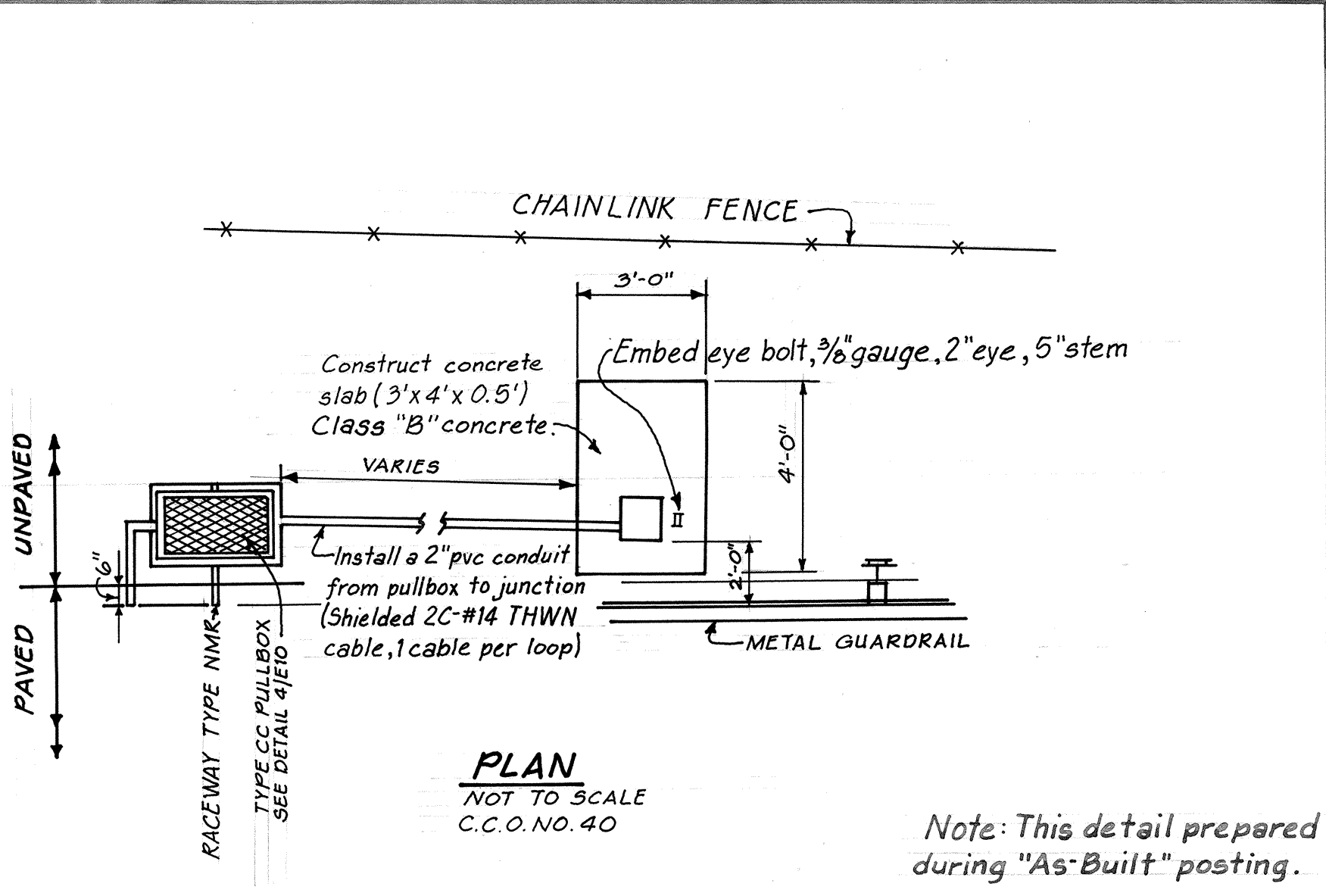
DC (BATTERY) POWERED
STATION JUNCTION BOX



JUNCTION BOX, PULLBOX WIRING AND IDENTIFICATION

DETAIL 4/E10 JUNCTION BOX

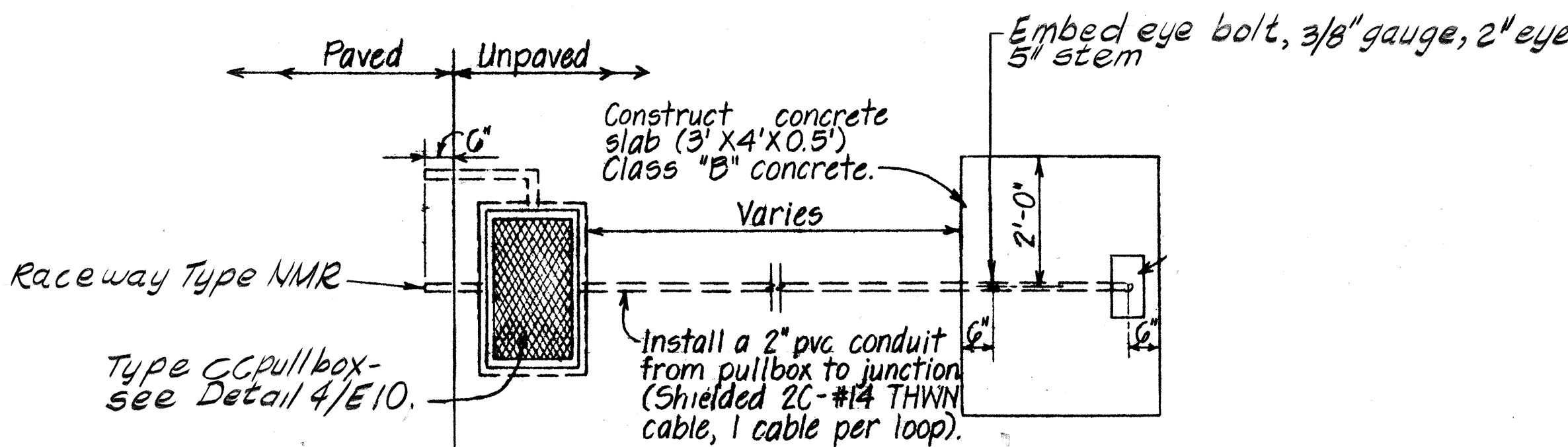
TYPE CC
PULLBOX



PLAN

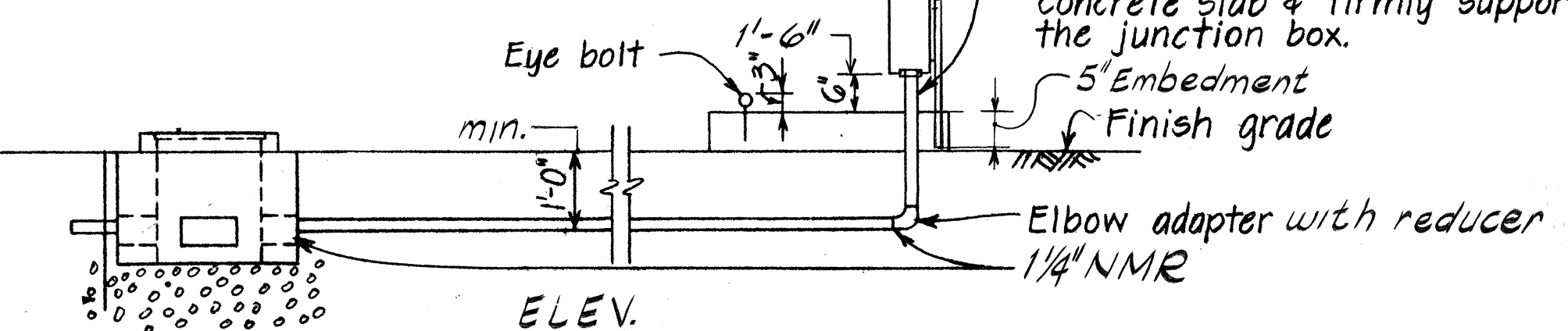
NOT TO SCALE
C.C.O. NO. 40

Note: This detail prepared during "As-Built" posting.



PLAN

Provide junction box per Detail 5/E10 at RAMP A location. Secure with lock nuts.



ELEV.

DETAIL 6/E10

TYPICAL DC POWERED TRAFFIC COUNT STATION



THIS DETAIL WAS PREPARED BY
M.A. Marzouk
HAWAII, U.S.A.

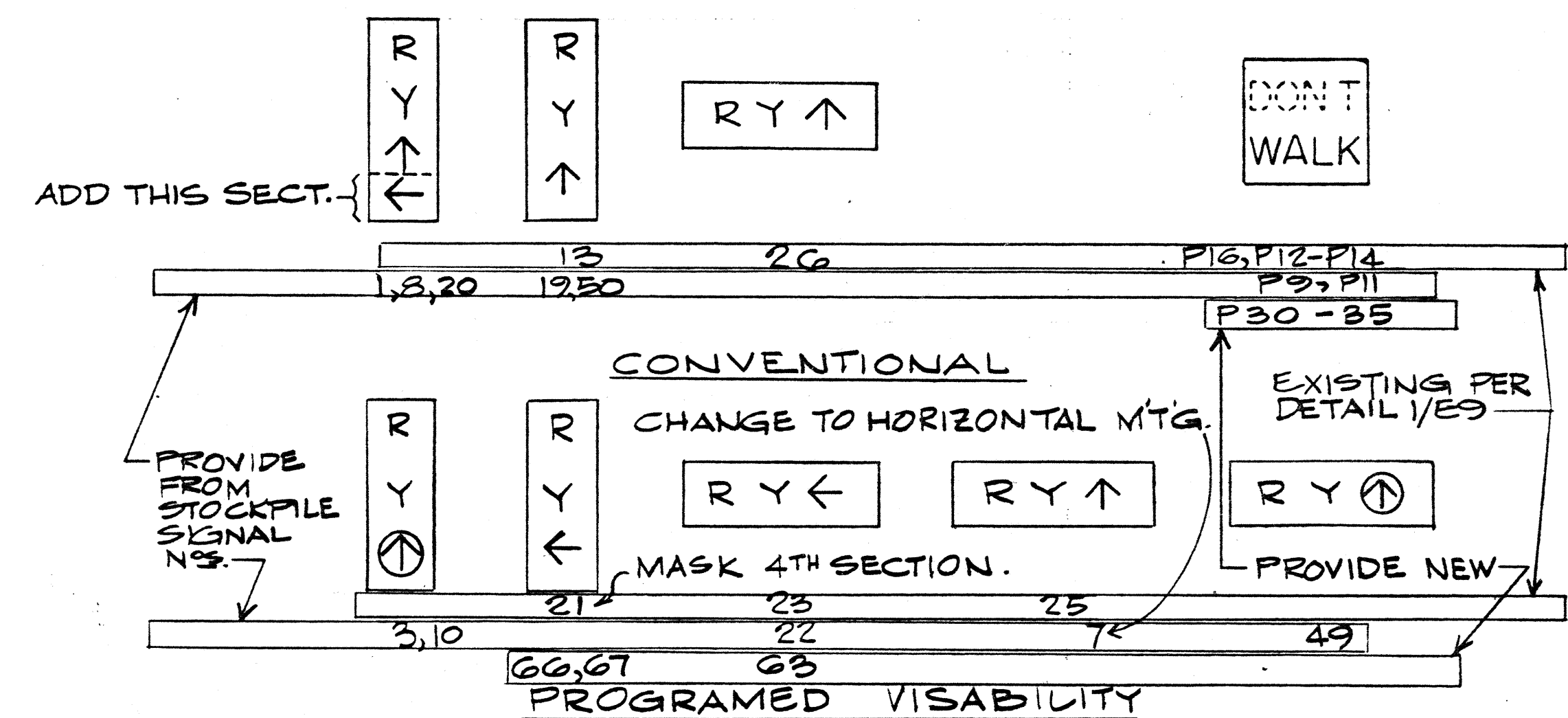
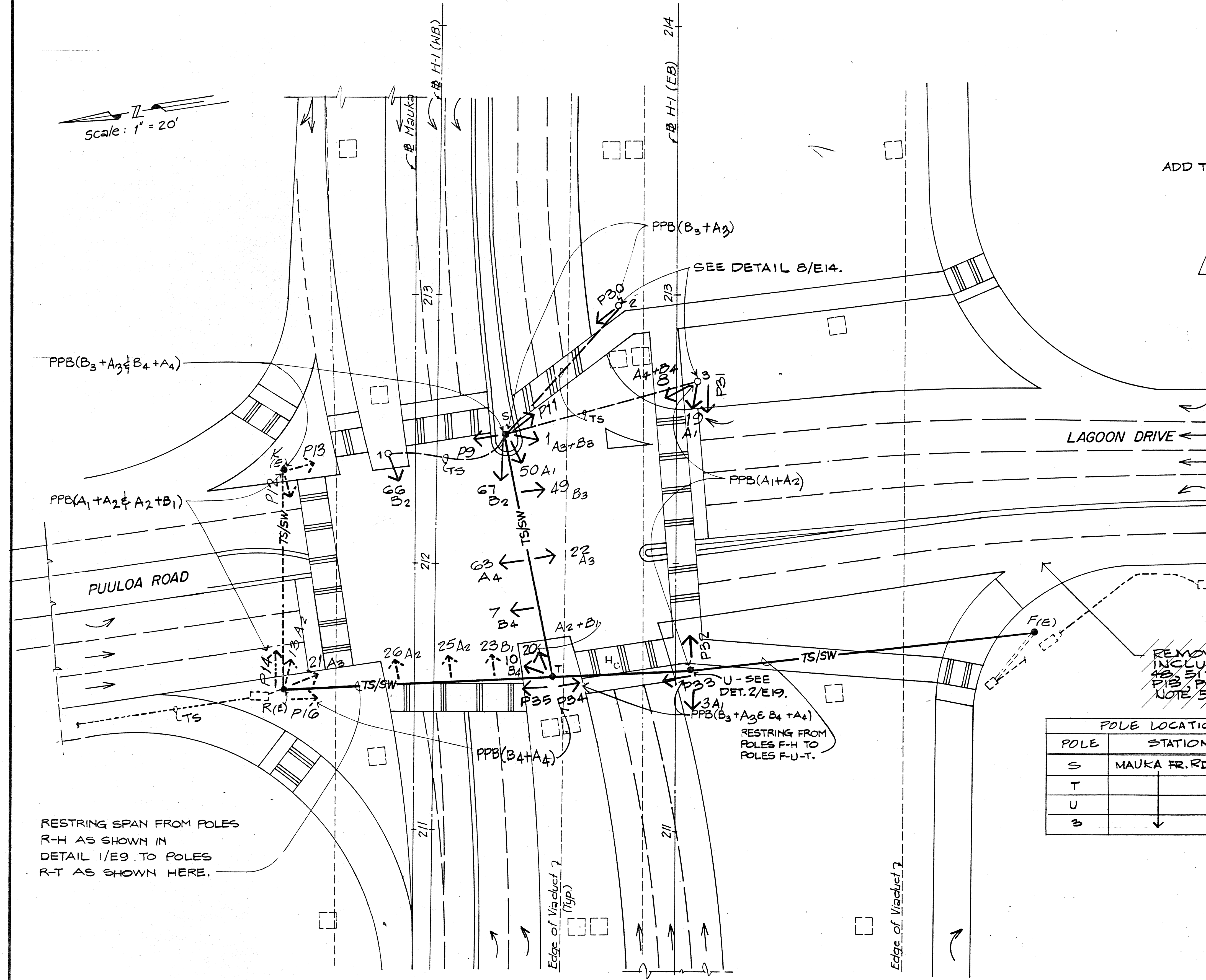
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC COUNT STATION
AND DETAILS
INTERSTATE ROUTE H-1
PROJECT NO. IIR-HI-1(170):17

SCALE: NONE DATE: 12/15/81

SHEET No.E10 OF 16 SHEETS

Scale: 1" = 20'

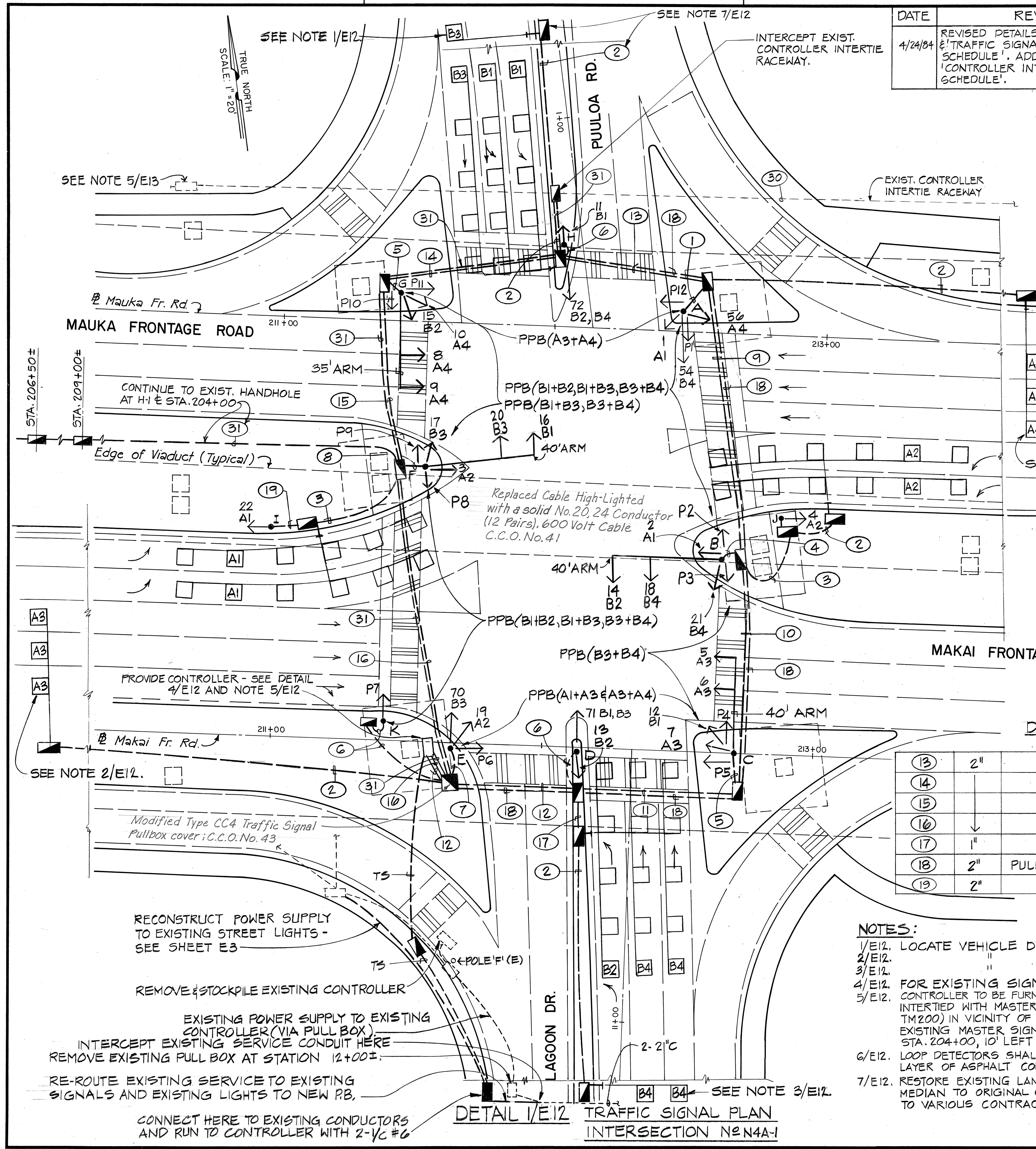


NOTES
1/E10. MODIFY THE SIGNAL SYSTEM SHOWN IN DETAIL 1/E9 TO PROVIDE THE SYSTEM SHOWN IN DETAIL 1/E10. SIGNALS IN BOTH DETAILS ARE NUMBERED ALIKE.
2/E10. TRAFFIC PHASES FOR DETAIL 1/E10 ARE AS SHOWN IN DETAIL 3/E9.

REMOVE SIGNAL FACILITIES INCLUDING SIGNALS 68, 24, 48, 51, 27, 29, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 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DATE	REVISION
4/24/84	REVISED DETAILS 1/E12, 2/E12, NOTE 5/E12 & TRAFFIC SIGNAL RACEWAY/CABLE SCHEDULE. ADDED NOTE 7/E12 AND 'CONTROLLER INTERTIE RACEWAY/CABLE SCHEDULE'.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IRH-1(170)17	1983	95	211



CONTROLLER INTERTIE RACEWAY/CABLE SCHEDULE

RACEWAY	CABLE
NO.	SIZE
(30)	EXIST.
(31)	2"

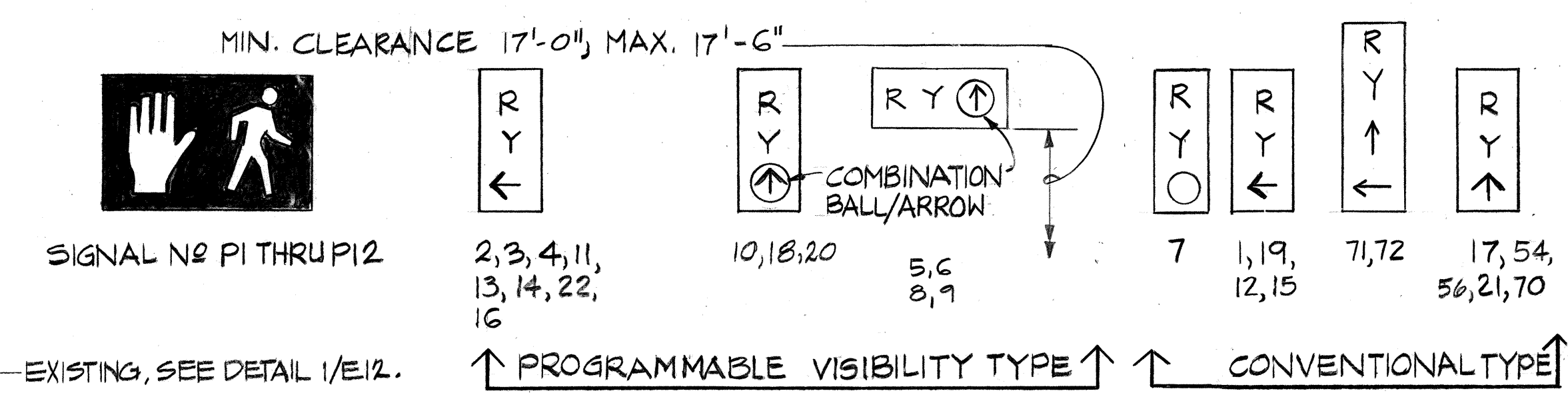
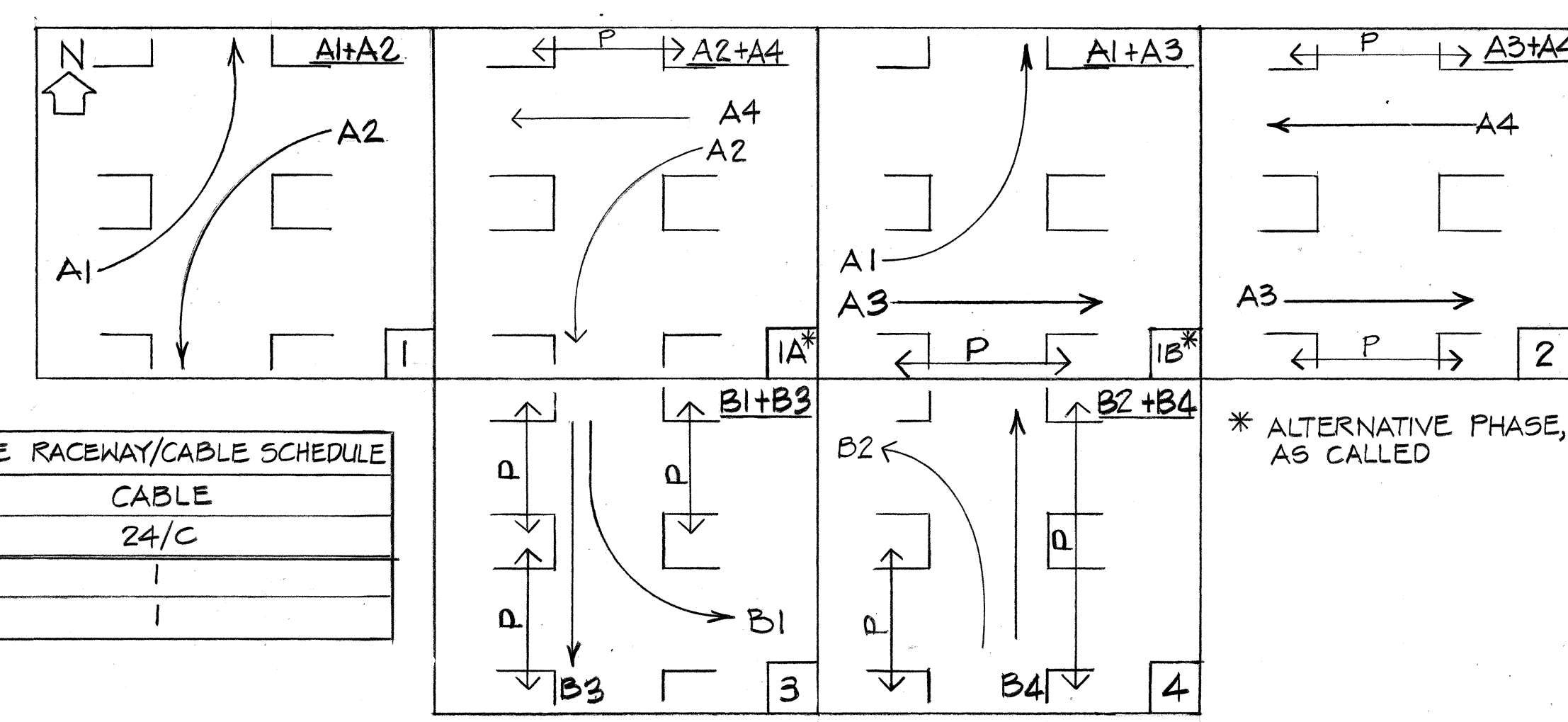


Diagram showing a transformer with a 2 #6 primary and a 2 POLE, 30A secondary. The secondary is connected to a 240X480V and 120-2400V tap. The secondary is connected to a controller using the first 5% tap. The secondary is connected to a controller using the first 5% tap. The secondary is connected to a controller using the first 5% tap.

2 #6

2 POLE, 30A

240X480V

120-2400V

CONNECT 480 TO 120V SECONDARY USING FIRST 5% TAP.

FURNISH WITH CONTROLLER

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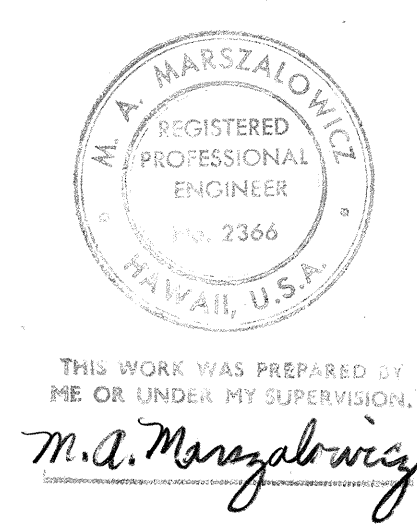
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- NOTES:
- 1/E12. LOCATE VEHICLE DETECTOR LOOPS 100' FROM STOP BAR.
 - 2/E12. " " " " " "
 - 3/E12. " " " " " "
 - 4/E12. FOR EXISTING SIGNAL PLAN AT THIS LOCATION SEE SHEET E11.
 - 5/E12. CONTROLLER TO BE FURNISHED BY CONTRACTOR SHALL BE COMPATIBLE & INTERTIED WITH MASTER CONTROLLER (LFE CORPORATION, AUTOMATIC SIGNAL MODEL TM200) IN VICINITY OF PAIEA ST. INTERSECTION. CONNECT INTERTIE CABLE TO EXISTING MASTER SIGNAL CONTROL CABLE (24/C#18) AT HANDHOLE AT H-1 & STA. 204+00, 10' LEFT (FOR H-1 & DATA SEE SHEET NO. 197).
 - 6/E12. LOOP DETECTORS SHALL BE INSTALLED PRIOR TO INSTALLATION OF TOP LAYER OF ASPHALT CONCRETE PAVEMENT.
 - 7/E12. RESTORE EXISTING LANDSCAPING & IRRIGATION FACILITIES IN PUULOA ROAD MEDIAN TO ORIGINAL CONDITION IF DAMAGED. PAYMENT CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS.

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

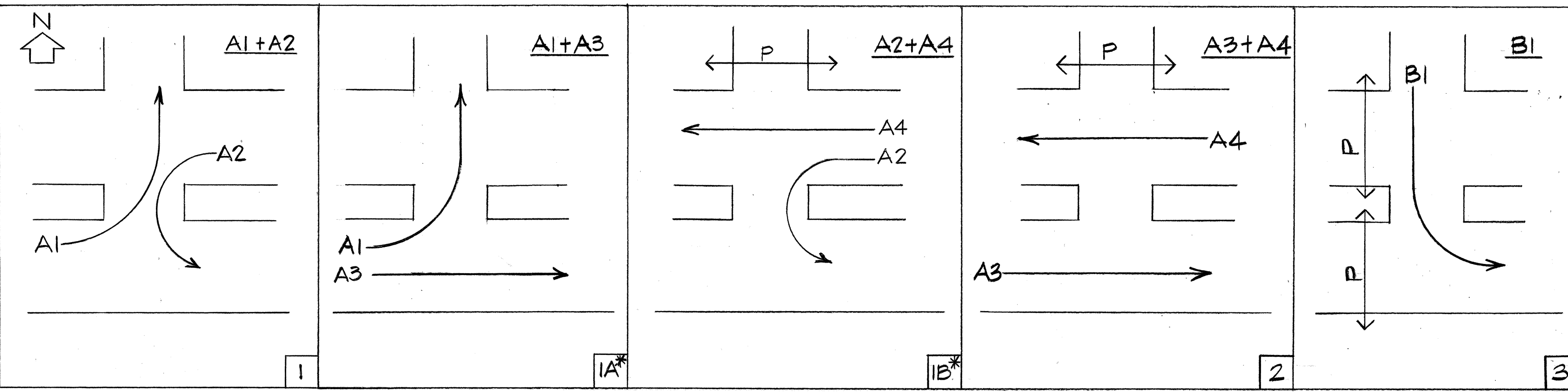


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

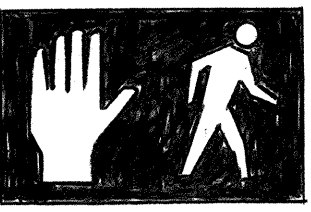
SIGNAL PLAN
INTERSECTION N4A-1

INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170)17

SCALE: 1" = 20'
DATE: 12/15/81
SHEET NO. 95 OF 16 SHEETS



DETAIL 2/E13 TRAFFIC PHASES * ALTERNATIVE PHASE, AS CALLED.



SIGNAL NO. PI THRU PG

RYG

23,24, 25,26

RY←

27,28

RY

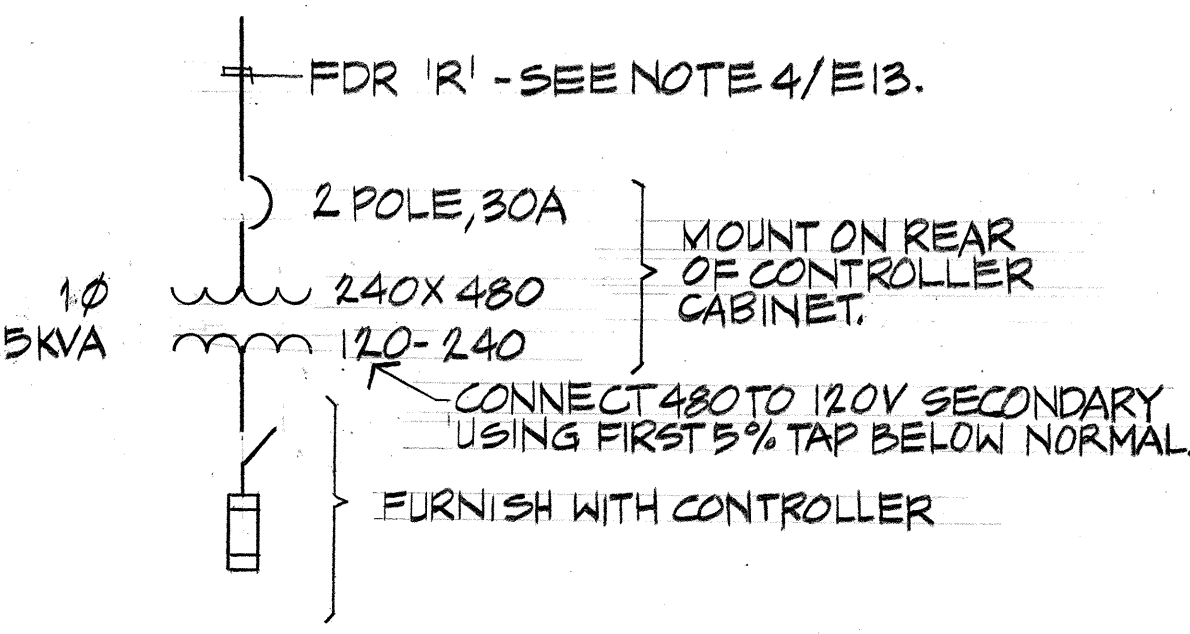
31,32, 33,34,35

RY↑

29,30

PROGRAMMABLE VISIBILITY TYPE CONVENTIONAL TYPE

DETAIL 3/E13 SIGNAL TYPES



DETAIL 4/E13 SERVICE TO CONTROLLER N4A-2

4/24/84
DETAIL 1/E13: REVISED RACEWAY NUMBERS & MADE PROVISION FOR CONTROLLER INTERTIE. REVISED DETAIL 2/E13 AND 'TRAFFIC SIGNAL RACEWAY/CABLE SCHEDULE'. ADDED 'CONTROLLER INTERTIE RACEWAY/CABLE SCHEDULE'.

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

SIGNAL PLAN
INTERSECTION N4A-2

INTERSTATE ROUTE H-1
PROJECT NO. I-IR-HI-1(170):17

SCALE: 1" = 20' DATE: 12/15/81
SHEET NO. E13 OF 16 SHEETS

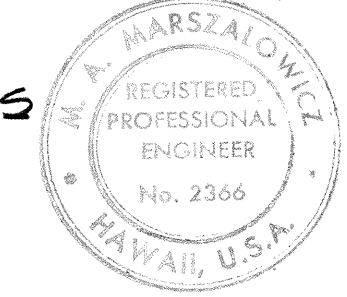
CONTROLLER INTERTIE RACEWAY/CABLE SCHEDULE		
RACEWAY NO.	SIZE	CABLE 24/C
30	EXIST.	1
31	2"	1

TRAFFIC SIGNAL RACEWAY/CABLE SCHEDULE					
RACEWAY		CABLE			
NO.	SIZE	20/C SIGNAL LOOP CABLE	4/C SIGNAL: HEAD CABLE	2/C DET. LEAD: IN CABLE	2/C PUSH BUTTON CABLE
1	2"		1		1
2	EXIST.			1	
3	1"			1	
4	2"	1			
5	EXIST.		3		
6	EXIST.		2		
7	EXIST.		2		
8	EXIST.	1		1	
9	EXIST.	1		2	
10	2"		1		
11	2"		1		
12	2"	1	1		1
13	2"			2	
14	2"		2		
15	2"		2		1
16	EXIST.		3		
17	EXIST.		1		
18	EXIST.	1		2	1
19	EXIST.				
20	2"	PULLWIRE ONLY			
21	2"		3		
22	EXIST.	1		3	1

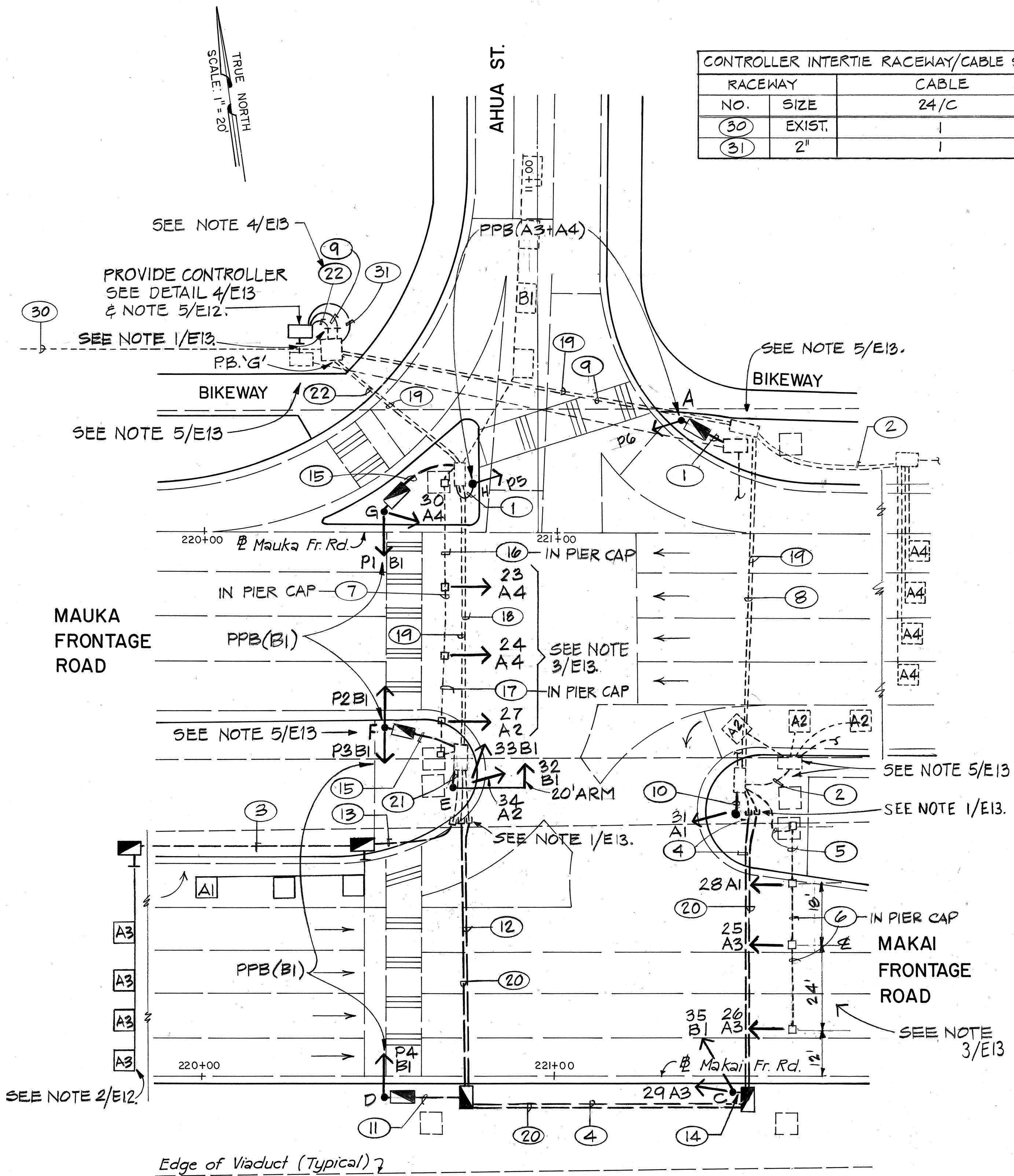
NOTES
1/E13. CONNECT TO CAPPED RACEWAY PROVIDED BY OTHERS.
2/E13. NONE.

3/E13. INSTALL SIGNALS 23 THRU 28 PER DETAIL 2/E13.
4/E13. EXTEND POWER SUPPLY CONDUCTORS (FDR 'R'), 2-1/C#8, TERMINATED BY OTHERS IN PULL BOX 'G' TO CONTROLLER.

5/E13. ADJUST ALL PULLBOXES TO FINISH GRADE.
6/E13. LOOP DETECTORS SHALL BE INSTALLED PRIOR TO INSTALLATION OF TOP LAYER OF ASPHALT CONC. PAVEMENT.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
M.A. Harszajowicz

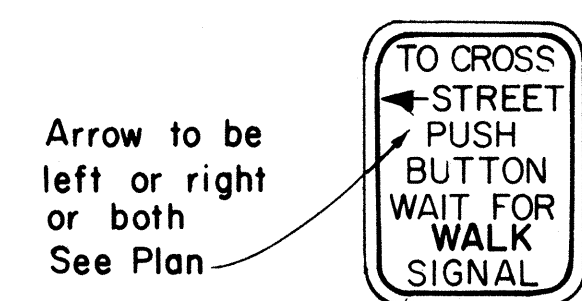
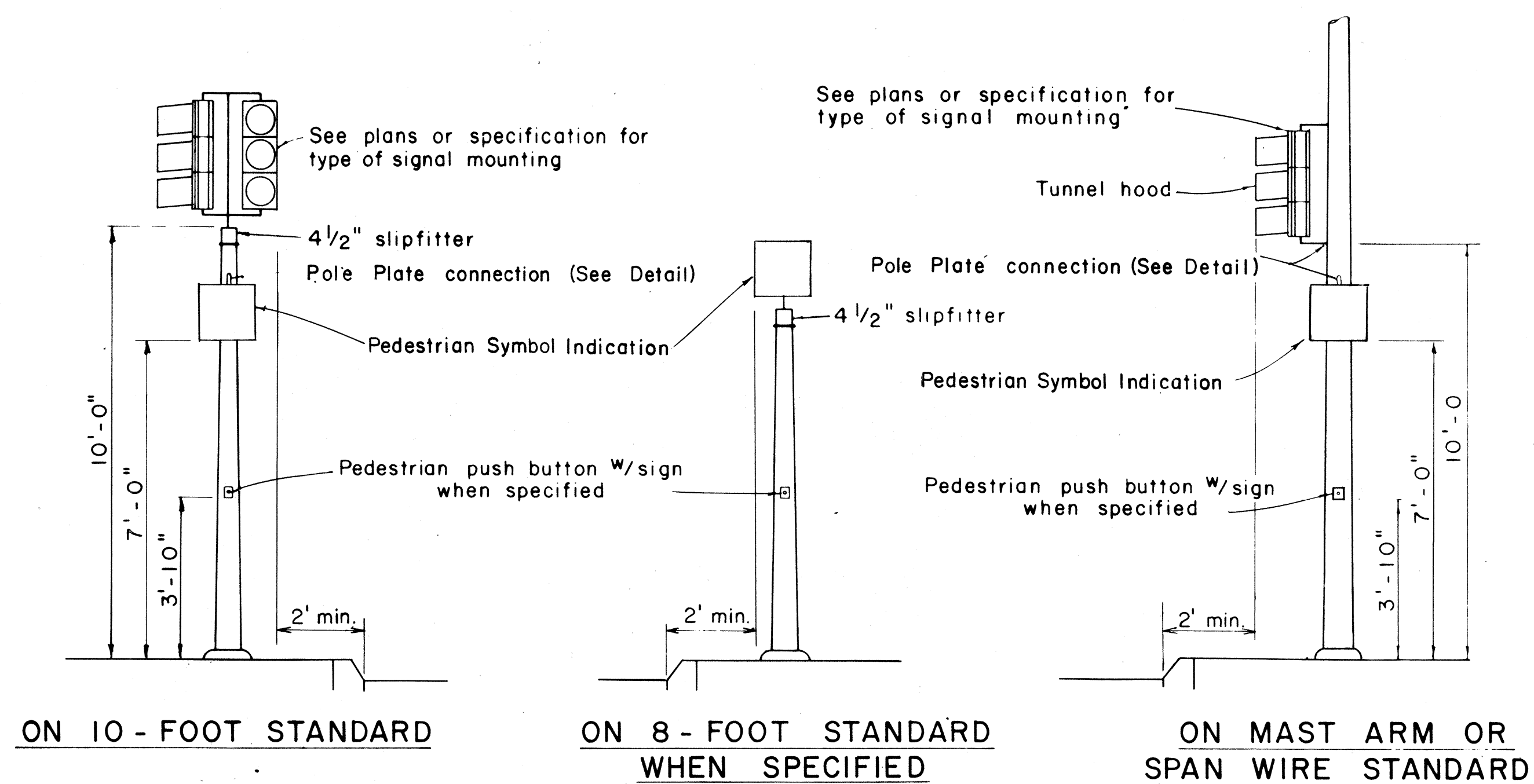


DETAIL 1/E13 TRAFFIC SIGNAL PLAN
INTERSECTION N4A-2

NOTE: ITEMS SHOWN DOTTED ARE EXISTING.

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

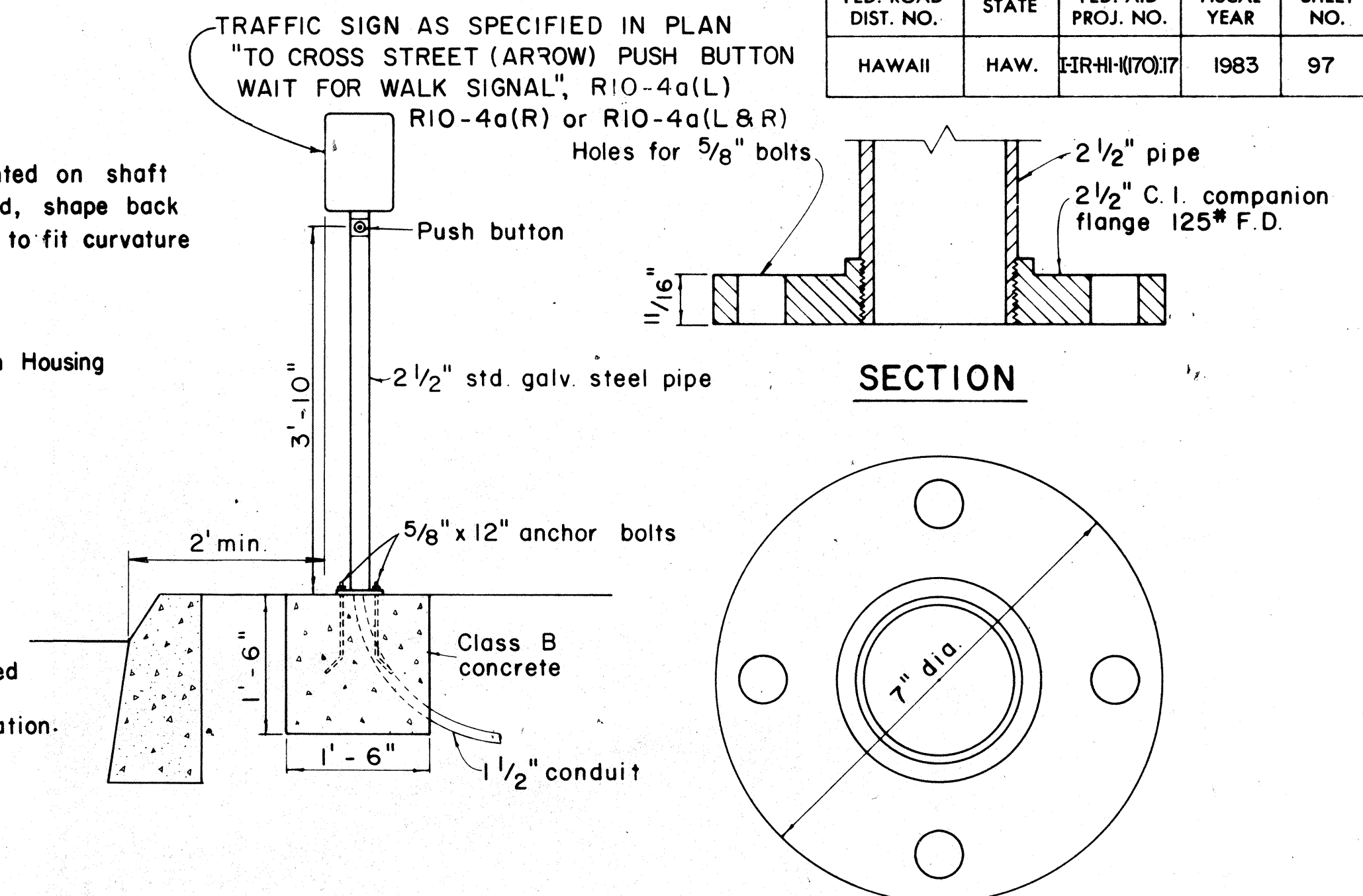
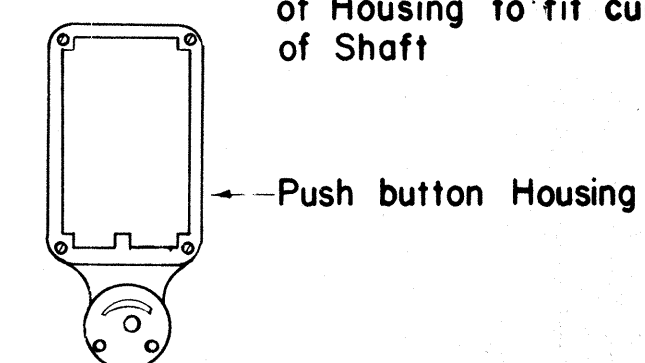
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IR-HI-17017	1983	97	211



RIO- 4a(L) PEDESTRIAN
5" x 7" PUSH BUTTON

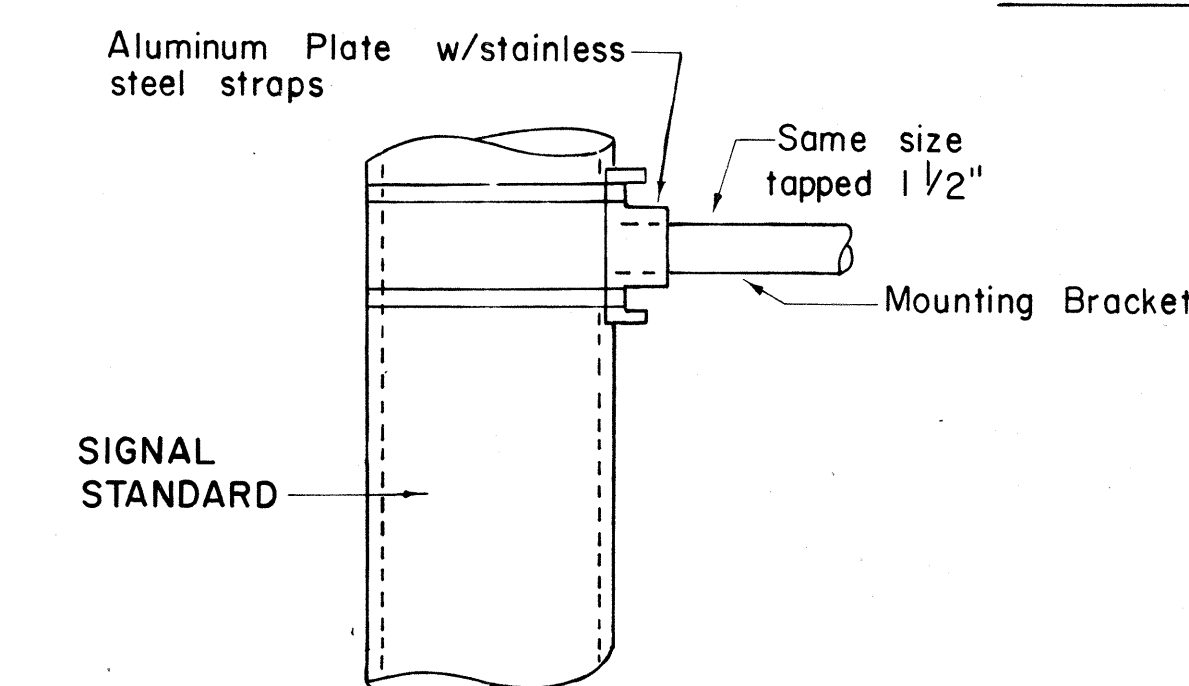
NOTE:

1. Conduits shall protrude 2" max. above finished surface of foundation.
2. Conduits shall slope away from pole foundation.

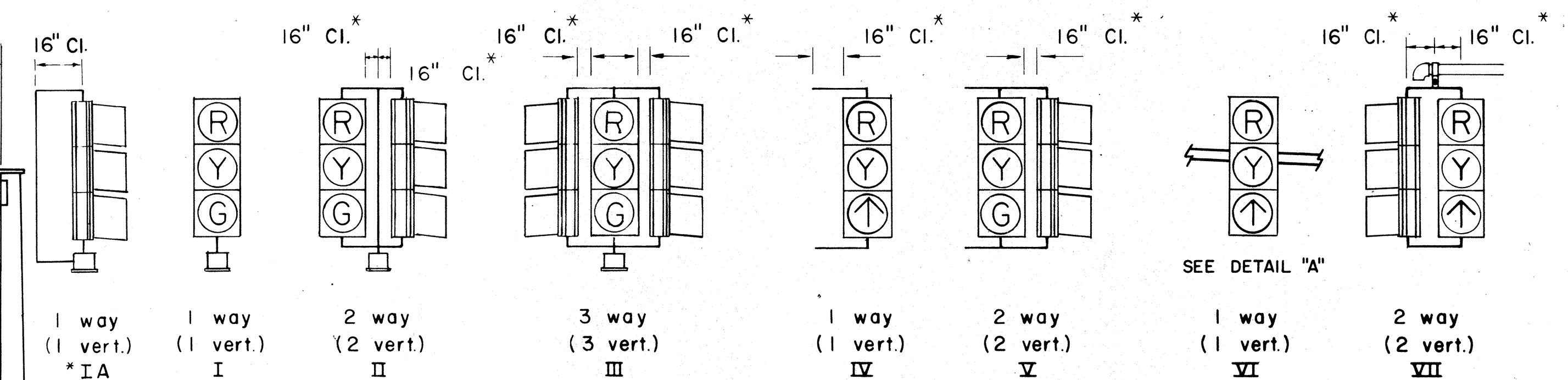
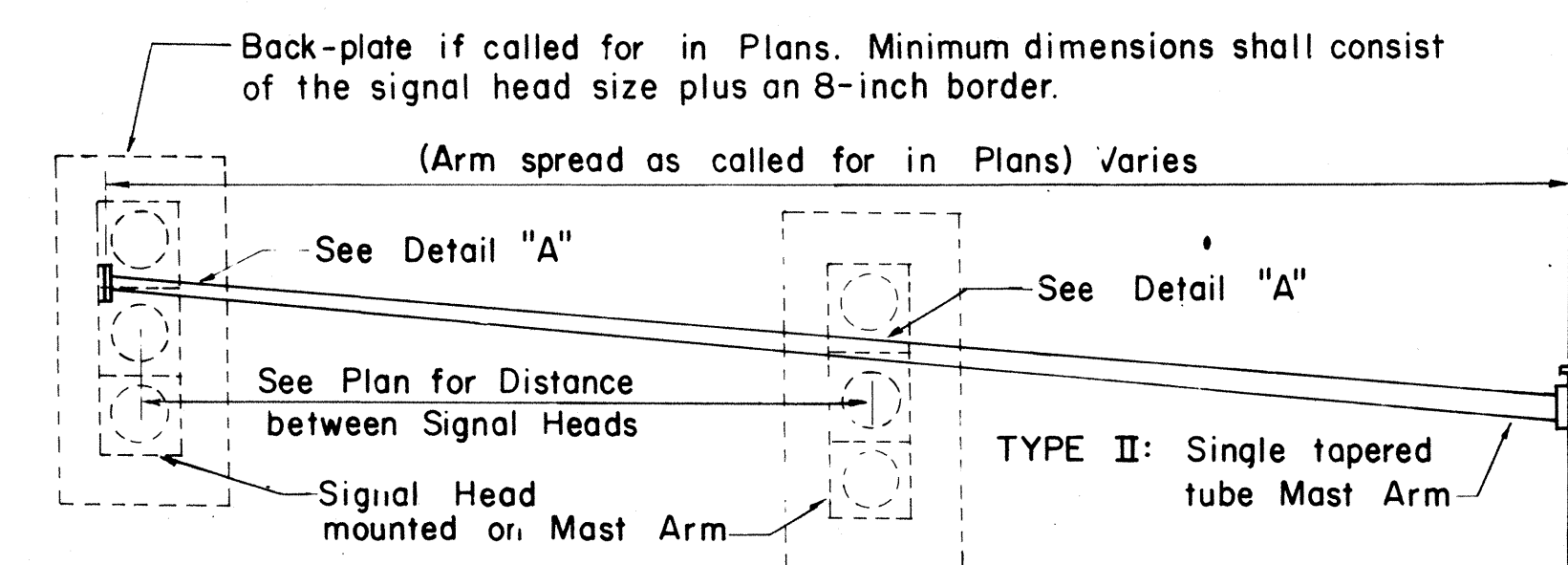


BASE DETAIL

TYPICAL EQUIPMENT MOUNTINGS



DETAIL OF POLE PLATE CONNECTIONS



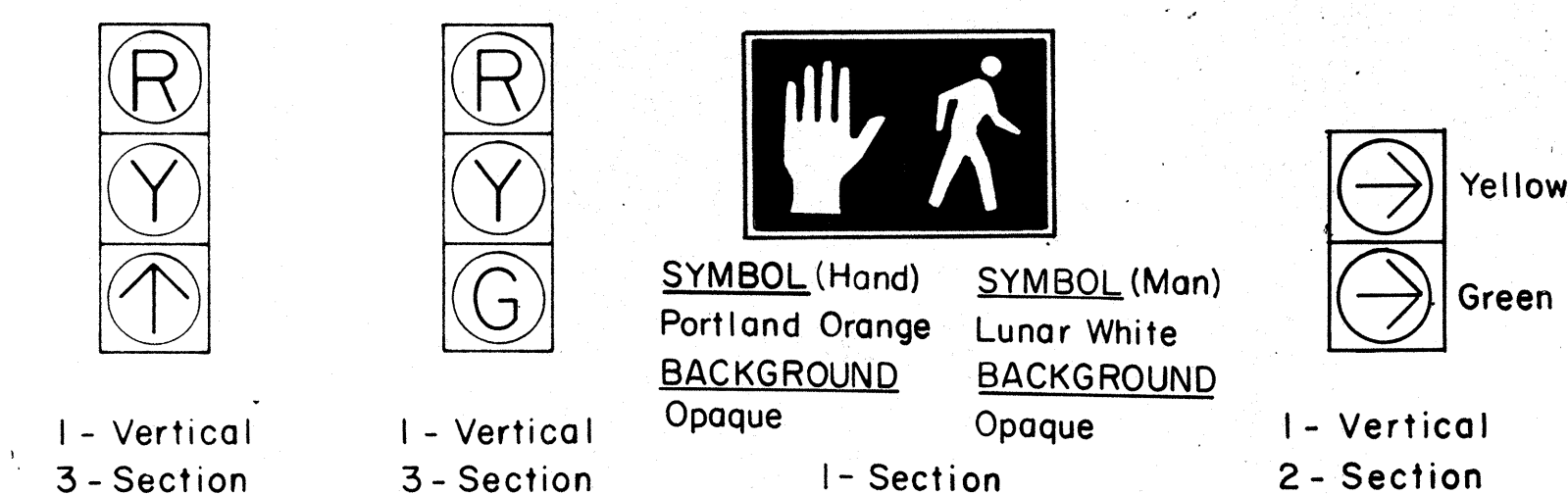
SLIPFITTER MOUNTINGS

BRACKET MOUNTINGS

MASTARM MOUNTINGS

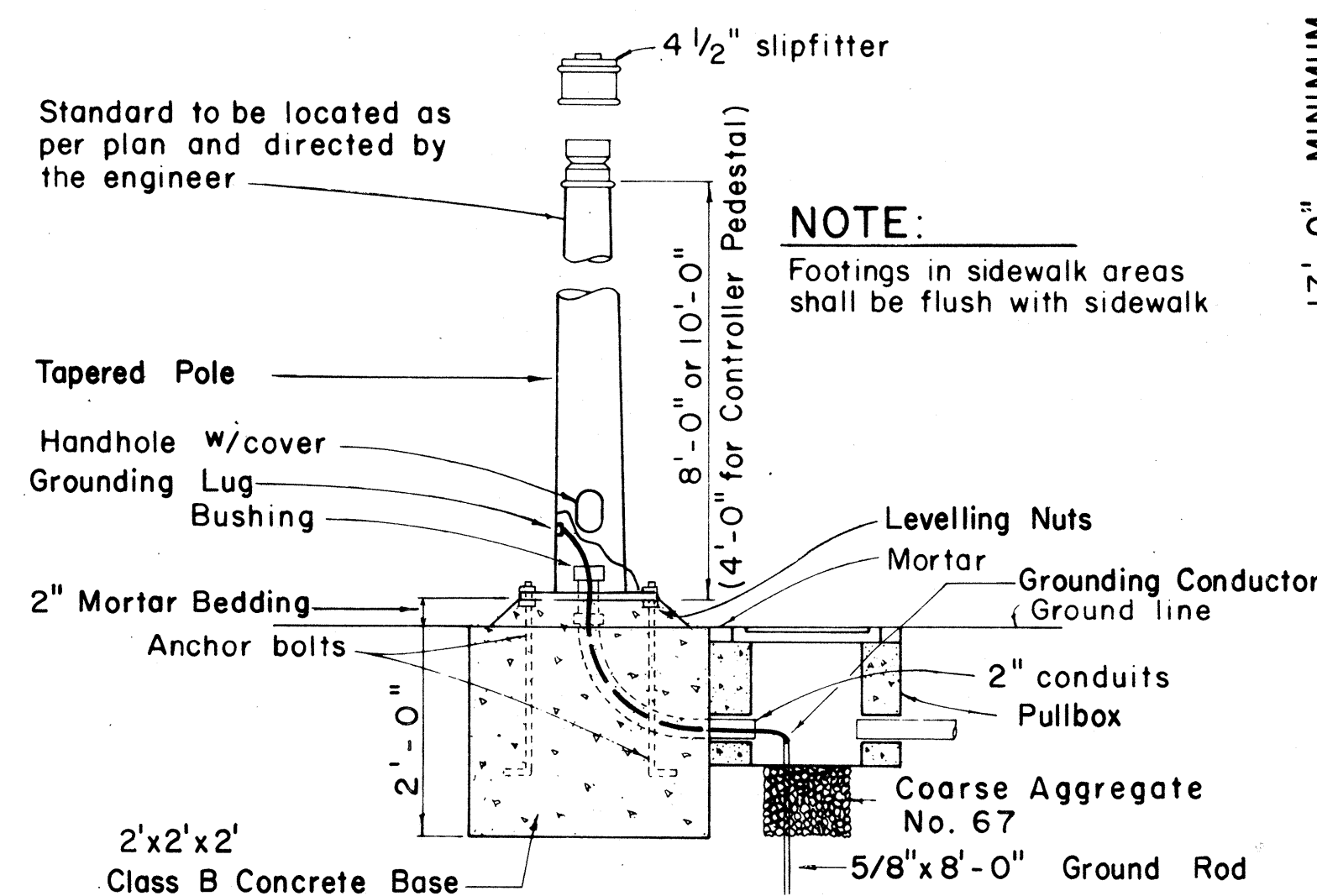
* Use with Programmed Visibility Signal

TYPICAL VEHICULAR AND PEDESTRIAN SIGNAL MOUNTINGS

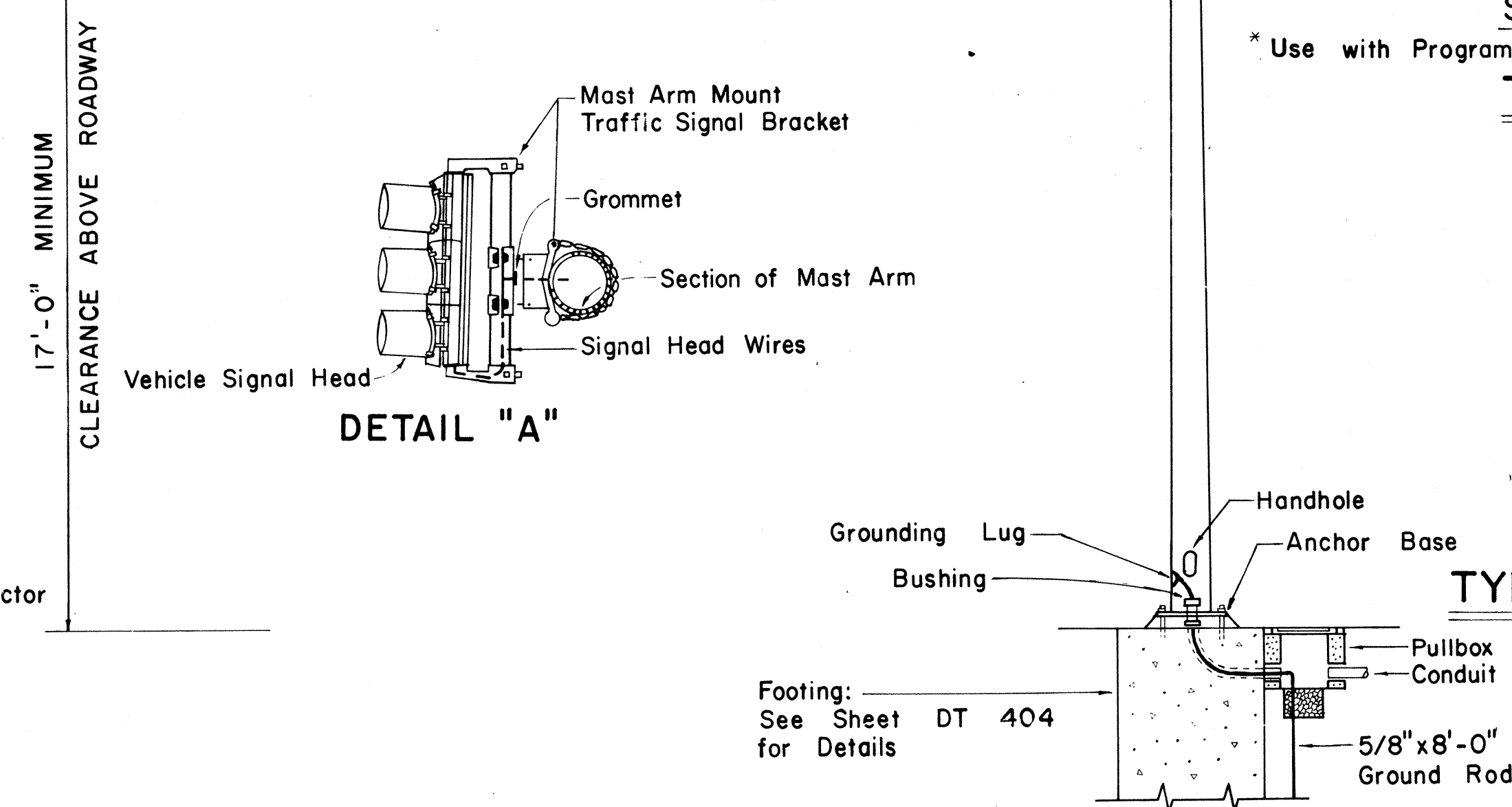


APPROVAL RECOMMENDED:
Eichi Tanaka
TRAFFIC ENGINEER

Shirley S. S. S. 12/30/69
ASSISTANT CHIEF, ENGINEERING DATE



TYPE I SIGNAL STANDARD OR CONTROLLER PEDESTAL AND FOOTING



TYPE II MAST ARM AND STANDARD

TYPICAL SIGNAL ARRANGEMENTS

NO	REVISION	APPROVED BY	DATE
1	Revise code nos. for Pedestrian Push Button signs.	H.T.	3/23/11
2	Revise Details of Traffic and Pedestrian Signals, Standards and Pedestrian Push Button and Signs.	H.T.	3/31/11
3	Revise signal indications.	H.T.	4/22/11
4	Remove Note No. 3 & Revise clearance and dimension.	H.T.	9/19/11
5	Revise Ped. Signal Indication	H.T.	8/6/12
6	Added note for back-plate dimensions.	p100	9-28-12

**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION**

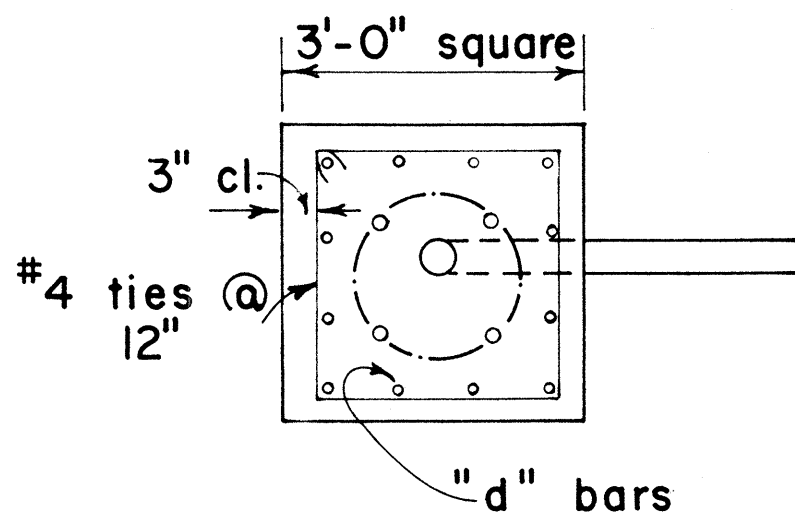
TRAFFIC SIGNAL SYSTEM

MISCELLANEOUS DETAILS

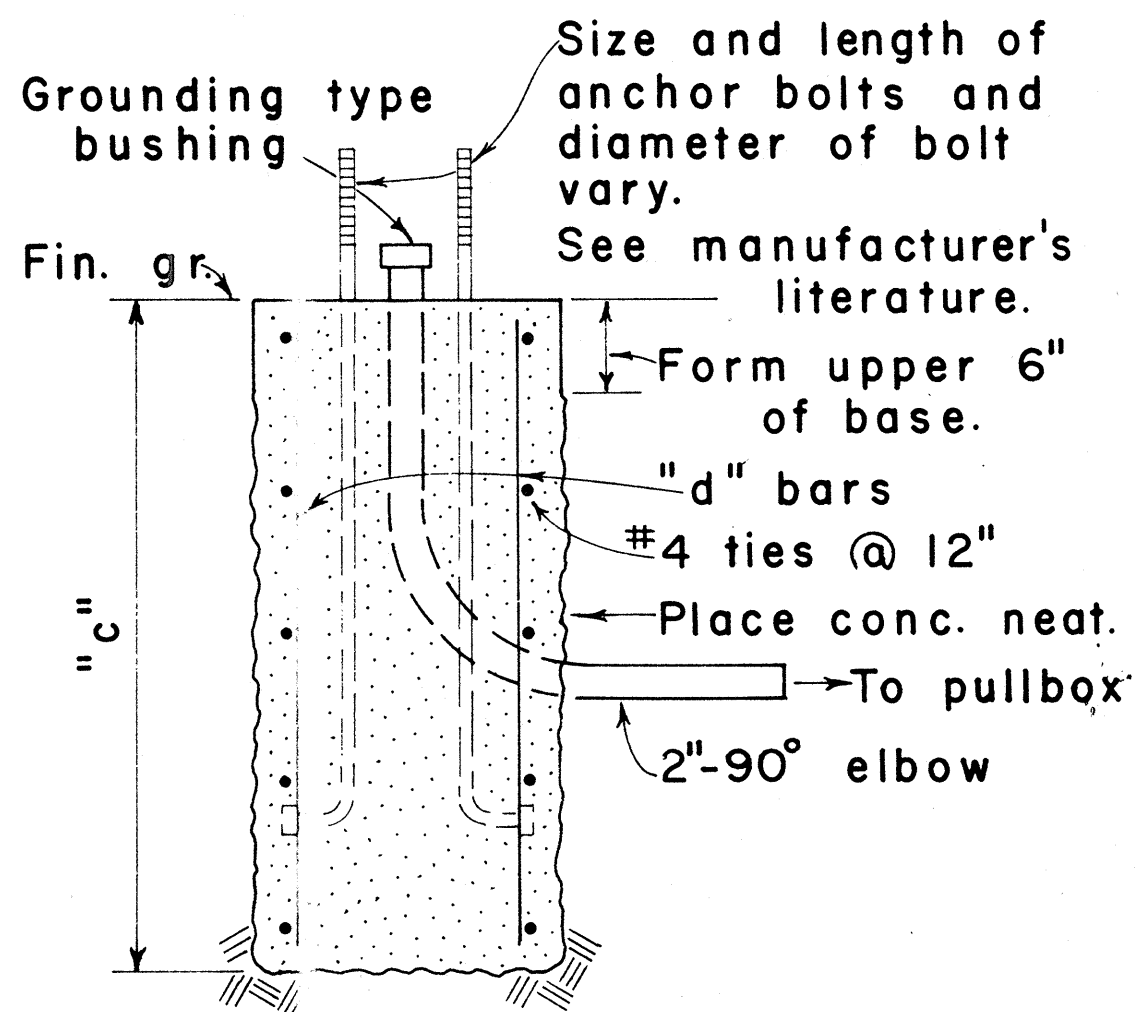
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SHEET No.E-4 OF 16 SHEETS DT 400

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-18-H(170)	1983	98	211



PLAN - SECTION

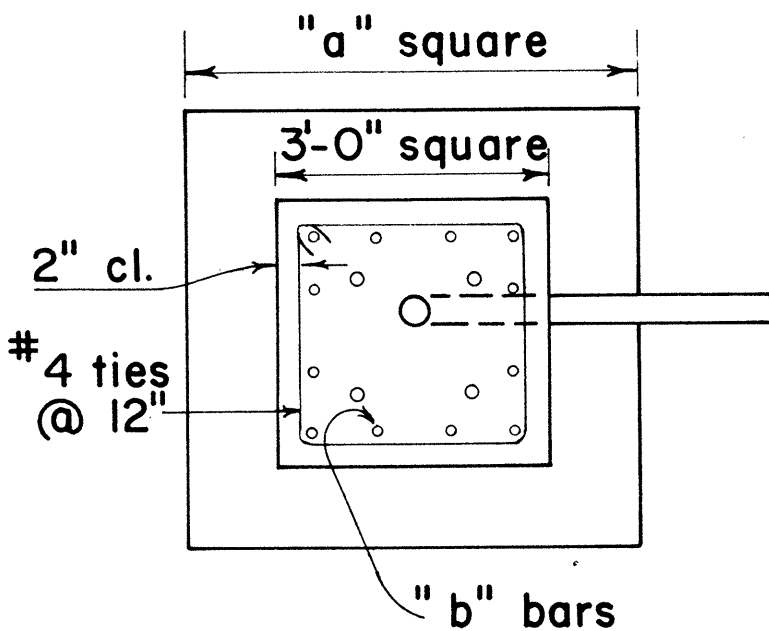


NOTE:
Concrete shall be Class B.

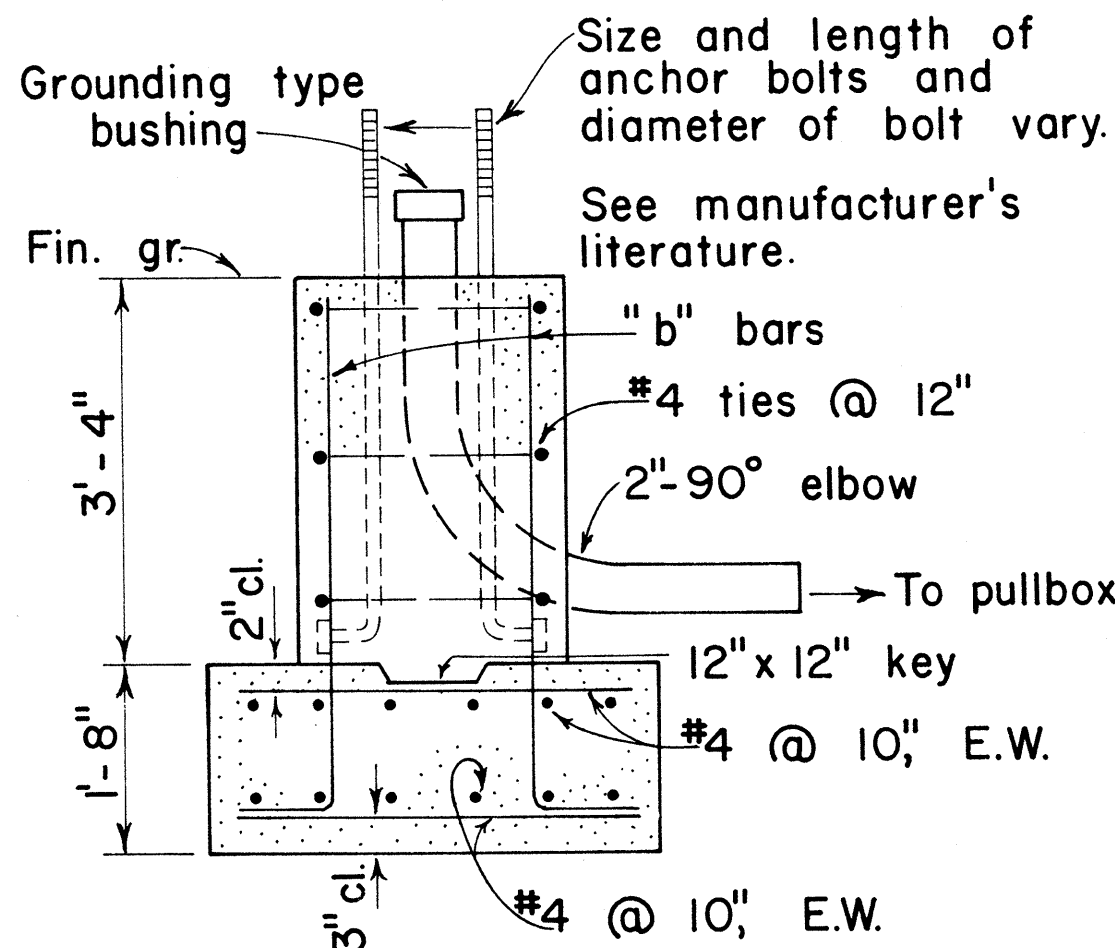
SECTION

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



PLAN - SECTION



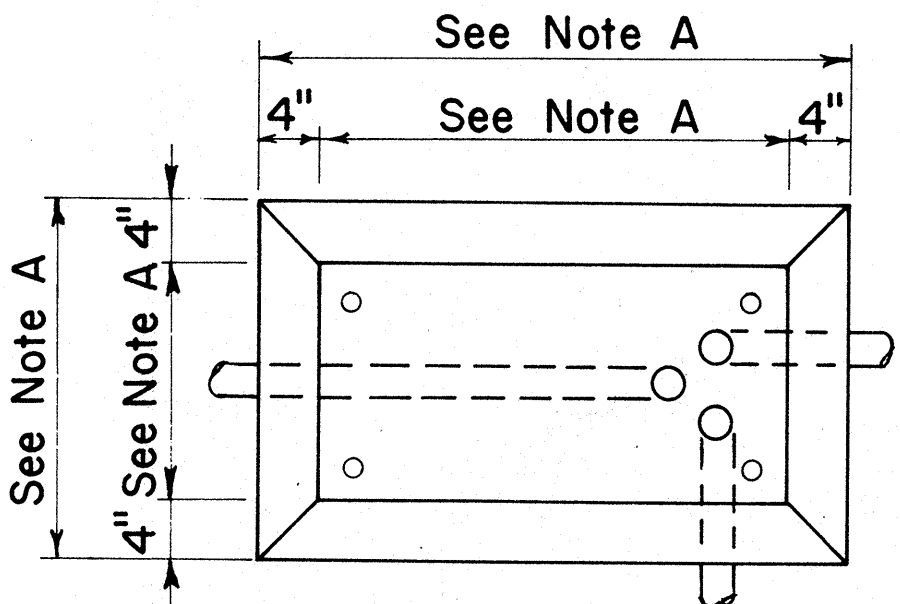
NOTE:
Concrete shall be Class B.

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

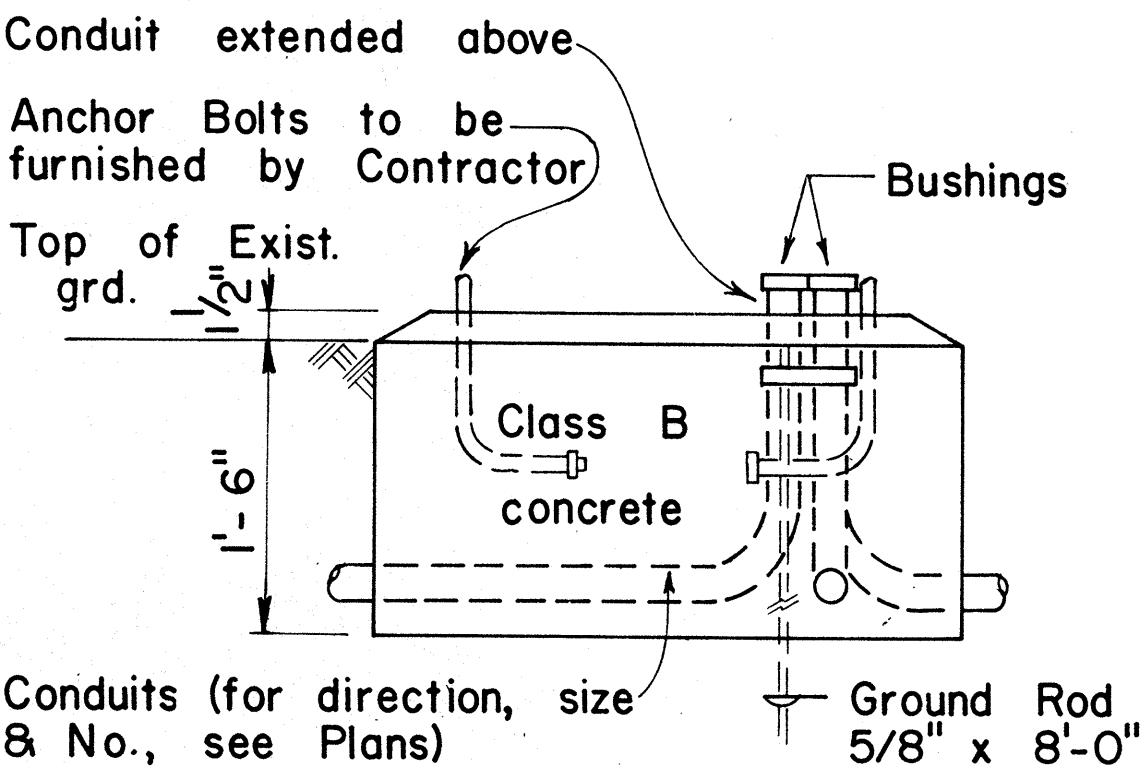
TYPE II A

FOOTING FOR MAST ARM STANDARD



PLAN

CONCRETE BASE FOR CONTROLLER CABINET



ELEVATION

- NOTES:
- Dimensions to be determined by the size of the Controller Cabinet to be furnished under this Contract.
 - Details of Conduits, Anchor Bolts, etc., are approximate only. Exact details shall be secured by the Contractor from Manufacturer.

APPROVAL RECOMMENDED:
Erich Tanaka
TRAFFIC ENGINEER
DATE 3/4/76

APPROVED:
Robert Z. Sakash
ASSISTANT CHIEF, ENGINEERING
DATE 2-5-76

NO.	REVISION	APPROVED BY	DATE

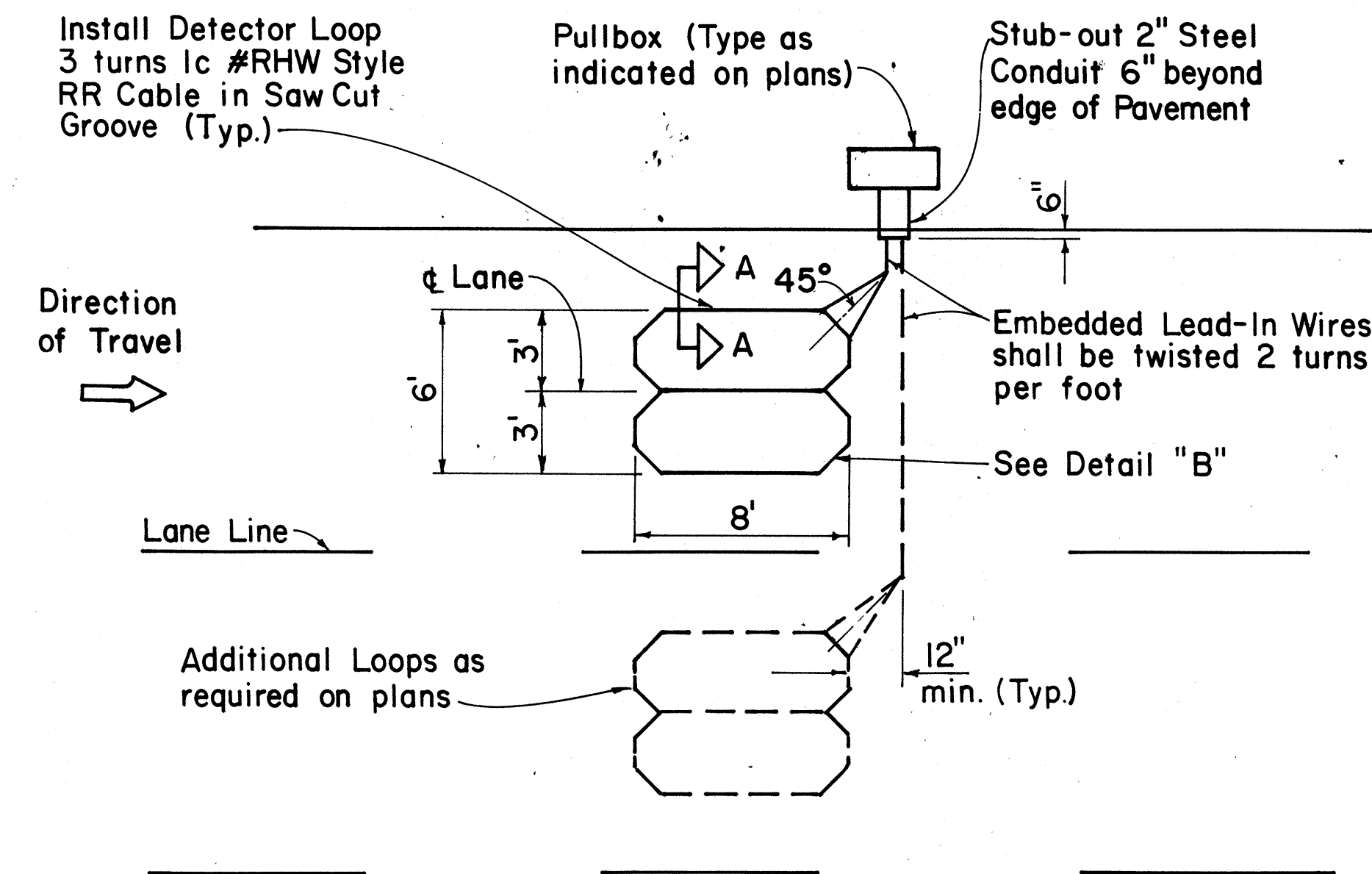
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

TRAFFIC SIGNAL SYSTEM
MISCELLANEOUS DETAILS

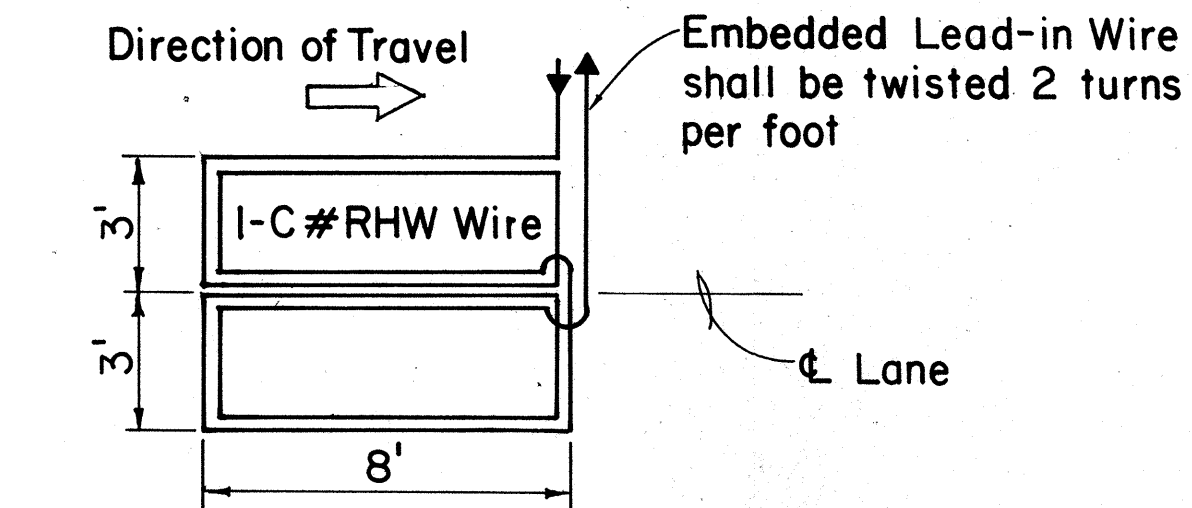
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SHEET NO. E15 OF 16 SHEETS DT404

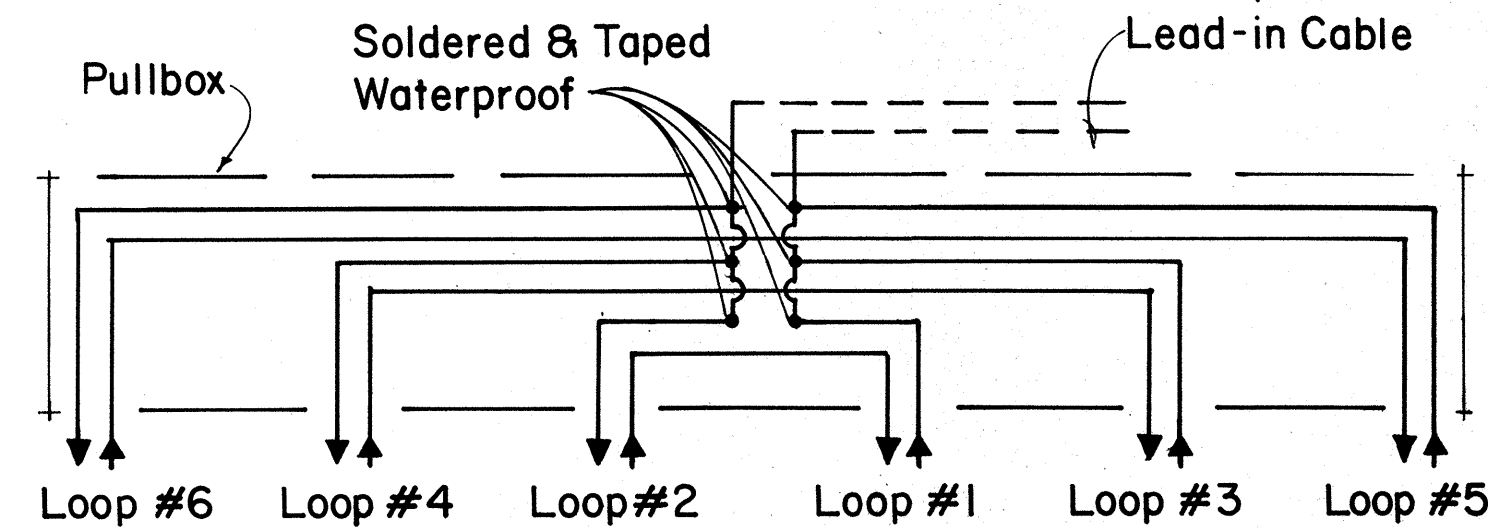
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	111-1(70)17	1983	99	211



SINGLE LOOP LAYOUT

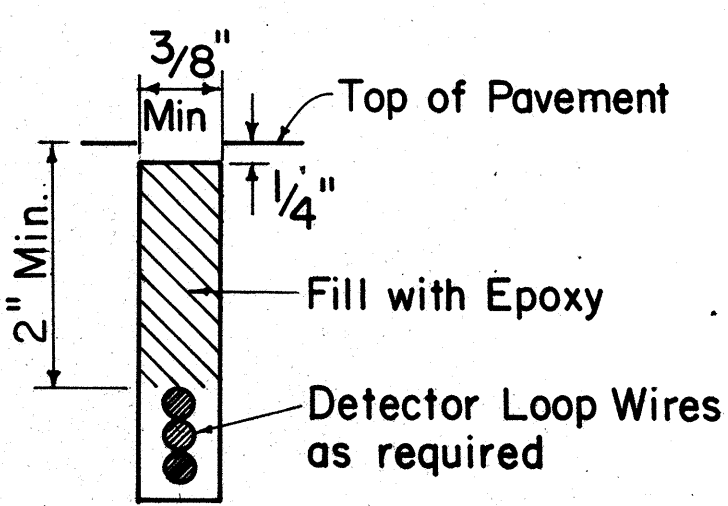


WIRING DIAGRAM



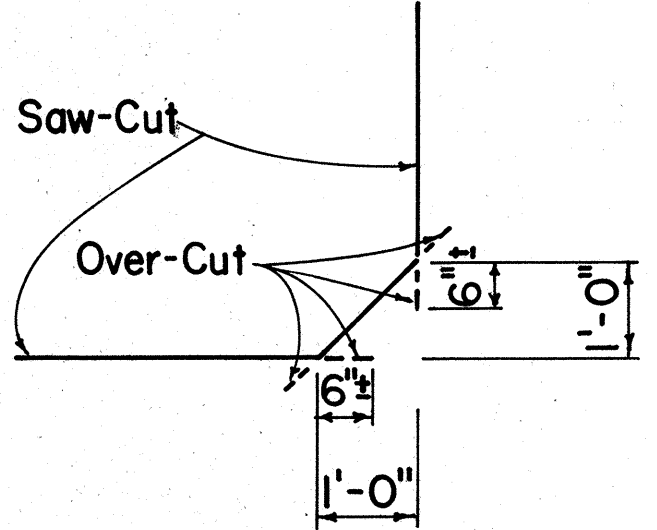
DETAIL "A"

TYPICAL SERIES-PARALLEL LOOP CONNECTION

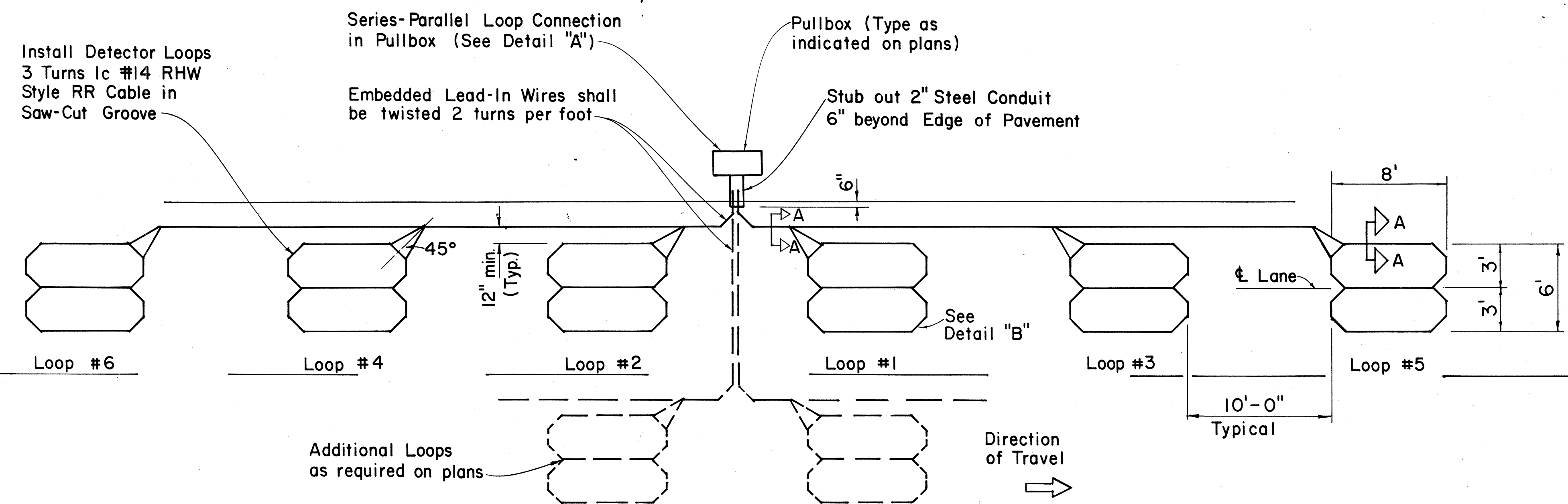


DETECTOR LOOP SAW-CUT SECTION A-A (TYPICAL)

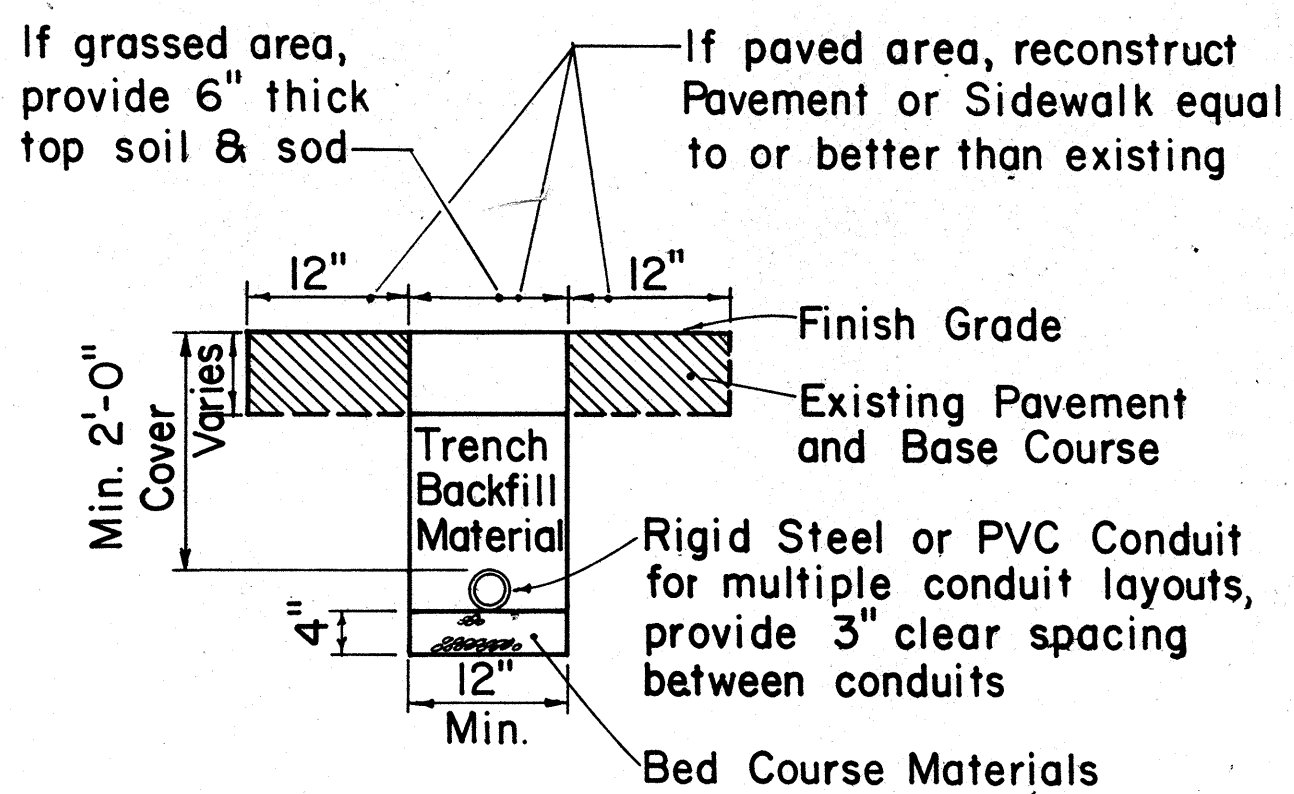
Note: Back-Fill Over-Cuts with Epoxy



DETAIL "B" SAW-CUT AT CORNERS



MULTIPLE LOOP LAYOUT



TYPICAL TRENCH SECTION FOR CONDUIT

NOTE:

1. All conduits under roadways shall be steel or PVC schedule 80. All other conduits shall be steel or PVC schedule 40.

APPROVAL RECOMMENDED:

Enoch Tanaka 9/26/80
TRAFFIC ENGINEER DATE

APPROVED:

Hubert Zafreshi 9/30/80
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1	Replaces Sht. DT 405 dated 3/5/76	H.T.	9/30/80
2	Revised Section A-A	H.T.	5/15/81

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
LOOP DETECTORS

Not to Scale
SHEET NO. 99 OF 16 SHEETS DT 405

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