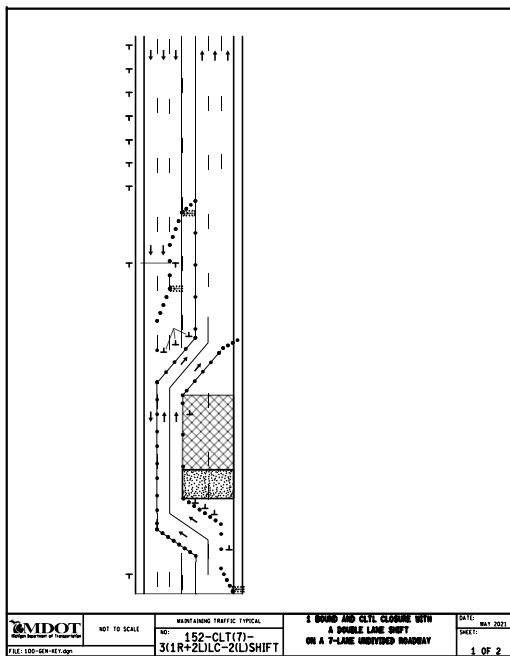


TYPICAL NUMBER KEY

CODES

AB = ARROW BOARD AW = ADVANCE WARNING C = CLOSURE CLT = CENTER LEFT TURN LANE CROSS = CROSSOVER CruSha = CRUSH AND SHAPE EM = EARLY MERGE EnR = ENTRANCE RAMP ExR = EXIT RAMP FW = FREEWAY GEN = GENERAL INFORMATION GORE = FREEWAY GORE AREA IN = INSIDE INT = INTERSECTION L = LANE (L) = LEFT LC = LANE CLOSURE LD = LONG DURATION	LO = LANE OPEN O = OUTSIDE (LANE CLOSURE) OUT = OUTSIDE OF SHOULDER MID = MIDDLE OF INTERSECTION OR ROAD NFW = NON-FREEWAY PARK = PARKING LANE PCMS = PORTABLE CHANGEABLE MESSAGE SIGN (R) = RIGHT ROLL = ROLLING ROADBLOCK RUM = RUMBLE STRIP SD = SHORT DURATION SHL = SHOULDER CLOSURE SIGN = SIGN SP = SPECIAL SPEED = SPEED STA = STOPPED TRAFFIC ADVISORY TR = TRAFFIC REGULATOR TS = TEMPORARY SIGNAL ZIP = ZIPPER MERGE
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- 100 - GENERAL NOTES
- 110 - TRAFFIC REGULATORS
- 120 - NON-FREEWAY
- 130 - CENTER LEFT TURN (CLT) LANES
- 140 - PARKING LANES
- 150 - CLT 7 LANE SECTIONS
- 160 - SIGNAL WORK
- 200 - FREEWAY CLOSURES
- 210 - FREEWAY LANE SHIFTS
- 220 - FREEWAY ENTRANCE RAMPS
- 230 - FREEWAY EXIT RAMPS
- 300 - ADVANCE WARNINGS
- 310 - CROSSOVER CLOSURE
- 320 - CRUSH AND SHAPE
- 340 - MERGE SYSTEMS
- 350 - GORE LOCATIONS
- 360 - ROLLING ROADBLOCK
- 4000 - MAINTENANCE
- 5000 - SURVEY

EXAMPLE TYPICAL

CODE: 152-CTL(7)-3(1R+2L)LC-2(L)SHIFT

152 - TYPICAL NUMBER

CTL(7) = CENTER LEFT TURN LANE, 7 LANES TOTAL.

3(1R+2L)LC = 3 LANES CLOSED, (1 RIGHT LANE AND 2 LEFT LANES).

2(L)SHIFT = 2 LANES SHIFTED TO THE LEFT.

NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	TYPICAL NUMBERING KEY	DATE: DECEMBER 2021
		NO: 100-GEN-KEY		SHEET: 1 OF 1

FILE: 100-GEN-KEY.dgn

DISTANCE BETWEEN TRAFFIC SIGNS, "D"

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
D (FEET)	250	300	350	400	450	500	550	600	650	700	750

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE, "B"

"B" LENGTHS	SPEED*, MPH (PRIOR TO WORK AREA)											
	20	25	30	35	40	45	50	55	60	65	70	75
B (FEET)	33	50	83	132	181	230	279	329	411	476	542	625

* POSTED SPEED, OFF-PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

MINIMUM MERGING TAPER LENGTH, "L" (FEET)

OFFSET (FEET)	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
	25	30	35	40	45	50	55	60	65	70	75
1	11	15	21	27	45	50	55	60	65	70	75
2	21	30	41	54	90	100	110	120	130	140	150
3	32	45	62	80	135	150	165	180	195	210	225
4	42	60	82	107	180	200	220	240	260	280	300
5	53	75	103	134	225	250	275	300	325	350	375
6	63	90	123	160	270	300	330	360	390	420	450
7	73	105	143	187	315	350	385	420	455	490	525
8	84	120	164	214	360	400	440	480	520	560	600
9	94	135	184	240	405	450	495	540	585	630	675
10	105	150	205	267	450	500	550	600	650	700	750
11	115	165	225	294	495	550	605	660	715	770	825
12	125	180	245	320	540	600	660	720	780	840	900
13	136	195	266	347	585	650	715	780	845	910	975
14	146	210	286	374	630	700	770	840	910	980	1050
15	157	225	307	400	675	750	825	900	975	1050	1125

NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	"B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING, SIGN BORDER KEY, AND ROLL-AHEAD SPACING	DATE: MAY 2021
		NO: 101-GEN-SPACING-CHARTS		SHEET: 1 OF 3

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

"L" = $\frac{W \times S^2}{60}$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = W X S WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
 S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
 W = WIDTH OF OFFSET

TYPES OF TAPERS

UPSTREAM TAPERS

- MERGING TAPER
- SHIFTING TAPER
- SHOULDER TAPER
- 2 TO 1 LANE ROAD TAPER

TAPER LENGTH

- L - MINIMUM
- 1/2 L - MINIMUM
- 1/3 L - MINIMUM
- 100' - MAXIMUM

DOWNSTREAM TAPERS
 (USE IS RECOMMENDED)

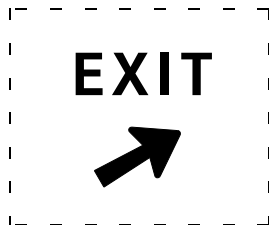
100' (PER LANE)

MAXIMUM SPACING FOR CHANNELIZING DEVICES

WORK ZONE SPEED LIMIT	DRUM AND 42" DEVICE SPACING (FT)		NIGHTTIME 42" DEVICE SPACING (FT)	
	TAPER	TANGENT	TAPER	TANGENT
< 45 MPH	1 x SPEED LIMIT	2 x SPEED LIMIT	25 FEET	50 FEET
≥ 45 MPH	50 FEET	100 FEET	25 FEET	50 FEET

SIGN OUTLINE KEY

DASHED OUTLINES INDICATE A SIGN THAT EXISTS ON SITE, AND NEEDS TO BE COVERED.



SOLID OUTLINES INDICATE A SIGN THAT IS TO BE PLACED ON THE PROJECT



NOT TO SCALE

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	"B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING SIGN BORDER KEY AND ROLL-AHEAD SPACING	DATE: MAY 2021
		NO: 101-GEN-SPACING-CHARTS		SHEET: 2 OF 3

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES – TEST LEVEL 2

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5.5 TONS (STATIONARY)	40 MPH OR LESS	25 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 4,410 POUND IMPACT VEHICLE WEIGHT.

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES – TEST LEVEL 3

WEIGHT OF TMA VEHICLE	PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE)	ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA)
5 TONS (MOBILE)	45 MPH	100 FT
	50-55 MPH	150 FT
	60-75 MPH	175 FT
12 TONS (STATIONARY)	45 MPH	25 FT
	50-55 MPH	25 FT
	60-75 MPH	50 FT

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 10,000 POUND IMPACT VEHICLE WEIGHT.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 101-GEN-SPACING-CHARTS

"B", "D" AND "L" TABLES
CHANNELIZING DEVICE SPACING
SIGN BORDER KEY AND ROLL AHEAD SPACING

DATE: MAY 2021

SHEET: 3 OF 3

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

GENERAL NOTES

- G1: SEE GEN-SPACING-CHARTS FOR COMMON VALUES INCLUDING:
 D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
 L = MINIMUM LENGTH OF TAPER
 B = LENGTH OF LONGITUDINAL BUFFER
 ROLL AHEAD DISTANCE
- G2: DISTANCE BETWEEN SIGNS, "D", THE VALUES FOR WHICH ARE SHOWN IN TYPICAL GEN-KEY ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- G3: ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING MUST MEET NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP 350) TEST LEVEL 3, OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) TL-3 AS WELL AS THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.
- G4: DO NOT STORE EQUIPMENT, MATERIALS OR PERFORM WORK IN ESTABLISHED BUFFER AREAS.
- G5: ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR TRAFFIC PATTERNS FOR WORK LESS THAN THREE DAYS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN NOTES

- S1: ALL NON-APPLICABLE SIGNING WITHIN THE CIA MUST BE MODIFIED TO FIT CONDITIONS, COVERED, OR REMOVED. FOR GUIDANCE SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, SECTIONS 6.01.09 AND 6.01.10.
- S2: R5-18b SIGNS ARE ONLY REQUIRED ON FREEWAY PROJECTS WITH A DURATION OF 15 DAYS OR LONGER OR NON-FREEWAY PROJECTS WITH A DURATION OF 90 DAYS OR LONGER. TO APPLY THIS TYPICAL WITHOUT R5-18b SIGNS, REMOVE THE SIGNS AND CONSOLIDATE THE SEQUENCE AS APPROPRIATE.
- S3: R5-18c IS ONLY REQUIRED IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. OMIT THIS SIGN IN SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE.
- S4: ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W20-5 SIGNS.
- S5: PLACE ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE WORK ZONE SPEED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK ZONE, OR AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT. PLACE ADDITIONAL SPEED LIMIT SIGNS AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS ARE MORE THAN 2 MILES APART. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, PLACE ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED BEYOND THE LIMITS OF THE WORK AREA AS INDICATED. IF PERMANENT SIGNS DISPLAYING THE CORRECT SPEED LIMIT ARE POSTED, OMIT ALL W3-5b AND R2-1 SIGNS AND REDUCE SPACING ACCORDINGLY.
- S6: FABRICATE SPECIAL SIGNS IN ACCORDANCE WITH CURRENT SIGNING DESIGN STANDARDS.
- S7: PLACE ADDITIONAL R8-3 SIGNS AT A MAXIMUM 500' SPACING THROUGHOUT THE WORK ZONE.
- S8: WHEN SPEED LIMIT SIGNS CANNOT BE PLACED SIDE BY SIDE AS SHOWN, PLACE THEM "D" DISTANCE APART.
- S9: STOP SIGNS NOT REQUIRED IF SIGNALS ARE ON 4-WAY FLASHING RED. STOP AHEAD SIGNS ARE NOT REQUIRED IF THERE IS ADEQUATE VISIBILITY OF THE STOP SIGN OR IF SIGNALS ARE BEING USED TO CONTROL TRAFFIC.
- S10: PLACE REDUCED SPEED ZONE AHEAD SIGN (W3-5b) HERE WHEN USING A SPEED REDUCTION IN THIS DIRECTION.
- S11: THE NUMBER OF W1-6 SHIFT SIGNS TO PLACE FOR A SHIFT IS AS FOLLOWS:
 SHIFTS 4FT OR LESS, PLACE ONE W1-6(R)(L)
 SHIFTS 5FT TO 12FT, PLACE TWO W1-6(R)(L)
 SHIFTS MORE THAN 12FT, PLACE THREE OR MORE W1-6(R)(L) SIGNS DEPENDING UPON LENGTH OF SHIFT AND AS PER THE ENGINEER.
- S12: PLACE R2-1 SIGNS AS DETAILED IN NOTE S5 WHEN THERE IS A SPEED REDUCTION IN THIS DIRECTION

TRAFFIC REGULATOR NOTES

- TR1: TRAFFIC REGULATORS MUST FOLLOW ALL THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS, THE CURRENT VERSIONS OF THE TRAFFIC REGULATOR'S INSTRUCTION MANUAL AND THE VIDEO "HOW TO SAFELY REGULATE TRAFFIC IN MICHIGAN". THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS IS DETERMINED BY THE ROADWAY ADT, GEOMETRICS, AND AS DIRECTED BY THE ENGINEER.
- TR2: PROVIDE APPROPRIATE BALLOON LIGHTING TO SUFFICIENTLY ILLUMINATE TRAFFIC REGULATOR'S STATIONS WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS.
- TR3: PROVIDE EITHER A STOP/SLOW AFAD OR A RED/YELLOW LENS AFAD, MEETING THE REQUIREMENTS OF THE MMUTCD

TEMPORARY TRAFFIC CONTROL DEVICE NOTES

- TCD1: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD NOT EXCEED 1.0 TIMES THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 50 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TAPERS ARE NOT TO EXCEED 25 FEET AT NIGHT.
- TCD2: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TANGENT SHOULD NOT EXCEED TWICE THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 100 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TANGENTS ARE NOT TO EXCEED 50 FEET AT NIGHT.
- TCD3: TYPE III BARRICADES MUST BE LIGHTED FOR OVERNIGHT CLOSURES.
- TCD4: WHEN THE HAUL ROAD IS NOT IN USE, PLACE LIGHTED TYPE III BARRICADES WITH "ROAD CLOSED" EXTENDING COMPLETELY ACROSS THE HAUL ROAD.
- TCD5: USE OBJECT MARKER SIGNS IN LIEU OF THE TYPE B HIGH INTENSITY LIGHT SHOWN IN THE STANDARD PLAN FOR TEMPORARY CONCRETE BARRIER (R-53, AND R-126) WHEN USED WITH A TEMPORARY SIGNAL SYSTEM. THE OBJECT MARKERS MUST BE A MINIMUM OF 12 INCHES IN WIDTH AND 36 INCHES IN HEIGHT AND HAVE ORANGE AND WHITE RETROREFLECTIVE SHEETING. THE RETROREFLECTIVE SHEETING MUST HAVE ALTERNATING DIAGONAL ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION VEHICULAR TRAFFIC IS TO PASS.
- TCD6: PLACE LIGHTED ARROW PANELS AS CLOSE TO THE BEGINNING OF TAPERS AS PRACTICAL, BUT NOT IN A MANNER THAT WILL OBSCURE OR CONFUSE APPROACHING MOTORISTS WHEN PHYSICAL LIMITATIONS RESTRICT PLACEMENT. IN CURBED SECTIONS, IF ARROW BOARD CANNOT BE PLACED BEHIND CURB, PLACE ARROW BOARD IN THE CLOSED LANE AS CLOSE TO THE BEGINNING OF TAPER AS POSSIBLE.
- TCD7: ADDITIONAL TYPE III BARRICADES MAY BE REQUIRED TO COMPLETELY CLOSE OFF ROAD FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.
- TCD8: WHERE THE SHIFTED SECTION IS SHORTER THAN 600 FEET, A DOUBLE REVERSE CURVE SIGN (W24-1) CAN BE USED INSTEAD OF THE FIRST REVERSE CURVE SIGN, AND THE SECOND REVERSE CURVE SIGN CAN BE OMITTED.
- TCD9: RUMBLE STRIPS ARE TO BE PLACED AS SPECIFIED IN THE CONTRACT. IF NOT SPECIFIED IN THE CONTRACT, PLACE RUMBLE STRIPS AS SHOWN, AND IN ACCORDANCE WITH THE RUMBLE STRIP MANUFACTURER'S RECOMMENDATIONS. AN ARRAY OF RUMBLE STRIPS CONTAINS THREE RUMBLE STRIPS. PLACE THE RUMBLE STRIPS IN THE ARRAY AT A CONSISTENT DISTANCE, BETWEEN 10' AND 20' APART.
- TCD10: SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, PORTABLE CHANGEABLE MESSAGE SIGN GUIDELINES FOR RECOMMENDED AND CORRECT PCMS MESSAGING. STAGGER PCMS THAT ARE ON OPPOSING SIDES OF THE ROAD 1000 FEET FROM EACH OTHER.

RAMP NOTES

- RMP1: WHEN CONDITIONS ALLOW, E5-1 SIGNS MUST BE REMOVED OR COVERED AND CHANNELIZING DEVICES MUST BE POSITIONED TO ENABLE RAMP TRAFFIC TO DIVERGE IN A FREE MANNER
- RMP2: STOP AND YIELD CONDITIONS SHOULD BE AVOIDED WHENEVER PRACTICAL. WHEN CONDITIONS WARRANT, R1-1 SIGNS MAY BE USED IN PLACE OF R1-2 SIGNS. WHEN R-1 SIGNS ARE USED, W3-1 SIGNS MUST BE USED IN PLACE OF W3-2 SIGNS. CONSIDERATION SHOULD BE GIVEN TO CLOSING THE RAMP TO COMPLETE WORK TO ALLOW AN ADEQUATE MERGE DISTANCE. WORK SHOULD BE EXPEDITED TO AVOID THE STOP AND/OR YIELD CONDITIONS.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 102-GEN-NOTES

TRAFFIC TYPICALS
NOTE SHEET

DATE: MAY 2022
SHEET:

1 OF 2

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

SIGNAL NOTES

- SIG1: EXISTING SIGNAL MUST BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.
- SIG2: SIGNAL IS IN OPERATION.
- SIG3: DELINEATE THE WORK ZONE AREA WITH 28 INCH CONES FOR DAYTIME WORK, OR 42 INCH CHANNELIZING DEVICES FOR NIGHTTIME WORK.
- SIG4: THE CONTRACTOR MUST HAVE A DESIGNATED SPOTTER IF THE AERIAL BUCKET TRUCK IS LOCATED OVER ACTIVE TRAVEL LANES.
- SIG5: THE LOWEST POINT OF THE BUCKET MAY NOT TRAVEL BELOW 14 FOOT VERTICAL CLEARANCE. THE CONTRACTOR MUST UTILIZE AN ALTERNATE SET UP, OR PLACE THE INTERSECTION IN A 4 WAY STOP IF THE 14 FOOT VERTICAL CLEARANCE IS COMPROMIZED. USE TRAFFIC REGULATORS TO CONTROL TRAFFIC THROUGH THE INTERSECTION WHEN TRAFFIC IS PLACED IN A 4 WAY STOP.
- SIG6: DELINEATE THE TRUCK WITH CHANNELIZING DEVICES. THE POSITION OF THE TRUCK MAY BE MOVED TO FACILITATE WORK.

MAINTENANCE AND SURVEYING NOTES

- MS1: WHENEVER STOPPING SIGHT DISTANCE EXISTS TO THE REAR, THE SHADOW VEHICLES SHOULD MAINTAIN THE RECOMENDED DISTANCE FROM THE WORK AREA AND PROCEED AT THE SAME SPEED. THE SHADOW VEHICLE SHOULD SLOW DOWN AND TRAVEL AT A FARTHER DISTANCE TO PROVIDE ADEQUATE SIGHT DISTANCE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES.
- MS2: WORKERS OUTSIDE OF VEHICLES SHOULD WORK WITHIN 150' OF WORK VEHICLES WITH AN ACTIVATED BEACON, BETWEEN THE "BEGIN WORK CONVOY" SIGN AND THE "END WORK CONVOY" SIGN, OR BETWEEN THE "WORK ZONE BEGINS" AND "END ROAD WORK" SIGN.
- MS3: WORK OR SHADOW VEHICLES WITH OR WITHOUT A TMA MAY BE USED TO SEPARATE THE WORK SPACE FROM TRAFFIC. IF USED, THE VEHICLES SHOULD BE PARKED ACCORDING TO THE ROLL AHEAD DISTANCE TABLES.
- MS4: WORK AND SHADOW VEHICLES SHALL BE APPROPRIATELY EQUIPPED WITH AN ACTIVATED AMBER BEACON.
- MS5: WHEN WORKERS ARE OUTSIDE THEIR VEHICLES IN AN EXISTING LANE WHILE A MOBILE OPERATION IS OCCURRING DURING THE NIGHTTIME HOURS, CHANNELIZING DEVICES TO DELINEATE OPEN OR CLOSED LANES AT 50 FT SPACING MUST BE USED. AN EXAMPLE OF AN OPERATION (BUT NOT LIMITED TO) IS THE LAYOUT OF CONCRETE PATCHES.
- MS6: W21-6 AND W20-1 SIGNS MAY BE SUBSTITUTED AS DETERMINED BY THE TYPE OF WORK TAKING PLACE AS PER THE ENGINEER.



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 102-GEN-NOTES

TRAFFIC TYPICALS
NOTE SHEET

DATE: MAY 2022
SHEET:

2 OF 2

SIGN NUMBER KEY



E5-1f
48" x 48"
60" x 48"



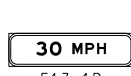
E5-2
48" x 36"



E5-2a
48" x 36"



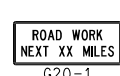
E5-3
48" x 36"



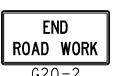
E13-1P
VAR x 24"



E13-1aP
36" x 24"



G20-1
60" x 24"



G20-2
48" x 24"



G20-4
36" x 18"



I-6a
18" x 18"
24" x 24"
30" x 30"



M1-1
18" x 18"
24" x 24"
36" x 36"
48" x 48"



M1-1
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"



M1-2
18" x 18"
24" x 24"
36" x 36"
48" x 48"



M1-2
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"



M1-3
18" x 18"
24" x 24"
36" x 36"
48" x 48"



M1-3
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"



M1-4
18" x 18"
24" x 24"
36" x 36"
48" x 48"



M1-4
22.5" x 18"
30" x 24"
45" x 36"
60" x 48"



M1-5
18" x 18"
24" x 24"
30" x 30"
36" x 36"



M1-5a
18" x 18"
24" x 24"



M1-6
18" x 18"
24" x 24"
36" x 36"



M1-6
22.5" x 18"
30" x 24"
45" x 36"



M3-1
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M3-2
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M3-3
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M3-4
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-1
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-1a
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-2
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-3
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-4
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-5
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-6
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-7
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-7a
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M4-8
12" x 6"
18" x 9"
24" x 12"
30" x 15"



M4-8a
24" x 18"



M4-8b
24" x 12"



M4-9L
30" x 24"
48" x 36"
60" x 48"



M4-9R
30" x 24"
48" x 36"
60" x 48"



M4-9j
30" x 24"
48" x 36"
60" x 48"



M4-9kL
30" x 30"
48" x 42"
60" x 54"



M4-9kR
30" x 30"
48" x 42"
60" x 54"



M4-9mL
30" x 30"
48" x 42"
60" x 54"



M4-9mR
30" x 30"
48" x 42"
60" x 54"



M4-9dL
12" x 18"



M4-9dR
12" x 18"



M4-9e
12" x 18"



M4-9f
12" x 18"



M4-9gL
12" x 18"



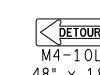
M4-9gR
12" x 18"



M4-9h
12" x 24"



M4-9i
12" x 18"



M4-10L
48" x 18"



M4-10R
48" x 18"



M4-11a
12" x 6"
18" x 9"
24" x 12"
30" x 15"
36" x 18"



M5-1L
12" x 9"
21" x 15"
30" x 21"



M5-1R
12" x 9"
21" x 15"
30" x 21"



M5-2L
12" x 9"
21" x 15"
30" x 21"



M5-2R
12" x 9"
21" x 15"
30" x 21"



M5-3
12" x 9"
21" x 15"
30" x 21"



M6-1L
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-1R
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-2L
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-2R
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-3
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-4
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-5
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-6L
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-6R
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-7L
12" x 9"
18" x 12"
21" x 15"
30" x 21"



M6-7R
12" x 9"
18" x 12"
21" x 15"
30" x 21"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

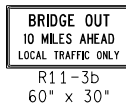
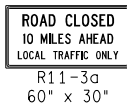
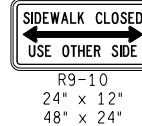
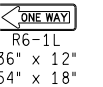
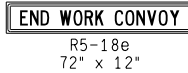
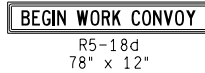
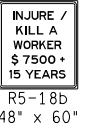
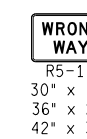
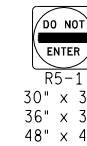
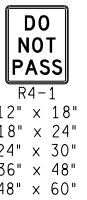
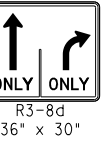
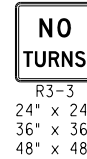
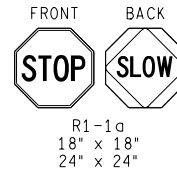
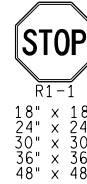
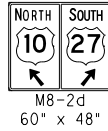
TRAFFIC TYPICALS
SIGN SHEET

DATE:
JUNE 2021

SHEET:

1 OF 5

SIGN NUMBER KEY



SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS



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MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

TRAFFIC TYPICAL SIGN SHEET

DATE: JUNE 2021
SHEET:

SIGN NUMBER KEY



W1-1L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-1R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-2L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-2R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-2bL
36" x 36"
48" x 48"



W1-2bR
36" x 36"
48" x 48"



W1-3L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-3R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4L
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4R
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4bL
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4bR
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4cL
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W1-4cR
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W24-1L
30" x 30"
36" x 36"
48" x 48"

ALL LANES

W24-1cP
24" x 18"
30" x 24"



W24-1R
30" x 30"
36" x 36"
48" x 48"



W24-1aL
30" x 30"
36" x 36"
48" x 48"



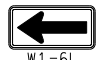
W24-1aR
30" x 30"
36" x 36"
48" x 48"



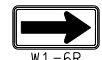
W24-1bL
30" x 30"
36" x 36"
48" x 48"



W24-1bR
30" x 30"
36" x 36"
48" x 48"



W1-6L
24" x 12"
36" x 18"
48" x 24"
60" x 30"
96" x 48"



W1-6R
24" x 12"
36" x 18"
48" x 24"
60" x 30"
96" x 48"



W1-8L
12" x 18"
18" x 24"
24" x 30"
30" x 36"
36" x 48"



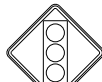
W1-8R
12" x 18"
18" x 24"
24" x 30"
30" x 36"
36" x 48"



W3-1
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W3-2
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W3-3
18" x 18"
30" x 30"
36" x 36"
48" x 48"



W3-4
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W3-4b
30" x 30"
36" x 36"
48" x 48"



W3-5
36" x 36"
48" x 48"



W3-5a
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W3-5b
30" x 30"
36" x 36"
48" x 48"



W4-1L
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-1R
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-2L
30" x 30"
36" x 36"
48" x 48"



W4-2R
30" x 30"
36" x 36"
48" x 48"



W4-3L
30" x 30"
36" x 36"
48" x 48"



W4-3R
30" x 30"
36" x 36"
48" x 48"



W4-5L
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-5R
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-5P
18" x 24"
24" x 30"



W4-6L
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-6R
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W4-7L
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W4-7R
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W5-1
30" x 30"
36" x 36"
48" x 48"



W5-2
18" x 18"
30" x 30"
36" x 36"
48" x 48"



W5-3
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W5-4
30" x 30"
36" x 36"
48" x 48"



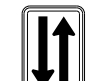
W6-1
30" x 30"
36" x 36"
48" x 48"



W6-2
30" x 30"
36" x 36"
48" x 48"



W6-3
30" x 30"
36" x 36"
48" x 48"



W6-4
12" x 18"



W7-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W7-1a
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-1
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS



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MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

TRAFFIC TYPICAL
SIGN SHEET

DATE:
JUNE 2021

SHEET:

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SIGN NUMBER KEY



W8-2
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-3
18" x 18"
30" x 30"
36" x 36"
48" x 48"



W8-4
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-5
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-5P
24" x 18"
30" x 24"
36" x 30"



W8-7
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-8
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-9
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-11
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-12
30" x 30"
36" x 36"
48" x 48"



W8-14
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-15
24" x 24"
30" x 30"
36" x 36"
48" x 48"



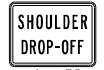
W8-15P
24" x 18"
30" x 24"
36" x 30"



W8-17L
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-17R
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-17P
24" x 18"
30" x 24"
36" x 30"



W8-18
24" x 24"
36" x 36"
48" x 48"



W8-23
24" x 24"
36" x 36"
48" x 48"



W8-24
30" x 30"
36" x 36"
48" x 48"



W8-25
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W8-26
36" x 36"
48" x 48"



W9-1L
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W9-1R
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W9-2L
30" x 30"
36" x 36"
48" x 48"



W9-2R
30" x 30"
36" x 36"
48" x 48"



W9-3C
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W9-3L
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W9-3R
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W9-3a
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W9-3b
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W11-10
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W11-10a
30" x 30"
36" x 36"
48" x 48"



W11-24
36" x 36"
48" x 48"



W12-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"



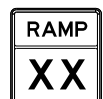
W12-2
18" x 18"
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W13-1P
18" x 18"
24" x 24"
30" x 30"



W13-2
24" x 30"
36" x 48"
48" x 60"



W13-3
24" x 30"
36" x 48"
48" x 60"



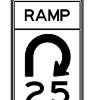
W13-4P
24" x 24"
36" x 36"



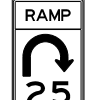
W13-6
24" x 42"
36" x 60"
48" x 84"



W13-6a
24" x 42"
36" x 60"
48" x 84"



W13-7
24" x 42"
36" x 60"
48" x 84"



W13-7a
24" x 42"
36" x 60"
48" x 84"



W14-3
36" x 24"
40" x 30"
48" x 36"
64" x 48"



W16-2P
18" x 12"
24" x 18"
30" x 24"



W16-4aP
18" x 12"
24" x 18"
30" x 24"
36" x 30"



W16-12P
24" x 18"



W16-13P
24" x 18"
30" x 24"



W20-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-1a
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-1b
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-1c
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-1d
24" x 24"
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W20-2
30" x 30"
36" x 36"
48" x 48"



W20-3
30" x 30"
36" x 36"
48" x 48"



W20-3a
30" x 30"
36" x 36"
48" x 48"

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS



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MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

TRAFFIC TYPICALS
SIGN SHEET

DATE:
JUNE 2021

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SIGN NUMBER KEY



W20-3b
30" x 30"
36" x 36"
48" x 48"



W20-4
30" x 30"
36" x 36"
48" x 48"



W20-4c
36" x 36"
48" x 48"



W20-5C
30" x 30"
36" x 36"
48" x 48"



W20-5L
30" x 30"
36" x 36"
48" x 48"



W20-5L1
30" x 30"
36" x 36"
48" x 48"



W20-5L2
30" x 30"
36" x 36"
48" x 48"



W20-5R
30" x 30"
36" x 36"
48" x 48"



W20-5R1
30" x 30"
36" x 36"
48" x 48"



W20-5R2
30" x 30"
36" x 36"
48" x 48"



W20-5aL2
30" x 30"
36" x 36"
48" x 48"



W20-5aL3
30" x 30"
36" x 36"
48" x 48"



W20-5aR2
30" x 30"
36" x 36"
48" x 48"



W20-5aR3
30" x 30"
36" x 36"
48" x 48"



W20-7a
30" x 30"
36" x 36"
48" x 48"



W20-8
24" x 18"



W20-9
54" x 48"



W20-10
48" x 24"
66" x 30"



W20-11
12" x 18"



W20-12P
VARIABLE x 12"



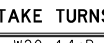
W20-13P
VARIABLE x 12"



W20-14L
36" x 36"
48" x 48"



W20-14R
36" x 36"
48" x 48"



W20-14dP
36" x 12"
48" x 12"



W20-14bP
36" x 12"
48" x 12"



W20-15
36" x 36"
48" x 48"



W20-15a
36" x 36"
48" x 48"



W20-15c
48" x 54"



W20-15d
48" x 54"



W20-16
36" x 36"
48" x 48"



W20-17
36" x 36"
48" x 48"



W21-1
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-2
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-2
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-3
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-4
36" x 18"



W21-5
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-5dL
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W21-5dR
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W21-5bL
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W21-5bR
30" x 30"
36" x 36"
48" x 48"
60" x 60"



W21-6
24" x 24"
30" x 30"
36" x 36"
48" x 48"



W21-7
30" x 30"
36" x 36"
48" x 48"



W21-8
30" x 30"
36" x 36"
48" x 48"



W22-1
30" x 30"
36" x 36"
48" x 48"



W22-2
42" x 36"



W22-3
36" x 30"
42" x 36"



W23-1
48" x 24"



W23-2
36" x 36"
48" x 48"

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MAINTAINING TRAFFIC TYPICAL

NO:

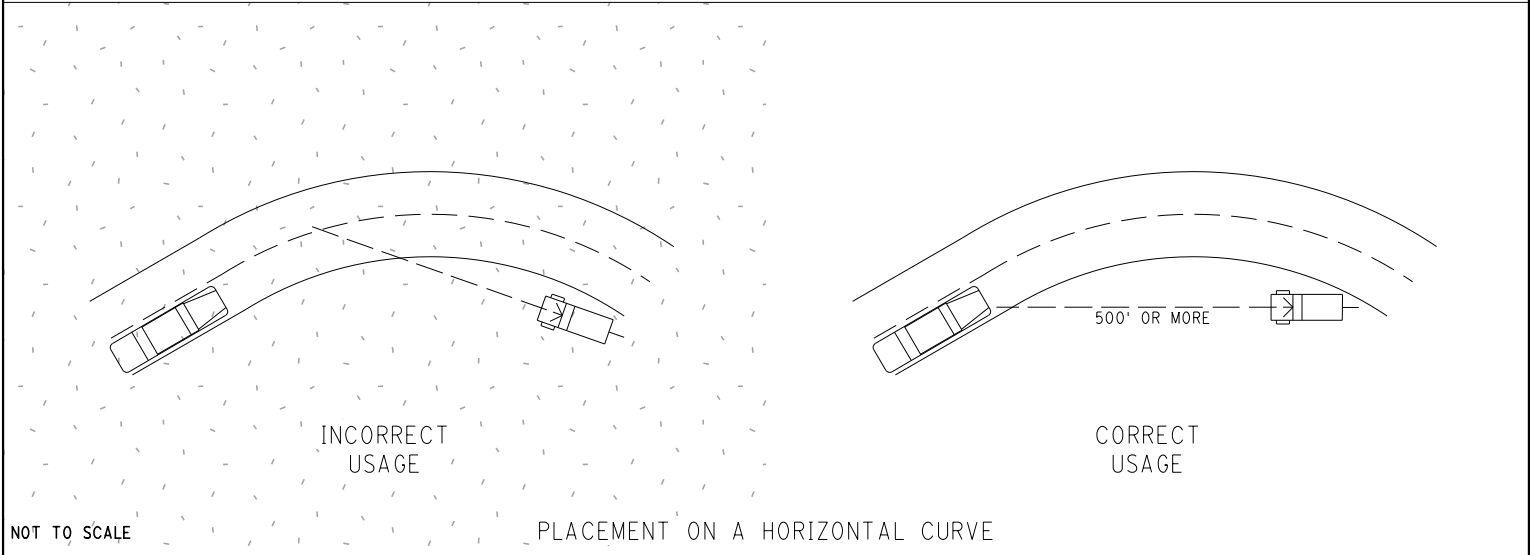
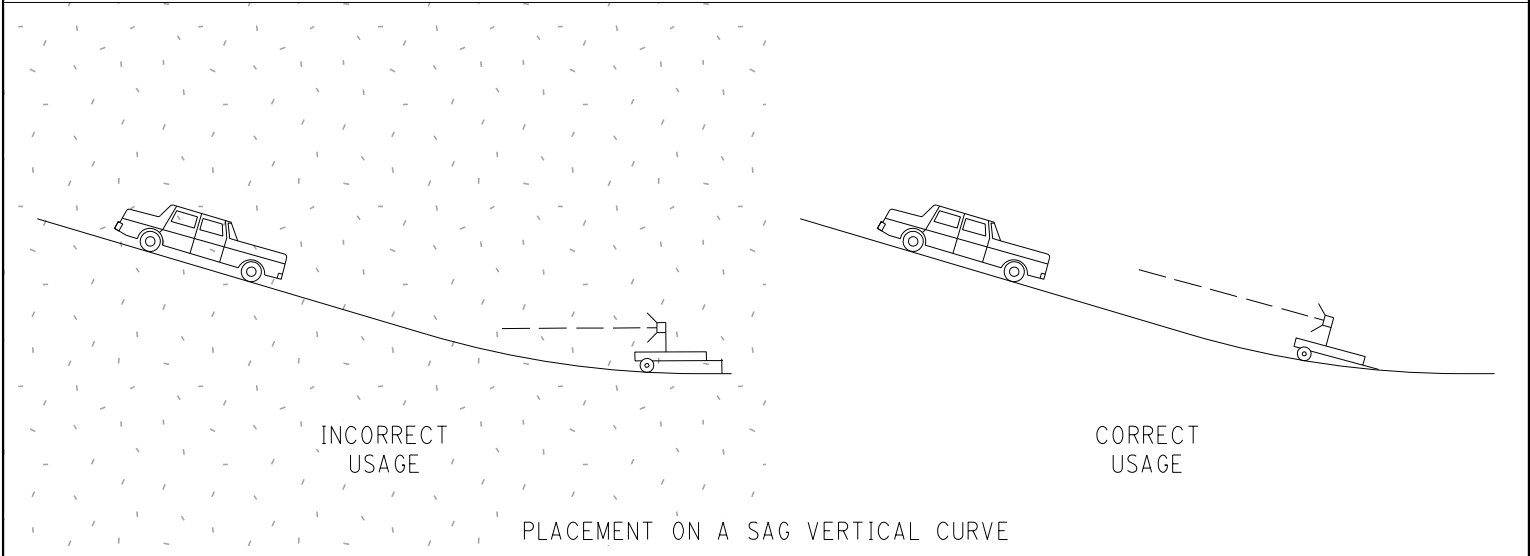
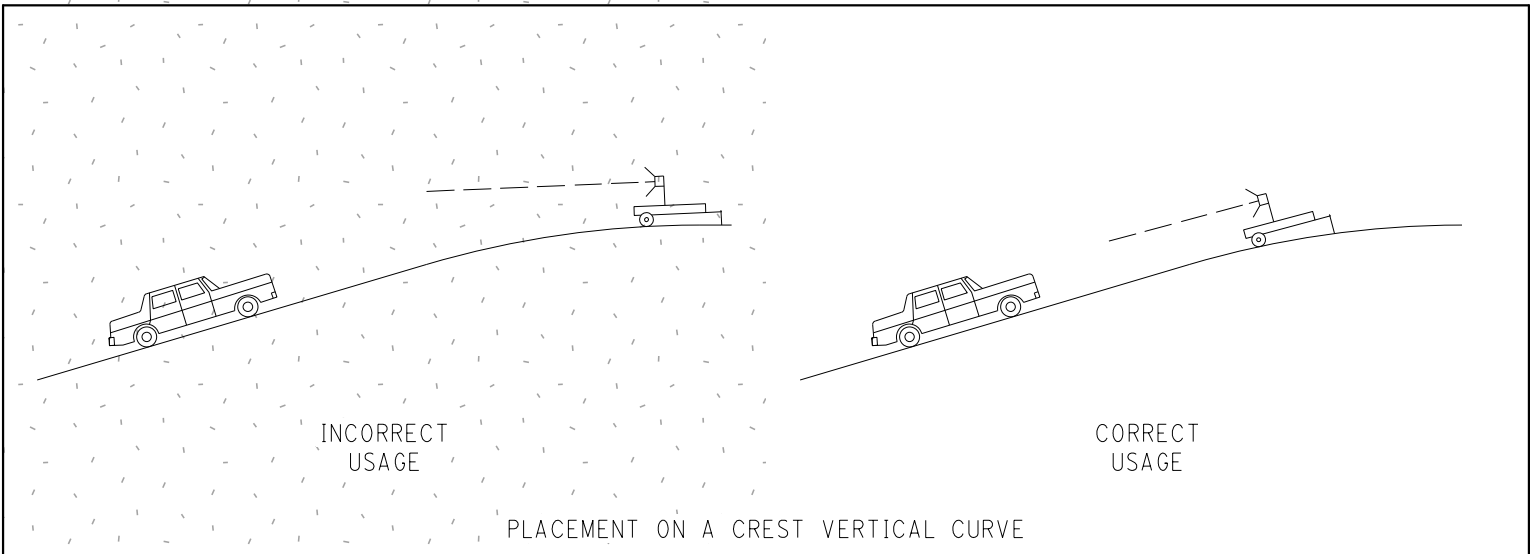
103-GEN-SIGN

TRAFFIC TYPICAL
SIGN SHEET

DATE:
JUNE 2021

SHEET:

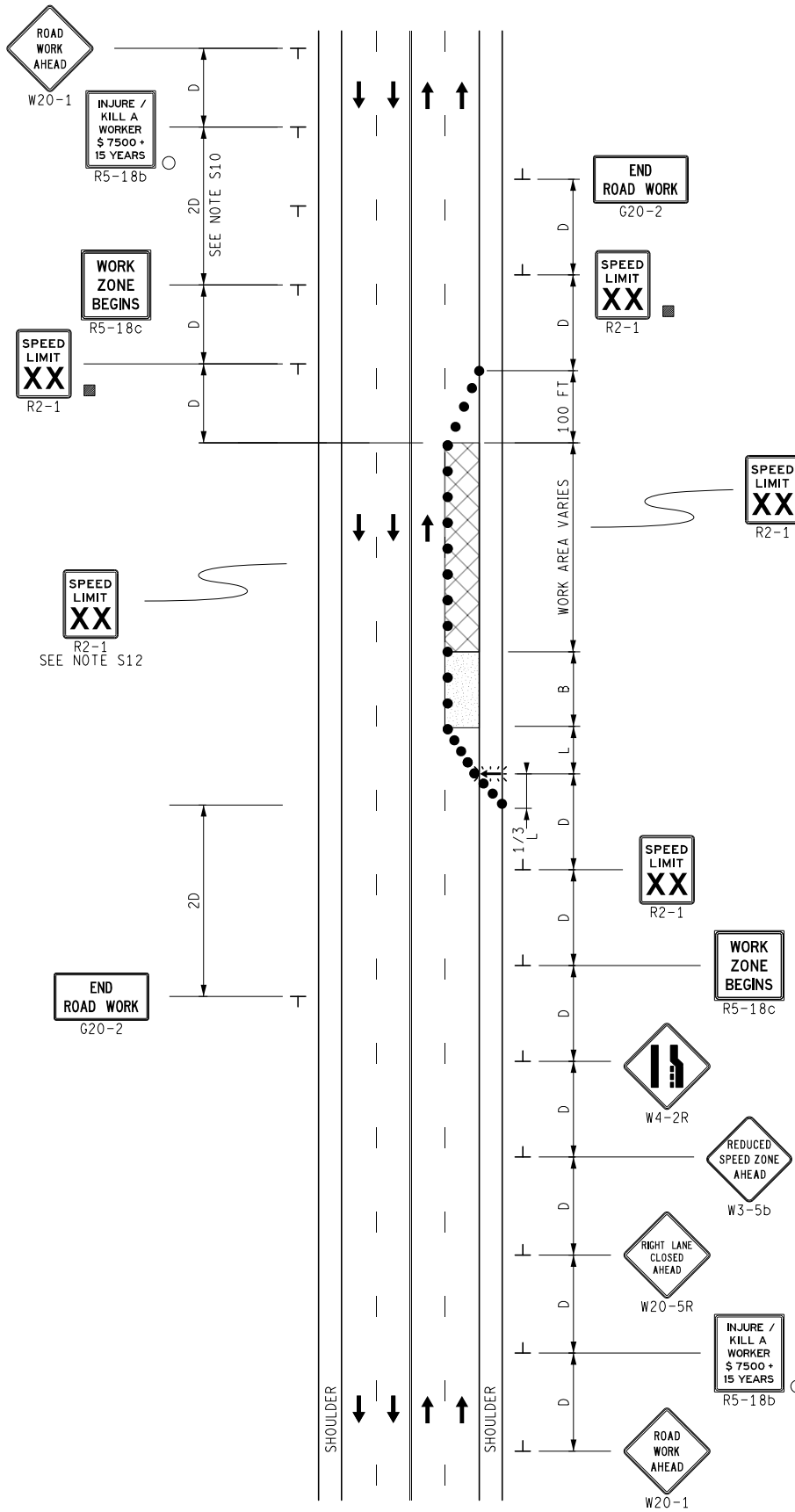
5 OF 5



NOTE:

ENSURE THE ARROW REMAINS CLEARLY LEGIBLE AT DISTANCES FROM 2,500 FEET TO 200 FEET, FROM ALL TRAFFIC LANES AND ROADWAY ENTRANCES. DO NOT PLACE THE LIGHTED ARROW ON A HORIZONTAL OR VERTICAL CURVE THAT MIGHT INTERFERE WITH THIS LEGIBILITY REQUIREMENT.

	NOT TO SCALE	MAINTAINING TRAFFIC TYPICAL	USE OF ARROW BOARD ON HILL OR CURVE AND WORK ZONE LAYOUT	DATE: MAY 2021
		NO: 104-GEN-AB		SHEET:
FILE: 104-GEN-AB.dgn				1 OF 1



KEY

- CHANNELIZING DEVICES
- ⚡ LIGHTED ARROW PANEL
- ← TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S5
- PLACE SIGN AS INDICATED IN NOTE S2

STANDARD NOTES

(SEE 102-GEN-NOTES)

GENERAL: G1, G2, G3, G4
 SIGNING: S1, S2, S3, S5, S10, S12
 DEVICES: TCD1, TCD2, TCD6



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO: 123-NFW-1LC-(R)

1 RIGHT LANE CLOSURE
 ON A 4-LANE UNDIVIDED ROADWAY

DATE: MAY 2021
 SHEET:

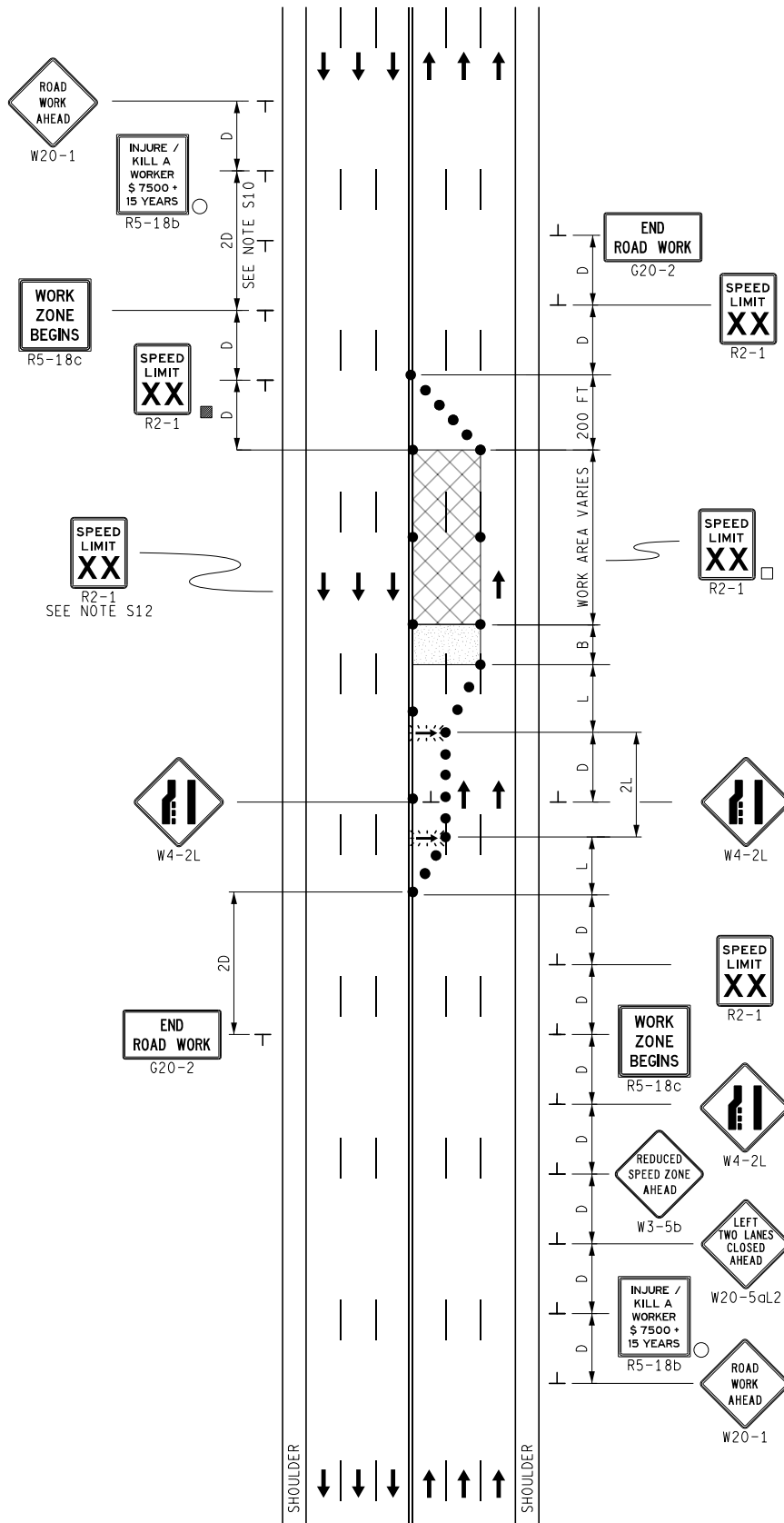
KEY

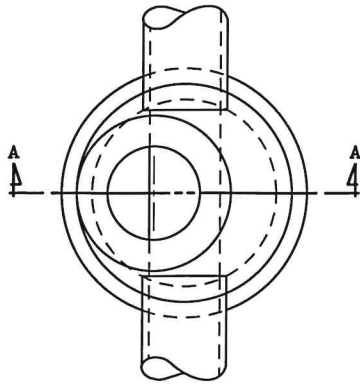
- CHANNELIZING DEVICES
- ⚡ LIGHTED ARROW PANEL
- ← TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT
- PLACE SIGN AS INDICATED IN NOTE S5
- PLACE SIGN AS INDICATED IN NOTE S2

STANDARD NOTES

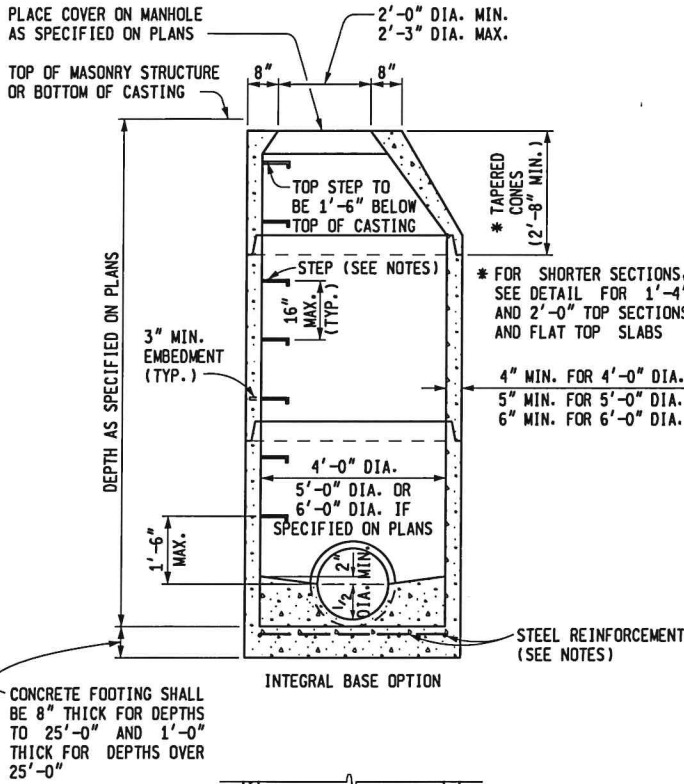
(SEE 102-GEN-NOTES)

GENERAL: G1, G2, G3, G4
 SIGNING: S1, S2, S3, S5, S10, S12
 DEVICES: TCD1, TCD2, TCD6



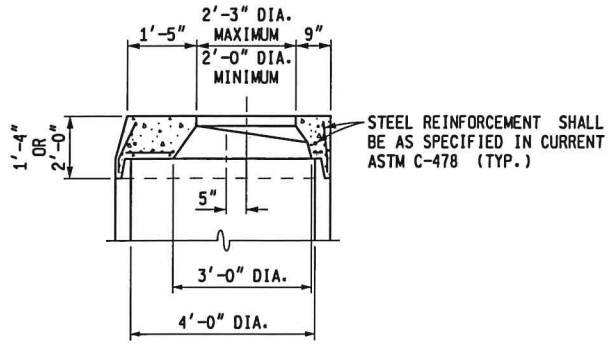


PLAN VIEW



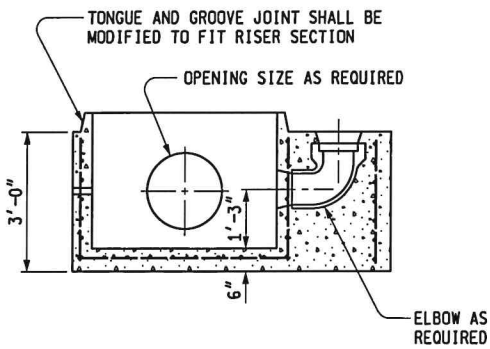
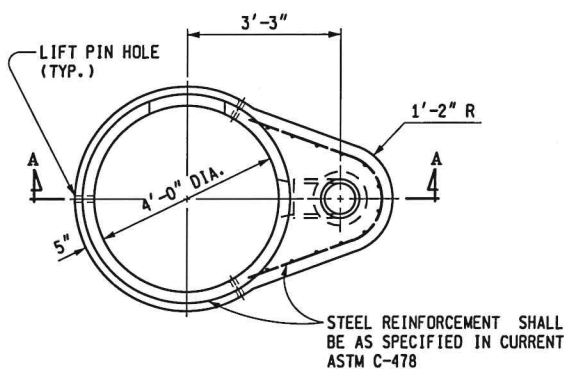
SECTION A - A
TYPICAL MANHOLE

PRECAST REINFORCED CONCRETE SHOWN
OTHER OPTIONS INCLUDE CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE WALL SECTIONS
SEE TYPICAL WALL SECTIONS FOR WALL THICKNESS



DETAIL FOR
1'-4" & 2'-0" TOP SECTIONS

SHAPE MAY VARY FROM DETAIL SHOWN BUT MUST COMPLY WITH ASTM C-478 AND JOINTS SHALL BE COMPATIBLE WITH THE RISER



SECTION A - A

TYPICAL PRECAST REINFORCED
BOTTOM SECTION FOR DROP MANHOLE



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Paul C. Ajegba

APPROVED BY: Gregg Brunner, P.E. Gregg Brunner
Sep 19 2019 2:17 PM
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: Bradley C. Wieferich Bradley C. Wieferich
Sep 19 2019 11:22 AM
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

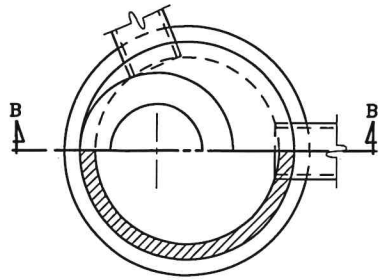
DRAINAGE STRUCTURES

5-18-2020
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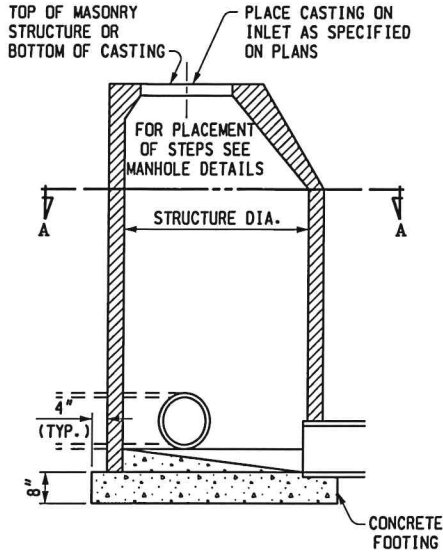
9-19-2019
PLAN DATE

R-1-G

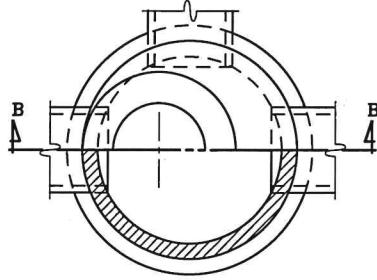
SHEET
1 OF 9



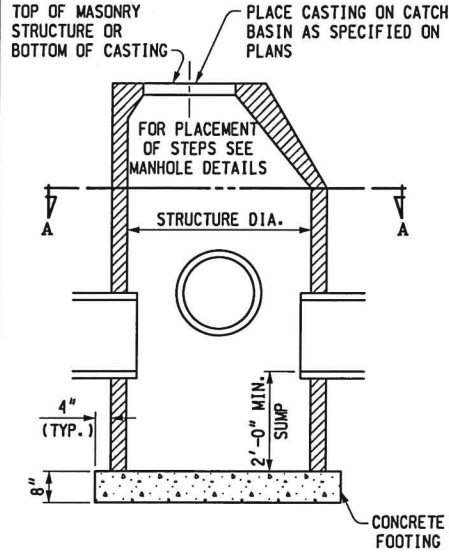
HALF SECTION A - A



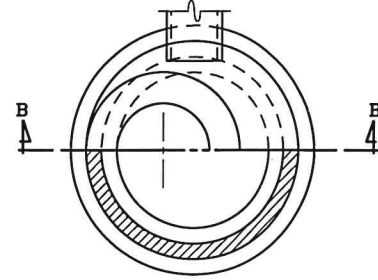
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
INLET



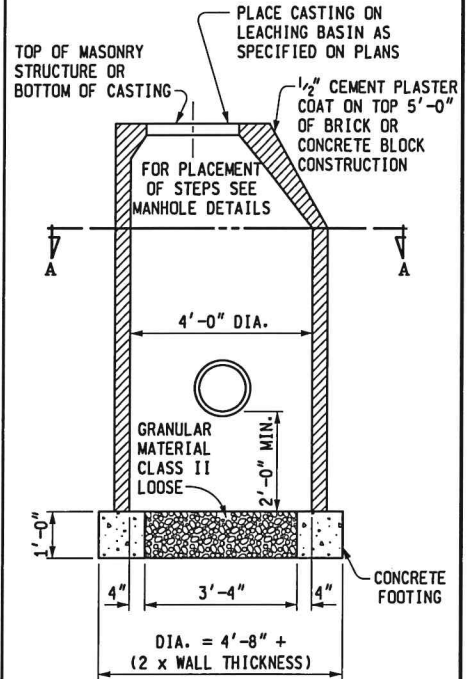
HALF SECTION A - A



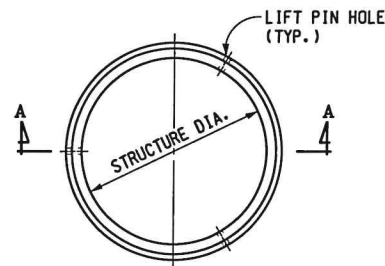
SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS
SECTION B - B
CATCH BASIN



HALF SECTION A - A



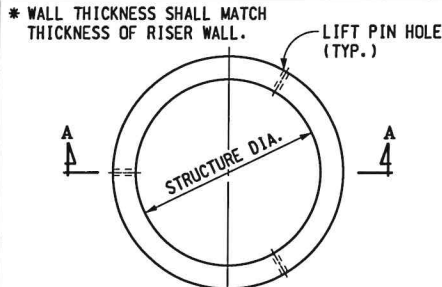
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
LEACHING BASIN



SECTION A - A

SEE MANHOLE DETAILS FOR SIZE AND BASE OPTIONS

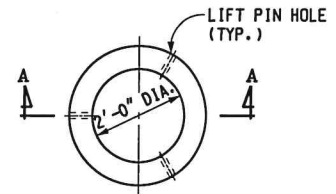
PRECAST SUMP FOR PRECAST RISERS



SECTION A - A

SEE TYPICAL BRICK AND BLOCK SECTION FOR SIZE AND BASE OPTIONS

PRECAST SUMP FOR BRICK OR BLOCK CONSTRUCTION



SECTION A - A

PRECAST SUMP FOR 2'-0" DIA. STRUCTURES

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

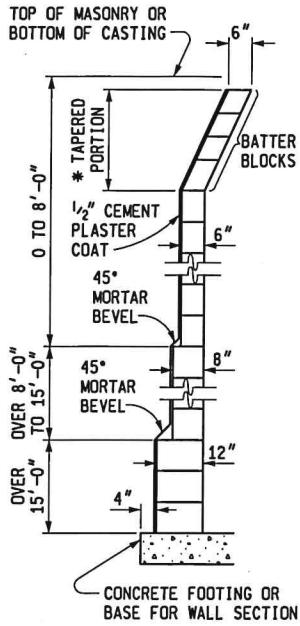
5-18-2020
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9-19-2019
PLAN DATE

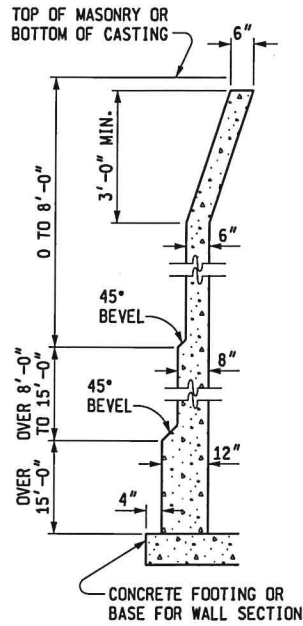
R-1-G

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2 OF 9

* 4 BLOCK MIN. FOR 4'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 5'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 6'-0" DIA. STRUCTURE

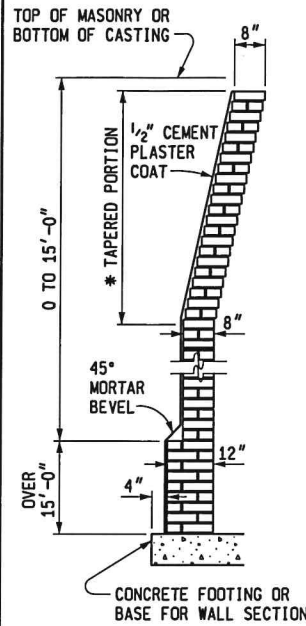


TYPICAL
 CONCRETE BLOCK
 WALL SECTION

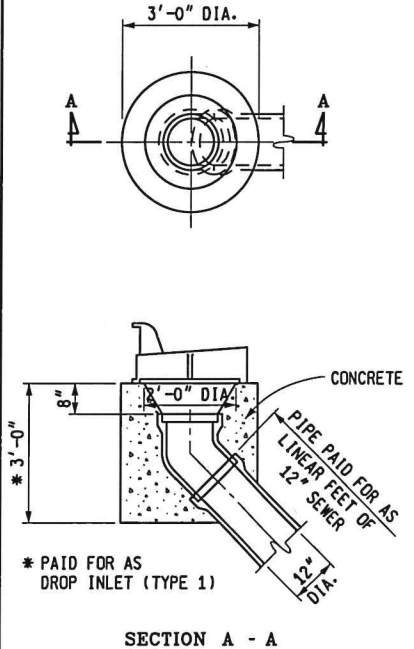


TYPICAL
 CAST-IN-PLACE
 CONCRETE
 WALL SECTION

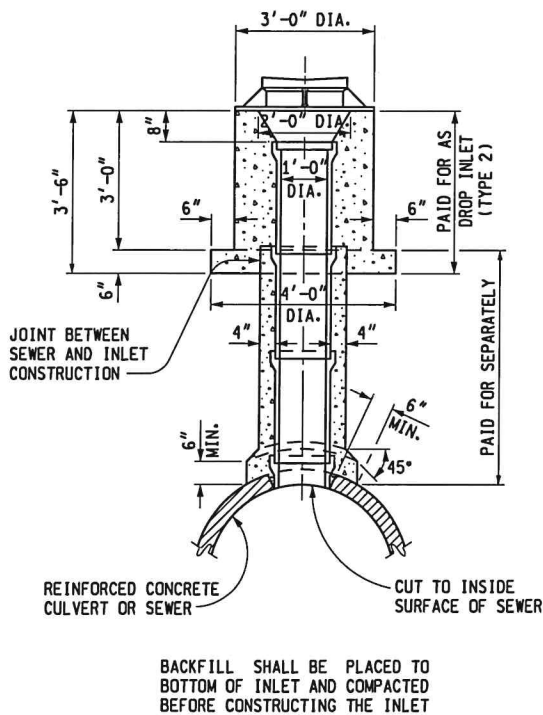
* 5'-0" MIN. FOR 4'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 5'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 6'-0" DIA. STRUCTURE



TYPICAL BRICK
 WALL SECTION

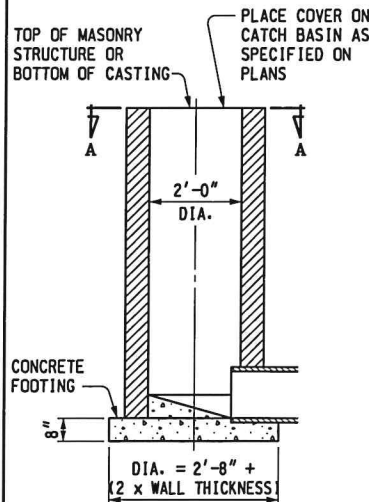
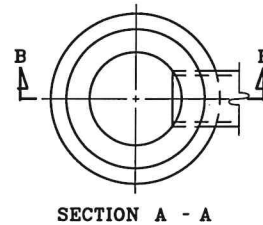


SECTION A - A
 DROP INLET (TYPE 1)

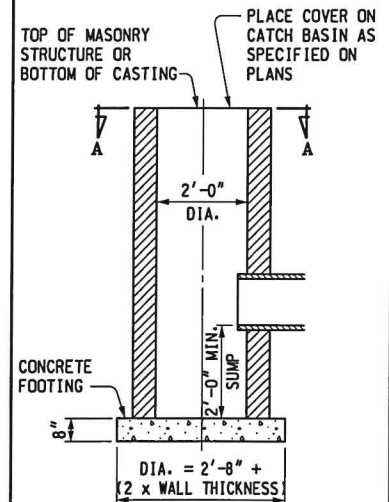
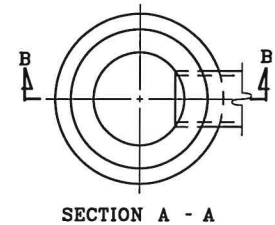


DROP INLET (TYPE 2)

BACKFILL SHALL BE PLACED TO
 BOTTOM OF INLET AND COMPACTED
 BEFORE CONSTRUCTING THE INLET



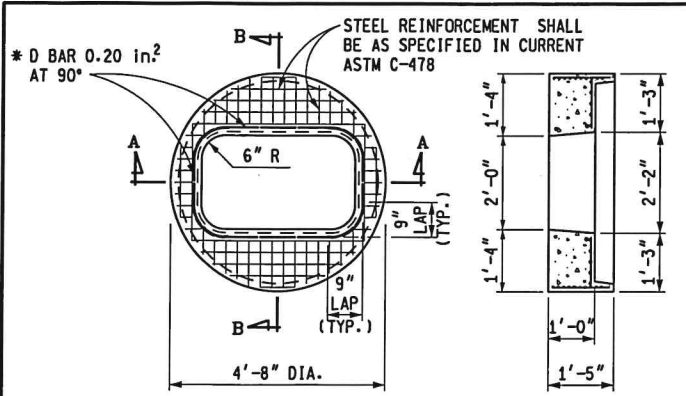
SECTION B - B
 INLET



SECTION B - B
 CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

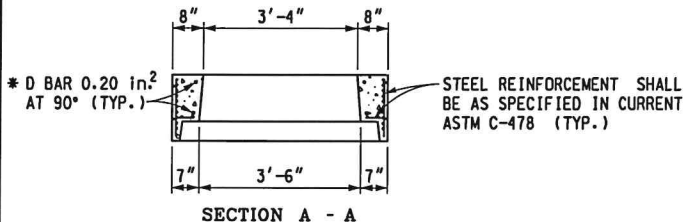


* D BAR 0.20 in² AT 90°

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478

SECTION B - B

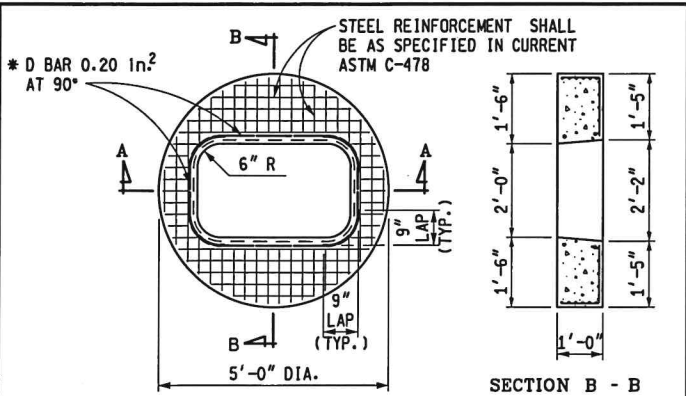
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



SECTION A - A

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478 (TYP.)

PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING

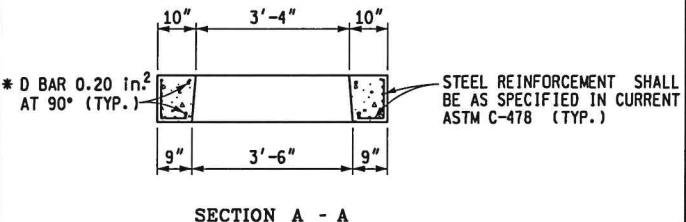


* D BAR 0.20 in² AT 90°

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478

SECTION B - B

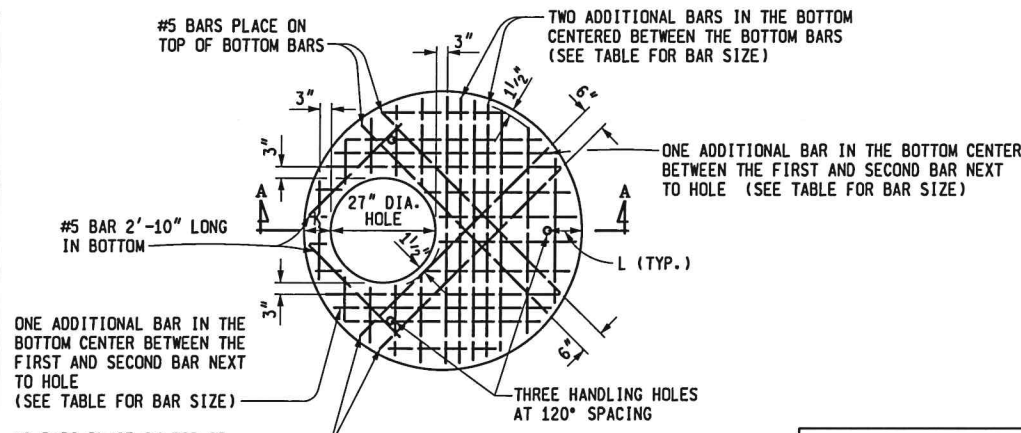
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



SECTION A - A

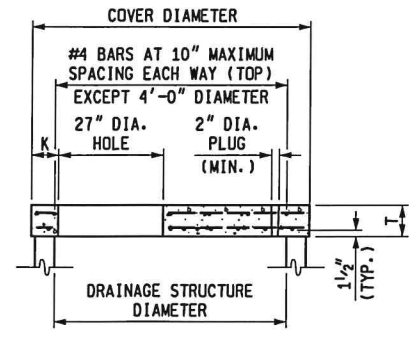
STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478 (TYP.)

PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING



PLAN (SHOWING BOTTOM LAYER OF REINFORCEMENT)

THREE HANDLING HOLES AT 120° SPACING



SECTION A - A

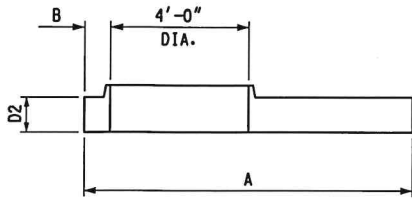
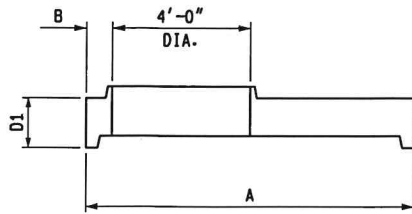
PRECAST REINFORCED CONCRETE FLAT SLAB TOP

TABLE OF DIMENSIONS					
STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	BAR MAXIMUM SPACING (BOTTOM EACH WAY)
* 4'-0"	58"	6"	6"	8"	#5 AT 6"
5'-0"	72"	8"	7"	9"	#5 AT 7"
6'-0"	86"	8"	8"	10"	#5 AT 6"
7'-0"	101 1/2"	12"	8 3/4"	11"	#5 AT 5"
8'-0"	114"	12"	9"	11"	#5 AT 6"
9'-0"	128"	12"	10"	12"	#5 AT 6"
10'-0"	140"	12"	10"	13"	#5 AT 6"

* ONLY BOTTOM LAYERS OF STEEL NECESSARY

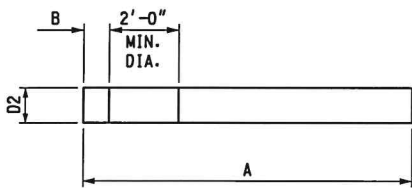
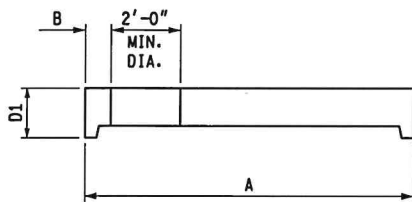
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES



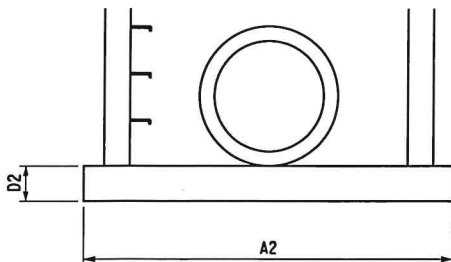
PRECAST REDUCER CAP

REDUCER CAP DIMENSIONS				
STRUCTURE DIAMETER	CAP DIAMETER "A"	B	CAP DEPTH "D1"	CAP DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"



PRECAST FLAT SLAB TOP

FLAT SLAB TOP DIMENSIONS				
STRUCTURE DIAMETER	COVER DIAMETER "A"	B	COVER DEPTH "D1"	COVER DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"



SEPARATE BASE OPTION

BASE AND RISER DIMENSIONS					
STRUCTURE DIAMETER	BASE DIAMETER "A1"	BASE DIAMETER "A2"	MIN. WALL THICKNESS "T"	BASE DEPTH "D1"	BASE DEPTH "D2"
7'-0"	101 1/2"	108"	7"	8"	12"
8'-0"	114"	128"	8"	8"	12"
9'-0"	128"	140"	9"	8"	12"
10'-0"	140"	154"	10"	8"	12"

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

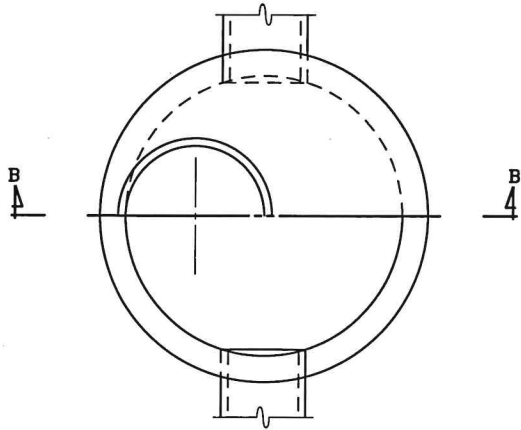
DRAINAGE STRUCTURES

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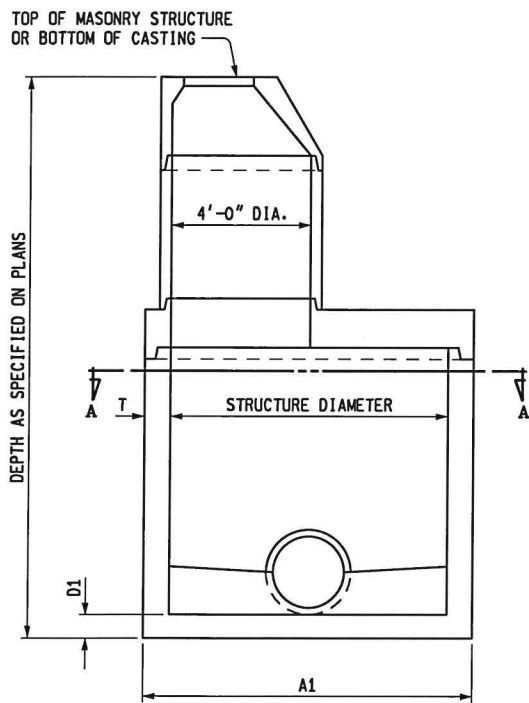
9-19-2019
PLAN DATE

R-1-G

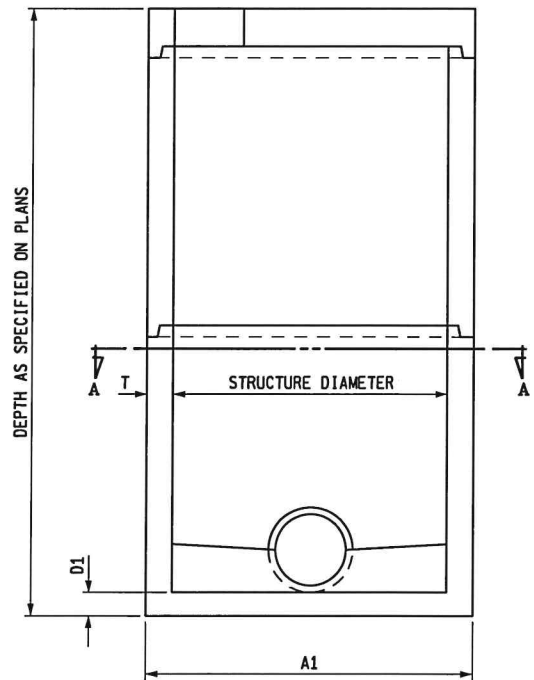
SHEET
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HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST MANHOLE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

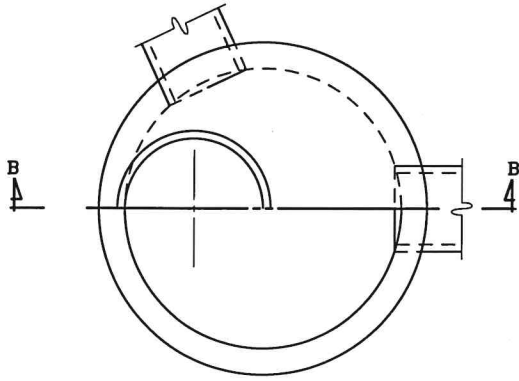
DRAINAGE STRUCTURES

5-18-2020
F.H.W.A. APPROVAL

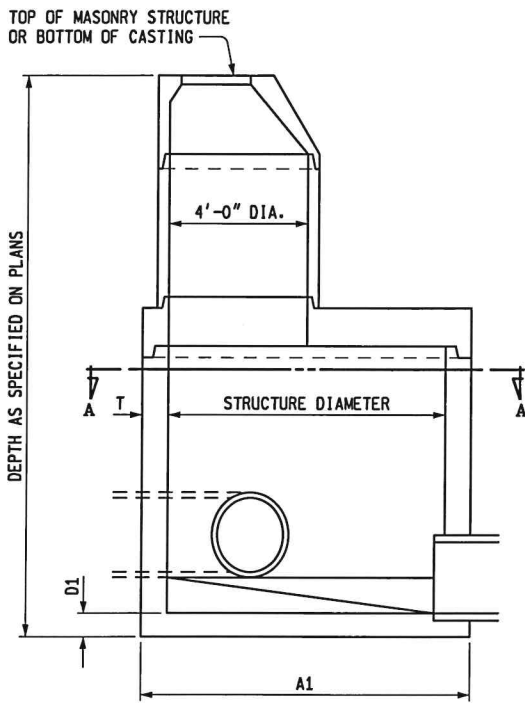
9-19-2019
PLAN DATE

R-1-G

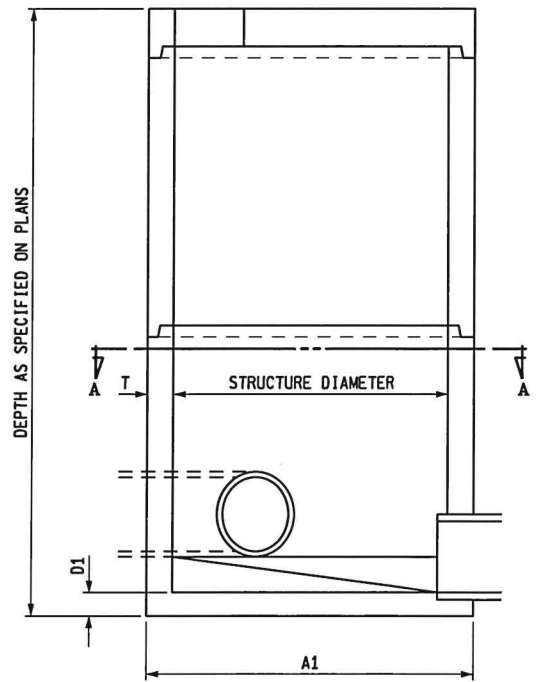
SHEET
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HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



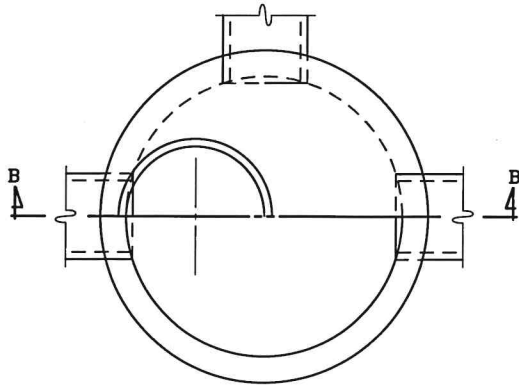
SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST INLET

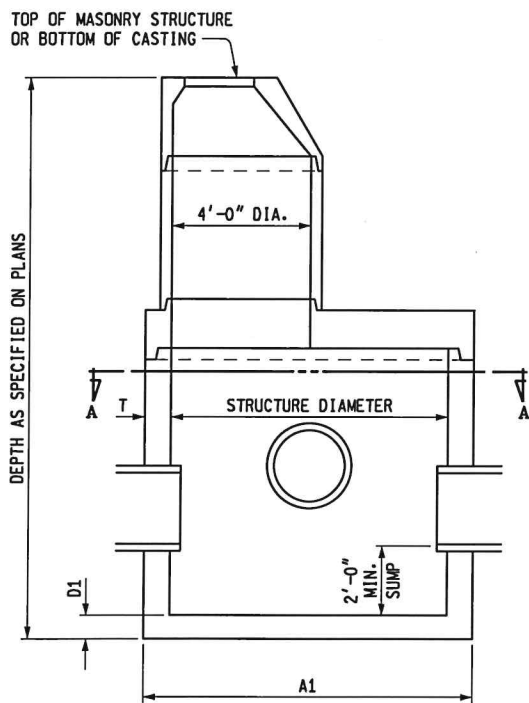
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

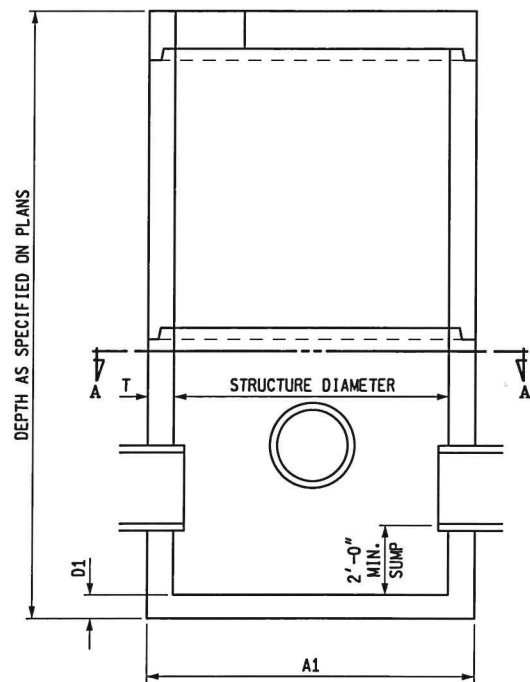
5-18-2020 F.H.W.A. APPROVAL	9-19-2019 PLAN DATE	R-1-G	SHEET 7 OF 9
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HALF SECTION A - A



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

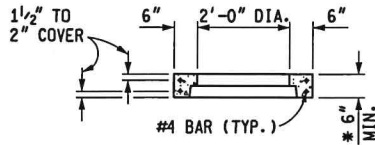
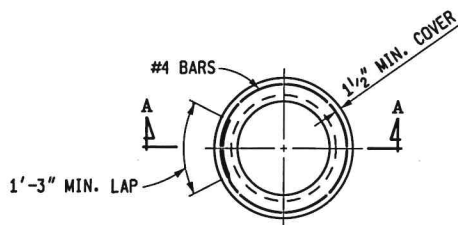
DRAINAGE STRUCTURES

5-18-2020
F.H.W.A. APPROVAL

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SECTION A - A

* WHEN RISER TONGUE LENGTH IS GREATER THAN 3", USE 2 TIMES THE TONGUE LENGTH.

NOTE: PRECAST RISER SHALL FULLY ENGAGE THE TONGUE OF THE RISER PIPE.

PRECAST RISER RING (FOR 2'-0" DIAMETER STRUCTURE)

NOTES:

THE DRAINAGE STRUCTURE COVERS ALLOWED FOR USE ON THESE DRAINAGE STRUCTURES ARE SPECIFIED IN SUBSEQUENT STANDARD PLANS AND ARE INTERCHANGEABLE ON ANY STRUCTURE.

THE TOPS OF MASONRY STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE USING MORTAR OR BRICK AS DIRECTED BY THE ENGINEER.

PREMIUM JOINTS ARE REQUIRED ON ALL SANITARY MANHOLES. SEE ASTM DESIGNATION C-923.

GRANULAR MATERIAL CLASS III SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1:1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB.

STEPS FOR DRAINAGE STRUCTURES SHALL BE OF AN APPROVED DESIGN AND MADE FROM CAST IRON, ALUMINUM, OR PLASTIC COATED STEEL. RUNGS SHALL BE A MINIMUM OF 10" IN CLEAR LENGTH, DESIGNED TO PREVENT THE FOOT FROM SLIPPING OFF THE END. THE MINIMUM HORIZONTAL PULL OUT LOAD SHALL BE 400 LBS. THE MINIMUM VERTICAL LOAD SHALL BE 800 LBS.

THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THROUGH THE WALL OF THE MANHOLE.

PRECAST CONCRETE SECTIONS, SUMPS, BASE SECTIONS, AND FLAT TOP SLABS SHALL BE BUILT ACCORDING TO CURRENT ASTM C-478 AND ACCORDING TO DETAILS SPECIFIED ON THIS PLAN. PRECAST REINFORCED CONCRETE FLAT TOP SLAB SHALL BE MARKED TO SHOW LOCATION OF REINFORCEMENT. THE WALLS OF THE PRECAST UNITS MAY HAVE A SLIGHT TAPER TO ALLOW FOR FORM REMOVAL. PRECAST CONCRETE 2'-0" DIAMETER DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 3" WALL THICKNESS WITH A 6" MINIMUM BEARING SURFACE ON TOP. SEE PRECAST RISER RING FOR 2'-0" DIAMETER STRUCTURE.

THE MAXIMUM INSIDE DIAMETER OF PIPES ENTERING OR LEAVING PRECAST DRAINAGE STRUCTURES SHALL BE 2'-0" LESS THAN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE. A PIPE LEAVING A 2'-0" DIAMETER DRAINAGE STRUCTURE IS ALLOWED TO HAVE 1'-0" INSIDE DIAMETER OR LESS.

THE NUMBER OF PIPE OPENINGS IN A RISER SHALL BE DETERMINED BY THE DESIGNER. SPACING BETWEEN OPENINGS SHALL BE 1'-0" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING OR SCRIBING IN PRECAST STRUCTURES DURING FABRICATION OR BY CORING THE CURED CONCRETE.

PRECAST CONCRETE FOOTINGS OR BASES SHALL BE REINFORCED WITH #4 BARS SPACED AT 1'-0" BOTH WAYS OR WITH TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED.

PRECAST CONCRETE FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.

THE MINIMUM WALL THICKNESS FOR ALL 2'-0", 4'-0", 5'-0", AND 6'-0" DRAINAGE STRUCTURES USING CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE CONCRETE SHALL BE AS SPECIFIED IN TYPICAL WALL SECTIONS.

THE CONICAL SECTION OF MANHOLES OR CATCH BASINS CONSTRUCTED OF BLOCK OR BRICK SHALL BE SHROUDED WITH GEOTEXTILE FABRIC TO A MINIMUM DEPTH OF 5'-0" OR THROUGH THE FROST ZONE. ENOUGH GEOTEXTILE MATERIAL SHALL BE LEFT ON THE TOP (8" OR MORE) TO ROLL OVER THE TOP OF THE CONE.

PREFORMED HIGH DENSITY POLYSTYRENE FILLER PIECES MAY BE USED TO CHANNEL FLOW IN THE BOTTOM OF MANHOLES PROVIDED THEY HAVE AT LEAST 2" OF CONCRETE COVER. THE USE OF THIS MATERIAL FOR CHANNEL FLOW IS RESTRICTED TO MANHOLES WHERE THE BOTTOM SECTION IS NOT SUBJECT TO FREEZING. THE USE OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

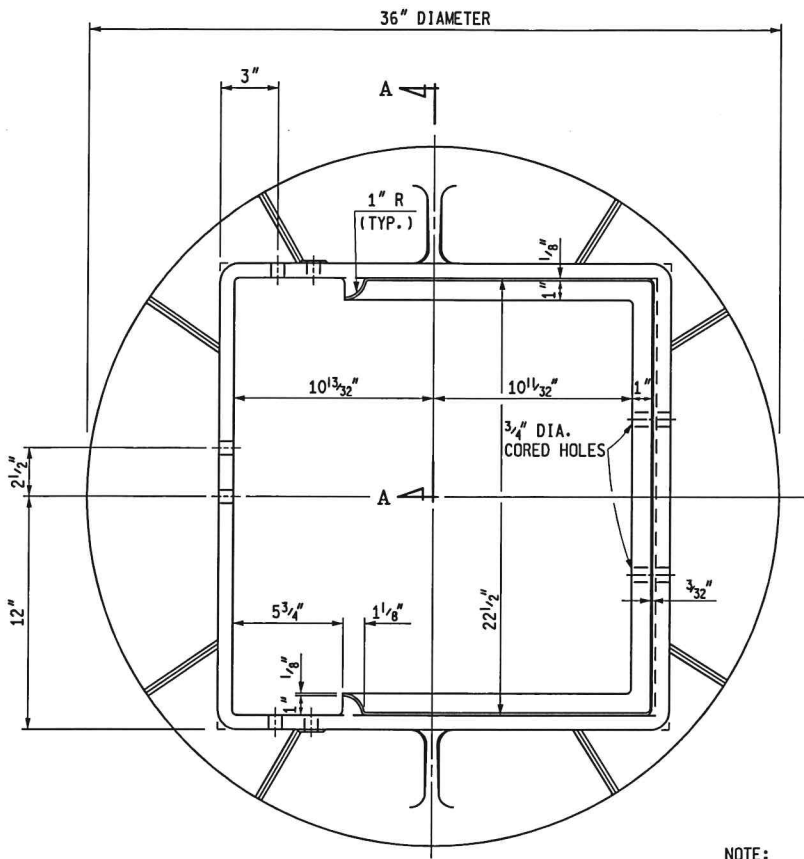
DRAINAGE STRUCTURES

5-18-2020
F.H.W.A. APPROVAL

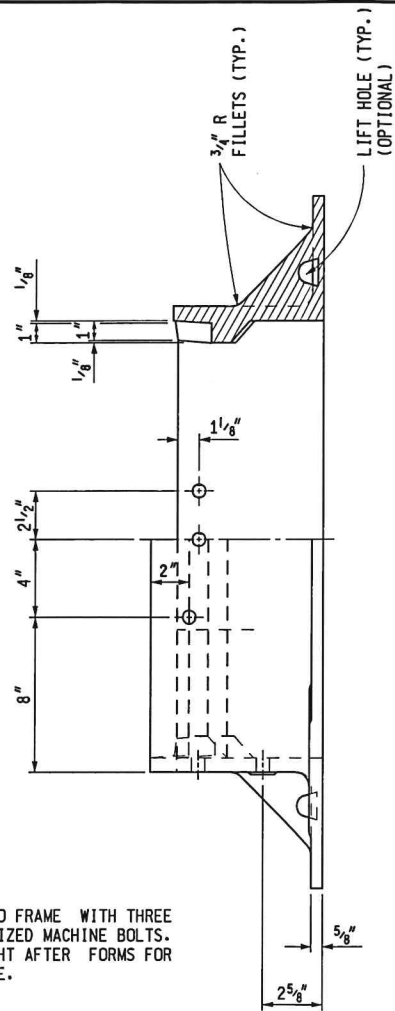
9-19-2019
PLAN DATE

R-1-G

SHEET
9 OF 9



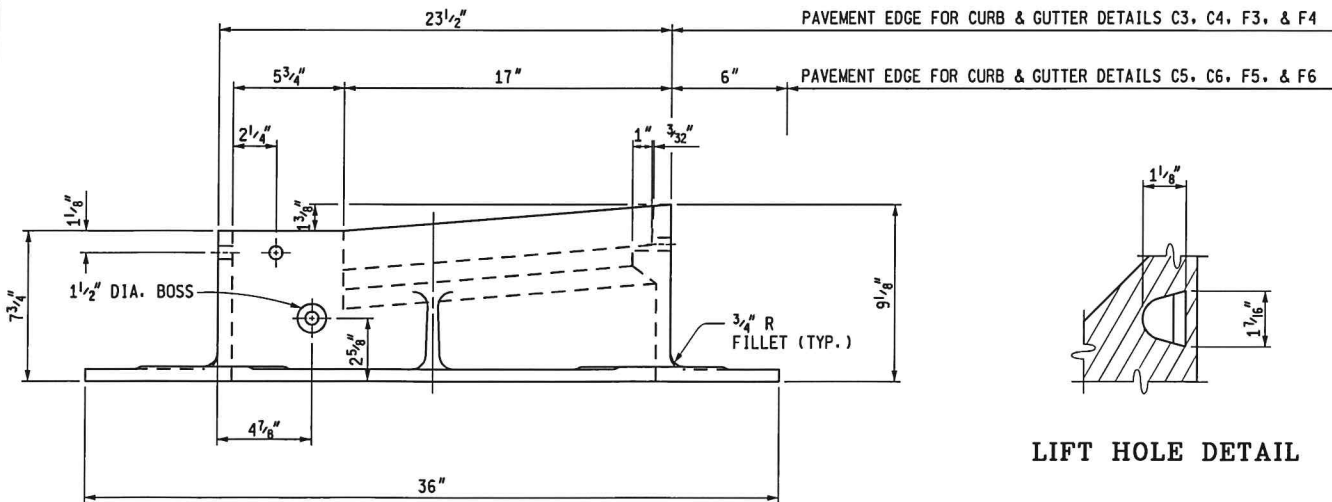
PLAN VIEW OF FRAME



SECTION A - A
OF FRAME

HALF FRONT ELEVATION
OF FRAME

NOTE:
BOLT CURB BOX TO FRAME WITH THREE
5/8" x 2 1/2" GALVANIZED MACHINE BOLTS.
ADJUST FOR HEIGHT AFTER FORMS FOR
CURB ARE IN PLACE.



SIDE ELEVATION OF FRAME

LIFT HOLE DETAIL

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Paul C. Ajegba

APPROVED BY: Gregg Brunner, P.E.
DIRECTOR, BUREAU OF FIELD SERVICES
Oct 14 2021 12:31 PM

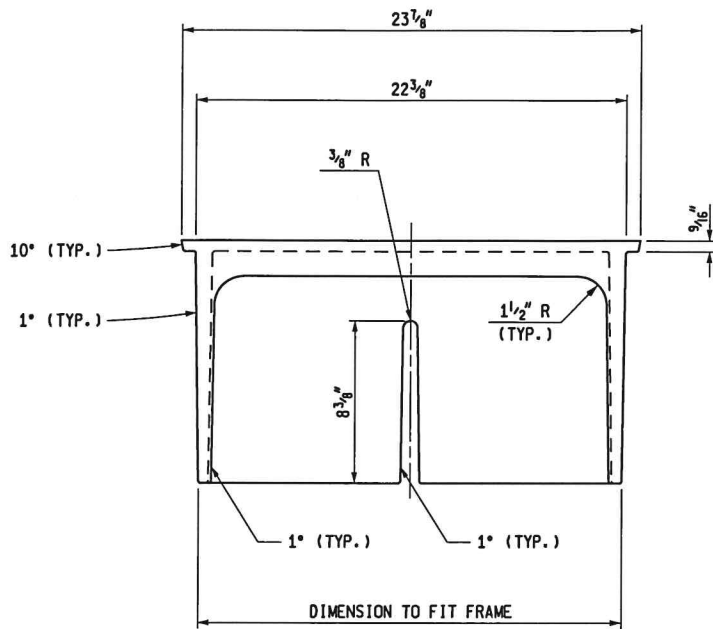
APPROVED BY: Bradley C. Wiefelrich
DIRECTOR, BUREAU OF DEVELOPMENT
Oct 14 2021 11:00 AM

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

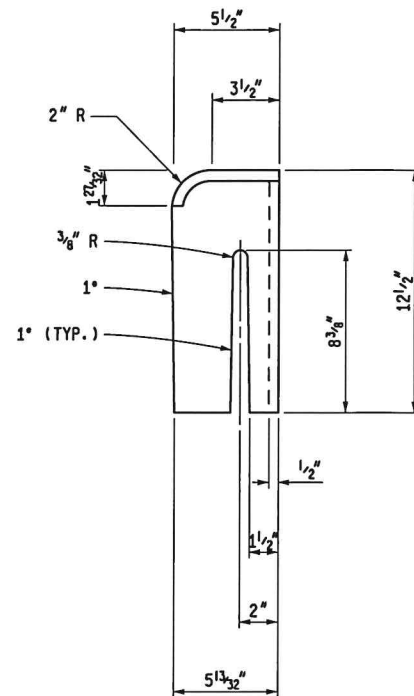
COVER K

FOR USE WITH CONCRETE CURB & GUTTER
DETAILS C, E & F

4-7-2022 F.H.W.A. APPROVAL	7-26-2019 PLAN DATE	R-15-G	SHEET 1 OF 3
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FRONT VIEW OF CURB BOX



SIDE VIEW

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON OR DUCTILE IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GROUND OR MACHINED SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CURB BOX AND FRAME SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

COVER K
FOR USE WITH CONCRETE CURB & GUTTER
DETAILS C, E & F

4-7-2022
F.H.W.A. APPROVAL

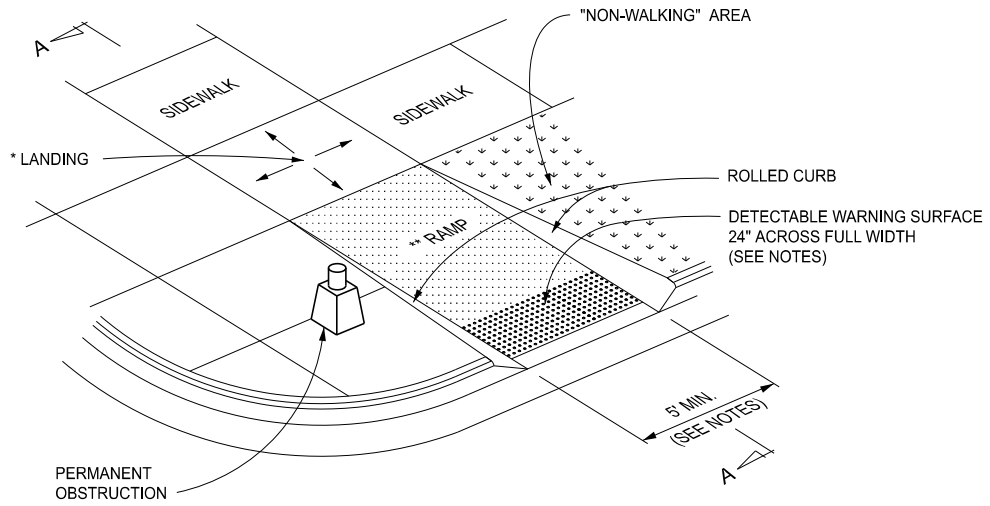
7-26-2019
PLAN DATE

R-15-G

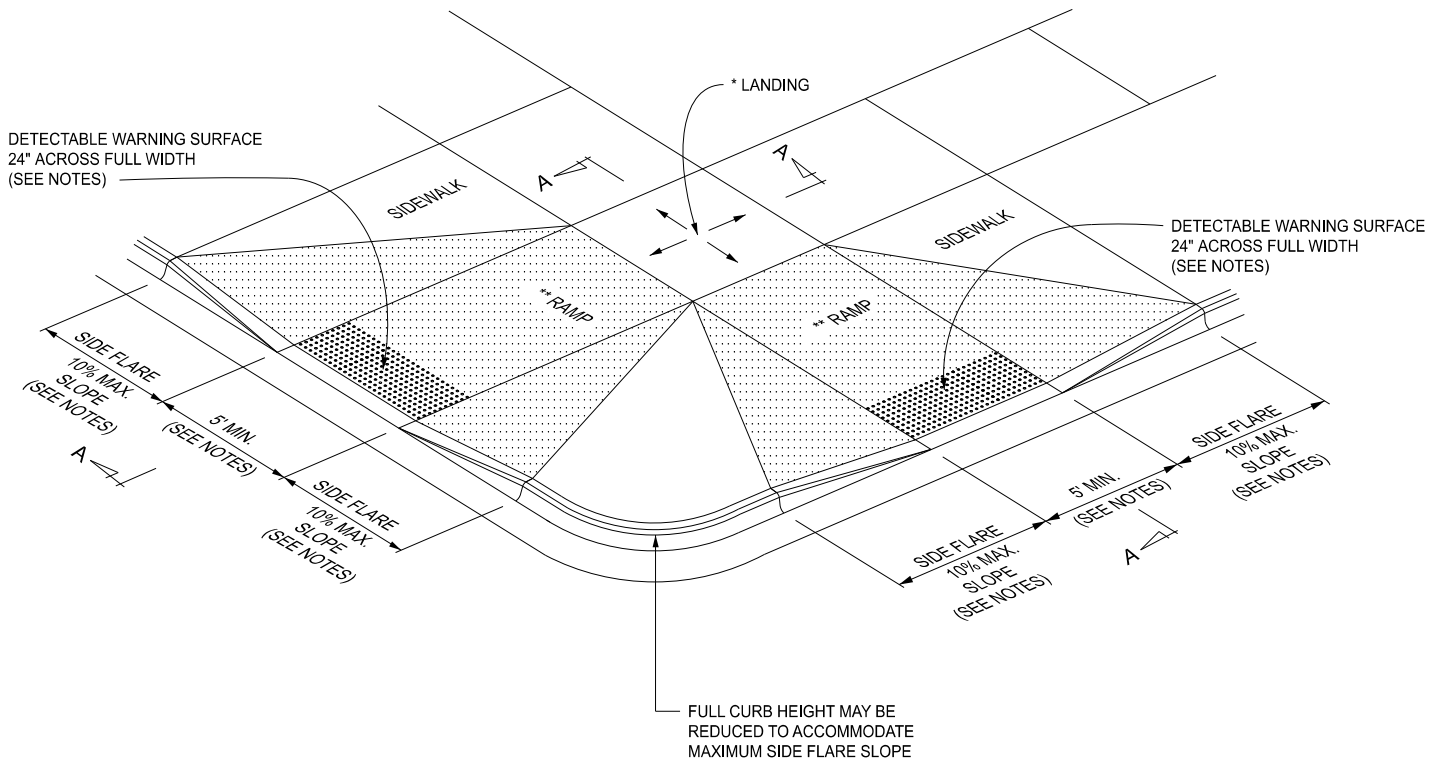
SHEET
3 OF 3

* MAXIMUM LANDING SLOPE IS 2.1% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.1%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



CURB RAMP TYPE R
(ROLLED SIDES)



CURB RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
**CURB RAMP AND
DETECTABLE WARNING DETAILS**

(SPECIAL DETAIL)
FHWA APPROVAL

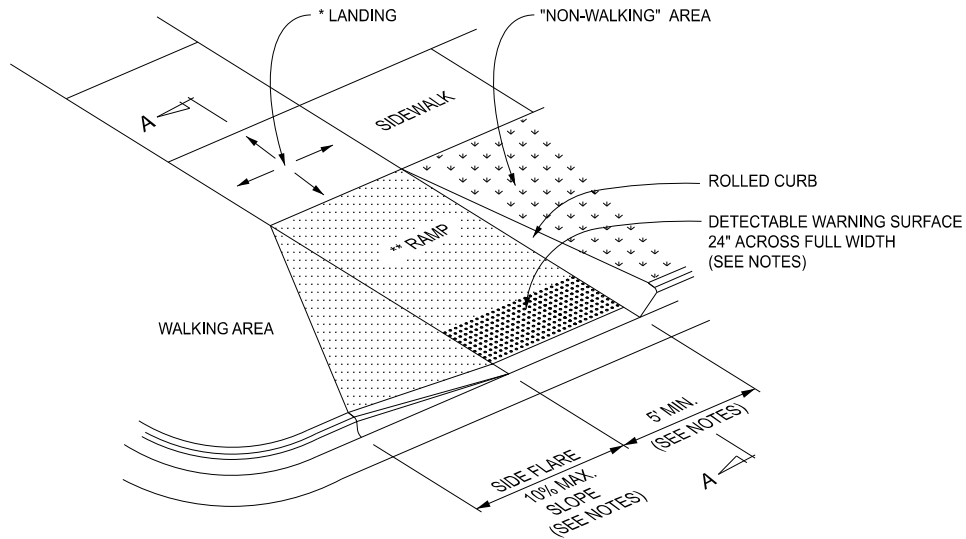
11/08/2023
PLAN DATE

R-28-K

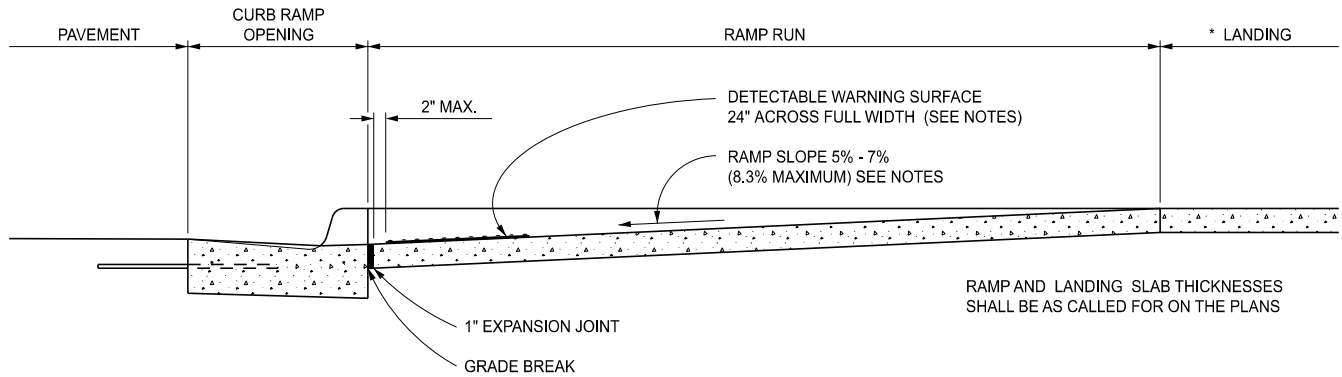
SHEET
1 OF 7

* MAXIMUM LANDING SLOPE IS 2.1% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.1%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



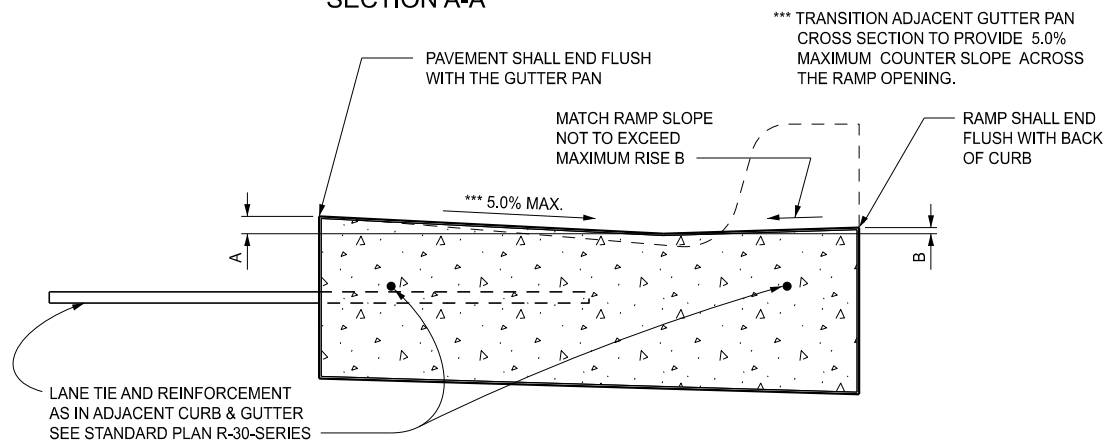
CURB RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

CURB TYPE	MAXIMUM RISE (INCHES)	
	A	B
B1	¾	1
B2	¾	1
B3	¾	1
D1	¾	1
D2	¾	1
D3	¾	1
C1	½	½
C2	½	½
C3	¾	½
C4	¾	½
C5	1	½
C6	1	½
F1	½	½
F2	½	½
F3	¾	½
F4	¾	½
F5	1	½
F6	1	½

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES

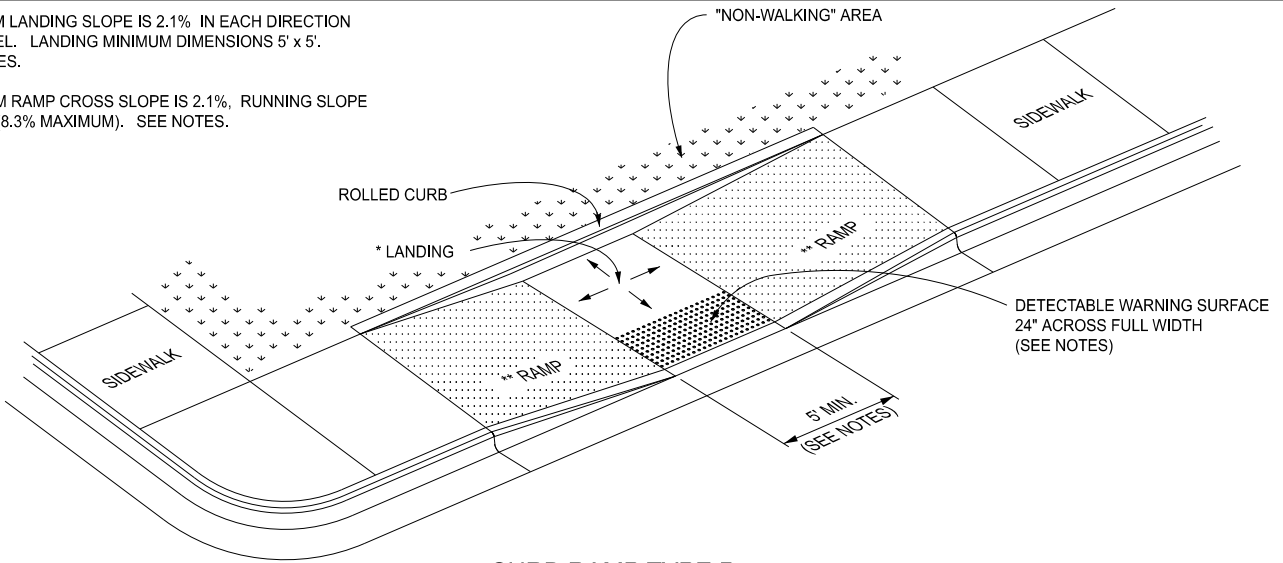


SECTION THROUGH CURB RAMP OPENING
(TYPICAL ALL RAMP TYPES)

<p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	<p>STANDARD PLAN FOR CURB RAMP AND DETECTABLE WARNING DETAILS</p>		<p>R-28-K</p>	<p>SHEET 2 OF 7</p>
	<p>(SPECIAL DETAIL) FHWA APPROVAL</p>	<p>11/08/2023 PLAN DATE</p>		

* MAXIMUM LANDING SLOPE IS 2.1% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

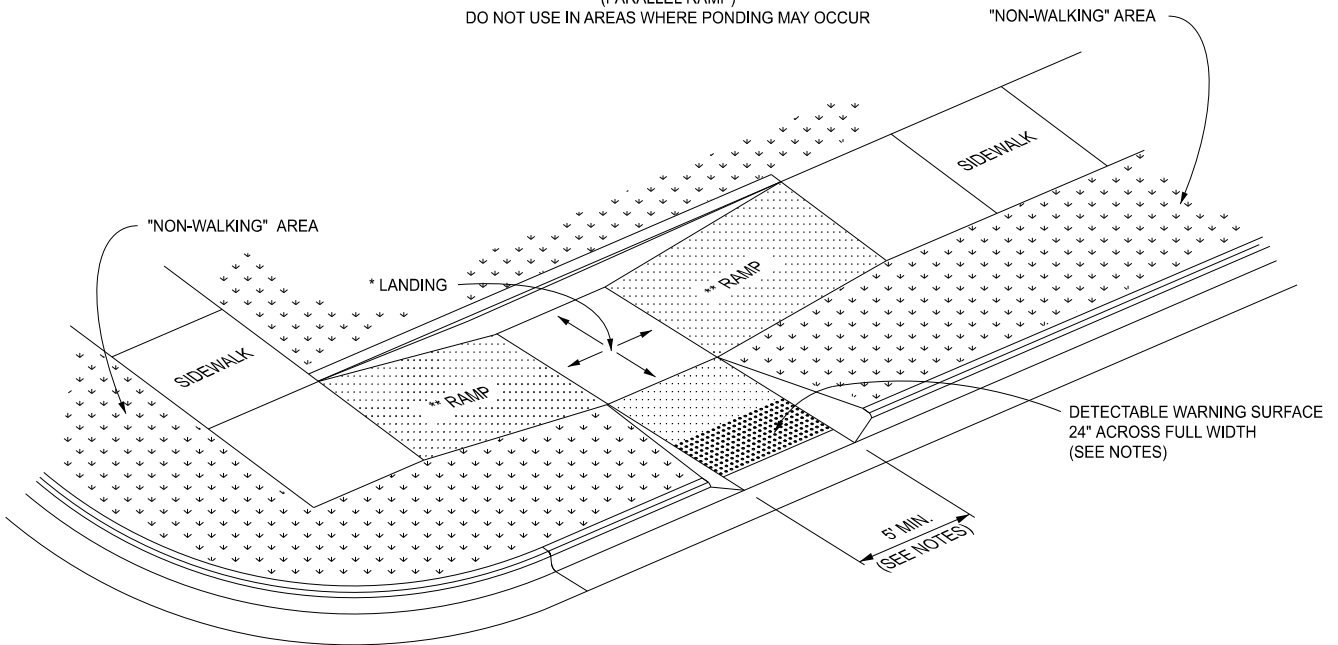
** MAXIMUM RAMP CROSS SLOPE IS 2.1%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



CURB RAMP TYPE P

(PARALLEL RAMP)

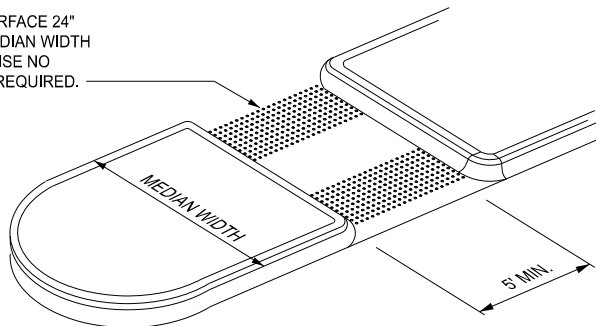
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



CURB RAMP TYPE C

(COMBINATION RAMP)

DETECTABLE WARNING SURFACE 24" ACROSS FULL WIDTH IF MEDIAN WIDTH IS AT LEAST 6'-0". OTHERWISE NO DETECTABLE WARNING IS REQUIRED.



CURB RAMP TYPE M

(MEDIAN ISLAND)



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
**CURB RAMP AND
DETECTABLE WARNING DETAILS**

(SPECIAL DETAIL)
FHWA APPROVAL

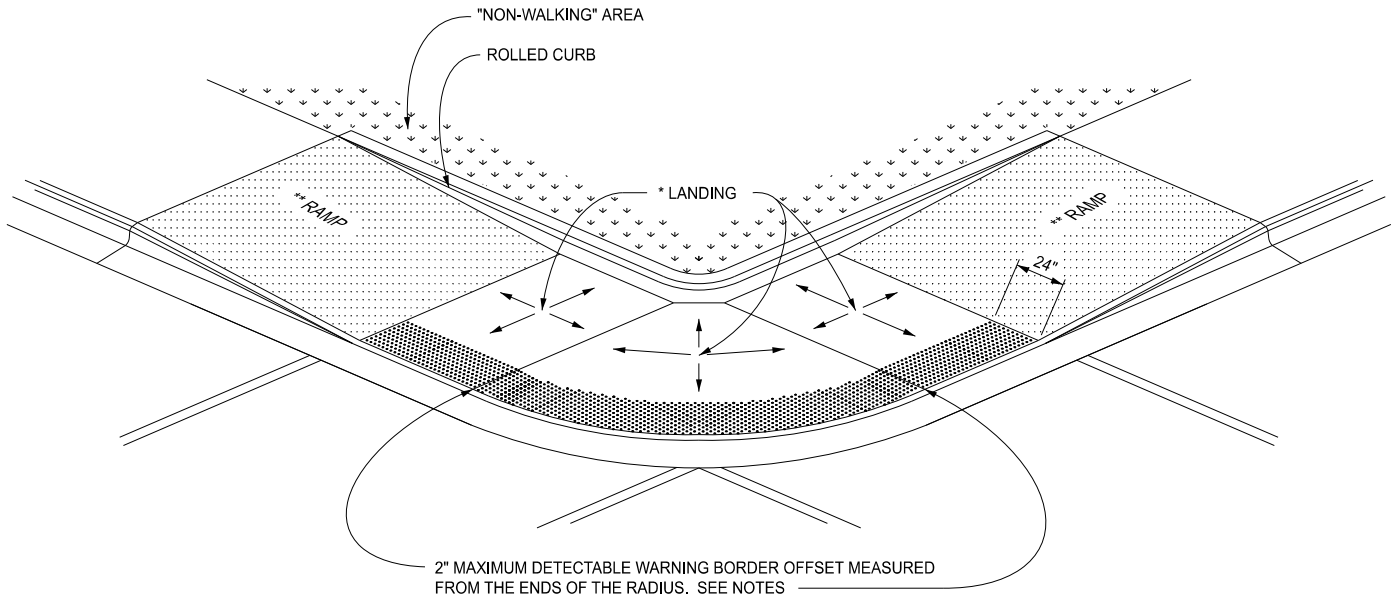
11/08/2023
PLAN DATE

R-28-K

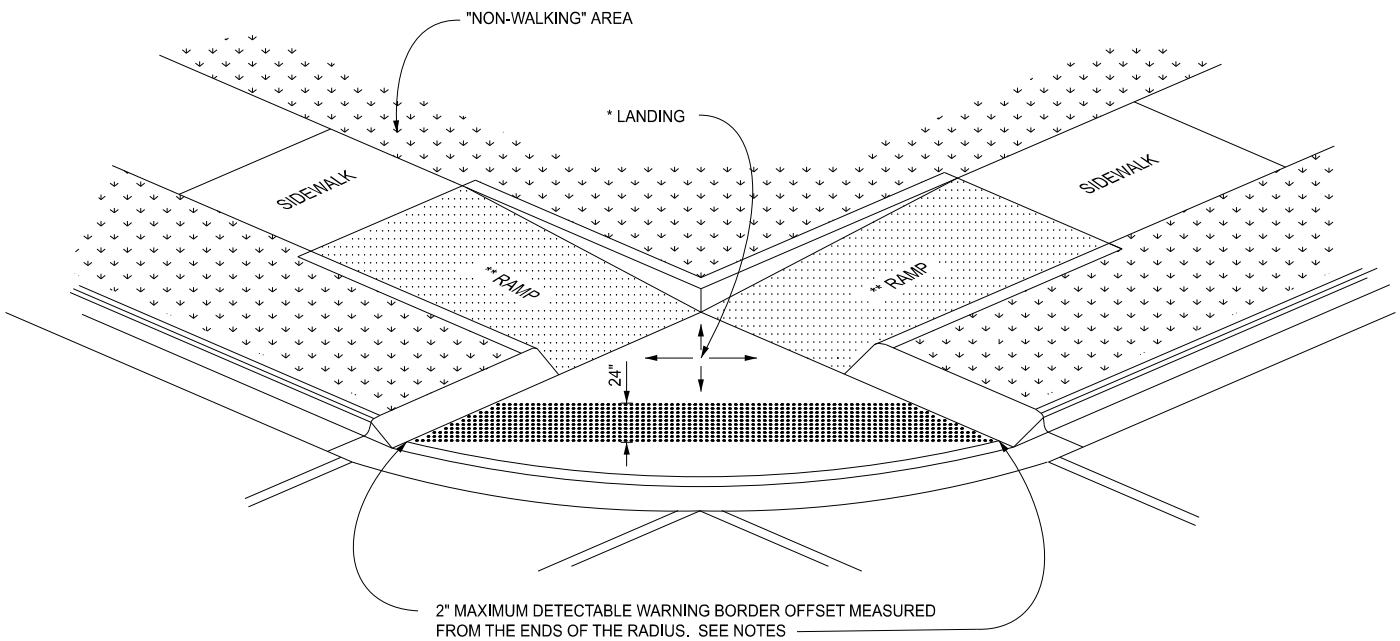
SHEET
3 OF 7

* MAXIMUM LANDING SLOPE IS 2.1% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.1%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)



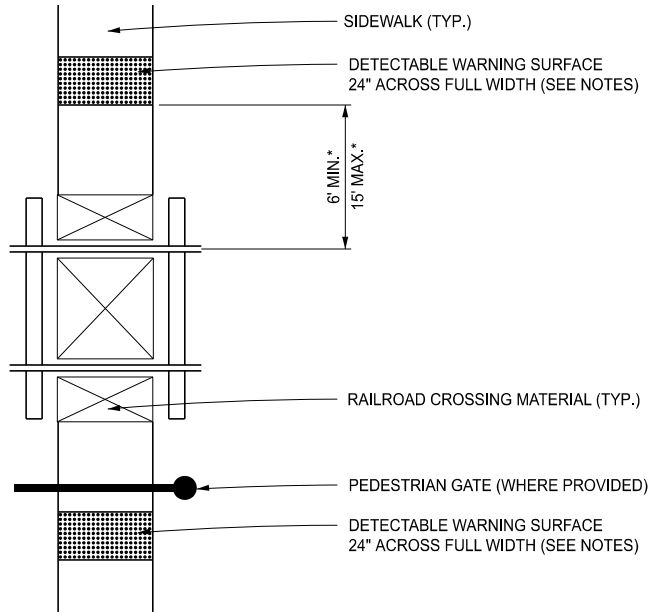
(TANGENT DETECTABLE WARNING SHOWN)

CURB RAMP TYPE D
(DEPRESSED CORNER)

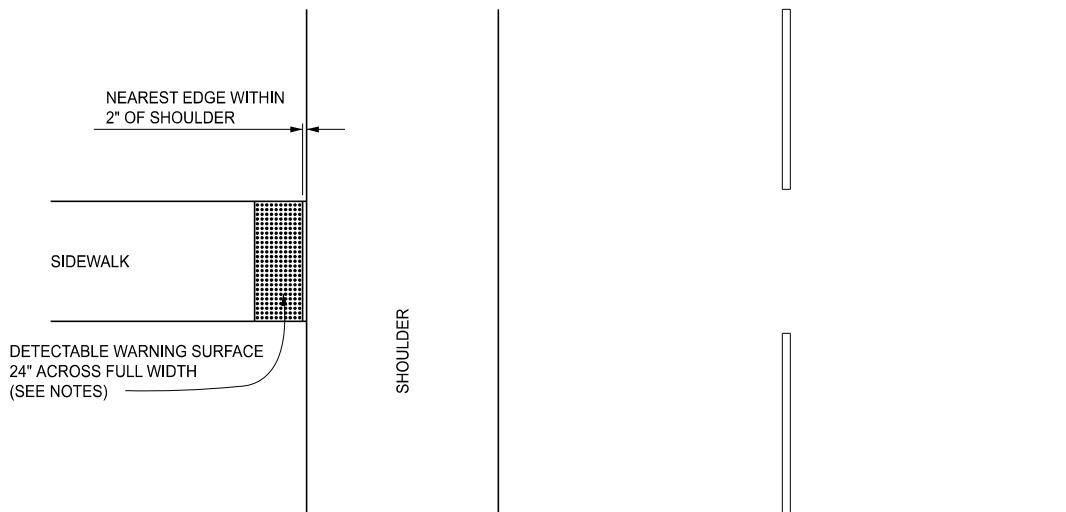
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

<p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	STANDARD PLAN FOR CURB RAMP AND DETECTABLE WARNING DETAILS		R-28-K	SHEET 4 OF 7
	(SPECIAL DETAIL) FHWA APPROVAL	11/08/2023 PLAN DATE		

* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING



DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

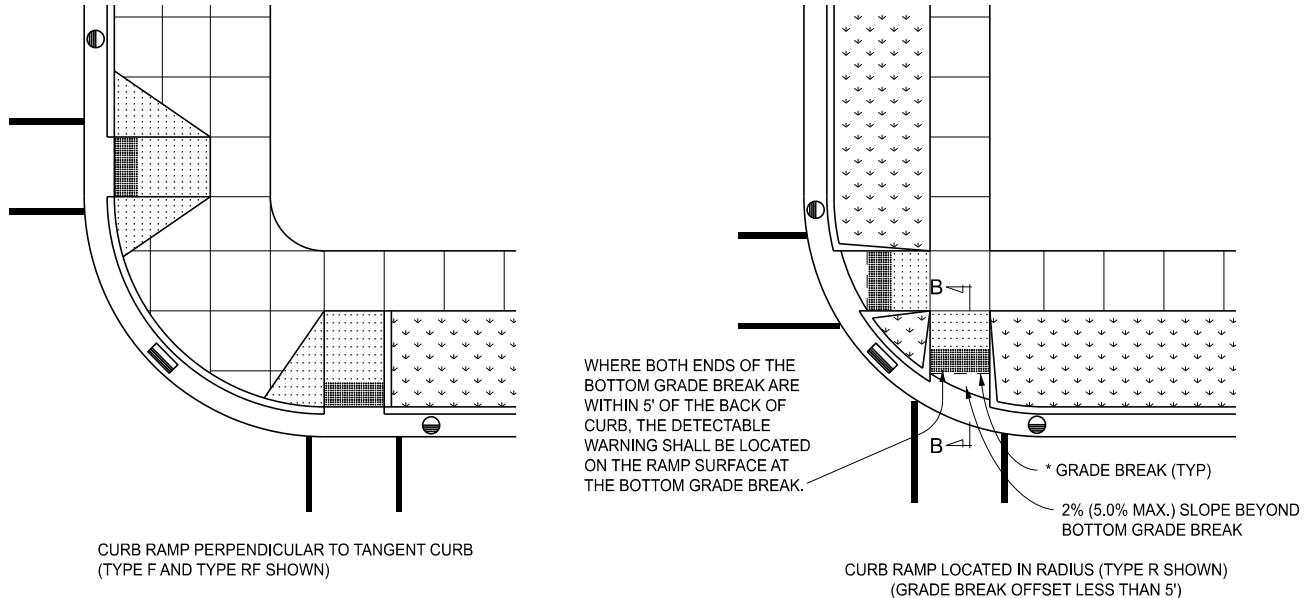
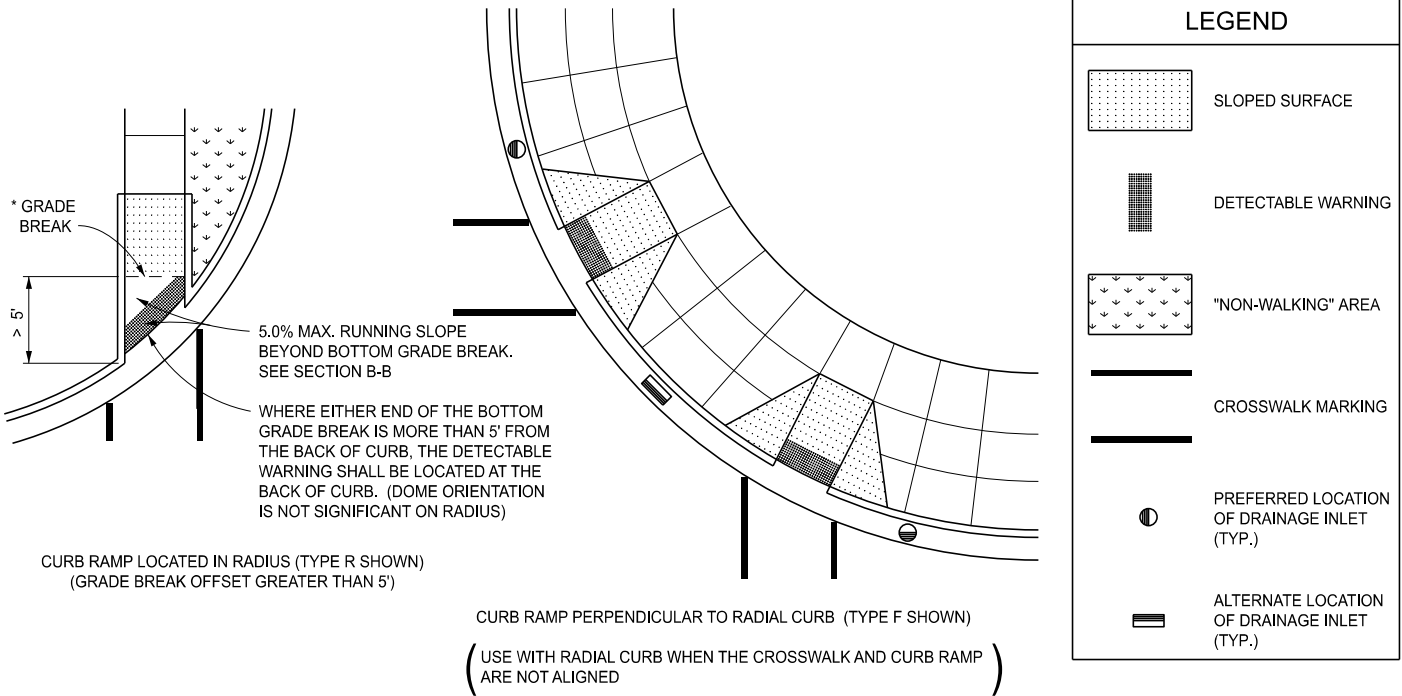
STANDARD PLAN FOR
CURB RAMP AND
DETECTABLE WARNING DETAILS

(SPECIAL DETAIL)
FHWA APPROVAL

11/08/2023
PLAN DATE

R-28-K

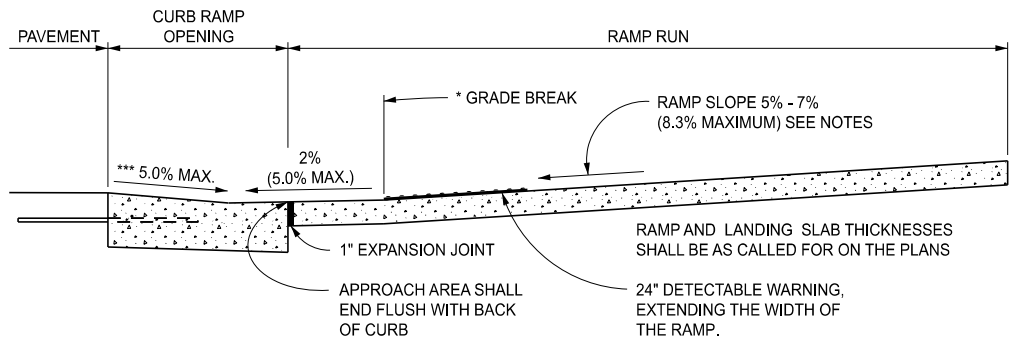
SHEET
5 OF 7



* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

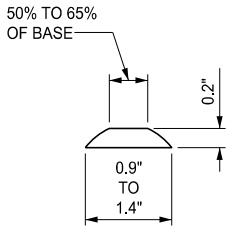
SEE SHEET 2 FOR CURB RAMP OPENING DETAILS.



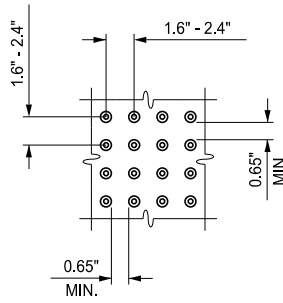
SECTION B-B

CURB RAMP ORIENTATION

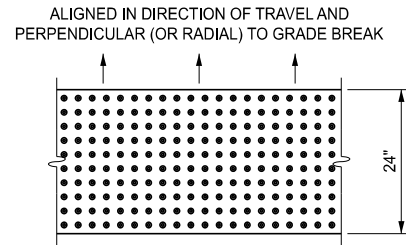
<p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	<p>STANDARD PLAN FOR CURB RAMP AND DETECTABLE WARNING DETAILS</p>		<p>R-28-K</p>	<p>SHEET 6 OF 7</p>
	<p>(SPECIAL DETAIL) FHWA APPROVAL</p>	<p>11/08/2023 PLAN DATE</p>		



DOME SECTION



DOME SPACING



DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

CURB RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5' MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.

CURB RAMPS WITH A RUNNING SLOPE $\leq 5\%$ DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2.1% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.1%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN 1/2". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE CURB RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

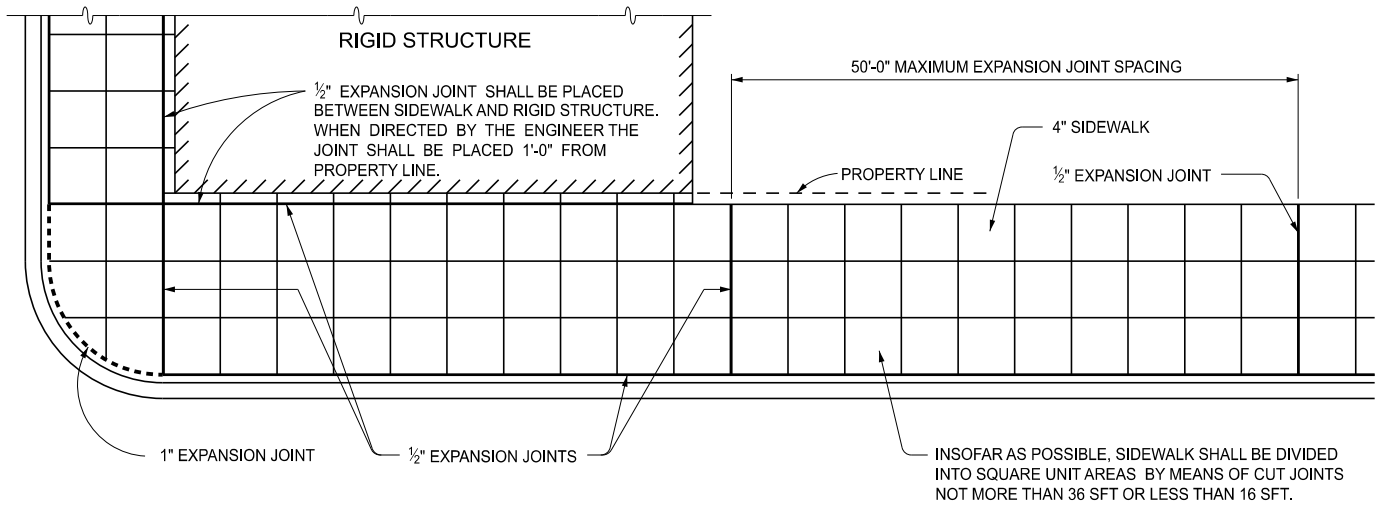
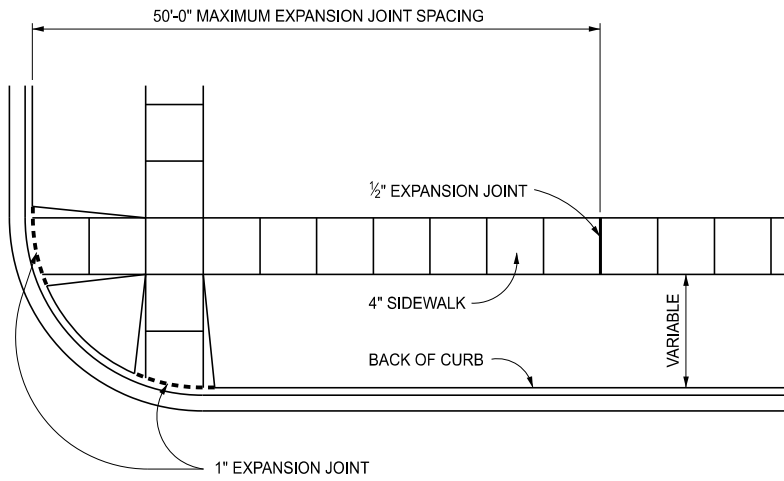
STANDARD PLAN FOR
CURB RAMP AND
DETECTABLE WARNING DETAILS

(SPECIAL DETAIL)
FHWA APPROVAL

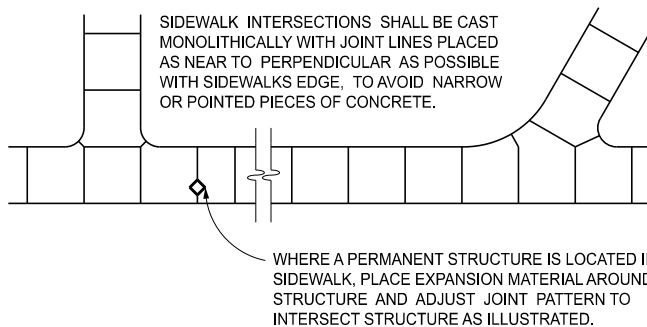
11/08/2023
PLAN DATE

R-28-K

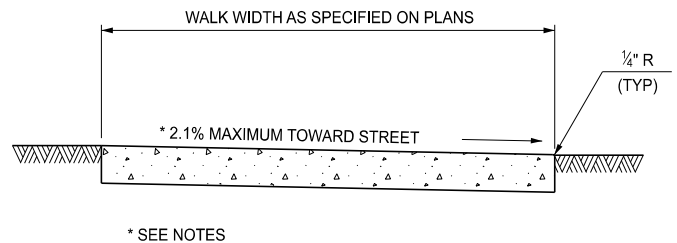
SHEET
7 OF 7



LOCATION OF JOINTS IN CONCRETE SIDEWALK



TYPICAL SIDEWALK JOINT LAYOUTS



4" CONCRETE SIDEWALK

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

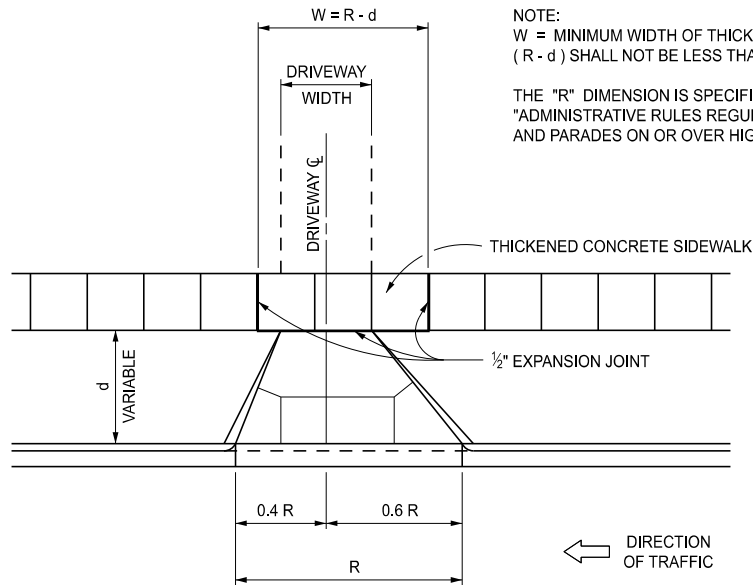
STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES,
AND CONCRETE SIDEWALK

(SPECIAL DETAIL)
FHWA APPROVAL

11/08/2023
PLAN DATE

R-29-J

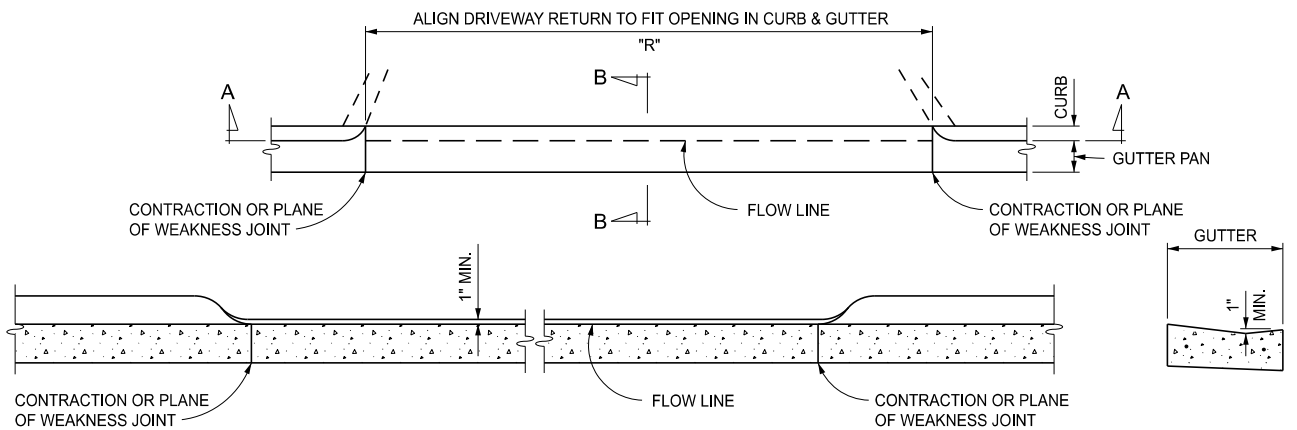
SHEET
1 OF 4



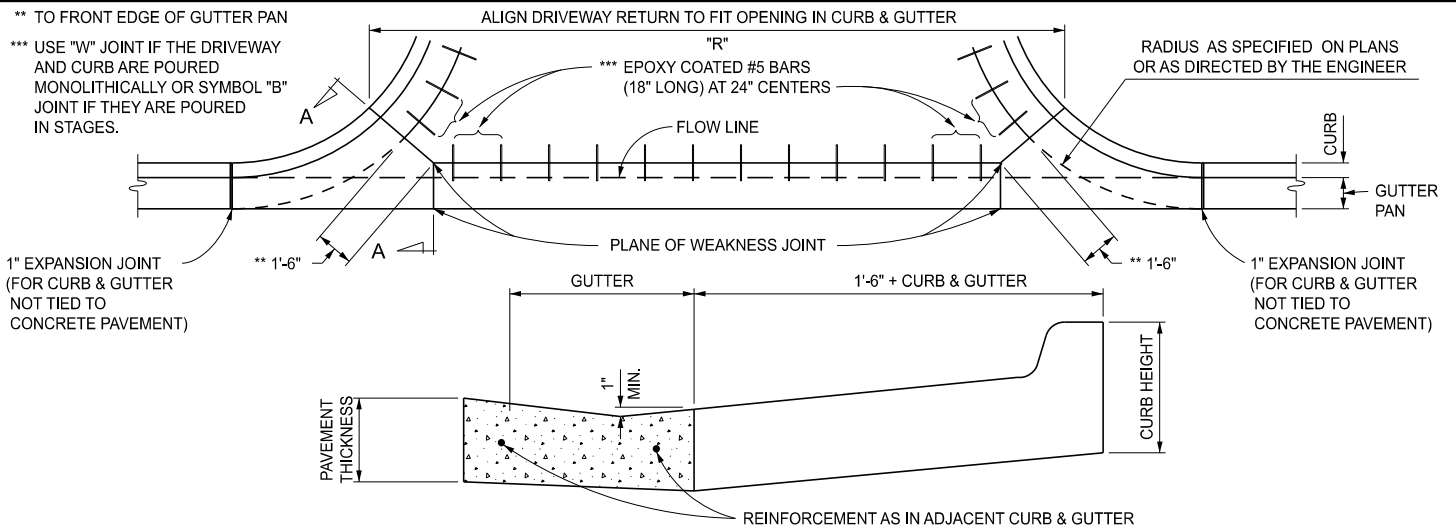
NOTE:
 $W =$ MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
 $(R - d)$ SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION
 "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS
 AND PARADES ON OR OVER HIGHWAYS".

CONCRETE DRIVEWAY OPENING LAYOUT



SECTION A - A
 SECTION B - B
 CONCRETE DRIVEWAY OPENING, DETAIL L

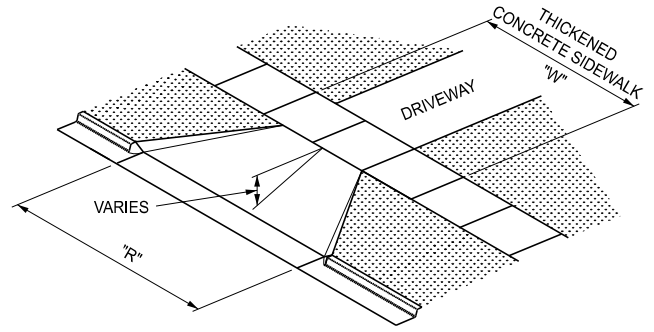
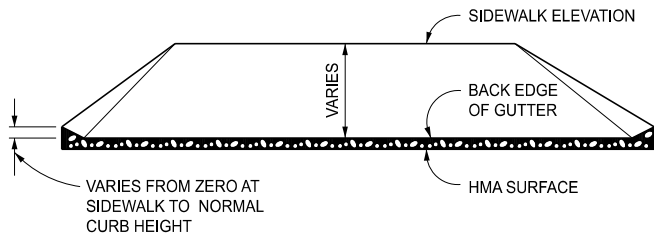


SECTION A - A
 CONCRETE DRIVEWAY OPENING, DETAIL M

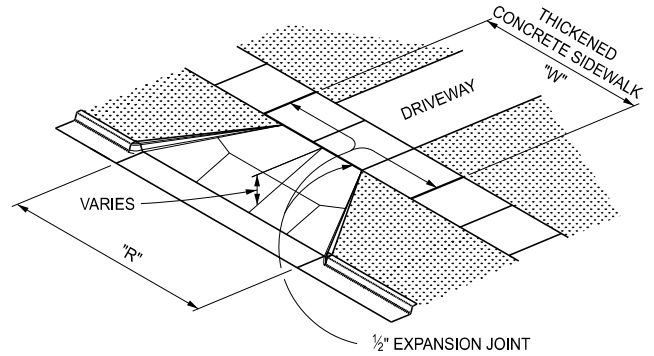
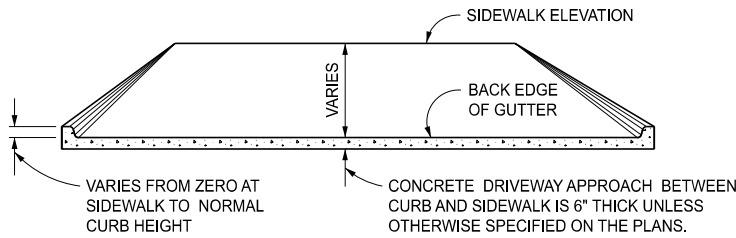
NOTE:
 FOR ROADWAYS WITH CONCRETE PAVEMENTS,
 LONGITUDINAL LANE TIES WILL BE CONTINUOUS
 THROUGH THE DRIVEWAY OPENING AND THE
 SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS
 SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE
 LONGITUDINAL LANE TIES.



STANDARD PLAN FOR DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK			
(SPECIAL DETAIL)	11/08/2023	R-29-J	SHEET 2 OF 4
FHWA APPROVAL	PLAN DATE		



HMA DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L)

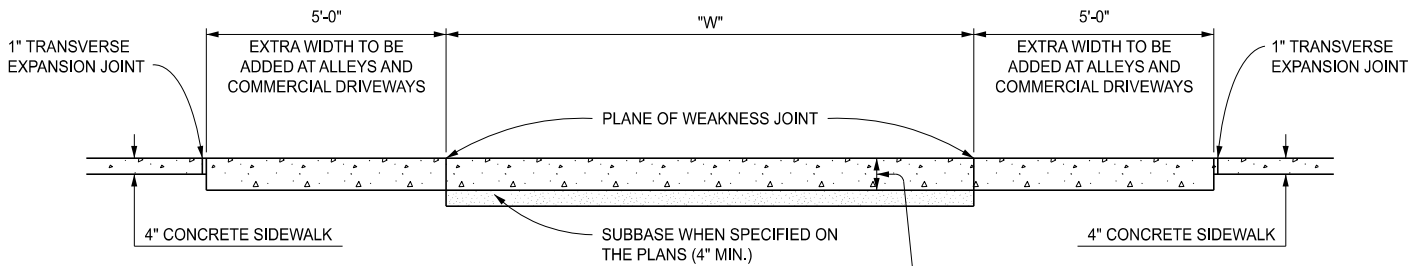


CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)

NOTES:

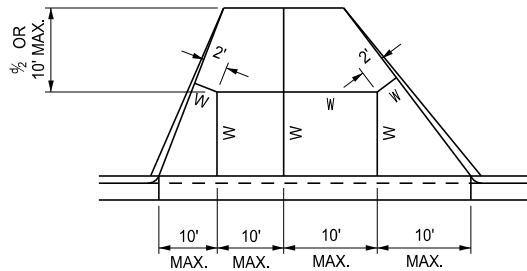
MONOLITHIC CURB IS INCLUDED IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.

REINFORCEMENT IS NOT REQUIRED UNLESS SPECIFIED ON THE PLANS. WHEN REINFORCEMENT IS SPECIFIED, SEE CHART ON THIS SHEET.



WHEN CONCRETE DRIVEWAY APPROACH IS SPECIFIED, THE THICKENED CONCRETE SIDEWALK THICKNESS IS EQUAL TO THE THICKNESS OF THE CONCRETE DRIVEWAY APPROACH. WHEN HMA DRIVEWAY APPROACH IS SPECIFIED, THE THICKENED CONCRETE SIDEWALK THICKNESS IS 6" MIN.

THICKENED CONCRETE SIDEWALK



ADJUST DRIVEWAY JOINTS AS NEEDED TO ALIGN WITH ANY COINCIDING TRANSVERSE PAVEMENT JOINTS.

JOINT LAYOUT IS AS INDICATED OR AS DIRECTED BY THE ENGINEER.

INTERMEDIATE DRIVEWAY JOINT DETAILS

REINFORCEMENT FOR CONCRETE DRIVEWAYS		
CONCRETE DRIVEWAY THICKNESS	WIRE SIZE (6" x 6" MESH)	AVERAGE WEIGHT (LBS/100 SFT)
LESS THAN 8"	W1.4	21
	W2.9	42
8" OR GREATER	USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-37-SERIES	



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

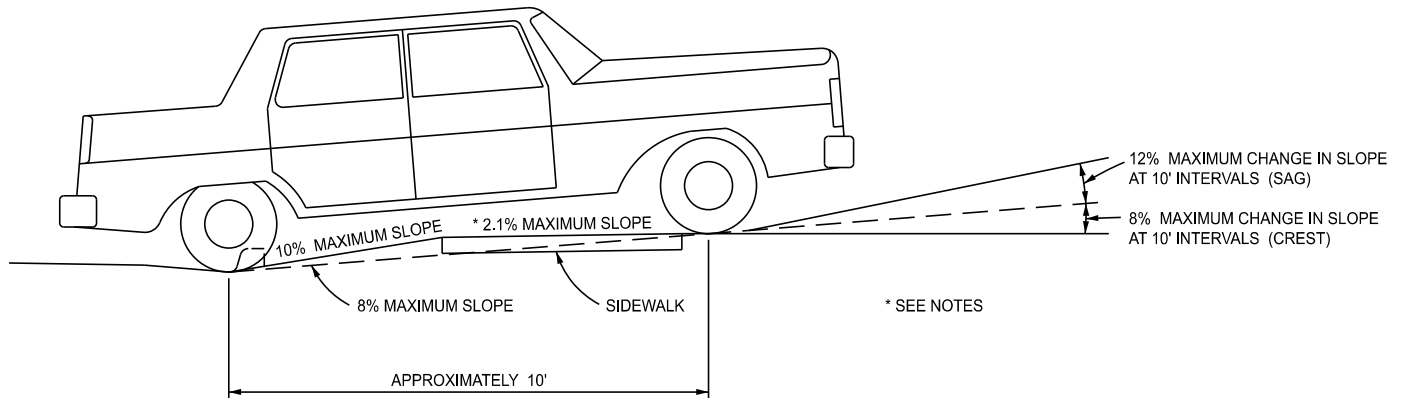
STANDARD PLAN FOR
**DRIVEWAY OPENINGS & APPROACHES,
AND CONCRETE SIDEWALK**

(SPECIAL DETAIL)
FHWA APPROVAL

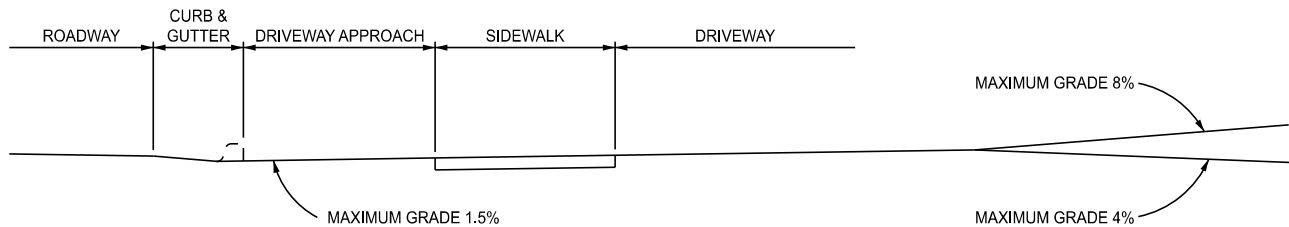
11/08/2023
PLAN DATE

R-29-J

SHEET
3 OF 4



LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES



COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:

FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN G-680-SERIES, COMMERCIAL DRIVEWAYS.

FOR CURB AND GUTTER DETAILS, SEE STANDARD PLAN R-30-SERIES.

TRANSVERSE SIDEWALK SLOPES ARE 2.1% MAXIMUM. IN ORDER TO MEET SITE CONDITIONS, IF THE TRANSVERSE SLOPE IS REQUIRED TO BE LESS THAN 1.5%, LONGITUDINAL DRAINAGE MUST BE PROVIDED.

WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

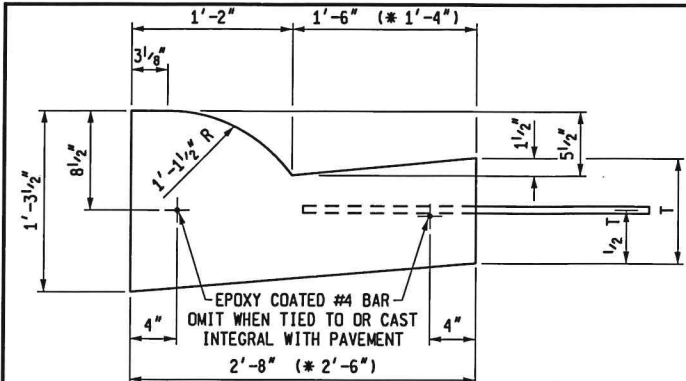
STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES,
AND CONCRETE SIDEWALK

(SPECIAL DETAIL)
FHWA APPROVAL

11/08/2023
PLAN DATE

R-29-J

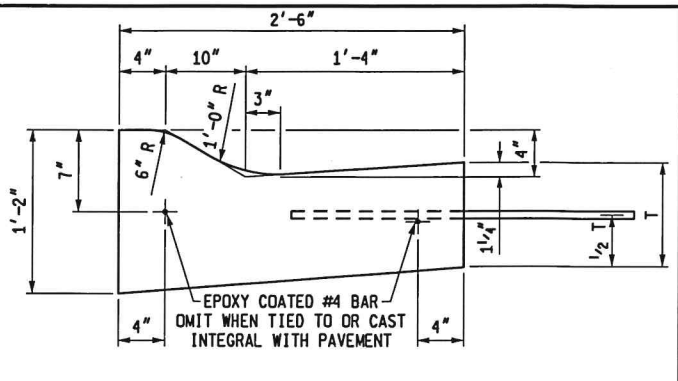
SHEET
4 OF 4



(* GUTTER PAN WIDTH MAY BE REDUCED WHEN APPROVED BY THE ENGINEER)

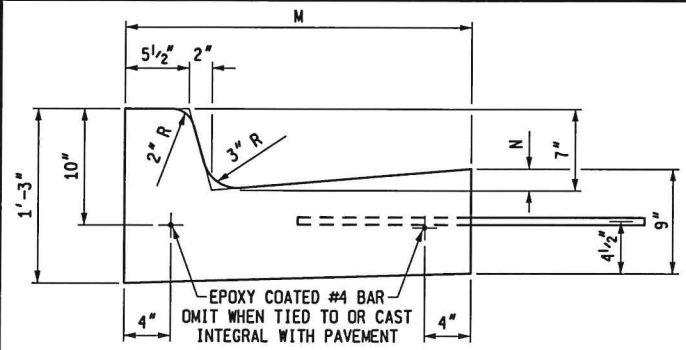
DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT	CONCRETE CYD / LFT
	T				
B1	9"		AS SHOWN	0.0900	(* 0.0855)
B2	9"		OMITTED	0.0900	(* 0.0855)
B3	10"		AS SHOWN	0.0941	(* 0.0894)

B



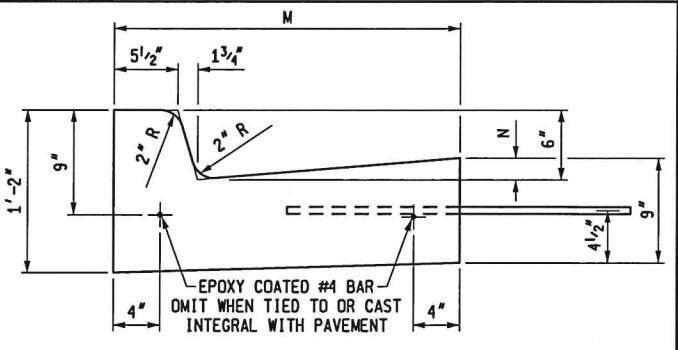
DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	T			
D1	9"		AS SHOWN	0.0788
D2	9"		OMITTED	0.0788
D3	10"		AS SHOWN	0.0826

D



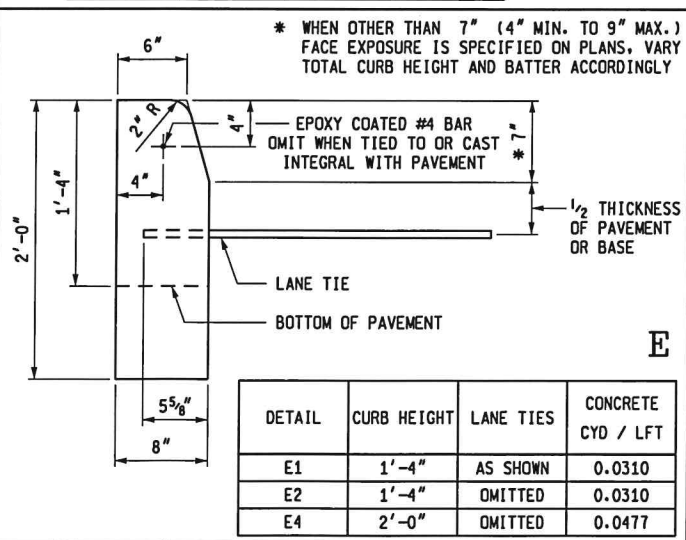
DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	M	N		
C1	1'-6"	7/8"	AS SHOWN	0.0506
C2	1'-6"	7/8"	OMITTED	0.0506
C3	2'-0"	1 3/8"	AS SHOWN	0.0632
C4	2'-0"	1 3/8"	OMITTED	0.0632
C5	2'-6"	1 7/8"	AS SHOWN	0.0757
C6	2'-6"	1 7/8"	OMITTED	0.0757

C



DETAIL	DIMENSION		LANE TIES	CONCRETE CYD / LFT
	M	N		
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737

F



DETAIL	CURB HEIGHT	LANE TIES	CONCRETE CYD / LFT
E1	1'-4"	AS SHOWN	0.0310
E2	1'-4"	OMITTED	0.0310
E4	2'-0"	OMITTED	0.0477

E

* WHEN OTHER THAN 7" (4" MIN. TO 9" MAX.) FACE EXPOSURE IS SPECIFIED ON PLANS, VARY TOTAL CURB HEIGHT AND BATTER ACCORDINGLY

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

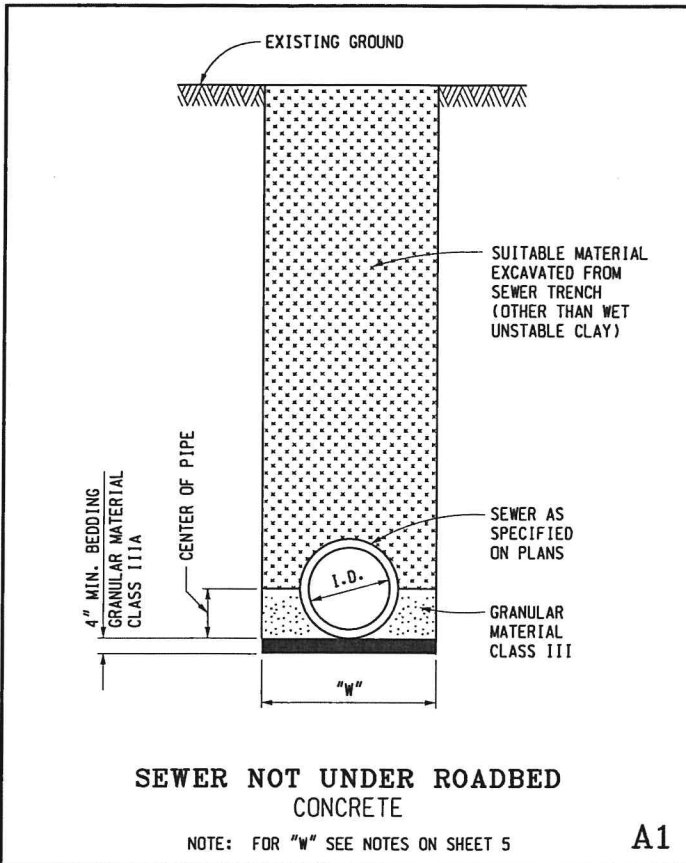
APPROVED BY: *Randy V. Penttila*
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: *Neil A. Van Pelt*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**CONCRETE CURB AND
CONCRETE CURB & GUTTER**

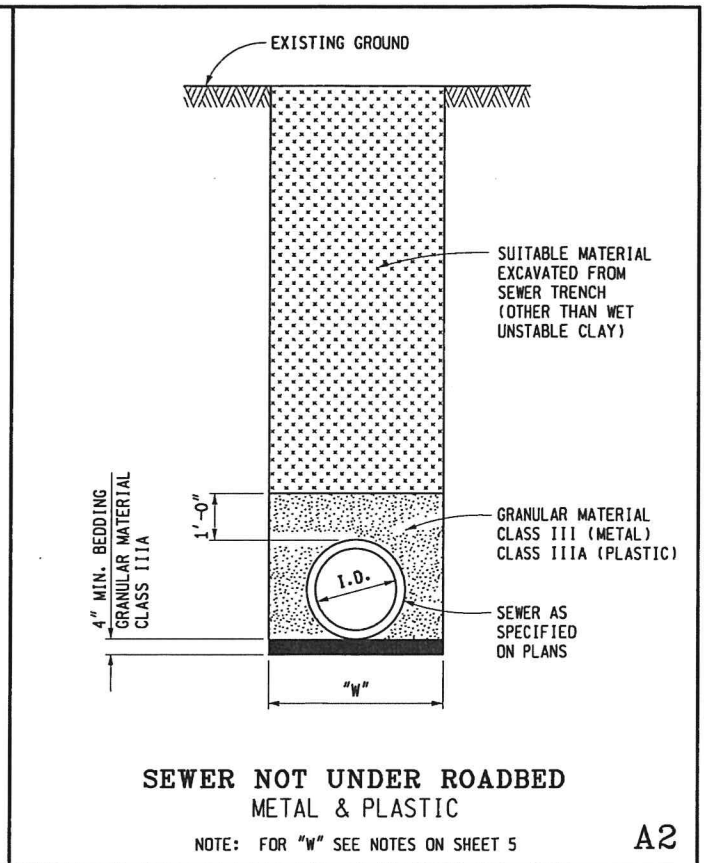
9-30-2014 F.H.W.A. APPROVAL	2-6-2014 PLAN DATE	R-30-G	SHEET 1 OF 2
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**SEWER NOT UNDER ROADBED
CONCRETE**

NOTE: FOR "W" SEE NOTES ON SHEET 5

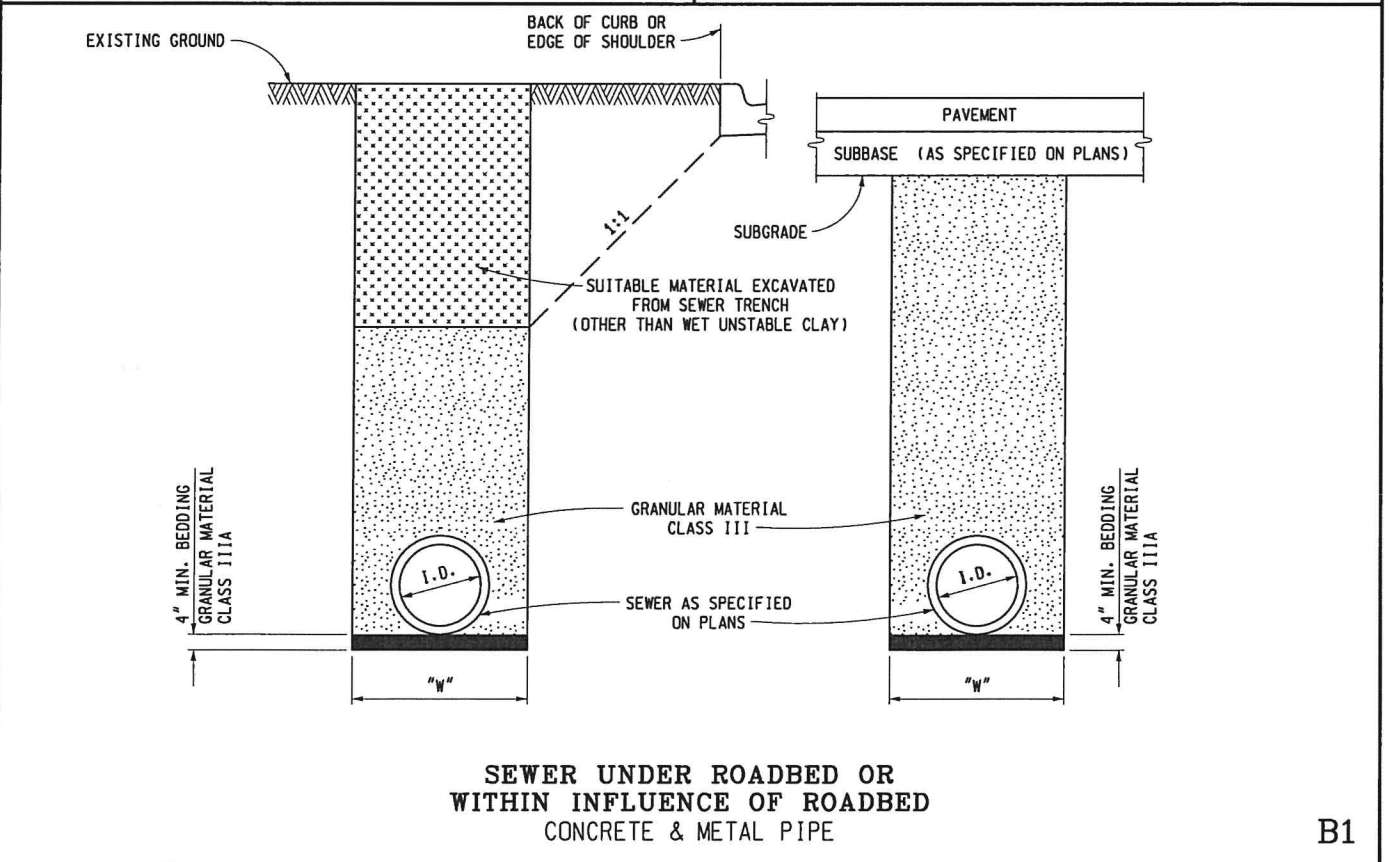
A1



**SEWER NOT UNDER ROADBED
METAL & PLASTIC**

NOTE: FOR "W" SEE NOTES ON SHEET 5

A2



**SEWER UNDER ROADBED OR
WITHIN INFLUENCE OF ROADBED
CONCRETE & METAL PIPE**

B1



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

Kimberly
Avery

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

Bradley C.
Wieferich

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

Digitally signed by Kimberly Avery
DN: cn=Kimberly Avery, o=MDOT,
ou=Bureau of Field Services,
email=averyk@michigan.gov, c=US
Date: 2016.12.15 09:03:17 -0500

Digitally signed by Bradley C. Wieferich
DN: cn=Bradley C. Wieferich, o=MDOT,
ou=Department of Transportation, c=US
Date: 2016.12.15 09:44:02

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

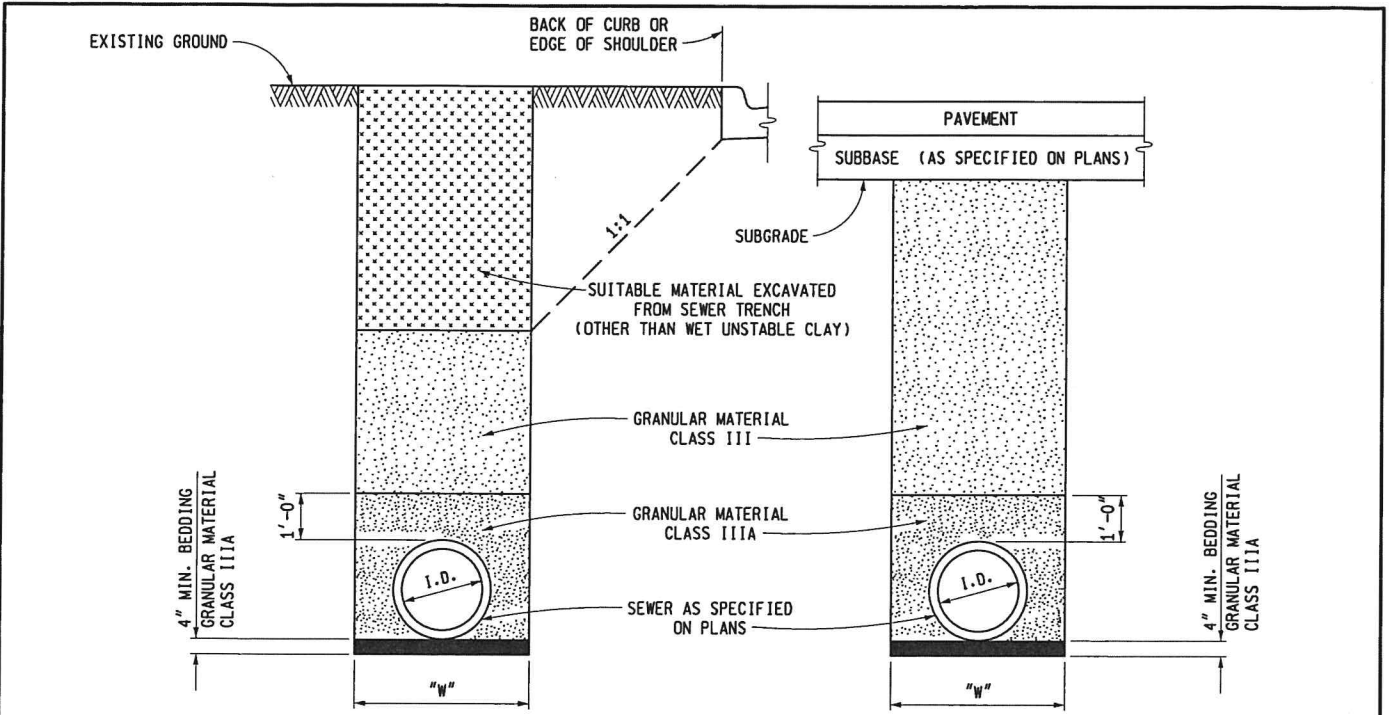
UTILITY TRENCHES

7-25-2017
F.H.W.A. APPROVAL

2-8-2016
PLAN DATE

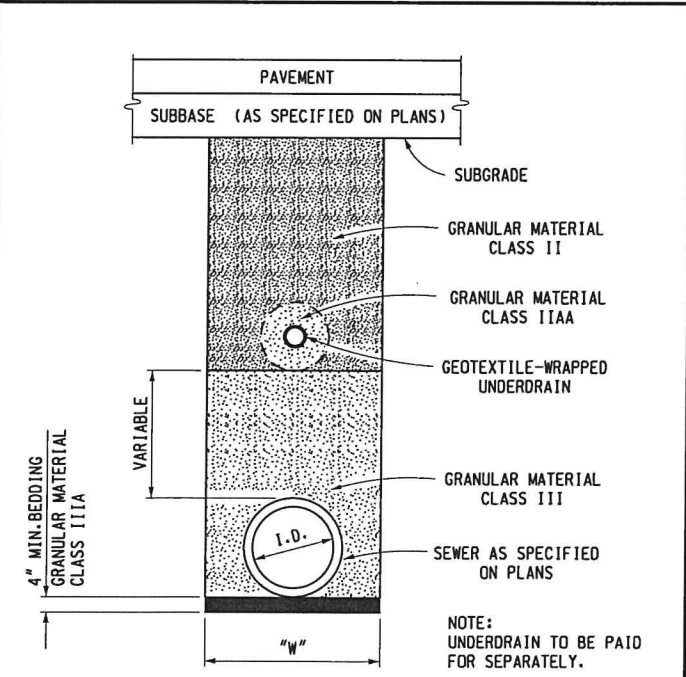
R-83-C

SHEET
1 OF 5



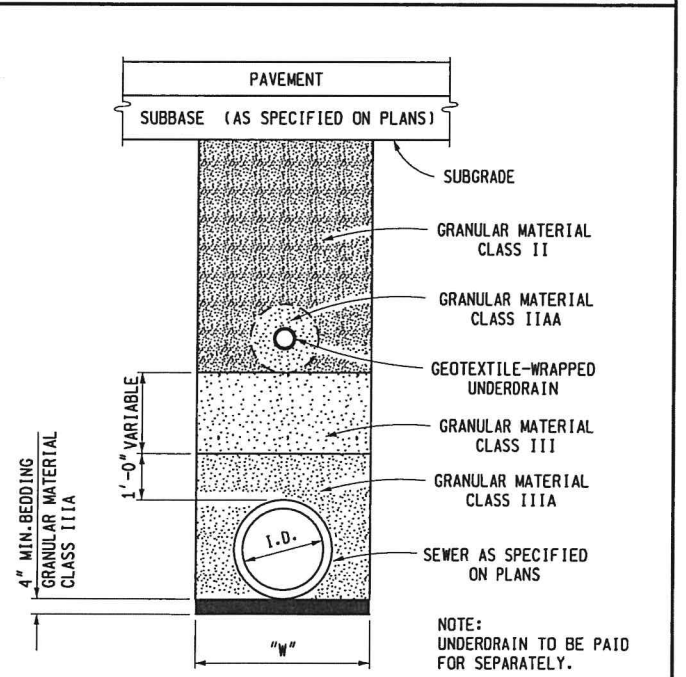
**SEWER UNDER ROADBED OR
WITHIN INFLUENCE OF ROADBED
PLASTIC PIPE**

B2



**SEWER WITH UNDERDRAIN UNDER ROADBED
CONCRETE & METAL PIPE**

C1



**SEWER WITH UNDERDRAIN UNDER ROADBED
PLASTIC PIPE**

C2

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

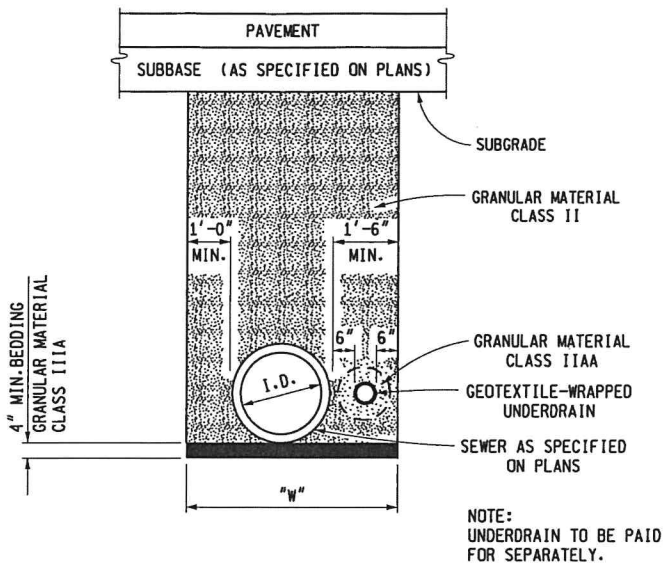
UTILITY TRENCHES

7-25-2017
F.H.W.A. APPROVAL

2-8-2016
PLAN DATE

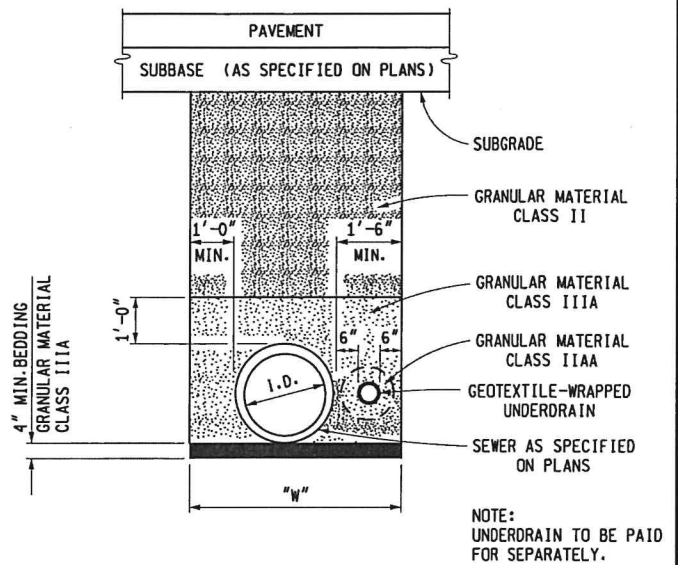
R-83-C

SHEET
2 OF 5



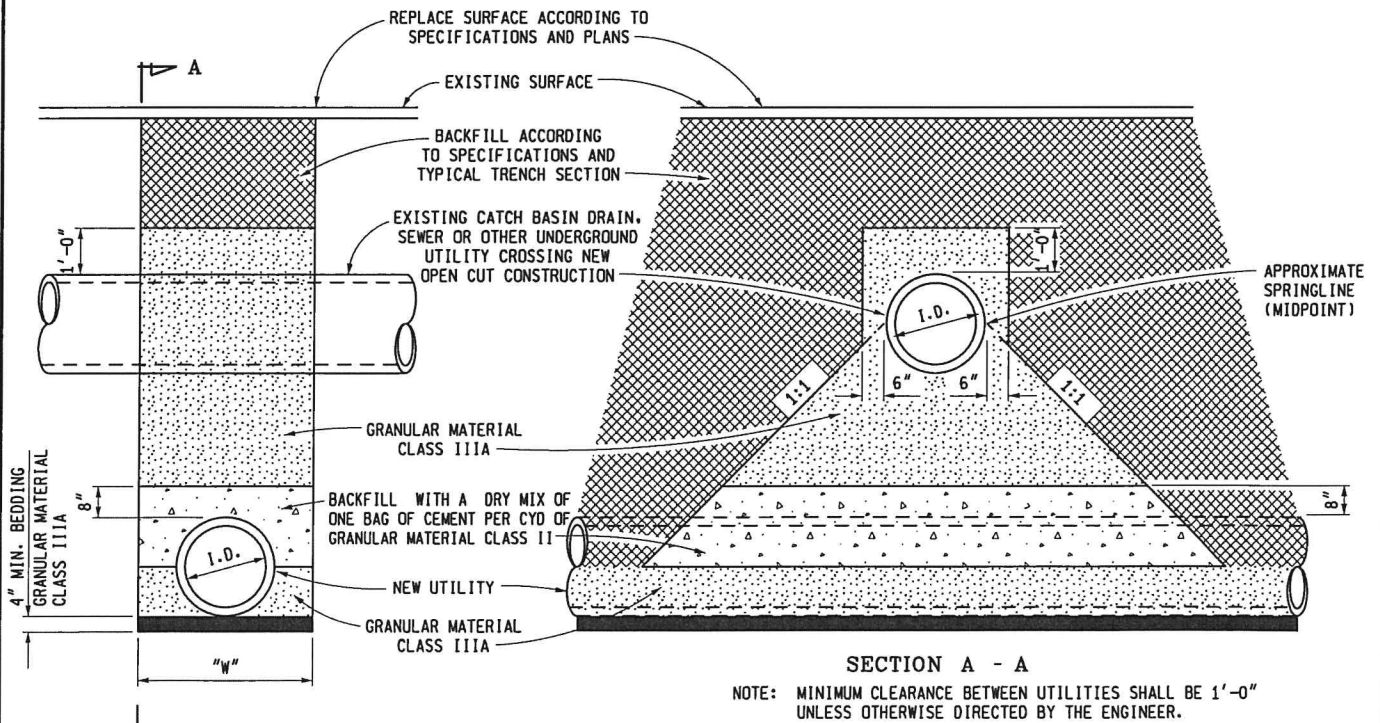
**SEWER WITH UNDERDRAIN UNDER ROADBED
CONCRETE & METAL PIPE
(FOR SHALLOW SEWERS)**

D1



**SEWER WITH UNDERDRAIN UNDER ROADBED
PLASTIC PIPE
(FOR SHALLOW SEWERS)**

D2



TYPICAL DETAIL AT CROSSING UNDER EXISTING UTILITIES

PAYMENT FOR THIS TRENCH DETAIL WILL BE INCLUDED WITH THE ADJACENT TRENCH DETAILS

E

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

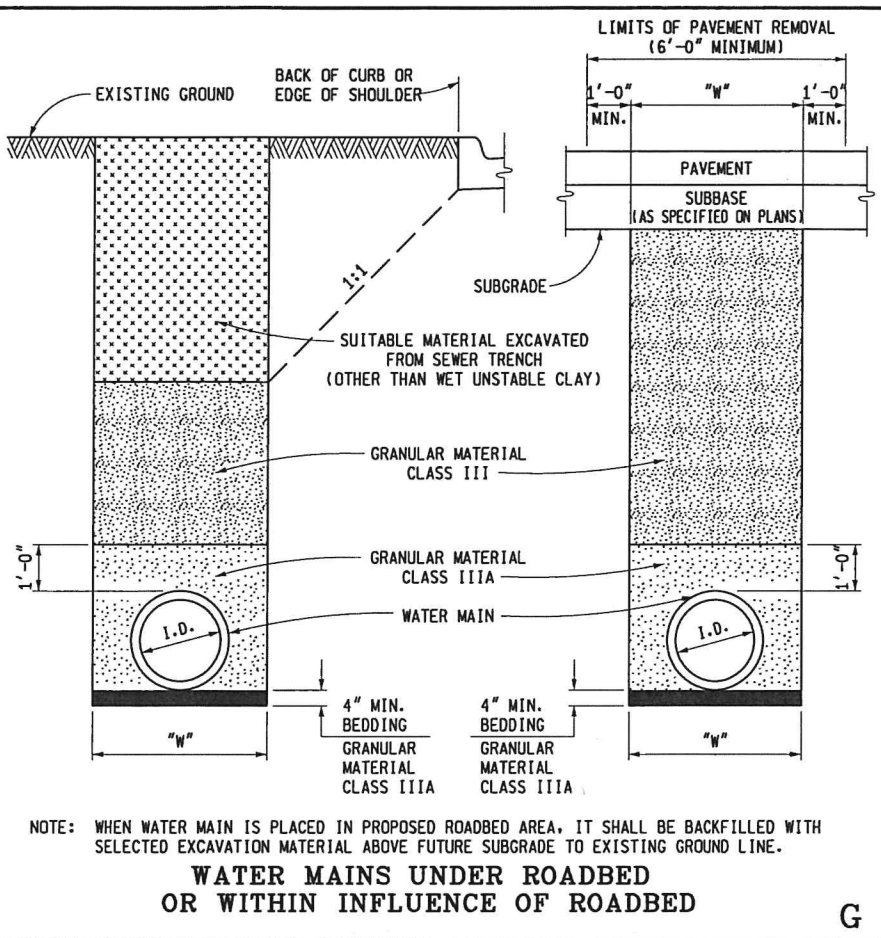
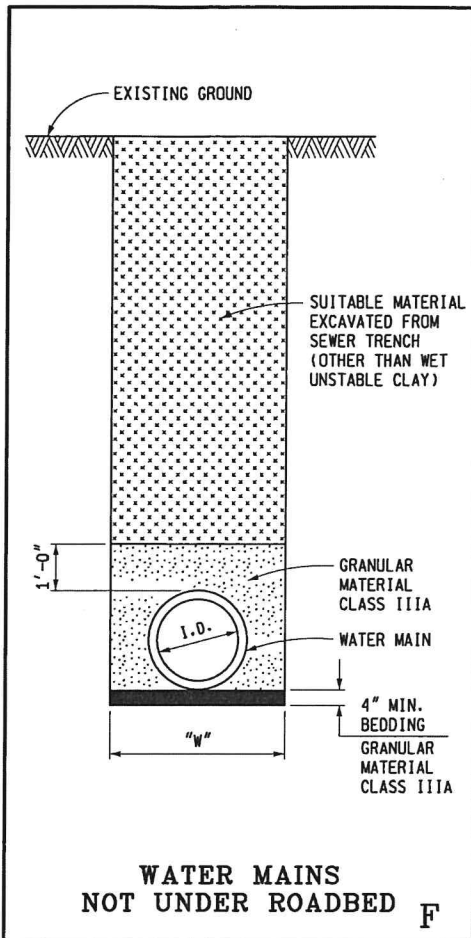
UTILITY TRENCHES

7-25-2017
F.H.W.A. APPROVAL

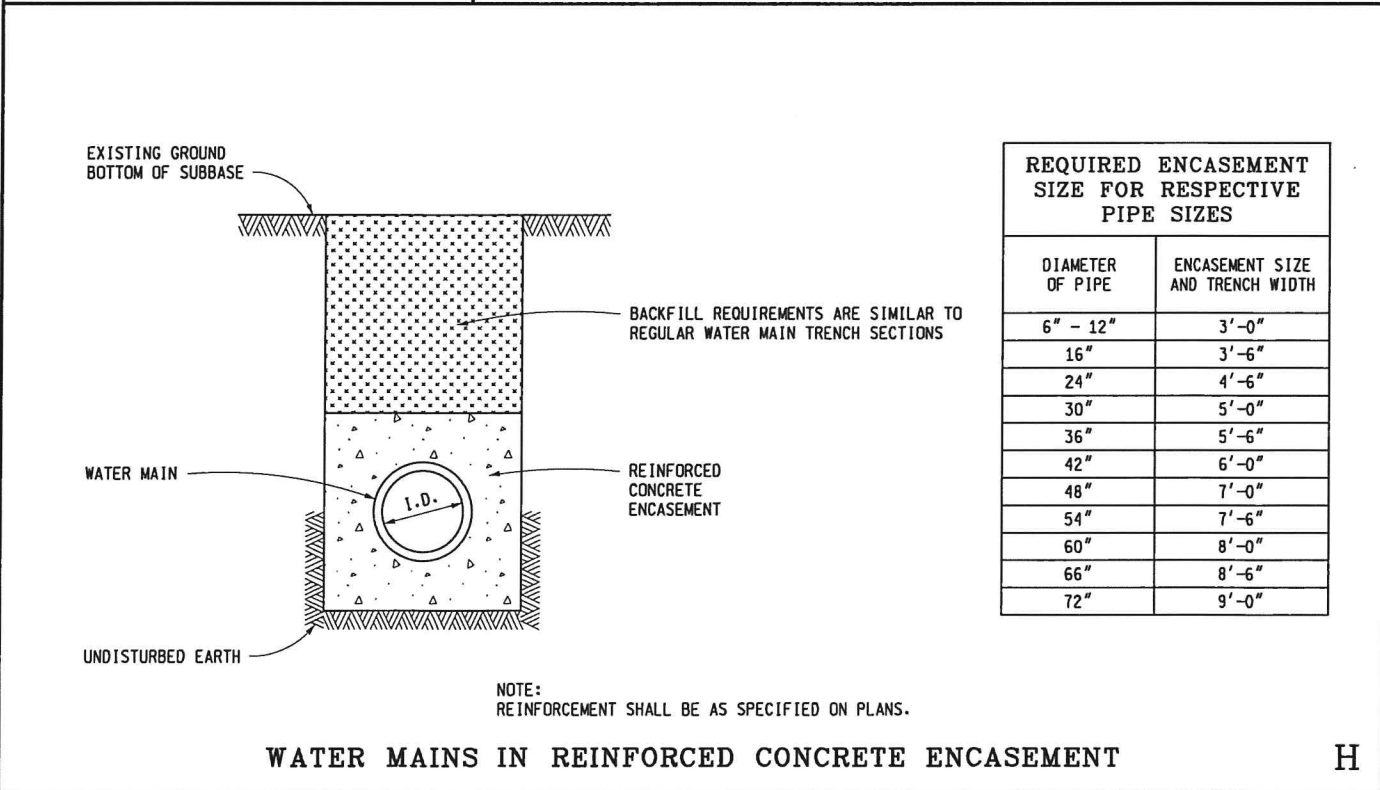
2-8-2016
PLAN DATE

R-83-C

SHEET
3 OF 5



NOTE: WHEN WATER MAIN IS PLACED IN PROPOSED ROADBED AREA, IT SHALL BE BACKFILLED WITH SELECTED EXCAVATION MATERIAL ABOVE FUTURE SUBGRADE TO EXISTING GROUND LINE.



REQUIRED ENCASEMENT SIZE FOR RESPECTIVE PIPE SIZES	
DIAMETER OF PIPE	ENCASEMENT SIZE AND TRENCH WIDTH
6" - 12"	3'-0"
16"	3'-6"
24"	4'-6"
30"	5'-0"
36"	5'-6"
42"	6'-0"
48"	7'-0"
54"	7'-6"
60"	8'-0"
66"	8'-6"
72"	9'-0"

NOTE: REINFORCEMENT SHALL BE AS SPECIFIED ON PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

UTILITY TRENCHES

7-25-2017 F.H.W.A. APPROVAL	2-8-2016 PLAN DATE	R-83-C	SHEET 4 OF 5
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NOTES:

BACKFILLING SHALL BE ACCORDING TO THE STANDARD SPECIFICATION.

SUFFICIENT TRENCH WIDTH SHALL BE PROVIDED TO ALLOW FREE WORKING SPACE AND TO PERMIT COMPACTING THE BACKFILL AROUND THE PIPE.

THE FOLLOWING ARE MINIMUM TRENCH WIDTHS:

I.D. PIPE SIZE (INCHES)	LESS THAN 18	21	24	30	36
"W" TRENCH WIDTH (FEET)	3.0	3.5	4.0	5.0	6.0

I.D. PIPE SIZE (INCHES)	42	48	54	60	66	72
"W" TRENCH WIDTH (FEET)	7.0	8.0	9.5	10.0	10.5	11.0

I.D. PIPE SIZE (INCHES)	78	84	90	96	102	108
"W" TRENCH WIDTH (FEET)	11.5	12.0	12.5	13.0	13.5	14.0

ESTIMATED PAVEMENT REMOVAL WIDTH IS TO BE TRENCH WIDTH "W" PLUS 1'-0" EACH SIDE OF THE TRENCH (16'-0" MINIMUM).

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

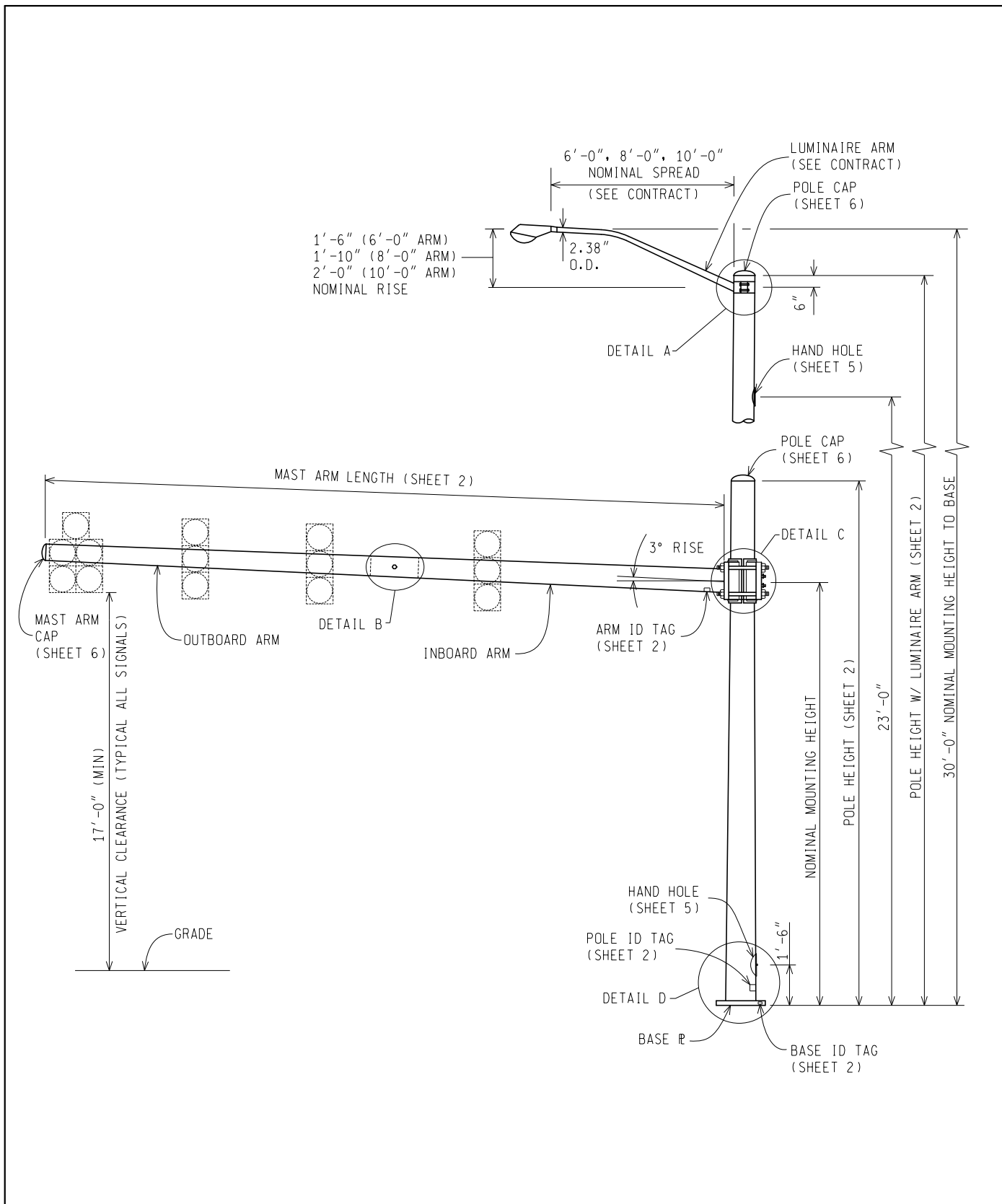
UTILITY TRENCHES

7-25-2017
F.H.W.A. APPROVAL

2-8-2016
PLAN DATE

R-83-C

SHEET
5 OF 5



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG031B.dgn Rev. 11/05/18



PREPARED BY
TRAFFIC AND SAFETY

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL MAST ARM POLE AND
MAST ARM DETAILS - CATEGORY II

DRAWN BY:

CHECKED BY:

PLAN DATE

SIG-031-B

SHEET
1 of 6

ROUND TAPERED STEEL MAST ARM			
MAST ARM LENGTH	* MAST ARM DIMENSIONS	MTG HT SINGLE	MTG HT TWIN
20'-0"	0.2500"-8.50" x 5.70" x 20'-0"	19'-0"	18'-6" & 21'-0"
25'-0"	0.2500"-9.50" x 6.00" x 25'-0"		
30'-0"	0.2500"-10.50" x 6.30" x 30'-0"		
35'-0"	0.4290"-12.00" x 10.60" x 10'-0"		
	0.1793"- ** x 7.50" x **		
40'-0"	0.5000"-12.00" x 10.60" x 10'-0"		
	0.1793"- ** x 6.80" x **		
45'-0"	0.5000"-12.00" x 9.90" x 15'-0"		
	0.1793"- ** x 6.10" x **		
50'-0"	0.7500"-12.00" x 9.20" x 20'-0"		
	0.1793"- ** x 5.36" x **		

ROUND TAPERED STEEL MAST ARM POLE		
* POLE DIMENSIONS	LUMINAIRE ARM	MAST ARM LENGTH (FT)
0.313"-14.00" x 10.92" x 22'-0"	NO	20, 25
0.313"-14.00" x 9.94" x 29'-0"	YES	30, 35
0.358"-14.00" x 10.92" x 22'-0"	NO	40, 45
0.358"-14.00" x 9.94" x 29'-0"	YES	
0.478"-14.00" x 10.92" x 22'-0"	NO	50
0.478"-14.00" x 9.94" x 29'-0"	YES	

POLE TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

NOTE: ONLY USE THE MAST ARM LENGTHS WITH POLE SIZES AS INDICATED IN TABLE ABOVE

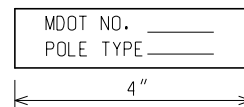
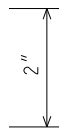
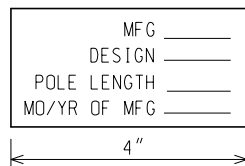
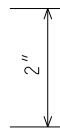
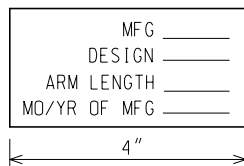
MAST ARM TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

** TO BE DETERMINED BY CONTRACTOR BASED ON REQUIRED MAST ARM LENGTH AND TELESCOPIC SPLICE LENGTH.

NOTES:

1. THE DESIGN OF THIS STRUCTURE IS BASED ON THE 2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS FOR 90 MPH WIND LOAD AND CATEGORY II WITH GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD A MINIMUM OF 36 INCHES LONG. IN ADDITION, LONGITUDINAL SEAM WELDS MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS MUST BE 90° ± FROM HAND HOLE AT BASE.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (Ø) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 3/4 INCH SCHEDULE (SCH.) 40 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.



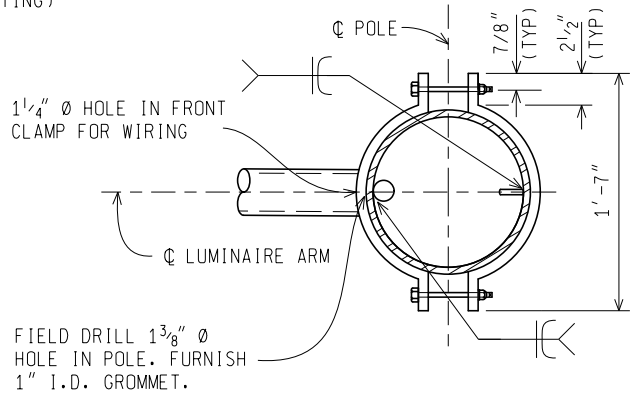
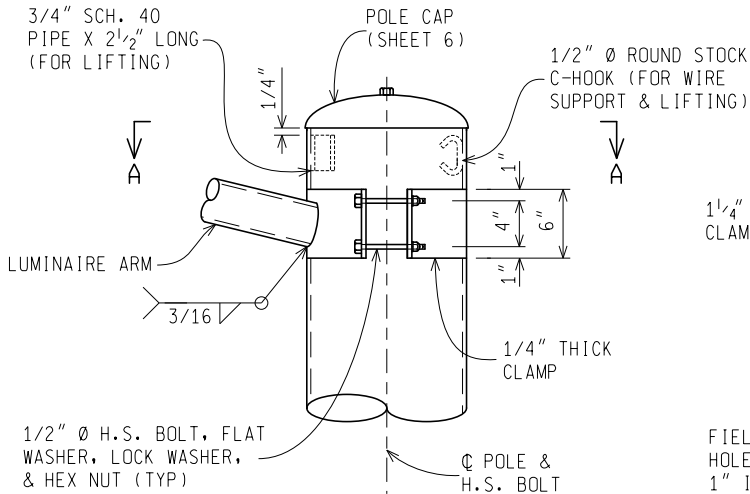
ARM/POLE S.S. ID TAG DETAIL

TO BE ATTACHED TO POLE OR MAST ARM AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 x 3/8" S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)

BASE S.S. ID TAG DETAIL

WELD TAG TO EDGE OF BASE Ø
(LETTERS STAMPED IN 3/8" CHARACTERS)

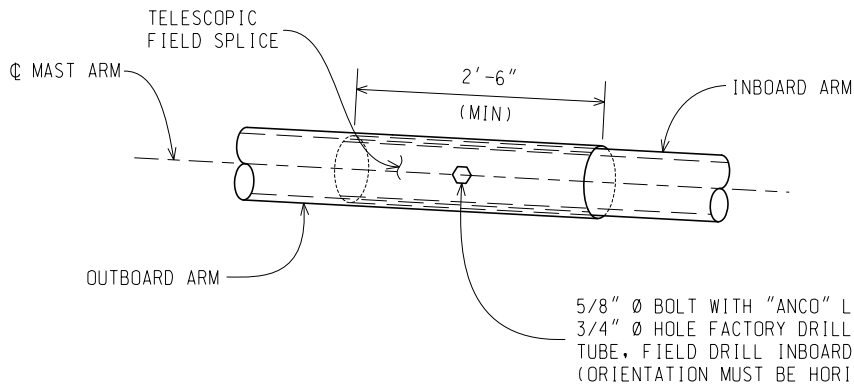
NOT TO SCALE



DETAIL A

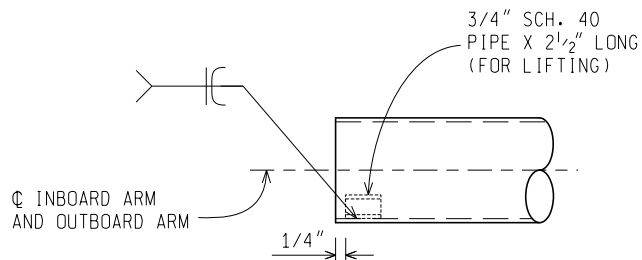
SECTION A-A

ORIENTATION OF SCH. 40 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 40 PIPE



DETAIL B

(35'-0" ARMS AND GREATER)



INBOARD/OUTBOARD ARM LIFTING DEVICE

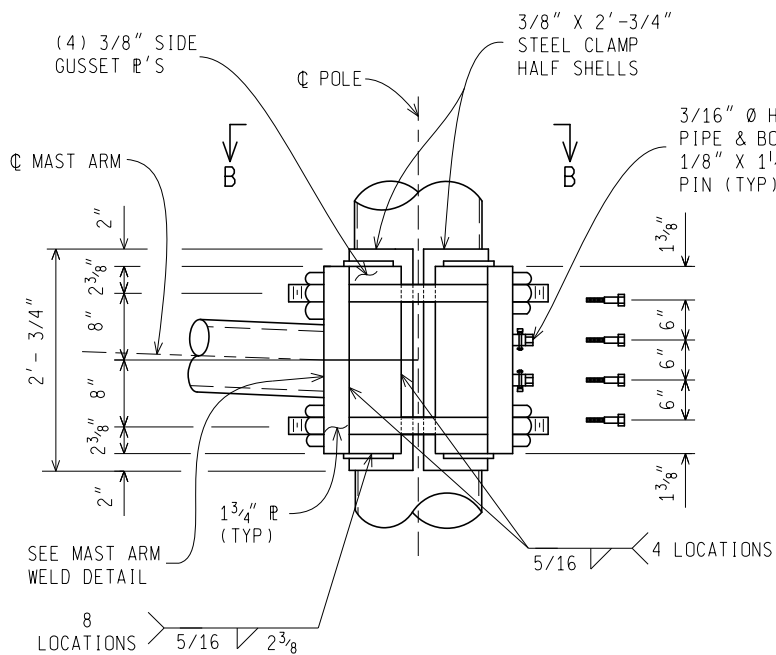
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

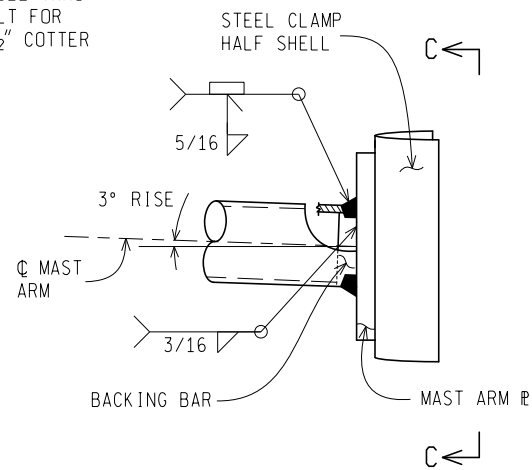
FHWA APPROVAL DATE

SIG-031-B

SHEET
3 of 6

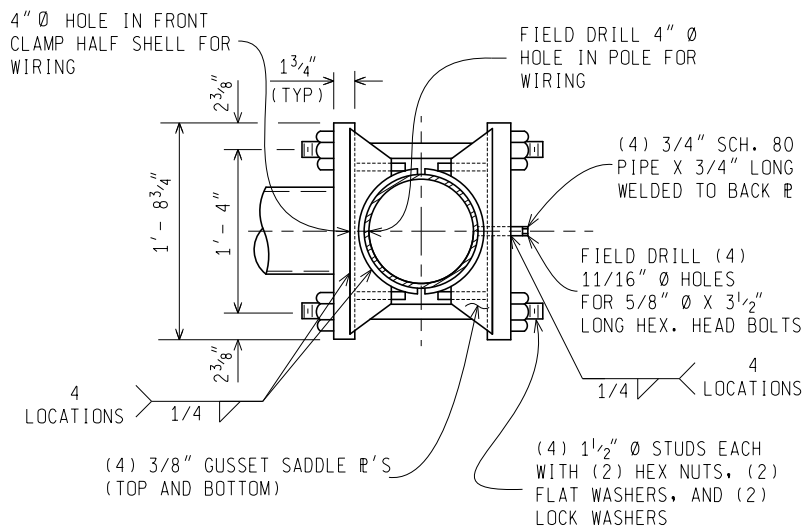


DETAIL C

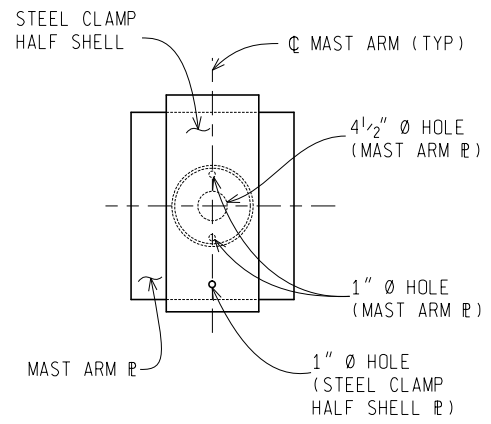


MAST ARM WELD DETAIL

SIDE GUSSET P'S AND SADDLE P'S NOT SHOWN FOR CLARITY



SECTION B-B



SECTION C-C

SIDE GUSSET P'S AND SADDLE P'S NOT SHOWN FOR CLARITY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

FHWA APPROVAL DATE

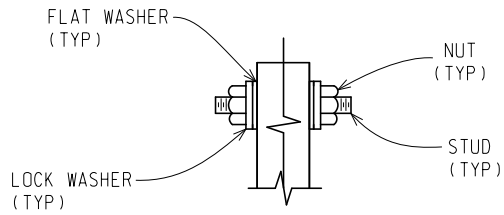
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Rev. 11/05/18

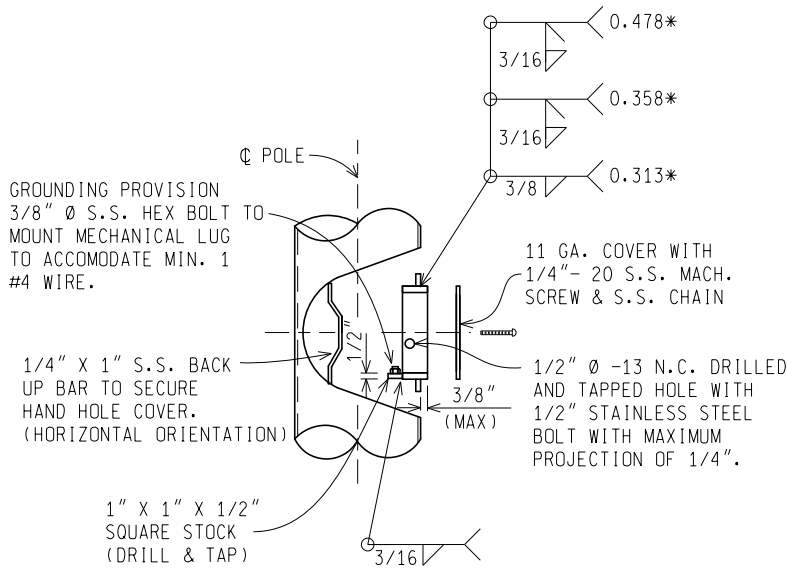
PLAN DATE

SIG-031-B

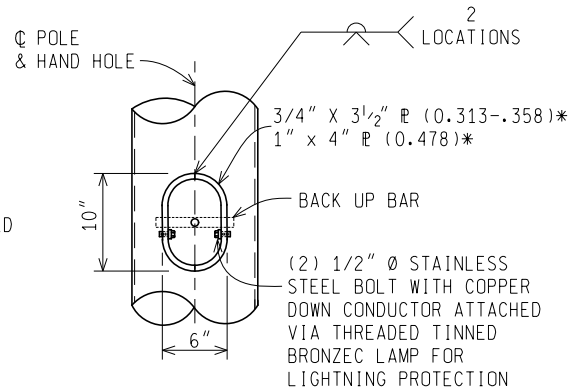
SHEET
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MAST ARM CLAMP WASHER PLACEMENT

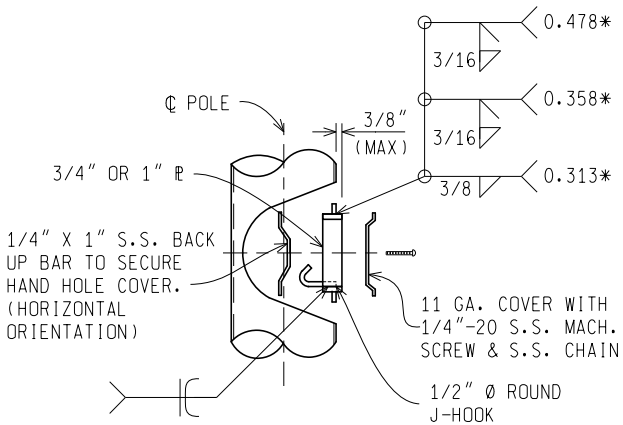


6" X 10" BAR BOTTOM HAND HOLE



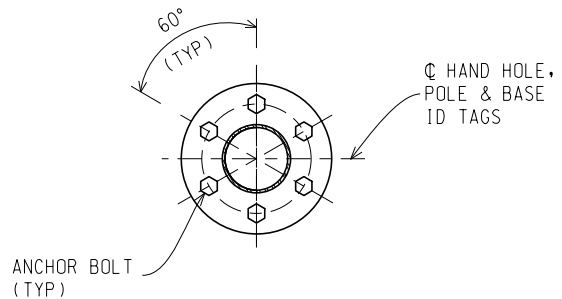
6" X 10" BAR BOTTOM HAND HOLE

(VIEW ROTATED 90 DEGREES)



4" X 6 1/2" BAR TOP HAND HOLE

DESIGN WITH 29'-0" POLE ONLY



ORIENTATION OF HAND HOLE

* THICKNESS OF POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

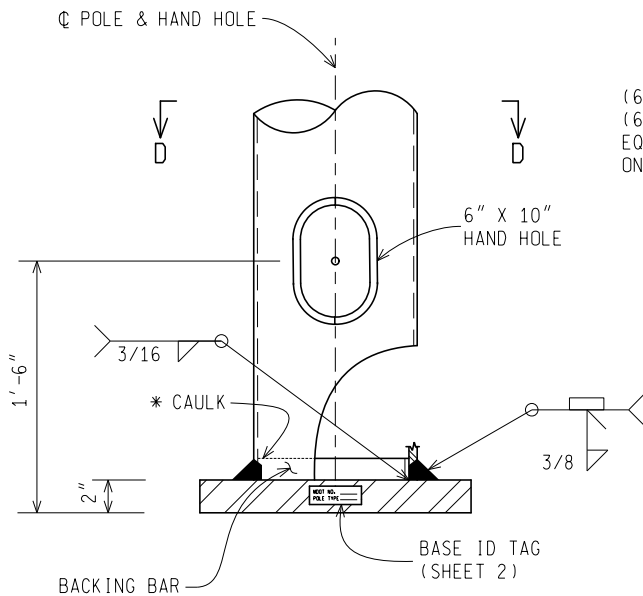
FHWA APPROVAL DATE

SIG-031-B

SHEET
5 of 6

File:RefDoc/TR/Signals/Web/Sp Det/F in/SIG031B.dgn Rev. 11/05/18

PLAN DATE

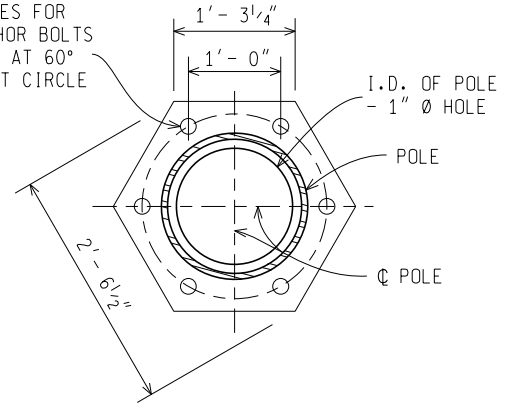


DETAIL D

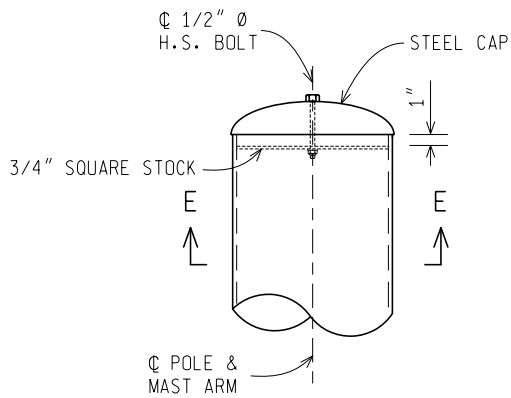
(VIEW ROTATED 90 DEGREES)

* SEAL JOINT WITH CAULK AFTER GALVANIZING

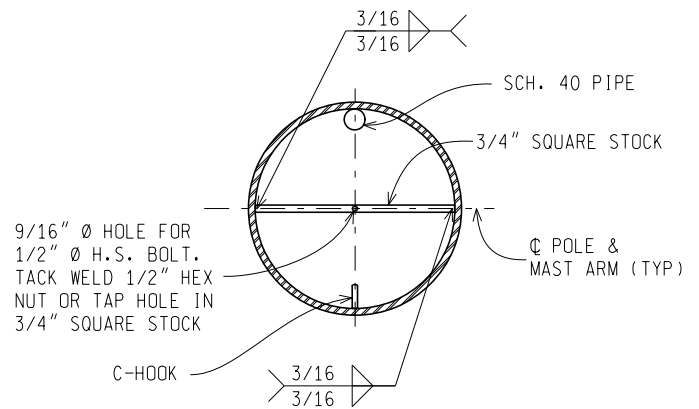
(6) 2 1/16" Ø HOLES FOR
 (6) 1 3/4" Ø ANCHOR BOLTS
 EQUALLY SPACED AT 60°
 ON A 24" Ø BOLT CIRCLE



SECTION D-D



POLE AND MAST ARM CAP DETAIL



SECTION E-E

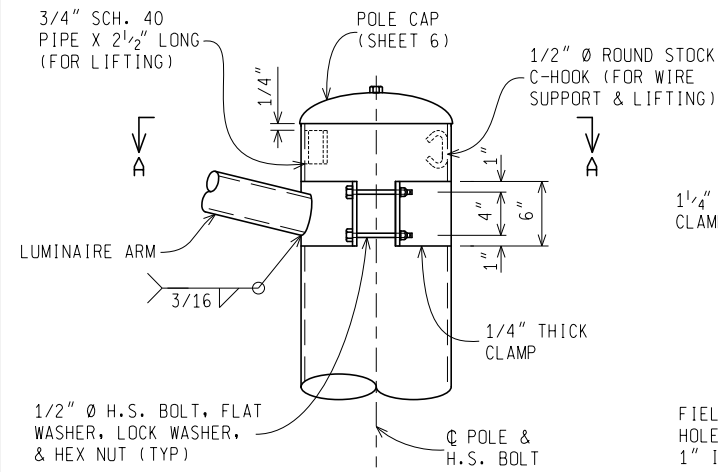
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

FHWA APPROVAL DATE

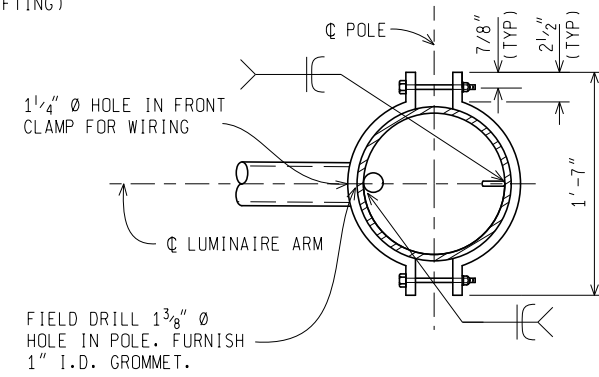
SIG-031-B

SHEET
 6 of 6

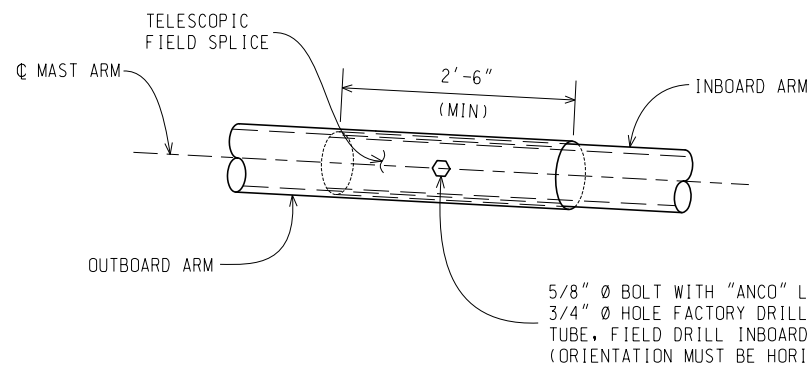


DETAIL A

ORIENTATION OF SCH. 40 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 40 PIPE

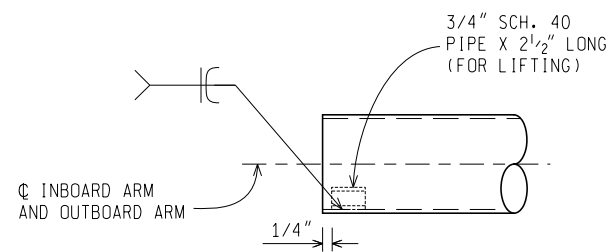


SECTION A-A



DETAIL B

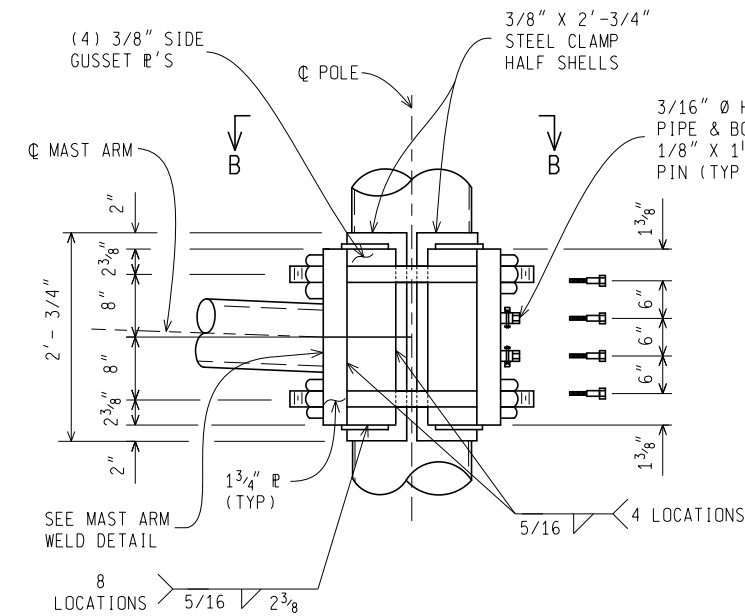
(35'-0" ARMS AND GREATER)



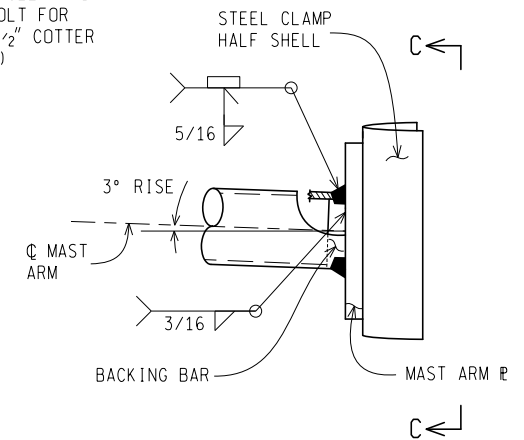
INBOARD/OUTBOARD ARM LIFTING DEVICE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN		FHWA APPROVAL DATE		PLAN DATE	SIG-031-B	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG031B.dgn	Rev. 11/05/18					

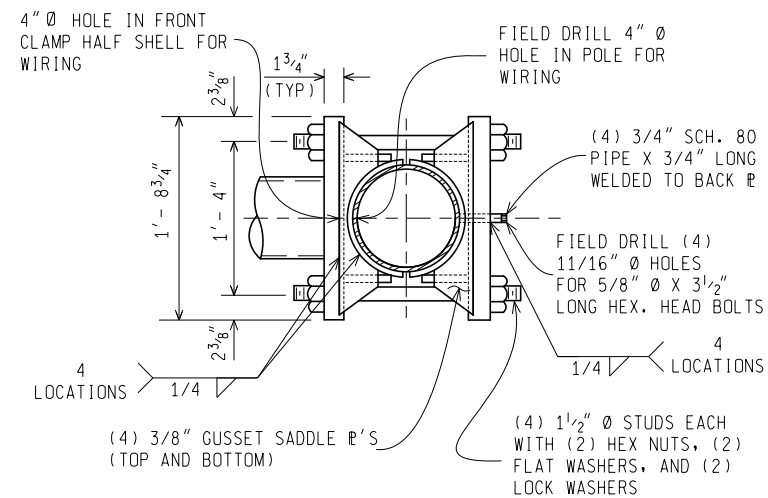


DETAIL C

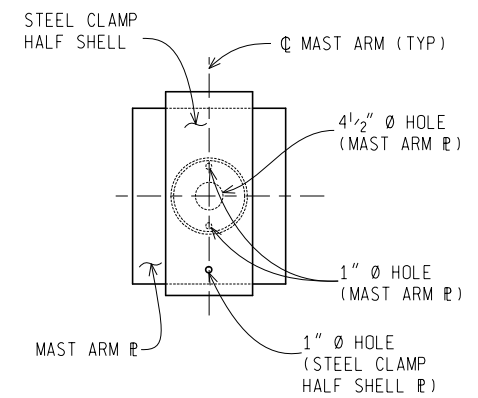


MAST ARM WELD DETAIL

SIDE GUSSET R'S AND SADDLE R'S NOT SHOWN FOR CLARITY



SECTION B-B



SECTION C-C

SIDE GUSSET R'S AND SADDLE R'S NOT SHOWN FOR CLARITY

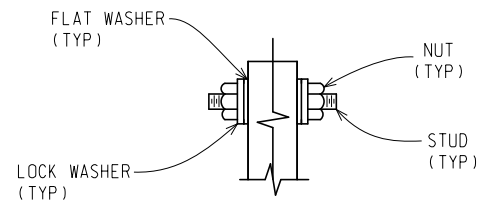
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN		FHWA APPROVAL DATE		PLAN DATE	SIG-031-B	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG031B.dgn	Rev. 11/05/18					

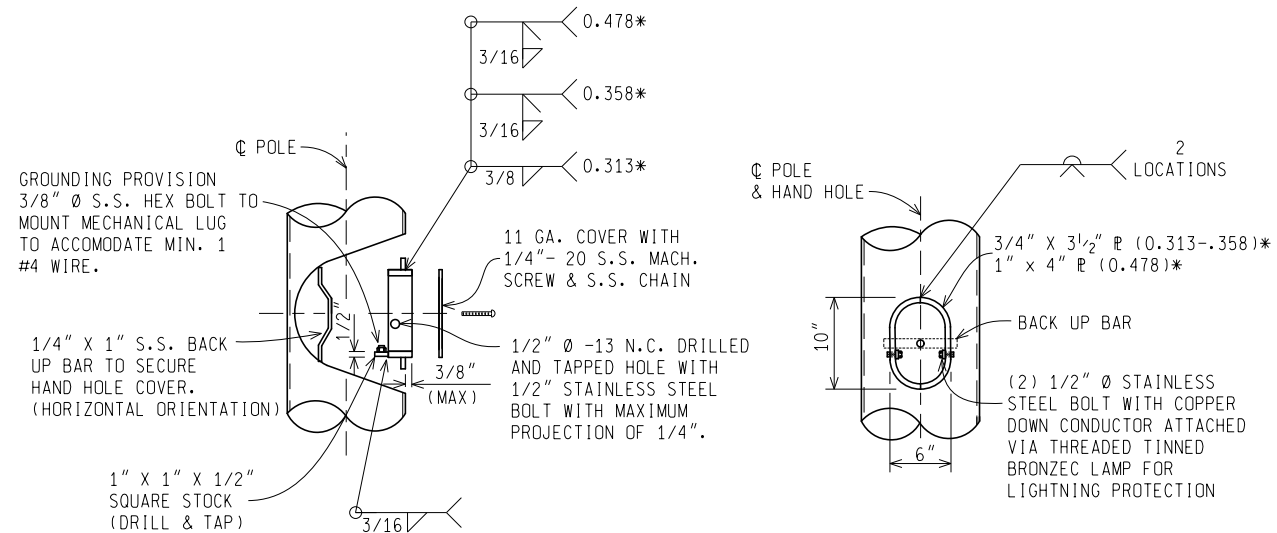
AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION



DATE:	CS:	DRAWING	SHEET
DESIGN UNIT:	JN:		
TSC:			
FILE:			



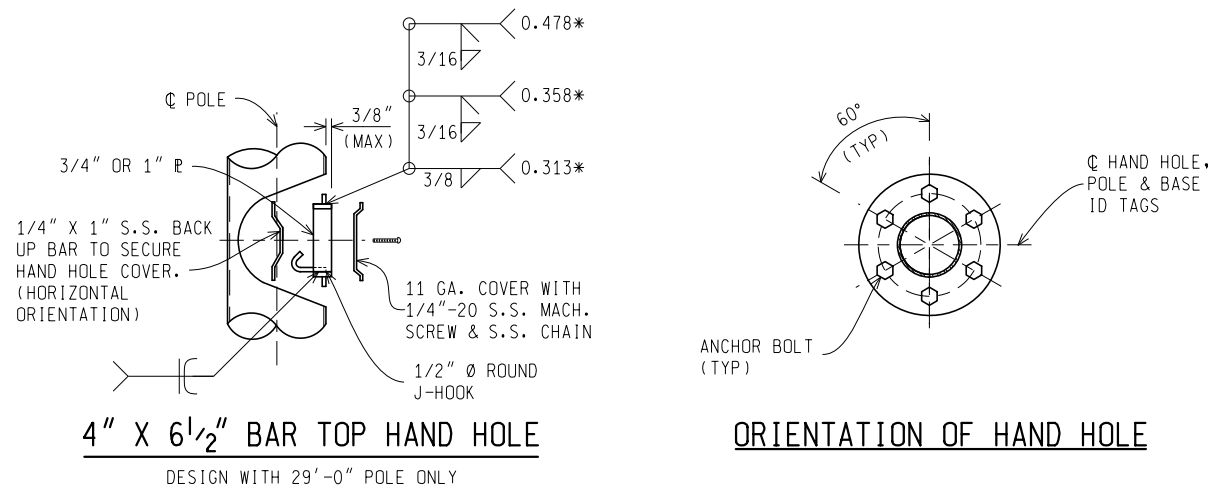
MAST ARM CLAMP WASHER PLACEMENT



6" X 10" BAR BOTTOM HAND HOLE

6" X 10" BAR BOTTOM HAND HOLE

(VIEW ROTATED 90 DEGREES)



4" X 6 1/2" BAR TOP HAND HOLE

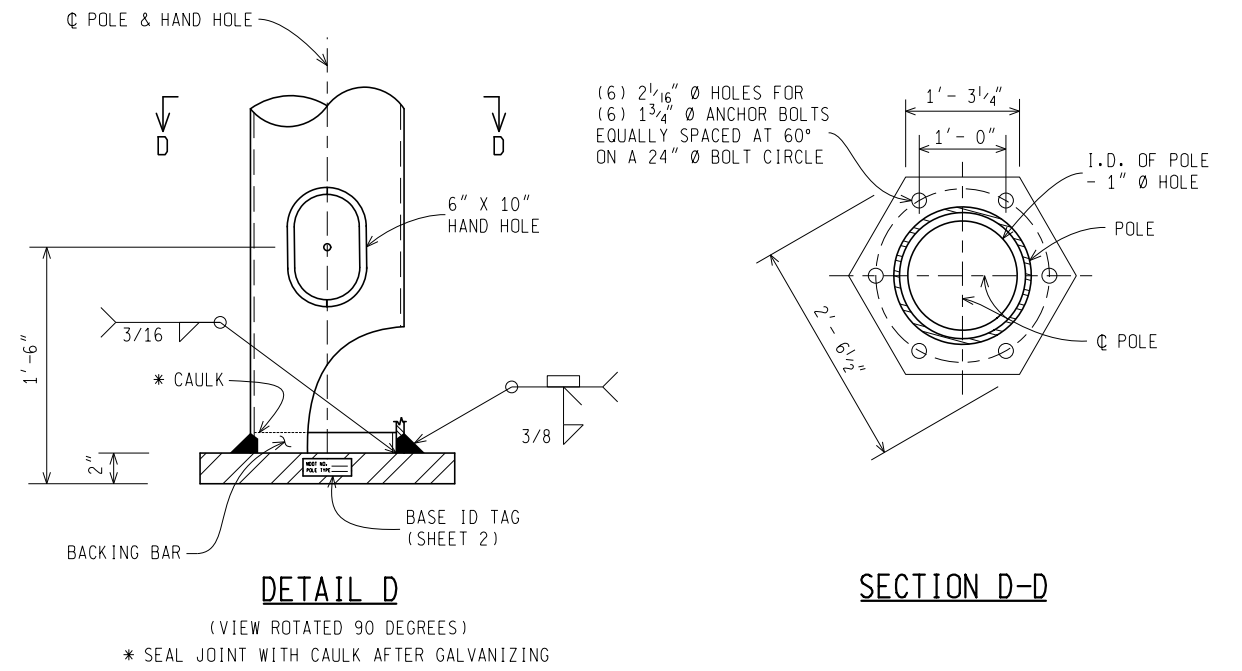
ORIENTATION OF HAND HOLE

DESIGN WITH 29'-0" POLE ONLY

* THICKNESS OF POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN				FHWA APPROVAL DATE				SIG-031-B				SHEET 5 of 6	
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG031B.dgn				Rev. 11/05/18				PLAN DATE					

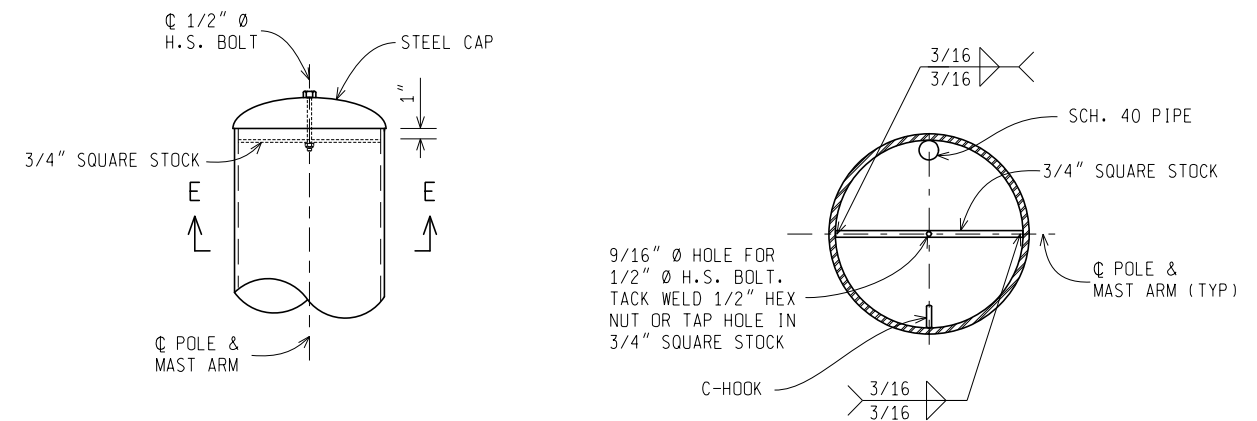


DETAIL D

(VIEW ROTATED 90 DEGREES)

* SEAL JOINT WITH CAULK AFTER GALVANIZING

SECTION D-D



POLE AND MAST ARM CAP DETAIL

SECTION E-E

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN				FHWA APPROVAL DATE				SIG-031-B				SHEET 6 of 6	
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG031B.dgn				Rev. 11/05/18				PLAN DATE					

AS-LET PLAN REVISIONS

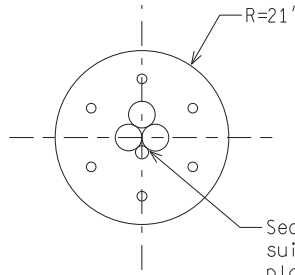
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DATE:	CS:	DRAWING	SHEET
DESIGN UNIT:	JN:		
TSC:			
FILE:			

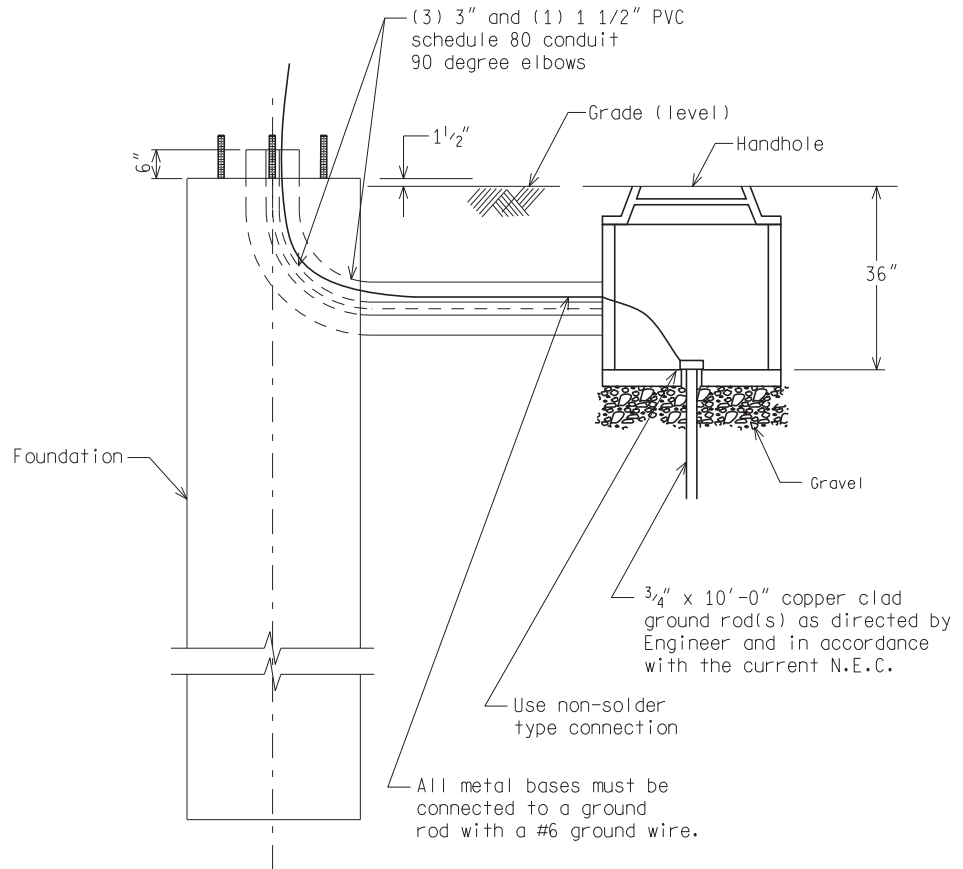
NOTES:

- 1) All ground rods shall be 3/4"x10' copper clad rod a minimum of 2 ground rods shall be used (one for the service disconnect and one for the messenger cable & pole).
- 2) Ground rod placement shall not be less than 12" from the foundation with a minimum of 6' between ground rods. Placement shall be as directed by the Engineer and in compliance with N.E.C.
- 3) Ground wire connection to grounding rod(s) shall utilize a non-solder type connection.
- 4) Indicate the direction of conduits in foundation top with an arrow.
- 5) Install pole that the foundation & anchor bolts are plumb.
- 6) All grounds shall provide less than 10 ohm resistance to ground.



PLAN

Secure conduits together with suitable banding to insure placement prior to concrete pour.



ELEVATION

MAST ARM FOUNDATION CONDUIT AND GROUNDING

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG040A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR
TRAFFIC SIGNAL MAST
ARM STANDARD FOUNDATIONS

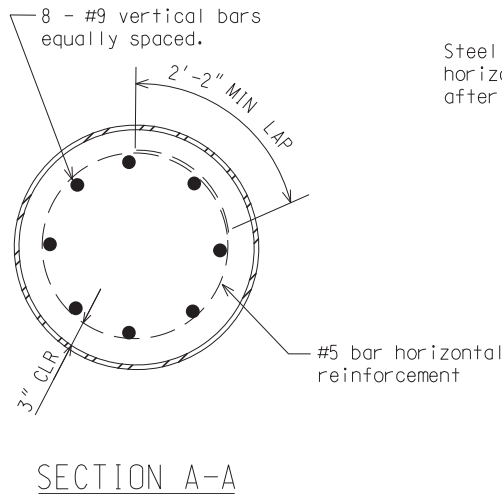
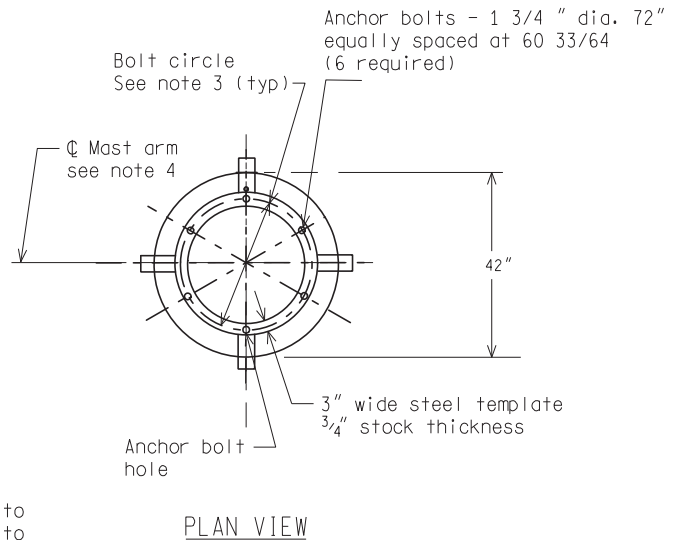
SIG-040-A

SHEET
1 of 4

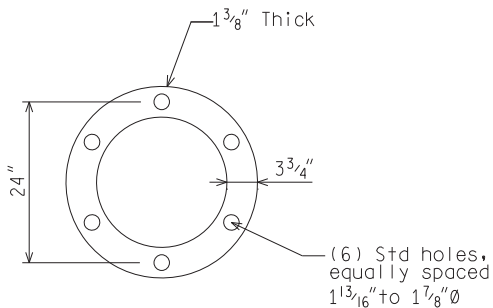
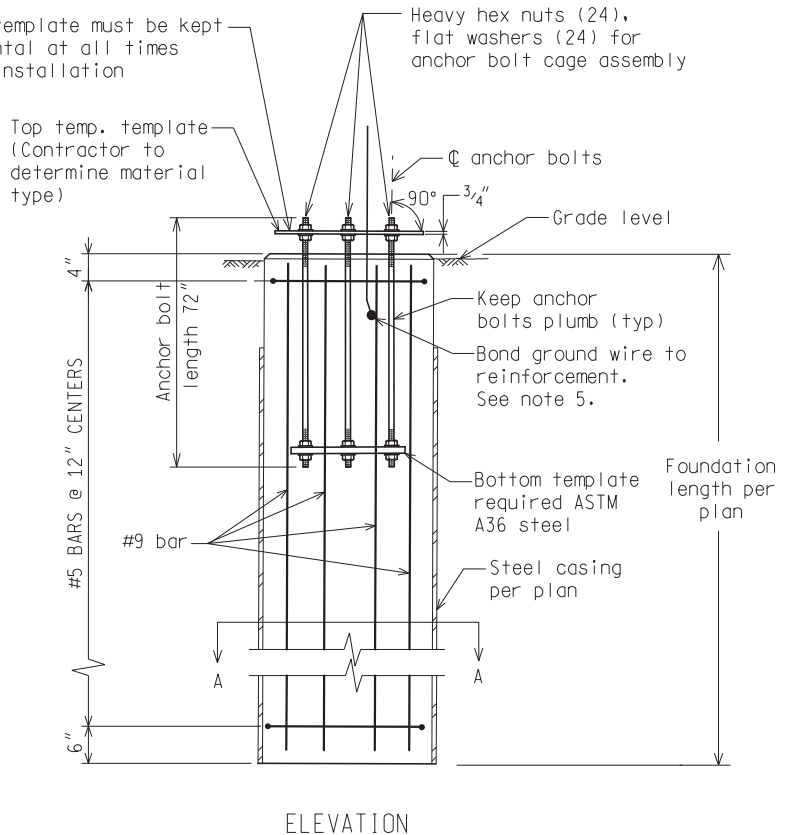
PLAN DATE

NOTES:

- Anchor bolts shall be set and held vertical at the correct location and at the proper elevation with a 3/4" steel (or approved equal) template a minimum of 24 hours after the concrete placement has been completed.
- (6) 1 3/4" - 72" Anchor bolts with (4) Hex nuts and (4) washers per bolt.
- 24" dia bolt circle for Category I, Category II, and Category III Mast Arms.
- Mast arm orientation is not dependent on anchor bolt position.
- Use #4 AWG or larger standard bare ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.
- Galvanize all exposed nuts, bolts, and washers according to ASTM F2329. Galvanize all other steel items according to ASTM A123. Embedded nuts, bolts, washers, and steel ring need not be galvanized.



Steel template must be kept horizontal at all times after installation



BOTTOM STEEL TEMPLATE

MAST ARM FOUNDATION
(SHOWN WITH CASING PAY ITEM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG040A.dgn

Rev. 02/16/17

PLAN DATE

SIG-040-A

SHEET
3 of 4

Foundation Notes:

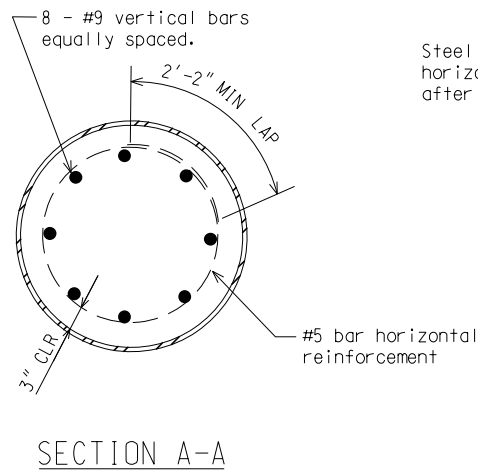
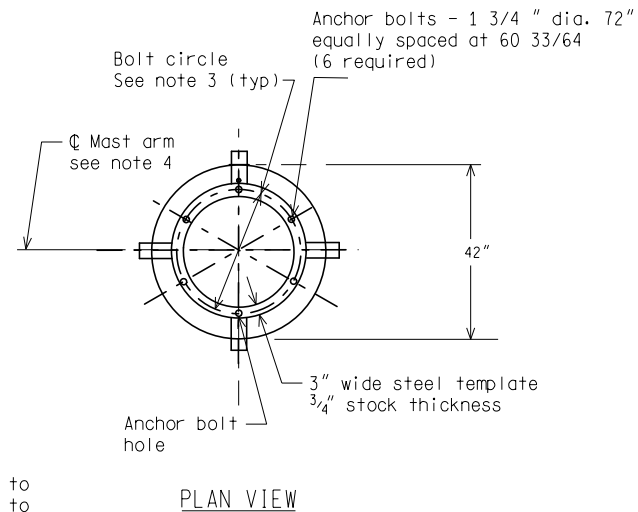
1. Refer to the following special provisions related to 6 anchor bolt mast arm poles:
Traffic Signal Mast Arm Pole and Mast Arm
Mast Arm Pole Foundation and Anchor Bolts
Casing Used With Strain Poles and Mast Arm Poles
2. Templates shall be shop fabricated and assembled prior to being approved by MDOT for shipping.
3. Diameter of bolt holes in template shall be 1/16 " larger than anchor bolt diameter.
4. Conduits and anchor bolts shall be rigidly installed before concrete is placed. The center of the template shall coincide with the center of the foundation. The template and handles shall be well supported, horizontally level and firmly anchored in place a minimum of 24 hours after the concrete placement is completed.
5. Due care shall be taken during the concrete placement to avoid displacing the anchor bolts.
6. No hammering on the anchor bolts or template will be allowed.
7. After template is removed, thread nuts on to the bolt flush with the bolt end to protect threads until signal support is erected.
8. For anchor bolt material refer to section 908.14 A and B of the Michigan Standard Specifications for Construction. For anchor bolt installation and tightening refer to section 810.03 N.
9. Dewatering of wet shafts is not allowed. A wet shaft is defined as having more than 3 inches of standing water or as having water infiltrating at a rate equal to or exceeding 12 inches per hour. For wet shafts, Concrete is to be placed in accordance with section 718.03. (wet construction method) with a tremie tube or concrete pump beginning at the shaft bottom. Grade T concrete must be used for underwater placement. Grade S2 may be used in dry excavations only. See MDOT standard specifications Tables 701-1A and 701-1B (Concrete Structure Mixtures).
10. Per MDOT standard specifications 718.02, the Grade S2 acceptable slump range is 6-8 inches. The Grade T acceptable slump range is 7-9 inches.
11. If soil conditions indicate there is no need for a casing pay item as shown on the plans, the contractor should request permission of the engineer to install the foundation without casing.
12. When the casing pay item is included on the plans for a foundation (due to granular soils or a wet hole), steel casing (smooth walled) is to be installed to enable the foundation to be poured. The thickness of the steel is to be determined by the contractor. The steel casing shall be left in place. A suitable method of compaction must be employed to ensure the soil immediately outside the casing is compacted properly.
13. When the casing pay item is called for on the plans, the steel casing may stop at the conduit entrance to foundation. Top of foundation must then be formed separately. The casing pay item quantity will be paid for based on actual linear feet installed.
14. Construct mast arm foundations, according to subsections 718.03 of the Standard Specifications for Construction. All work and materials shall be in accordance with the MDOT Standard Specifications.
15. Steel reinforcement shall be ASTM A615 grade 60 without epoxy coating.
16. Exposed concrete surfaces shall be cast in forms. Exposed concrete edges shall be beveled 3/4".
17. Steel reinforcement shall have a clear cover of 3 inches unless noted otherwise. Steel Reinforcement may be adjusted to ensure proper clear cover.
18. Grounding of pole includes adding #4 bare copper ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.

NOT TO SCALE

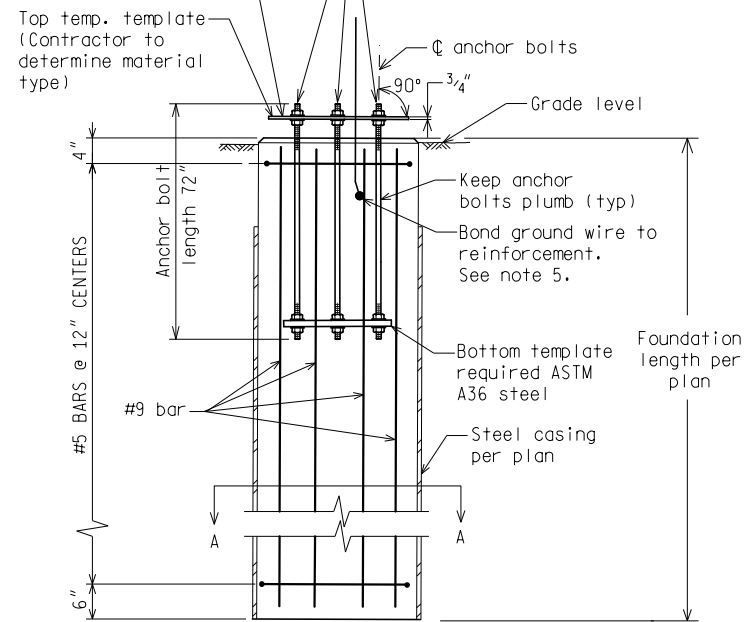
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-040-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG040A.dgn	Rev. 02/16/17	PLAN DATE		

NOTES:

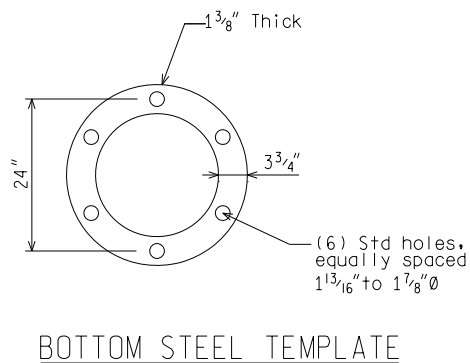
- Anchor bolts shall be set and held vertical at the correct location and at the proper elevation with a 3/4" steel (or approved equal) template a minimum of 24 hours after the concrete placement has been completed.
- (6) 1 3/4" - 72" Anchor bolts with (4) Hex nuts and (4) washers per bolt.
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- Mast arm orientation is not dependent on anchor bolt position.
- Use #4 AWG or larger standard bare ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.
- Galvanize all exposed nuts, bolts, and washers according to ASTM F2329. Galvanize all other steel items according to ASTM A123. Embedded nuts, bolts, washers, and steel ring need not be galvanized.



Steel template must be kept horizontal at all times after installation



MAST ARM FOUNDATION (SHOWN WITH CASING PAY ITEM)



NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-040-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Def/F in/SIG040A.dgn Rev. 02/16/17		PLAN DATE		

Foundation Notes:

- Refer to the following special provisions related to 6 anchor bolt mast arm poles:
Traffic Signal Mast Arm Pole and Mast Arm Mast Arm Pole Foundation and Anchor Bolts Casing Used With Strain Poles and Mast Arm Poles
- Templates shall be shop fabricated and assembled prior to being approved by MDOT for shipping.
- Diameter of bolt holes in template shall be 1/16" larger than anchor bolt diameter.
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- Due care shall be taken during the concrete placement to avoid displacing the anchor bolts.
- No hammering on the anchor bolts or template will be allowed.
- After template is removed, thread nuts on to the bolt flush with the bolt end to protect threads until signal support is erected.
- For anchor bolt material refer to section 908.14 A and B of the Michigan Standard Specifications for Construction. For anchor bolt installation and tightening refer to section 810.03 N.
- Dewatering of wet shafts is not allowed. A wet shaft is defined as having more than 3 inches of standing water or as having water infiltrating at a rate equal to or exceeding 12 inches per hour. For wet shafts, concrete is to be placed in accordance with section 718.03. (wet construction method) with a tremie tube or concrete pump beginning at the shaft bottom. Grade T concrete must be used for underwater placement. Grade S2 may be used in dry excavations only. See MDOT standard specifications Tables 701-1A and 701-1B (Concrete Structure Mixtures).
- Per MDOT standard specifications 718.02, the Grade S2 acceptable slump range is 6-8 inches. The Grade T acceptable slump range is 7-9 inches.
- If soil conditions indicate there is no need for a casing pay item as shown on the plans, the contractor should request permission of the engineer to install the foundation without casing.
- When the casing pay item is included on the plans for a foundation (due to granular soils or a wet hole), steel casing (smooth walled) is to be installed to enable the foundation to be poured. The thickness of the steel is to be determined by the contractor. The steel casing shall be left in place. A suitable method of compaction must be employed to ensure the soil immediately outside the casing is compacted properly.
- When the casing pay item is called for on the plans, the steel casing may stop at the conduit entrance to foundation. Top of foundation must then be formed separately. The casing pay item quantity will be paid for based on actual linear feet installed.
- Construct mast arm foundations, according to subsections 718.03 of the Standard Specifications for Construction. All work and materials shall be in accordance with the MDOT Standard Specifications.
- Steel reinforcement shall be ASTM A615 grade 60 without epoxy coating.
- Exposed concrete surfaces shall be cast in forms. Exposed concrete edges shall be beveled 3/4".
- Steel reinforcement shall have a clear cover of 3 inches unless noted otherwise. Steel Reinforcement may be adjusted to ensure proper clear cover.
- Grounding of pole includes adding #4 bare copper ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.

NOT TO SCALE

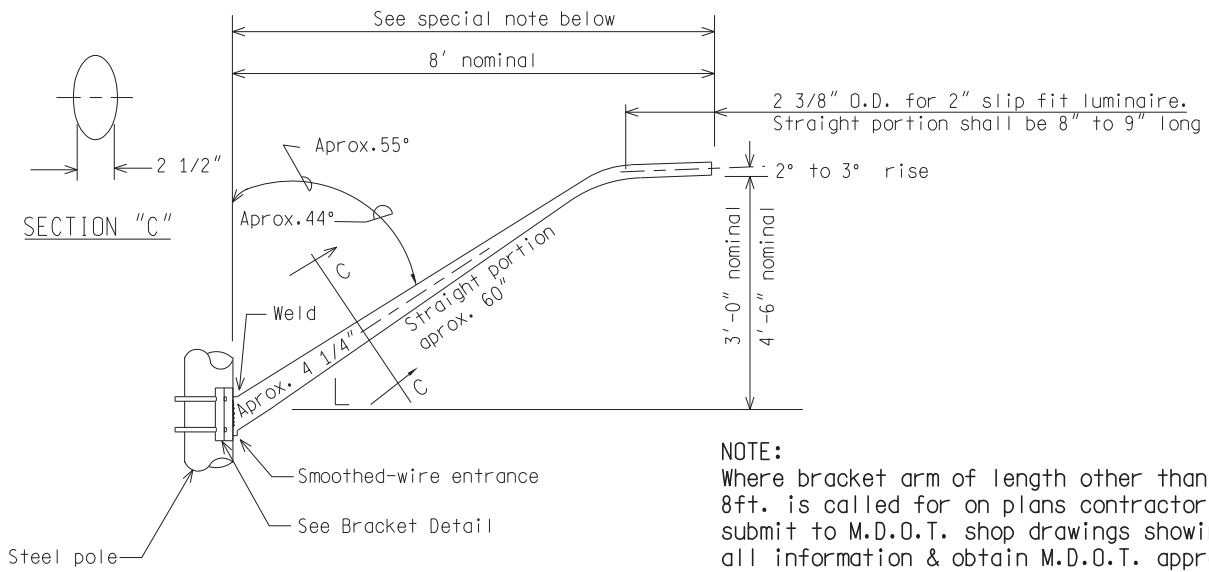
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-040-A	SHEET 4 of 4
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AS-LET PLAN REVISIONS

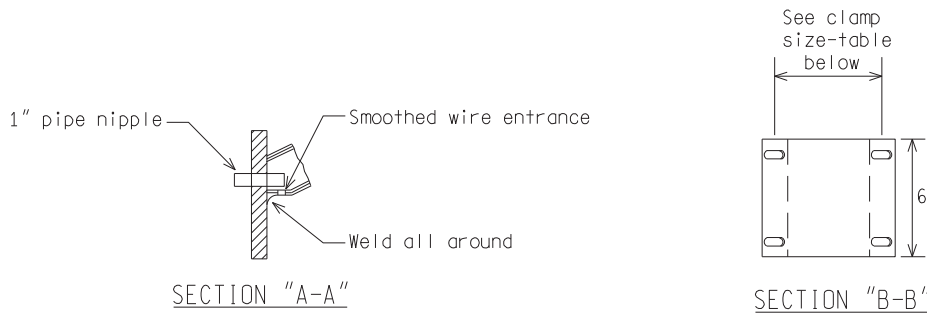
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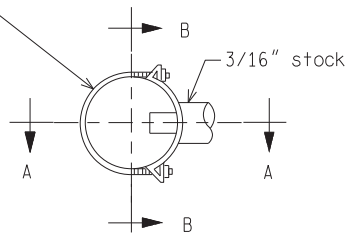
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DESIGN UNIT:	JN:		
TSC:			
FILE:			



CLAMP ON BRACKET ARM ASSEMBLY (STREET LIGHT)



(2) 5/8" dia. "U" bolts, cadmium or zinc phosphate plating with lockwashers & nuts.



BRACKET DETAIL

CLAMP SIZE TABLE

TYPE	POLE DIAMETER
A	3.6" - 4.5"
B	6.1" - 6.9"
C	7.5" - 8.5"

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG061A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR
**CLAMP ON BRACKET ARM ASSEMBLY
(STREET LIGHT)**

PLAN DATE

SIG-061-A

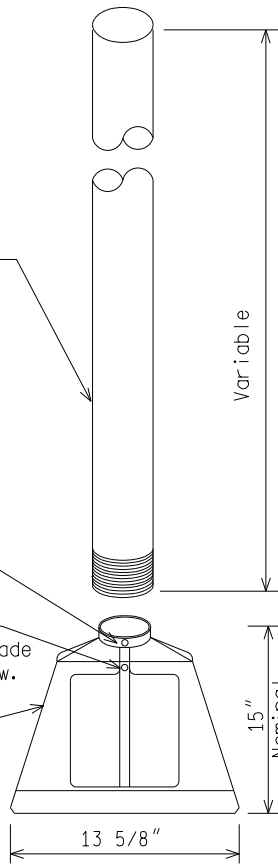
SHEET
1 of 1

Aluminum Pedestal
6063-T6 alloy, 4" x .237"
wall schedule 40-3.73 #/ft.
spun finish.

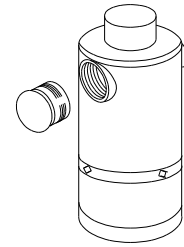
3/8"x1 1/4" stainless
steel set screw

Cover held in place with a
1/4"x 20 UNC Hex head 300 grade
stainless steel machine screw.

Frangible Square
aluminum base
See Note 4) on
sheet 3 of 3.



SQUARE ALUMINUM BASE

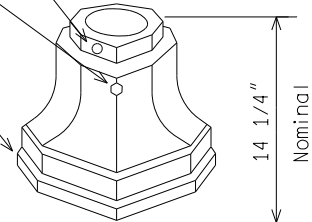


POST TOP
(SLIP FITTER)

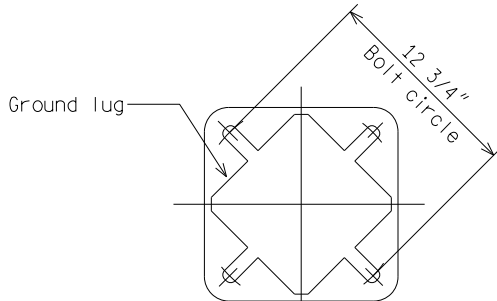
3/8" x 20 UNC x 2" stainless
steel set screw

Cover held in place with a
1/4"x20 UNC Hex head 300 grade
stainless steel machine screw.

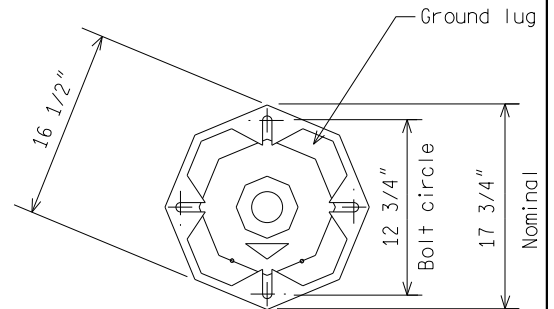
Frangible Octagonal
aluminum base
See Note 4) on
sheet 3 of 3.
See Note 5) on sheet 3 of 3
for RCOC preference.



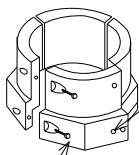
OCTAGONAL BASE



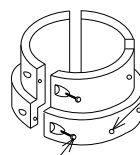
SQUARE BASE
BOTTOM PLAN



OCTAGONAL BASE
BOTTOM PLAN



COLLAR
(OCTAGONAL BASE)



COLLAR
(SQUARE BASE)

NOTE: Use pedestal collar for pedestal length greater than or equal to 14' (typical for 3 color traffic signals with pedestrian signals)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG070A.dgn Rev. 04/05/21



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:
CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

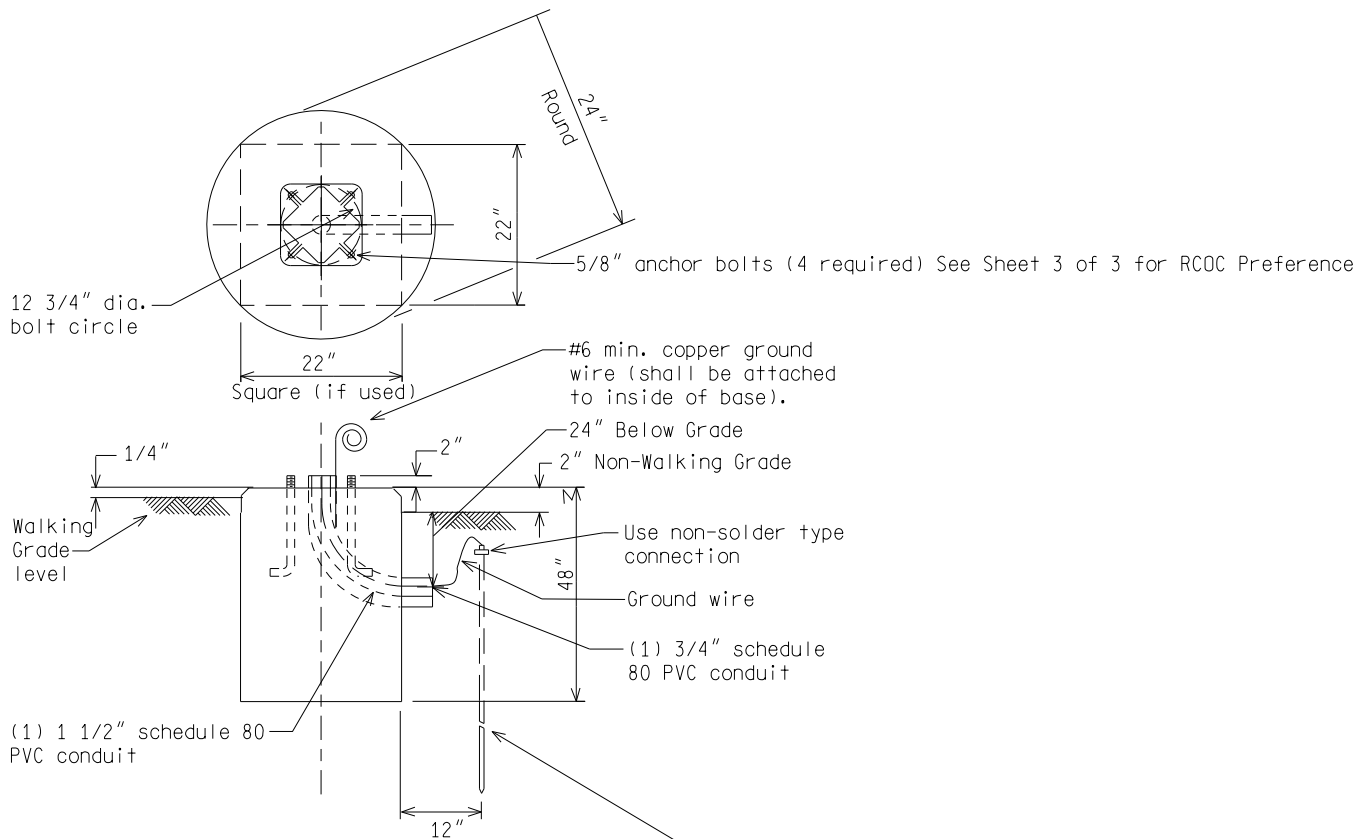
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTAL FOUNDATION

SIG-070-A

PLAN DATE

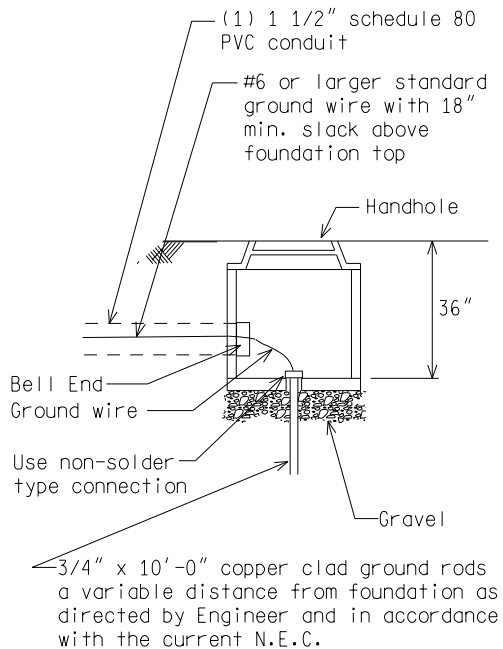
SHEET
1 of 3



3/4"x10'-0" copper clad ground rod(s). (Ground rod(s) must be installed in handhole outside of fdn. (a min. of 12" from fdn.-6" below grade) or as directed by the Engineer.)

PEDESTAL FOUNDATION

See notes 1, 2 & 3 on sheet 3 of 3.



HANDHOLE DETAIL

NOT TO SCALE

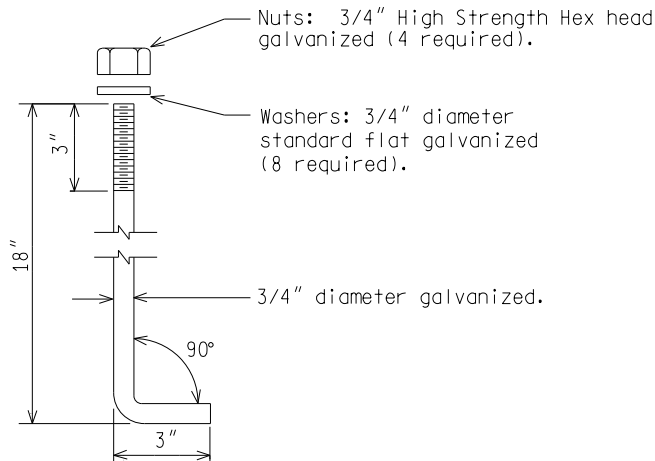
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

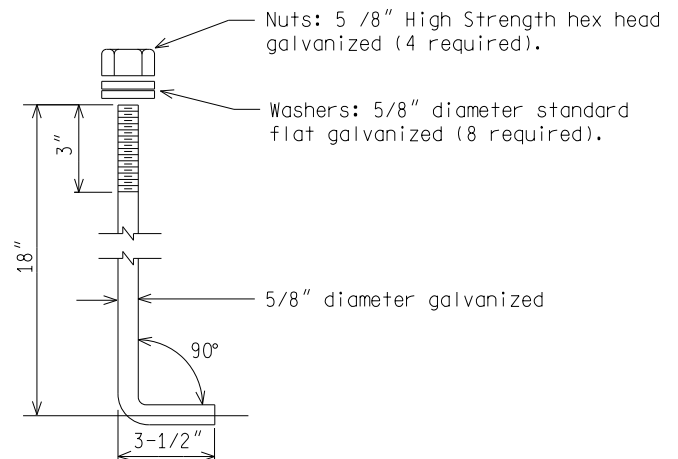
PLAN DATE

SIG-070-A

SHEET
2 of 3



For use on MDOT Trunkline.



For use on Oakland County Roads only.

ANCHOR BOLT DETAIL

NOTE: Anchor bolts are to be ASTM-F1554 Grade 36 (Hot dipped galvanized) (4-required)

NOTES:

- 1) Alternate foundation may be constructed 22"x22" square - 48" deep.
- 2) Grounding system shall measure 10 ohm or less to ground.
- 3) Construction joints not permitted in foundation.
- 4) Pedestal base must meet the requirements of National Cooperative Highway Research Program Report 350 (NCHRP 350) or Manual for Assessing Safety Hardware (MASH) and have Federal Highway Administration (FHWA) acceptance. Pedestal base must also be certified to have a 4-inch maximum stub height after the support has broken away from its base, as specified in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals and the AASHTO Roadside Design Guide.
- 5) Use the Octagonal Base as a preference by the Road Commission for Oakland County (RCOC), for use on Oakland County roads only.

NOT TO SCALE

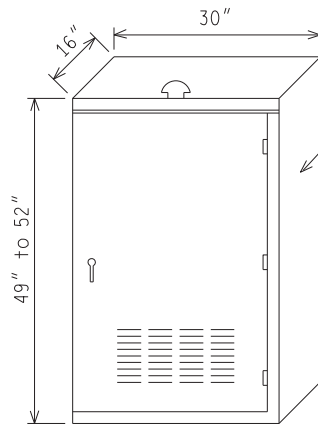
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

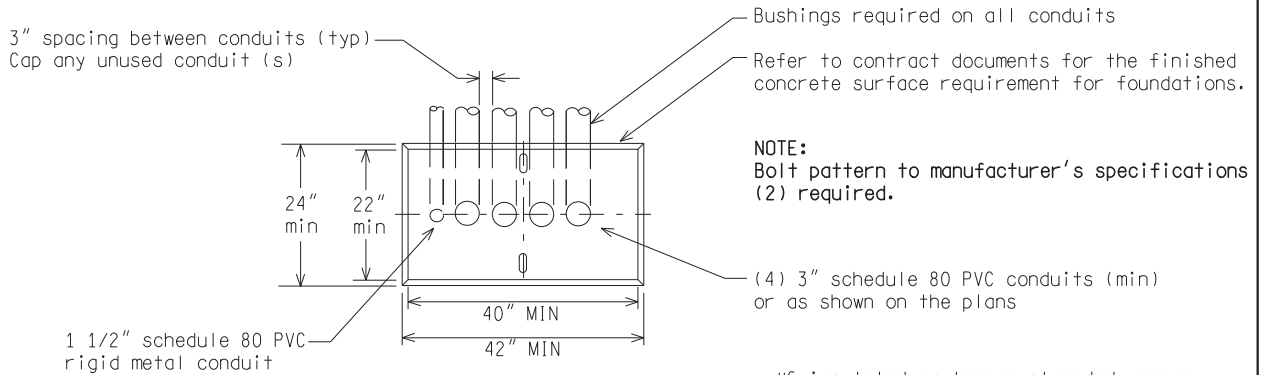
SIG-070-A

SHEET
3 of 3

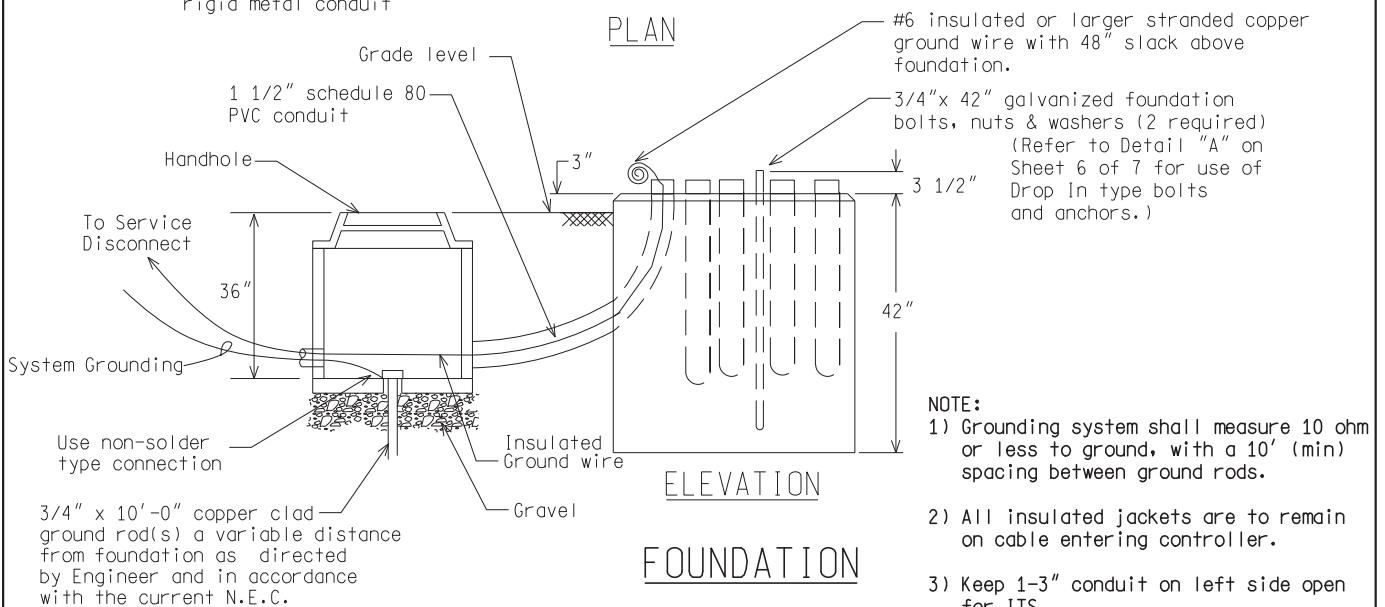


Vented aluminum cabinet with base mounting shall be Type NEMA 3R Size M-30

BASE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET



PLAN



ELEVATION

FOUNDATION

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

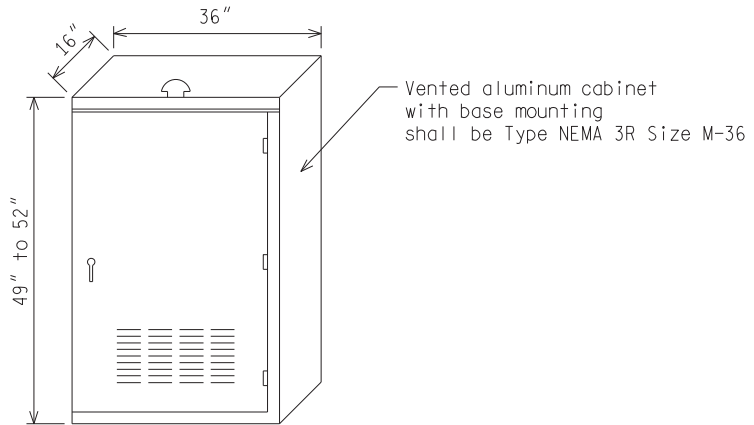
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BASE MOUNTED T.S. CONTROLLER CABINET/FOUNDATIONS

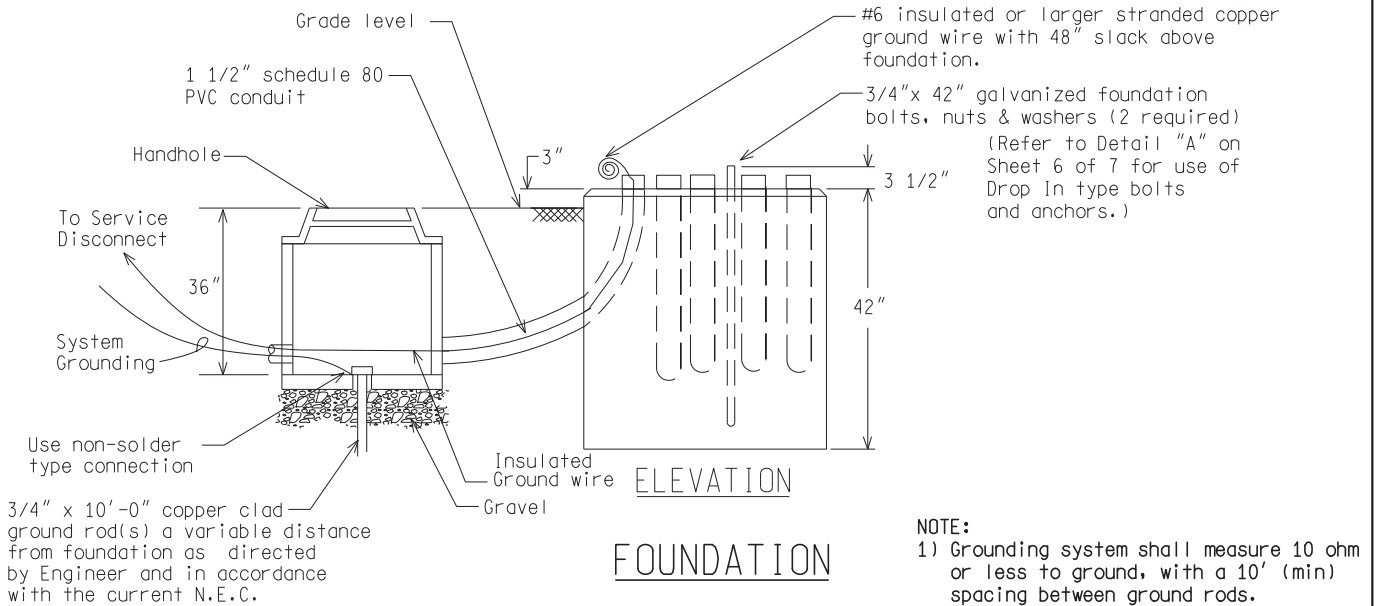
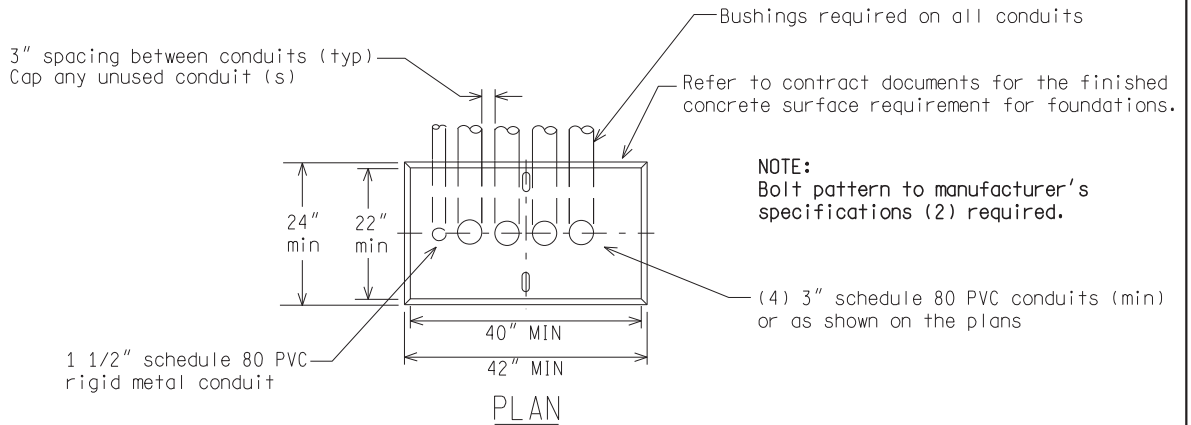
PLAN DATE

SIG-110-A

SHEET
1 of 7



BASE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET



NOT TO SCALE

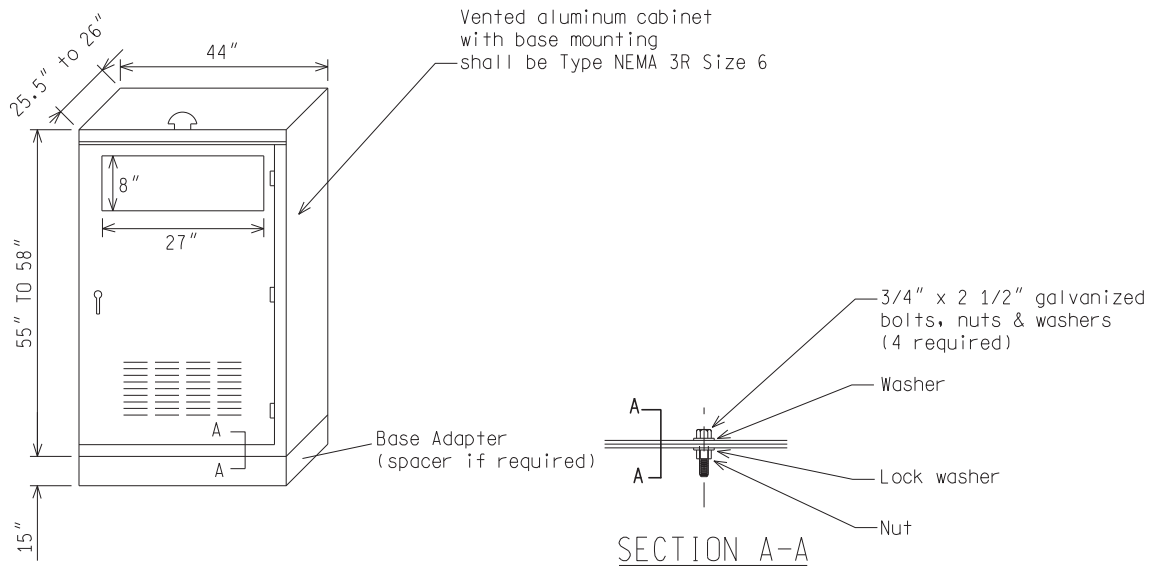
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

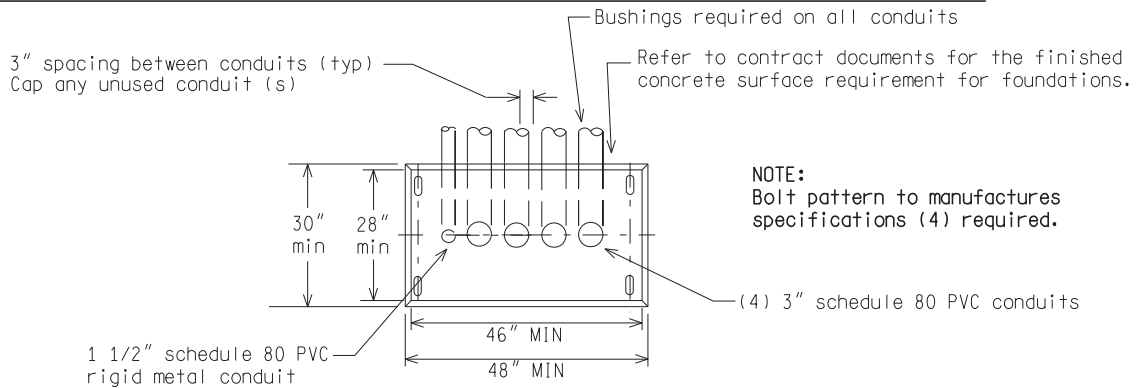
PLAN DATE

SIG-110-A

SHEET
2 of 7

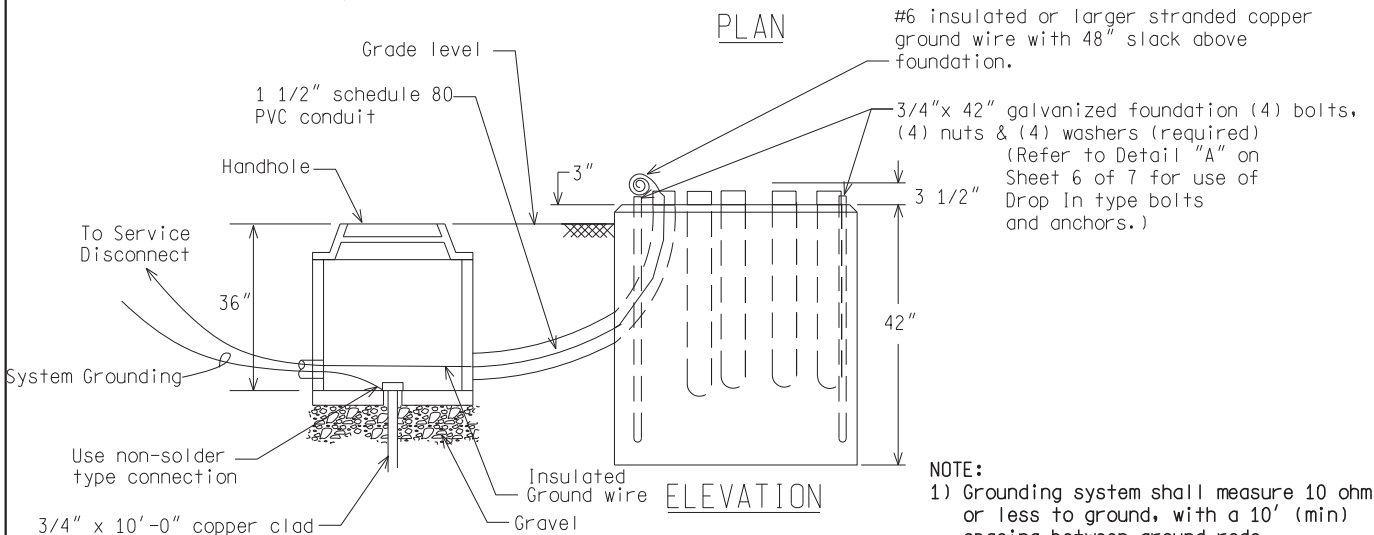


BASE MOUNTED TRAFFIC SIGNAL SIGNAL CONTROLLER CABINET



NOTE:
Bolt pattern to manufactures specifications (4) required.

PLAN



#6 insulated or larger stranded copper ground wire with 48" slack above foundation.

3/4" x 42" galvanized foundation (4) bolts, (4) nuts & (4) washers (required) (Refer to Detail "A" on Sheet 6 of 7 for use of Drop In type bolts and anchors.)

- NOTE:**
- 1) Grounding system shall measure 10 ohm or less to ground, with a 10' (min) spacing between ground rods.
 - 2) All insulated jackets are to remain on cable entering controller.
 - 3) Keep 1-3" conduit on left side open for ITS

ELEVATION FOUNDATION

NOT TO SCALE

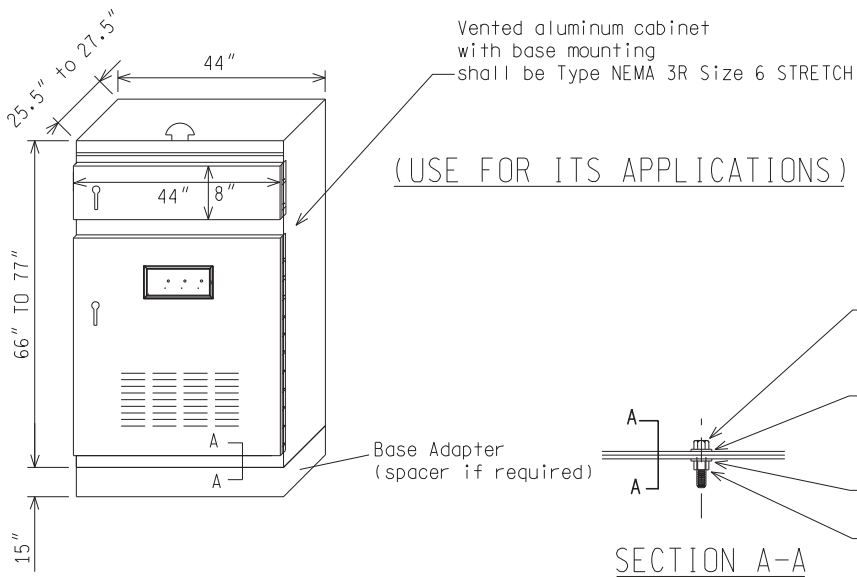
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

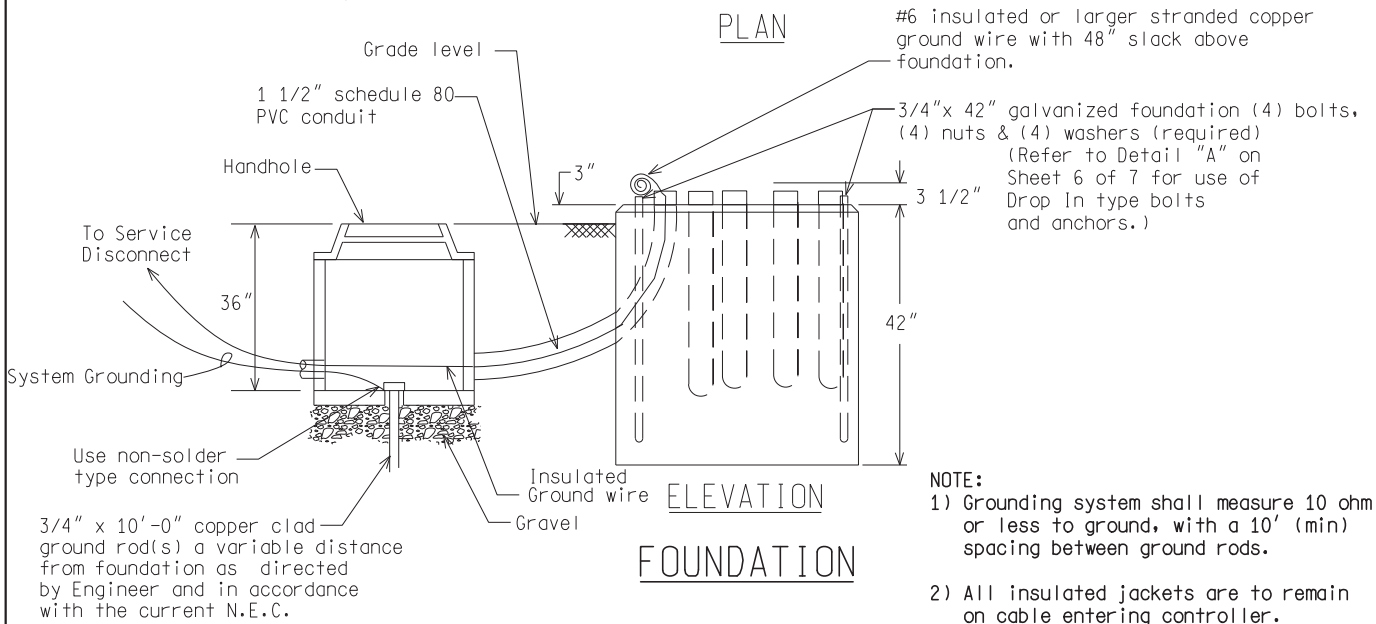
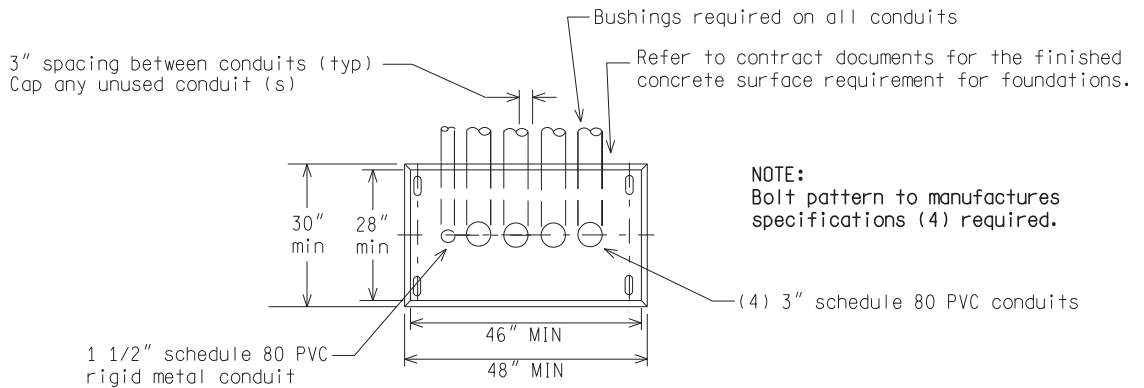
PLAN DATE

SIG-110-A

SHEET
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BASE MOUNTED TRAFFIC SIGNAL ITS CONTROLLER CABINET (IF USED)



NOT TO SCALE

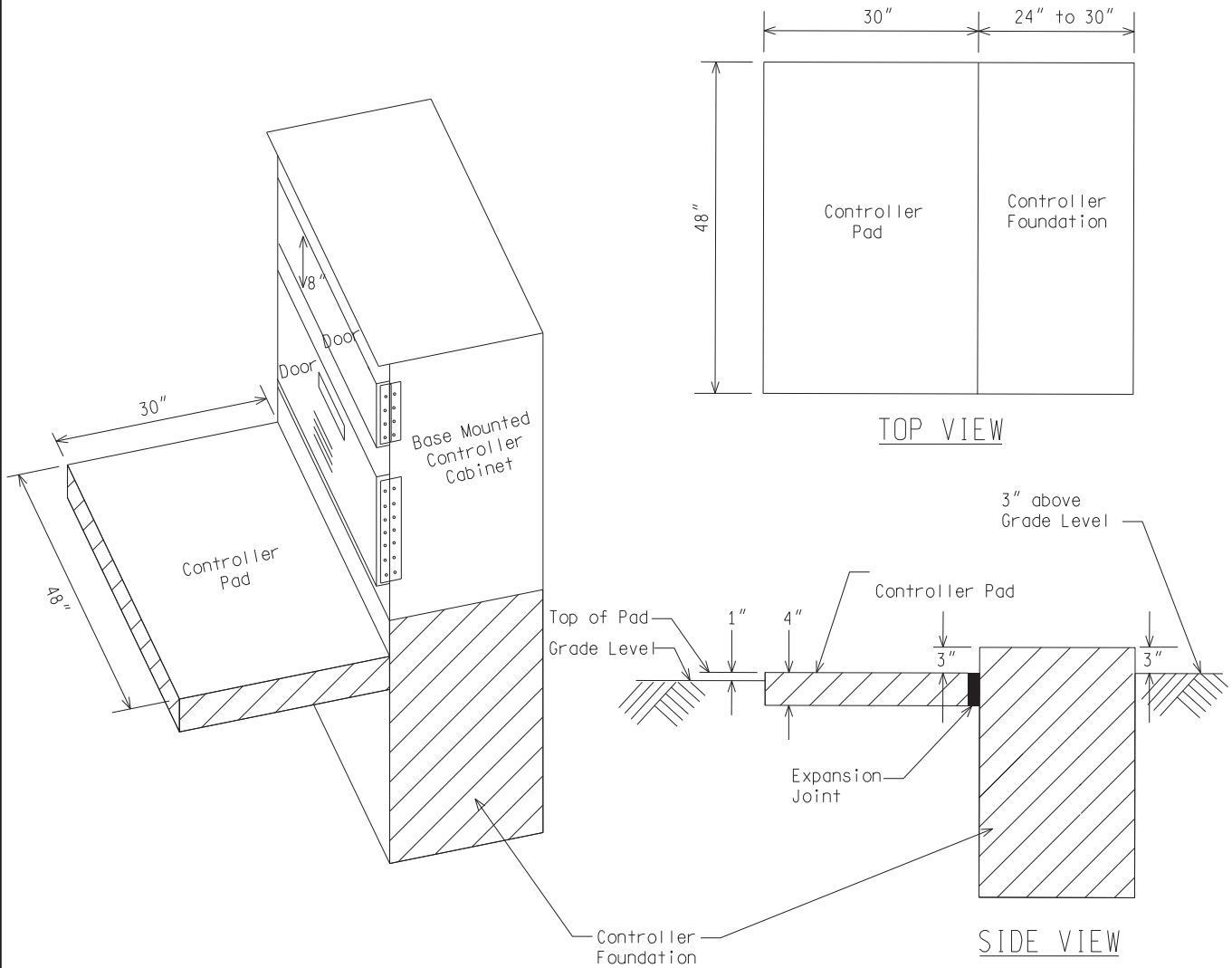
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

SIG-110-A

SHEET
4 of 7

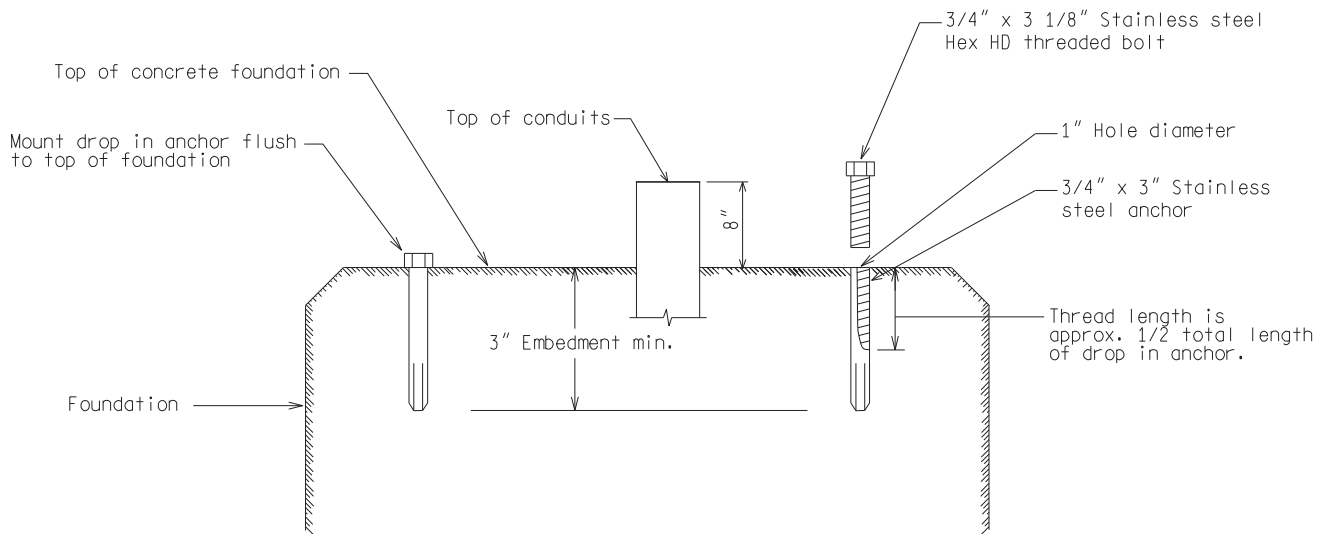


BASE MOUNTED CONTROLLER PAD

NOTE:
 Payment for controller pad to be included in controller foundation pay item.
 Controller cabinet door to open toward pad.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-110-A	SHEET 5 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn	Rev. 02/16/17	PLAN DATE		

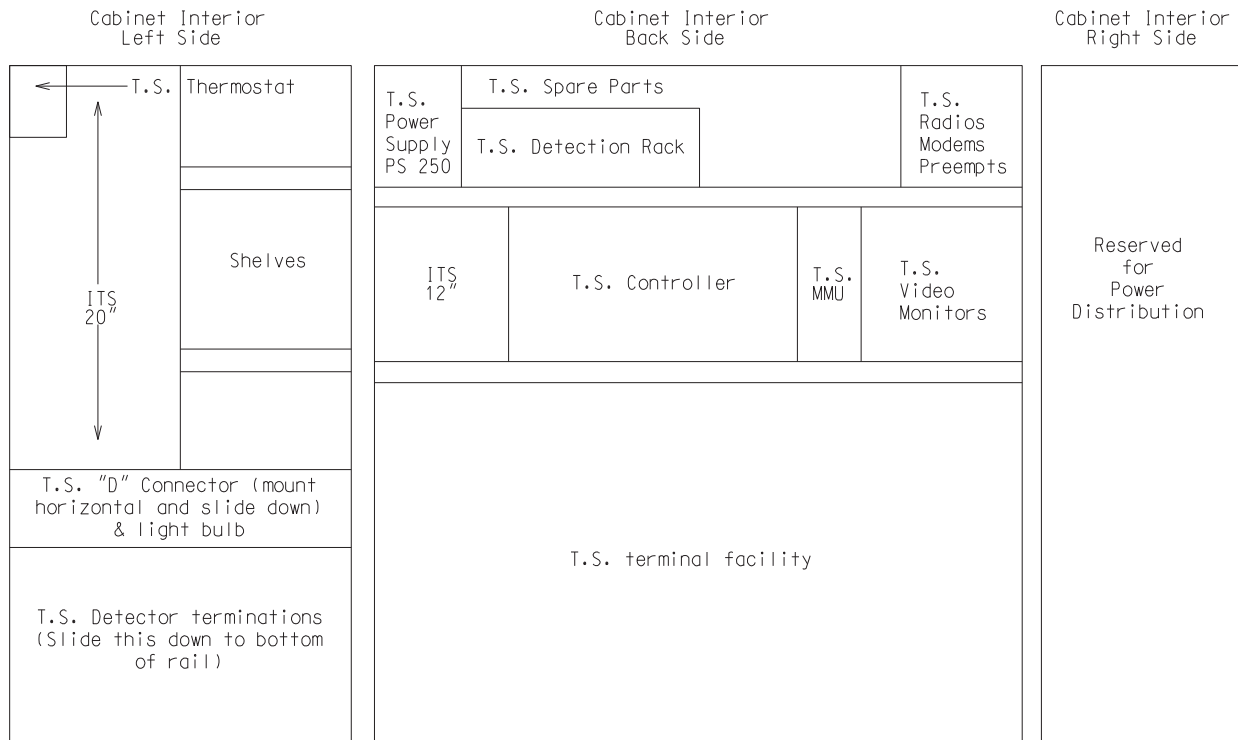


- Notes:
1. Use AISI 300 Series Stainless Steel for all bolts and anchors.
 2. Use Drop In foundation bolts and anchors as directed by the Engineer.

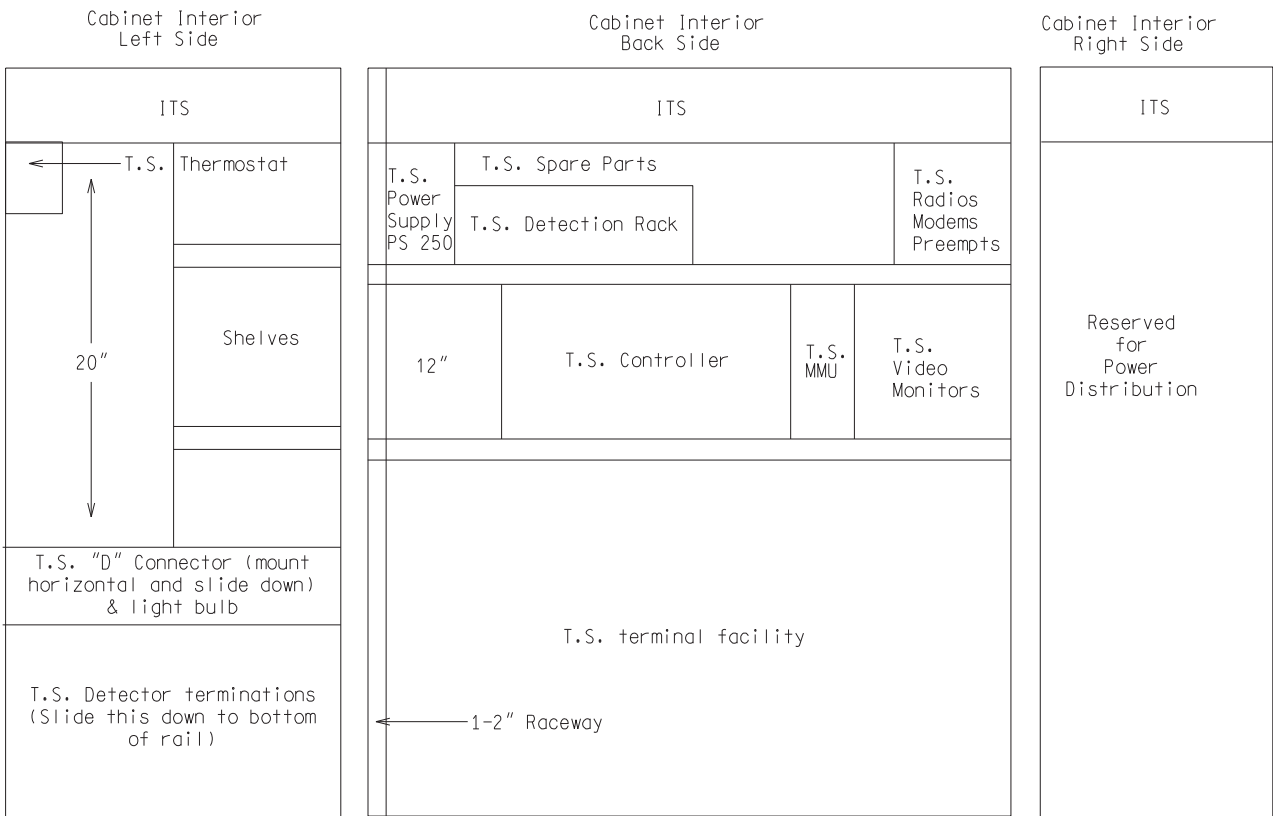
ALTERNATIVE DETAIL "A": DROP IN FOUNDATION BOLTS & ANCHORS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-110-A	SHEET 6 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn	Rev. 02/16/17	PLAN DATE		



TRAFFIC SIGNAL NEMA 3R SIZE 6 CABINET REQUIREMENTS



TRAFFIC SIGNAL NEMA 3R SIZE 6 STRETCH CABINET REQUIREMENTS

FOR ITS APPLICATIONS

NOT TO SCALE

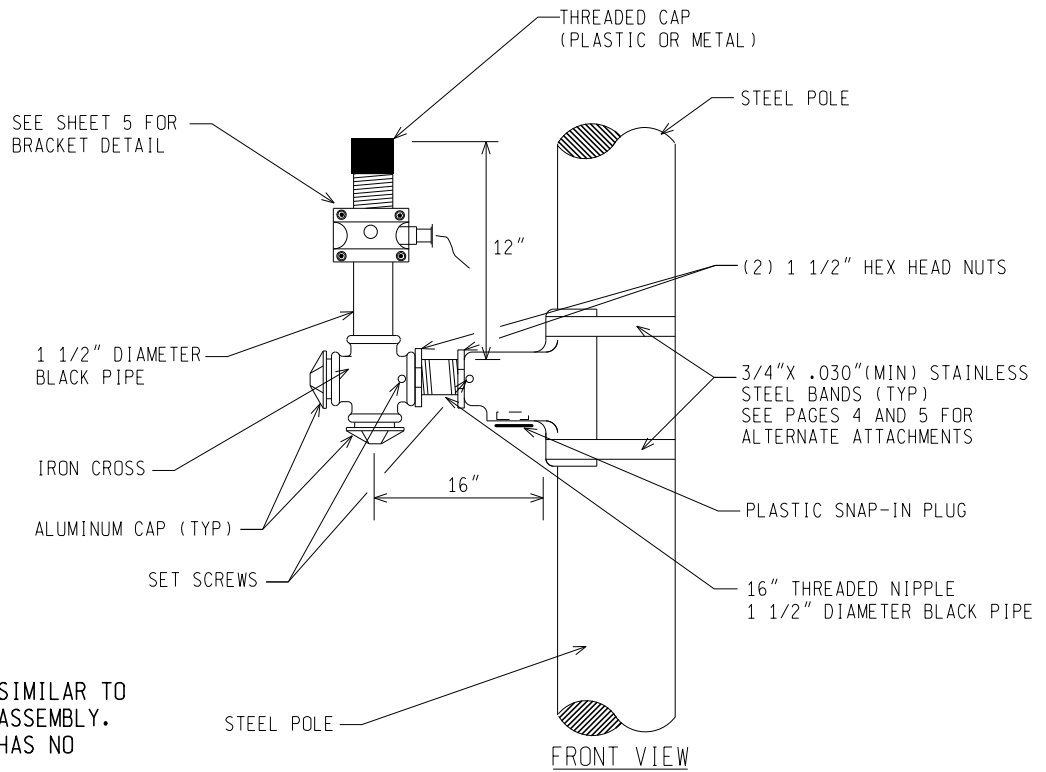
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

SIG-110-A

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7 of 7




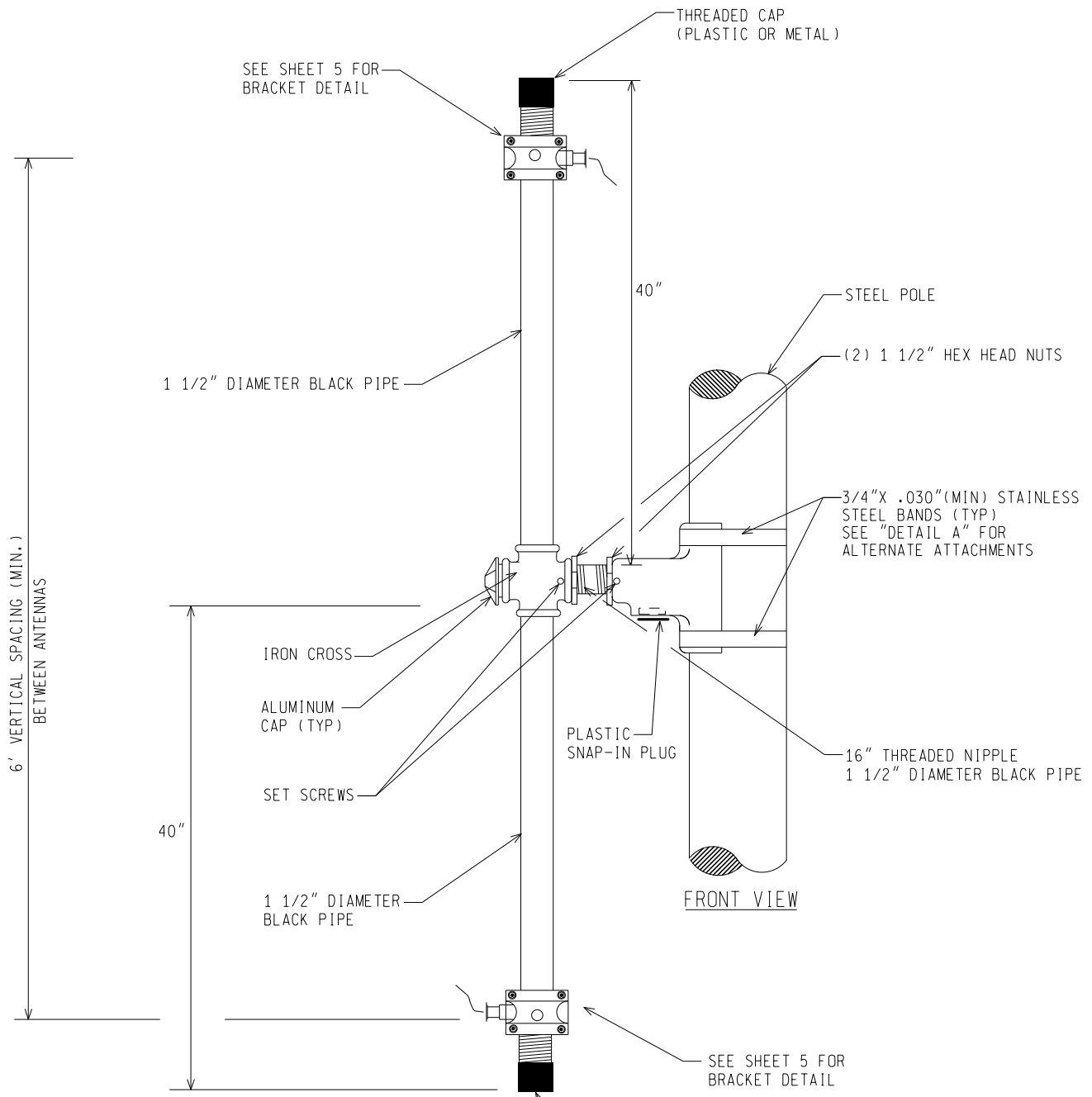
(*) NOTE:
 ANTENNA ATTACHMENT SIMILAR TO
 PED SIGNAL BRACKET ASSEMBLY.
 (FINISHED ASSEMBLY HAS NO
 THREADS EXPOSED.)

ANTENNA ATTACHMENT DETAIL (STEEL POLE)
FOR REMOTE LOCATION

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/2018

 PREPARED BY TRAFFIC AND SAFETY	_____ ENGINEER OF DELIVERY	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR ANTENNA ATTACHMENT DETAIL	
	_____ ENGINEER OF DEVELOPMENT (SPECIAL DETAIL) FHWA APPROVAL DATE	_____ PLAN DATE	SIG-130-B

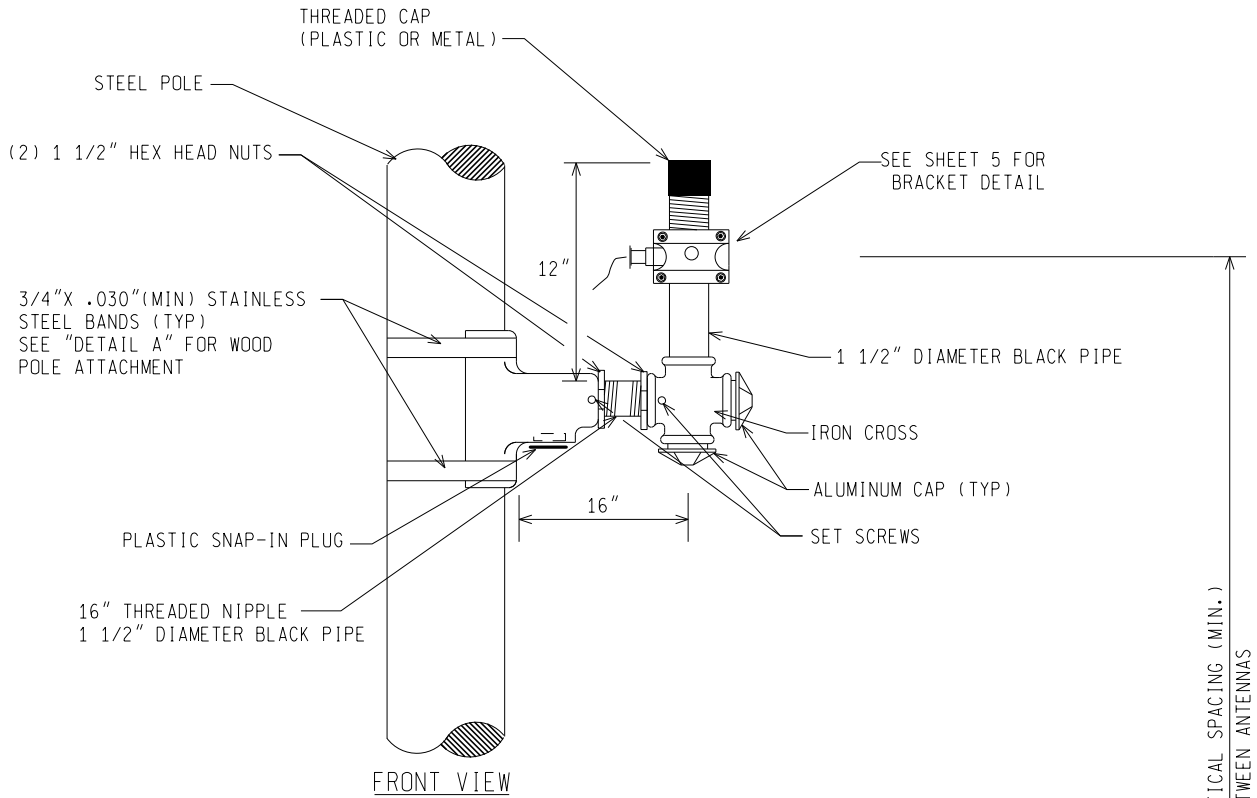


(* NOTE:
 ANTENNA ATTACHMENT SIMILAR TO
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 (FINISHED ASSEMBLY HAS NO
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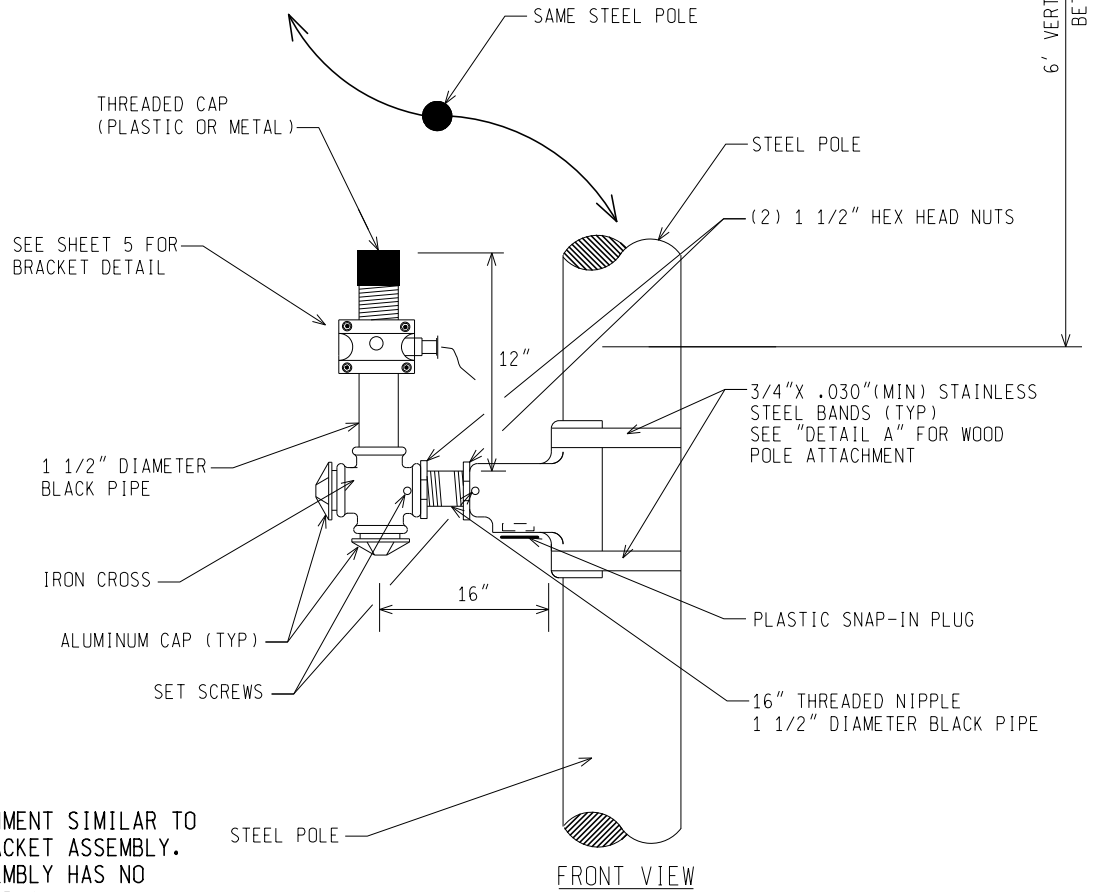
ANTENNA ATTACHMENT DETAIL (STEEL POLE)
FOR MASTER OR REPEATER LOCATION
 SINGLE BRACKET METHOD PREFERRED

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-130-B	SHEET 2 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18				



FRONT VIEW



FRONT VIEW

(* NOTE:
ANTENNA ATTACHMENT SIMILAR TO
PED SIGNAL BRACKET ASSEMBLY.
(FINISHED ASSEMBLY HAS NO
THREADS EXPOSED.)

ANTENNA ATTACHMENT DETAIL (STEEL POLE)
FOR MASTER OR REPEATER LOCATION
USE WHEN 2 BRACKETS ARE REQUIRED

6' VERTICAL SPACING (MIN.)
BETWEEN ANTENNAS

NOT TO SCALE

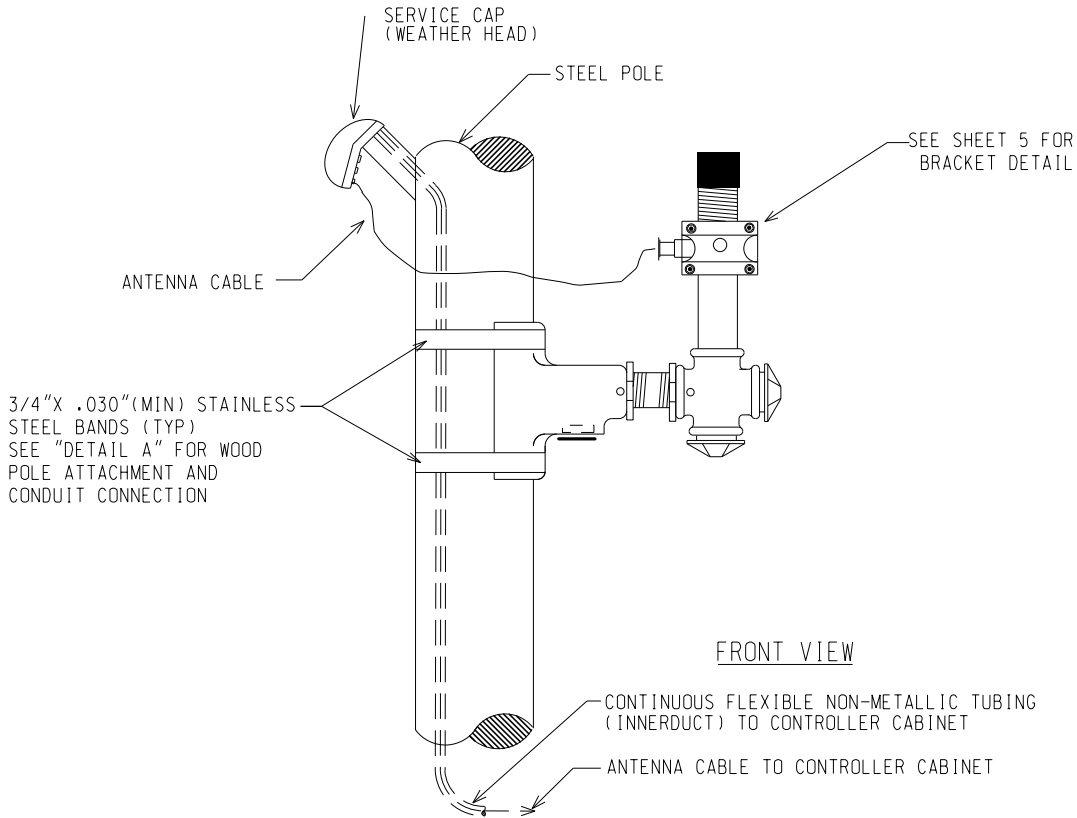
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

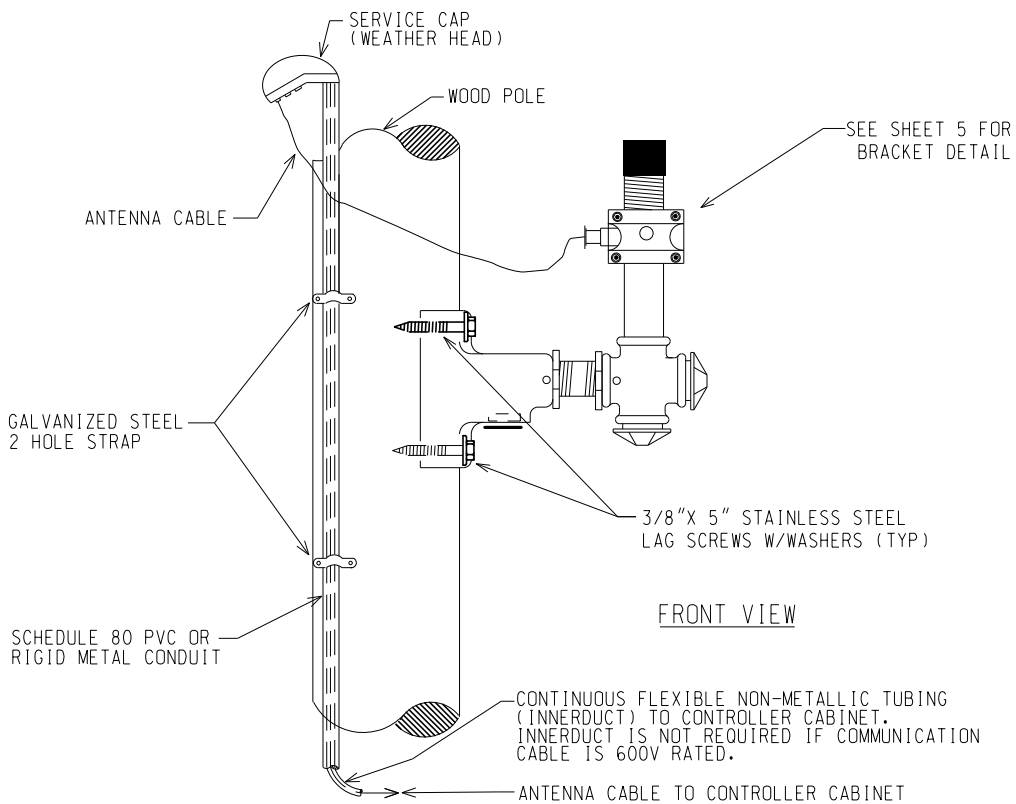
PLAN DATE

SIG-130-B

SHEET
3 of 6



ANTENNA ATTACHMENT DETAIL (STEEL POLE)



ANTENNA ATTACHMENT DETAIL (WOOD POLE)

NOT TO SCALE

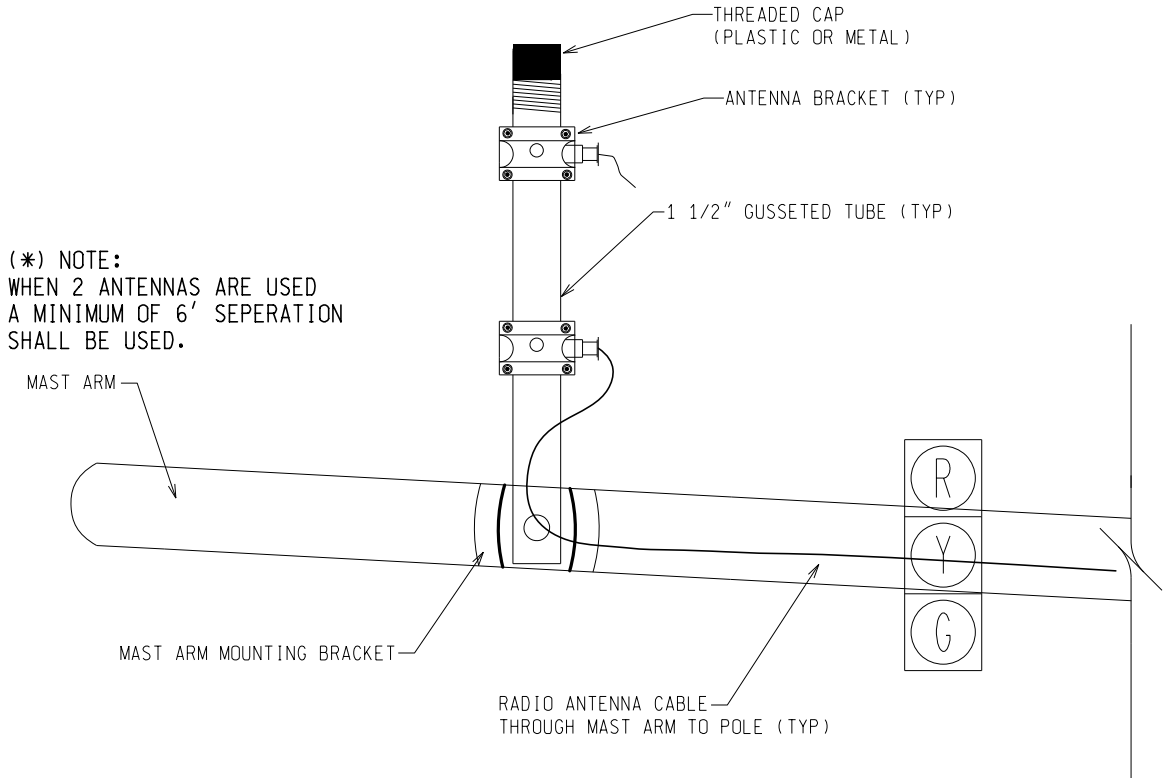
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

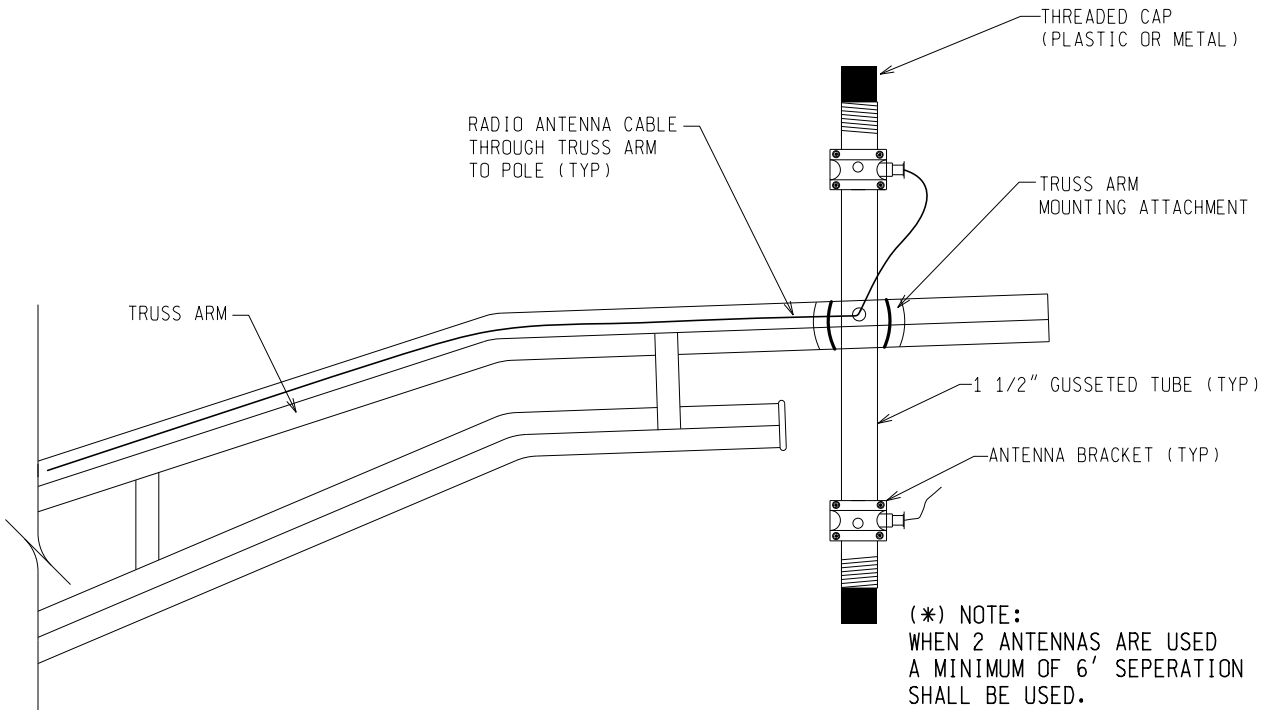
PLAN DATE

SIG-130-B

SHEET
4 of 6



ANTENNA ATTACHMENT DETAIL (MAST ARM)



ANTENNA ATTACHMENT DETAIL (TRUSS ARM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

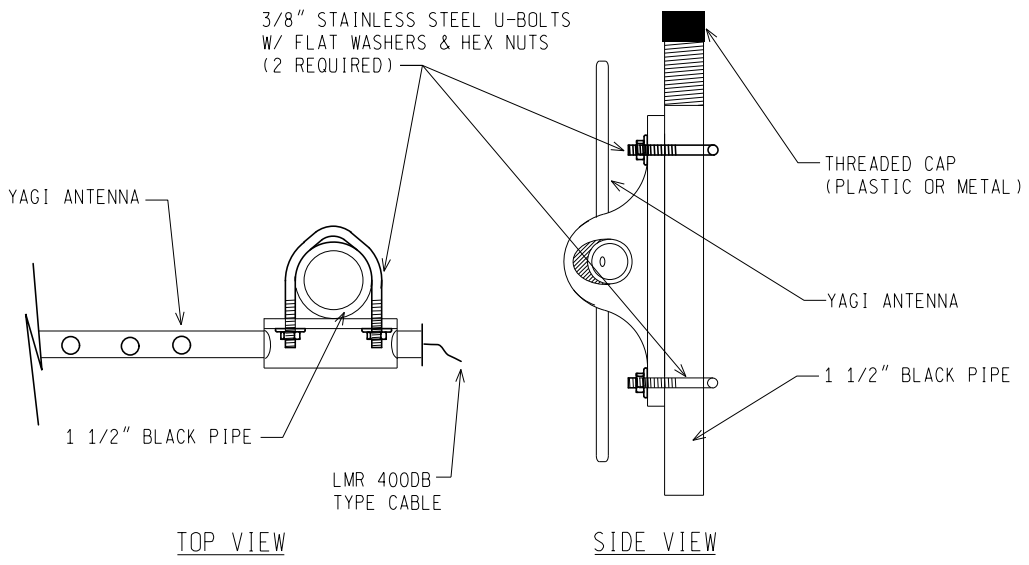
(SPECIAL DETAIL)
FHWA APPROVAL DATE

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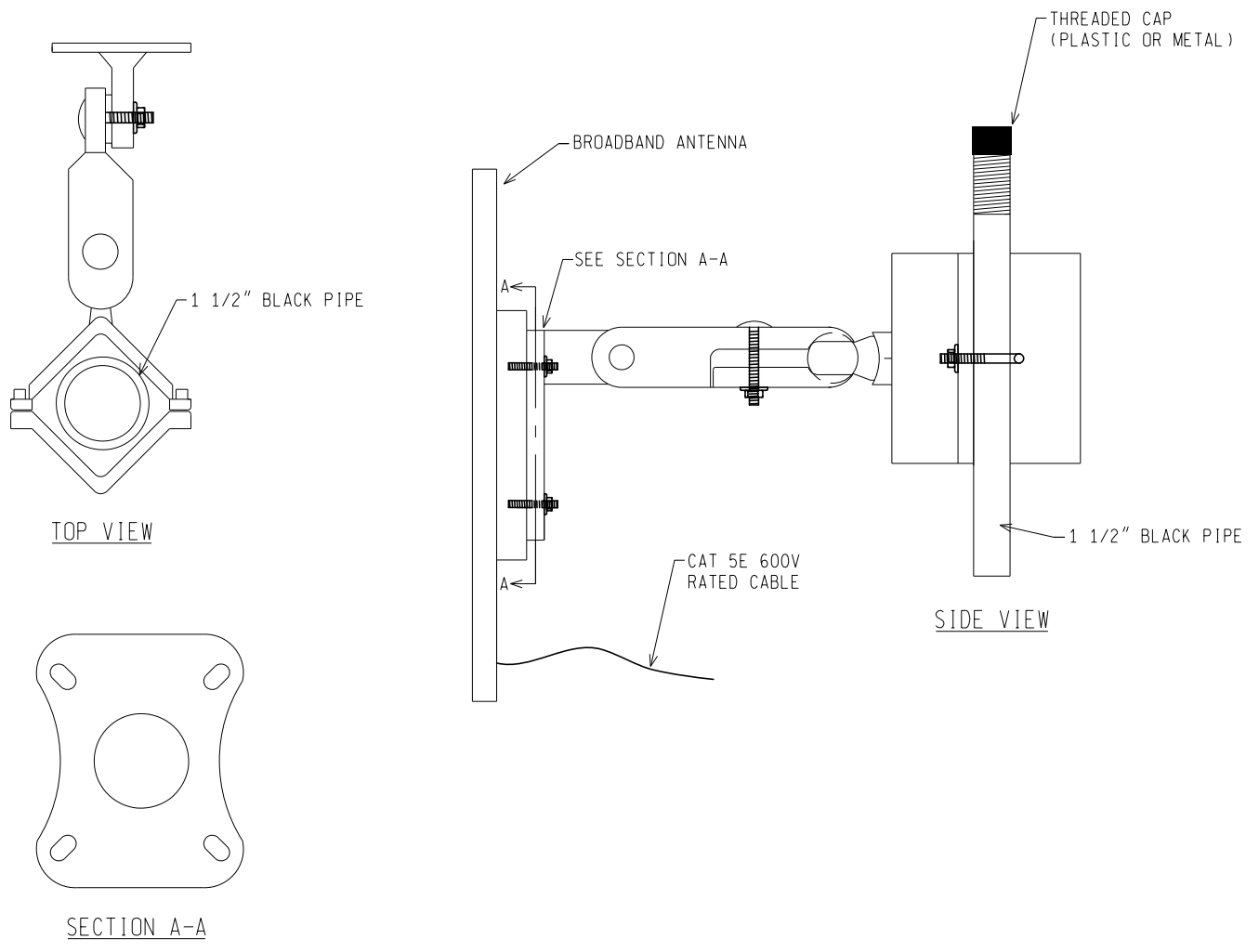
PLAN DATE

SIG-130-B

SHEET
5 of 6



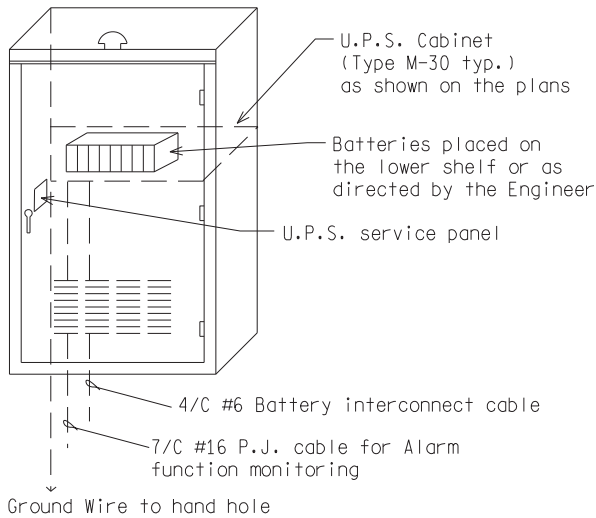
YAGI ANTENNA BRACKET ATTACHMENT DETAIL



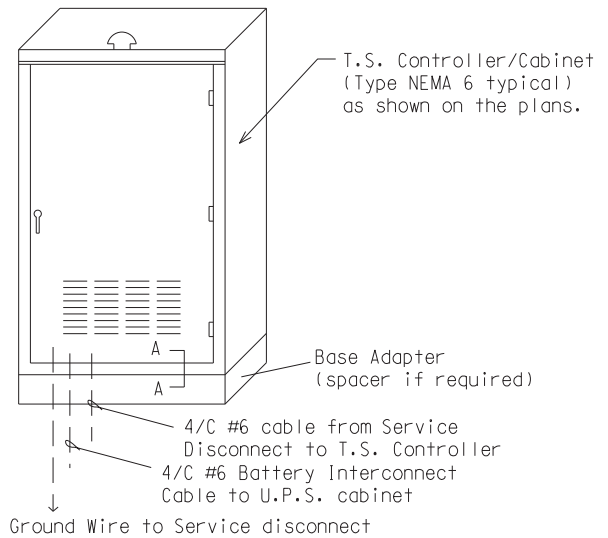
BROADBAND ANTENNA BRACKET ATTACHMENT DETAIL

NOT TO SCALE

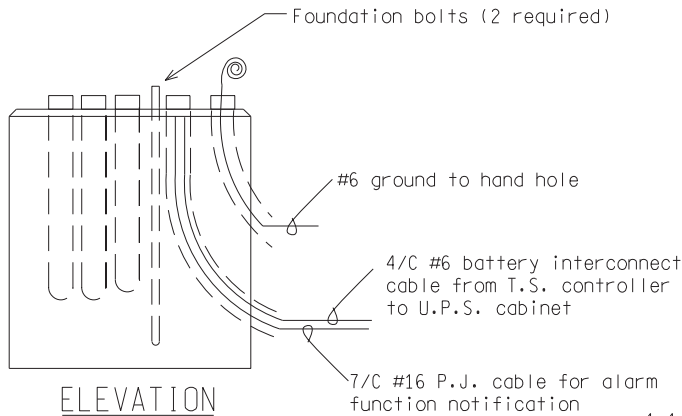
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-130-B	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18				



U.P.S. CABINET BASE MOUNTED



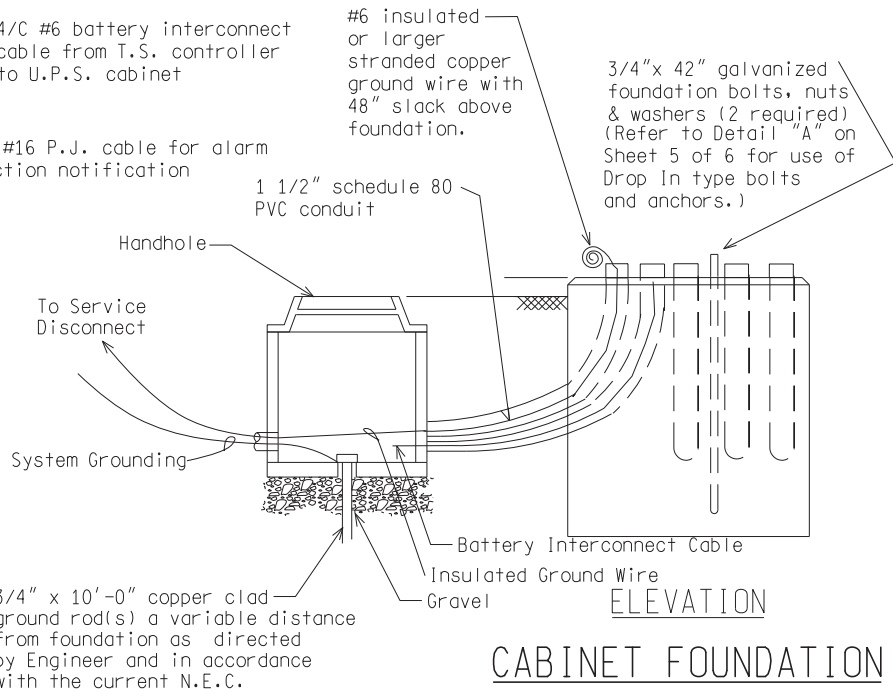
TRAFFIC SIGNAL CONTROLLER/CABINET BASE MOUNTED



CABINET FOUNDATION

NOTE:

1. Refer to SIG-011-A for Controller Cabinet Mounting on Steel or Wood Pole
2. Refer to SIG-045-A for T.S. Base Mounted Controller Cabinet foundations.
3. Refer to SIG-153-A for strain pole foundation details.



CABINET FOUNDATION

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG140A.dgn Rev. 02/16/17



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TRAFFIC AND SAFETY

DRAWN BY:

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ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

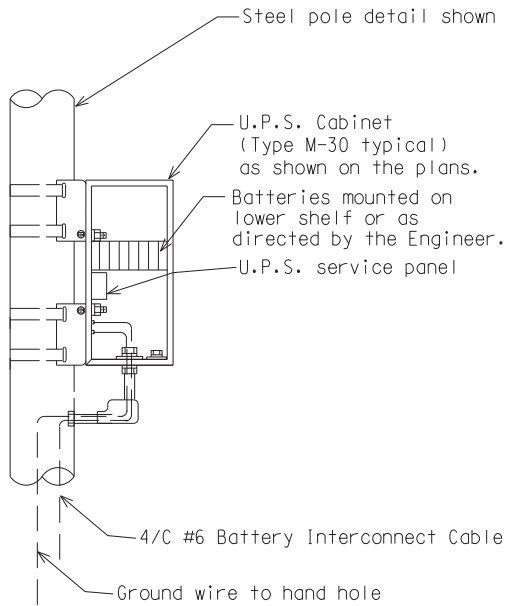
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**TRAFFIC SIGNAL
UNINTERRUPTIBLE POWER SYSTEM**

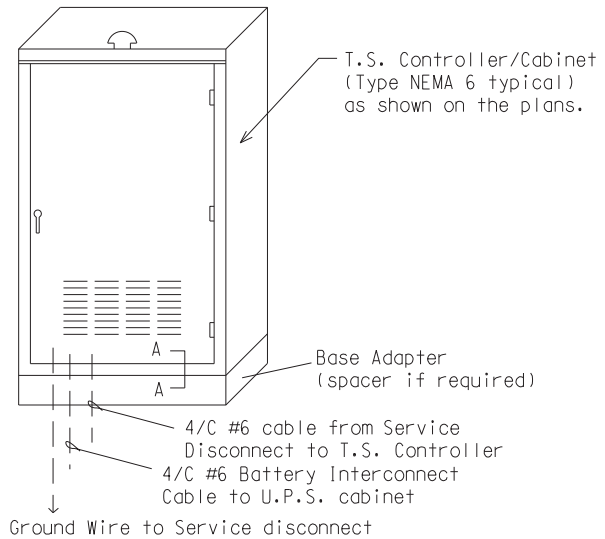
PLAN DATE

SIG-140-A

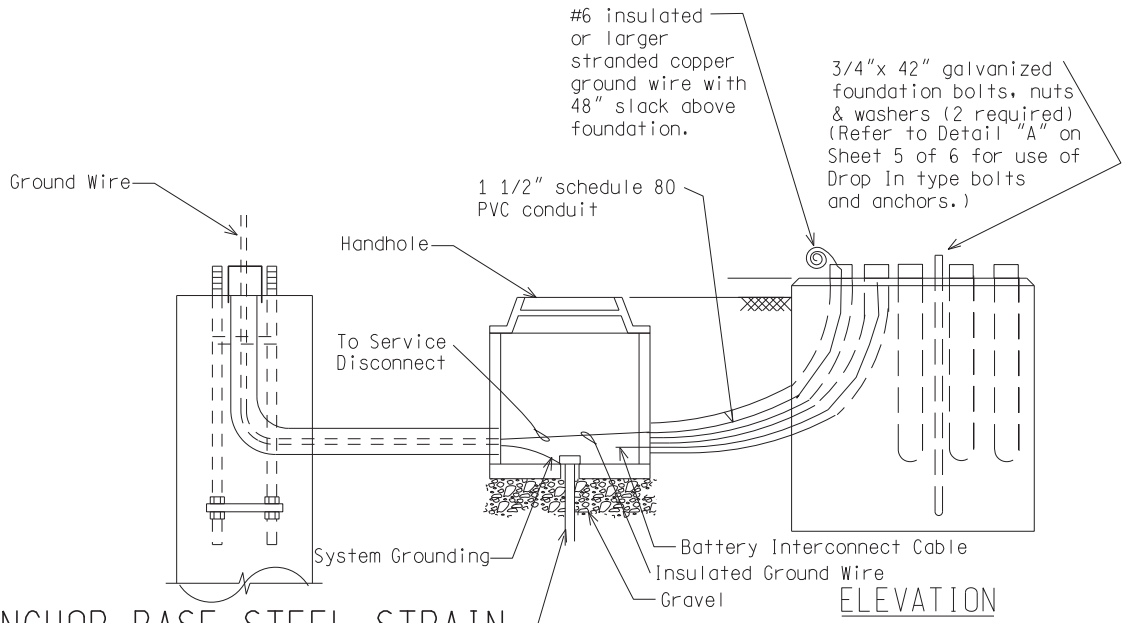
SHEET
1 of 2



U.P.S. CABINET
POLE MOUNTED



TRAFFIC SIGNAL CONTROLLER/
CABINET BASE MOUNTED



ANCHOR BASE STEEL STRAIN
POLE FOUNDATION

CABINET FOUNDATION

3/4" x 10'-0" copper clad ground rod(s) a variable distance from foundation as directed by Engineer and in accordance with the current N.E.C.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

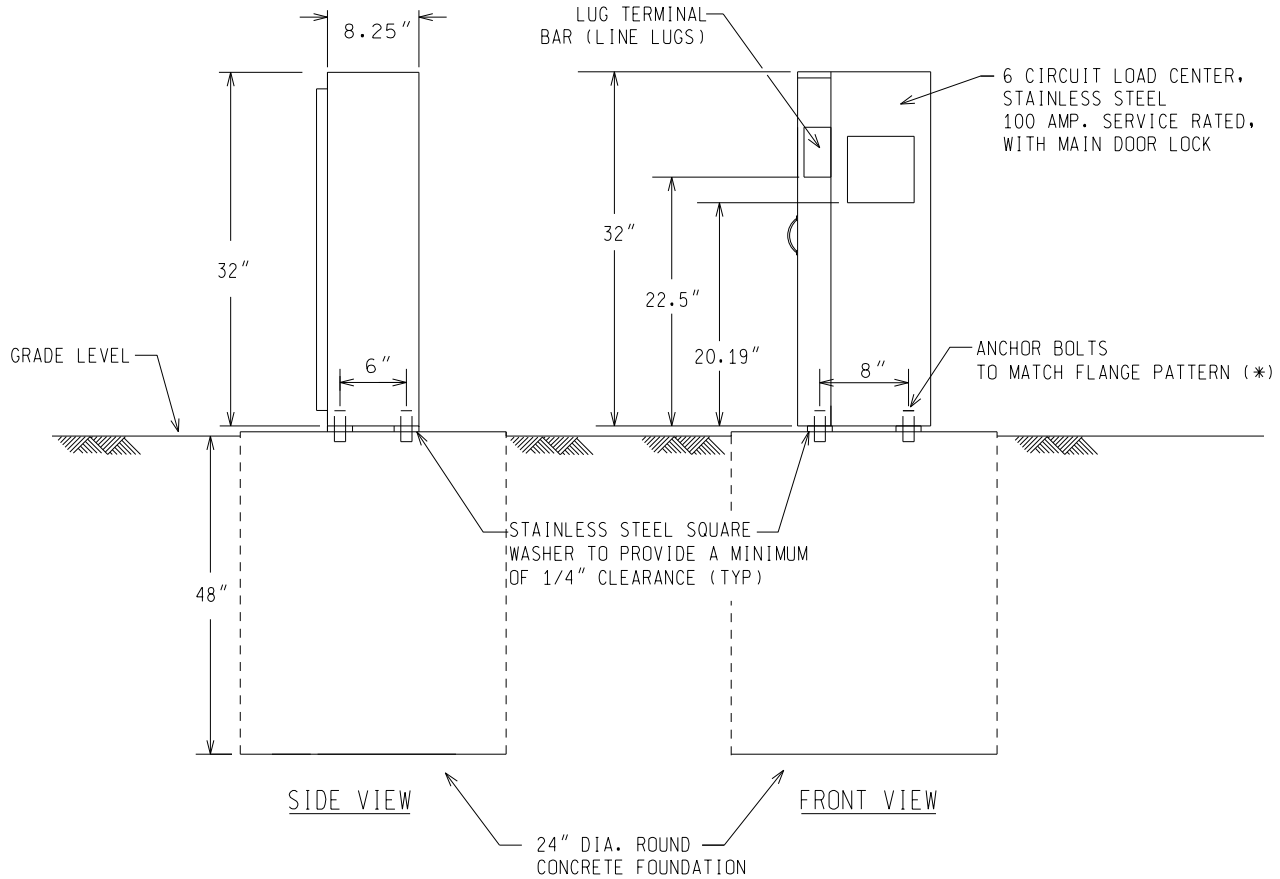
(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

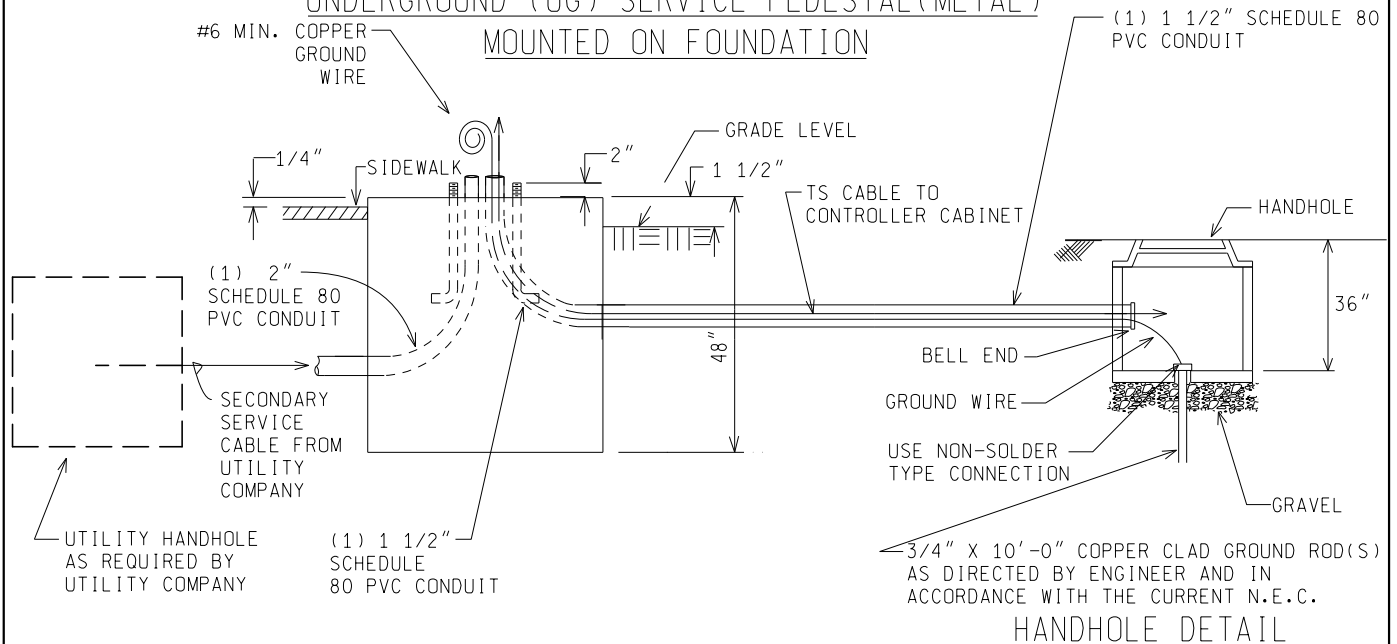
SIG-140-A

SHEET
2 of 2

(* NOTE: STAINLESS STEEL ANCHOR BOLTS OR STAINLESS STEEL DROP INS, TO BE USED ON EXISTING FOUNDATIONS WITH PROPER GRADE AND SIZE.



UNDERGROUND (UG) SERVICE PEDESTAL (METAL)
MOUNTED ON FOUNDATION



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG210B.dgn Rev. 02/06/18



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TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

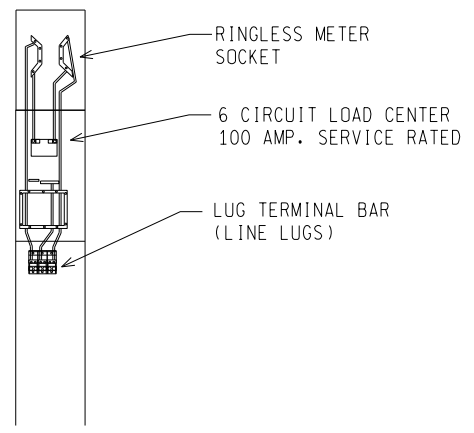
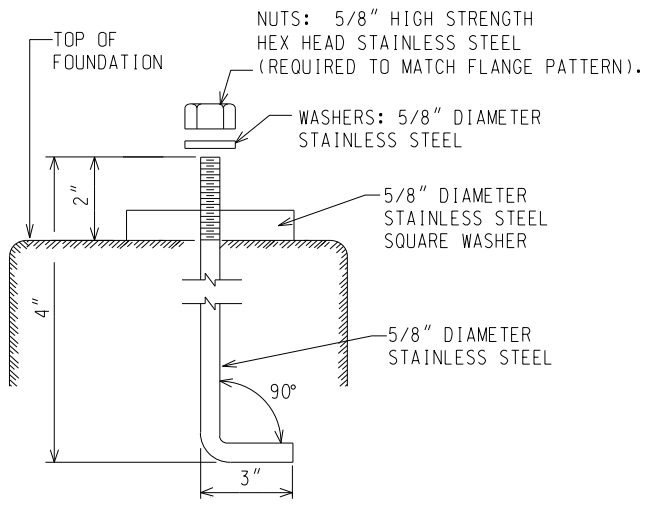
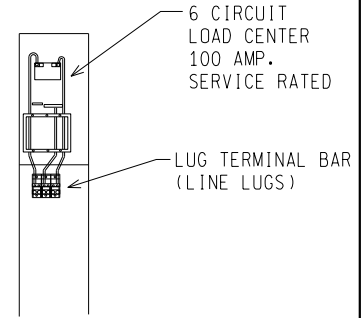
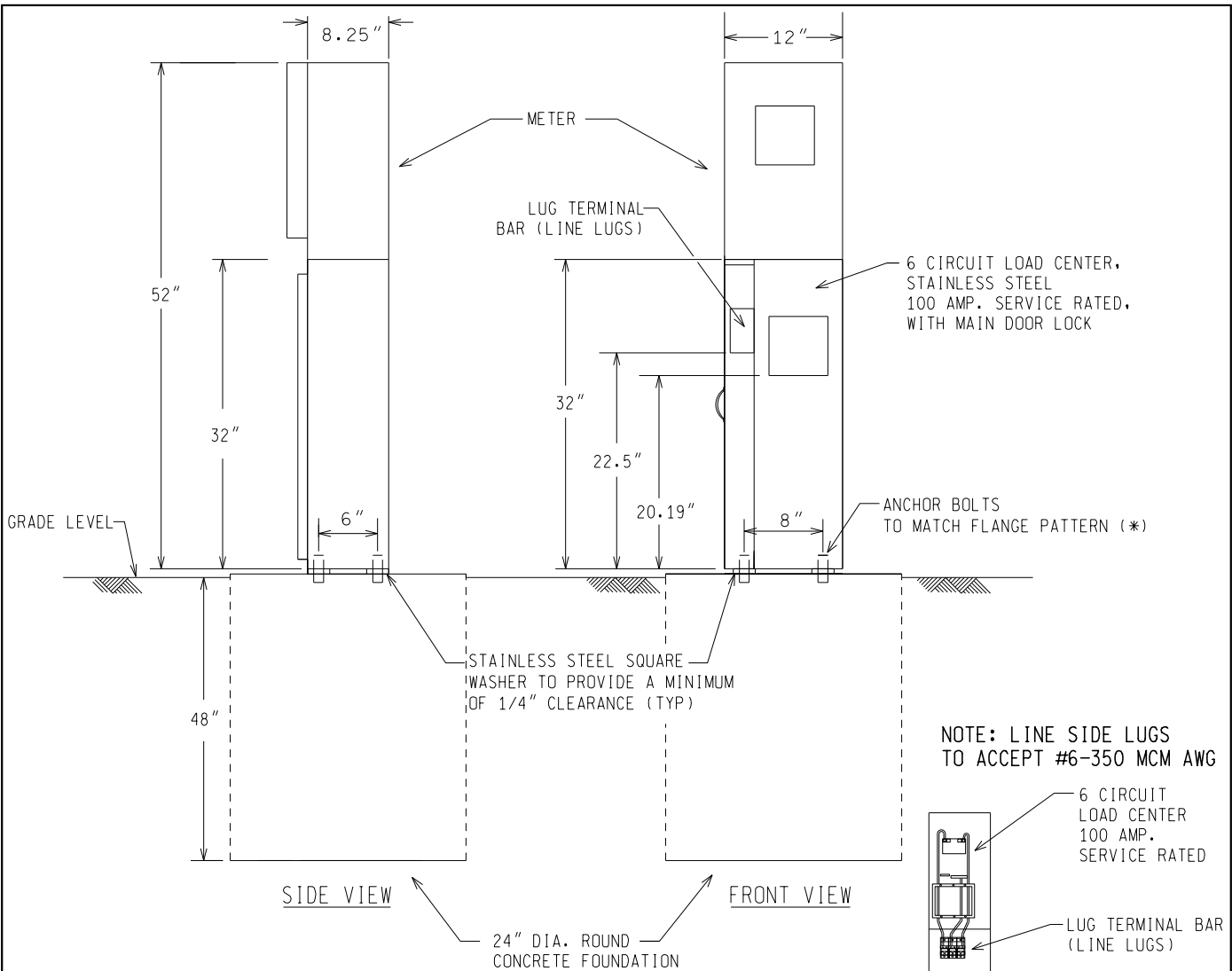
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR
UNDERGROUND SERVICE
METERED AND UNMETERED

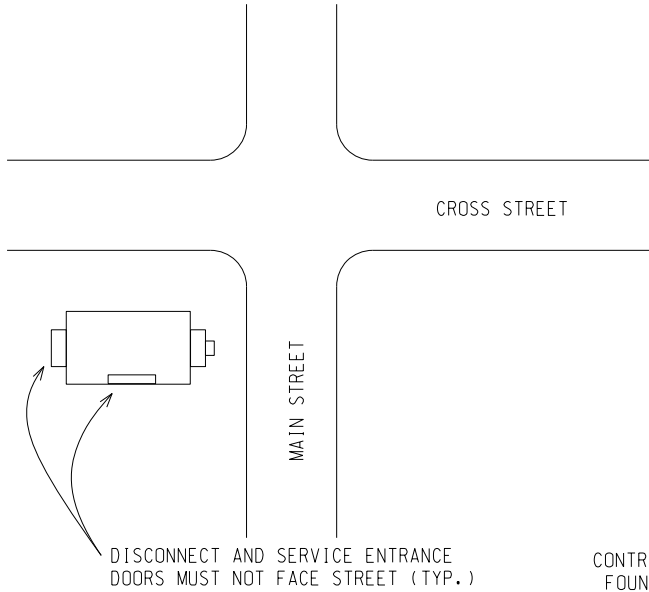
PLAN DATE

SIG-210-B

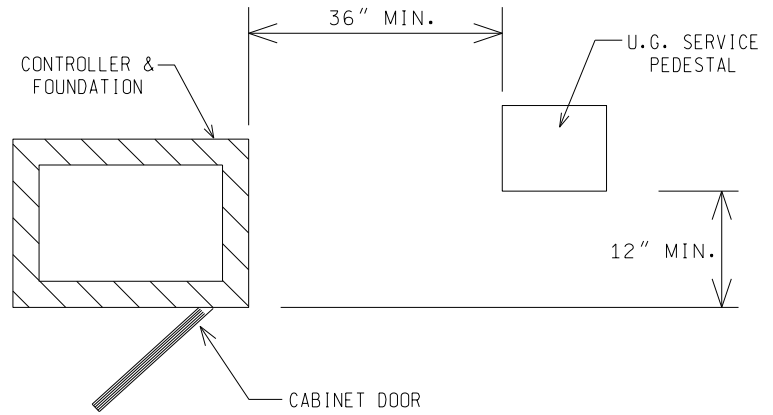
SHEET
1 of 3



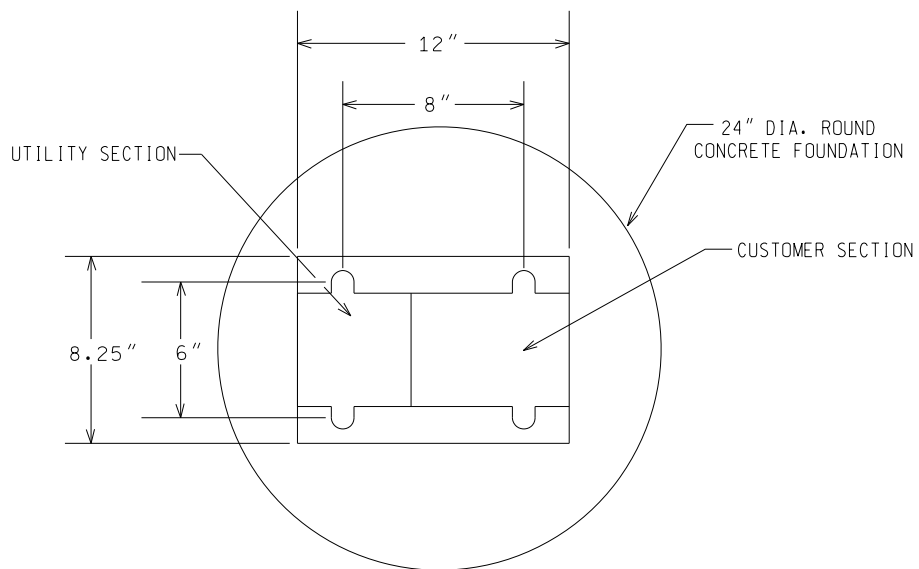
PREFERRED SITE ORIENTATION PLAN



(PLACE PEDESTAL SO IT DOES NOT INTERFERE WITH FULL OPERATION OF CABINET DOOR)



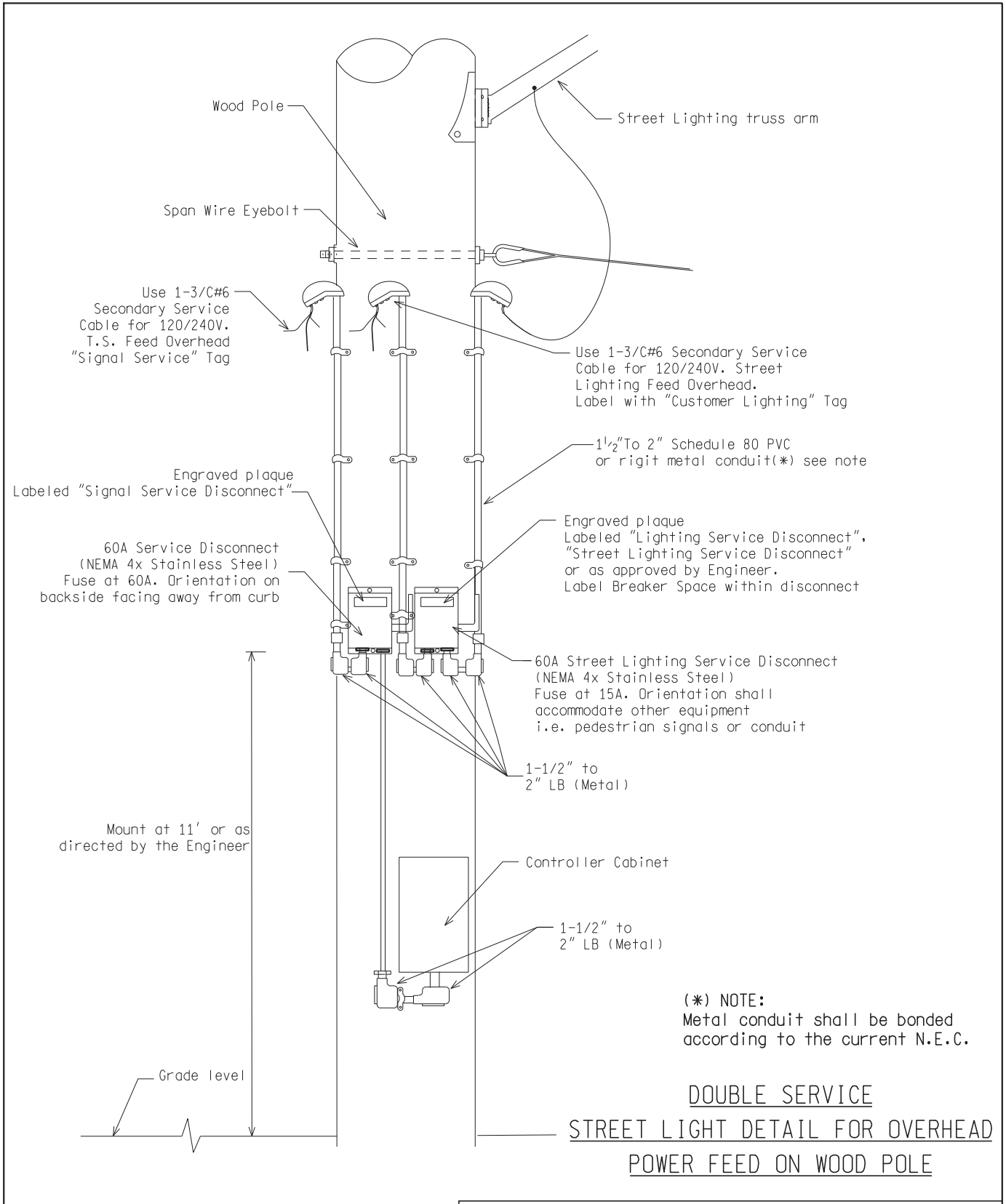
PREFERRED PEDESTAL & FOUNDATION ORIENTATION PLAN



BOLT PATTERN LAYOUT

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-210-B	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG210B.dgn	Rev. 02/06/18	PLAN DATE		



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

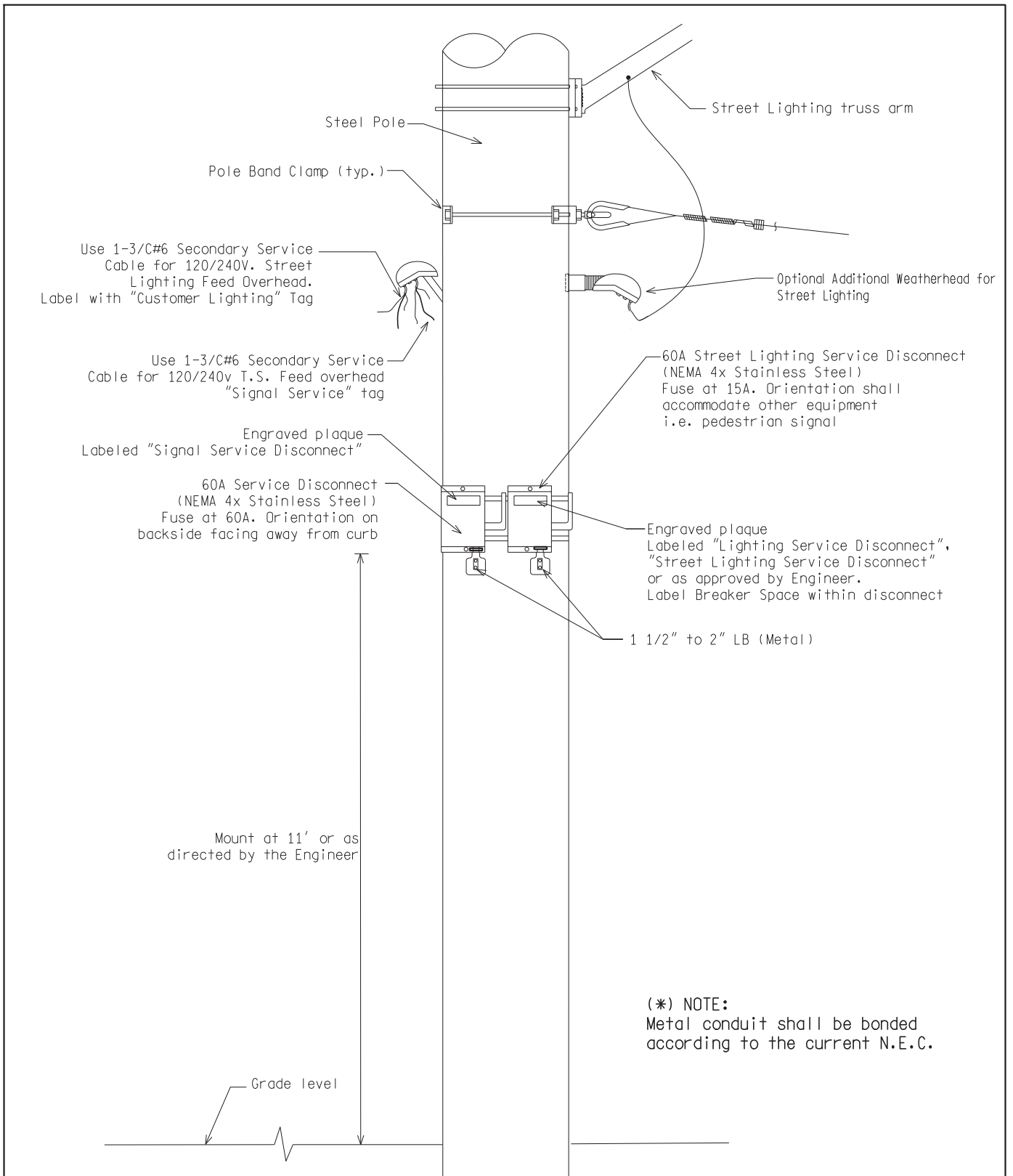
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**SECONDARY SERVICE FOR STREET
LIGHTING AND STREET NAME SIGNS**

02/16/17
PLAN DATE

SIG-220-A

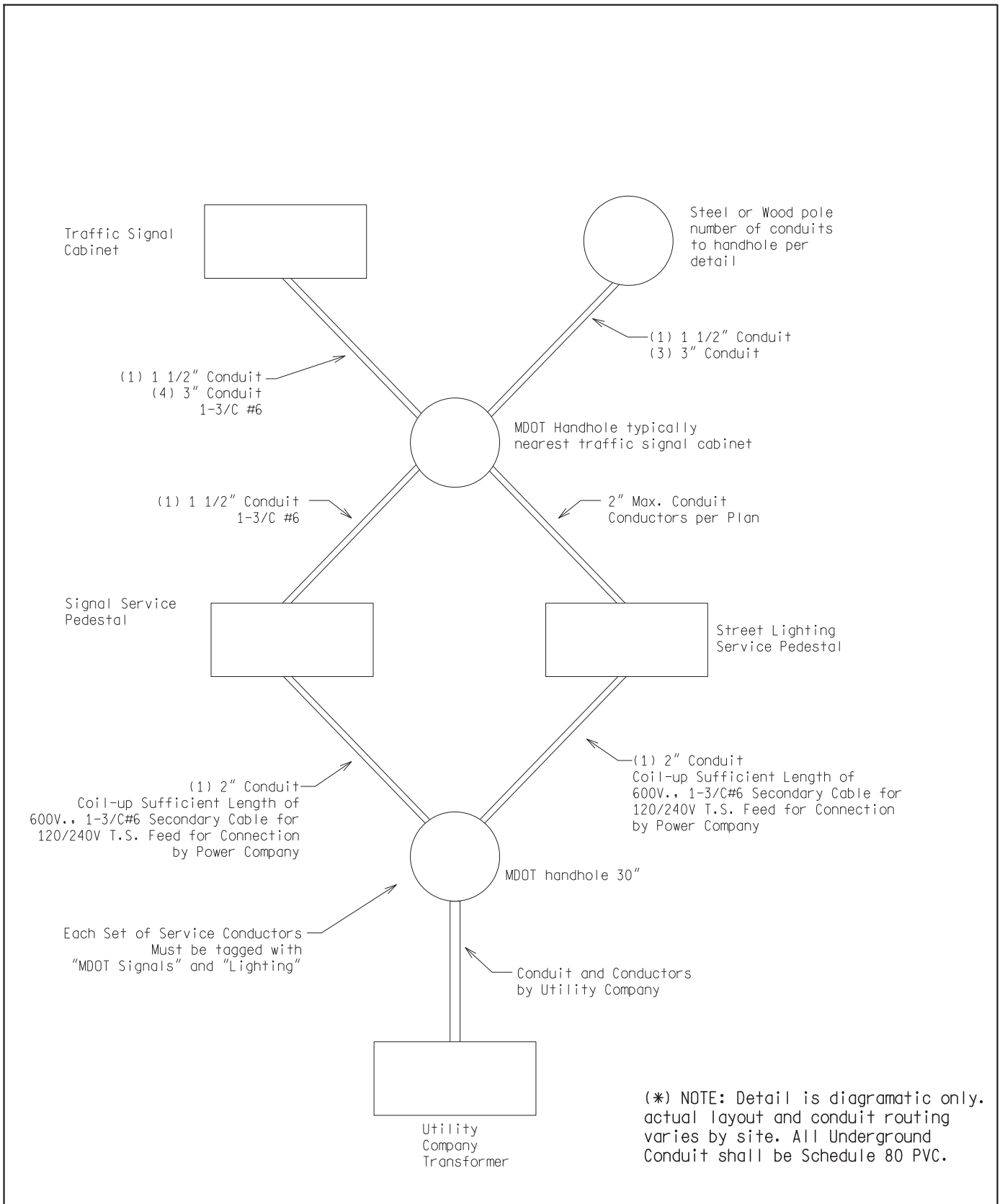
SHEET
1 of 4



DOUBLE SERVICE
STREET LIGHT DETAIL FOR OVERHEAD
POWER FEED ON STEEL POLE

NOT TO SCALE

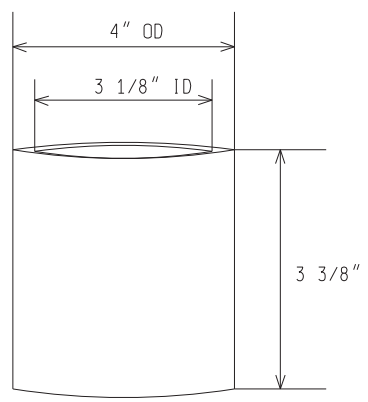
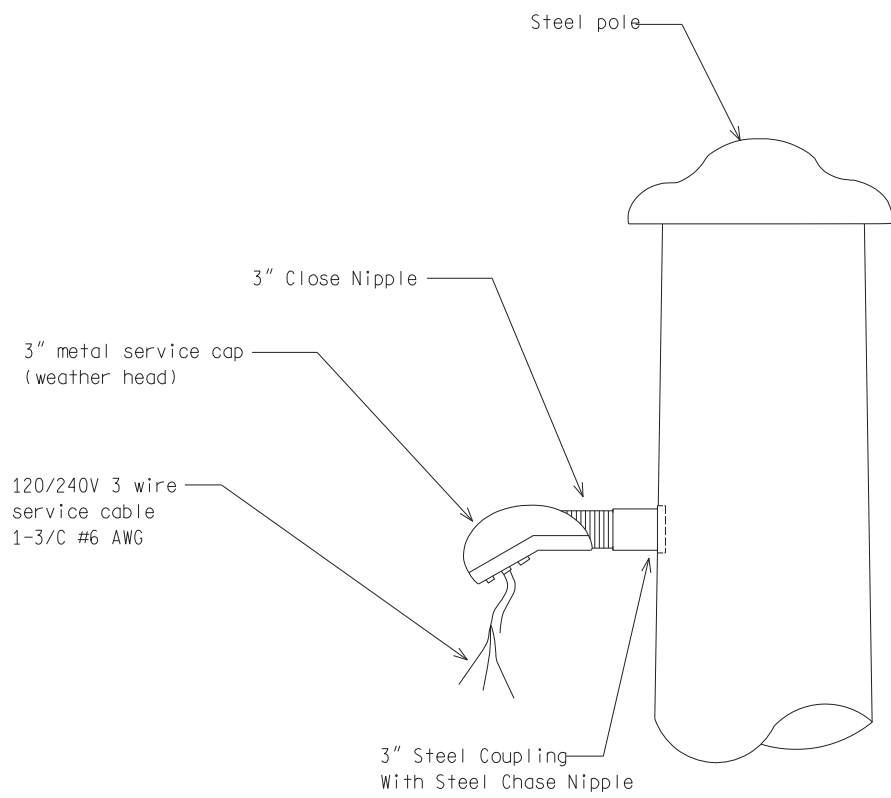
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-220-A	SHEET 2 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.				



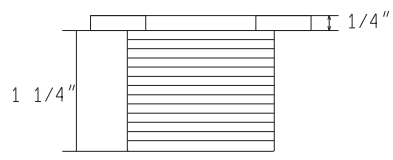
UNDERGROUND DOUBLE SERVICE STREET LIGHTING
WIRING DIAGRAM

NOT TO SCALE

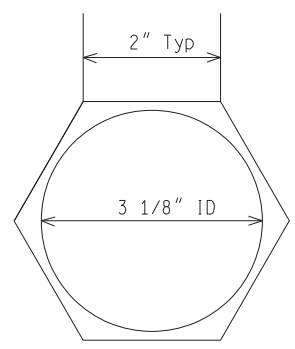
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17	SIG-220-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.		PLAN DATE		



Steel Coupling



Chase Nipple A

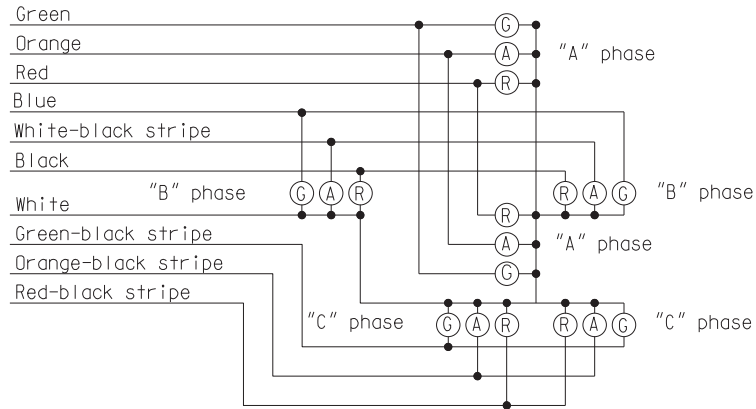


Chase Nipple B

STRAIN POLE WEATHER HEAD INSTALLATION

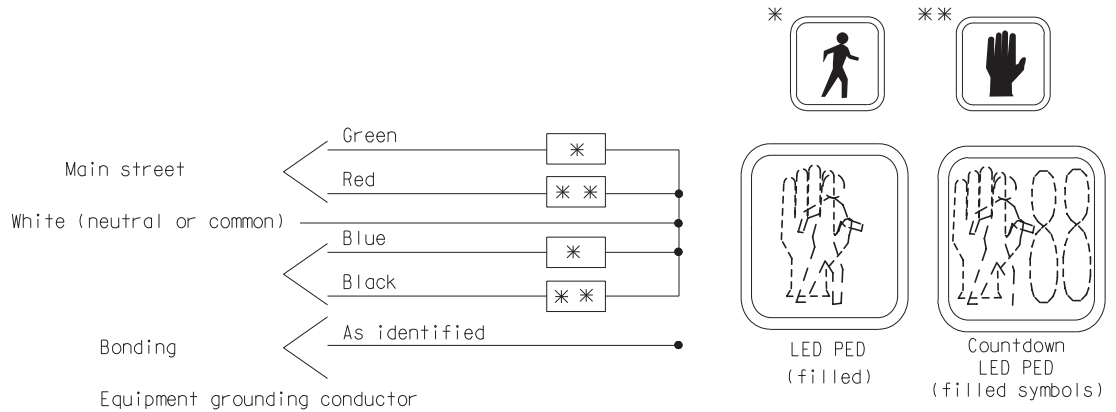
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-220-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.				



COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOTE: No splices allowed between traffic signal head and controller.



COLOR CODE FOR WIRING CONNECTING PEDESTRIAN SIGNAL LAMPS
(WALKING PERSON - HAND SYMBOL)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

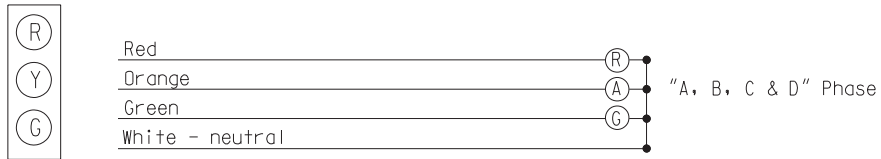
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**COLOR CODE WIRING/
EQUIPMENT GROUNDING**

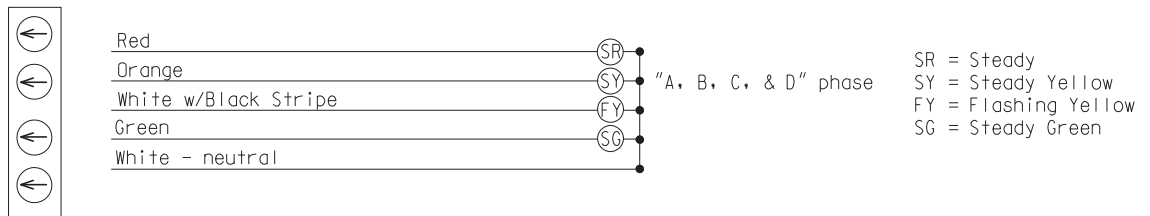
PLAN DATE

SIG-230-A

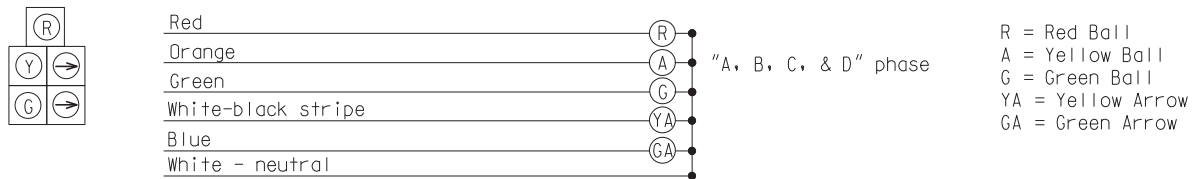
SHEET
1 of 6



STANDARD - 3 COLOR SIGNAL DISPLAY



FLASHING YELLOW ARROW (FYA) - 4 COLOR SIGNAL DISPLAY



DOG HOUSE W/RIGHT TURNS - 5 COLOR SIGNAL DISPLAY

COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

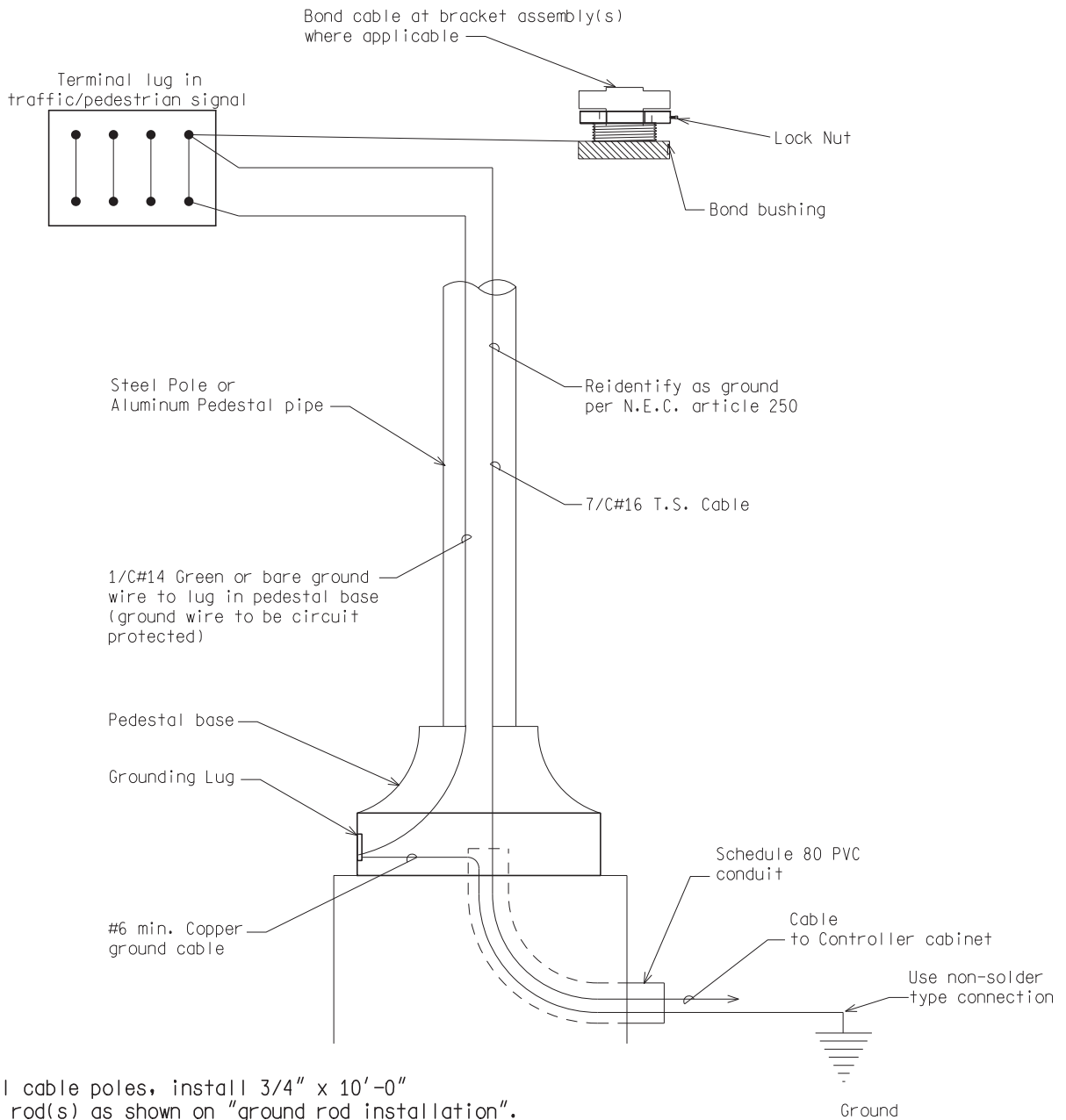
(SPECIAL DETAIL)
FHWA APPROVAL DATE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17

PLAN DATE

SIG-230-A

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2 of 6

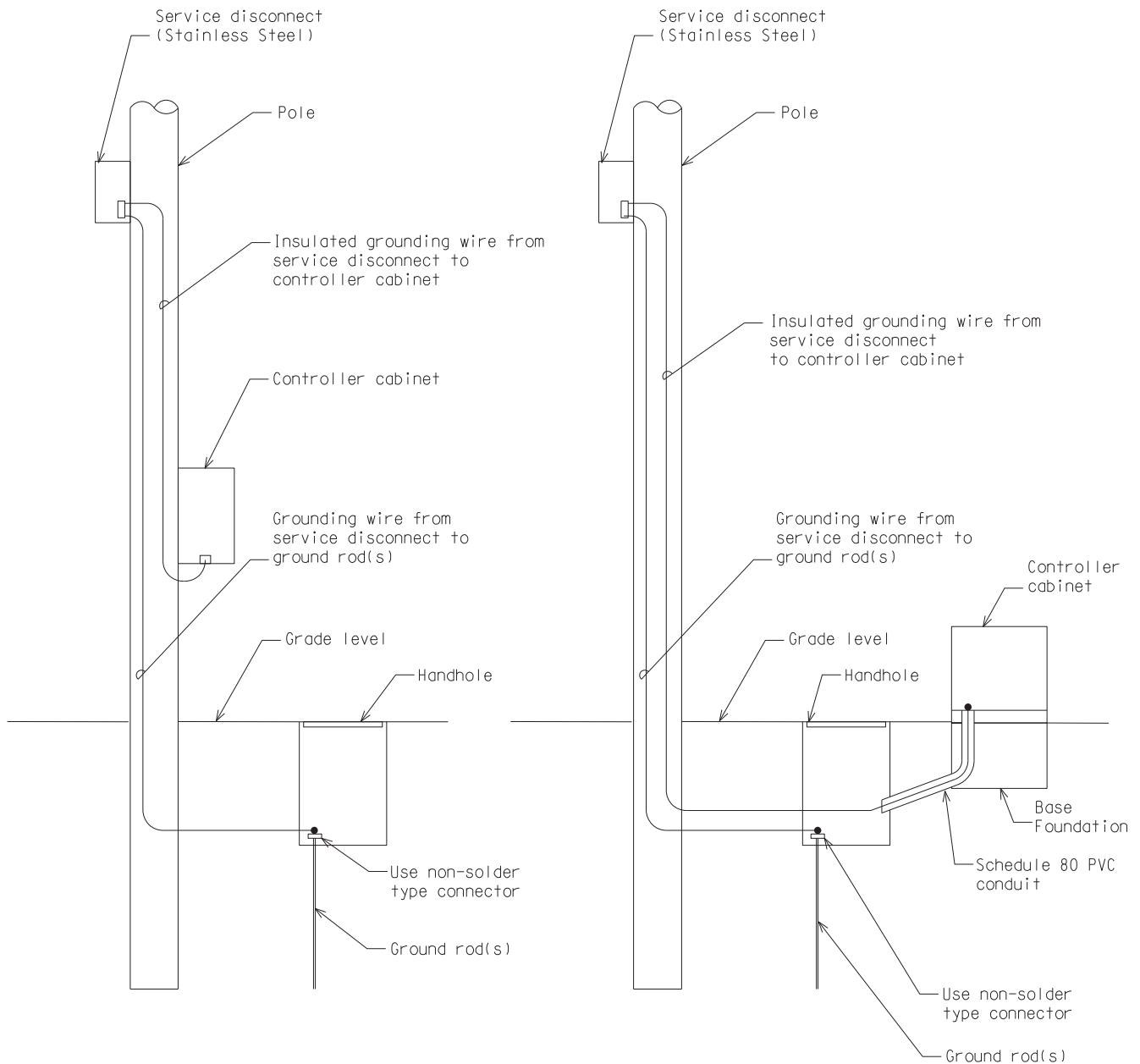


NOTE:
 For all cable poles, install 3/4" x 10'-0"
 ground rod(s) as shown on "ground rod installation".
 Connect ground rod(s) with #6 min. copper wire to
 messenger wire with non-solder type connection.

STEEL POLE/PEDESTAL GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-230-A	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE		



GROUNDING

Install 3/4 " x 10'-0" copper clad ground rod(s) as required to provide less than 10 OHM resistance to ground.

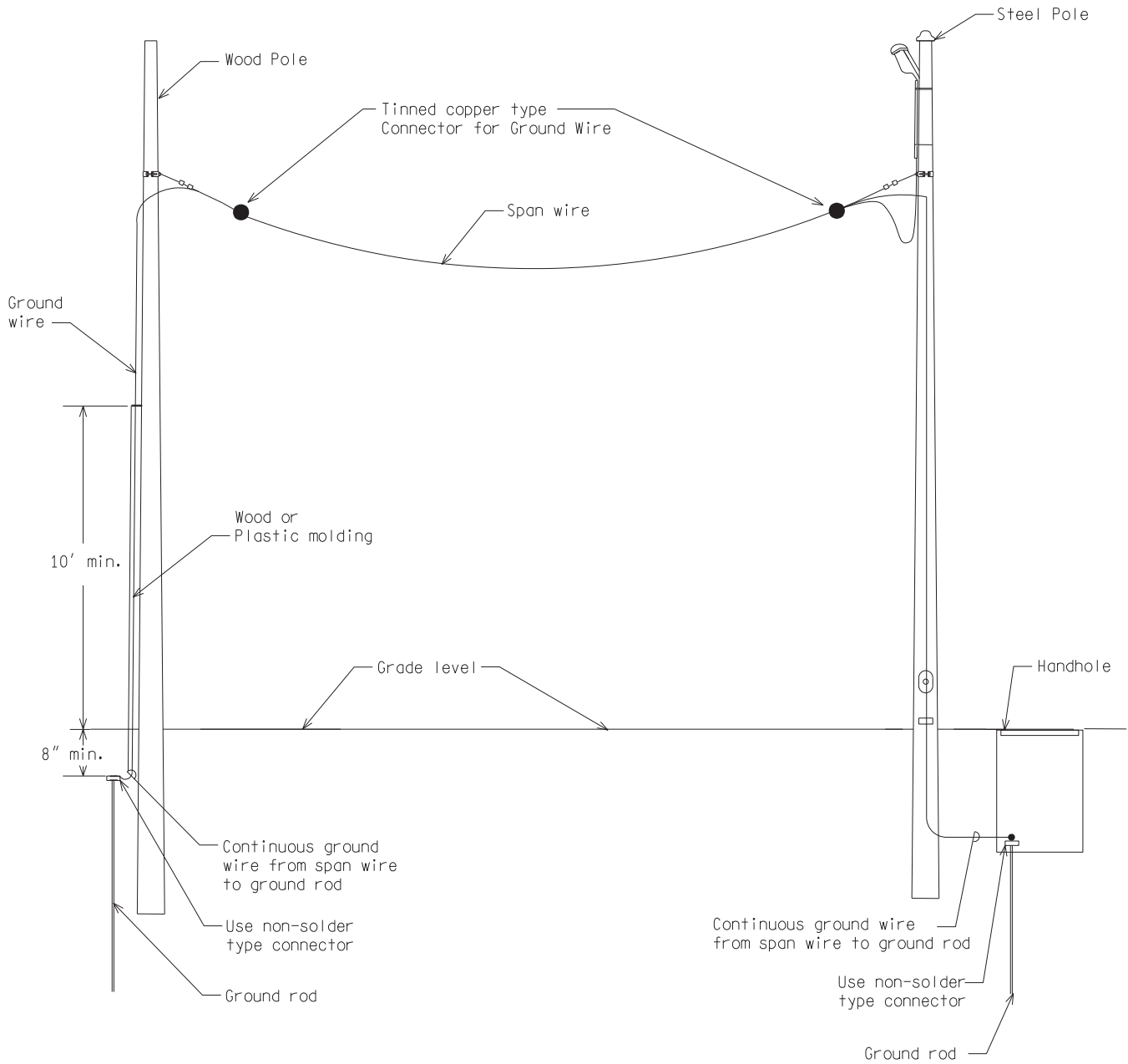
Grounding wire #6 AWG min. bare copper grounding wire shall be installed to meet N.E.C. and utility company specs.

Ground wire from disconnect to ground rod to be in moulding (wood pole or post) or inside the pole (steel). Ground wire from disconnect to controller cabinet to be in conduit (wood pole, wood post, and steel pole).

CONTROLLER CABINET GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-230-A	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE		



SPAN WIRE GROUNDING DETAIL

NOT TO SCALE

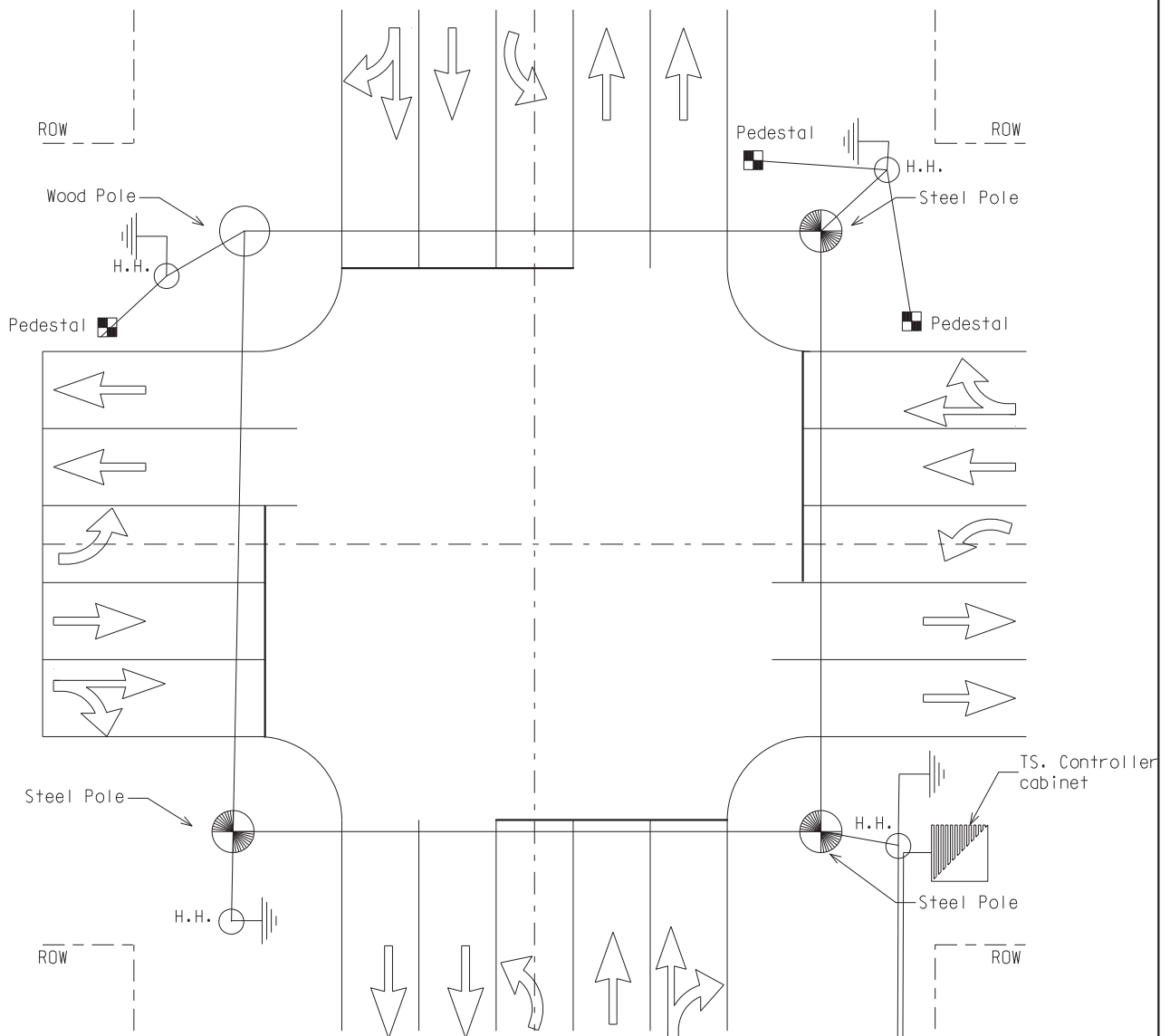
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

SIG-230-A

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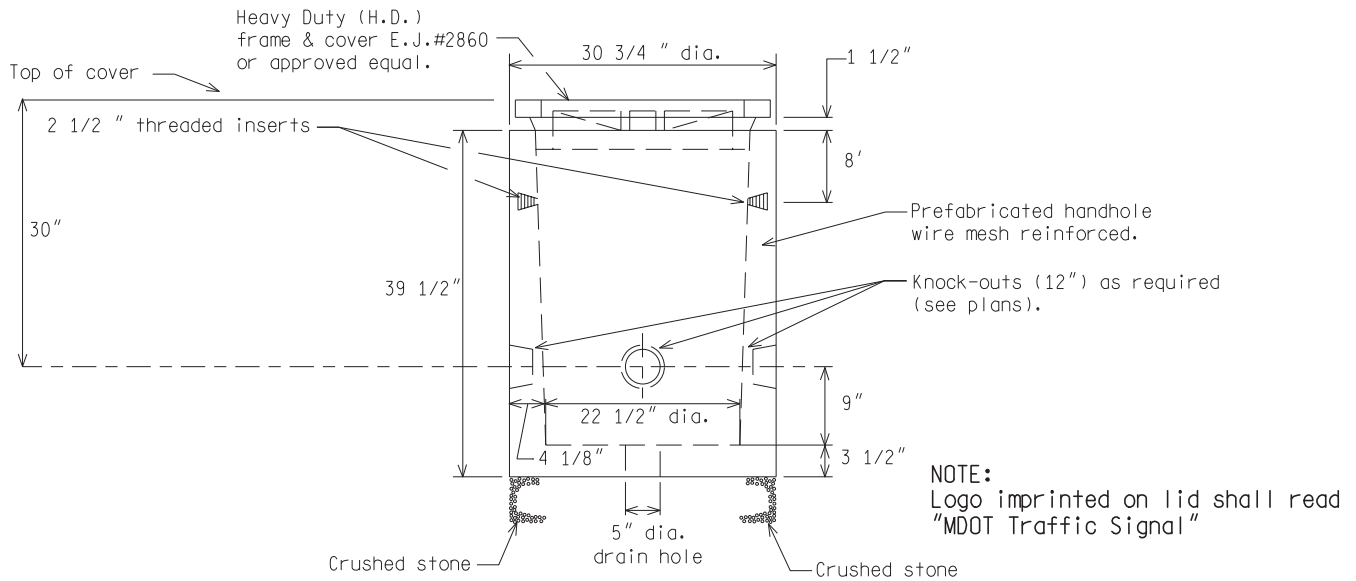


- 1) All ground rods shall be 3/4" x 10' in length copperclad.
- 2) Ground rods shall be drive straight down, so that only the required portions of of the ground rod is exposed to attach the ground wires.
- 3) All ground rods shall be connected to each other or to a span wire with a single #6 AWG copper conductor.
- 4) Each ground wire attaching to a ground rod shall have its own approved acorn type connector.
- 5) Do not install any ground rods within 10' of any other ground rods from other grounding.
- 6) The grounding system shall measure 10 ohms or less.
- 7) A separate insulated green #6 AWG copper ground is required from the service disconnect (safety switch) to the ground bussbar in the controller cabinet.
- 8) Ground rod for each steel pole, wood pole, pedestal and/or traffic signal controller cabinet shall be located in the adjacent handhole as indicated on the plans or as directed by the Engineer.
- 9) All metal bases must be connected to a ground rod with a #6 ground wire.

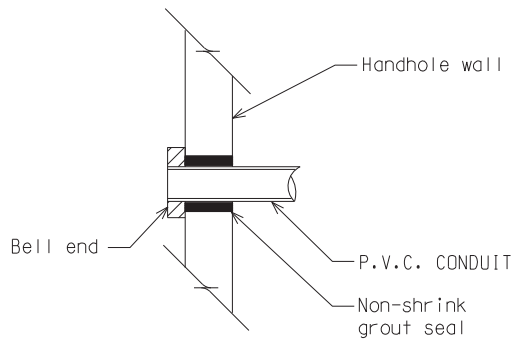
SYSTEM GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		<h2 style="margin: 0;">SIG-230-A</h2>	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE		



2' PRECAST ROUND HANDHOLE WITH FLOOR



TYPICAL CONDUIT ENTRANCE AT HANDHOLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

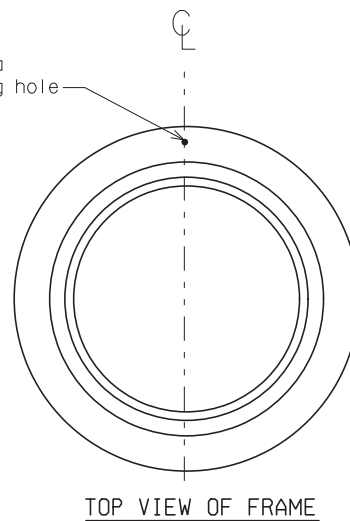
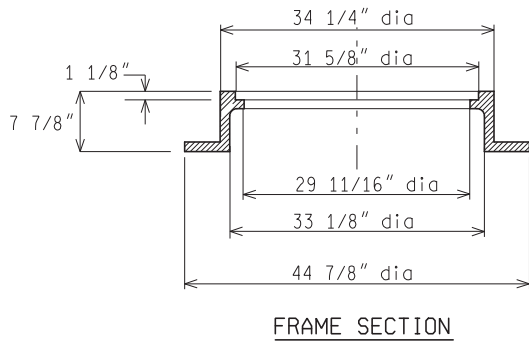
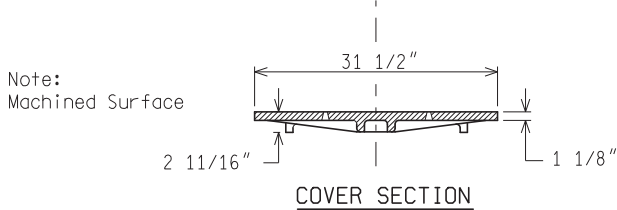
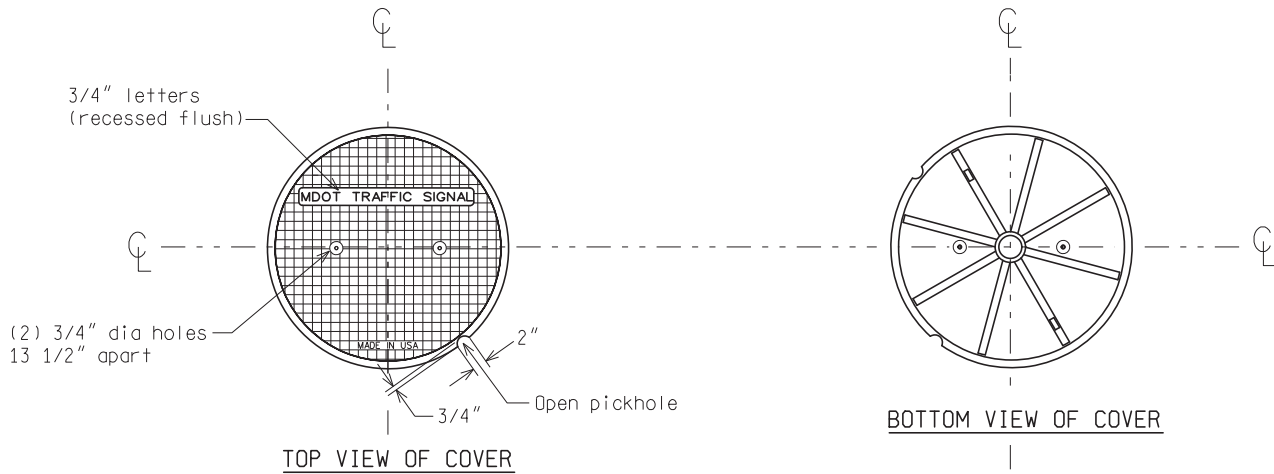
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**HANDHOLE- PRECAST,
POLYMER CONCRETE**

PLAN DATE

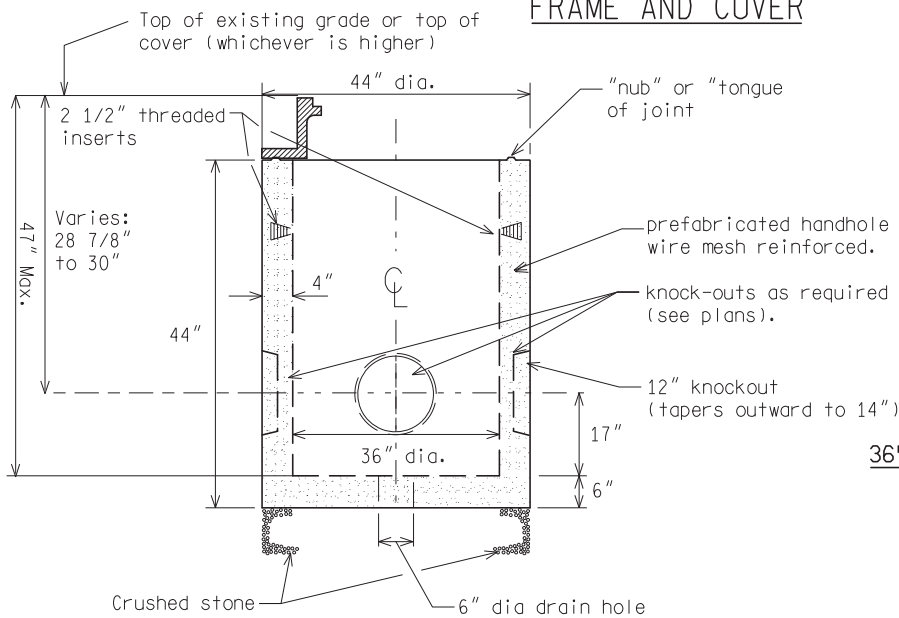
SIG-240-A

SHEET
1 of 6



The H. D. frame and cover shall be manufactured by East Jordan Iron Works, Model 1220 or approved equal.

FRAME AND COVER



NOTE:
Logo imprint may read "Traffic Signal" for non MDOT Installation

36" PRECAST ROUND HANDHOLE SECTION DETAIL

3' DIAMETER ROUND PRECAST CONCRETE HANDHOLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

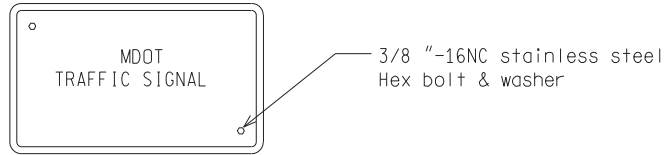
(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

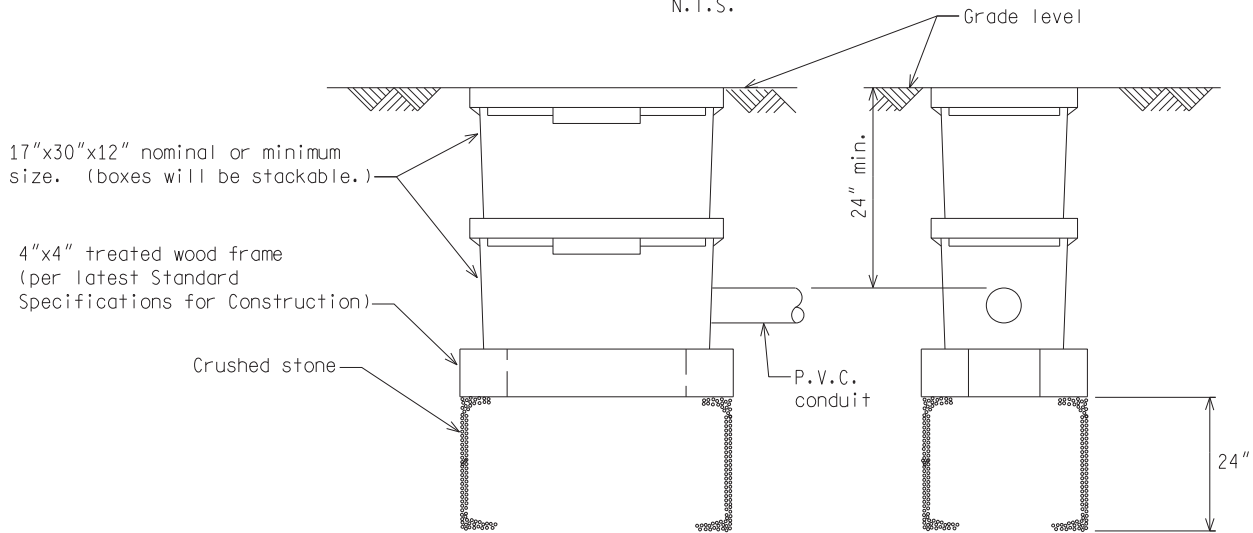
SIG-240-A

SHEET
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NOTE:
Logo imprint may read "Traffic Signal"
for non MDOT installations



COVER
N.T.S.



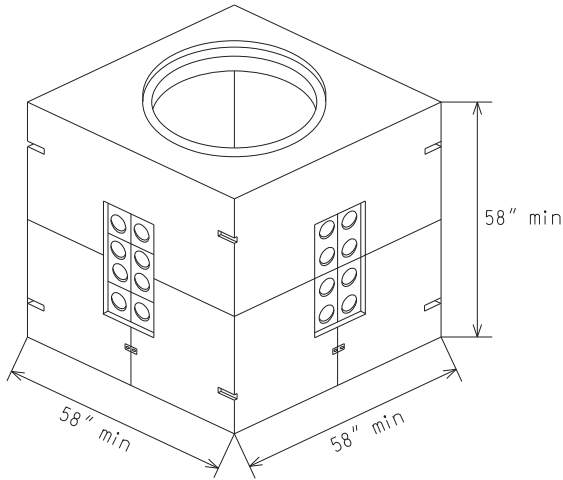
POLYMER CONCRETE HANDHOLE

NOTES PERTAIN TO PRECAST OR BRICK:

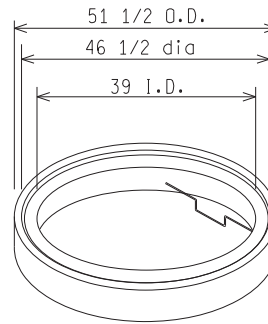
- 1) The material and workmanship shall be in accordance with the current M.D.O.T. Standard Specifications for Construction.
- 2) All concrete masonry shall be grade 30M.
- 3) The inner surface of the handhole shall be smooth.
- 4) Heavy Duty covers shall be castings which meet the requirements of the current specifications for gray iron castings ASTM designation A48 and shall have a minimum strength as provided for Class No. 30 gray iron castings.
- 5) All castings shall be cleaned by sand blasting.
- 6) The seating face of the cover and the seat for the same on the frame if required, shall be ground or machined so that the cover shall have an even bearing on its seat to prevent rocking or tilting.
- 7) The castings shall be free of pouring faults, blow holes, cracks, and other imperfections. They shall be sound, true to form and thickness, clean and neatly finished and shall be coated with tar pitch varnish.
- 8) Light Duty cover shall be bolted to frame with not less than 2 countersunk Hex head bronze bolts.
- 9) The Heavy Duty cover & frame shall be East Jordan Iron Works #8206 Neenah Foundry, #R-6662-HP for square cover or East Jordan Iron Works #2860 Type "A", Neenah Foundry #R-6052 D for circular cover or an approved equal.
- 10) Handhole shall be equipped with cable rack and hooks to train cable.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-240-A	SHEET 3 of 6
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NOTE:
Galvanized step is standard with
grade ring ASTM C478.



Dimensions	
A	Min Wt. (lbs)
6	440
9	650
12	860

	Length	Width	Height
Inside	48	48	48
Outside	58	58	58
Recommended Hole size	82	82	--

GRADE RING WITH 39" I.D. &
46 1/2" RECESS

	Min Thickness	Min Weight lbs
Wall	5	Top 3300
Roof	5	Bottom 3850
Floor	5	Total 7150

4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

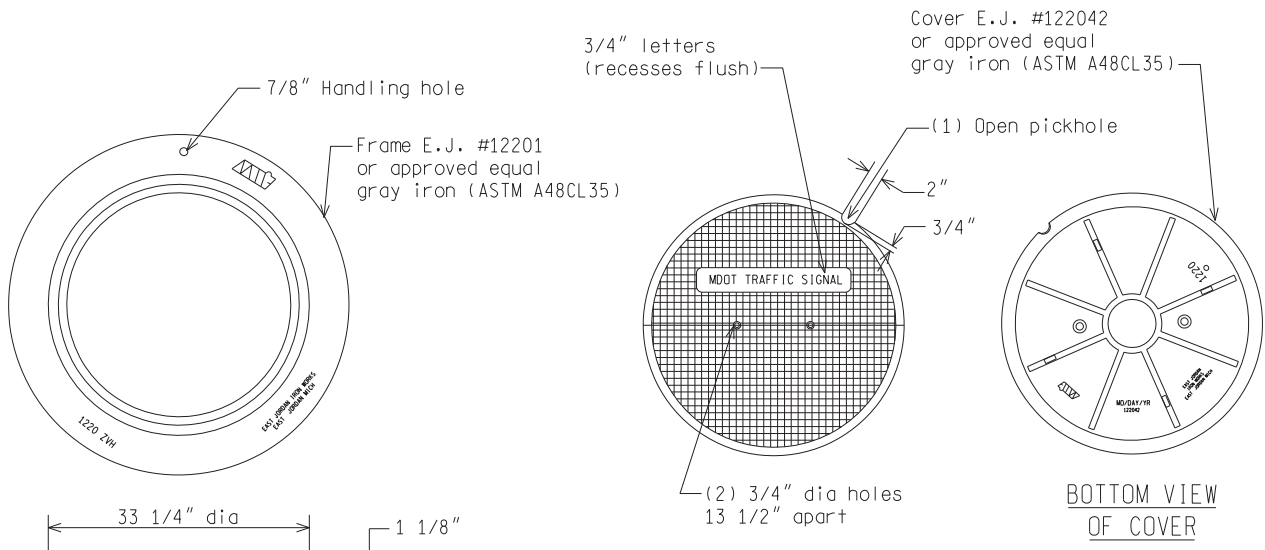
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17

PLAN DATE

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SHEET
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NOTE:
 Logo imprint it on cover shall
 read "MDOT Traffic Signal" for
 MDOT installations



FRAME SECTION
MANHOLE FRAME
(HEAVY DUTY)
 Estimated weight 410 lbs

NOTE:
 Machined surface

COVER SECTION
MANHOLE COVER
(HEAVY DUTY)
 Estimated weight 245 lbs

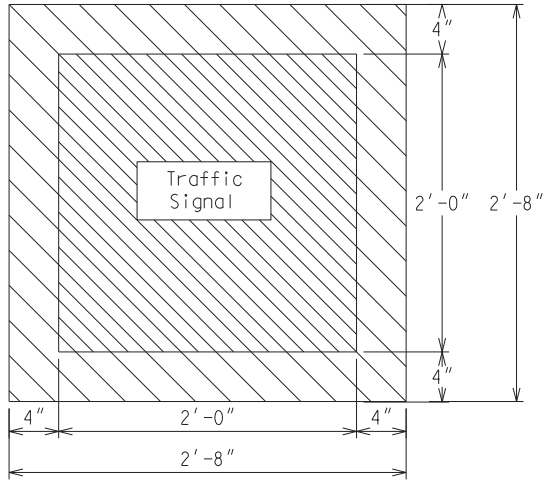
NOTE:
 Machined surface

4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

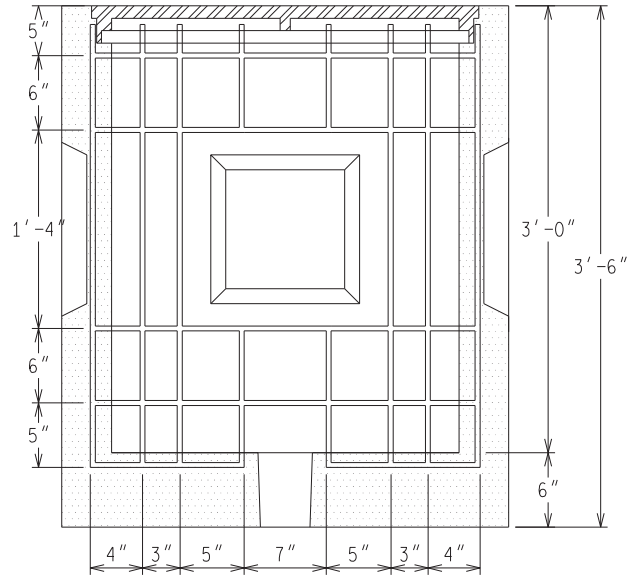
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-240-A	SHEET 5 of 6
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Concrete: 4500 p.s.i. @ 28 days
 Reinforcement: Grade 60 rebar
 All bars are #4



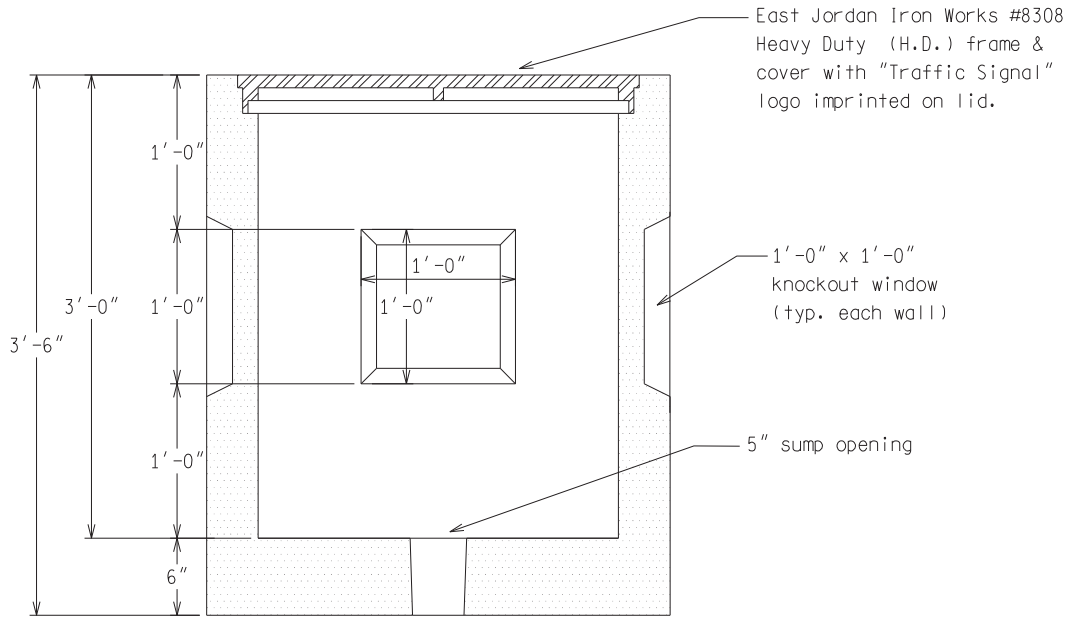
PLAN VIEW

With out frame & cover



SECTION VIEW

Typ. reinforcement all walls



SECTION VIEW

2' x 2' SQUARE x 3' HANDHOLE

For use on Oakland County roads only.

NOT TO SCALE

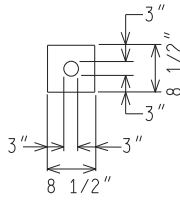
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
 FHWA APPROVAL DATE

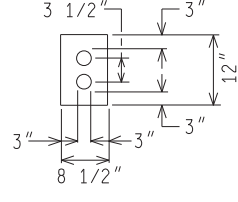
PLAN DATE

SIG-240-A

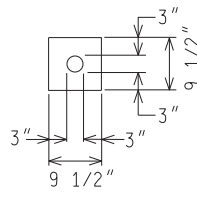
SHEET
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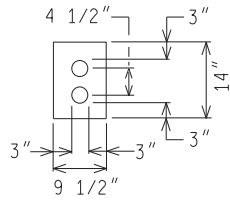
1 2" CONDUIT



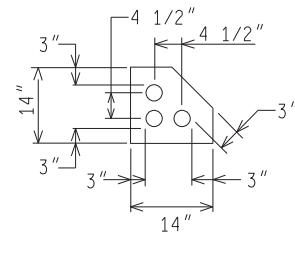
2 2" CONDUIT



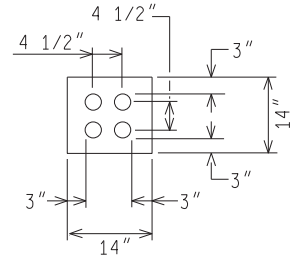
ONE
2 1 1/2" CONDUIT



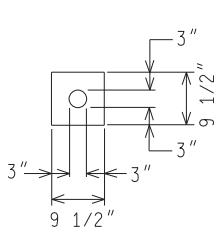
TWO
2 1 1/2" CONDUIT



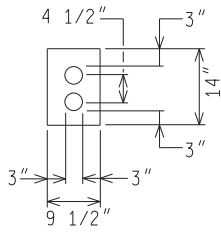
THREE
2 1 1/2" CONDUIT



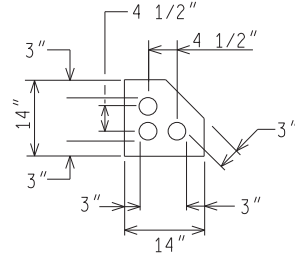
FOUR
2 1 1/2" CONDUIT



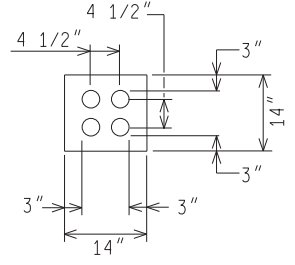
1 3" CONDUIT



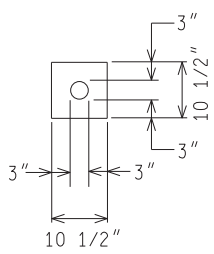
2 3" CONDUIT



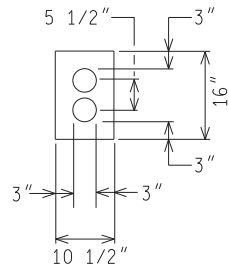
3 3" CONDUIT



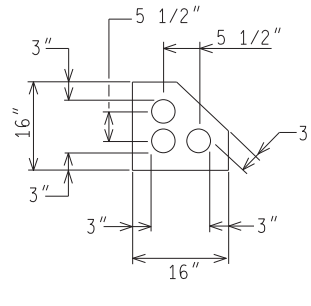
4 3" CONDUIT



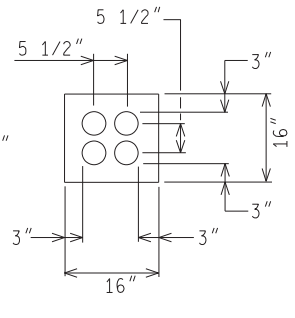
1 4" CONDUIT



2 4" CONDUIT



3 4" CONDUIT



4 4" CONDUIT

ENCASED CONDUIT SECTIONS

NOT TO SCALE

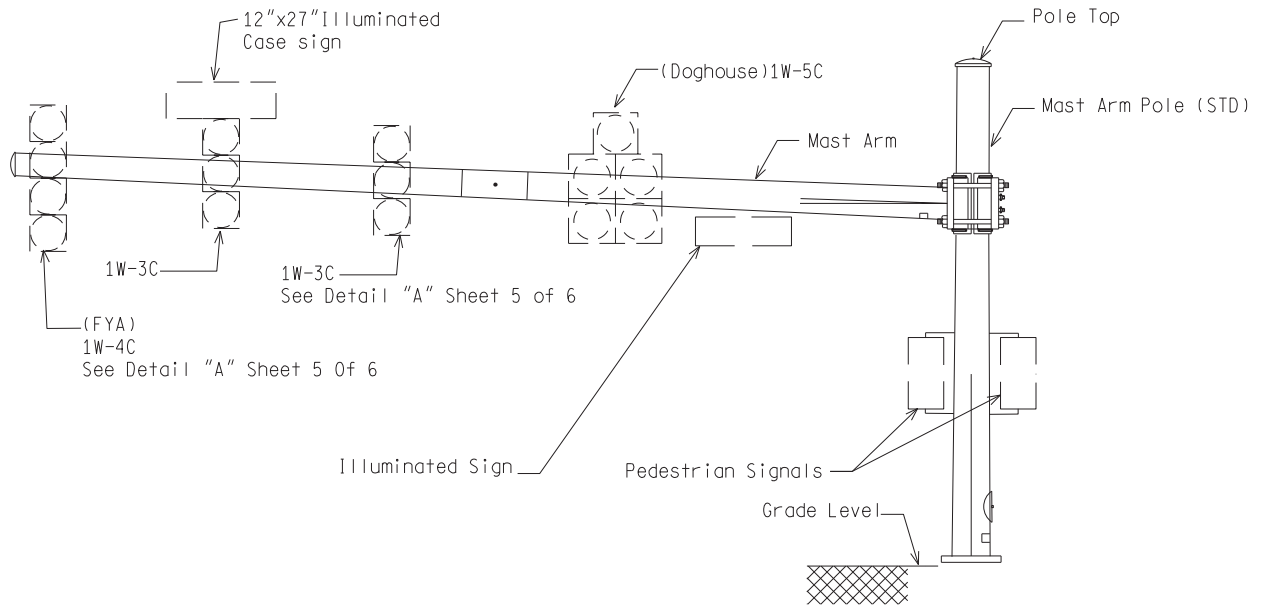
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

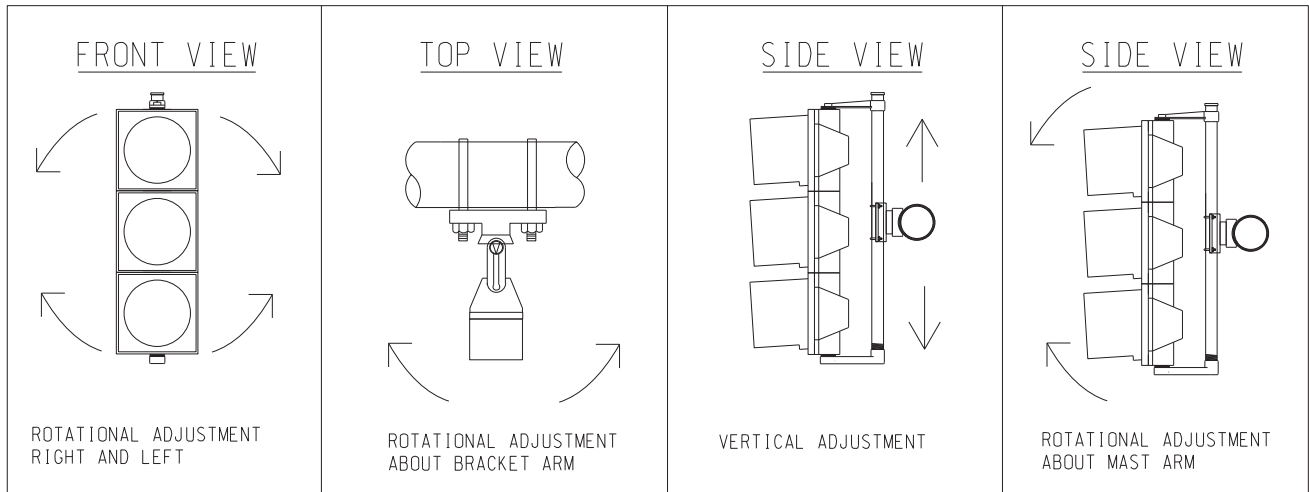
PLAN DATE

SIG-250-A

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TYPICAL SIGNAL DISPLAYS



SIGNAL HEAD BRACKET ADJUSTMENT

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: JEV

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

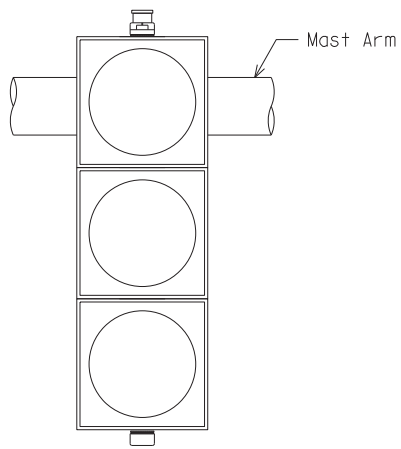
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

MAST ARM MOUNTED
T.S. BRACKET ASSEMBLY

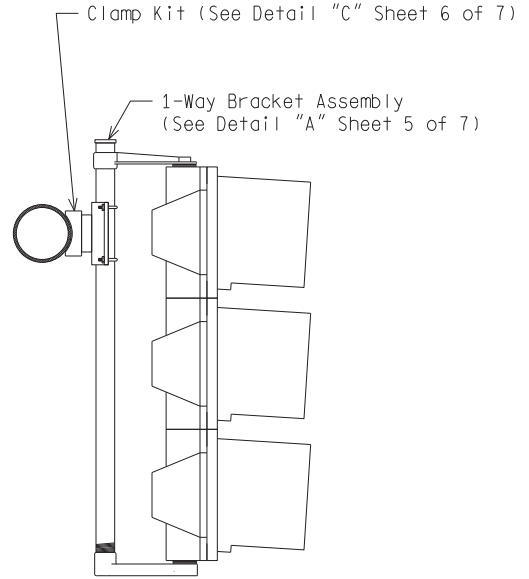
PLAN DATE

SIG-301-A

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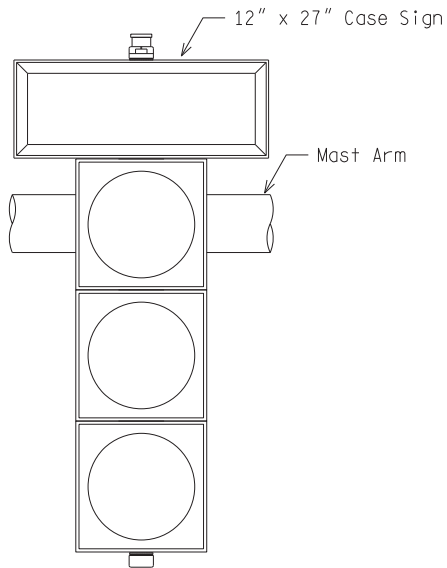


FRONT VIEW

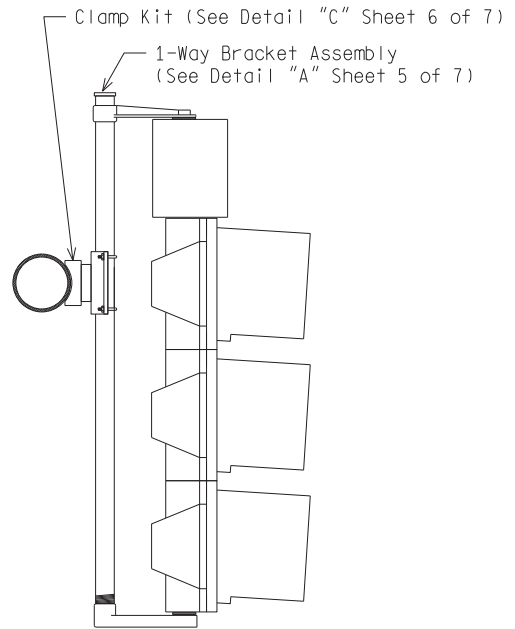


SIDE VIEW

1W-3C



FRONT VIEW



SIDE VIEW

1W-3C With 12\" x 27\" Case Sign

NOT TO SCALE

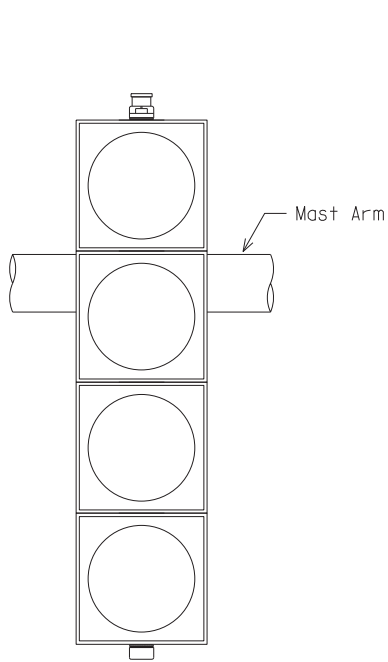
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

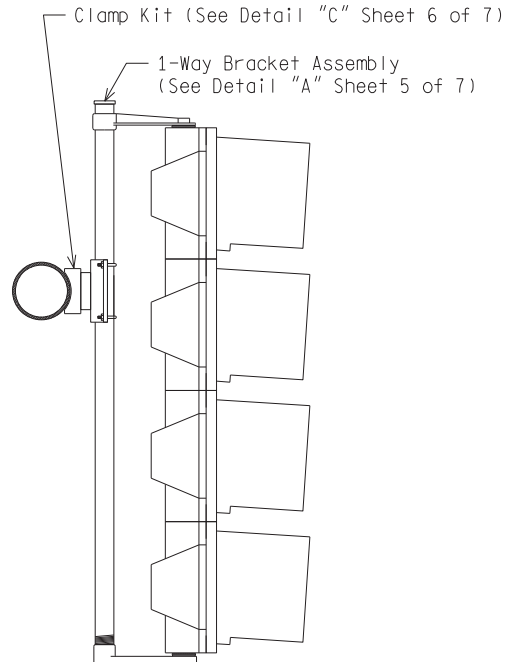
PLAN DATE

SIG-301-A

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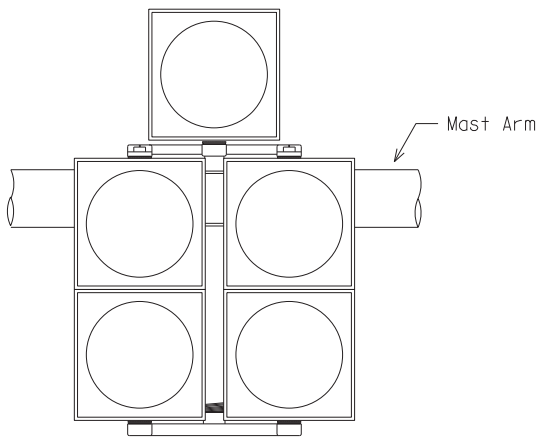


FRONT VIEW

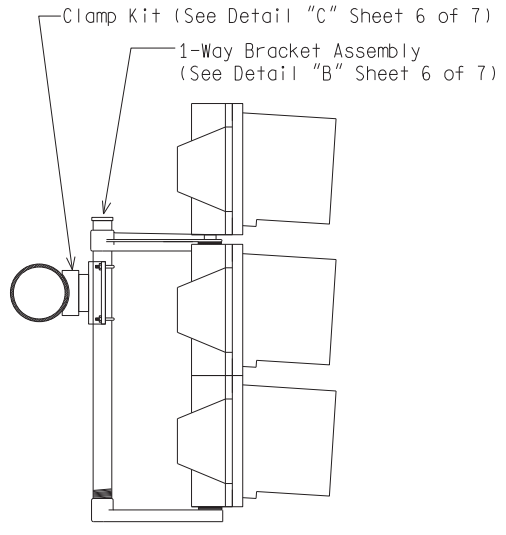


SIDE VIEW

1W-4C (FYA)



FRONT VIEW



SIDE VIEW

1W-5C (Doghouse)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

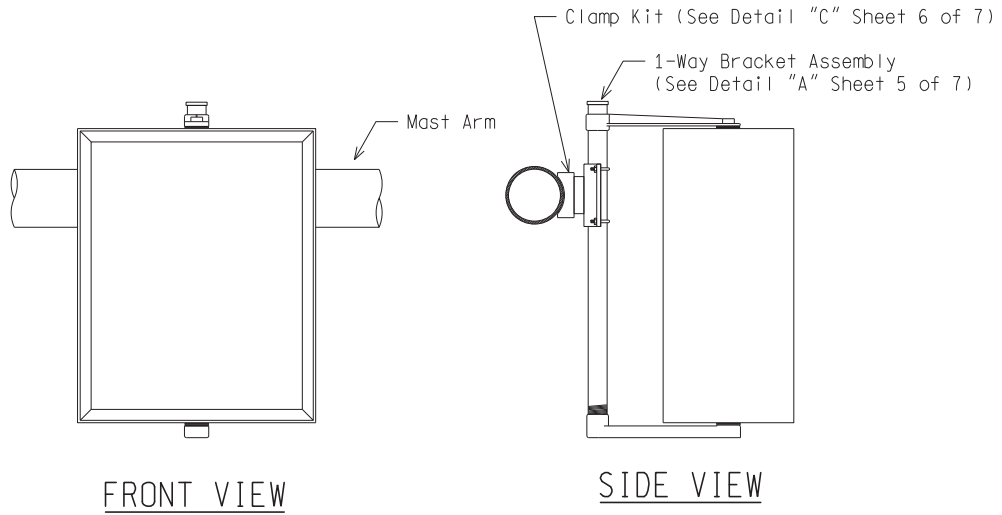
(SPECIAL DETAIL)
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3 of 7



1W-Case Sign (24" x 30" Shown)

NOT TO SCALE

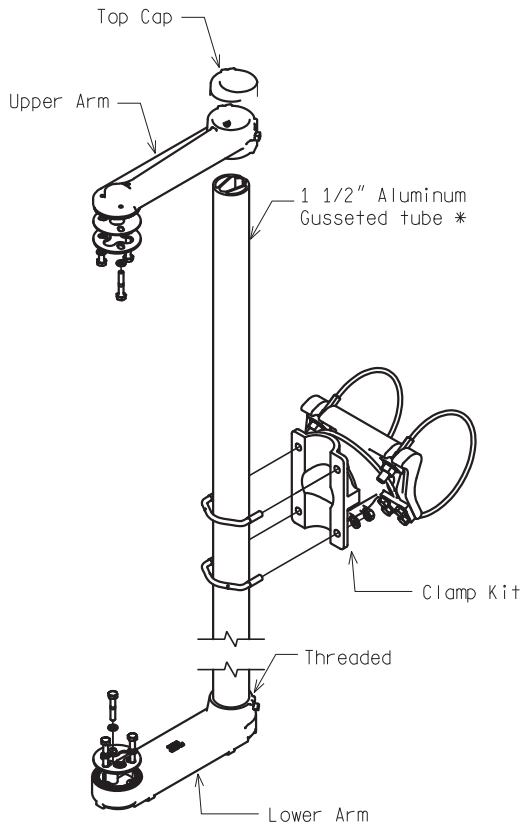
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

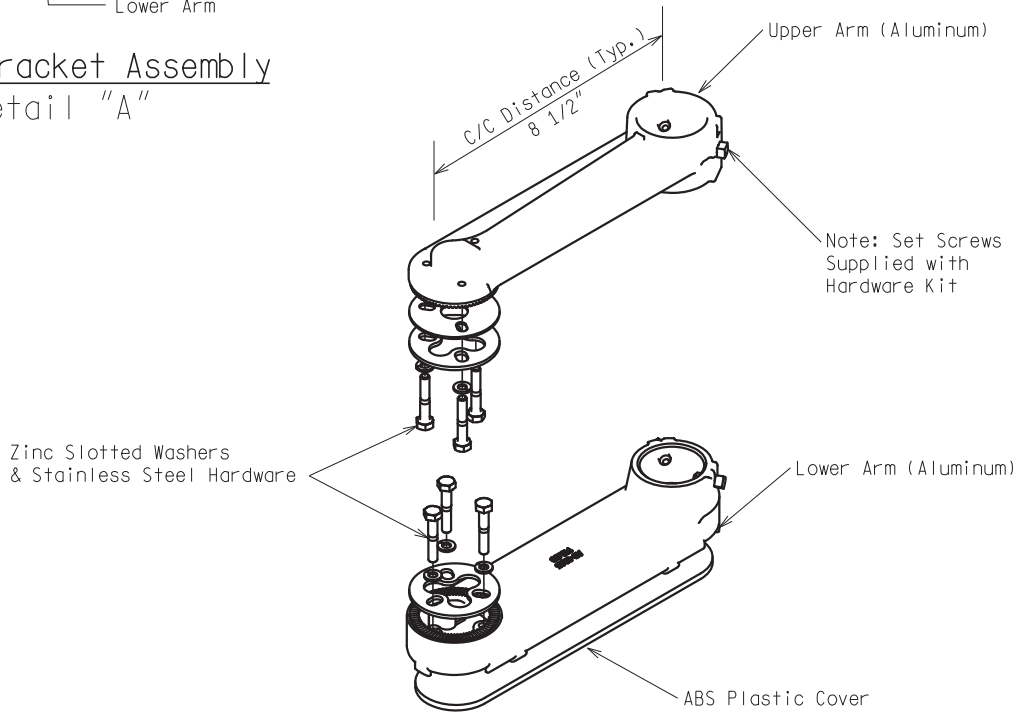
SIG-301-A

SHEET
4 of 7



* Note: Use 46" tube for 3 section T.S.
Use 58" tube for 4 section T.S.

1-WAY Bracket Assembly
Detail "A"



1-WAY Bracket Arm Assembly

NOT TO SCALE

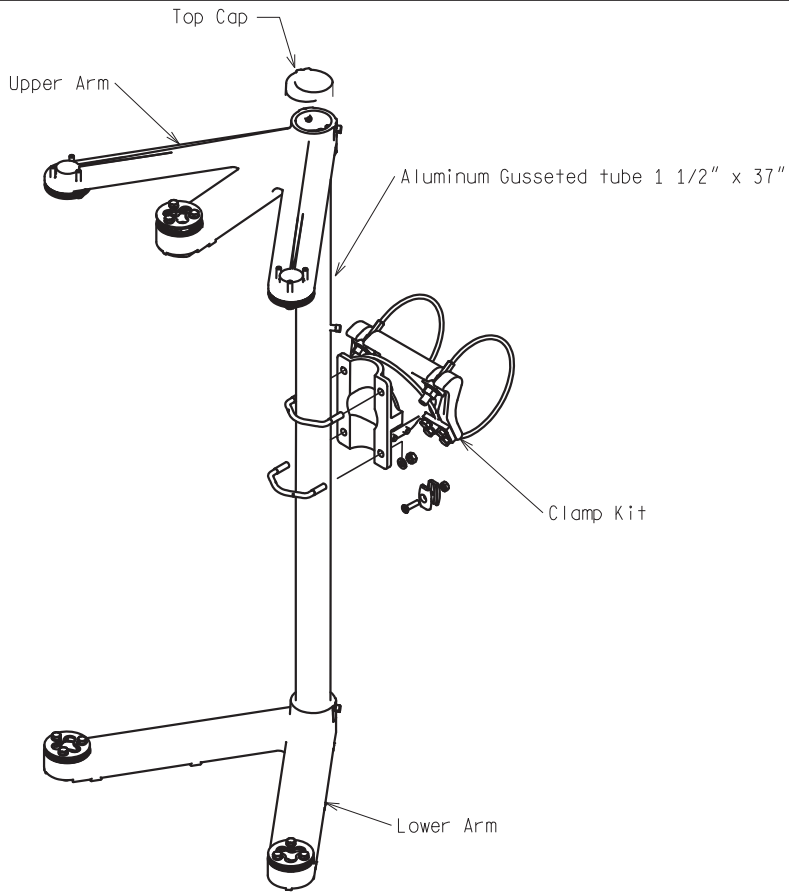
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

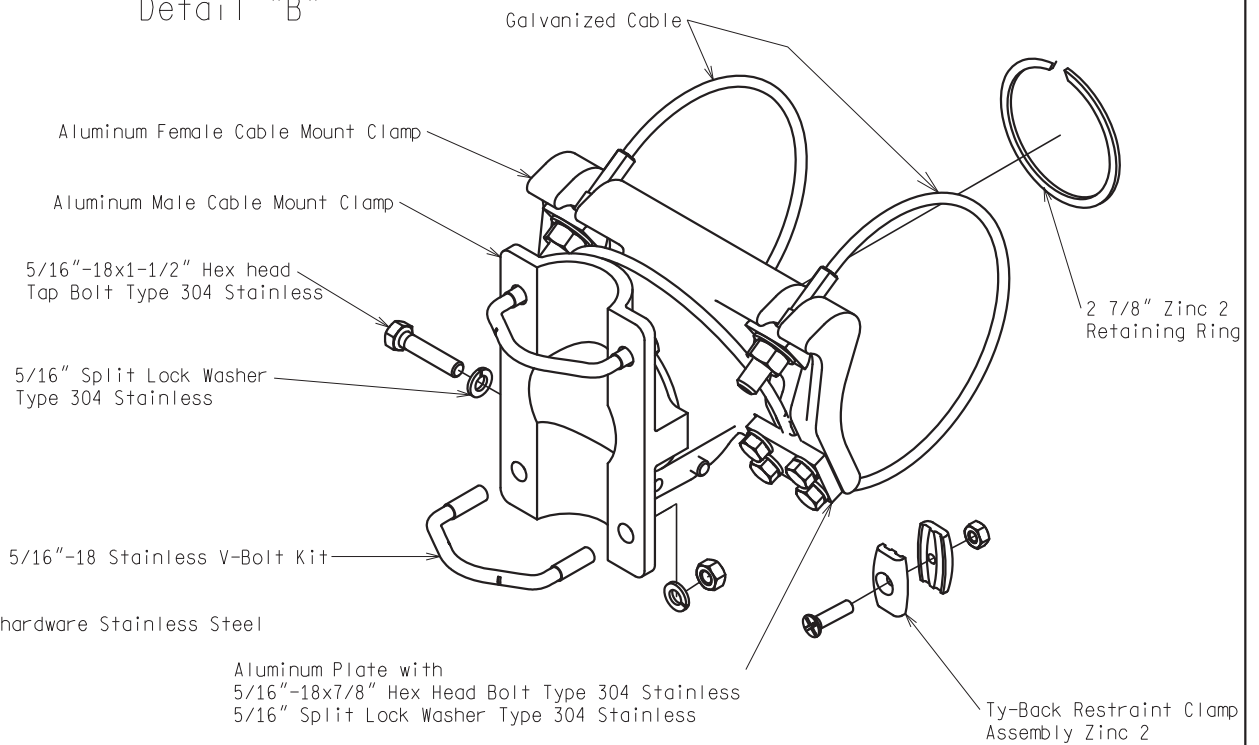
PLAN DATE

SIG-301-A

SHEET
5 of 7



1-WAY 5-Section Cluster Bracket Assembly
Detail "B"



Aluminum Clamp With Galvanized Cable
Detail "C"

NOT TO SCALE

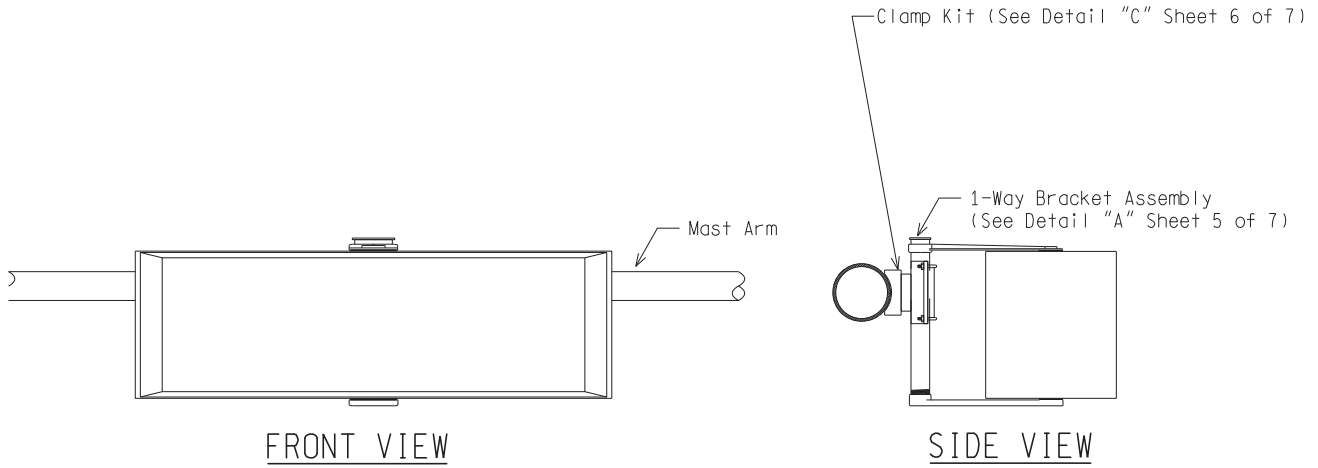
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BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

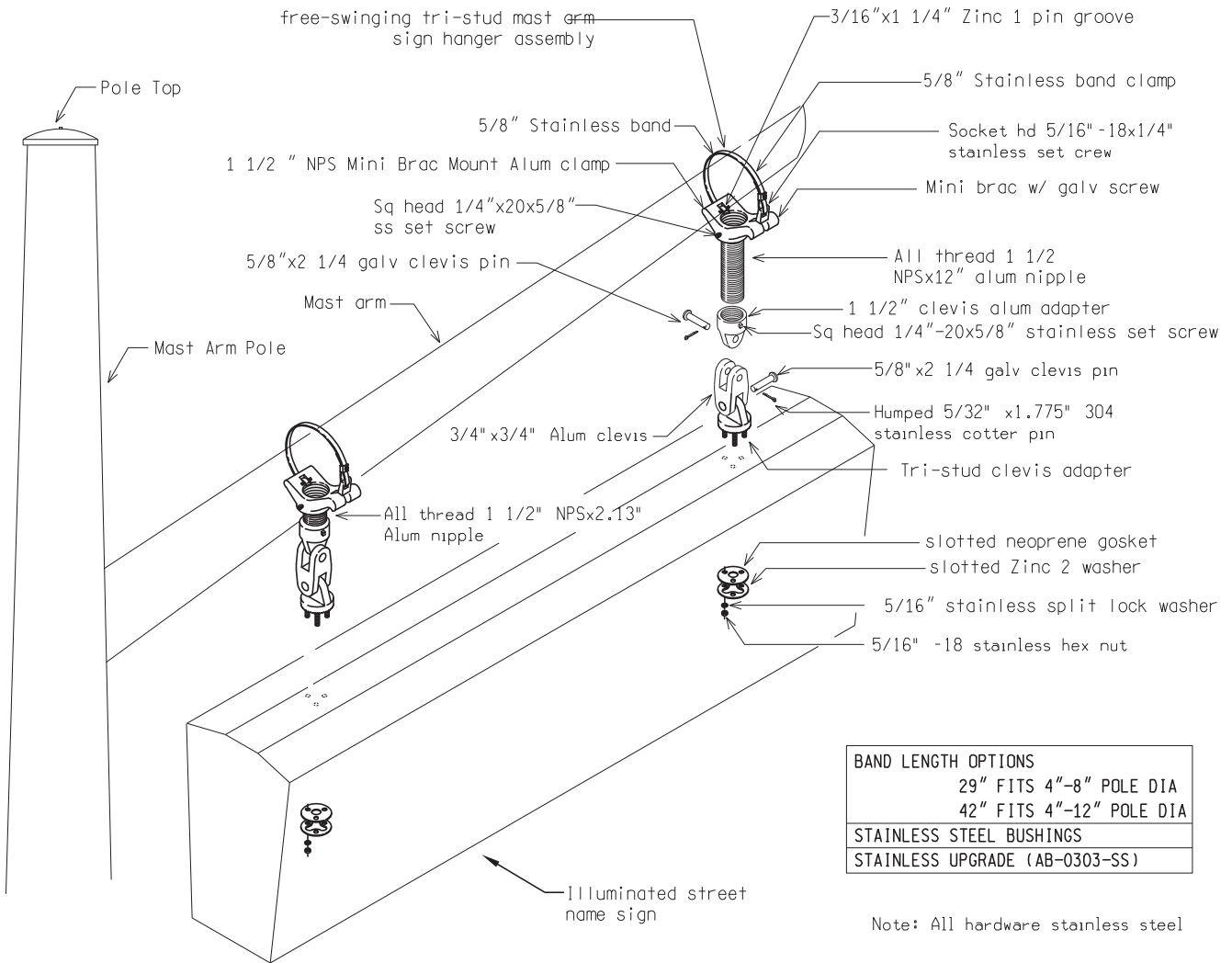
PLAN DATE

SIG-301-A

SHEET
6 of 7



1W-Illuminated Street Name Sign



2W-Illuminated Street Name Sign

NOT TO SCALE

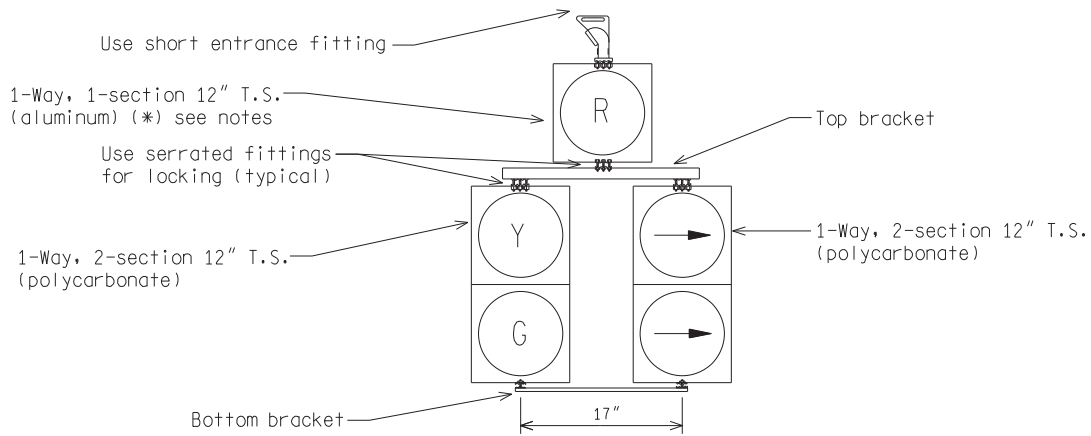
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BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

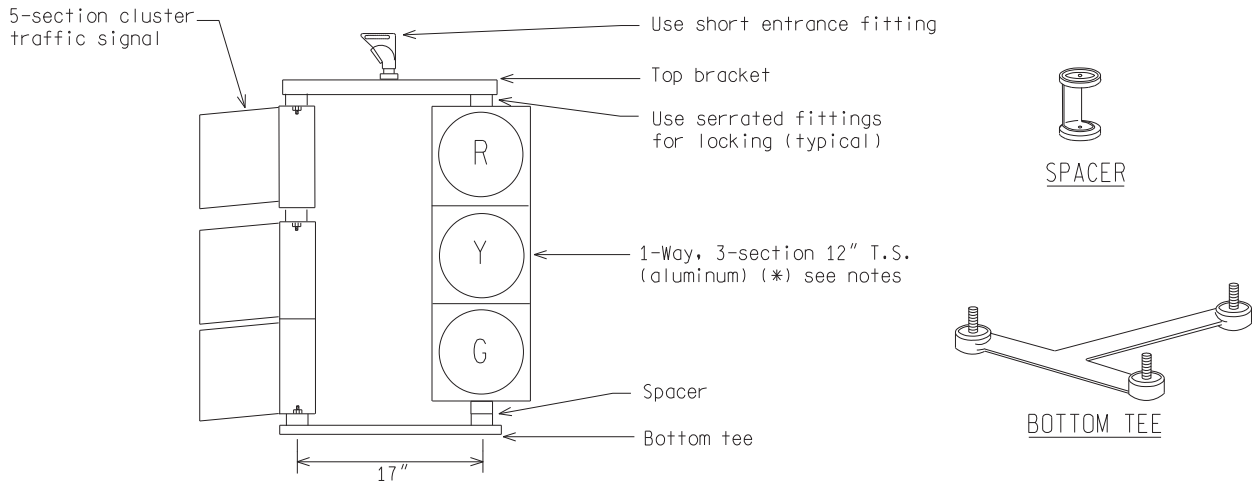
PLAN DATE

SIG-301-A

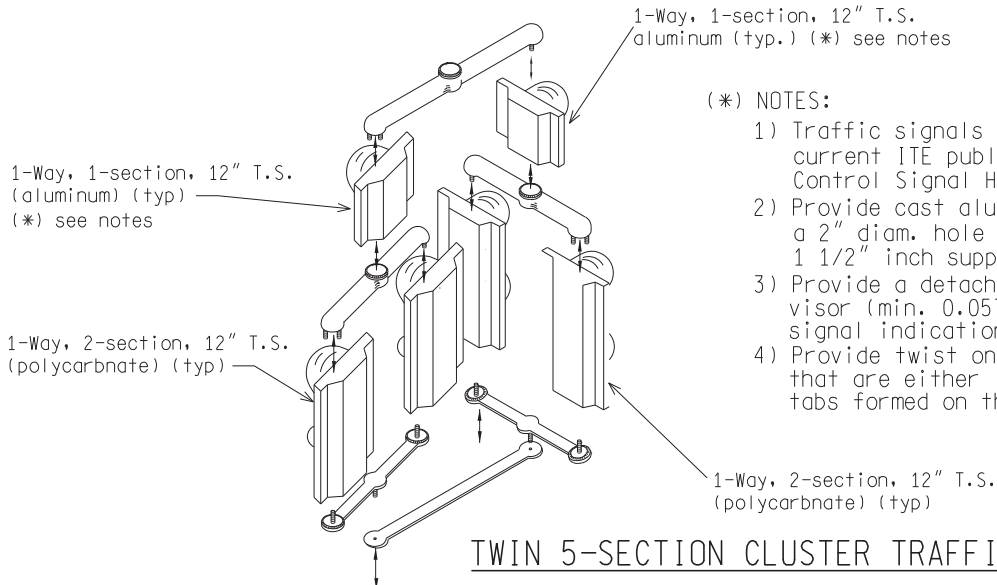
SHEET
7 of 7



5-SECTION CLUSTER (DOGHOUSE) TRAFFIC SIGNAL



COMBINATION 5-SECTION CLUSTER & 1-WAY T.S. (ALUMINUM)



(*) NOTES:

- 1) Traffic signals must conform to the current ITE publication "Vehicle Traffic Control Signal Heads."
- 2) Provide cast aluminum alloy housings with a 2" diam. hole top and bottom to receive 1 1/2" inch supporting pipe.
- 3) Provide a detachable, sheet aluminum visor (min. 0.057" thick), for each signal indication.
- 4) Provide twist on slots for visor mounting that are either in the visor or on the tabs formed on the visor.

TWIN 5-SECTION CLUSTER TRAFFIC SIGNAL

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG302A.dgn Rev. 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

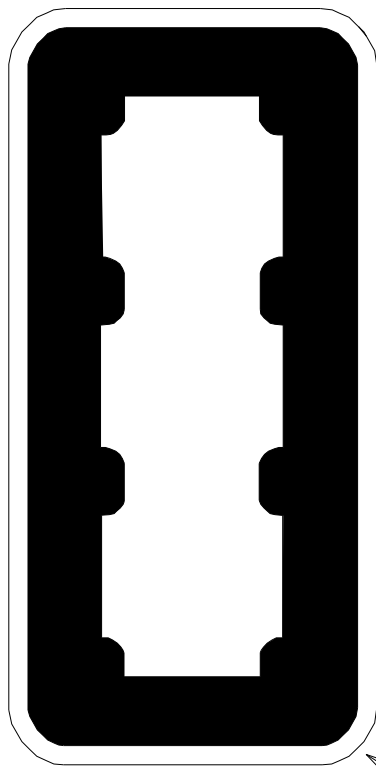
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**BRACKETING FOR
5-SECTION HEADS**

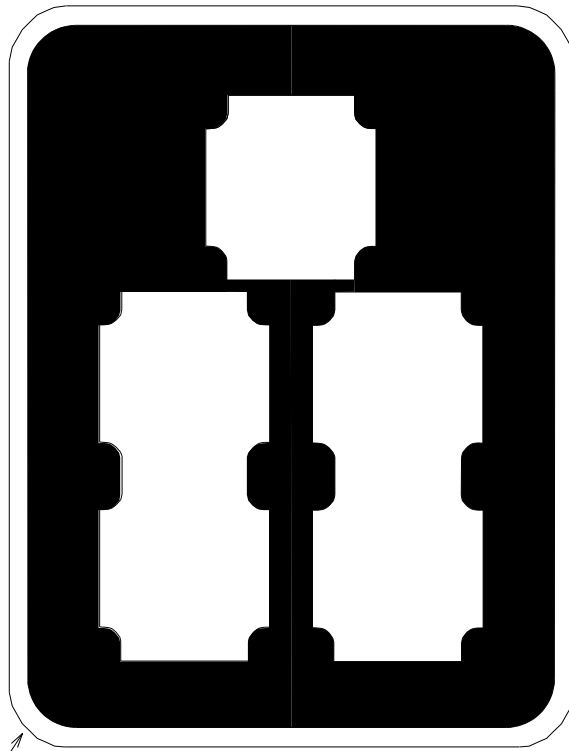
SIG-302-A

PLAN DATE

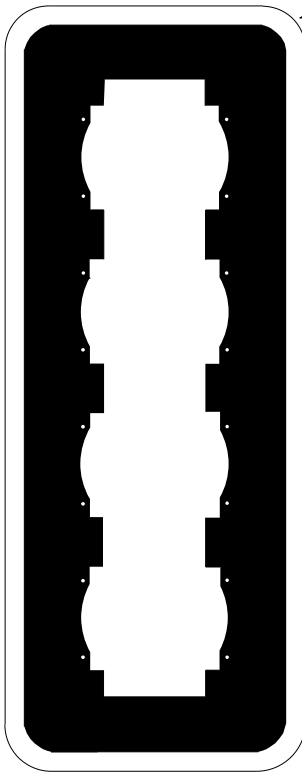
SHEET
1 of 1



12", 3 SECTION



12", 5 SECTION



12", 4 SECTION

ASTM Type Reflective yellow,
and fluorescent yellow tape border

NOTES:

- 1) Backplates are to be used for mast arm type (fixed support) or tethered span wire type installations as indicated on the plans or as directed by the Engineer.
- 2) Backplates must be a one piece construction unless otherwise directed by the Engineer.
- 3) Do not cut the backplate for installation.
- 4) Use one inch border ASTM Type (Reflective yellow, and fluorescent yellow tape border) and Yellow signal heads with visors.

TRAFFIC SIGNAL BACKPLATES

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG304A.dgn Rev. 11/13/20



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TRAFFIC AND SAFETY

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ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

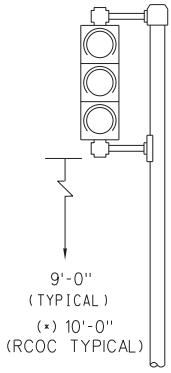
TRAFFIC SIGNAL BACKPLATES

PLAN DATE

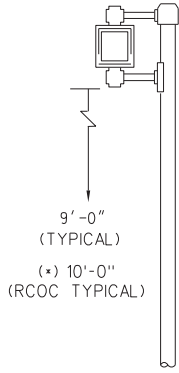
SIG-304-A

SHEET
1 of 1

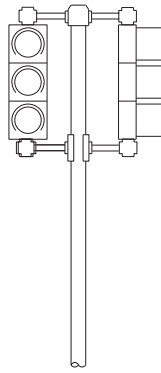
(* Refer to Note 4 on Sheet 2 of 2.



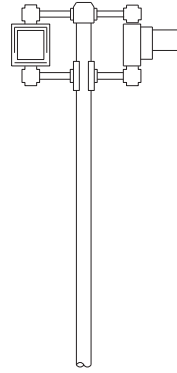
DETAIL "A-2"



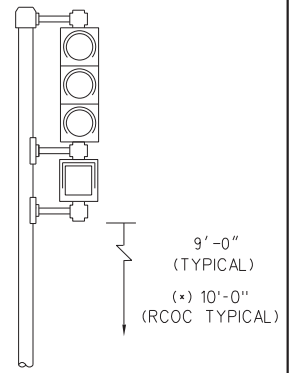
DETAIL "B-2"



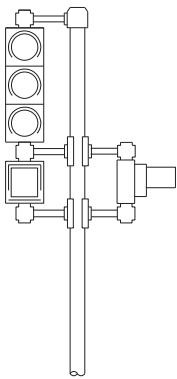
DETAIL "C-2"



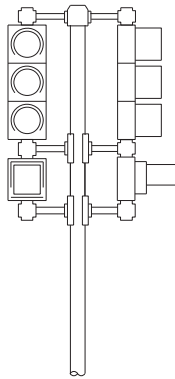
DETAIL "D-2"



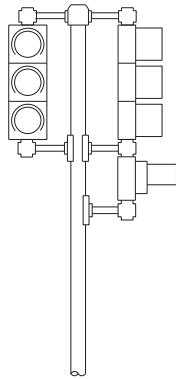
DETAIL "E-2"



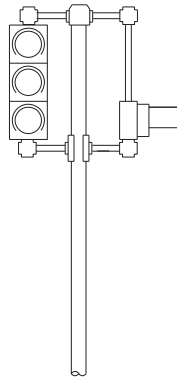
DETAIL "F-2"



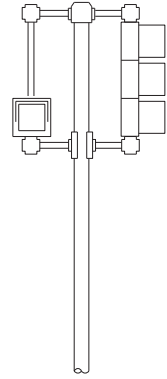
DETAIL "G-2"



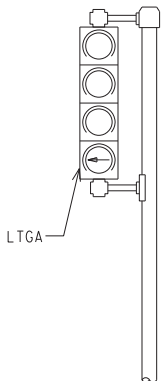
DETAIL "H-2"



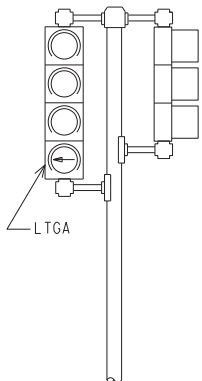
DETAIL "I-2"



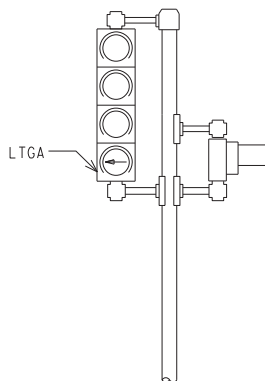
DETAIL "J-2"



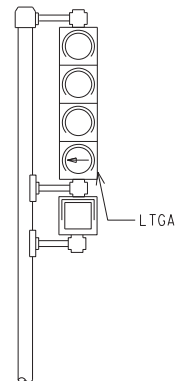
DETAIL "K-2"



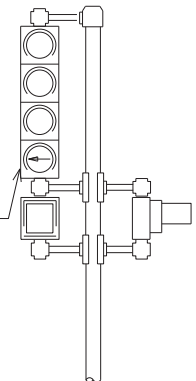
DETAIL "L-2"



DETAIL "M-2"



DETAIL "N-2"



DETAIL "O-2"

Left Turn Green Arrow (LTGA)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG330A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:
CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

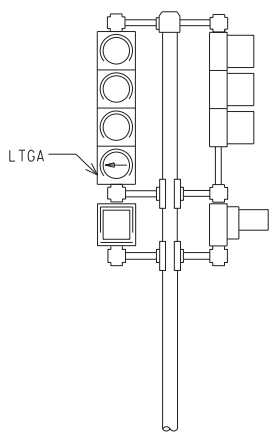
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTAL MOUNTED
SIGNAL DISPLAYS

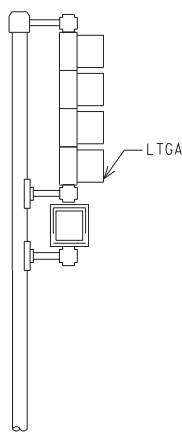
SIG-330-A

PLAN DATE

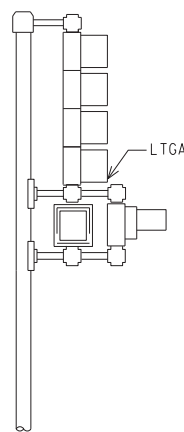
SHEET
1 of 2



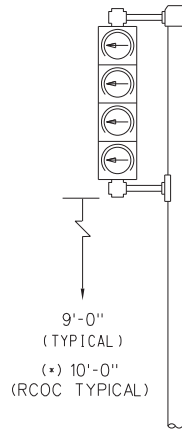
DETAIL "P-2"



DETAIL "Q-2"

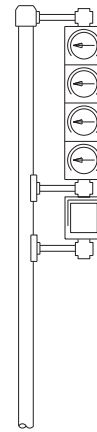


DETAIL "R-2"



DETAIL "S-2"

(FYA)

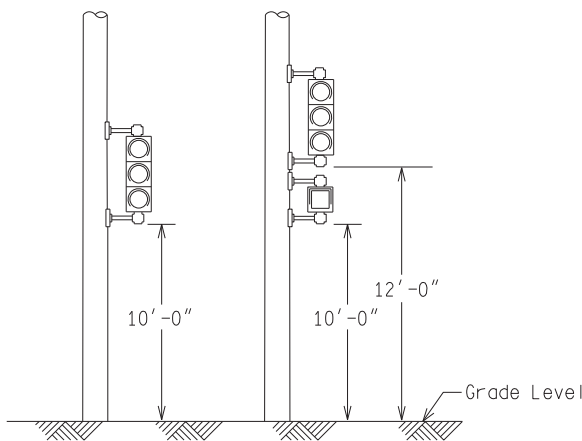


DETAIL "T-2"

(FYA)

Left Turn Green Arrow (LTGA)

Flashing Yellow Arrow (FYA)



RCOC Mounting Detail (*) see note

DETAIL "U-2"

(FYA)

DETAIL "V-2"

(FYA)

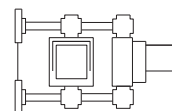
DETAIL "Typical"

WITH CASE SIGN

Flashing Yellow Arrow (FYA)

NOTE:

- 1) Pipe assembly shall be such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.
 - 2) Pipe assembly shall be of such length and height as to accommodate an illuminated (12"x27") case sign for proper maintenance and clear vehicular viewing.
 - 3) Bracket lengths are 16 inches for LED pedestrian signals and for LED pedestrian countdown signals.
 - 4) Tolerance within +/- 1/8" for bracketing.
- (*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.



LED PED

NOTE:
Walking person and hand symbol are filled.

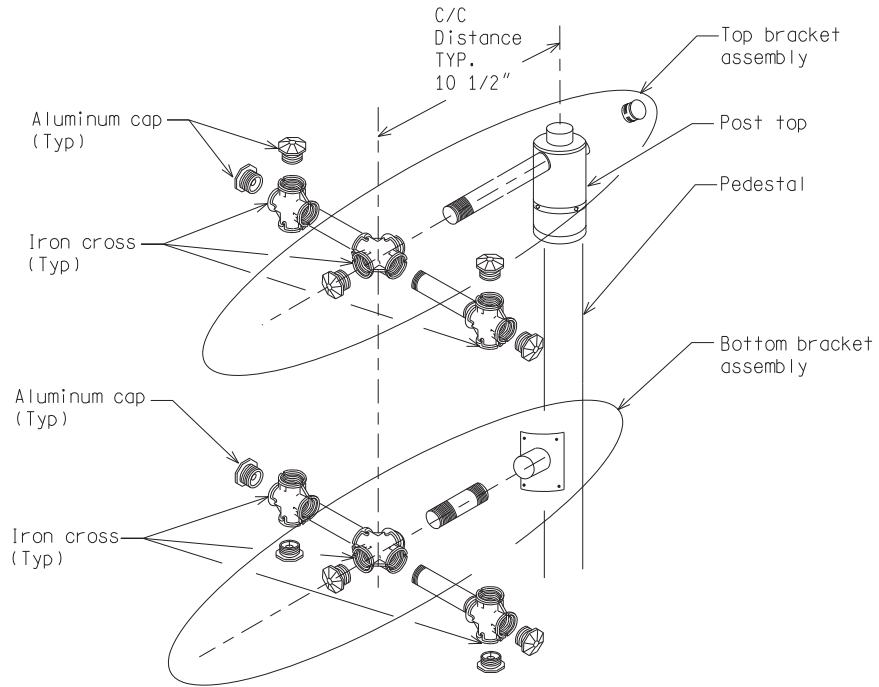


LED PED (filled)

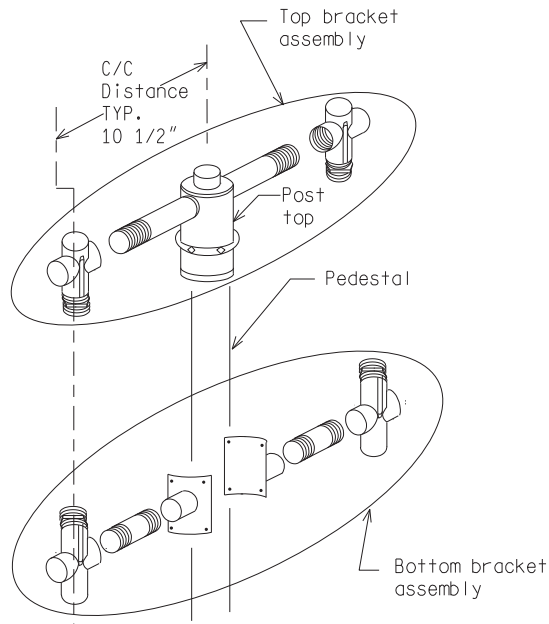


Countdown LED PED (filled symbols)

NOT TO SCALE



SIGNAL MOUNTING HARDWARE FOR BACKSIDE BRACKET



SIGNAL MOUNTING HARDWARE - STANDARD BRACKET

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG331A.dgn Rev.



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

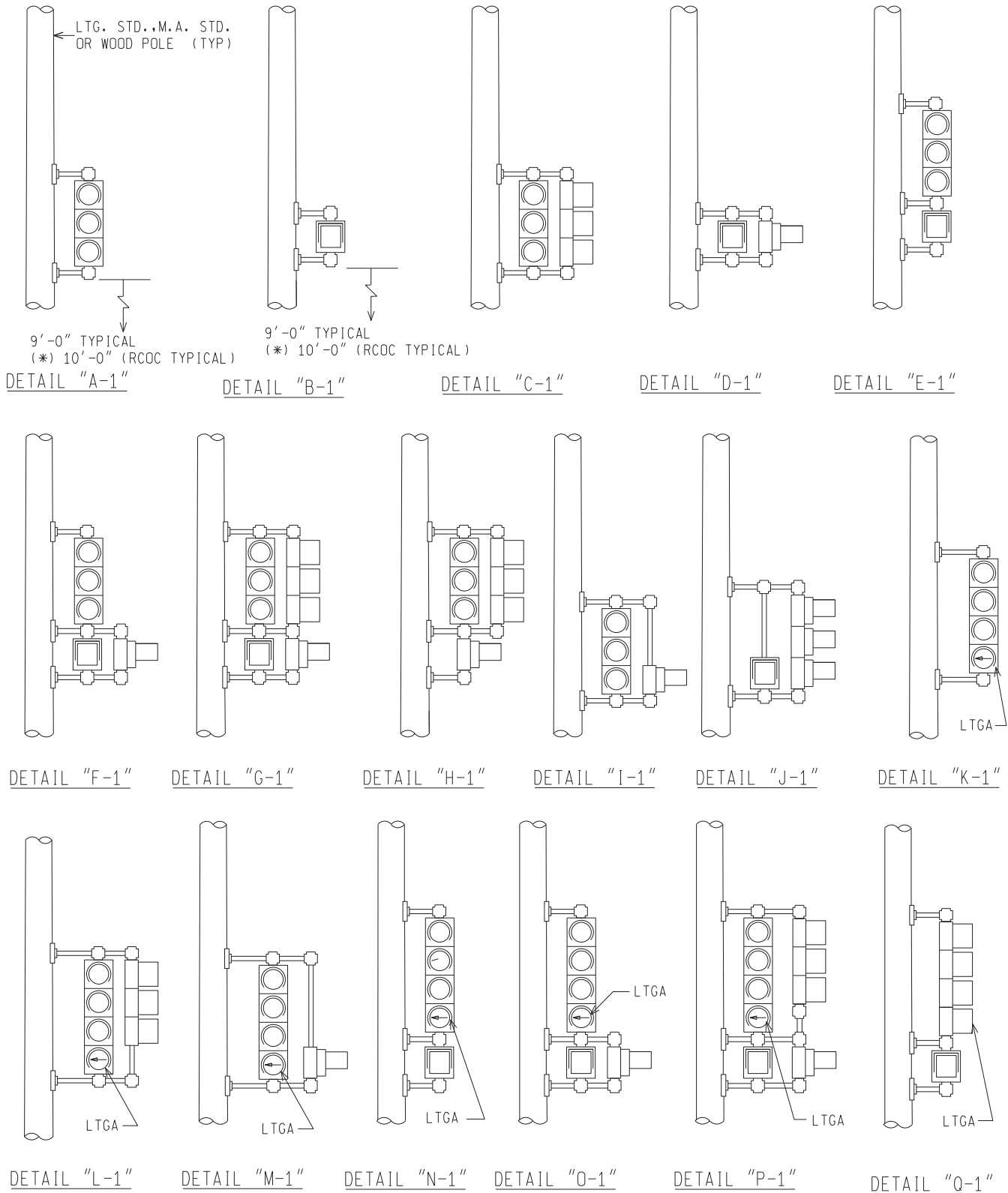
PEDESTAL MOUNTING
FOR SIGNALS

02/16/17
PLAN DATE

SIG-331-A

SHEET
1 of 1

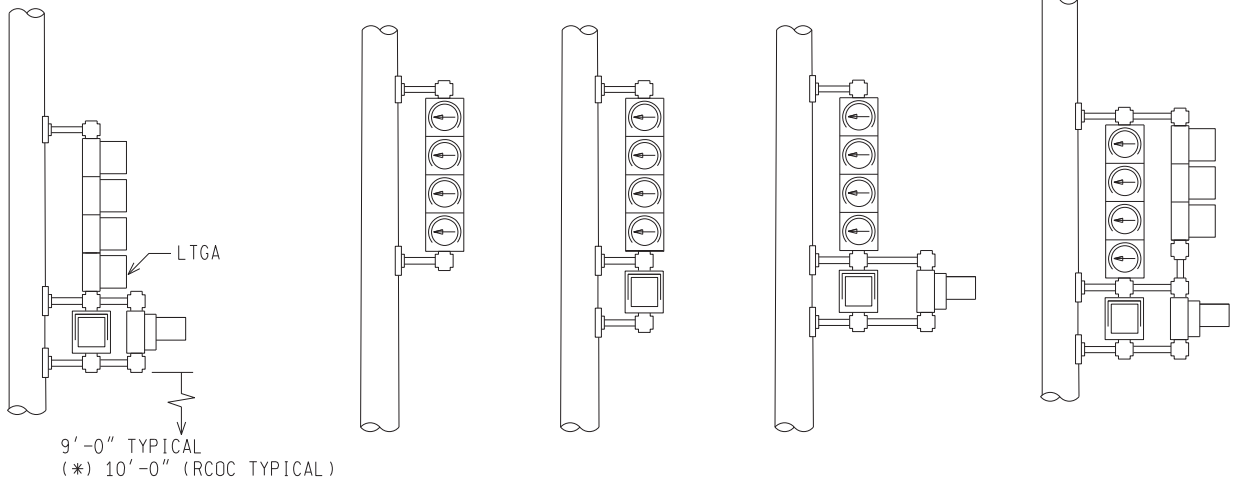
(* Refer to Note 5 on Sheet 2 of 2.



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG340A.dgn Rev: 02/16/17

<p>PREPARED BY TRAFFIC AND SAFETY</p>	<p>ENGINEER OF DELIVERY</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR</p>	
	<p>ENGINEER OF DEVELOPMENT</p>	<p>POLE MOUNTED SIGNAL DISPLAYS</p>	
<p>DRAWN BY:</p>	<p>(SPECIAL DETAIL)</p>	<p>PLAN DATE</p>	<p>SIG-340-A</p>
<p>CHECKED BY:</p>	<p>FHWA APPROVAL DATE</p>		



DETAIL "R-1"

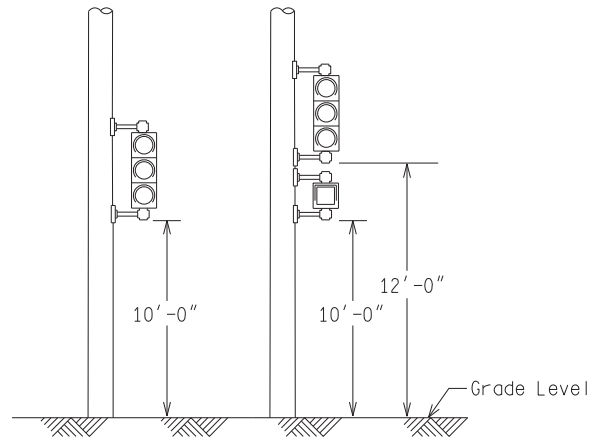
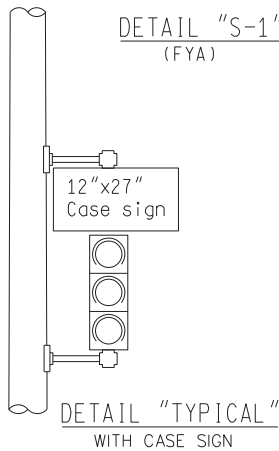
DETAIL "S-1"
(FYA)

DETAIL "T-1"
(FYA)

DETAIL "U-1"
(FYA)

DETAIL "V-1"
(FYA)

Flashing Yellow Arrow (FYA)

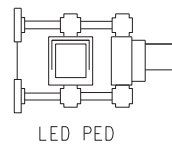


RCOC Mounting Detail (*) see note

NOTES:

- 1) The relative position of 2-Way T.S. & pedestrian bracket arm signals within the bracket assembly shall be reversed (i.e. the signal nearest the pole goes to the outside of the bracket assembly & the outside signal goes inboard or nearest to pole) according to the plan view to provide clear vehicular and pedestrian viewing.
- 2) Pipe assembly shall be of such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.
- 3) Pipe assembly shall be of such length and height as to accommodate an illuminated (12"x27") case sign for proper maintenance and clear vehicular viewing.
- 4) Bracket lengths are 16 inches for LED pedestrian signals and LED pedestrian countdown signals.
- 5) For poles located 6' or less from face of curb, contact Engineer for traffic and/or pedestrian bracket type and orientation if field installation requires a change from information shown on the plans.
- 6) Tolerance within +/- 1/8" for bracketing.

(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.



LED PED

NOTE:
Walking person and hand symbol are filled.



LED PED
(filled)



Countdown
LED PED
(filled symbols)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

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Rev. 02/16/17

PLAN DATE

SIG-340-A

SHEET
2 of 2

See detail "A" sheet 3 of 3

1 1/4" schedule 80 PVC or rigid metal conduit.

1 1/4" pulling "L" box (Type C)

Wood or plastic moulding

NOTES:

1) Exterior surface of all mounting assemblies for pedestrian signals including brackets, nuts and related hardware shall be weather-resistant black enamel.

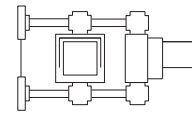
(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown on SIG-028A, SIG-029A or SIG-029B for the RCOC Mounting Detail.

Grade level

9'-0" (*) see note

Use non-solder type connection

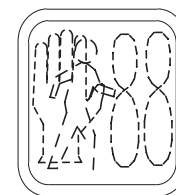
Ground rod (s)



LED ped



LED PED (filled)



Countdown LED PED (filled symbols)

WOOD POLE

OVERHEAD FEED

1 1/4" schedule 80 PVC or rigid metal conduit, shown, but apply to all conduit sizes.

Galvanized Steel 2 hole Strap

Expansion Joint

Grade level

1' to Grade Maximum

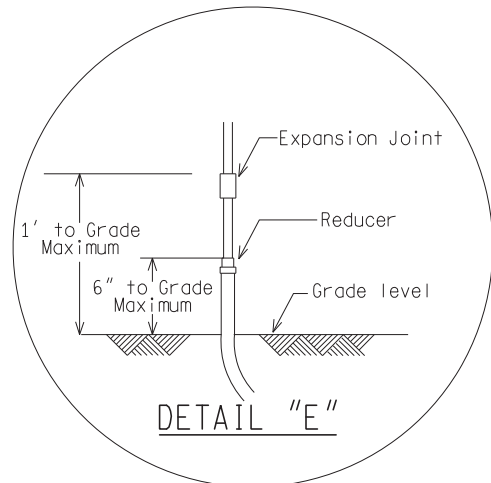
Handhole

WOOD POLE

NOTE:

If rigid metal conduit is used, the conduit must be bonded according to the current N.E.C.

Schedule 80 PVC conduit (size of conduit as shown on plans)



DETAIL "E"

UNDERGROUND ALTERNATE (COUPLING NOT SHOWN)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG341A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

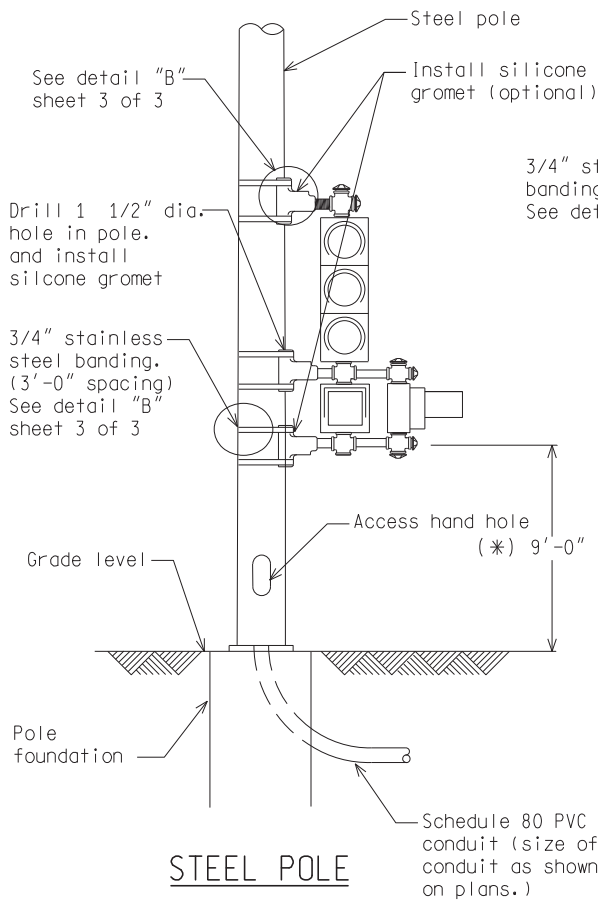
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

**POLE MOUNTING DETAILS
FOR SIGNALS**

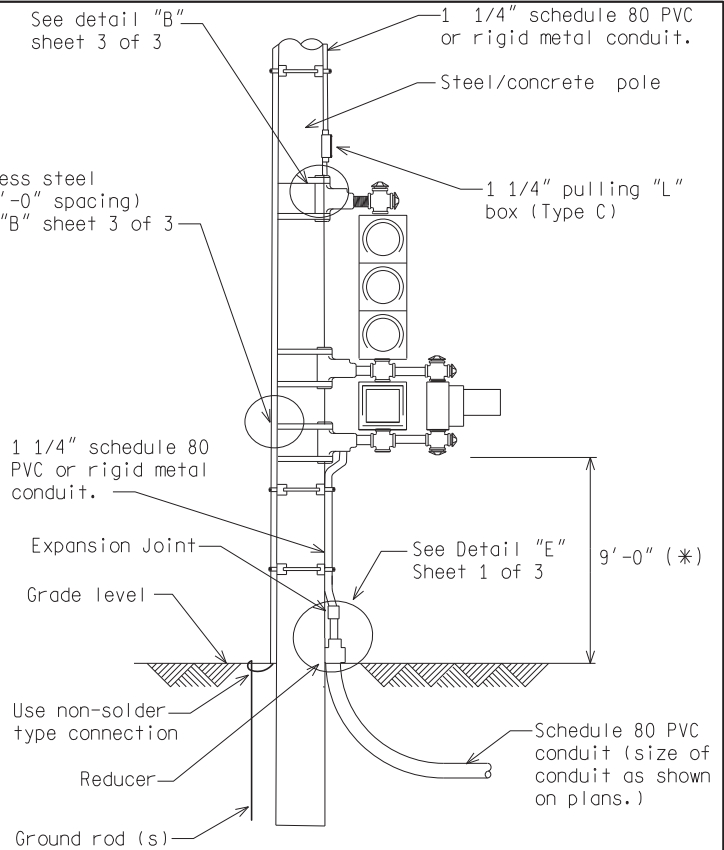
PLAN DATE

SIG-341-A

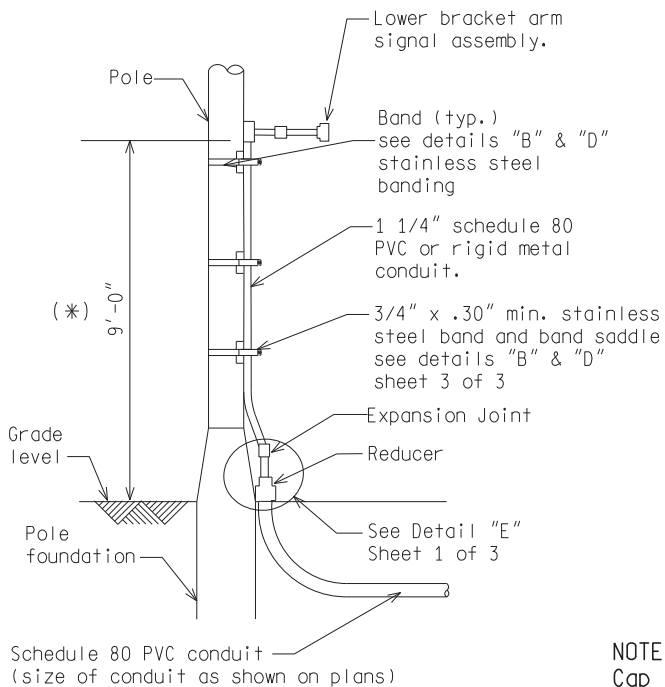
SHEET
1 of 3



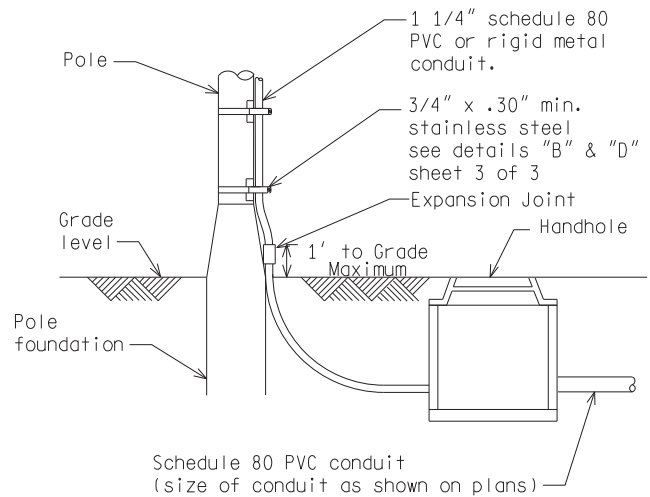
STEEL POLE



STEEL STREET LIGHT POLE OR CONCRETE POLE

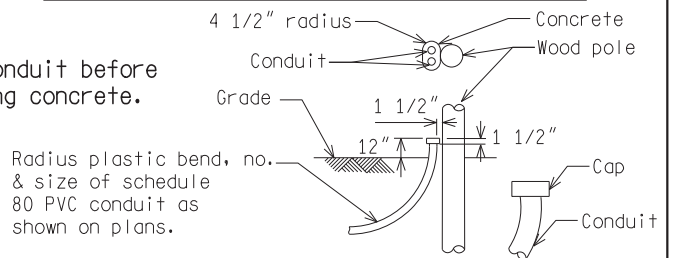


INSTALLATION OF CONDUIT ON OUTSIDE OF POLE



INSTALLATION OF CONDUIT ON OUTSIDE OF POLE (ALTERNATE)

NOTE:
Cap conduit before pouring concrete.



INSTALLATION OF CONDUIT AT CABLE POLE

(*) Refer to Note 2 on Sheet 1 of 3.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

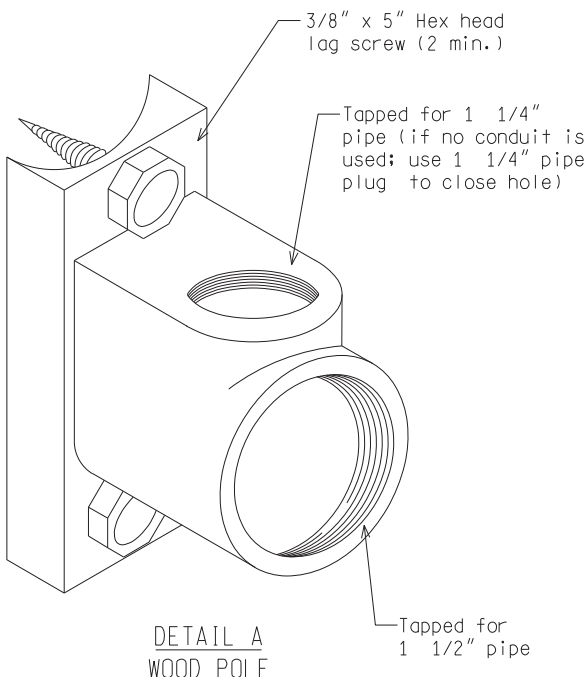
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Rev. 02/16/17

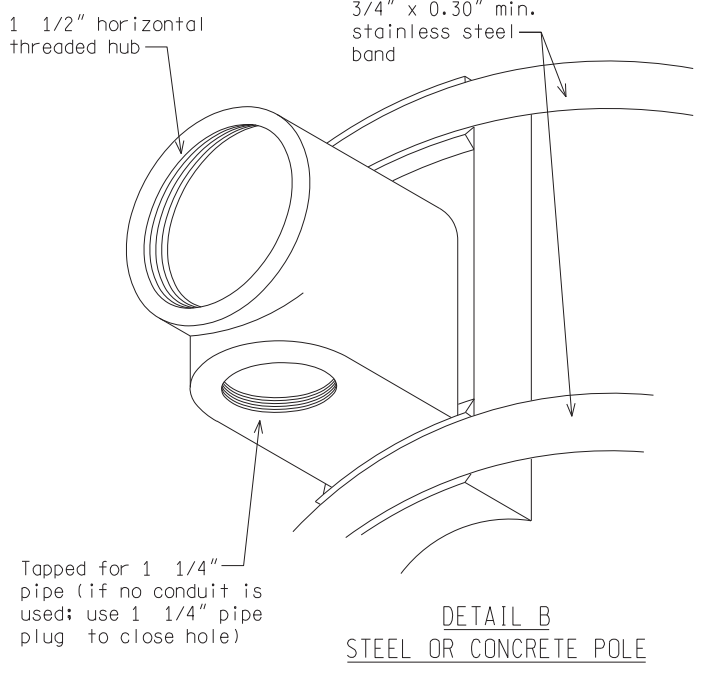
PLAN DATE

SIG-341-A

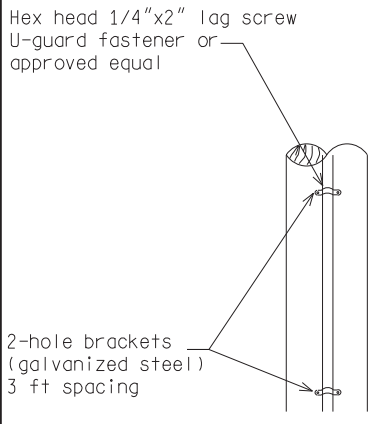
SHEET
2 of 3



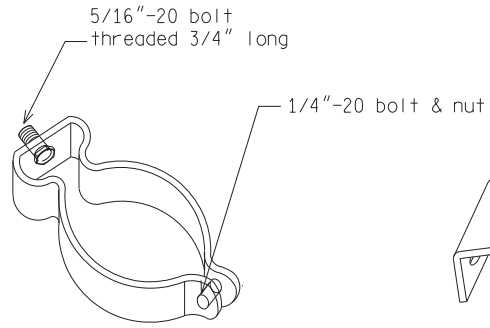
DETAIL A
WOOD POLE



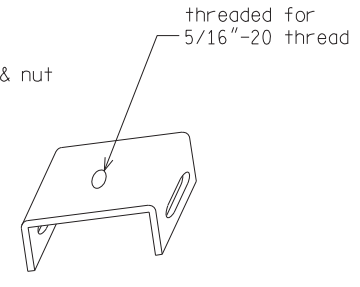
DETAIL B
STEEL OR CONCRETE POLE



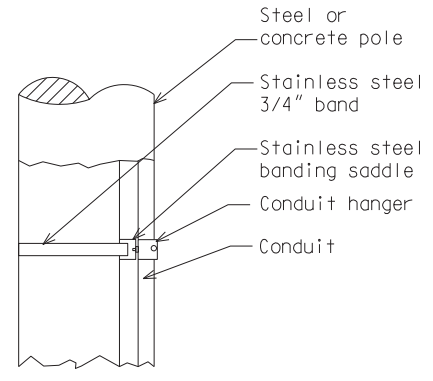
DETAIL C
TYPICAL CONDUIT ATTACHMENT
TO WOOD POLE



HANGER
To fit conduit size hanger
as called for on plans.
(zinc plated)



BANDING SADDLE

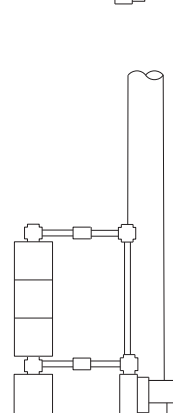
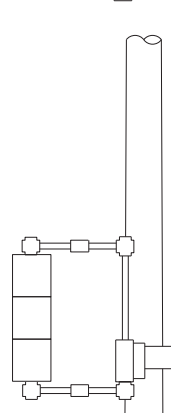
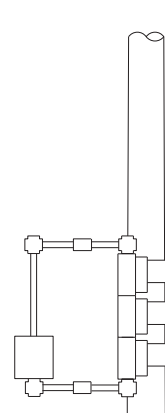
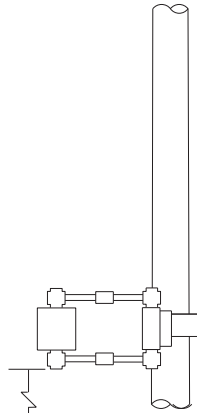
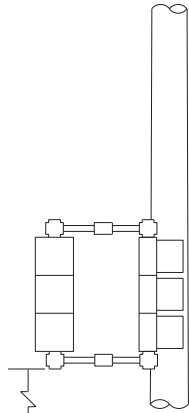
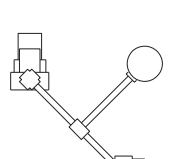
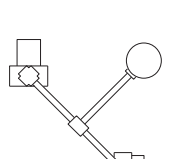
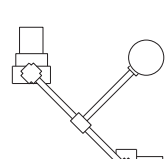
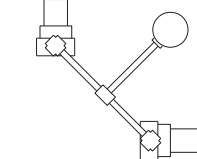
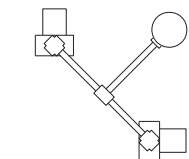


DETAIL D
TYPICAL CONDUIT ATTACHMENT
TO STEEL OR CONCRETE POLE.

- NOTES:**
- 1) Install 3/4" x 10'-0" copper clad ground rod (s) as required to provide less than 10 ohm resistance to ground. install #6 min. copper wires from ground rod (s) to span wire at each supporting pole using non-solder type connections for span wire ground.
 - 2) Use conduit size specified (min.) unless current N.E.C. indicates a larger size is required.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-341-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG341A.dgn Rev. 02/16/17	PLAN DATE			



9'-0" (TYPICAL)
(*) 10'-0" (RCOC TYPICAL)

9'-0" (TYPICAL)
(*) 10'-0" (RCOC TYPICAL)

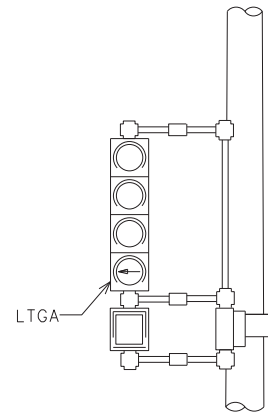
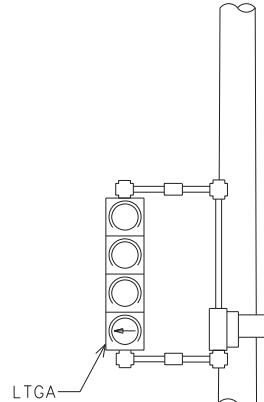
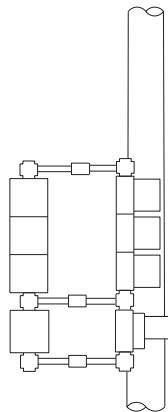
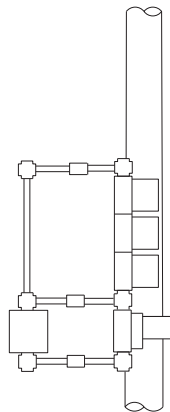
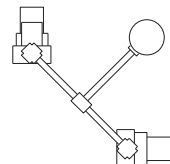
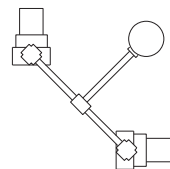
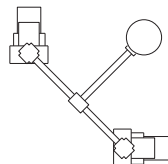
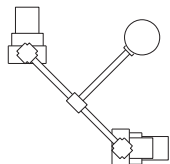
DETAIL "A-3"

DETAIL "B-3"

DETAIL "C-3"

DETAIL "D-3"

DETAIL "E-3"



DETAIL "F-3"

DETAIL "G-3"

DETAIL "H-3"

DETAIL "I-3"

Left Turn Green Arrow (LTGA)

(*) Refer to Note 5 on Sheet 2 of 2.

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG342A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:
CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

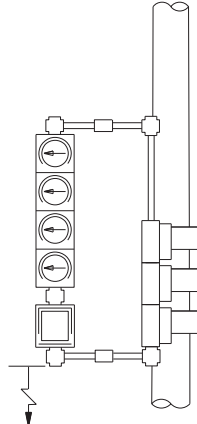
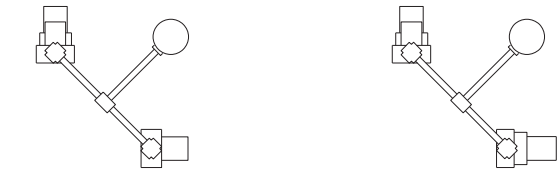
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BACK BRACKET
SIGNAL DISPLAYS

PLAN DATE

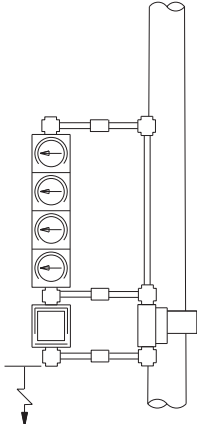
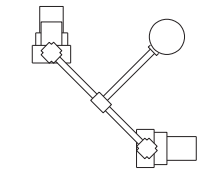
SIG-342-A

SHEET
1 of 2



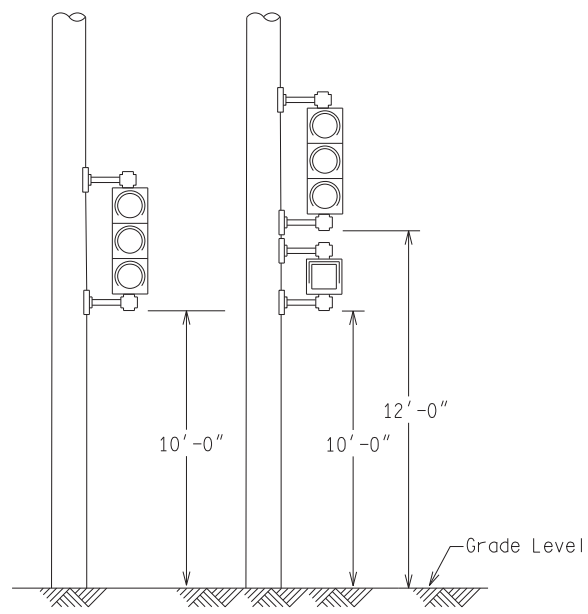
9'-0" (TYPICAL)
 (*) 10'-0" (RCOC TYPICAL)

DETAIL "J-3"
 (FYA)



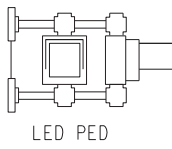
9'-0" (TYPICAL)
 (*) 10'-0" (RCOC TYPICAL)

DETAIL "K-3"
 (FYA)



RCOC Mounting Detail (*) see note

Flashing Yellow Arrow (FYA)



LED PED

NOTES: Walking person and hand symbol are filled.



LED PED
 (filled)



Countdown
 LED PED
 (filled symbols)

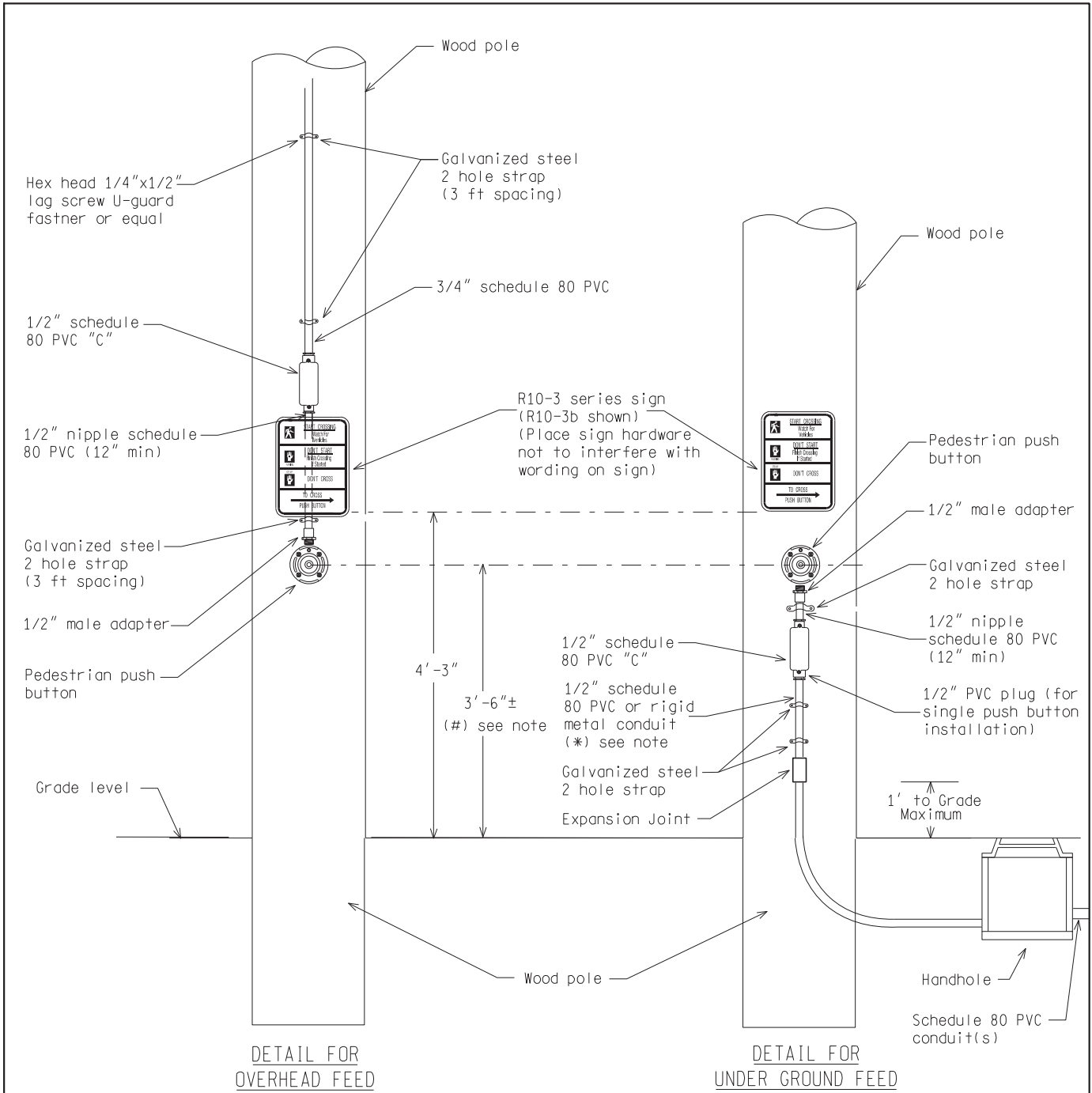
NOTES:

- 1) The relative position of 2-Way T.S. & pedestrian bracket arm signals within the bracket assembly shall be reversed (i.e. the signal nearest the pole goes to the outside of the bracket assembly & the outside signal goes inboard or nearest to pole) according to the plan view to provide clear vehicular and pedestrian viewing.
- 2) Pipe assembly shall be of such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.
- 3) Pipe assembly shall be of such length and height as to accommodate an illuminated (12"x27") case sign for proper maintenance and clear vehicular viewing.
- 4) Bracket lengths are 16 inches for LED pedestrian signals and LED pedestrian countdown signals.
- 6) Tolerance within +/- 1/8" for bracketing.

(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-342-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG342A.dgn Rev. 02/16/17				



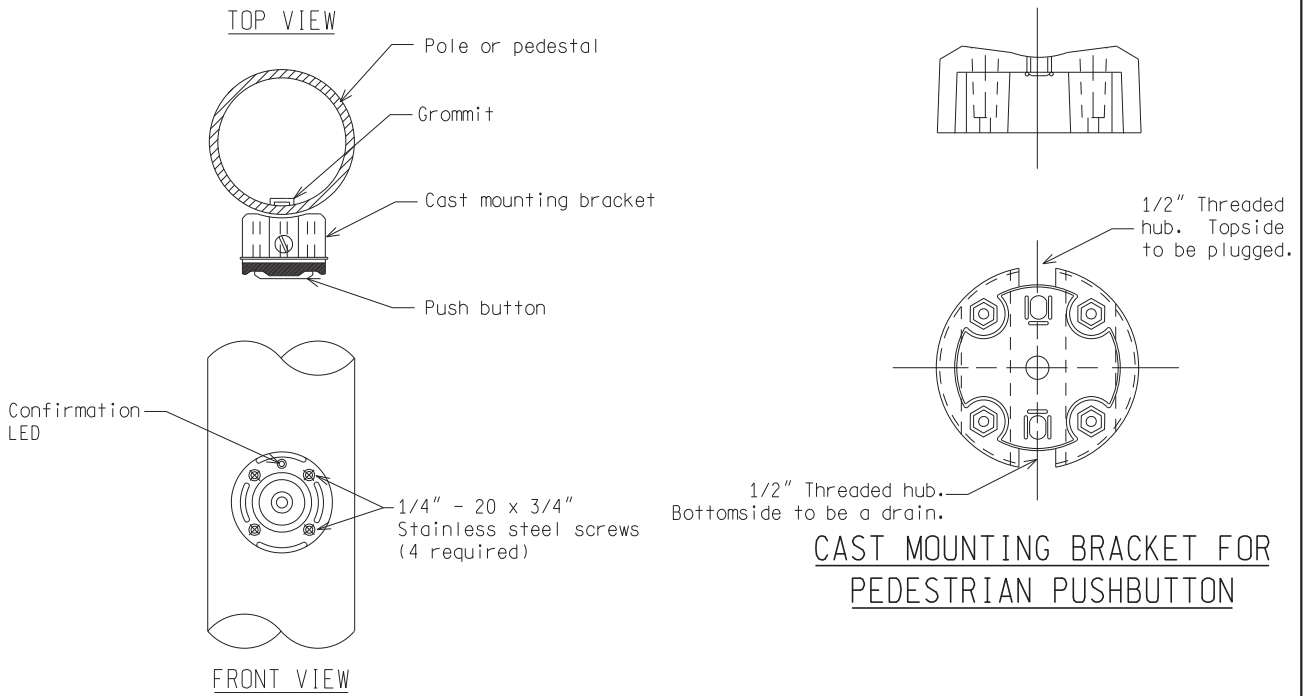
Note: (*) For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10' (min.) above grade or as directed by the Engineer.

(#) If pushbutton is from 10" to 24" from edge of sidewalk an acceptable range is 38" to 46"

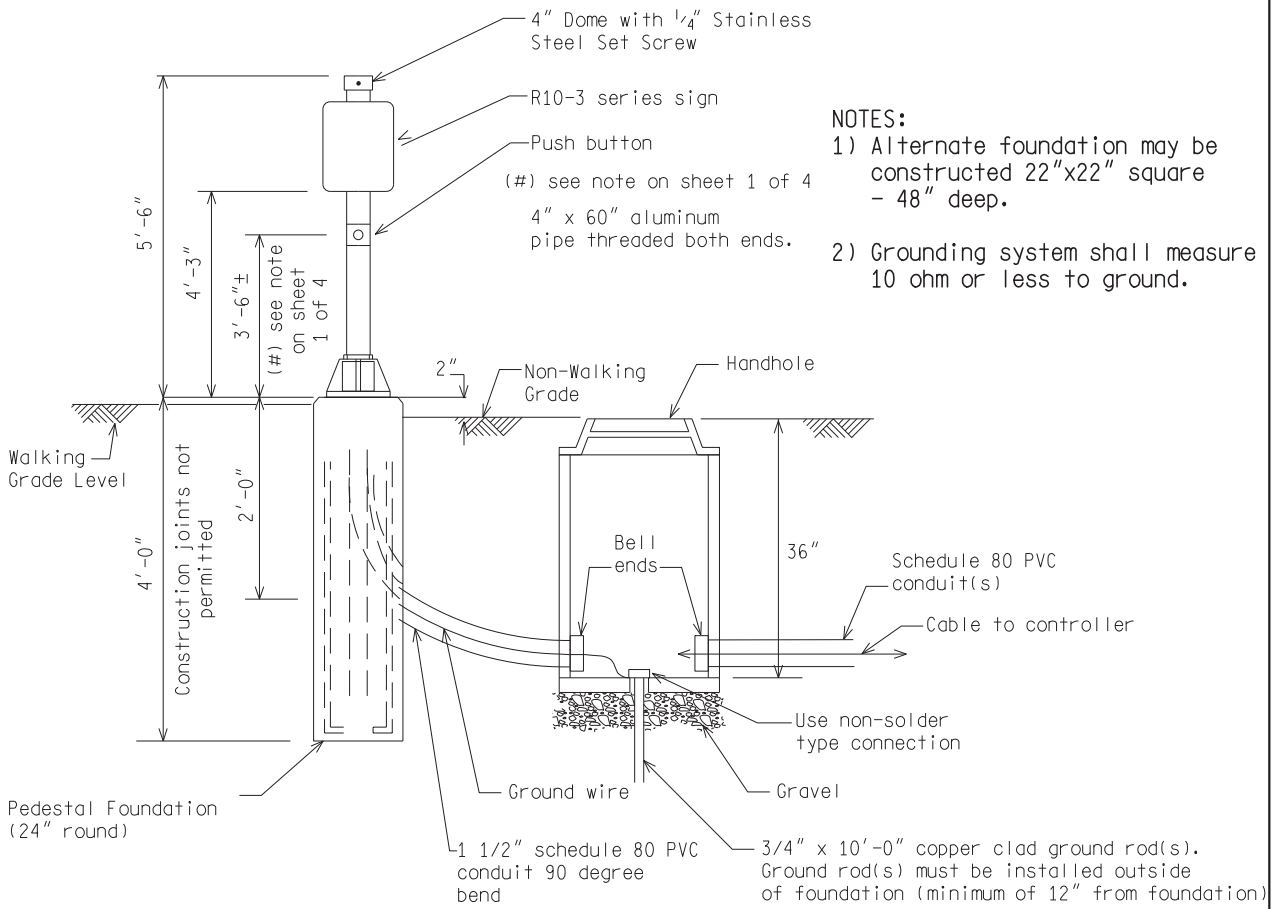
PEDESTRIAN PUSH BUTTON DETAILS ON WOOD POLE

NOT TO SCALE File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG400A.dgn Rev. 02/16/17

<p>PREPARED BY TRAFFIC AND SAFETY</p>	<p>ENGINEER OF DELIVERY</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR PEDESTRIAN PUSH BUTTON DETAILS</p>	
	<p>ENGINEER OF DEVELOPMENT</p>		
<p>DRAWN BY:</p>	<p>(SPECIAL DETAIL)</p>	<p>SIG-400-A</p>	<p>SHEET 1 of 4</p>
<p>CHECKED BY:</p>	<p>FHWA APPROVAL DATE</p>		



PEDESTRIAN PUSHBUTTON INSTALLATION ON STEEL POLE OR PEDESTAL



PUSH BUTTON PEDESTAL

NOT TO SCALE

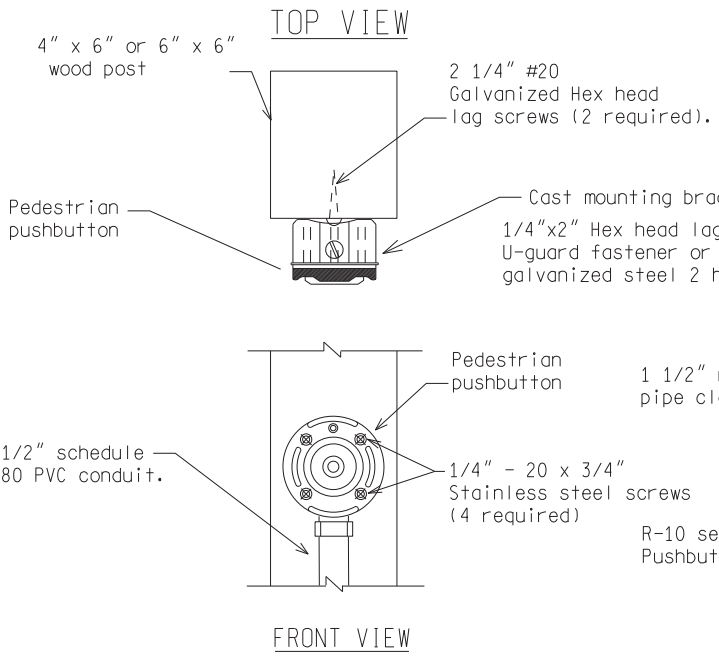
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

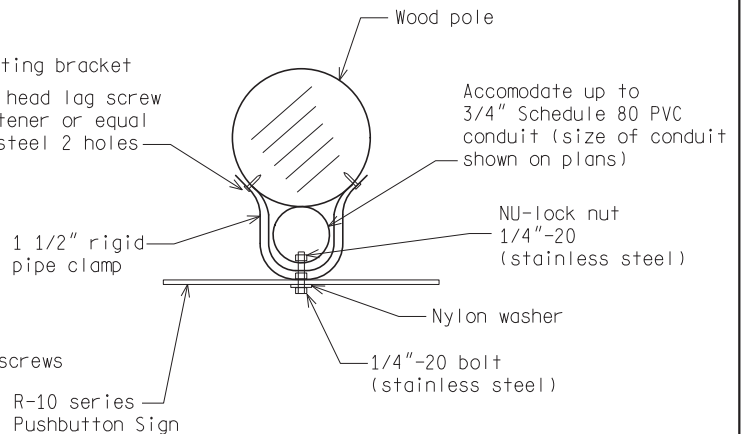
PLAN DATE

SIG-400-A

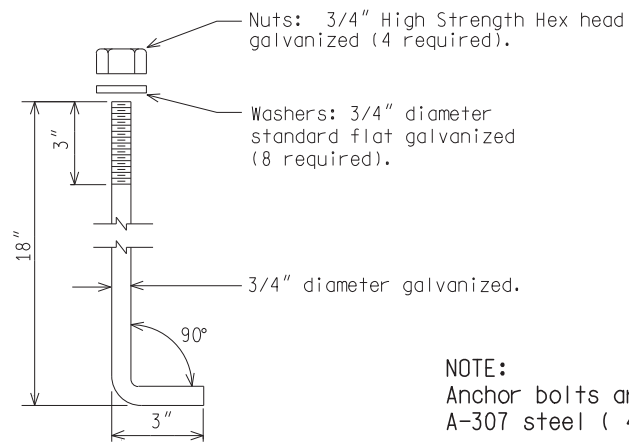
SHEET
2 of 4



**PEDESTRIAN PUSHBUTTON
INSTALLATION ON WOOD POST**



**PEDESTRIAN PUSHBUTTON
SIGN INSTALLATION
ON WOOD POLE**

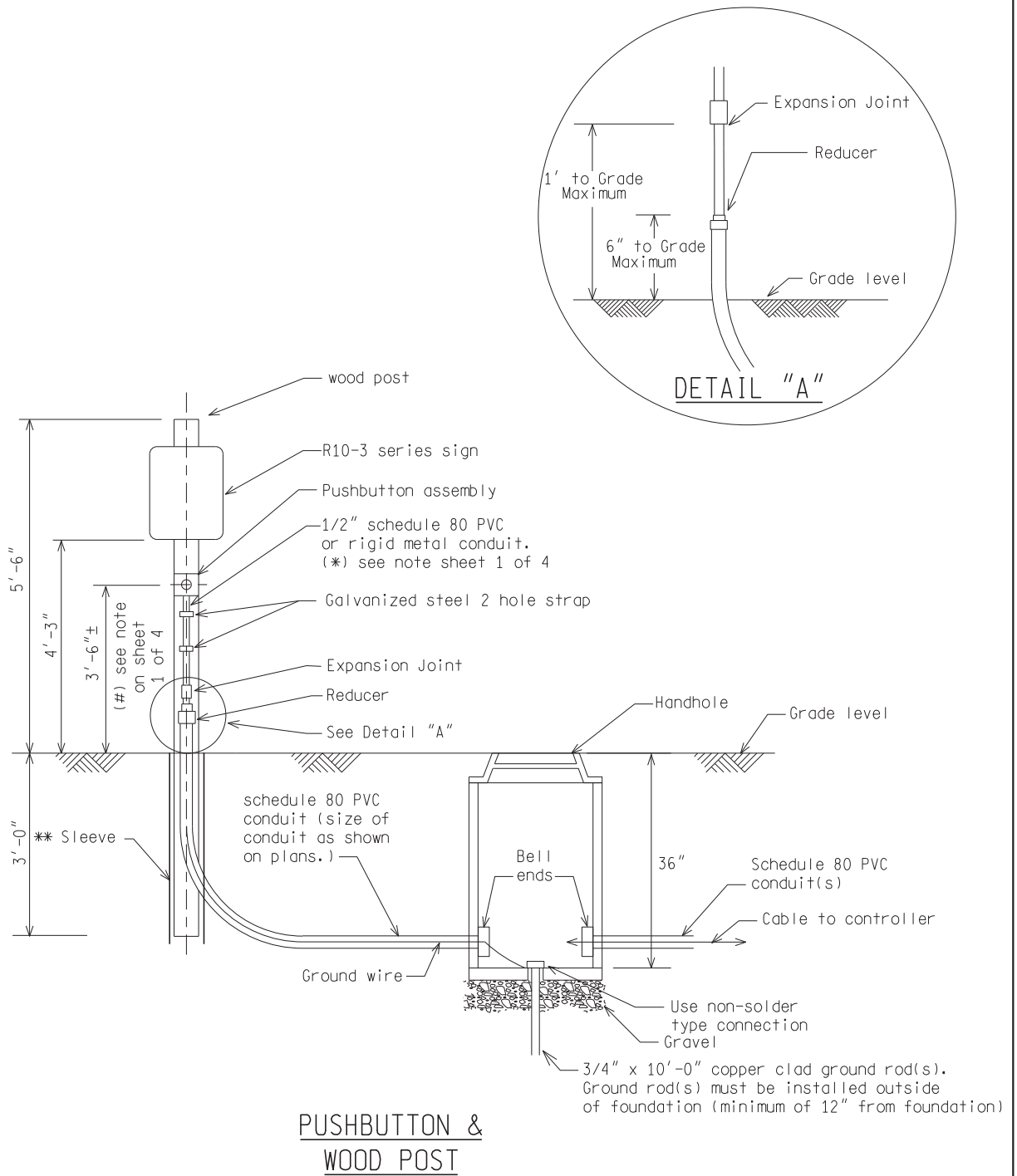


NOTE:
Anchor bolts are to be ASTM A-307 steel (4-required)

ANCHOR BOLT DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-400-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/F in/SIG400A.dgn	Rev. 02/16/17	PLAN DATE		



** Refer to Standard Plan for Wood Posts

NOT TO SCALE

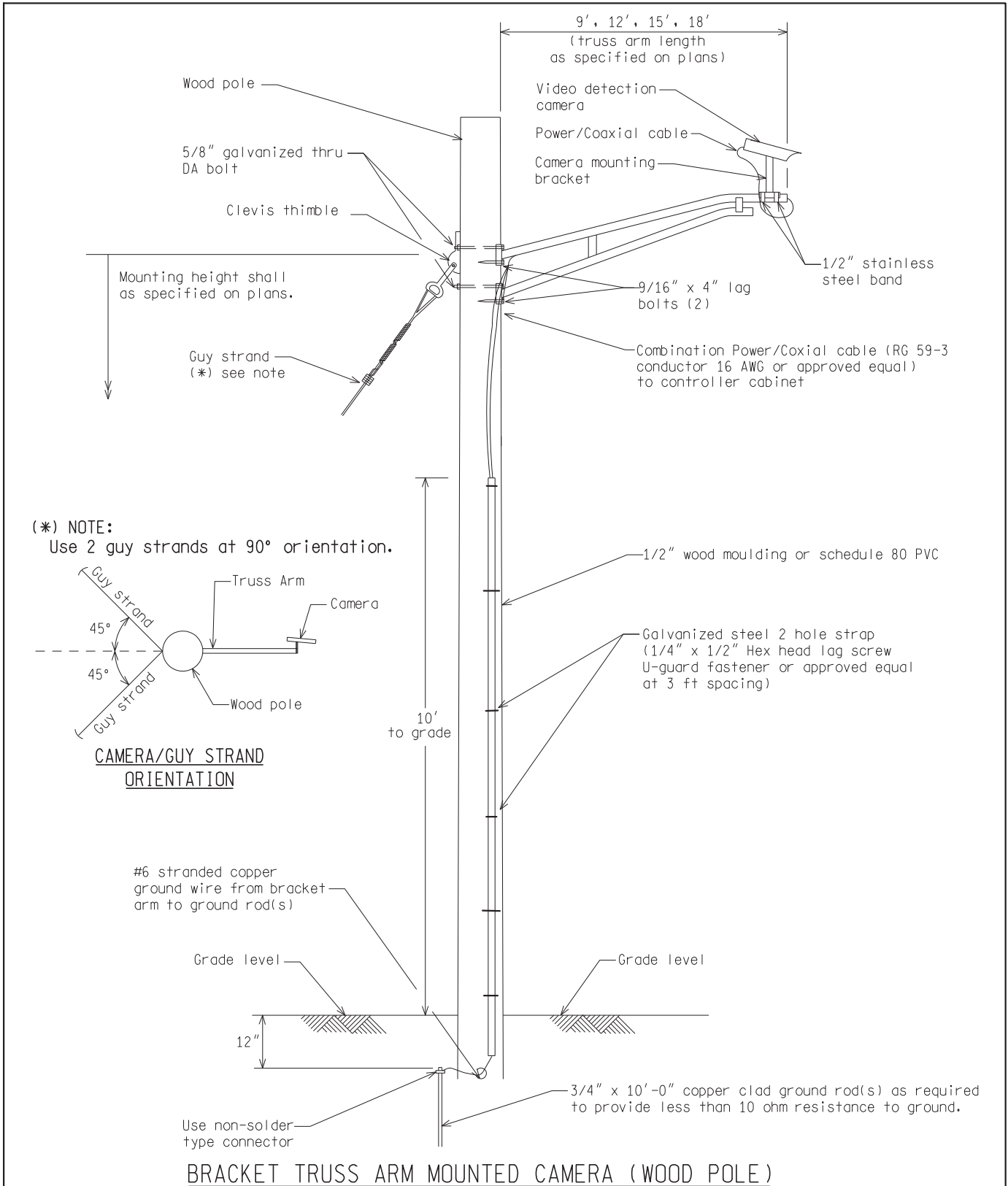
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

PLAN DATE

SIG-400-A

SHEET
4 of 4



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG430A.dgn Rev: 02/16/17



PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

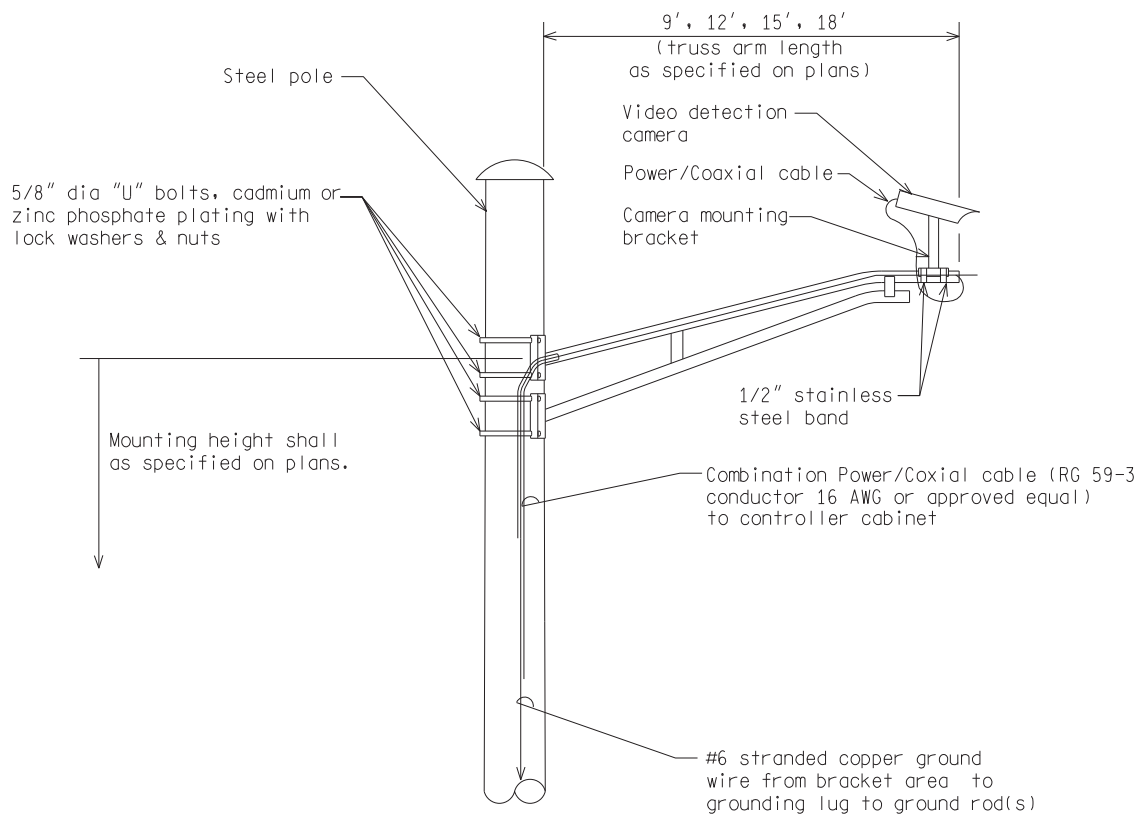
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

VIDEO DETECTION
CAMERA

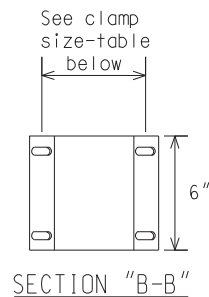
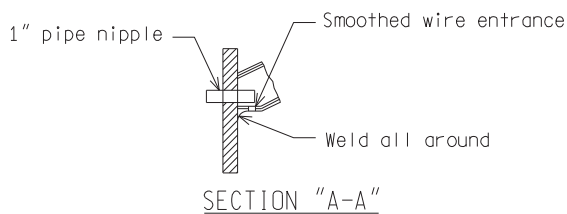
PLAN DATE

SIG-430-A

SHEET
1 of 2



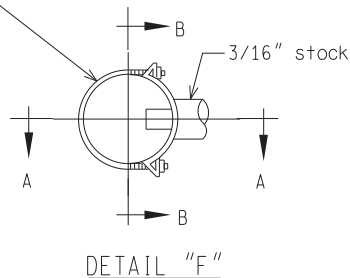
BRACKET TRUSS ARM MOUNTED CAMERA (STEEL POLE)



CLAMP SIZE TABLE

TYPE	POLE DIAMETER
A	3.6" - 4.5"
B	6.1" - 6.9"

(2) 5/8" dia. "U" bolts, cadmium or zinc phosphate plating with lockwashers & nuts.



NOT TO SCALE

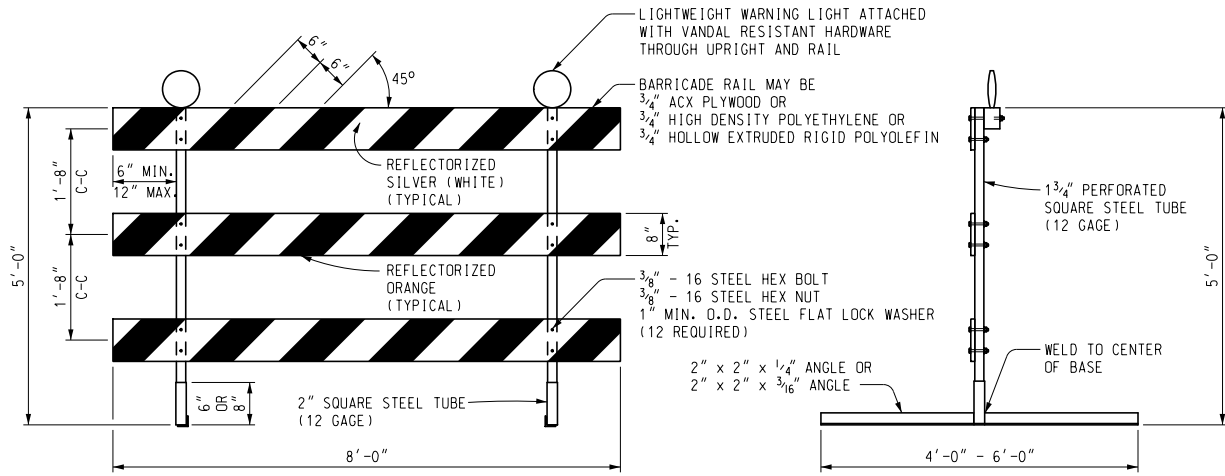
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

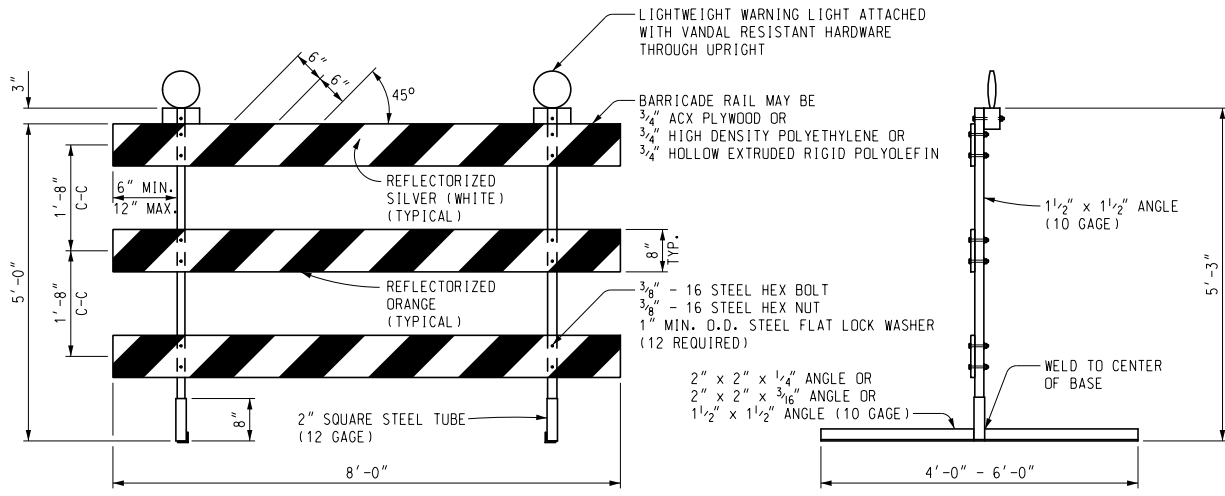
PLAN DATE

SIG-430-A

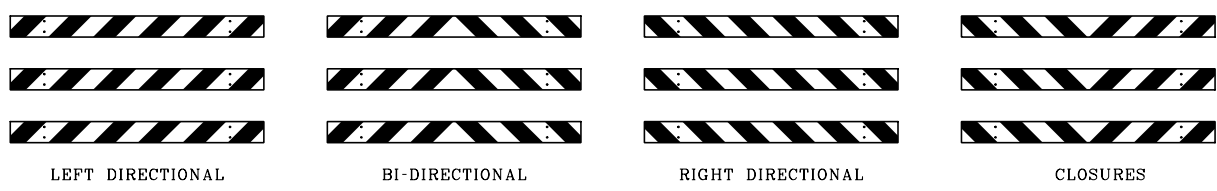
SHEET
2 of 2



FRONT ELEVATION SIDE VIEW
PERFORATED SQUARE STEEL TUBE OPTION



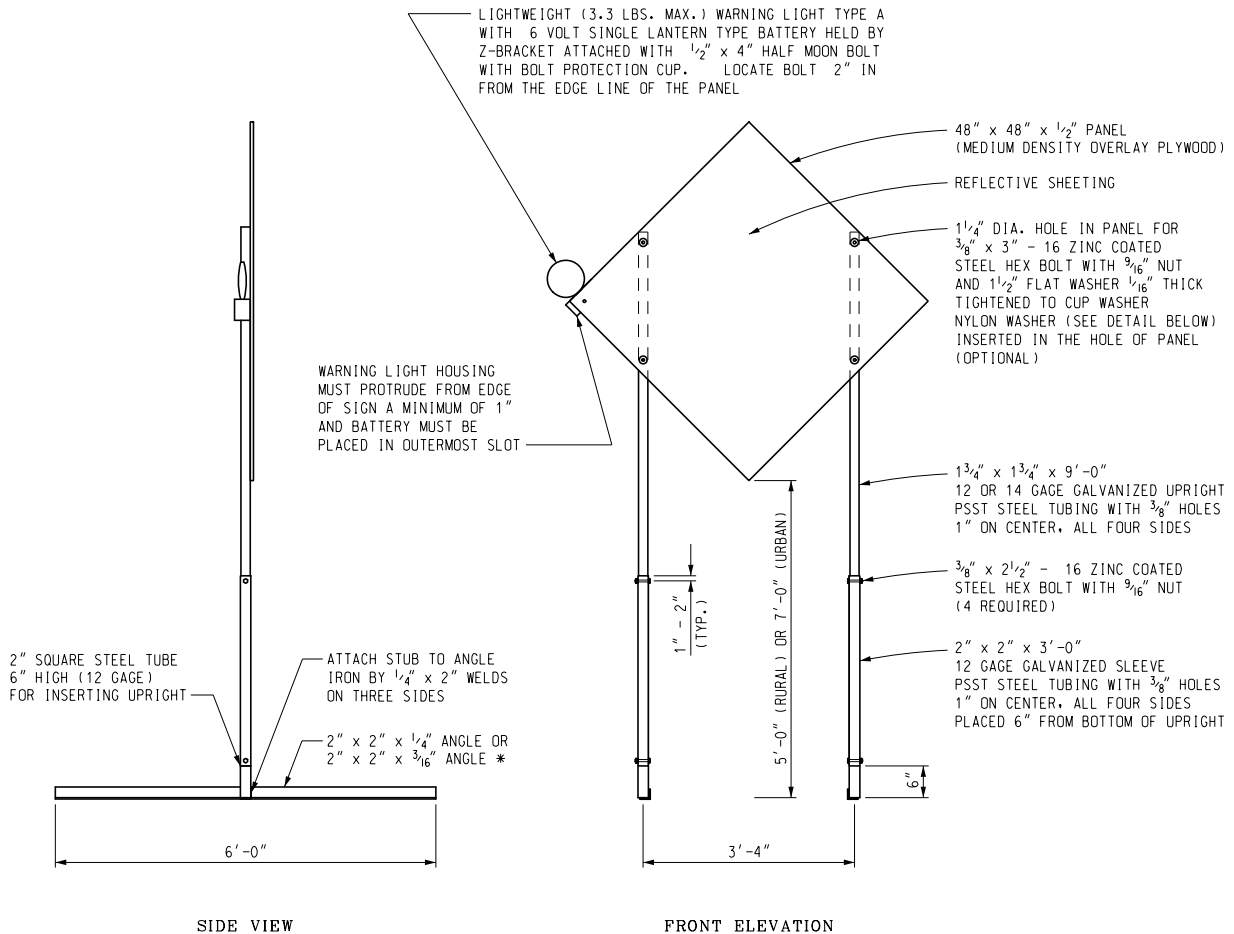
FRONT ELEVATION SIDE VIEW
ANGLE IRON OPTION



**BARRICADE RAIL SHEETING OPTIONS
 TYPE III BARRICADES**

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

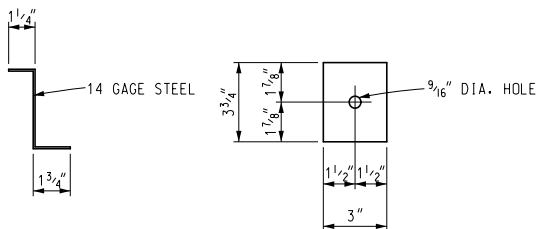
<p>PREPARED BY OPERATIONS FIELD SERVICES</p> <p>DRAWN BY: <u>ECH</u></p> <p>CHECKED BY: <u>MWB</u></p>	<p>DEPARTMENT DIRECTOR Paul C. Ajegba</p> <p>APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL FOR</p> <p style="text-align: center;">Temporary Traffic Control Devices</p>	
	<p>APPROVED BY: _____ (SPECIAL DETAIL) DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT</p>	<p>F.H.W.A. APPROVAL</p>	<p>6/16/22 PLAN DATE</p>



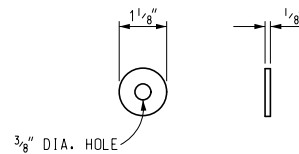
TEMPORARY SIGN SUPPORT

(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

* SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END. UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF FIELD SERVICES SPECIAL DETAIL

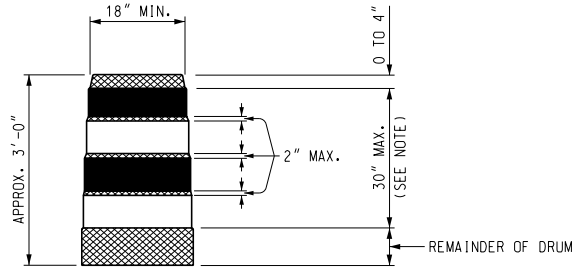
SPECIAL DETAIL
F.H.W.A. APPROVAL

6/16/22
PLAN DATE

WZD-125-E

SHEET
2 OF 3

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



- REFLECTORIZED ORANGE
- REFLECTORIZED WHITE
- NON REFLECTORIZED ORANGE

NOTE:
 DRUMS SHALL HAVE AT LEAST 4 HORIZONTAL REFLECTORIZED STRIPES (2 ORANGE AND 2 WHITE) OF 6" UNIFORM WIDTH, ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE. NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

PLASTIC DRUM

NOTES:

2" PERFORATED SQUARE STEEL TUBES MAY BE USED TO FABRICATE THE HORIZONTAL BASE OF THE TYPE III BARRICADE.

WARNING LIGHTS SHALL BE PLACED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND ALL OTHER PROVISIONS IN THE CONTRACT ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMPORARY CONCRETE BARRIER.

SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE TRAFFIC CONTROL DEVICE.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF FIELD SERVICES SPECIAL DETAIL	(SPECIAL DETAIL) F.H.W.A. APPROVAL	6/16/22 PLAN DATE	WZD-125-E	SHEET 3 OF 3
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NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.