

**POLE AND MAST ARM
60' TO 80' MAST ARMS**

SIGNAL MOUNTING PLATE LOCATIONS

DIMENSION	60'	65'	70'	75'	80'
SA	11'0"	11'0"	11'0"	11'0"	11'0"
SB	12'0"	12'0"	12'0"	12'0"	12'0"
SC	12'0"	12'0"	12'0"	12'0"	12'0"
SD	25'0"	30'0"	12'0"	12'0"	12'0"
SE	-	-	23'0"	28'0"	33'0"
NO. OF PLATES	4	4	4	5	5

MEMBER SIZES FOR MAST ARM ASSEMBLY ②

DESCRIPTION	DIMENSION	60'	70'	75'	80'
MAST ARM LENGTH	A	60'	65'	70'	75'
MAST ARM LENGTH - INTERIOR	A1	15'	20'	20'	25'
MAST ARM LENGTH - EXTERIOR	A2	45'	45'	50'	50'
POLE DIAMETER AT BASE PLATE	DB	20.80"	21.80"	21.80"	23.80"
POLE DIAMETER AT CAP	DA	17.54"	18.54"	18.54"	20.54"
DIAMETER OF TOP CHORD AT BASE PLATE	DC	19.0"	20.0"	20.0"	22.0"
DIAMETER OF TOP CHORD AT TIP	DD	10.6"	10.9"	10.2"	11.5"
DIAMETER OF BOTTOM CHORD AT BASE PLATE	DE	13.59"	14.29"	14.99"	15.69"
DIAMETER OF BOTTOM CHORD AT TIP	DF	5.5"	5.5"	5.5"	5.5"
WALL THICKNESS OF POLE	T1	0.25"	0.3125"	0.3125"	0.3125"
WALL THICKNESS OF TOP CHORD	T2	0.25"	0.3125"	0.3125"	0.3125"
WALL THICKNESS OF BOTTOM CHORD	T3	0.25"	0.25"	0.3125"	0.3125"

NOTES:

- SEE SHEET 8 OF 13 FOR VERTICAL PICKETS DIMENSIONS. PLACE AT THE SPACING SHOWN.
- DIAMETER DIMENSIONS PROVIDED ARE THE OUTSIDE DIAMETER.
- INCREASE FOUNDATION PROJECTION AS REQUIRED TO PROVIDE A VERTICAL CLEARANCE FROM THE BOTTOM OF ALL SIGNS AND SIGNAL HEADS (INCLUDING BACKGROUND SHIELDS) TO THE PAVEMENT OF NOT LESS THAN 17.50' NOR MORE THAN 19.00'.
- INCLUDES END MAST ARM SIGNAL MOUNT.
- PROVIDE BRACKETING AND HARDWARE FOR CCTV CABINET ON POLES SHOWN ON THE PLANS. CCTV CABINET BY OTHERS.
- FURNISH AND INSTALL HIGH-STRENGTH, LOW-ALLOY, COLUMBIUM-VANADIUM STRUCTURAL STEEL IN ACCORDANCE WITH SPEC. 3310. 50,000 PSI MINIMUM YIELD.
- GALVANIZE HARDWARE IN ACCORDANCE WITH SPEC. 3392. GALVANIZE STEEL COMPONENTS IN ACCORDANCE WITH SPEC. 3394 AFTER FABRICATION. PROVIDE VENT AND DRAIN HOLES FOR THE HOT-DIP GALVANIZING PROCESS.

FURNISH AND INSTALL HIGH STRENGTH STRUCTURAL STEEL BOLTS, NUTS, WASHERS, AND TENSION INDICATORS IN ACCORDANCE WITH SPEC. 3391 AND 2404 FOR THE STRUCTURAL BOLTING OF MAST ARM SPLICES, MAST ARM TO POLE CONNECTIONS, AND LUMINAIRE AND CAMERA SHAFT EXTENSIONS TO POLES. PLACE DIRECT TENSION INDICATORS (DTI) UNDER THE STRUCTURAL BOLT HEADS WITH THE BUMPS TOUCHING THE UNDERSIDE OF THE BOLT HEAD. TIGHTEN THE CONNECTIONS BY TURNING THE STRUCTURAL HEAVY HEX NUTS. DO NOT ROTATE THE BOLT HEADS. USE AN INSPECTION PROCEDURE FOR DTI IN ACCORDANCE WITH SPEC. 2402.

WELD IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE (STEEL) ANS/AWS D1.1 (CURRENT EDITION).
FABRICATE ROUND TAPERED POLE AND MAST ARM ELEMENTS BY LONGITUDINAL SEAM WELDING WITH 60% PENETRATION EXCEPT WITHIN 6" OF FULL-PENETRATION CIRCUMFERENTIAL GROOVE WELDS. FULL-PENETRATION GROOVE WELDS ARE REQUIRED WITHIN THIS 6" REGION.

PERFORM A WIND LOAD ANALYSIS FOR COMPONENTS MOUNTED TO THE MAST ARM. LEVEL THE POLE AND BASE PLATE BY ADJUSTING THE LEVELING NUTS. TAPER POLE MEMBER AND MAST ARM CHORD MEMBERS AT A RATE OF 0.14 INCHES/FOOT.
FOR SECTION A-A AND SECTION B-B, SEE SHEET 2 OF 13. FOR SECTION C-C, SEE SHEET 9 OF 13.

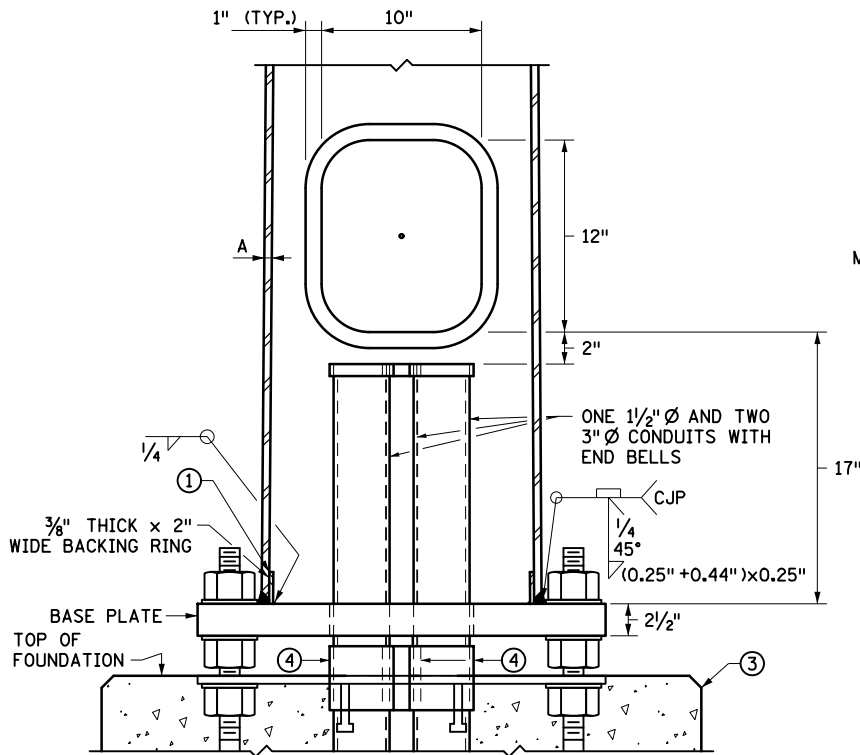
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STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
POLE AND MAST ARM TYPE TS
MAST ARM ASSEMBLY
FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION REFERENCE
2565

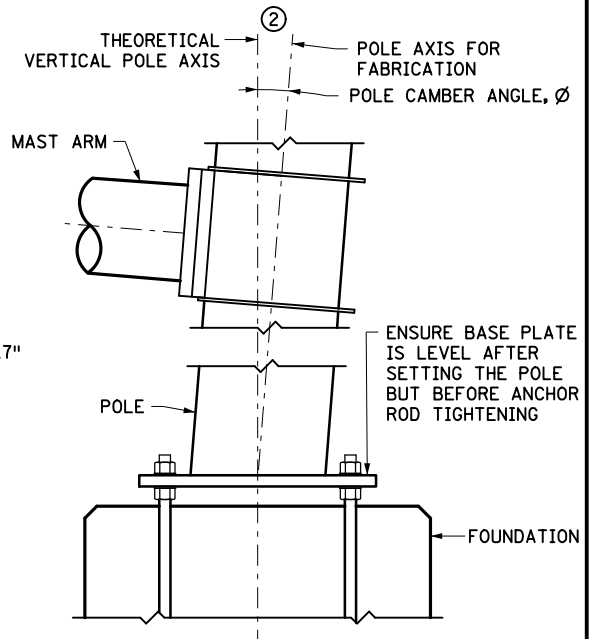
STANDARD PLATE NO.
8125A
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POLE TYPE	MAST ARM LENGTH	POLE CAMBER ANGLE ∅
TS60, TS65, TS70 TS75, TS80	60' 0" TO 80' 0"	0°30'00.0"



SECTION B-B

FOUNDATION REINFORCEMENT NOT SHOWN FOR CLARITY

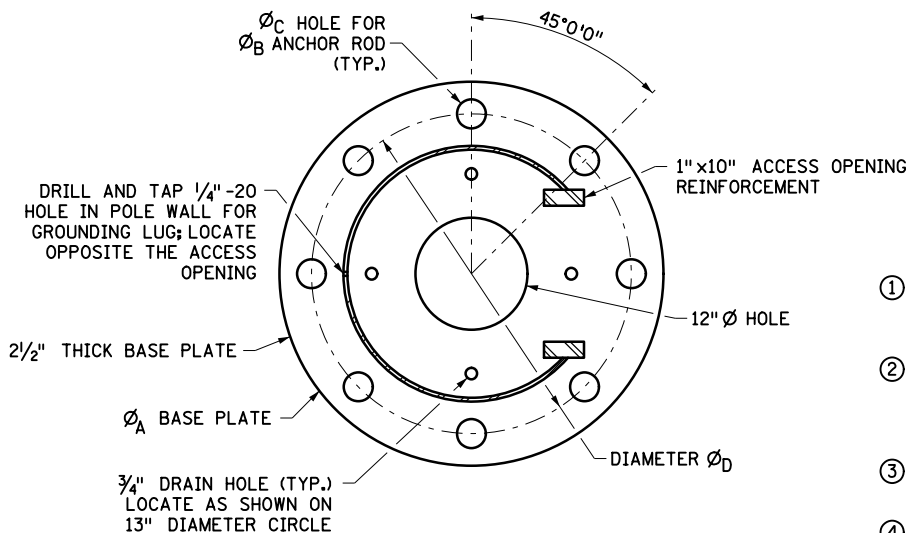


SCHEMATIC OF POLE ALIGNMENT

NOT TO SCALE

POLE TYPE	POLE WALL THICKNESS A
TS60	0.25"
TS65	0.3125"
TS70	0.3125"
TS75	0.3125"
TS80	0.3125"

POLE TYPE	BASE PLATE DIAMETER ∅ _A	ANCHOR ROD DIAMETER ∅ _B	DIAMETER OF ANCHOR ROD HOLE ∅ _C	ANCHOR ROD PLACEMENT DIAMETER ∅ _D
TS60	37"	1 1/2"	1 5/8"	29"
TS65	37"	1 3/4"	1 7/8"	29"
TS70	39"	2"	2 1/8"	31"
TS75	41"	2"	2 1/8"	33"
TS80	41"	2 1/4"	2 3/8"	33"



SECTION A-A

NOTES:

- ① FIELD-APPLIED 100% SILICONE CAULK (EXTERIOR USAGE) AT TOP OF BACKING RING ALONG ENTIRE CIRCUMFERENCE.
- ② POLE ROTATION IS ABOUT A HORIZONTAL AXIS ORIENTED PERPENDICULAR TO MAST ARM AXIS. SENSE OF ROTATION IS SUCH THAT TIP OF MAST ARM WILL BE RAISED.
- ③ SEE STANDARD PLAN 5-297.861 FOR PVC CONDUIT AND COUPLING INSTALLATION REQUIREMENTS.
- ④ PVC COUPLING.

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POLE AND MAST ARM TYPE TS

POLE DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION
REFERENCE

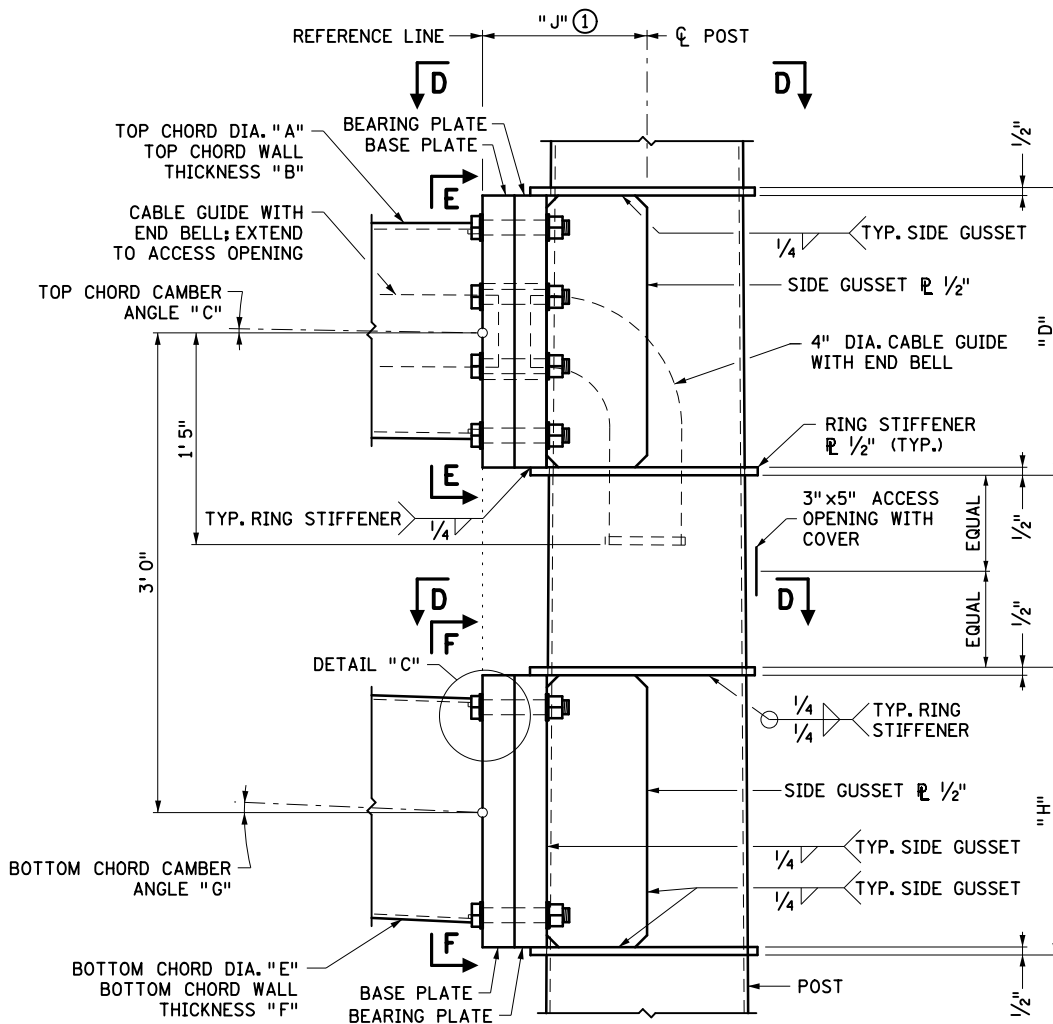
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SCHEMATIC POST/BEAM CONNECTION DETAIL
 BOLT CONFIGURATION VARIES BY MAST ARM LENGTH
 SEE SHEETS 4 AND 5 OF 13 FOR DETAILS

MAST ARM CONNECTIONS DIMENSIONS						
DESCRIPTION	DIMENSION	MAST ARM LENGTH				
		60'	65'	70'	75'	80'
TOP CHORD DIAMETER AT BASE PLATE	A	19.0"	20.0"	20.0"	22.0"	23.0"
TOP CHORD WALL THICKNESS AT BASE PLATE	B	0.25"	0.3125"	0.3125"	0.375"	0.375"
TOP CHORD CAMBER ANGLE	C	1°00'00.0"	1°00'00.0"	1°15'00.0"	1°15'00.0"	1°30'00.0"
RING STIFFENER SPACING - TOP	D	25"	27"	27"	29"	35"
BOTTOM CHORD DIAMETER AT BASE PLATE	E	13.52"	14.22"	14.92"	15.62"	16.32"
BOTTOM CHORD WALL THICKNESS AT BASE PLATE	F	0.25"	0.25"	0.3125"	0.3125"	0.3125"
BOTTOM CHORD CAMBER ANGLE	G	3°00'00.0"	2°45'00.0"	2°45'00.0"	2°45'00.0"	3°00'00.0"
RING STIFFENER SPACING - BOTTOM	H	20"	20"	20"	23"	25"
DISTANCE FROM ϕ POST TO REFERENCE LINE	J	13.375"	13.875"	13.875"	14.875"	15"

NOTES:

EACH MAST ARM CONNECTION CONSISTS OF THE FOLLOWING:
 TWO HORIZONTAL RING STIFFENER PLATES, 0.50" THICK
 TWO VERTICAL SIDE GUSSET PLATES, 0.50" THICK
 ONE BEARING PLATE, 2" THICK

MAST ARM CHORD MEMBERS ARE WELDED TO A 2" THICK CHORD BASE PLATE, WHICH IS BOLTED TO THE BEARING PLATE BY A SPECIFIED NUMBER OF BOLTS.

FOR SECTION D-D AND DETAIL C, SEE SHEET 6 OF 13. FOR SECTION E-E (BEARING AND BASE PLATE DETAILS), SEE SHEET 4 OF 13. FOR SECTION F-F (BEARING AND BASE PLATE DETAILS), SEE SHEET 5 OF 13.

- ① DISTANCE TO MAST ARM REFERENCE LINE. THE REFERENCE LINE IS LOCATED ON THE PLANE OF WHERE THE RESPECTIVE MAST ARM CHORD MEMBER MEETS THE BASE PLATE.
- ② 4" DIAMETER SCHEDULE 40 STEEL PIPE CABLE GUIDE, BEND INTO A 90° CONFIGURATION. PROJECT CABLE GUIDE 6" BEYOND TOP CHORD BEARING PLATE. SEE SHEET 4 OF 13 FOR CONNECTION DETAIL TO BEARING PLATE. BREAK EDGES OF GUIDE.

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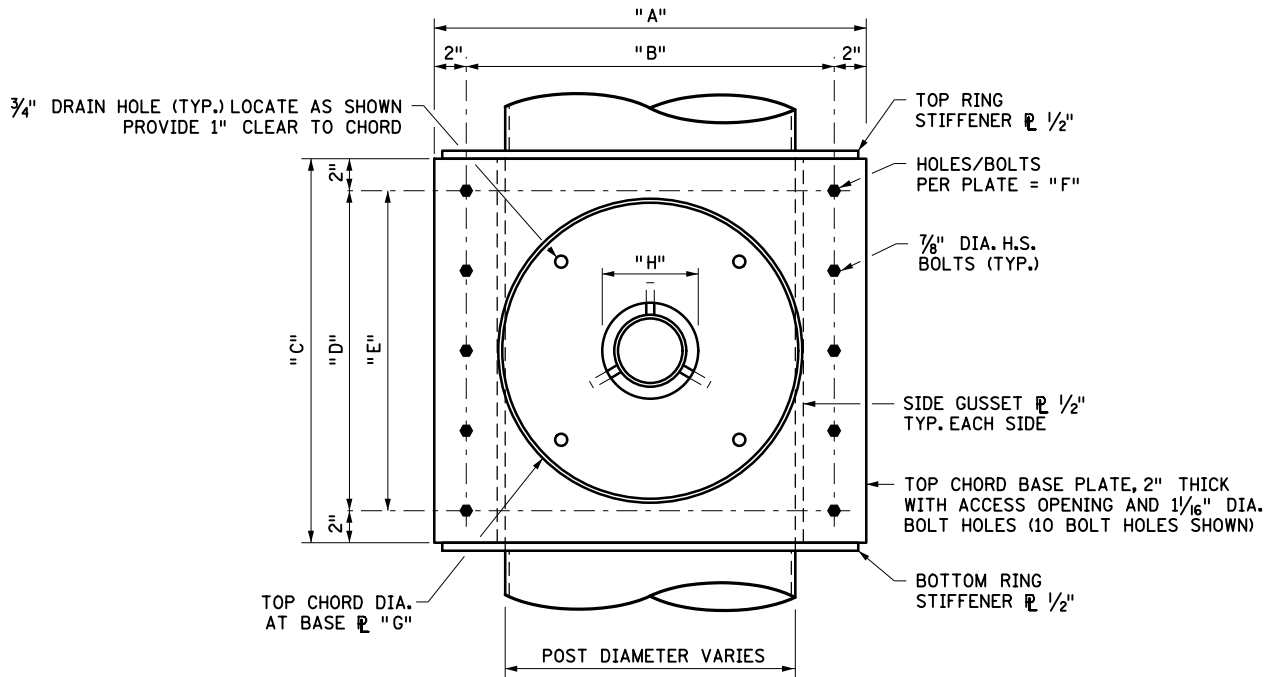
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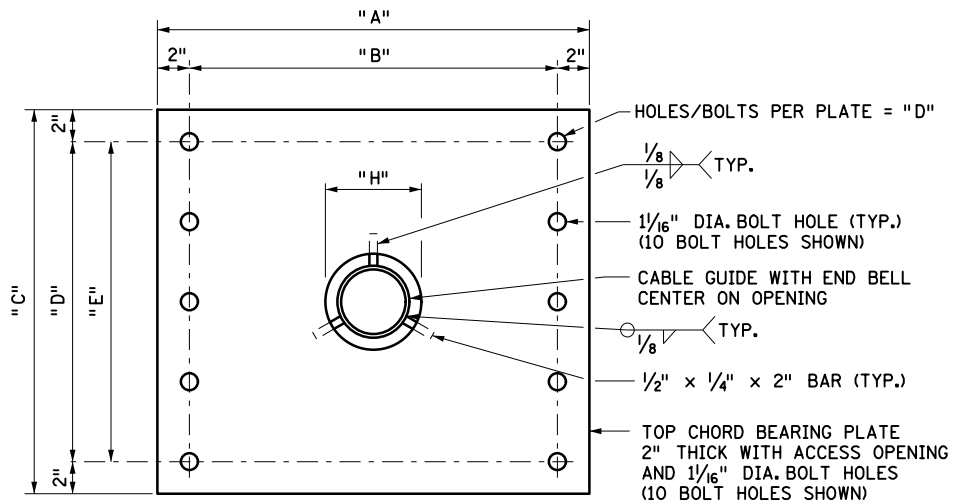
POLE AND MAST ARM TYPE TS
 MAST ARM CONNECTION DETAILS
 FOR MAST ARM LENGTHS 60' TO 80'

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SECTION E-E - BASE PLATE
60' MAST ARM SHOWN; 65' TO 80' SIMILAR



TOP CHORD BEARING PLATE DETAILS
60' MAST ARM SHOWN; 65' TO 80' SIMILAR

MAST ARM CONNECTIONS DIMENSIONS						
DESCRIPTION	DIMENSION	MAST ARM LENGTH				
		60'	65'	70'	75'	80'
BASE/BEARING PLATE WIDTH	A	27"	28"	29"	31"	32"
TOTAL HOLE SPACING HORIZONTAL	B	23"	24"	25"	27"	28"
BASE/BEARING PLATE HEIGHT	C	24"	26"	26"	28"	34"
TOTAL HOLE SPACING VERTICAL	D	20"	22"	22"	24"	30"
HOLE SPACING	E	4 SPS. @ 5"	4 SPS. @ 5 1/2"	4 SPS. @ 5 1/2"	6 SPS. @ 4"	6 SPS. @ 5"
HOLES PER PLATE	F	10	10	10	14	14
TOP CHORD O.D. AT BASE PLATE	G	19.0"	20.0"	20.0"	22.0"	23.0"
ACCESS OPENING	H	6"	6"	6"	7"	7.5"

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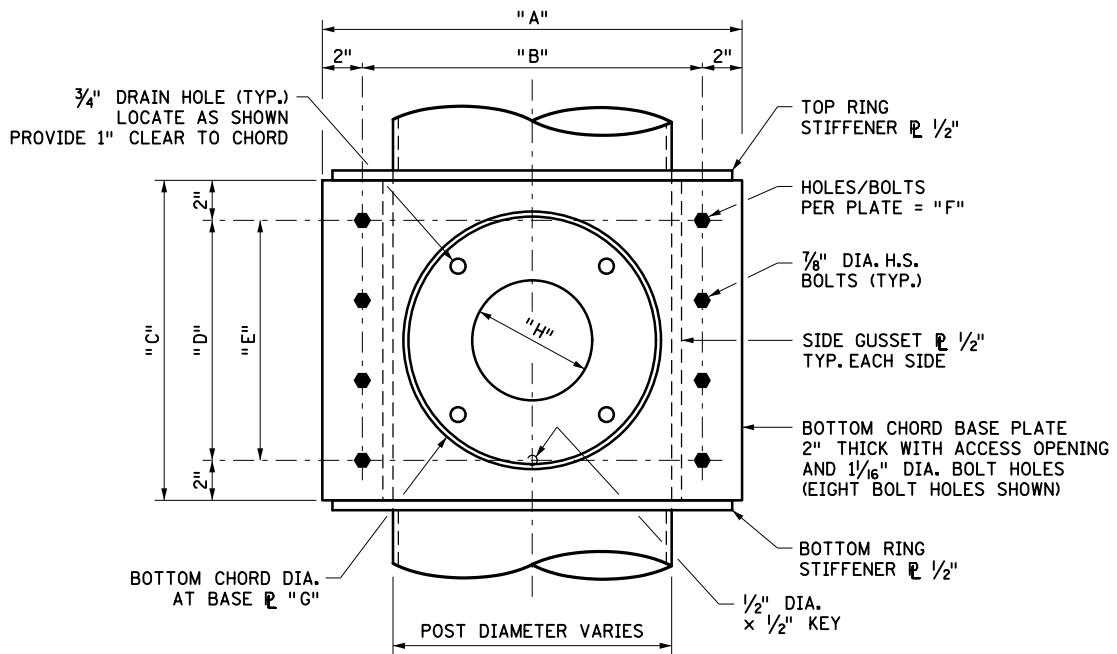
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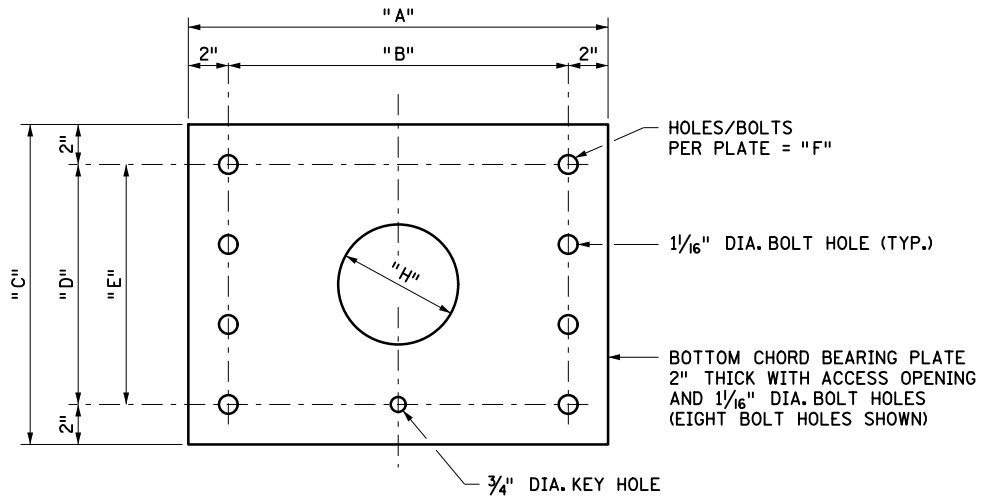
POLE AND MAST ARM TYPE TS
TOP CHORD CONNECTION DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

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SECTION F-F - BASE PLATE
60' MAST ARM SHOWN; 65' TO 80' SIMILAR



BOTTOM CHORD BEARING PLATE DETAILS
60' MAST ARM SHOWN; 65' TO 80' SIMILAR

MAST ARM CONNECTIONS DIMENSIONS						
DESCRIPTION	DIMENSION	MAST ARM LENGTH				
		60'	65'	70'	75'	80'
BASE/BEARING PLATE WIDTH	A	27"	28"	29"	31"	32"
TOTAL HOLE SPACING HORIZONTAL	B	23"	24"	25"	27"	28"
BASE/BEARING PLATE HEIGHT	C	19"	19"	19"	22"	24"
TOTAL HOLE SPACING VERTICAL	D	15"	15"	15"	18"	20"
HOLE SPACING	E	3 SPS. @ 5"	3 SPS. @ 5"	3 SPS. @ 5"	3 SPS. @ 6"	4 SPS. @ 5"
HOLES PER PLATE	F	8	8	8	8	10
BOTTOM CHORD O.D. AT BASE PLATE	G	19.0"	20.0"	20.0"	22.0"	23.0"
ACCESS OPENING	H	6"	6"	6"	6"	6"

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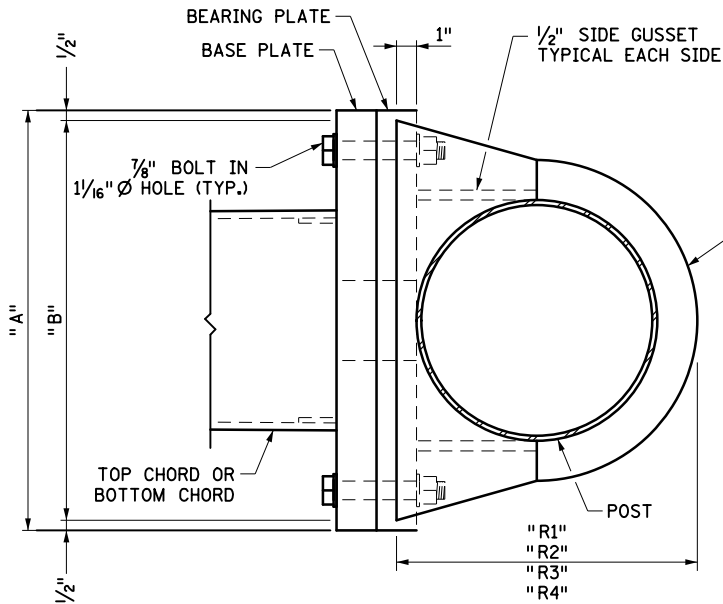
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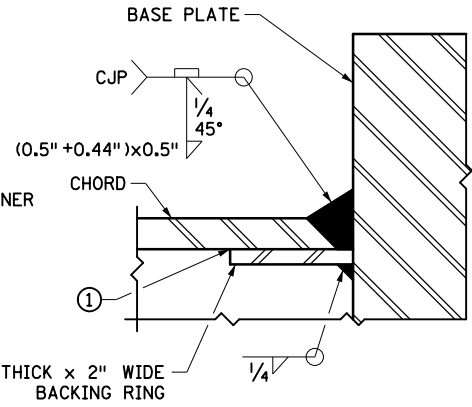
POLE AND MAST ARM TYPE TS
BOTTOM CHORD CONNECTION DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION
REFERENCE
2565

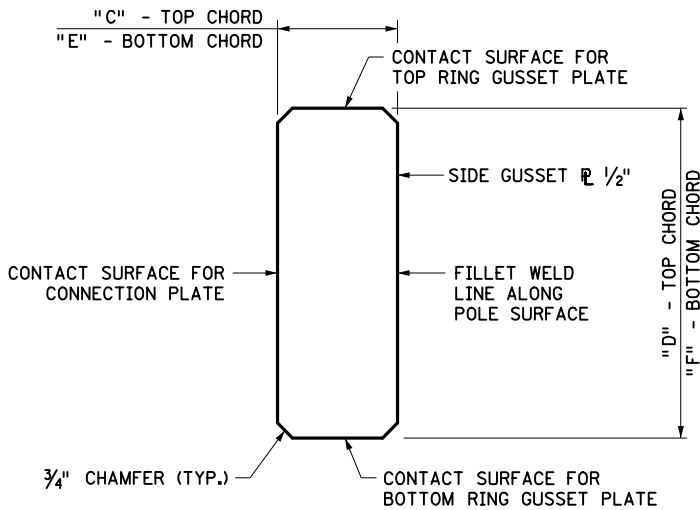
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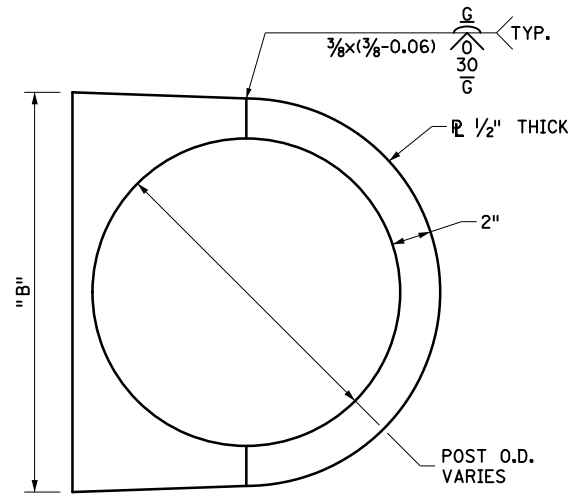
SECTION D-D
CABLE GUIDE NOT SHOWN FOR CLARITY



DETAIL C
BASE PLATE WELD DETAIL



SCHEMATIC OF SIDE GUSSET PLATE



RING STIFFENER

NOTES:

- ① FIELD-APPLY 100% SILICONE CAULK (EXTERIOR USAGE) AT TOP OF BACKING RING ALONG ENTIRE INTERIOR CIRCUMFERENCE OF ARM.

MAST ARM CONNECTION						
DESCRIPTION	DIMENSION	MAST ARM LENGTH				
		60'	65'	70'	75'	80'
TOP CHORD - TOP RING STIFFENER PLATE	R1	21 1/8"	22 1/8"	22 1/8"	24"	24 1/4"
TOP CHORD - BOTTOM RING STIFFENER PLATE	R2	21 3/8"	22 3/8"	22 3/8"	24 3/8"	24 3/4"
BOTTOM CHORD - TOP RING STIFFENER PLATE	R3	21 1/2"	22 1/2"	22 1/2"	24 1/2"	24 3/4"
BOTTOM CHORD - BOTTOM RING STIFFENER PLATE	R4	21 3/4"	22 3/4"	22 3/4"	24 3/4"	25 1/8"
BEARING/BASE PLATE WIDTH	A	27"	28"	29"	31"	32"
RING STIFFENER WIDTH AT BEARING PLATE	B	26"	27"	28"	30"	31"
TOP CHORD GUSSET PLATE WIDTH	C	9"	9 1/2"	9 1/2"	10 1/2"	10 3/4"
TOP CHORD GUSSET PLATE HEIGHT	D	24"	26"	26"	28"	34"
BOTTOM CHORD GUSSET PLATE WIDTH	E	9 1/4"	9 3/4"	9 3/4"	10 3/4"	10 7/8"
BOTTOM CHORD GUSSET PLATE HEIGHT	F	19"	19"	19"	22"	24"

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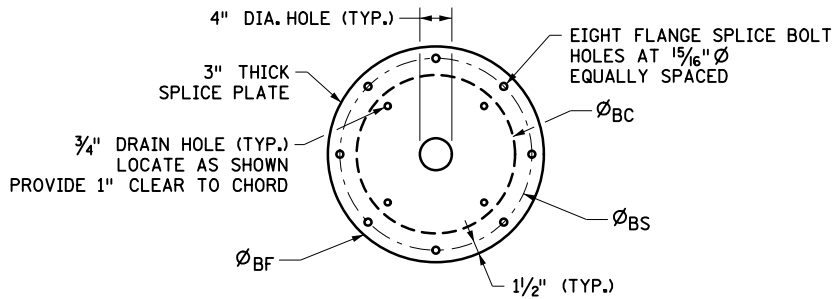
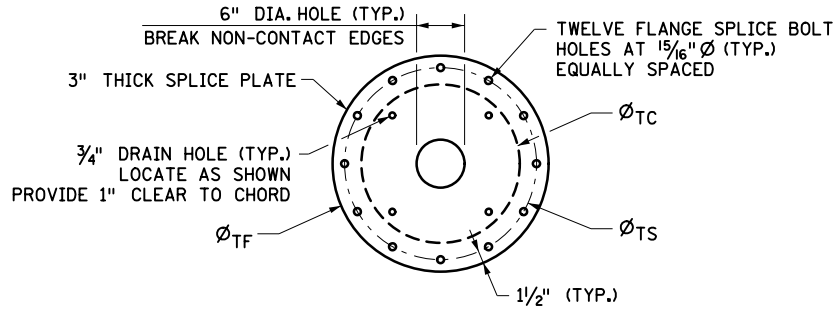
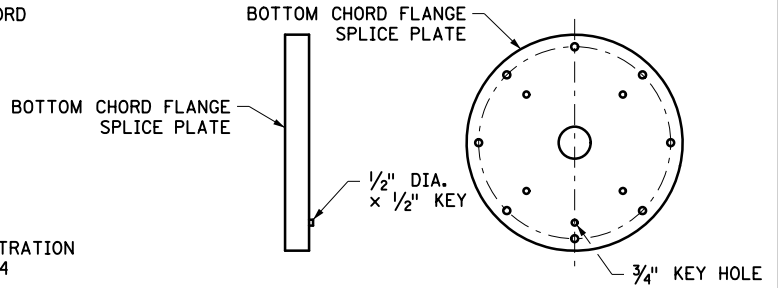
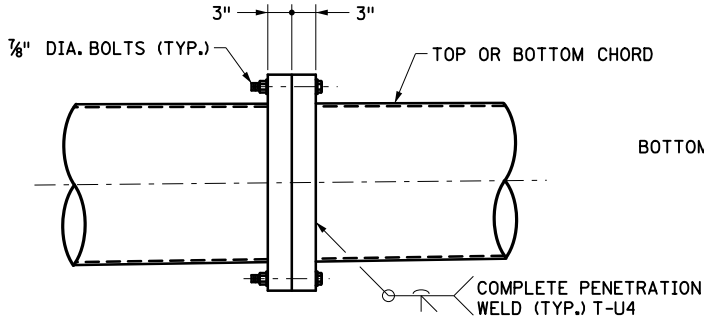
POLE AND MAST ARM TYPE TS
STIFFENER PLATE/GUSSET PLATE CONNECTION DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION
REFERENCE
2565

STANDARD
PLATE
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FLANGE SPLICE PLATE

POLE TYPE	MAST ARM LENGTH	TOP CHORD			BOTTOM CHORD		
		FLANGE SPLICE PLATE DIAMETER \varnothing_{TF}	BOLT CIRCLE DIAMETER \varnothing_{TS}	CHORD DIAMETER @ SPLICE \varnothing_{TC}	FLANGE SPLICE PLATE DIAMETER \varnothing_{BF}	BOLT CIRCLE DIAMETER \varnothing_{BS}	CHORD DIAMETER @ SPLICE \varnothing_{BC}
TS60	60' 0"	24"	21"	16.9"	19"	16"	11.5"
TS65	65' 0"	24.5"	21.5"	17.2"	19"	16"	11.5"
TS70	70' 0"	24.5"	21.5"	17.2"	20"	17"	12.2"
TS75	75' 0"	26"	23"	18.5"	20"	17"	12.2"
TS80	80' 0"	26"	23"	18.8"	20"	17"	12.2"



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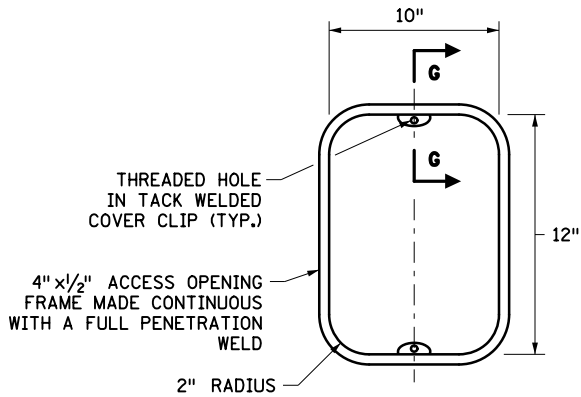
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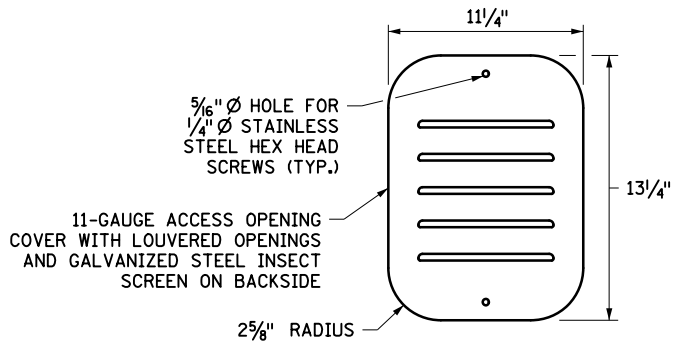
POLE AND MAST ARM TYPE TS
FLANGE SPLICE DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

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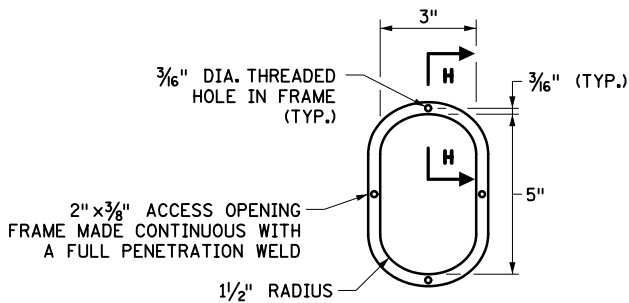
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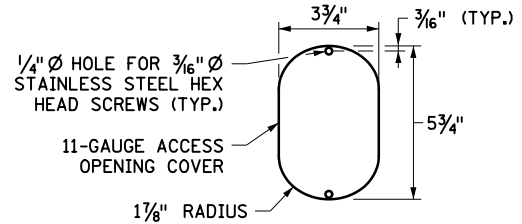
10" x 12" ACCESS OPENING FRAME



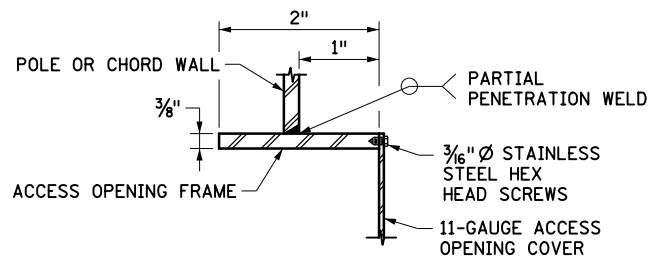
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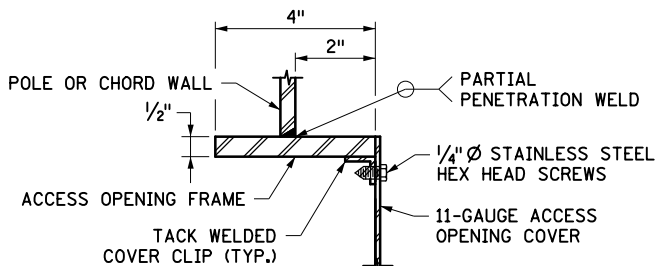
3" x 5" ACCESS OPENING FRAME



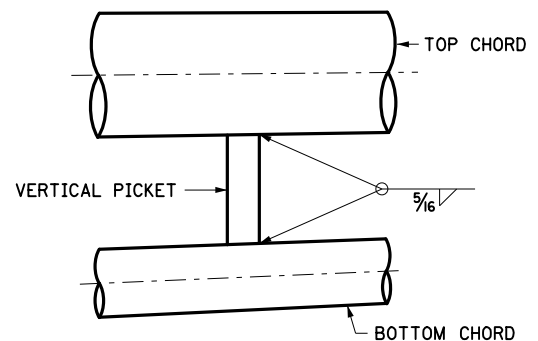
3" x 5" ACCESS OPENING COVER



SECTION H-H



SECTION G-G



VERTICAL PICKET

VERTICAL PICKET		
POLE TYPE	MAST ARM LENGTH	BAR DIMENSION
TS60	60' 0"	4" x 5/8"
TS65	65' 0"	4 1/2" x 5/8"
TS70	70' 0"	4 1/2" x 5/8"
TS75	75' 0"	5" x 5/8" ①
TS80	80' 0"	5" x 5/8" ①

NOTES:

INSTALL FASTENERS TO A SNUG-TIGHT CONDITION.

① 6" x 5/8" BARS REQUIRED AT THE TWO PICKET LOCATIONS NEAREST TO THE POLE.

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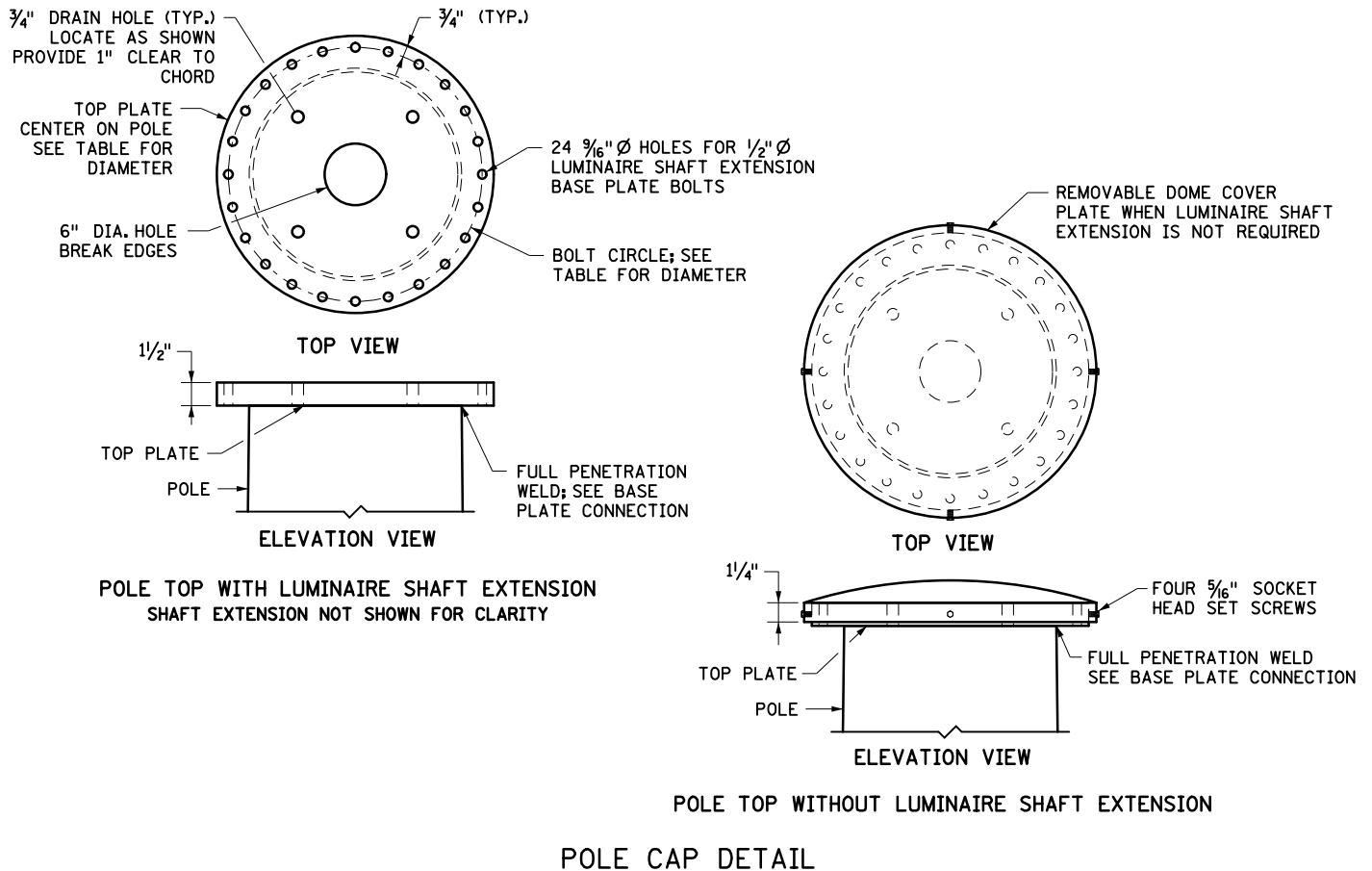
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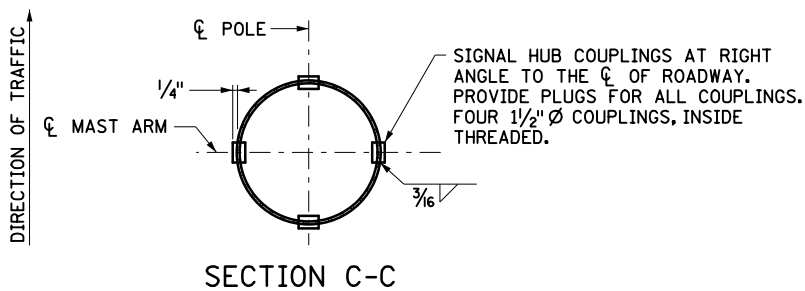
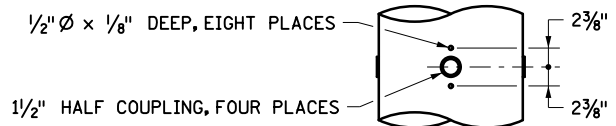
POLE AND MAST ARM TYPE TS
ACCESS OPENING AND ATTACHMENT DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

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POLE CAP DIMENSIONS			
POLE TYPE	TOP PLATE DIAMETER	BOLT CIRCLE DIAMETER	COVER PLATE DIAMETER
TS60	22 1/2"	21"	22 1/2"
TS65	24"	22 1/2"	24"
TS70	24"	22 1/2"	24"
TS75	26"	24 1/2"	26"
TS80	26 1/2"	25"	26 1/2"



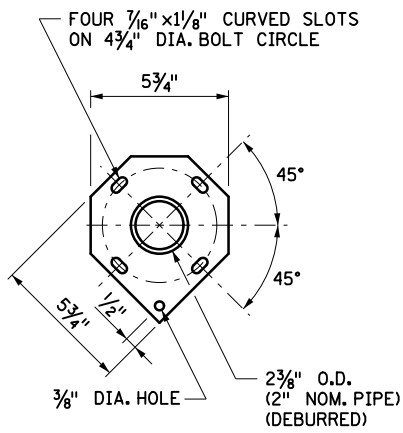
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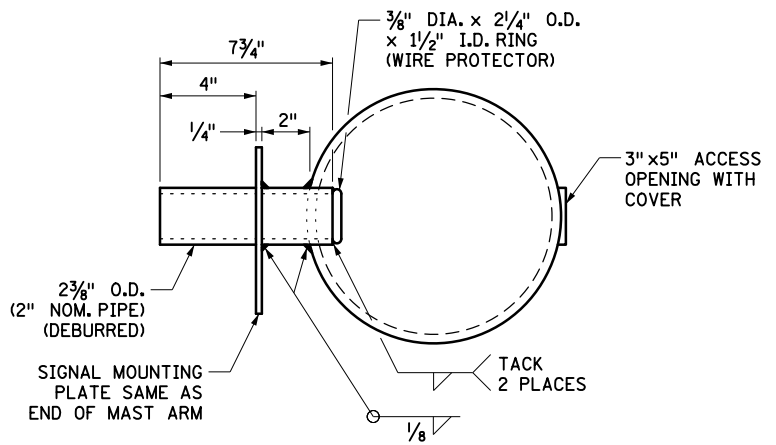
STATE OF MINNESOTA
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POLE AND MAST ARM TYPE TS
 MISCELLANEOUS DETAILS
 FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION REFERENCE
 2565

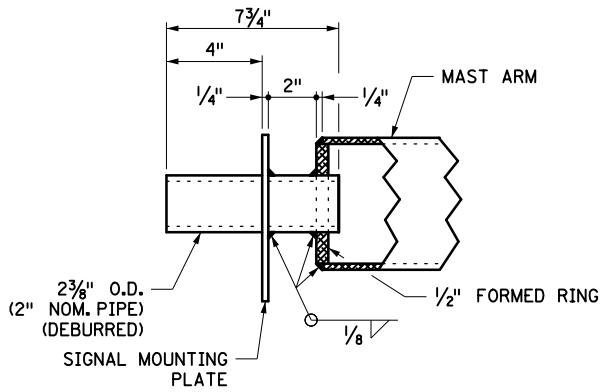
STANDARD PLATE NO.
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FRONT VIEW

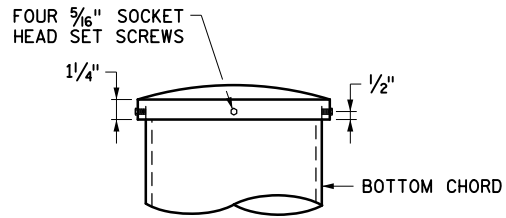


SIGNAL MOUNTING DETAIL
MID MAST ARM



SIDE VIEW

SIGNAL MOUNTING DETAIL
END OF MAST ARM



REMOVABLE CHORD CAP DETAIL

APPROVED 02-27-2024

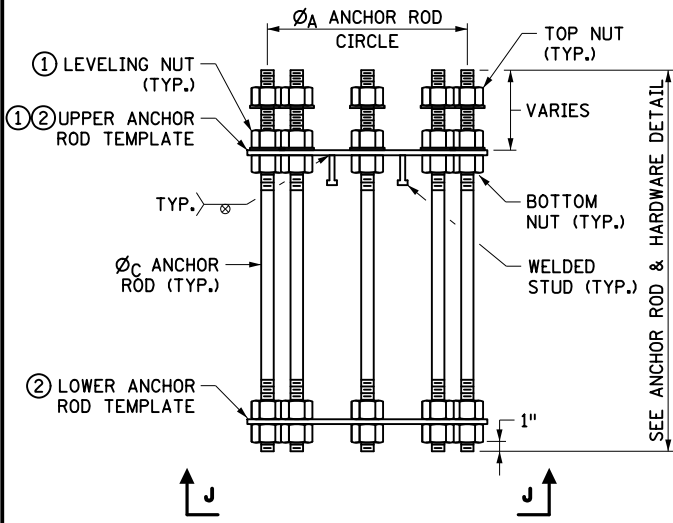
Rom Sln
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

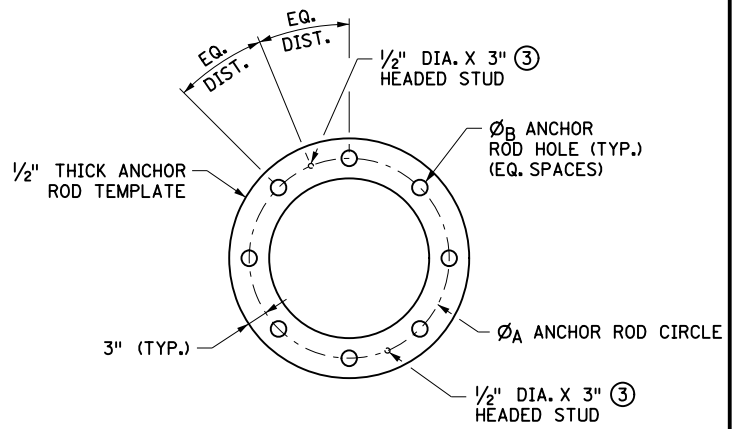
POLE AND MAST ARM TYPE TS
MISCELLANEOUS DETAILS
FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION
REFERENCE
2565

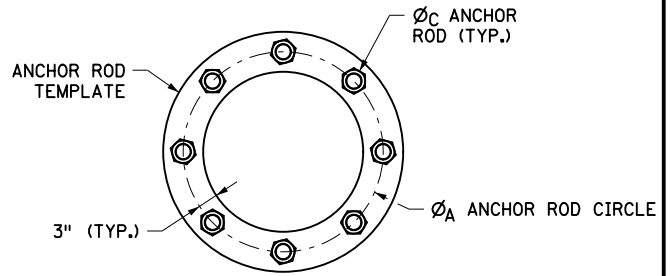
STANDARD
PLATE
NO.
8125A
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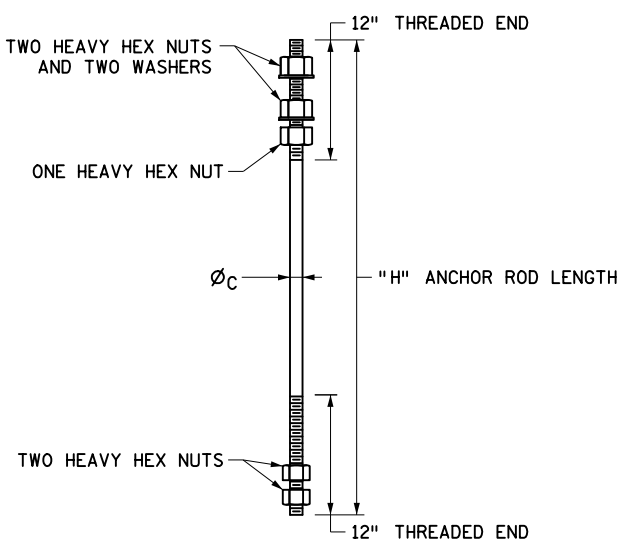
ANCHOR ROD ASSEMBLY DETAIL



ANCHOR ROD TEMPLATE
TWO PER ASSEMBLY, ONE UPPER AND ONE LOWER



VIEW J-J



ANCHOR ROD AND HARDWARE
EIGHT REQUIRED PER ASSEMBLY

POLE TYPE	ANCHOR ROD CIRCLE	ANCHOR ROD HOLE	ANCHOR ROD DIA.	ANCHOR ROD TOTAL LENGTH
	Ø _A	Ø _B	Ø _C	H
TS60	29"	1 5/8"	1 1/2"	42"
TS65	29"	1 7/8"	1 3/4"	47"
TS70	31"	2 1/8"	2"	52"
TS75	33"	2 1/8"	2"	52"
TS80	33"	2 3/8"	2 1/4"	59"

NOTES:

- ① USE THE LEVELING NUTS TO TEMPORARILY SECURE THE UPPER ANCHOR ROD TEMPLATE BEFORE CONCRETE OPERATIONS. LEAVE THE NUTS SECURE AGAINST THE TEMPLATE UNTIL POLE INSTALLATION. USE THE REQUIRED HARDWARE FOR DOUBLE-NUT ANCHOR ROD CONNECTIONS IN ACCORDANCE WITH SPEC 2545.3.
- ② TIGHTEN ANCHOR ROD TEMPLATE NUTS USING A 12"-LONG WRENCH.
- ③ FURNISH AND INSTALL HEADED STUDS IN ACCORDANCE WITH 3391.2 "STUD WELDED FASTENERS" ON THE UPPER TEMPLATE AT THE LOCATIONS SHOWN.

GALVANIZE HEAVY HEX NUTS AND WASHERS IN ACCORDANCE WITH SPEC. 3392.

GALVANIZE UPPER AND LOWER ANCHOR ANCHOR ROD TEMPLATES IN ACCORDANCE WITH SPEC. 3394.

FURNISH AND INSTALL TYPE B ANCHOR RODS IN ACCORDANCE WITH SPEC. 3385.

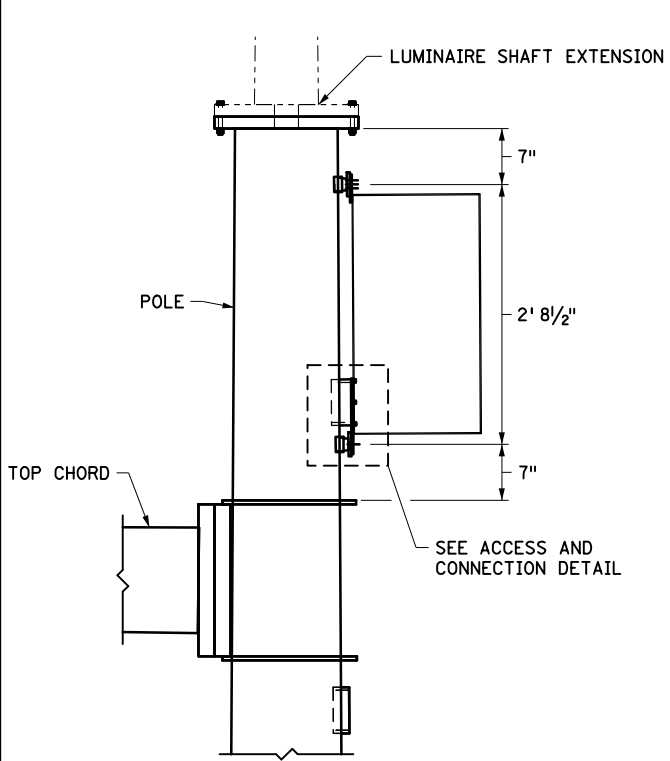
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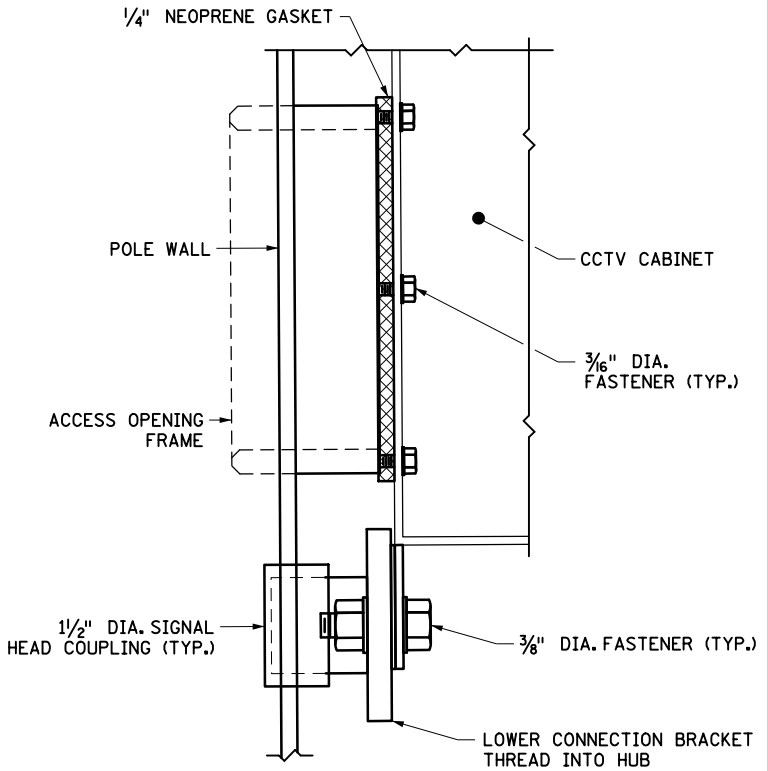
STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION
POLE AND MAST ARM TYPE TS
 ANCHOR ROD ASSEMBLY DETAILS
 FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION REFERENCE
 2565

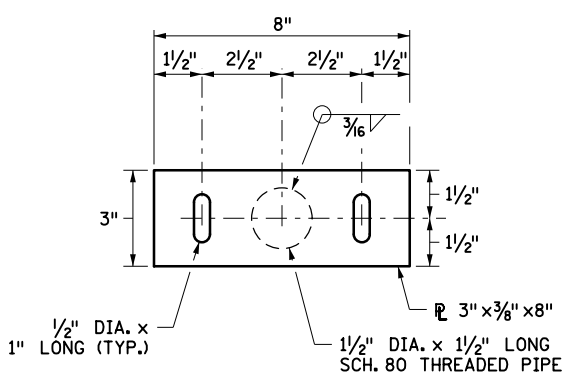
STANDARD PLATE NO.
8125A
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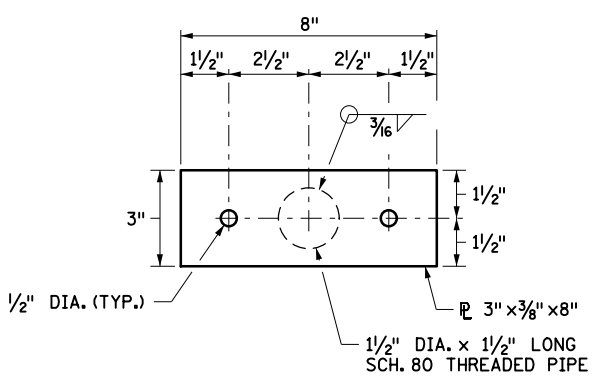
CCTV CABINET DETAIL



ACCESS AND CONNECTION DETAIL
LOWER CONNECTION SHOWN; UPPER SIMILAR




UPPER CONNECTION BRACKET
ONE REQUIRED PER POLE



LOWER CONNECTION BRACKET
ONE REQUIRED PER POLE

NOTES:

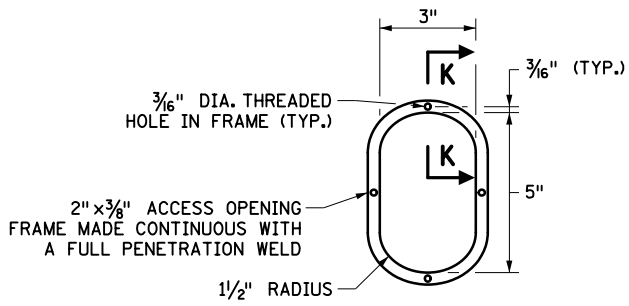
- PROVIDE DETAILS ON THIS SHEET IF POLE IS TO RECEIVE A CCTV CABINET.
- FURNISH AND INSTALL COMMON STRUCTURAL STEEL BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH SPEC. 3391 FOR THE CCTV CABINET TO POLE BRACKETING CONNECTIONS.

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 STATE DESIGN ENGINEER

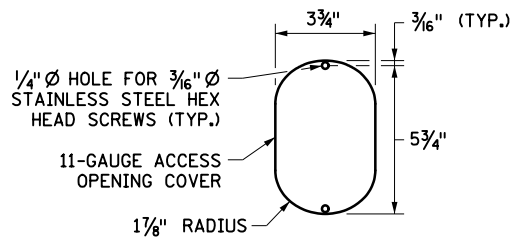
STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION
POLE AND MAST ARM TYPE TS
 CCTV CONNECTION DETAILS (1 OF 2)
 FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION
 REFERENCE
 2565

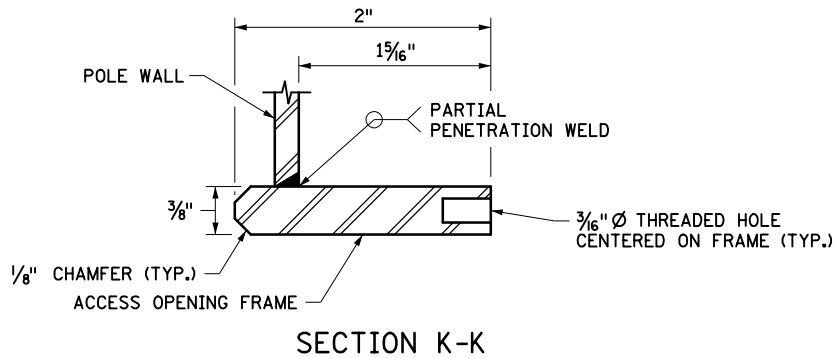
STANDARD
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3" x 5" ACCESS OPENING FRAME



3" x 5" ACCESS OPENING COVER PLATE
 PROVIDE COVER PLATE WHEN CCTV CABINET IS NOT REQUIRED



APPROVED 02-27-2024

Rom S. [Signature]

STATE DESIGN ENGINEER

STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION

POLE AND MAST ARM TYPE TS

CCTV CONNECTION DETAILS (2 OF 2)
 FOR MAST ARM LENGTHS 60' TO 80'

SPECIFICATION REFERENCE
 2565

STANDARD PLATE NO.
8125A
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