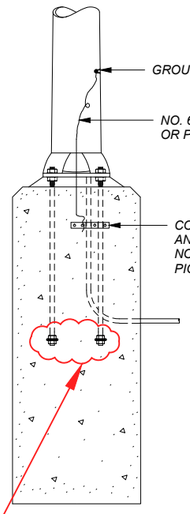
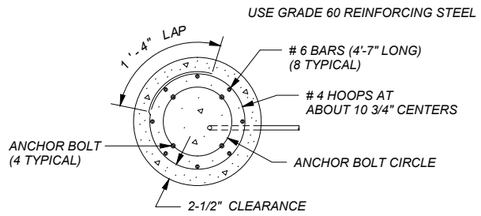
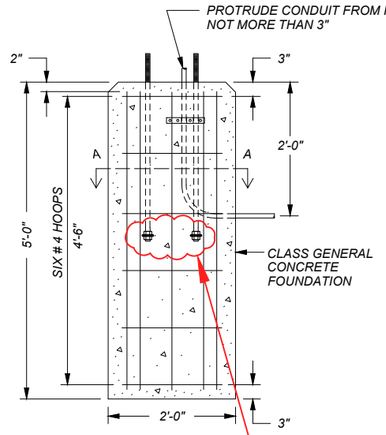
WELDING INSPECTION:
INSPECT PER APPLICABLE MDT STANDARD SPECIFICATIONS.





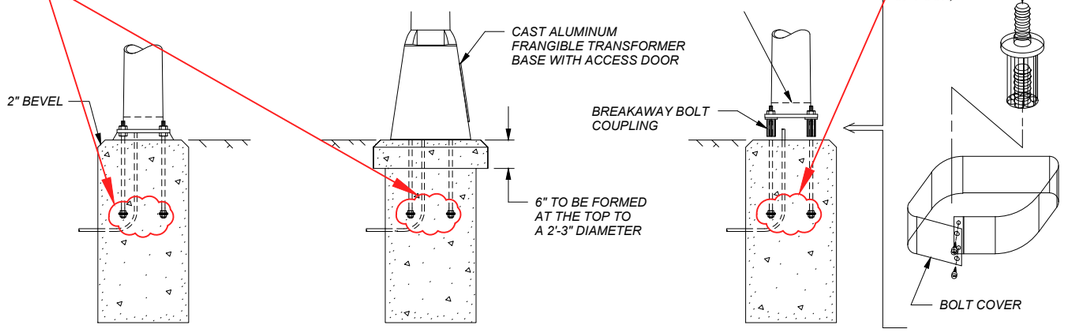
SECTION A-A



TYPICAL OF ALL FOUNDATIONS

CJP WELD WITH BACKER RING (TYP. ALL BASE CONNECTION) SEE DETAIL 4.4 IN TABLE 11.9.3.1-1

CHANGES TO FOUNDATION ANCHORS



ANCHOR (DOUBLE NUT CONNECTION REQUIRED)

TRANSFORMER (BREAKAWAY TYPE)

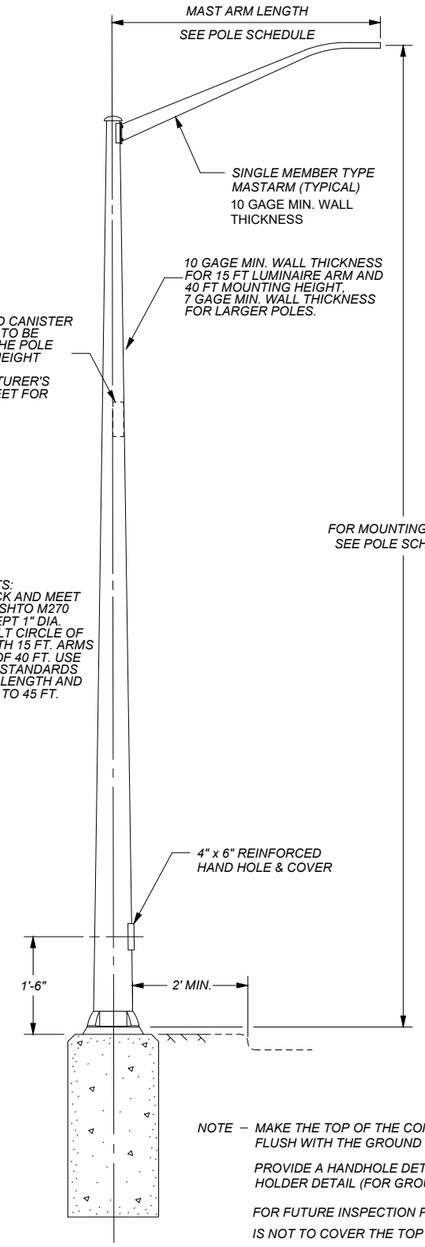
BOLT COUPLING (BREAKAWAY TYPE)

BASE TYPES FOR LUMINAIRE STANDARDS

NOTE – INSTALL AND PRETENSION ANCHOR BOLTS PER THE SPECIFICATIONS
MARK TOP OF ANCHOR BOLT WITH MATERIAL GRADE PER ASTM F 1554 S3

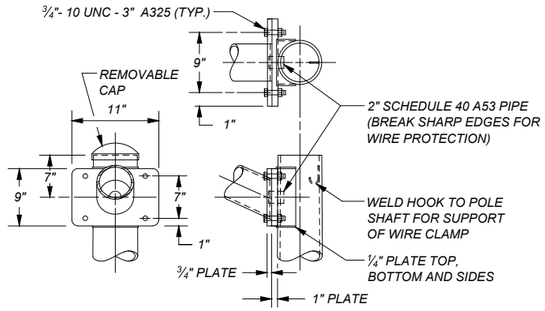
FACTORY INSTALLED CANISTER VIBRATION DAMPER TO BE INSTALLED INSIDE THE POLE TWO THIRDS POLE HEIGHT FROM THE BASE. PROVIDE MANUFACTURER'S PRODUCT DATA SHEET FOR MDT APPROVAL.

BASE PLATE REQUIREMENTS:
BASE PLATES TO BE 1" THICK AND MEET THE REQUIREMENTS OF AASHTO M270 GRADE 50. HOLES TO ACCEPT 1" DIA. ANCHOR BOLTS WITH A BOLT CIRCLE OF 13 1/2" FOR STANDARDS WITH 15 FT. ARMS AND A MOUNTING HEIGHT OF 40 FT. USE A BOLT CIRCLE OF 15" FOR STANDARDS WITH ARMS UP TO 25 FT. IN LENGTH AND MOUNTING HEIGHTS OF UP TO 45 FT.



TYPE I0-A POLE

LUMINAIRE ARM CONNECTION REQUIRES 4 BOLT DESIGN WITH A325 BOLTS, NUTS AND WASHERS (FULLY TENSIONED)
TUBE TO PLATE CONNECTION TO BE SOCKET TYPE CONNECTION WITH TWO FILLET WELDS PER 14.4.4.6 OF THE SPECIFICATIONS.



NOTE – FOR ARMS BETWEEN 16 FT. AND 25 FT. IN LENGTH, USE AN 11" SQUARE PLATE WITH A BOLT SPACING OF 9" VERTICAL AND 9" HORIZONTAL

DESIGN, FABRICATE, ERECT, AND INSPECT STANDARDS IN ACCORDANCE WITH THE CURRENT EDITION AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (AND ANY AMENDMENTS THERETO).

DESIGN PARAMETERS:

DESIGN WEIGHT = DEAD LOAD, ICE.

DESIGN AREA = AREA WITH MAXIMUM WIND LOAD (WIND IS PERPENDICULAR TO STANDARD, AS SHOWN).

DIRECTIONAL FACTOR Kd = 0.95, GUST FACTOR = 1.14 DRAG COEFFICIENTS LFRD TABLE 3.8.7-1

HEIGHT AND EXPOSURE FACTOR Kz
zg = TAKEN AS 900 FEET FOR EXPOSURE C
ά= 9.5
z = 16 FEET

DESIGN WIND VELOCITY 700 YEAR MRI BASIC WIND SPEED (115 MPH)

NOTE – MAKE THE TOP OF THE CONCRETE FOUNDATION FLUSH WITH THE GROUND LINE.

PROVIDE A HANDHOLE DETAIL AND A ½" NUT HOLDER DETAIL (FOR GROUNDING) .

FOR FUTURE INSPECTION PURPOSES, FILL MATERIAL IS NOT TO COVER THE TOP OF THE FOUNDATIONS

TYPE 10-A LUMINAIRE STANDARDS, POLE BASES & FOUNDATION DETAILS

NO SCALE

LS
REVISED 26-FEB-2026

SHEET NO.
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PROJECT NAME
COUNTY
PROJECT ID
UPN

DESIGNED BY #### #### | REVIEWED BY #### #### | CHECKED BY #### ####

EL-LS.DWG

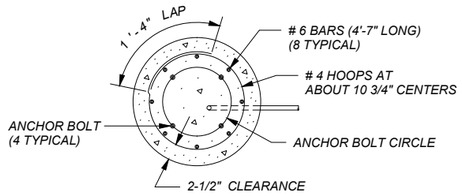
MONTANA Department of Transportation

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WELDING INSPECTION:
INSPECT PER APPLICABLE MDT STANDARD SPECIFICATIONS.

USE GRADE 60 REINFORCING STEEL



SECTION A-A

DESIGN, FABRICATE, ERECT, AND INSPECT STANDARDS IN ACCORDANCE WITH THE CURRENT EDITION AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (AND ANY AMENDMENTS THERETO).

DESIGN PARAMETERS:

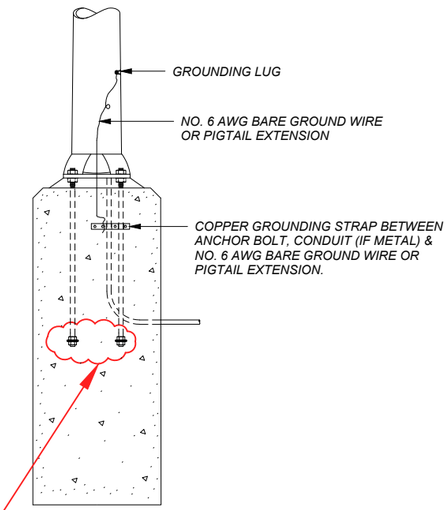
DESIGN WEIGHT = DEAD LOAD, ICE.

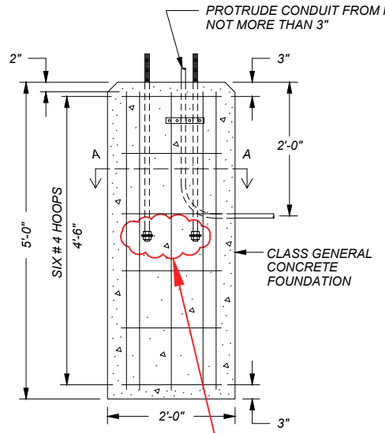
DESIGN AREA = AREA WITH MAXIMUM WIND LOAD (WIND IS PERPENDICULAR TO STANDARD, AS SHOWN).

DIRECTIONAL FACTOR Kd = 0.95, GUST FACTOR = 1.14 DRAG COEFFICIENTS LFRD TABLE 3.8.7-1

HEIGHT AND EXPOSURE FACTOR Kz
zg = TAKEN AS 900 FEET FOR EXPOSURE C
ά= 9.5
z = 16 FEET

DESIGN WIND VELOCITY 700 YEAR MRI BASIC WIND SPEED (115 MPH)

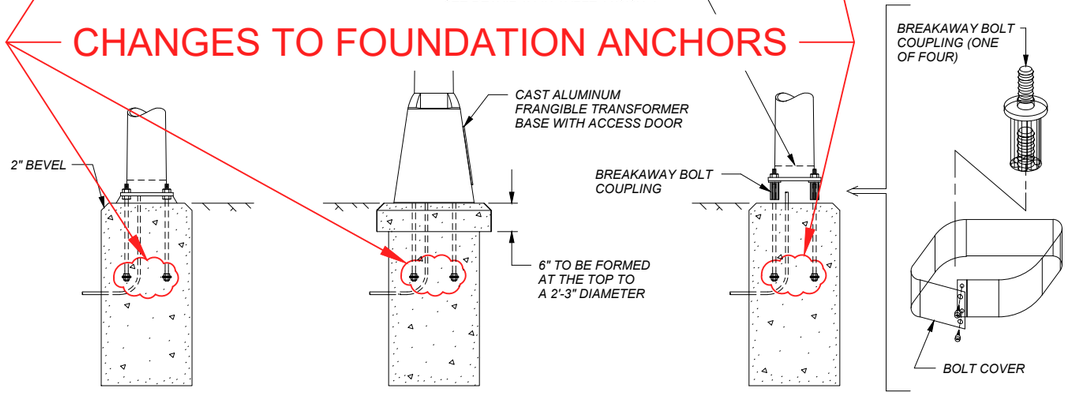




TYPICAL OF ALL FOUNDATIONS

CJP WELD WITH BACKER RING (TYP. ALL BASE CONNECTION) SEE DETAIL 4.4 IN TABLE 11.9.3.1-1

CHANGES TO FOUNDATION ANCHORS



ANCHOR (DOUBLE NUT CONNECTION REQUIRED)

TRANSFORMER (BREAKAWAY TYPE)

BOLT COUPLING (BREAKAWAY TYPE)

BASE TYPES FOR LUMINAIRE STANDARDS

NOTE – INSTALL AND PRETENSION ANCHOR BOLTS PER THE SPECIFICATIONS
MARK TOP OF ANCHOR BOLT WITH MATERIAL GRADE PER ASTM F 1554 S3

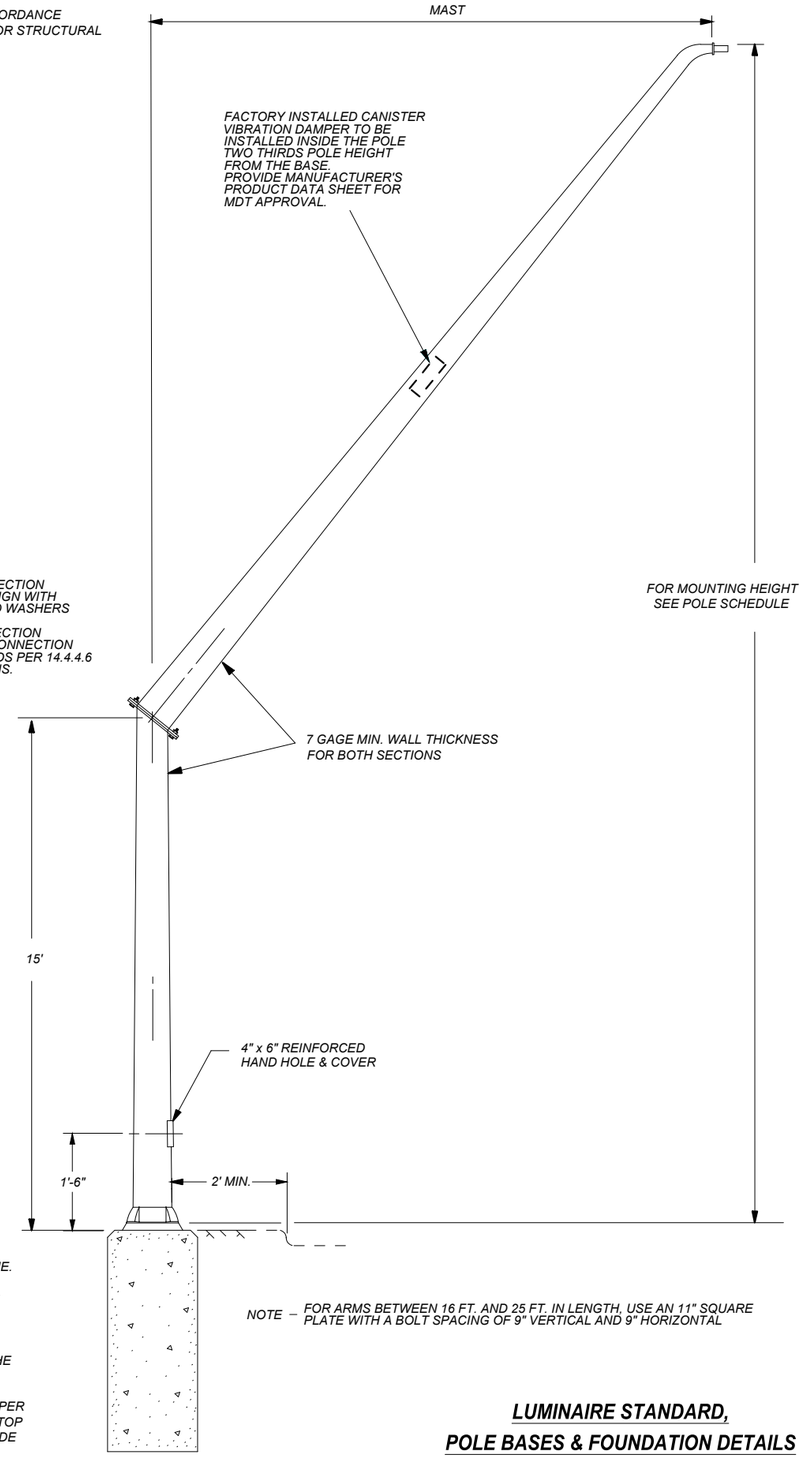
BASE PLATE REQUIREMENTS:
BASE PLATES TO BE 1" THICK AND MEET THE REQUIREMENTS OF AASHTO M270 GRADE 50. HOLES TO ACCEPT 1" DIA. ANCHOR BOLTS WITH A BOLT CIRCLE OF 13 1/2" FOR STANDARDS WITH 15 FT. ARMS AND A MOUNTING HEIGHT OF 40 FT. USE A BOLT CIRCLE OF 15" FOR STANDARDS WITH ARMS UP TO 25 FT. IN LENGTH AND MOUNTING HEIGHTS OF UP TO 45 FT.

NOTE - MAKE THE TOP OF THE CONCRETE FOUNDATION FLUSH WITH THE GROUND LINE.

PROVIDE A HANDHOLE DETAIL AND A ½" NUT HOLDER DETAIL (FOR GROUNDING).

FOR FUTURE INSPECTION PURPOSES, FILL MATERIAL IS NOT TO COVER THE TOP OF THE FOUNDATIONS.

INSTALL AND PRETENSION ANCHOR BOLTS PER 15.6.3 OF THE SPECIFICATIONS. MARK THE TOP OF THE ANCHOR BOLT WITH MATERIAL GRADE PER ASTM F 1554 S3.



NOTE – FOR ARMS BETWEEN 16 FT. AND 25 FT. IN LENGTH, USE AN 11" SQUARE PLATE WITH A BOLT SPACING OF 9" VERTICAL AND 9" HORIZONTAL

LUMINAIRE STANDARD, POLE BASES & FOUNDATION DETAILS

NO SCALE

LS

REVISED 10-MARCH-2026

SHEET NO.
####

PROJECT NAME
COUNTY
PROJECT ID
UPN

DESIGNED BY ####
REVIEWED BY ####
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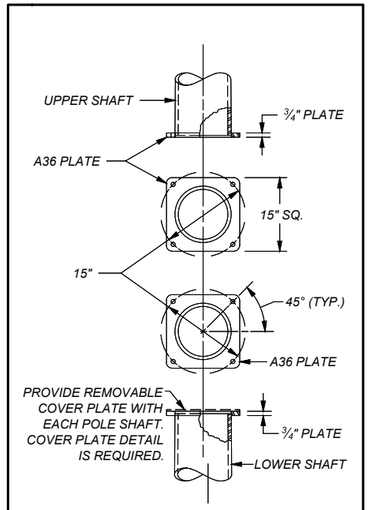
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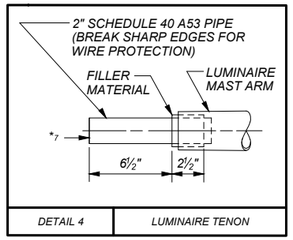
EL-SLANTED_LUM2026.DWG

OVERHEAD CANTILEVER STRUCTURE

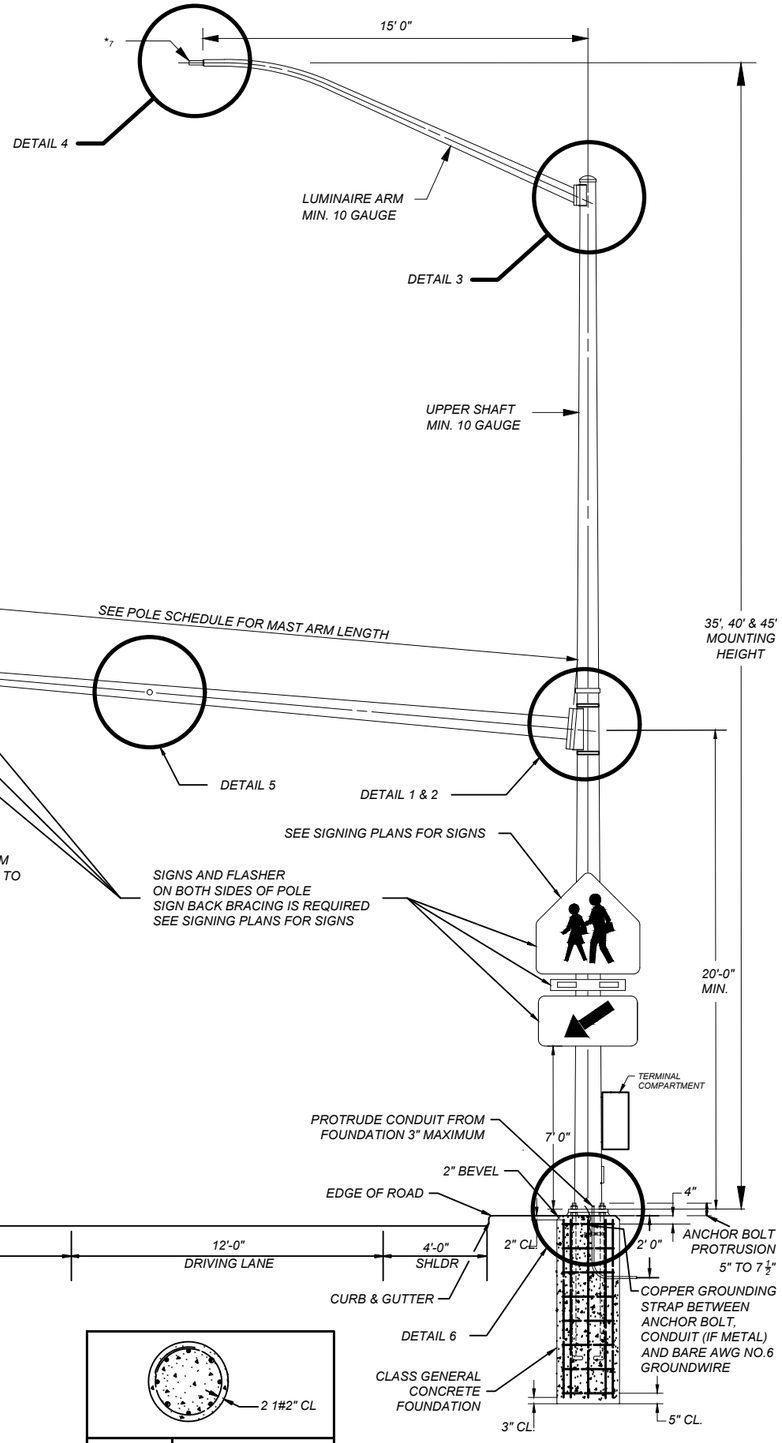
(SIGN STRUCTURE IS FOR INFORMATION ONLY. CONTRACTOR TO DETERMINE FINAL DESIGN)

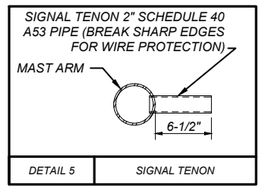


DETAIL 2 | SHAFT TO SHAFT



DETAIL 4 | LUMINAIRE TENON

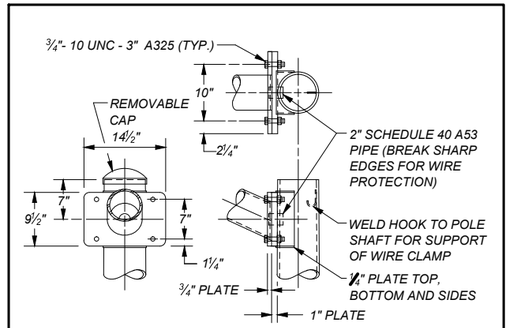




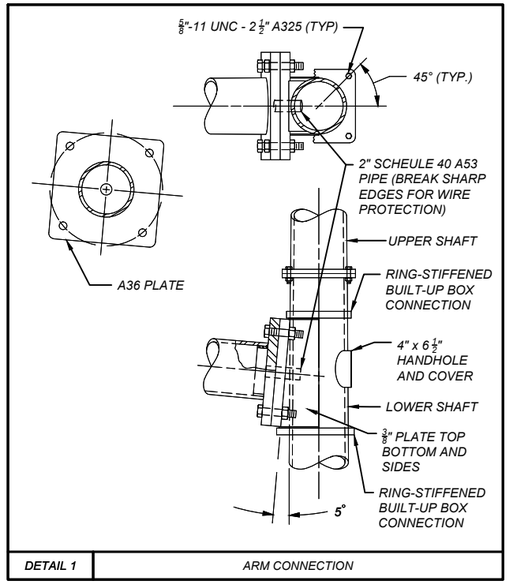
DETAIL 5 | SIGNAL TENON

DETAIL 7 | TYPICAL FOUNDATION

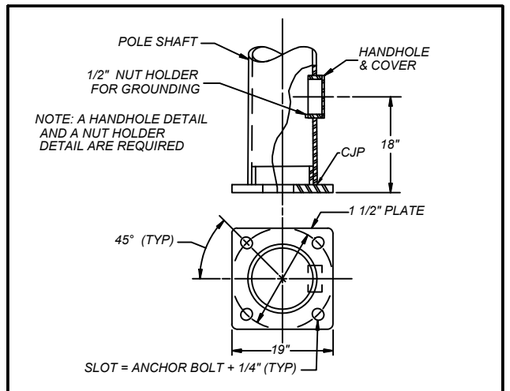
FOUNDATION DESIGN BY CONTRACTOR



DETAIL 3 | LUMINAIRE ARM CONNECTION



DETAIL 1 | ARM CONNECTION



DETAIL 6 | BASE CONNECTION

NOTES

MOUNT ALL SIGNS LEVEL HORIZONTALLY ON THE MASTARM AS SHOWN AND CENTERED OVER THE APPROPRIATE DRIVING LANE.

INCLUDE MOUNTING HARDWARE IN THE UNIT BID PRICE FOR SIGNS.

PROVIDE SHOP DRAWINGS ACCORDING TO STANDARD SPECIFICATIONS.

DESIGN, FABRICATE, AND INSPECT IN ACCORDANCE WITH THE CURRENT AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, INCLUDING THE REQUIREMENTS IN SECTION 11. REFER TO SECTION 704 OF MDT STANDARD SPECIFICATIONS FOR SPECIFIC DESIGN REQUIREMENTS.

REFER TO SECTION 703.04.3 OF MDT STANDARD SPECIFICATIONS FOR SPECIFIC INSPECTION AND TESTING.

UNLESS NOTED OTHERWISE, ALL MAJOR COMPONENT CONNECTIONS ARE TO BE WELDED, BOLTED USING HIGH STRENGTH BOLTS OR A COMBINATION OF BOTH.

ALL TUBE-TO-TRANSVERSE PLATE CONNECTIONS ARE TO BE CJP WELDS PER DETAIL 4.4 IN TABLE 11.9.3.1-1 OF THE SPECIFICATIONS.

UNLESS NOTED OTHERWISE, THE BID ITEM INCLUDES DESIGNING AND FURNISHING THE FOUNDATION AND OBTAINING BORING LOG.

WELDING PROCEDURES, SYMBOLS, BASE METAL SPECIFICATIONS & GRADES MUST BE CALLED OUT PRIOR TO FABRICATION OR APPROVAL.

GALVANIZE POLES, SHAFTS, ARMS, AND ACCESSORIES TO ASTM DESIGNATION : A123.

GALVANIZE HARDWARE PER ASTM DESIGNATION : ASTM F2329. ANCHOR BOLTS TO BE IDENTIFIED PER ASTM F1554 S3

RAPID FLASHING OVERHEAD BEACON & LUMINAIRE & SIGN MOUNTING DETAIL

NO SCALE

RFOHBL

REVISED 15-SEPT-2025

SHEET NO.
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PROJECT NAME ####
COUNTY ####
PROJECT ID ####
UPN ####

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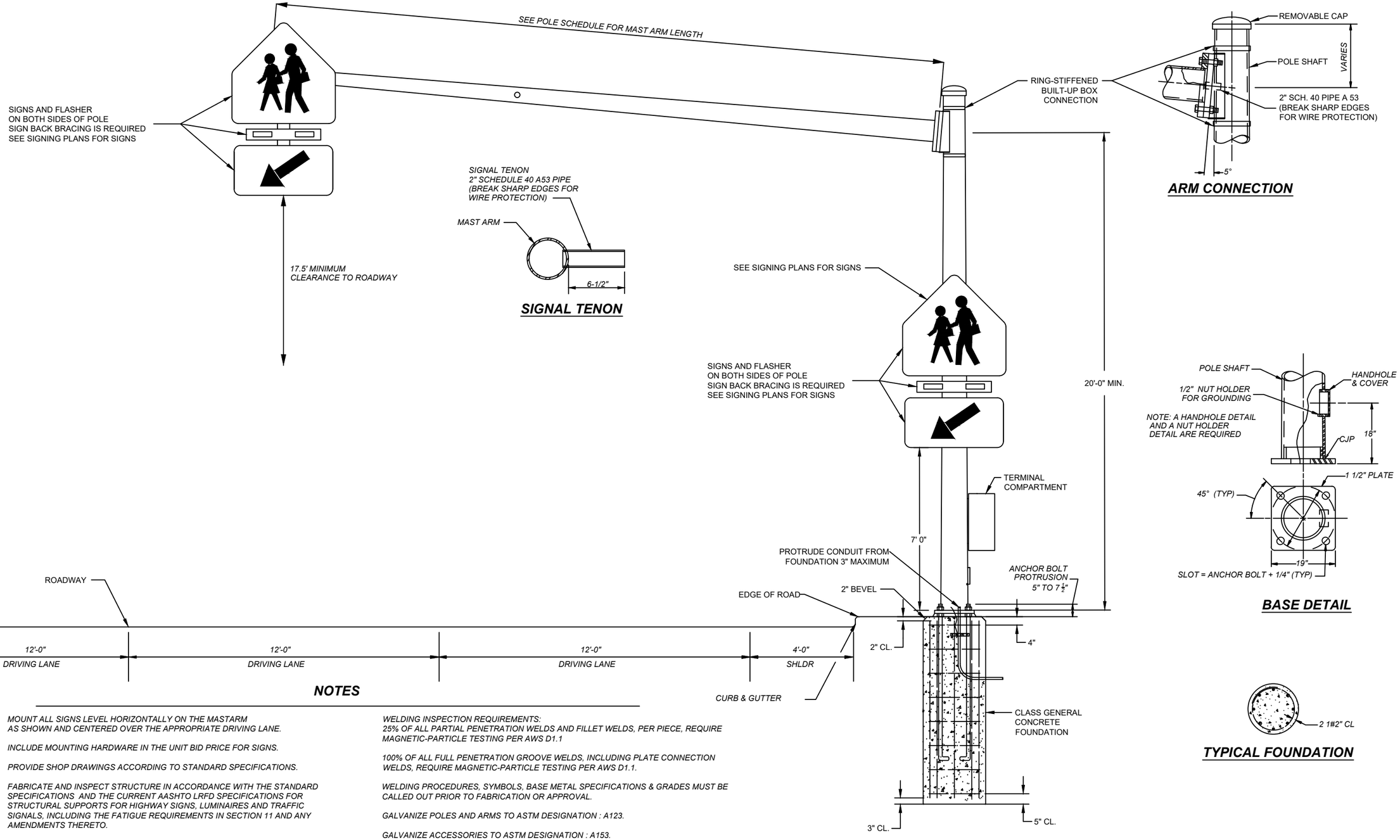
MONTANA Department of Transportation

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OVERHEAD CANTILEVER STRUCTURE

(SIGN STRUCTURE IS FOR INFORMATION ONLY. CONTRACTOR TO DETERMINE FINAL DESIGN)



ARM CONNECTION

SIGNAL TENON

BASE DETAIL

TYPICAL FOUNDATION

FOUNDATION DESIGN BY CONTRACTOR

NOTES

MOUNT ALL SIGNS LEVEL HORIZONTALLY ON THE MASTARM AS SHOWN AND CENTERED OVER THE APPROPRIATE DRIVING LANE.

INCLUDE MOUNTING HARDWARE IN THE UNIT BID PRICE FOR SIGNS.

PROVIDE SHOP DRAWINGS ACCORDING TO STANDARD SPECIFICATIONS.

FABRICATE AND INSPECT STRUCTURE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THE CURRENT AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, INCLUDING THE FATIGUE REQUIREMENTS IN SECTION 11 AND ANY AMENDMENTS THERETO.

UNLESS NOTED OTHERWISE, ALL MAJOR COMPONENT CONNECTIONS ARE TO BE WELDED, BOLTED USING HIGH STRENGTH BOLTS OR A COMBINATION OF BOTH.

ALL TUBE-TO-TRANSVERSE PLATE CONNECTIONS ARE TO BE CJP WELDS PER DETAIL 4.4 IN TABLE 11.9.3.1-1 OF THE SPECIFICATIONS.

UNLESS NOTED OTHERWISE, THE BID ITEM INCLUDES DESIGNING AND FURNISHING THE FOUNDATION AND OBTAINING BORING LOG.

WELDING INSPECTION REQUIREMENTS:
25% OF ALL PARTIAL PENETRATION WELDS AND FILLET WELDS, PER PIECE, REQUIRE MAGNETIC-PARTICLE TESTING PER AWS D1.1

100% OF ALL FULL PENETRATION GROOVE WELDS, INCLUDING PLATE CONNECTION WELDS, REQUIRE MAGNETIC-PARTICLE TESTING PER AWS D1.1.

WELDING PROCEDURES, SYMBOLS, BASE METAL SPECIFICATIONS & GRADES MUST BE CALLED OUT PRIOR TO FABRICATION OR APPROVAL.

GALVANIZE POLES AND ARMS TO ASTM DESIGNATION : A123.

GALVANIZE ACCESSORIES TO ASTM DESIGNATION : A153.

RAPID RECTANGULAR FLASHING OVERHEAD BEACON & SIGN MOUNTING DETAIL

NO SCALE

RRFOHB

REVISED 10-JUN-2025

SHEET NO.
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PROJECT NAME
COUNTY
PROJECT ID
UPN

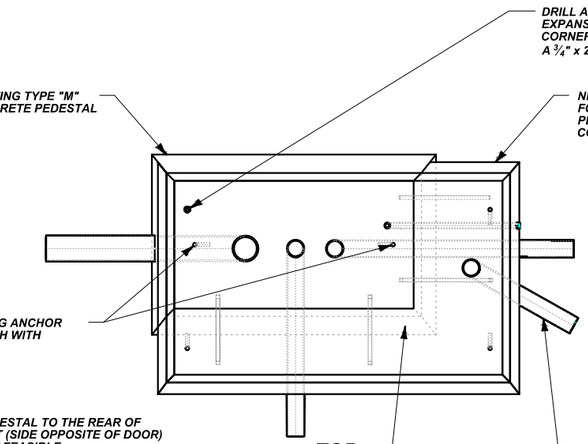
DESIGNED BY ####
REVIEWED BY ####
CHECKED BY ####

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Department of Transportation

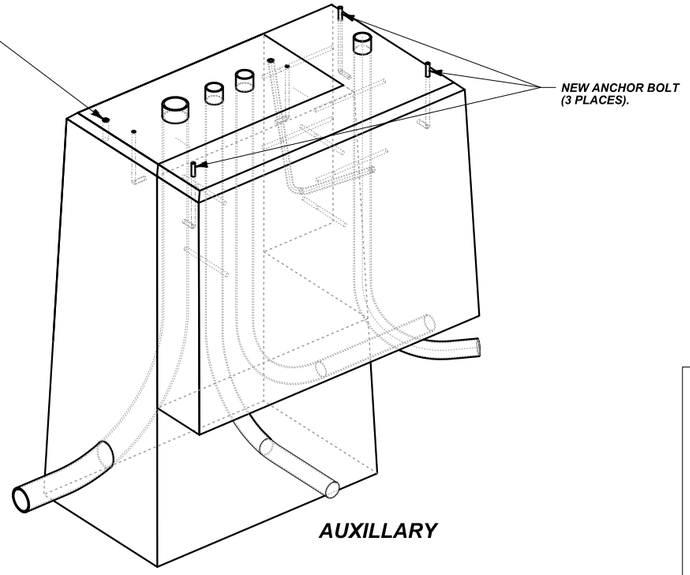
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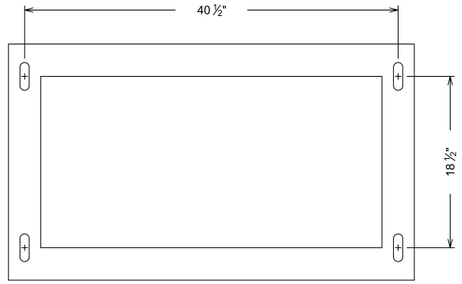


TOP

NOTE: CONDUITS SHOWN ARE FOR EXAMPLE ONLY. ACTUAL CONDUIT LOCATIONS MAY VARY.

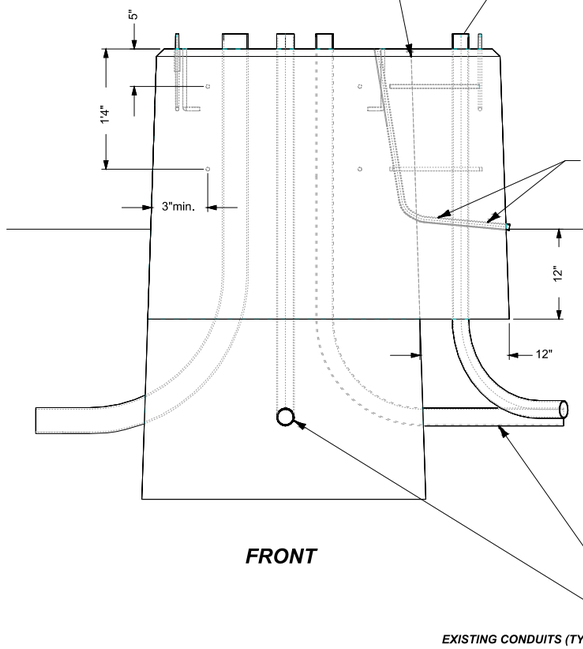


AUXILLARY

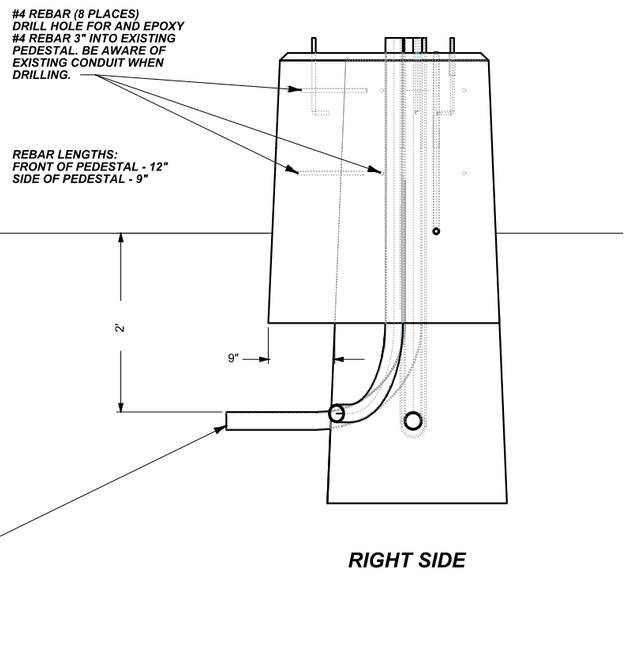


ANCHOR BOLT PATTERN FOR TYPE "P" CABINET

(VERIFY BEFORE PLACING ANCHOR BOLTS)



FRONT



RIGHT SIDE

TYPE "M" TO TYPE "P"
CONTROLLER CABINET PEDESTAL
CONVERSION
NO SCALE

MTOP
REVISED 25-FEB-2026

SHEET NO.
####

PROJECT NAME ####
COUNTY ####
PROJECT ID ####
UPN ####

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CHECKED BY #### ####

EL-MTOP.DWG

MONTANA Department of Transportation

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