

GENERAL NOTES

1.

STEEL LIGHT STANDARDS SHALL HAVE AN 8 IN. OUTSIDE DIAMETER AT THE BASE WITH A $\frac{3}{16}$ IN. MINIMUM WALL THICKNESS, AND A UNIFORM TAPER THROUGHOUT. LIGHT STANDARDS SHALL BE ROUND OR TWELVE OR MORE SIDED, AND FABRICATED IN ACCORDANCE WITH SECTIONS 613 AND 715.
2.

A CERTIFICATE OF COMPLIANCE (C.O.C) SHALL BE SUBMITTED TO THE ENGINEER AFTER FABRICATION OF THE LIGHT STANDARDS. THE C.O.C. SHALL BE SUBMITTED IN ACCORDANCE WITH SUBSECTION 106.12.
3.

THE GATE ARM SHALL BE FABRICATED FROM HIGH STRENGTH RECTANGULAR FIBERGLASS AND 6061-T6 RECTANGULAR ALUMINUM TUBING. THE MAXIMUM ARM LENGTH SHALL BE 40 FT. THE FIBERGLASS/ALUMINUM GATE SHALL BE SUPPLIED BY SAFETRAIN, B&B ELECTRONIC, OR AN APPROVED EQUIVALENT.
4.

THE CONTRACTOR SHALL SURVEY THE CROSS SECTION OF THE ROADWAY, DETERMINE EACH GATE ARM LENGTH, AND SUBMIT THIS INFORMATION TO THE ENGINEER BEFORE ORDERING MATERIAL. THE LOCATION OF THE ROAD CLOSURE GATES AND THE REQUIRED MOUNTING HEIGHT OF THE GATE ARM PIVOT SHALL BE VERIFIED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER.
5.

A BREAKAWAY SHEAR PIN BASE IS REQUIRED FOR THE LIGHTWEIGHT ALUMINUM/FIBERGLASS ARMS. WHEN EXCESSIVE FORCE IS APPLIED TO THE GATE ARMS EQUIPPED WITH THE SHEAR PIN BASE, THE PIN SHALL SHEAR, AND THE ARM SHALL THEN SWING 45 DEGREES HORIZONTALLY AND DROP FREE OF THE GATE OPERATOR, MINIMIZING DAMAGE TO THE VEHICLE AND THE GATE.
6.

THE HEIGHTS OF THE GATE ARM GUIDES WERE DETERMINED FOR A 29 FT. TALL TAPERED LIGHT STANDARD WITH A BASE DIAMETER OF 8 IN. AND A TOP DIAMETER OF 4 IN. GUIDE LOCATIONS MAY BE ADJUSTED FOR VARIOUS GATE ARM LENGTHS AND WARNING LIGHT SPACINGS. THE HEIGHT OF THE GATE ARM OVER THE ROADWAY SHALL BE 3 FT. - 7 IN. TO 4 FT. - 7 IN. FROM THE BOTTOM OF THE ARM TO THE ROADWAY.
7.

THE WORM GEAR WINCH AND CABLE SHALL BE MANUFACTURED BY DUTTON-LAINSON, MFR. MODEL NO. WG2000, WITH A 7/32" THICK CABLE, AND A PULL CAPACITY OF 2000 LBS.
8.

WHEN THE GATE IS FULLY RAISED, THE NUT AND WASHER SHALL FIT SNUGLY AGAINST THE OUTSIDE OF THE REAR CHANNEL AND BE PADLOCKED IN PLACE. THE CONTRACTOR SHALL SUPPLY ONE HEAVY, WEATHERPROOF PADLOCK WITH TWO KEYS FOR EACH GATE ARM PIVOT. INFORMATION ON THE KEY TYPE REQUIREMENTS WILL BE PROVIDED BY THE ENGINEER. PAIRED PIVOTS FOR DIVIDED HIGHWAYS SHALL BE KEYED ALIKE.
9.

ELECTRICAL CONNECTION TO THE POWER SOURCE SHOWN ON THE PLANS WILL BE PAID FOR BY FORCE ACCOUNT. IF NO POWER SOURCE IS AVAILABLE, OMIT THE LUMINAIRE AND USE BATTERY OR SOLAR PANEL POWER FOR THE LED LIGHTS AS APPROVED BY THE ENGINEER.
10.

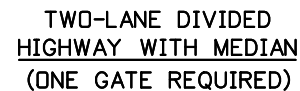
GATE WARNING LIGHTS SHALL BE RED LED (TYPE B) HIGH INTENSITY. THE LIGHT AT THE END OF THE ARM NEAR THE CENTERLINE OF THE ROADWAY SHALL BE STEADY BURN. THE OTHER TWO LIGHTS SHALL FLASH AT THE RATE REQUIRED BY THE "MUTCD". SPACING OF THE LIGHTS SHALL VARY BASED ON ROADWAY WIDTH AND GATE ARM LENGTH. THE CONTRACTOR SHALL DETERMINE THE SPACING AND SUBMIT THE LED LAYOUT TO THE ENGINEER FOR VERIFICATION PRIOR TO PLACEMENT.
11.

GALVANIZING: THE STEEL LIGHT STANDARDS, MAST ARMS, DROP GATE PIVOTS, SUPPORTS, GUIDES, AND ALL ASSOCIATED HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 715. ALL ROUGH EDGES AND BURRS SHALL BE GROUNDED SMOOTH PRIOR TO GALVANIZING.
12.

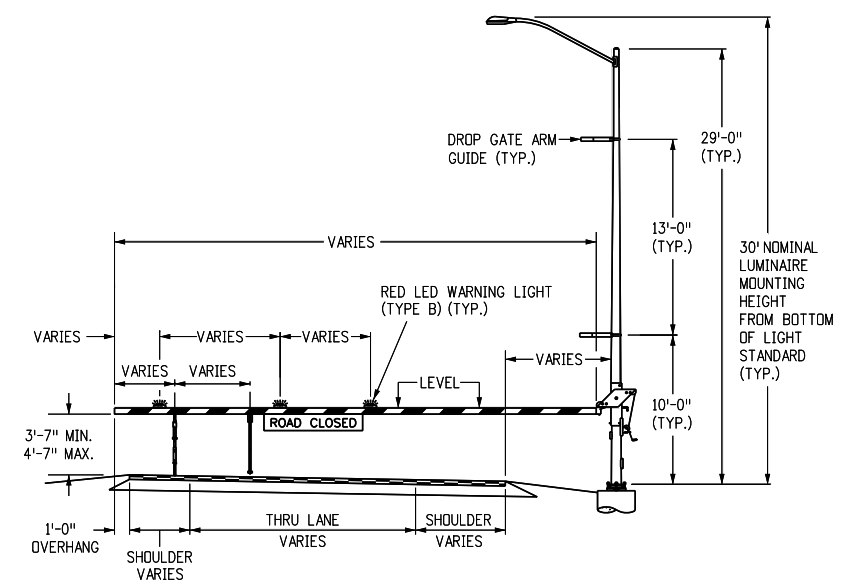
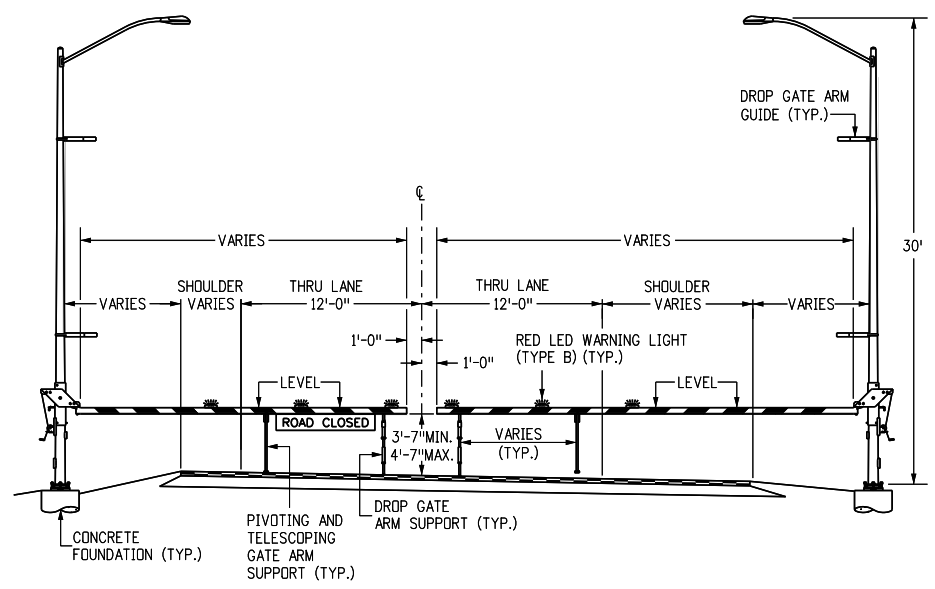
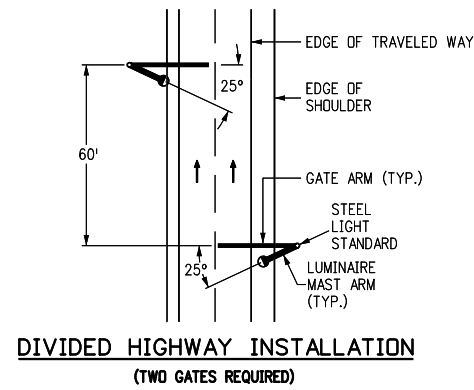
BOLTED CONNECTIONS: ALL BOLTS SHALL CONFORM TO ASTM A 307, GRADE A, UNLESS DESIGNATED AS HS (HIGH STRENGTH). HS BOLTS SHALL CONFORM TO ASTM A 325. AFTER THE ROAD CLOSURE GATE IS ASSEMBLED, ALL EXPOSED BOLT THREADS SHALL BE PAINTED WITH TWO COATS OF ALUMINUM PAINT. THE ALUMINUM PAINT SHALL MEET THE REQUIREMENTS OF SUBSECTION 708.04.
13.

FIELD ASSEMBLY: IN SOME INSTALLATIONS, THE CONNECTION PLATES FOR THE LUMINAIRE ARMS MAY REQUIRE MODIFICATION TO ALLOW THE PIVOT SLEEVE TO SLIP OVER. ALL DAMAGE TO THE GALVANIZING SHALL BE REPAIRED WITH TWO COATS OF ALUMINUM PAINT.

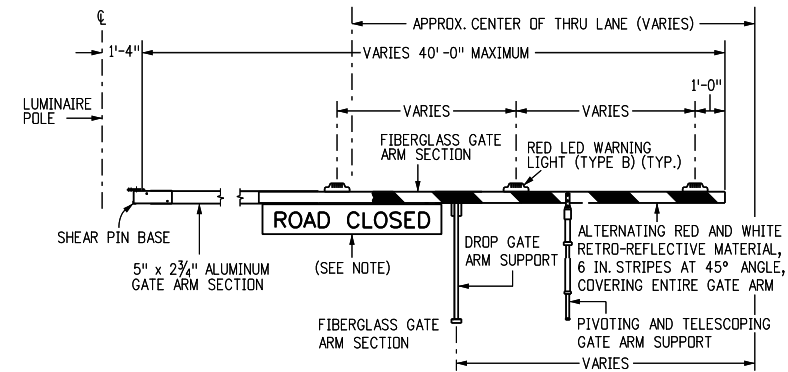
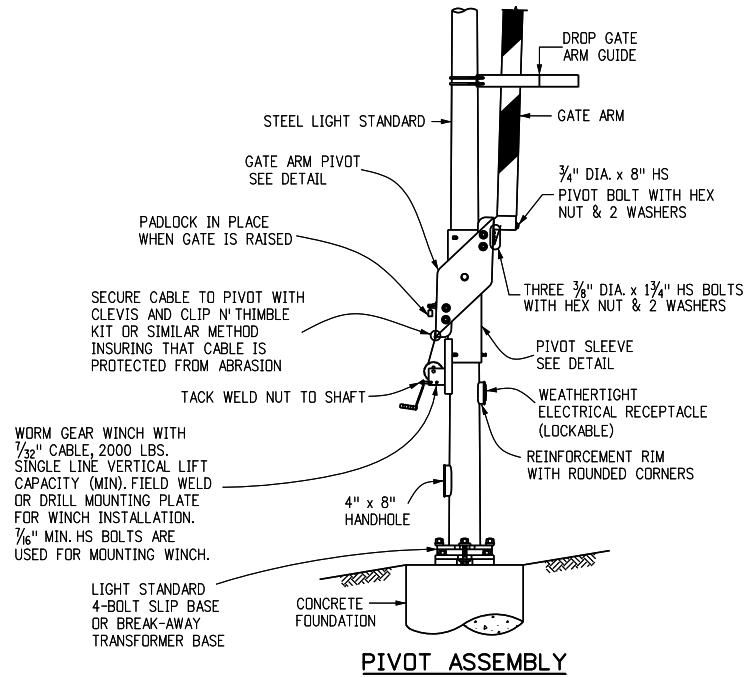
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Creation Date: 07/31/19		Date:	Comments				M-607-15
Designer Initials: JBK	(R-X)						Standard Sheet No. 1 of 9
Last Modification Date: 07/31/19	(R-X)						
Detailer Initials: LTA	(R-X)						
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)					Issued by the Project Development Branch: July 31, 2019	Project Sheet Number:



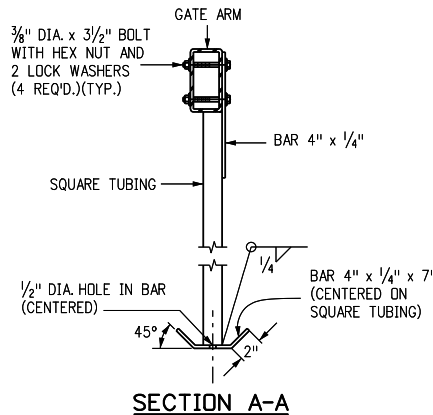
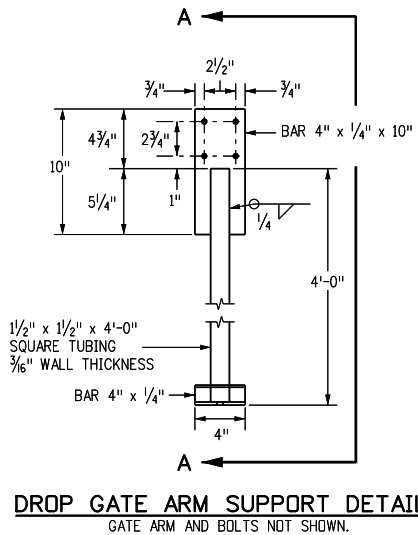
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Designer Initials: JBK					CDOT HQ, 3rd Floor					
Last Modification Date: 07/31/19					Denver, CO 80204				Standard Sheet No. 2 of 9	
Detailer Initials: LTA					Phone: 303-757-9021 FAX: 303-757-9868					
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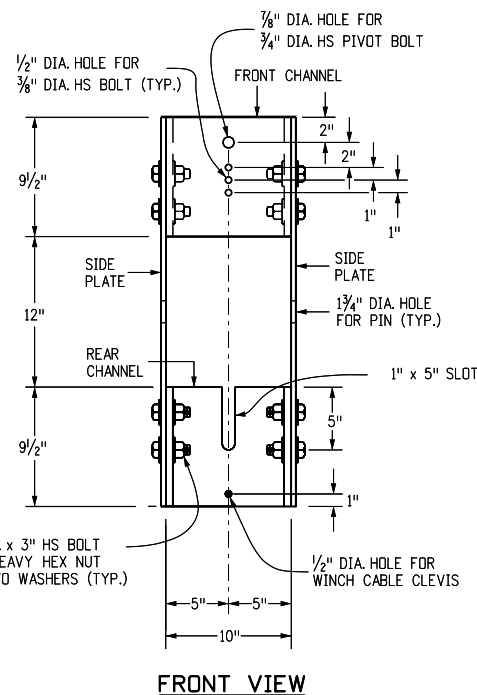
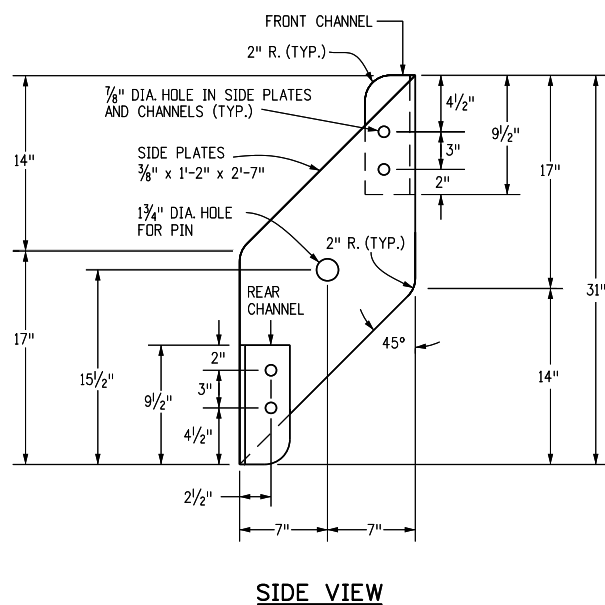
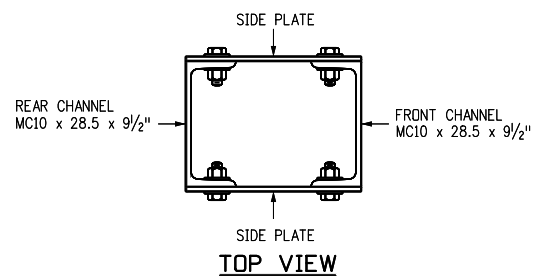
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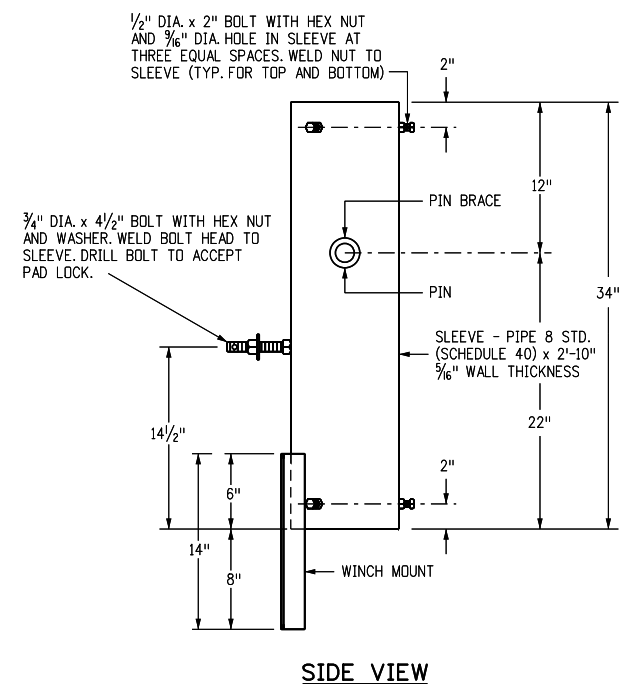
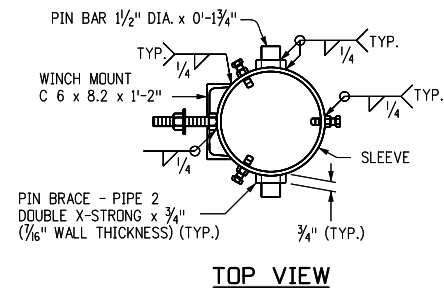
NOTE: PLACE THE BLACK AND WHITE "ROAD CLOSED" SIGN IN THE CENTER OF THE THROUGH LANE. THE SIGN LETTERS WILL BE 6" IN HEIGHT.



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GATE ARM PIVOT SIDE PLATE DETAIL

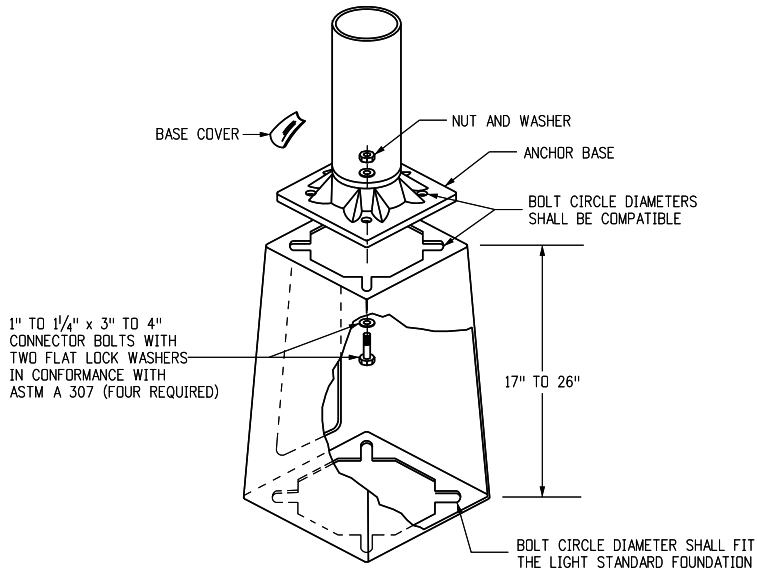


PIVOT SLEEVE DETAIL

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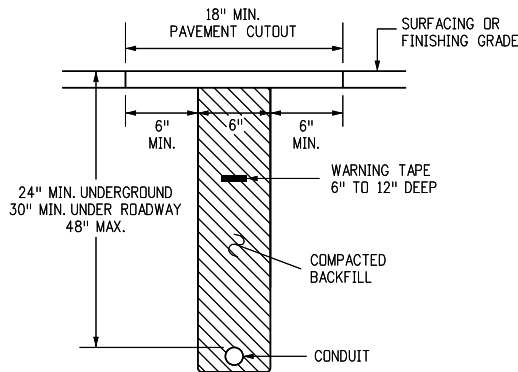
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Designer Initials: JBK		Comments _____		Denver, CO 80204				Standard Sheet No. 6 of 9	
Last Modification Date: 07/31/19		_____		Phone: 303-757-9021 FAX: 303-757-9868					
Detailer Initials: LTA		_____		Project Development Branch JBK					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		_____				Issued by the Project Development Branch: July 31, 2019		Project Sheet Number: _____	



TYPICAL BREAK-AWAY TYPE TRANSFORMER BASE DETAIL

NOTES:

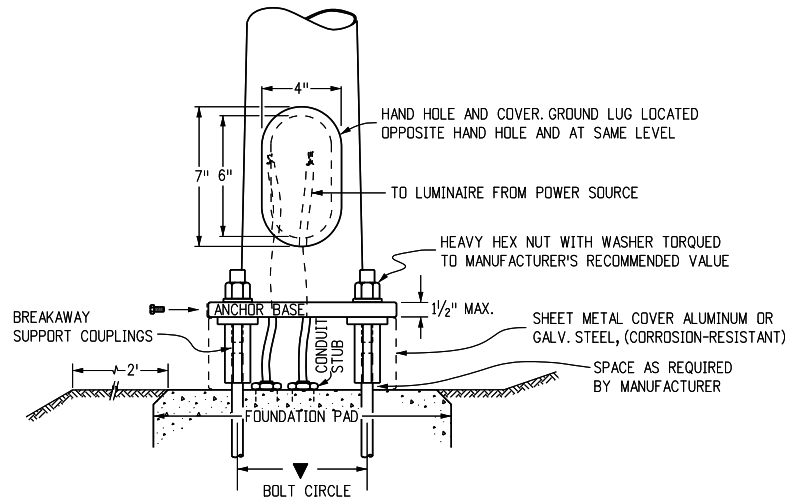
1. HARDWARE SHALL CONFORM TO MANUFACTURER'S REQUIREMENTS.
2. A HAND HOLE IS NOT REQUIRED IN POLE IF A BREAK-AWAY TRANSFORMER BASE IS USED.



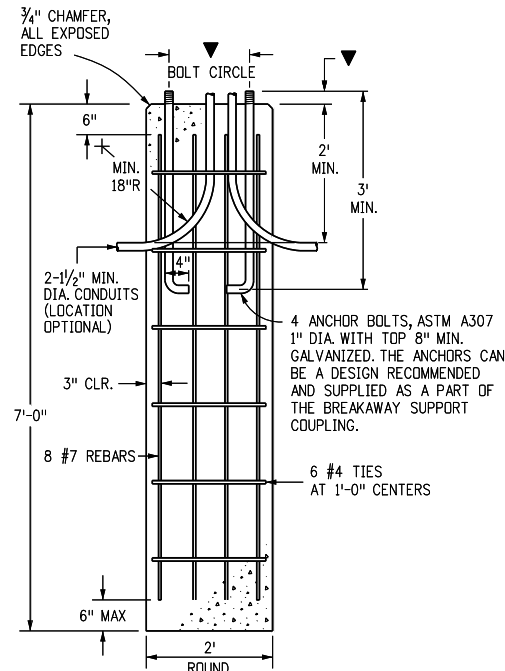
TYPICAL CONDUIT BURIAL SECTION

NOTES:

1. THE CONTRACTOR SHALL COORDINATE TRENCHING WITH OTHER UNDERGROUND UTILITIES, RAMP METERING, AND IRRIGATION. THE CONTRACTOR SHALL USE COMMON TRENCHES AT ALL ROAD CROSSINGS WHERE POSSIBLE.
2. ONE #14 AWG LOCATE WIRE AND A NYLON PULL STRING IN ALL EMPTY CONDUITS.



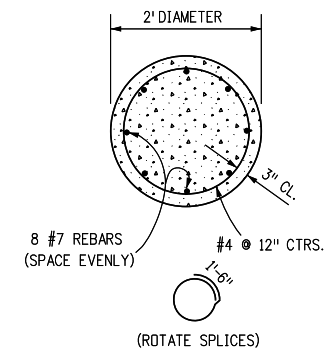
BREAK-AWAY SUPPORT COUPLING



TYPICAL CONCRETE FOUNDATION

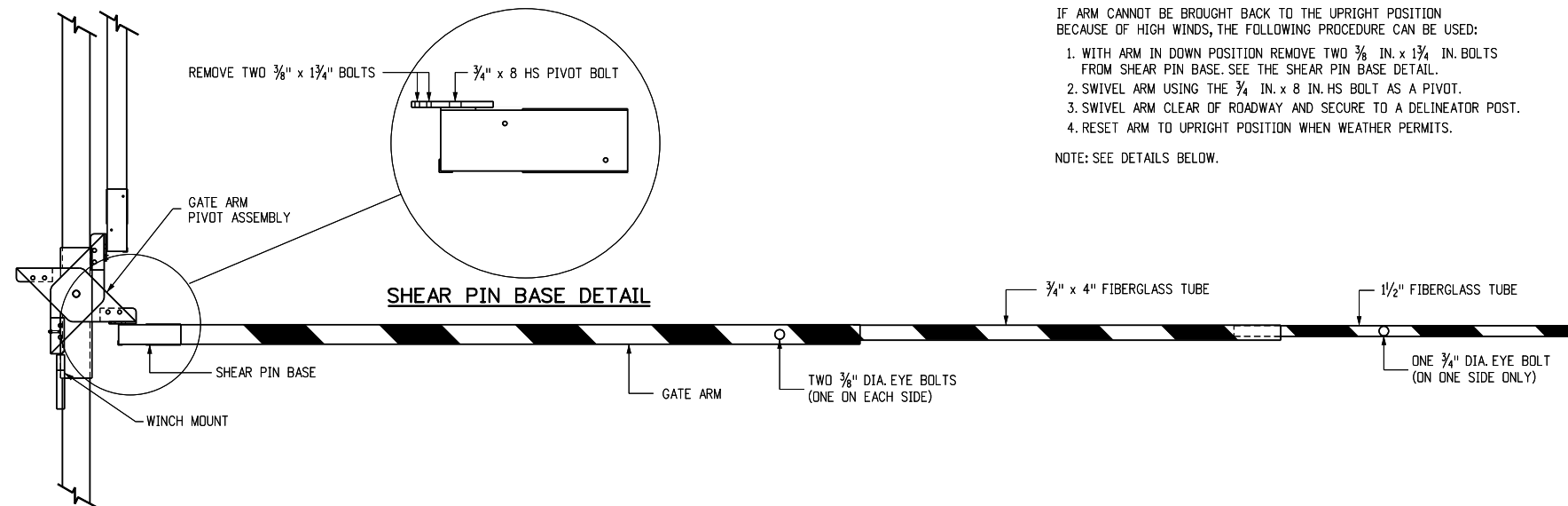
FOUNDATION NOTES

1. SEE POLE SUPPLIER DETAILS FOR BOLT CIRCLE AND PROJECTION.
2. ALL BREAKAWAY SUPPORT COUPLINGS SHALL MEET THE BREAKAWAY REQUIREMENTS STATED IN THE LATEST EDITION OF AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS".
3. BREAKAWAY SUPPORT COUPLINGS SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL HAVE A COUPLING MANUFACTURER'S REPRESENTATIVE ON THE PROJECT PRIOR TO CONSTRUCTION TO INSTRUCT THE CONTRACTOR AND PROJECT PERSONNEL IN THE PROPER INSTALLATION OF THE BREAKAWAY SUPPORT COUPLINGS.
4. LIGHT STANDARD FOUNDATIONS MAY BE PRECAST CONCRETE OR CAST-IN PLACE CONCRETE.
5. CONCRETE SHALL BE CLASS B.
6. EACH LIGHT STANDARD SHALL BE WIRED WITH A BREAKAWAY FUSED CONNECTOR AND BE GROUNDED AS STATED IN THE SPECIFICATIONS.
7. LIGHT STANDARDS SHALL NOT BE PLACED IN DITCHES OR OTHER LOW AREAS. EMBANKMENT AND BACKFILL SHALL BE COMPACTED IN CONFORMANCE WITH SECTION 203.
8. THE PHYSICAL SHAPES OF THE POLE CAPS, BRACKETS, AND CONCRETE PULL BOXES SHALL BE CONSIDERED APPROXIMATE AS SHOWN.
9. ALL NUTS, BOLTS, STUDS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH AASHTO M 232 (ASTM A 153).



TYPICAL FOUNDATION SECTION

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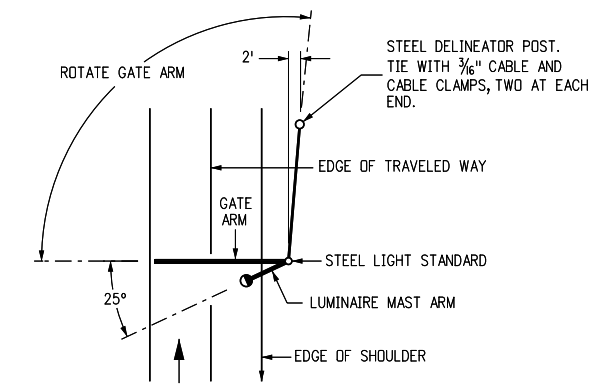


HIGH WIND STOWING PROCEDURE

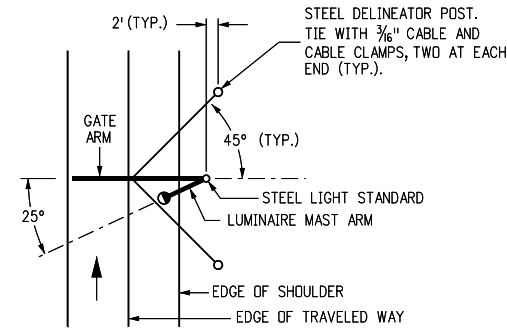
- IF ARM CANNOT BE BROUGHT BACK TO THE UPRIGHT POSITION BECAUSE OF HIGH WINDS, THE FOLLOWING PROCEDURE CAN BE USED:
1. WITH ARM IN DOWN POSITION REMOVE TWO $\frac{3}{8}$ IN. x $1\frac{3}{4}$ IN. BOLTS FROM SHEAR PIN BASE. SEE THE SHEAR PIN BASE DETAIL.
 2. SWIVEL ARM USING THE $\frac{3}{4}$ IN. x 8 IN. HS BOLT AS A PIVOT.
 3. SWIVEL ARM CLEAR OF ROADWAY AND SECURE TO A DELINEATOR POST.
 4. RESET ARM TO UPRIGHT POSITION WHEN WEATHER PERMITS.

NOTE: SEE DETAILS BELOW.

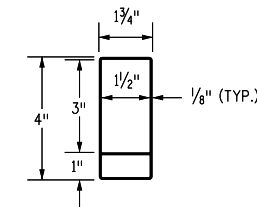
GATE ARM PROFILE



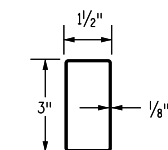
DETAIL FOR HIGH WIND STOW POSITION



DETAIL TO SECURE GATE IN HIGH WIND

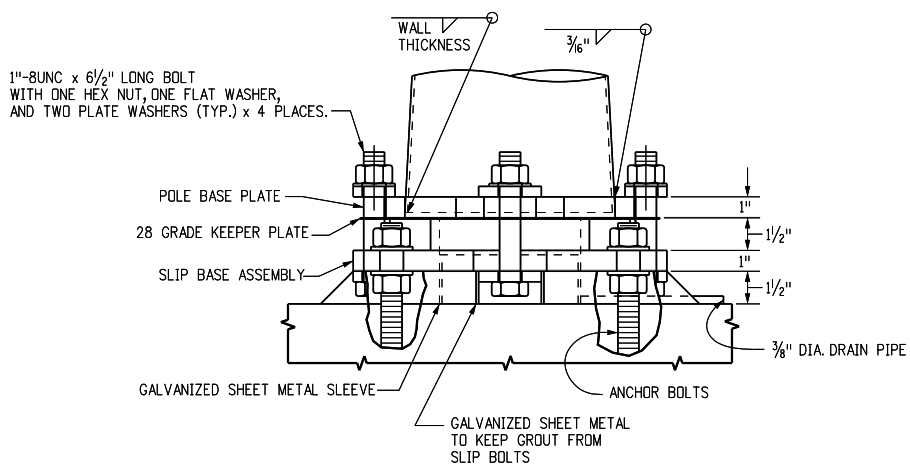


SECTION $1\frac{3}{4}$ IN. x 4 IN. FIBERGLASS TUBE



SECTION $1\frac{1}{2}$ IN. x 3 IN. FIBERGLASS TUBE

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**BREAK-AWAY BASE
(FOR INFORMATION ONLY)**

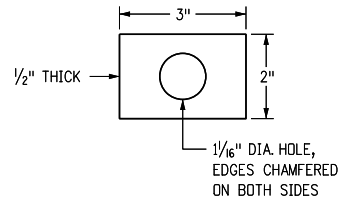
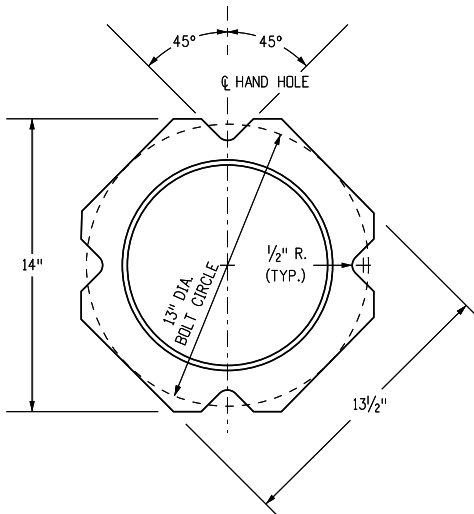
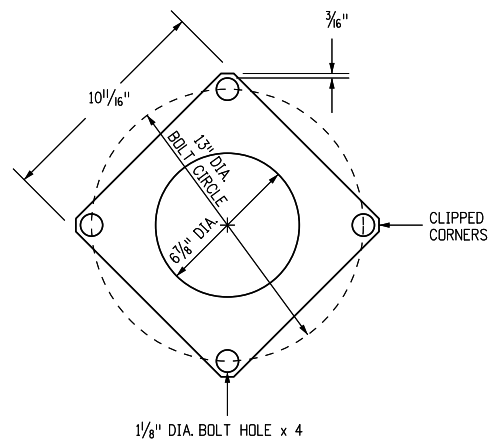


PLATE WASHER

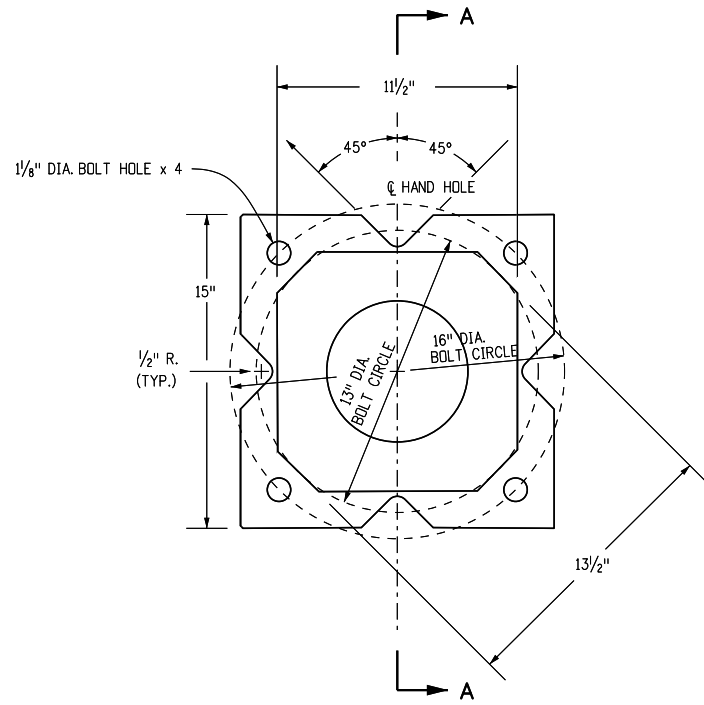
- NOTES**
1. POLE BASE PLATE SHALL CONFORM TO ASTM A 572, GRADE 42.
 2. BOTTOM PLATE OF SLIP BASE ASSEMBLY SHALL CONFORM TO ASTM A 572, GRADE 50.
 3. ALL STRUCTURAL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN CONFORMANCE WITH ASTM A 123. ALL CONTACT AREAS OF THE STRUCTURAL STEEL SHALL BE FREE OF GALVANIZING BEADS AND RUNS.
 4. SLIP BASE CONNECTING HARDWARE SHALL CONFORM TO ASTM A 325, AND SHALL BE ELECTROPLATED CADMIUM IN CONFORMANCE WITH ASTM B 766 TYPE NS.
 5. KEEPER PLATE SHALL CONFORM TO ASTM A 653, GRADE 33, AND COATING G 90.



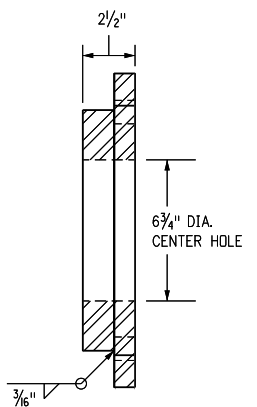
LIGHT STANDARD BASE PLATE



28 GRADE KEEPER PLATE



SLIP BASE ASSEMBLY



SECTION A-A

OPTIONAL BREAK-AWAY TYPE BASE

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