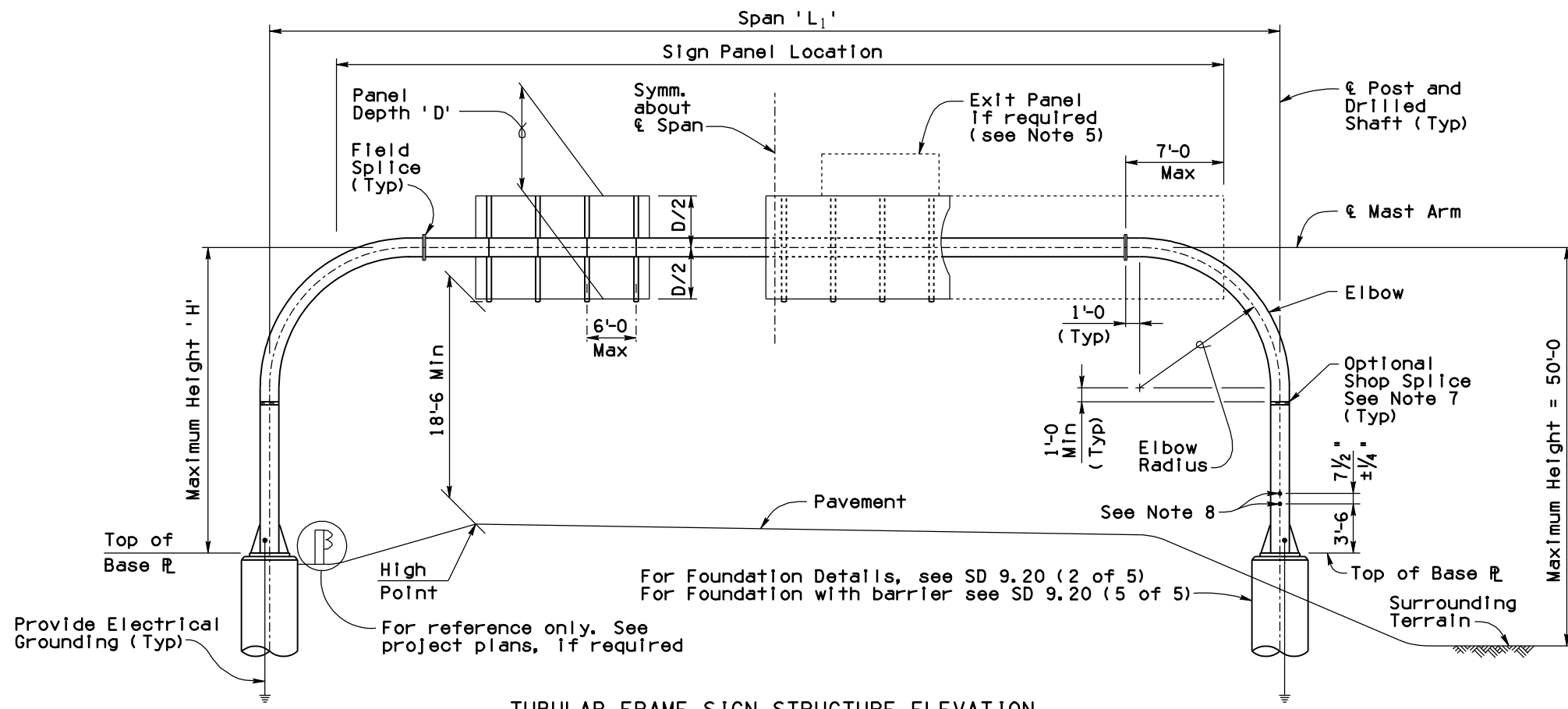


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TUBULAR FRAME SIGN STRUCTURE ELEVATION

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) with 2015 Interim Revisions

All tubular structural cantilever pipe shall be welded or seamless steel pipe and shall conform to ASTM Specification (Fy = 35,000 psi):
 A-53 Grade B, Type E or S
 A252 Grade 2, Type E or S
 A106 Grade B, Type S only
 API 5L Grade B, Type E or S
 API 5LX Grade X42, Type E or S

All other Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.

All bolts shall conform to ASTM Specification F3125 GR A325.

All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Welding of structural tubing shall conform to the requirements of the American Welding Society, Structural Welding Code, D1.1, latest Edition.

All welding shall be continuous unless noted otherwise. All butt welds shall be full penetration using prequalified welding procedures and shall be tested by ultrasonic testing. All butt welds shall be ground flush, full width.

Grinding striations shall be parallel to the length of member.

The Column to base plate weld (WELD DETAIL A) and pipe flange to elbow and mast arm welds (WELD DETAIL C) shall be tested by ultrasonic testing. Any detected shallow toe cracks shall be repaired in the shop.

All Concrete shall be Class "S" (f'c = 3500 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All hooks and bends shall meet the requirements of AASHTO 8th Edition (2017) Article 5.10.2. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

Dimensions shall not be scaled from drawings.

Drilled shaft location and top of drilled shaft elevation shall be field verified by the Contractor prior to fabrication of post.

TUBULAR FRAME DATA FOR SIGN PANEL SUPPORT													
TUBULAR FRAME					PIPE WALL THICKNESS (INCHES)			SIGN PANEL		PAYMENT ITEMS			
Frame Type	Frame Span 'L1'	Nominal Pipe Dia	90° Elbow Radius	Max Height 'H'	Post	Elbow	Mast Arm	Max Area Sq. Ft.	Max Depth 'D'	BRIDGE SIGN STRUCTURE		FOUNDATIONS	
										Item Number	Measurement	Item Number	Measurement
1F	20' - 70'	12"	10'-0	28'-0	1.312	1.312	1.000	250	8'	6060045	Ea	6060075	Ea
2F	41' - 70'	16"	10'-0	30'-0	1.219	1.219	0.500	690	12'	6060046	Ea	6060076	Ea
3F	71' - 110'	20"	12'-0	30'-0	1.280	1.280	0.625	920	12'	6060047	Ea	6060078	Ea
4F	111' - 142'	22"	12'-0	30'-0	1.125	1.125	0.875	920	12'	6060048	Ea	6060079	Ea

OVERHEAD SIGN NOTES:

1. Wind Loading: 90 MPH Velocity
2. Maximum Height: 50'-0 from average surrounding terrain to the center of the mast arm (Regardless of post height). The Tubular Overhead has been designed for site conditions which are level and neither elevated above the average surrounding terrain by more than the 50'-0 height shown nor supported on a bridge.
3. Maximum difference between post heights for an individual frame = 5'-0.
4. The maximum sign panel overlap onto elbow shall not exceed 7'-0 from field splice.
5. The sum of the sign panel area plus the exit panel area shall not exceed the maximum area shown in table. All signs shall be placed within Sign Panel Location.
6. For Standard pipe mast arms with lengths greater than 60'-0 an optional field splice will be permitted at the third points of mast arm length to facilitate hauling operations. All additional field splices in the Mast Arm proposed by the fabricator will not be allowed.

7. The Optional Shop Splice may not be used when the splice location is less than 5'-0 above the top of base plate. Shop splice of pipe sections (other than shown) are not permitted without prior approval.
8. Drill and tap for 1 1/2" chase nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. Install nipples on shoulder posts only.
9. Before any portion of the tubular frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame in the no load condition is equal to (+/- 1/2 inch) the field measured span length between foundations.
10. If the tubular frame is erected as one unit the frame shall be adequately suspended to avoid distortions or changes in span length between base plates.
11. The Field Splice surfaces shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1 3/8" radius around each bolt.
12. Provide electrical grounding at pole foundations per ADOT Standard Specification Section 732-3.03.

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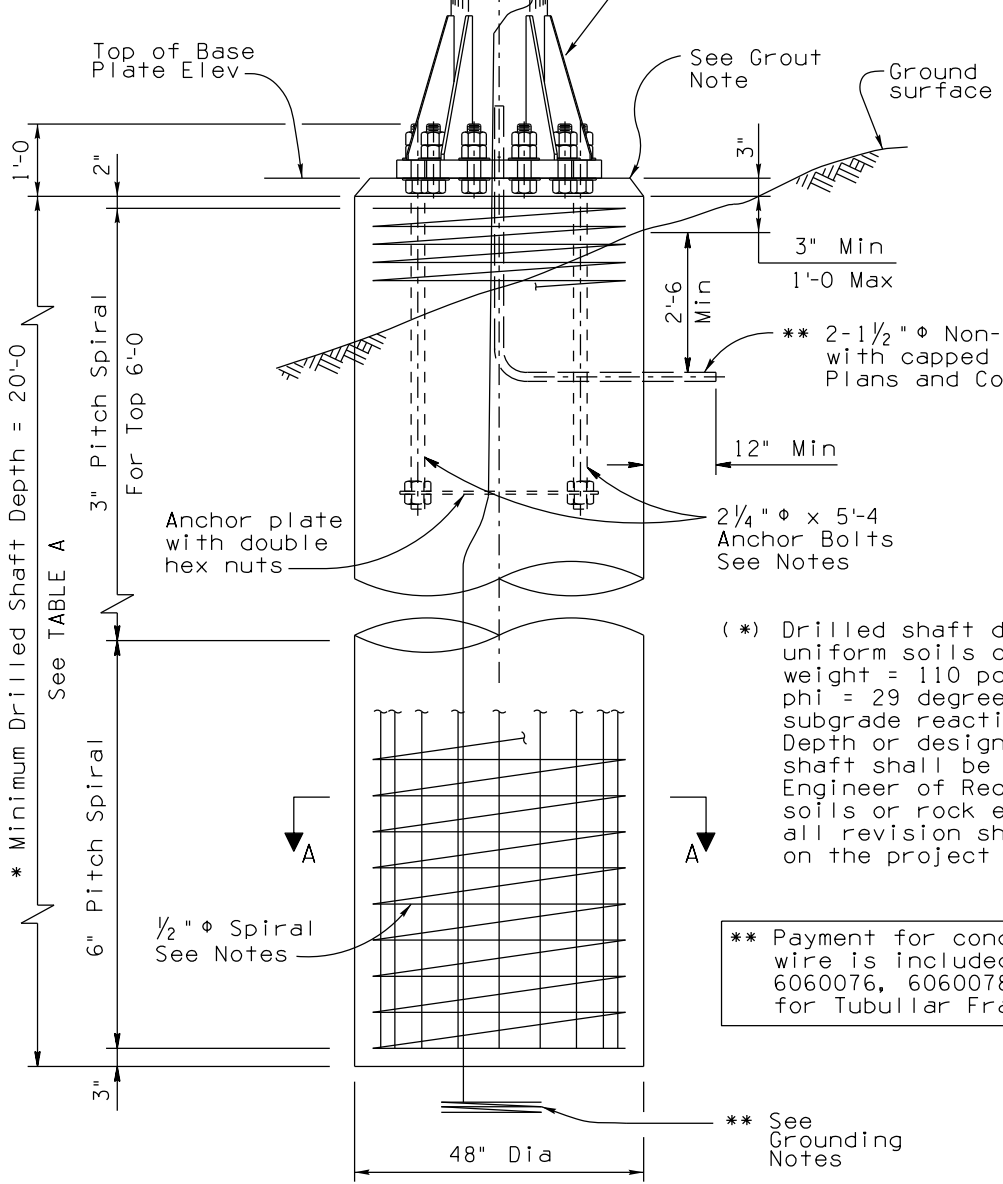
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 BRIDGE GROUP STANDARD DRAWING

TUBULAR SIGN STRUCTURES
 TUBULAR FRAME
 GENERAL PLAN

DRAWING NO.
 SD 9.20
 (1 of 5)

HARDWARE NOTE:

Provide 2 Hardened Steel washers, 2 Hex nuts and one Leveling nut for each bolt. At final position of post, all top and bottom nuts of anchor bolts shall be snug tightened against base plate



(*) Drilled shaft depth is based on uniform soils condition with unit weight = 110 pcf, friction angle ϕ = 29 degrees, modulus of subgrade reaction $K=50$ psf/ft. Depth or design of the drilled shaft shall be revised by the Engineer of Record for weaker soils or rock embedment, and all revision shall be shown on the project plans.

** Payment for conduits and grounding wire is included in pay items 6060075, 6060076, 6060078, and 6060079 Foundation for Tubular Frame Sign Structure.

** See Grounding Notes

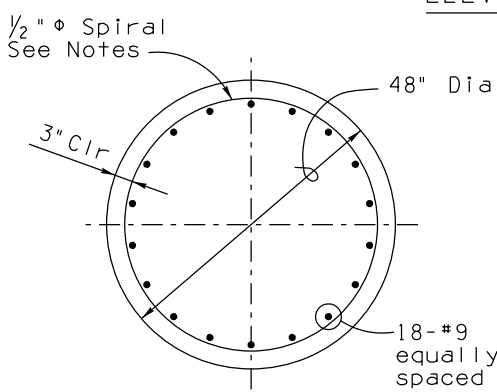
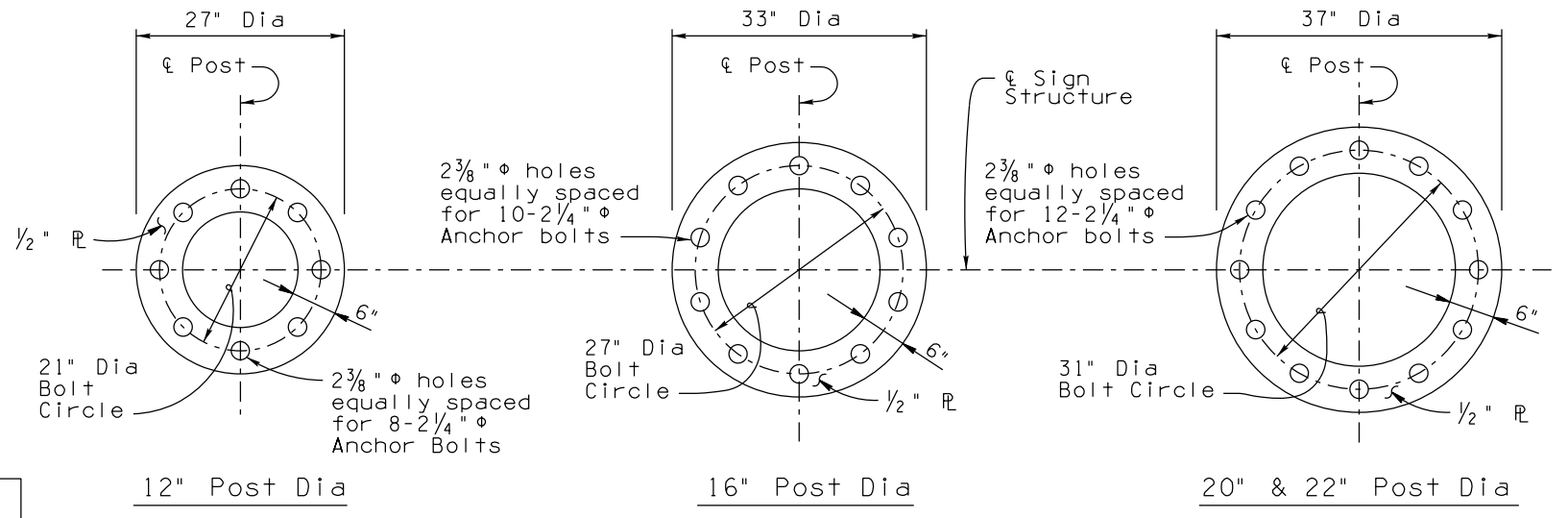
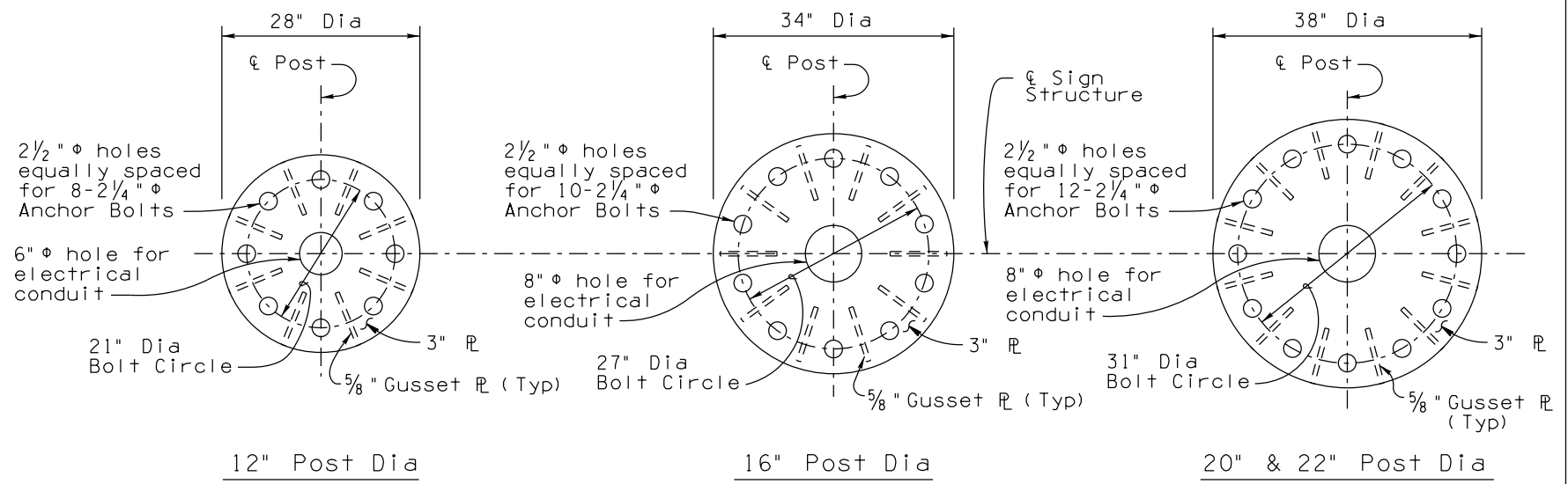


TABLE A	
Max Slope	' X'
8:1	0'
6:1	1'
4:1	2'
2:1	4'
1 1/2:1	5'
1:1	8'

Drilled Shaft Depth shall be adjusted for ground slope. Add value of 'X' in TABLE A to the minimum Drilled Shaft Depth to obtain the total length of shaft



GUSSET PLATE NOTES:

Gusset plates shall be placed perpendicular to base plate and post face, and centered between anchor bolt holes.

Gusset Plate Details are shown on SD 9.20 (3 of 5).

CONDUIT NOTE:

If the project plans do not callout for the installation of a conduit, 2-1/2" diameter non-metallic conduits shall be stubbed out 30" below grade. The stubbed conduits shall be perpendicular to traffic direction to the non-traffic side, be a minimum of 12" from edge of foundation cap, and the conduit ends shall be capped.

GROUNDING NOTES:

A 25 feet long coil of No. 4 AWG bare copper grounding wire shall be installed before concrete is poured and shall be connected to the post grounding screw in the hand hole.

The grounding wire shall be installed on the outside of the conduit.

GROUT NOTE:

Space to be filled with non-shrink grout after tubular structure is permanently erected.

NOTES:

All anchor bolts shall conform to ASTM F1554 Grade 55 Specifications. The upper 1'-2 and lower 6" shall be threaded. The upper 1'-8 shall be galvanized in accordance with the requirements of ASTM A153.

Provide bolt template during installation of anchor bolts. The bolt template shall be fabricated of 1/4" thick (Min) steel plate, similar to anchor plate details, and both the bolt template and the anchor plate shall be drilled to match the base plate.

Drilled shaft concrete shall be class 'S' and shall be placed within undisturbed material or compacted embankment. Top of drilled shaft shall be formed to 1'-0 below ground surface.

Compacted finished grade backfill or embankment shall be in place prior to erecting the post.

1/2" ϕ Spiral shall be cold drawn steel wire conforming to AASHTO M336, except Min Tensile Strength is 60,000 psi. Lap 1 1/2 turns at top and bottom of spiral.

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RECOMMENDED FOR APPROVAL GROUP MANAGER D. EBERHART	
APPROVED	TUBULAR SIGN STRUCTURES TUBULAR FRAME FOUNDATION DETAILS
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION	DRAWING NO. SD 9.20 (2 of 5)

03/22
DATE

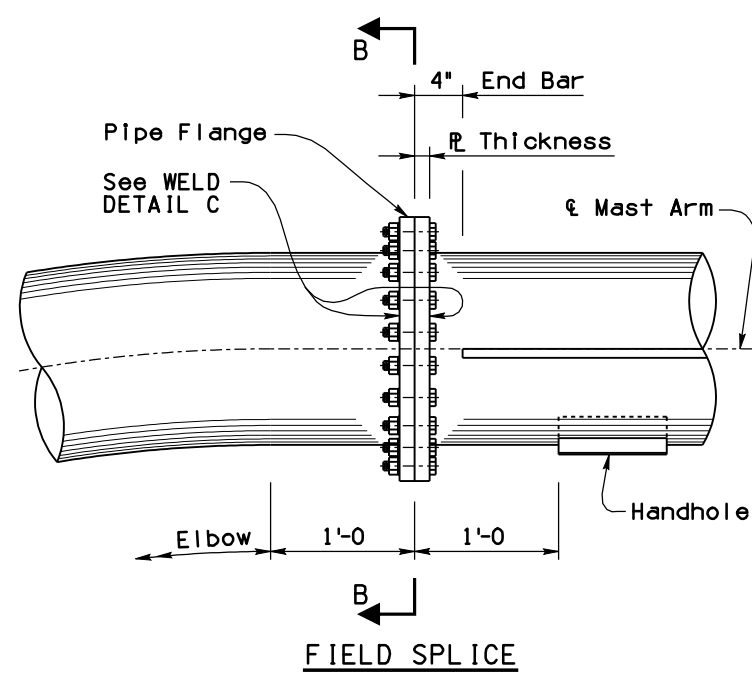
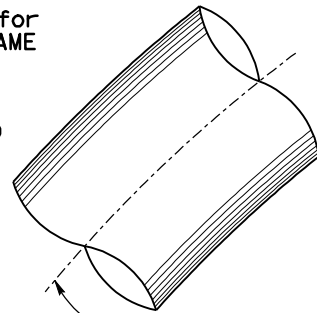
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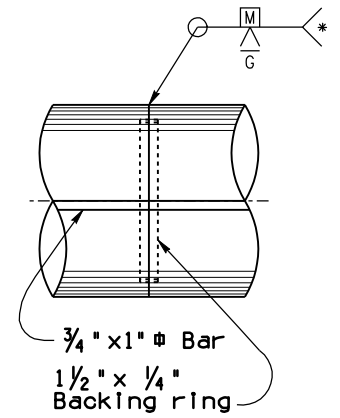
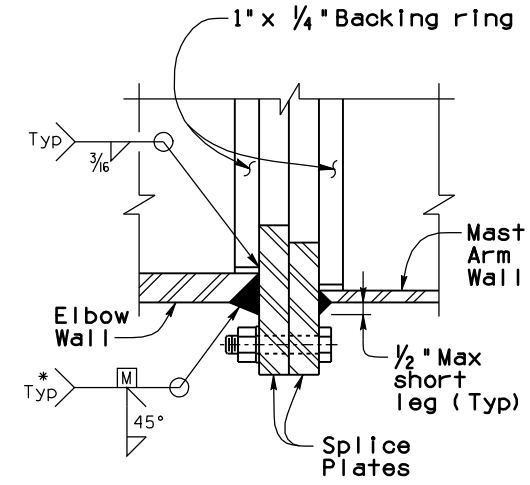
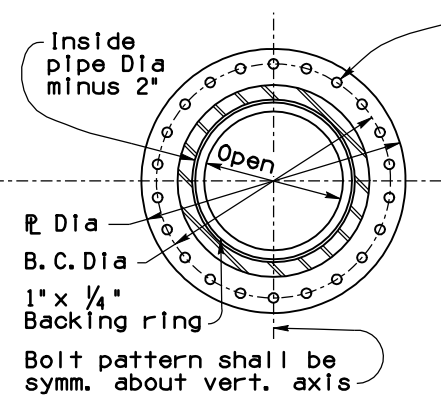
Field Splice					
Frame Type	Pipe Dia	R Dia	R Thickness	No. of Bolts	B. C. Dia
1F	12"	18"	1"	16	15½"
2F	16"	22"	1¼"	22	19½"
3F	20"	26"	1⅜"	29	23½"
4F	22"	28"	1½"	31	25½"

NOTE:

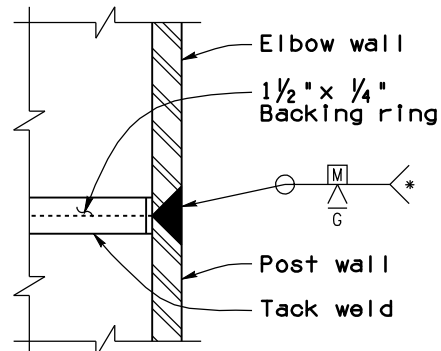
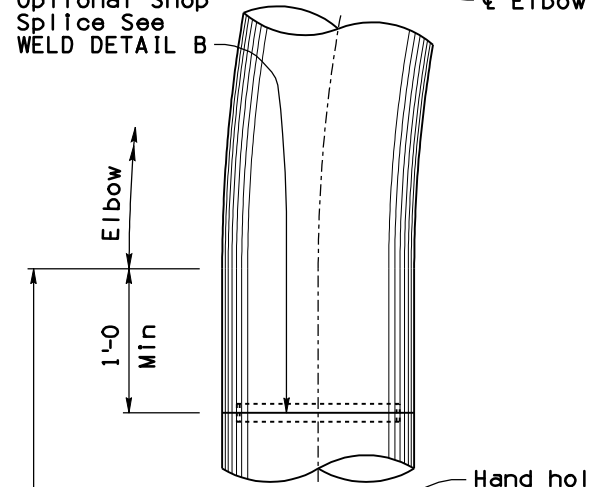
Provide hand holes for TUBULAR OVERHEAD FRAME on one side only. For HAND HOLE & COVER DETAILS See SD 9.20 (4 of 5)



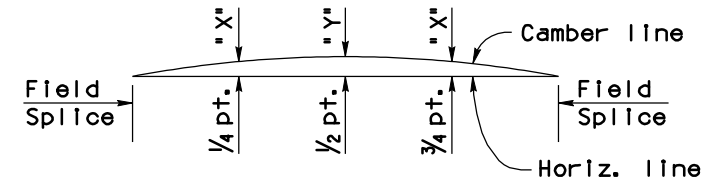
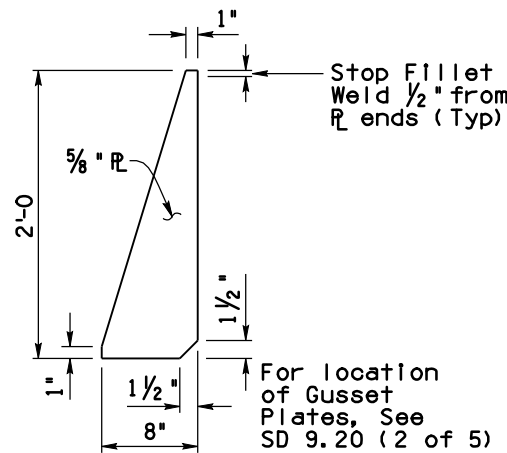
¾" φ ATSM F3125 GR A325 bolts equally spaced. Bolt hole Dia = ⅞". Tighten bolts to a tension of 28K. All F3125 GR A325 bolts shall be installed in accordance with ADOT Standard Specification 604-2.03(c). See Field Splice Table for other details



Optional Shop Splice See WELD DETAIL B



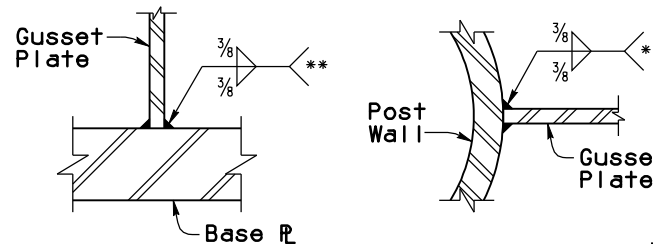
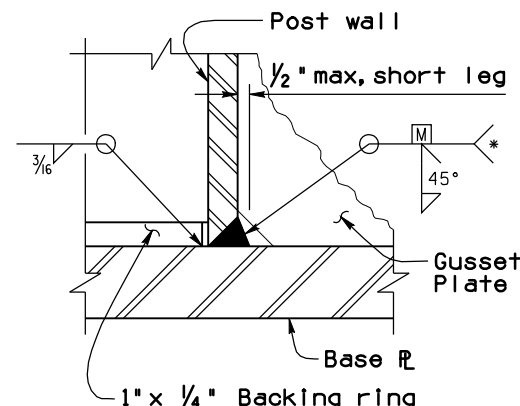
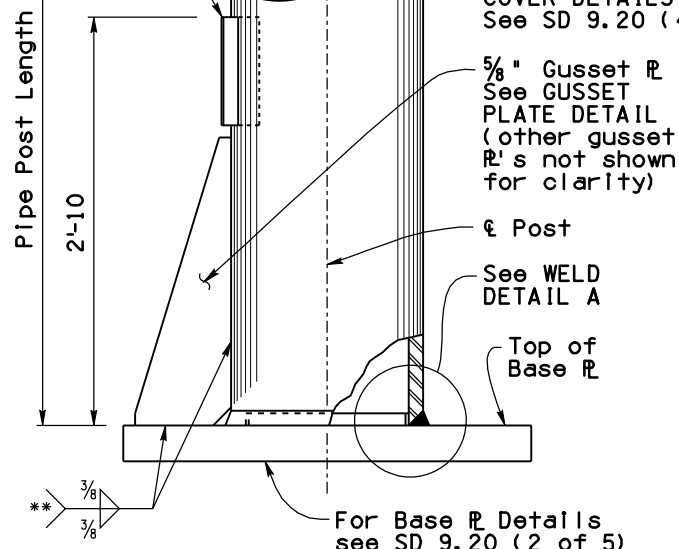
Hand hole (Facing away from traffic) For HAND HOLE & COVER DETAILS See SD 9.20 (4 of 5)



Camber shown is required to be built into horizontal members. Members shall be erected so that camber is provided above the Horizontal line

TUBULAR FRAME CAMBER (INCHES)											
Frame Type	1F	1F	2F	2F	2F	3F	3F	3F	4F	4F	4F
Span	40'-0"	70'-0"	46'-0"	58'-0"	70'-0"	82'-0"	94'-0"	106'-0"	118'-0"	130'-0"	142'-0"
"X"	¾"	2"	½"	1"	1½"	1¾"	2½"	3½"	4"	6"	7¾"
"Y"	1½"	2½"	¾"	1¼"	2"	2¼"	3½"	4¾"	6"	8¼"	11¼"

Calculated camber provides for deflections due to dead load of tubular structure and dead loads due to sign panels and attachments. For spans other than shown, interpolate for "X" and "Y" dimensions



* Preheat per AWS requirements

** Stop Fillet Weld ½" from R ends

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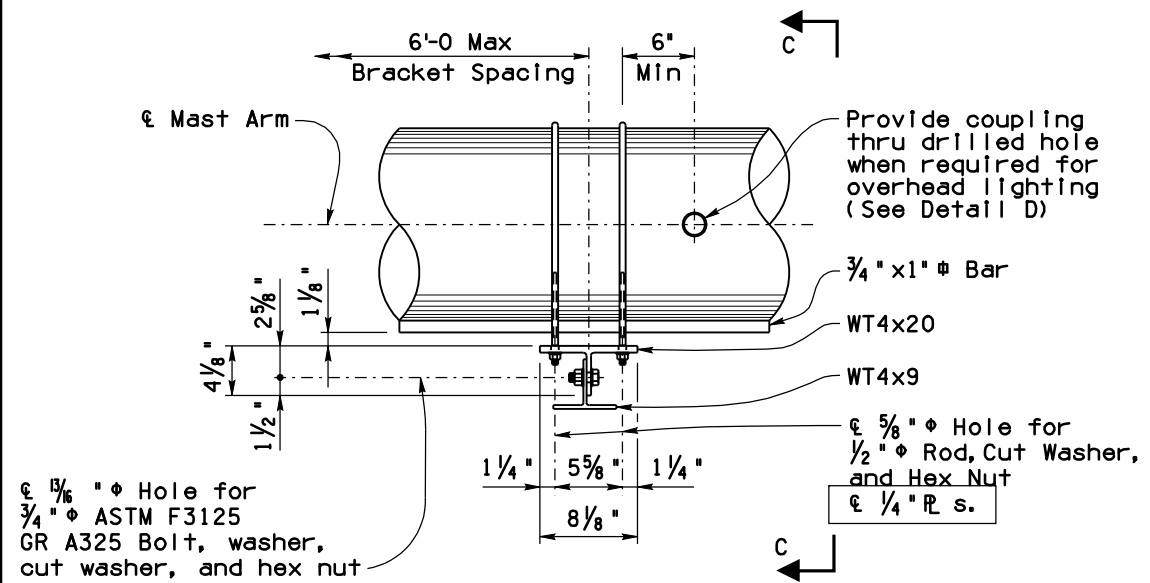
TUBULAR SIGN STRUCTURES
TUBULAR FRAME
POST AND MAST ARM DETAILS

DRAWING NO.
SD 9.20
(3 of 5)

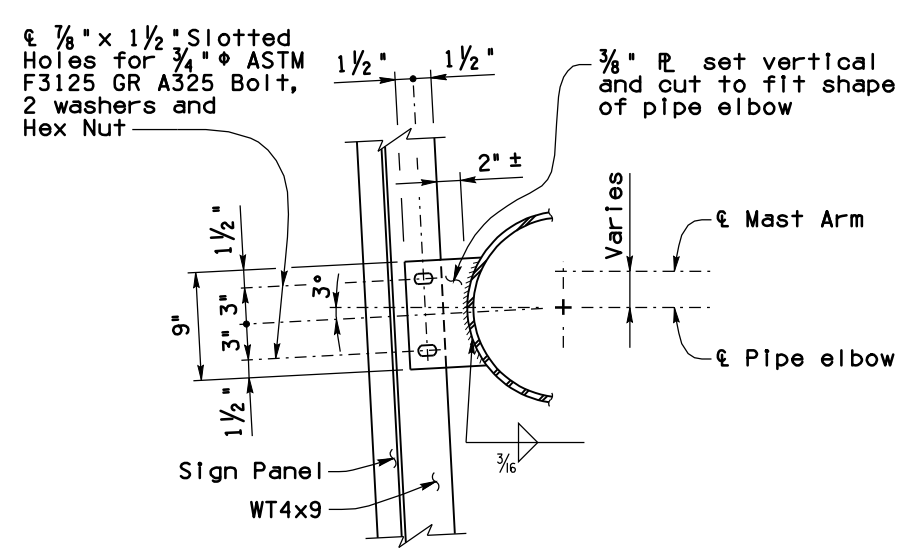
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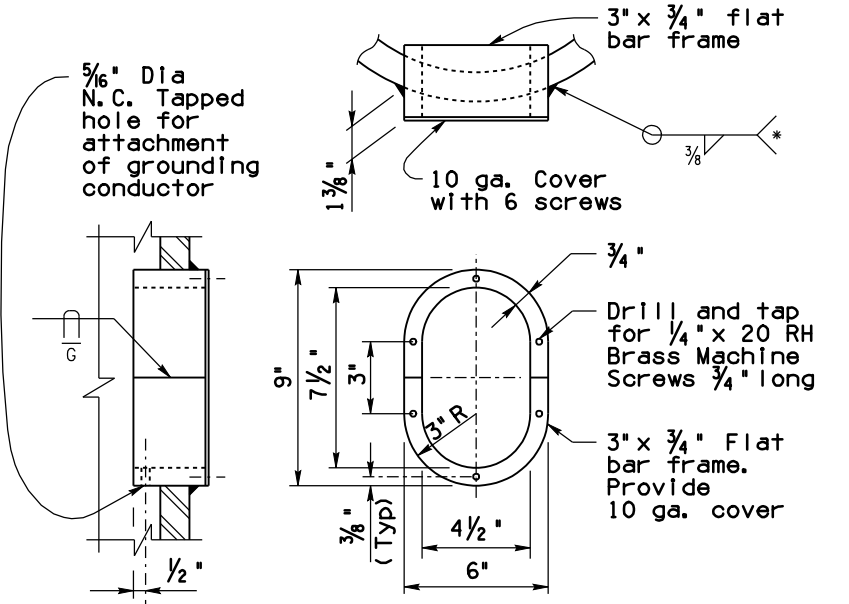
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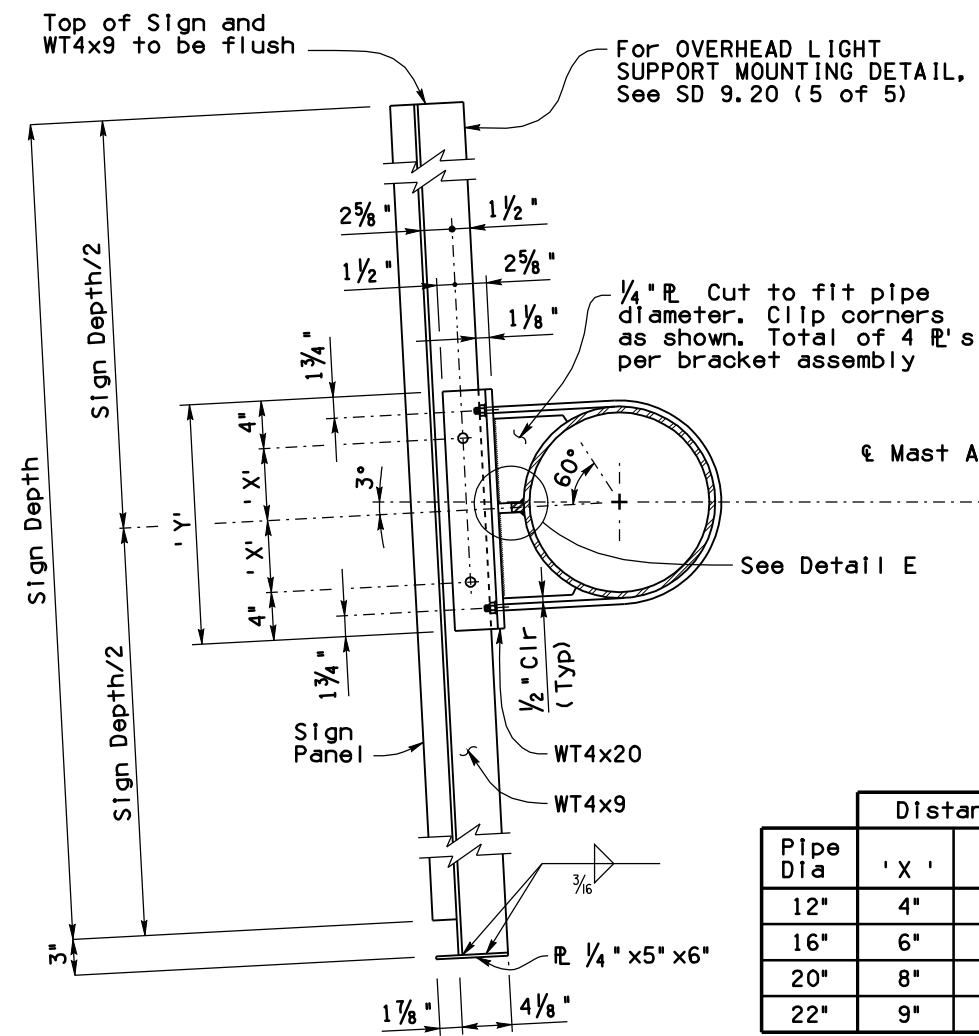
PLAN
SIGN MOUNTING BRACKET



ELEVATION
SIGN MOUNTING BRACKET AT ELBOW

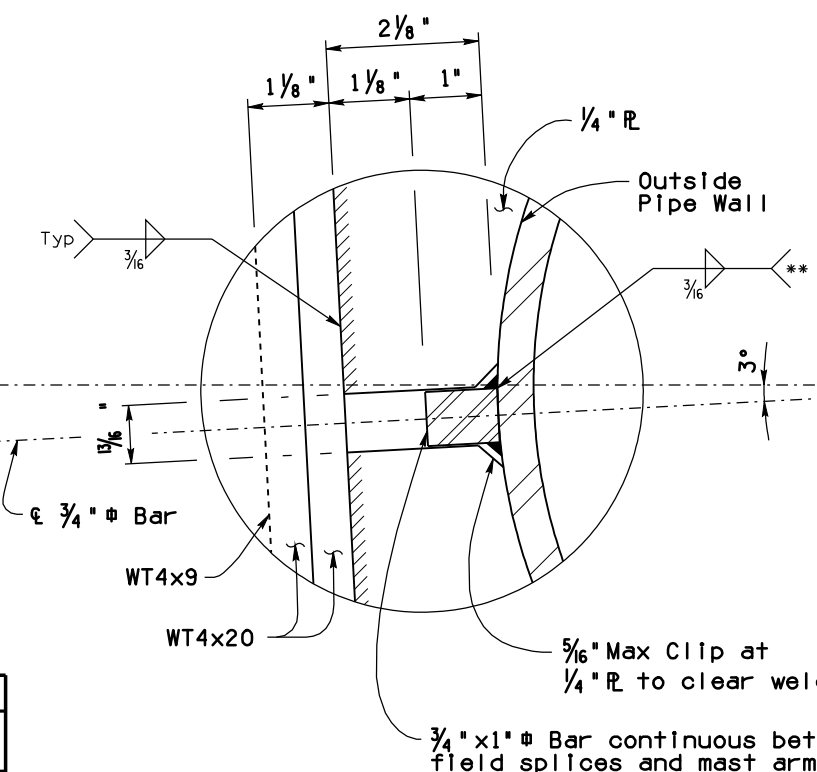


HAND HOLE & COVER DETAILS



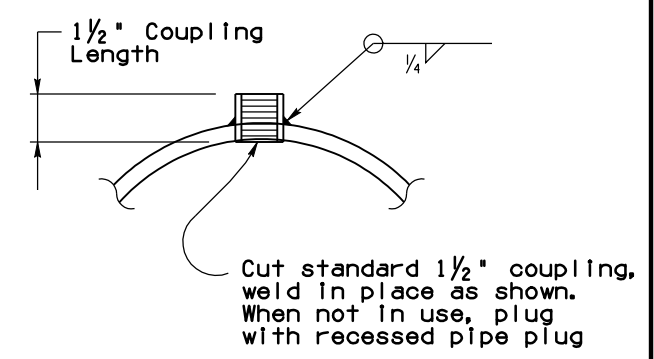
ELEVATION C-C

Pipe Dia	Distance	
	'X'	'Y'
12"	4"	1'-4"
16"	6"	1'-8"
20"	8"	2'-0"
22"	9"	2'-2"



DETAIL E

* Preheat per AWS requirements



DETAIL D

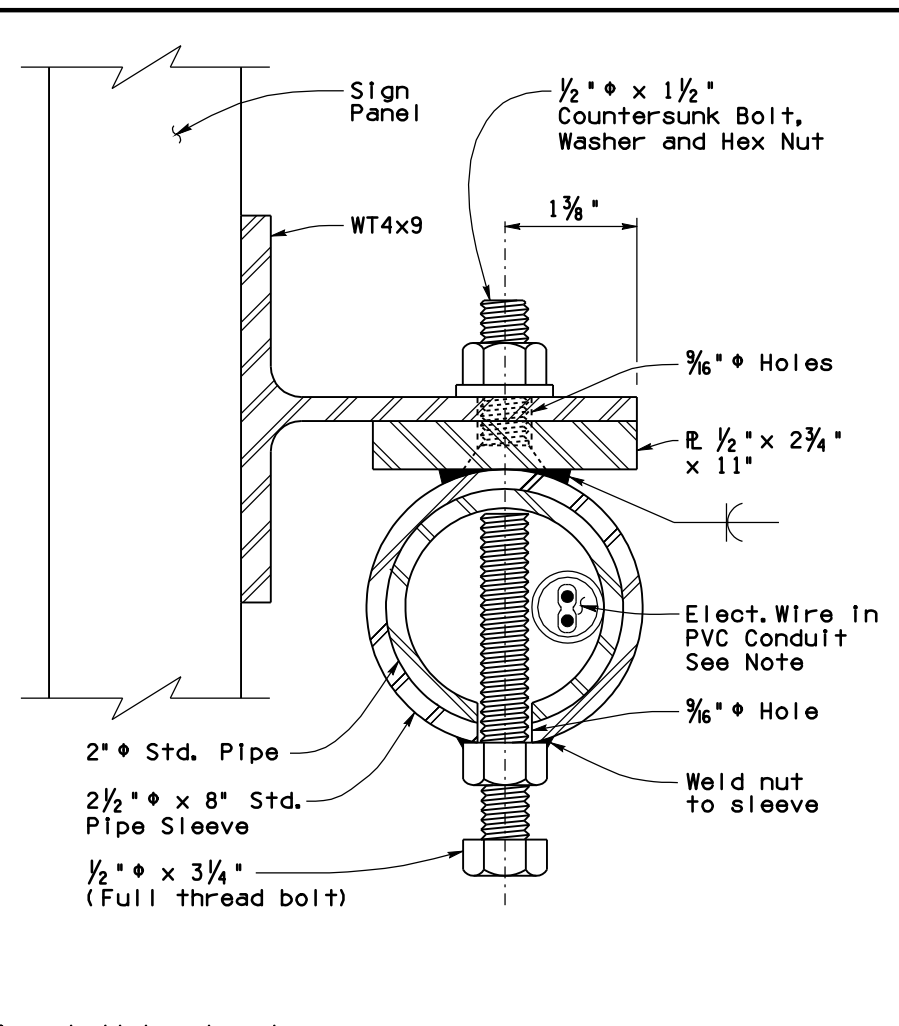
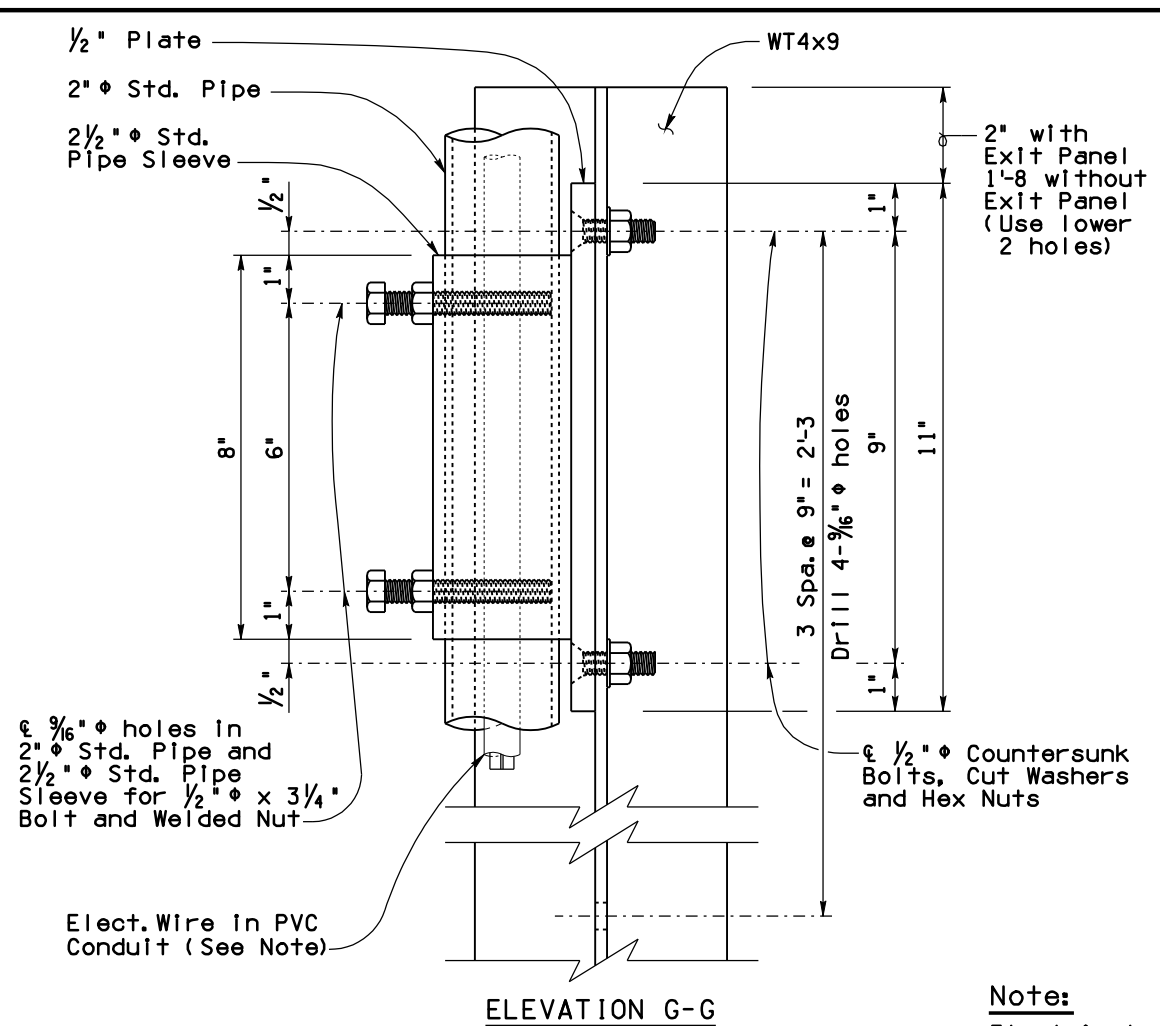
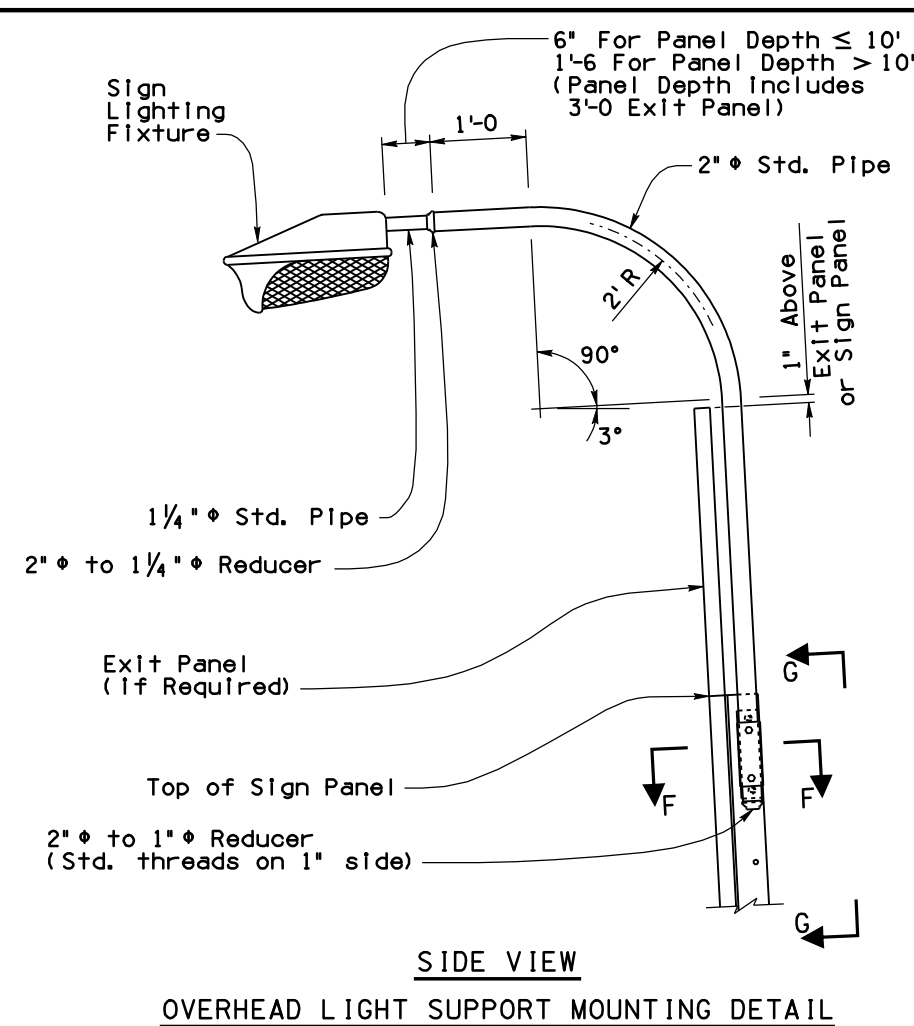
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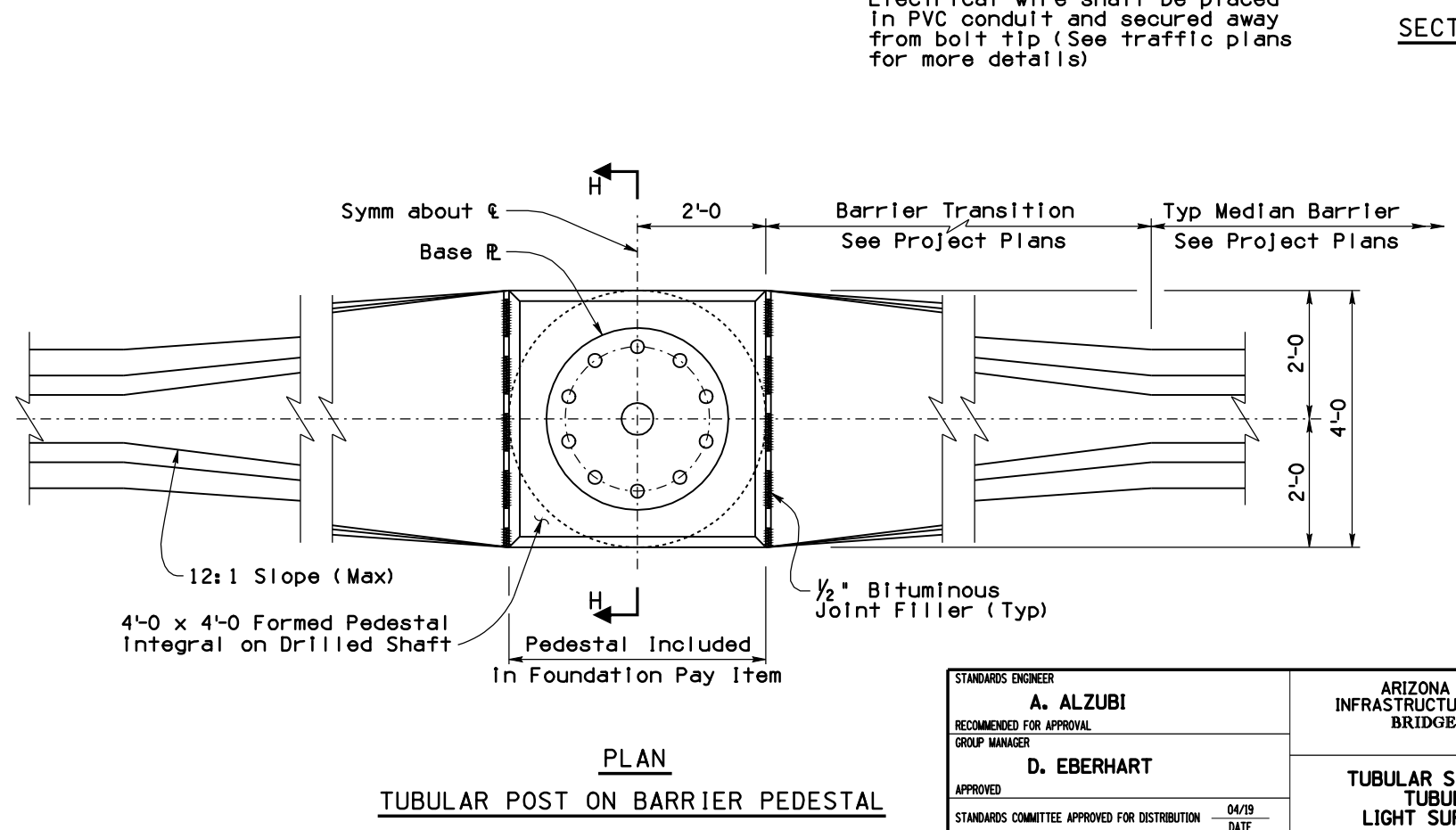
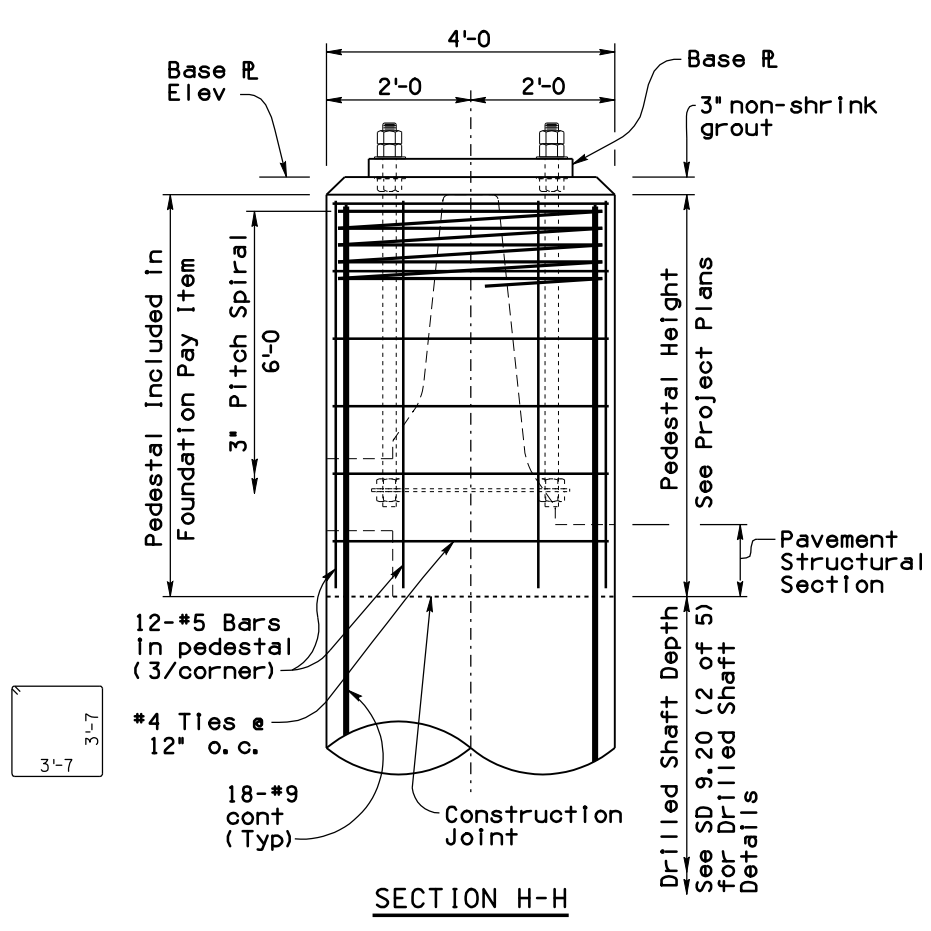
TUBULAR SIGN STRUCTURES
TUBULAR FRAME
SIGN SUPPORT DETAILS

DRAWING NO.
SD 9.20
 (4 of 5)

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Note:
 Electrical wire shall be placed in PVC conduit and secured away from bolt tip (See traffic plans for more details)



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 TUBULAR FRAME
 LIGHT SUPPORT DETAILS**
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**SD 9.20
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