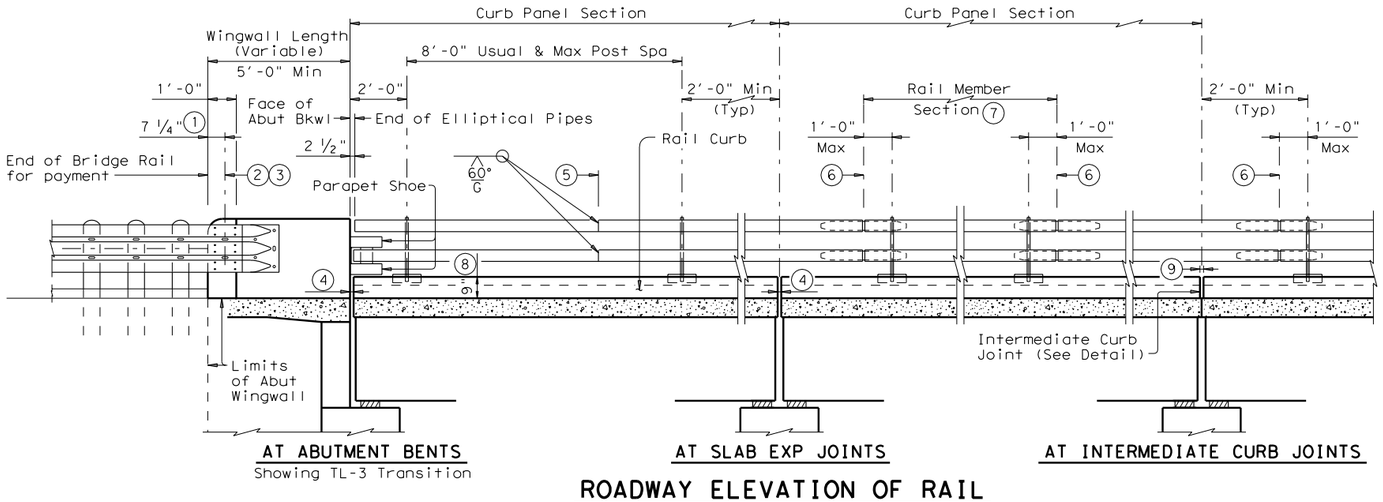
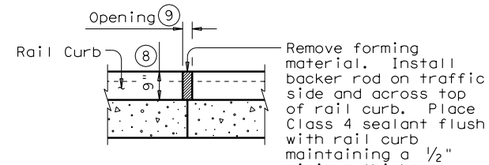
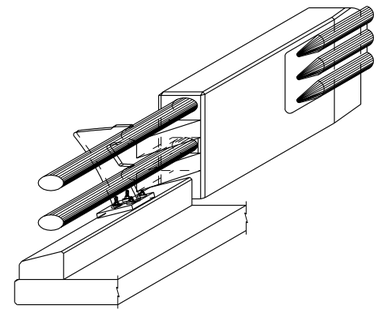


ROADWAY ELEVATION OF RAIL



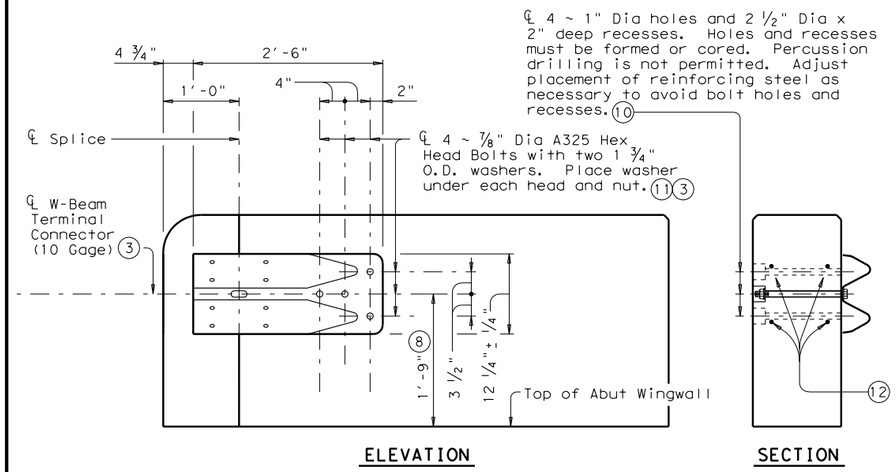
INTERMEDIATE CURB JOINT DETAIL

Note: Provide intermediate curb joints at all interior bents without expansion joints. Center on slab construction or controlled joint if present.

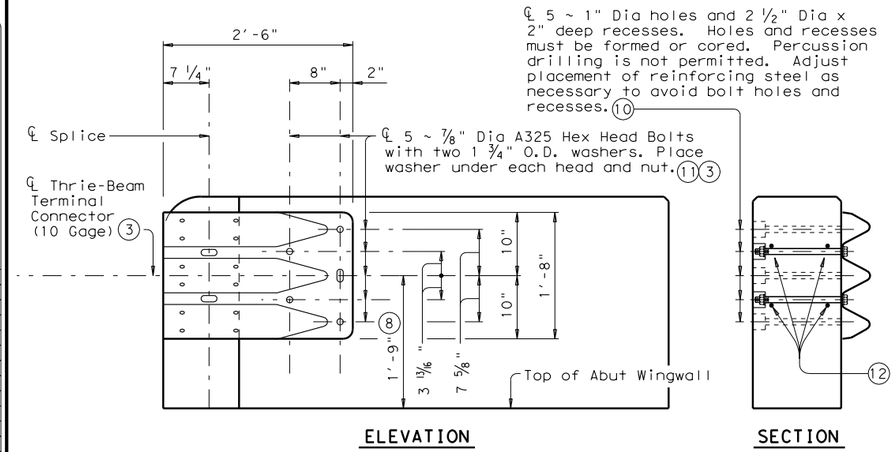


ISOMETRIC VIEW AT END OF BRIDGE

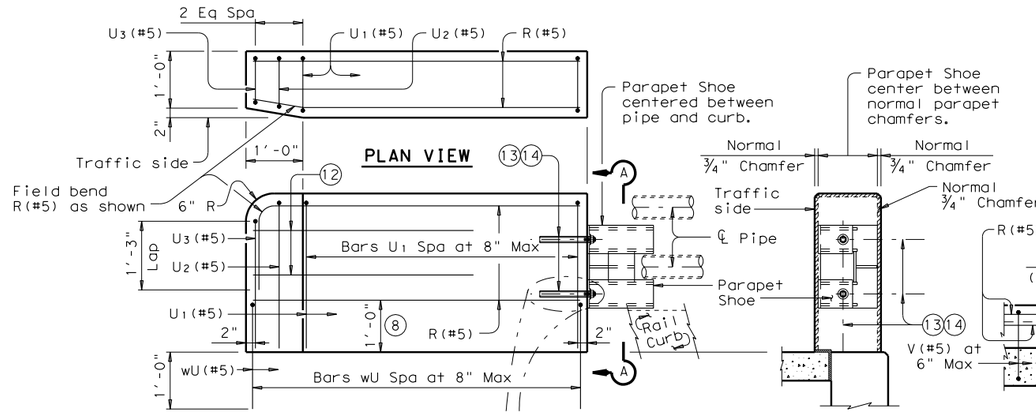
Showing TL-3 Transition



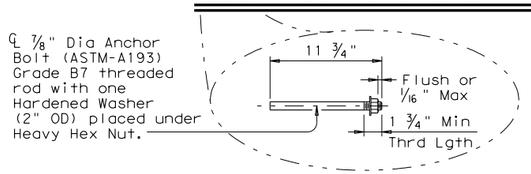
TL-2 TERMINAL CONNECTION DETAILS



TL-3 TERMINAL CONNECTION DETAILS



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



(1) Showing TL-3 Splice location, TL-2 Splice location is 1'-0".

(2) ℄ Splice ~ Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.

(3) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence".

(4) Same as slab joint opening. (5" Max Exp Jt).

(5) One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(6) ℄ Exp Jt or Splice Jt as required.

(7) Rail member sections shall have at least two posts but not more than four.

(8) Increase 2" for structures with overlay.

(9) 1/4" Min, 3/4" Max

(10) If approved by the Engineer, bolt recesses may be omitted.

(11) Bolts shall be of sufficient length to extend 1/2" to 3/4" beyond nut.

(12) 4 additional Bars R(#5) 3'-8" in length shall be placed inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.

(13) Anchor bolts shall be 7/8" Dia ASTM A193 Grade B7 threaded rods with heavy hex nuts and one hardened washer (2" OD) each. Embed threaded rods into parapet wall with an epoxy anchorage system. Estimated required embedment depth is 8". Anchorage system chosen must be able to achieve an ultimate tensile resistance of 34 kips. The Contractor must provide evidence to the Engineer that this can be achieved. Evidence of adequate tensile resistance can be based on the manufacturer's published values of ultimate tensile strength (anchor spacing and edge distance must be accounted for). Anchor installation, including hole size, drilling, and clean-out, must be in accordance with the manufacturer's recommendations.

(14) Install Parapet Shoe after rail has been placed. To ease installation, contractor may temporarily brace parapet shoe until the anchorage system achieves manufacturer's recommended curing time. Anchorage system shall be assembled with one (2" OD) hardened washer and one heavy hex nut each. Temporary bracing can be removed after anchorage systems have been firmly tightened.

ACC:

LEVELS DISPLAYED

1

SHEET 1 OF 4

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T77

FILE: ristde39.dgn	DN: DVL	CK: TxDOT	DW: JTR	CK: TxDOT
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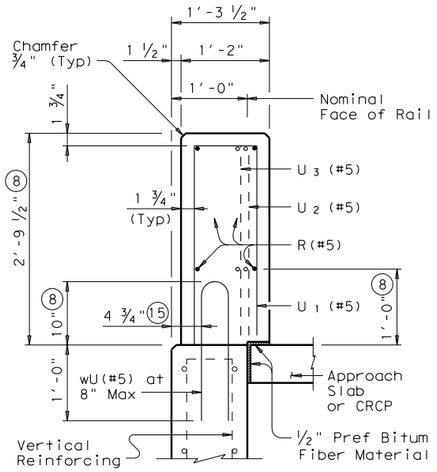
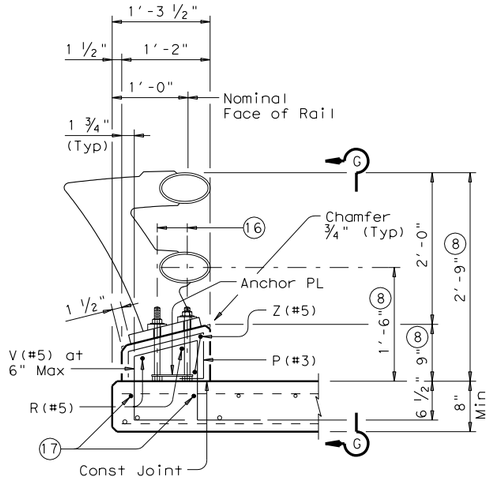
REVISIONS				
	COUNTY	CONTROL	SECT	JOB	HIGHWAY

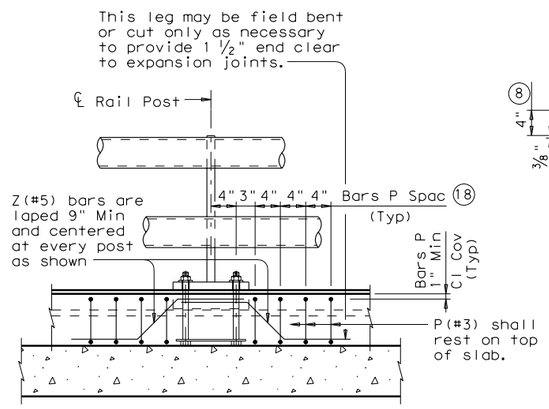


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



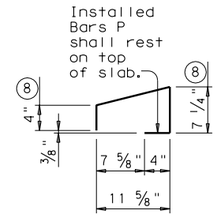
ON BRIDGE SLAB

SECTIONS THRU RAIL

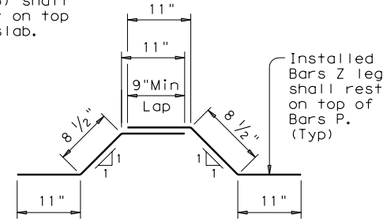


SECTION G-G

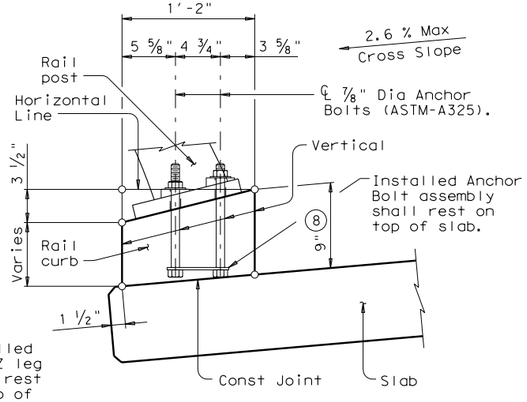
Showing reinf spaced around rail post.
Bars V and R omitted for clarity.



BARS P(#3)

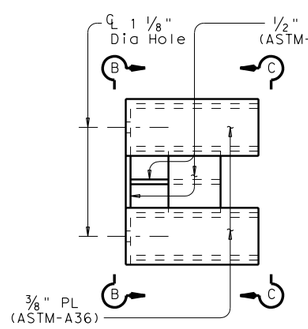


BARS Z(#5)



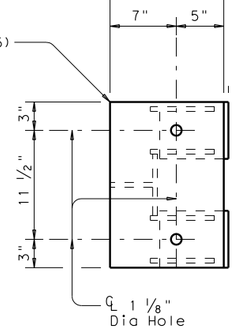
RAIL CURB FORMING DETAIL

Reinforcing not shown for clarity.

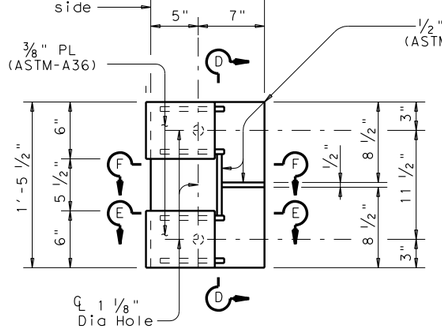


PARAPET SHOE

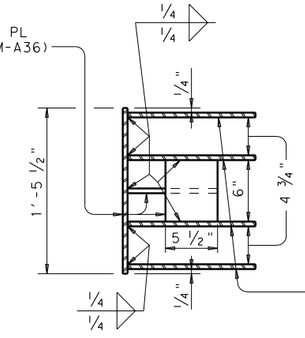
(Parapet Shoe weight = 84 lb each, for contractor's information only).



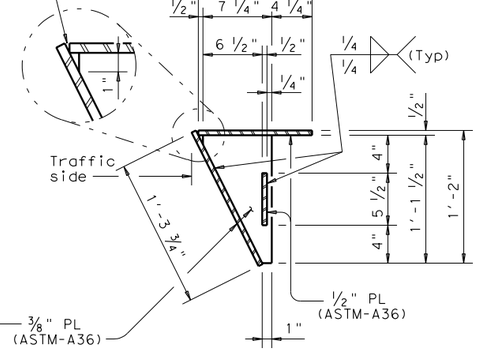
VIEW B-B



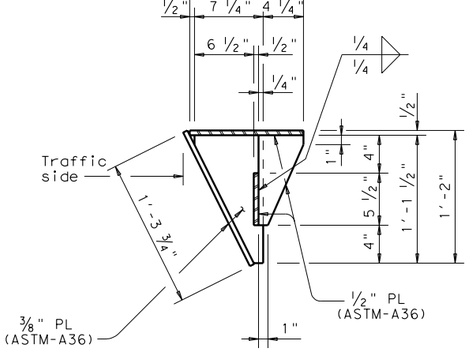
VIEW C-C



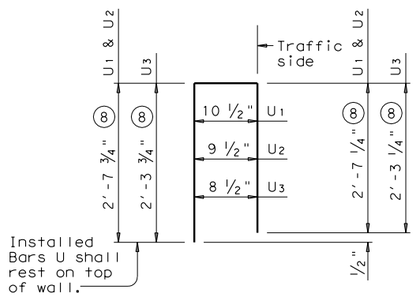
SECTION D-D



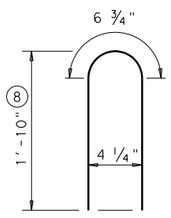
SECTION E-E



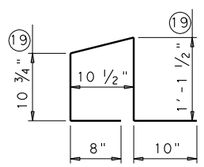
SECTION F-F



BARS U(#5)



BARS wU(#5)



BARS V(#5)

(8) Increase 2" for structures with overlay.

(15) 5 ½" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(16) ℄ ⅞" Dia Hex Head Anchor Bolts (ASTM-A325) with one Hardened Washer and one Beveled Washer placed under each Heavy Hex Nut.

(17) Top longitudinal slab bar may be adjusted laterally 3" ± to tie reinforcing.

(18) Adjust Bars P(#3) as necessary to avoid Bars V(#5) and expansion joints.

(19) Length shown for 6 ½" Min bar embedment with no overlay. Adjust as required.

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T77

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ACC:
LEVELS DISPLAYED
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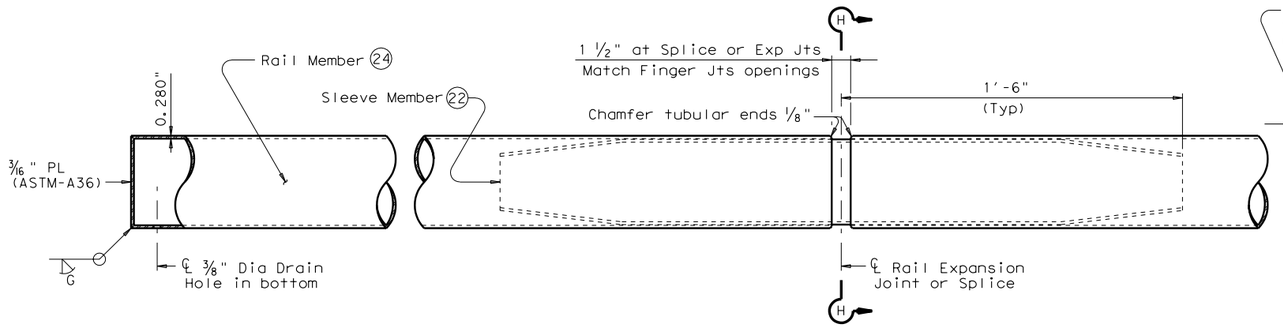
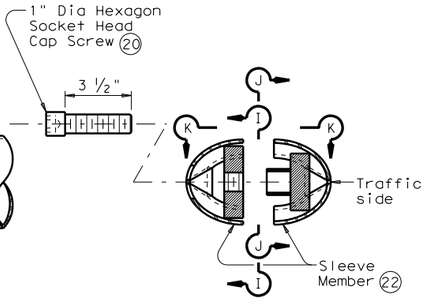


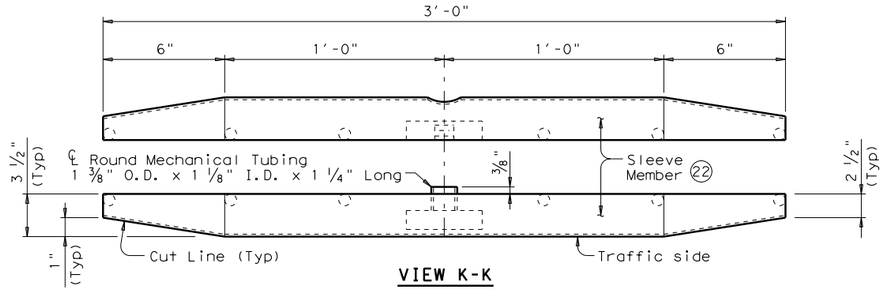
AT RAIL ENDS

AT SPLICES OR EXP JTS

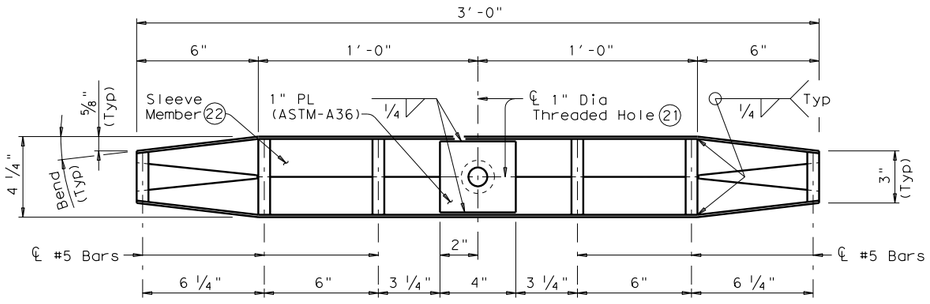


SECTION H-H

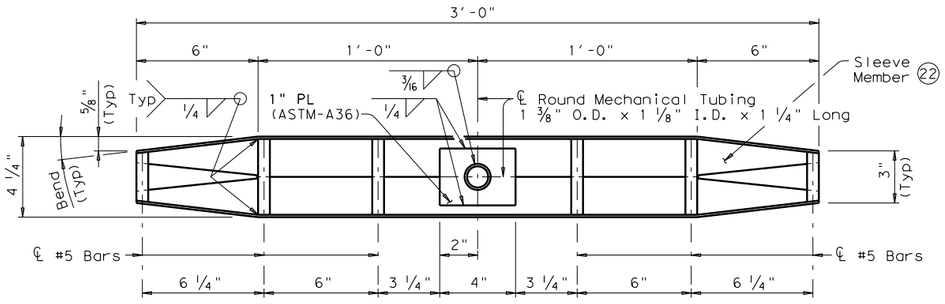
Tube & #5 support bars not shown for clarity.



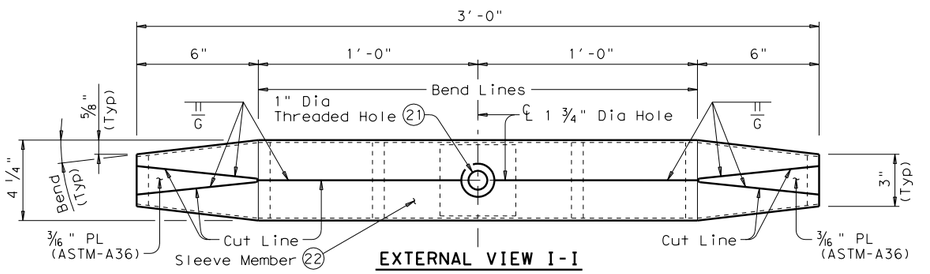
VIEW K-K



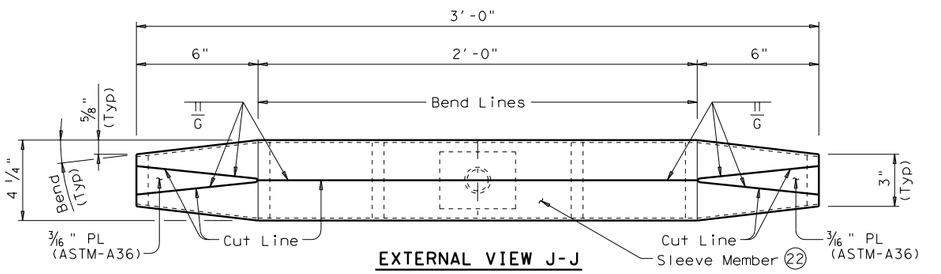
VIEW I-I



VIEW J-J



EXTERNAL VIEW I-I



EXTERNAL VIEW J-J

(20) Hexagon Socket Head Cap Screw shall conform to ASTM A574. Threads shall have Class 3A fit tolerance in accordance ASME B1.1.

(21) Hole shall be tapped oversize the minimum amount required for proper assembly. The amount of overtap shall be galvanized such that the 1" plate and screw assembles freely.

(22) Sleeve Member is shaped to 8" x 4 7/8" Ellipse made from 6" Dia Pipe (6.625" O.D., 0.188" wall thickness) API-5LX52 which is cut and assembled to the following details shown.

(23) Due to variability in fabricated rail members and sleeves, dimensions shown are nominal. Sleeve members must be fabricated such that the maximum gap between rail member and sleeve is 1/16" after installations.

(24) Rail Member shaped to 8" x 4 7/8" Ellipse from 6" Dia Std Pipe (6.625" O.D., 0.280" wall thickness) ASTM-A53 (E or S Grade B).

TUBE AND SLEEVE MEMBER FABRICATION DETAILS (23)

Showing Ellipse made from Round Pipe.
(Sleeve Member = 47 lb each complete splice, for contractor's information only).

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T77

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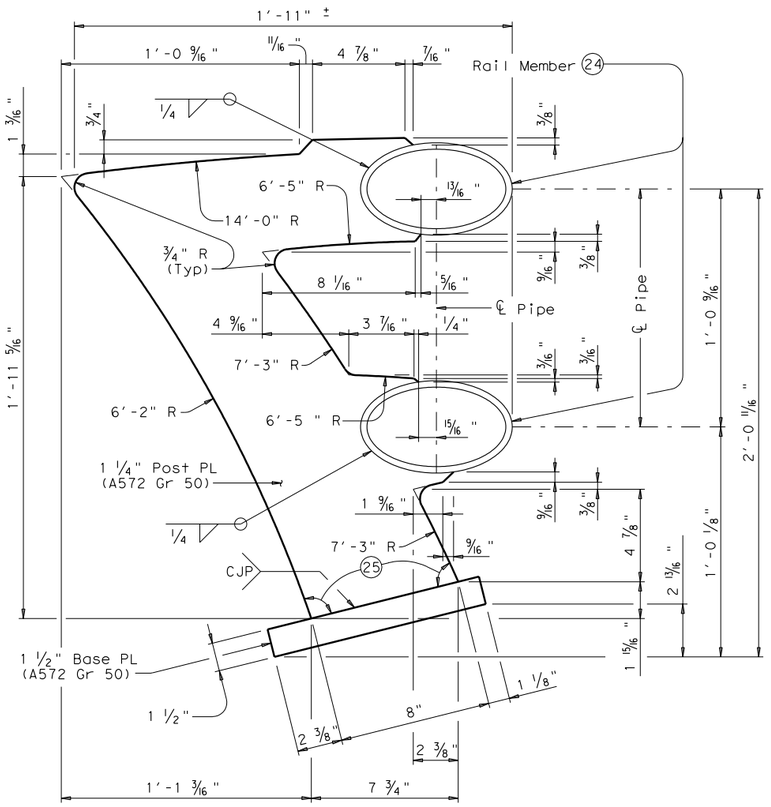
REVISIONS						
	COUNTY		CONTROL	SECT	JOB	HIGHWAY

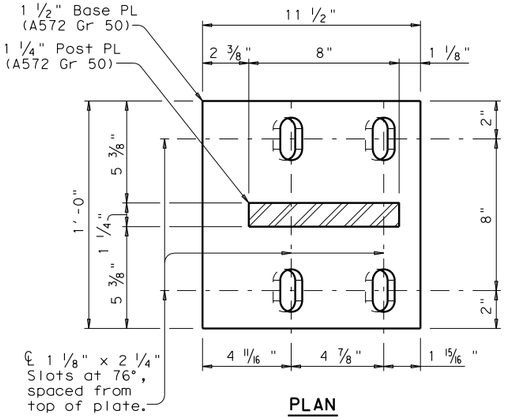
ACC:
LEVELS DISPLAYED
1



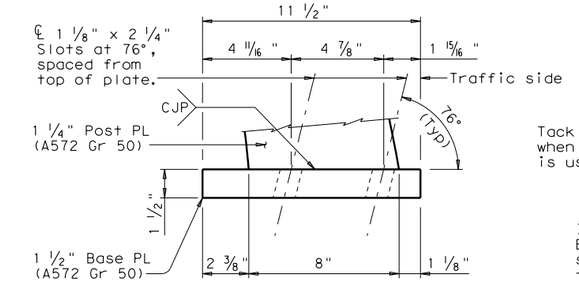
POST DETAIL

(24) Rail Member shaped to 8" x 4 7/8" Ellipse from 6" Dia Std Pipe (6.625" O.D., 0.280" wall thickness) ASTM-A53 (E or S Grade B).

(25) Not perpendicular to Base Plate.

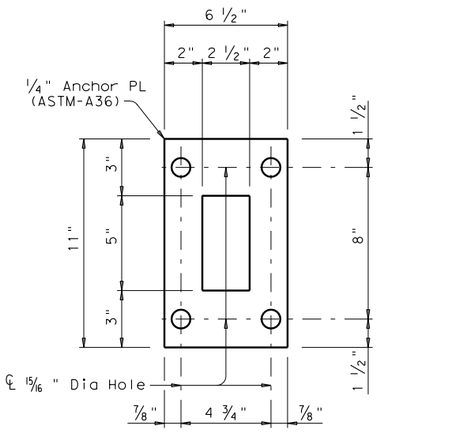


PLAN

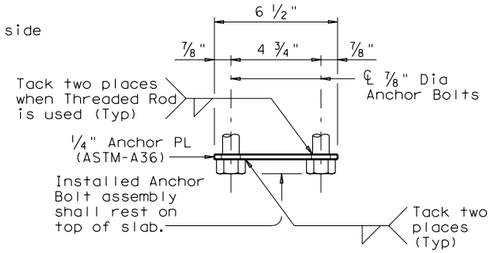


ELEVATION

BASE PLATE DETAILS

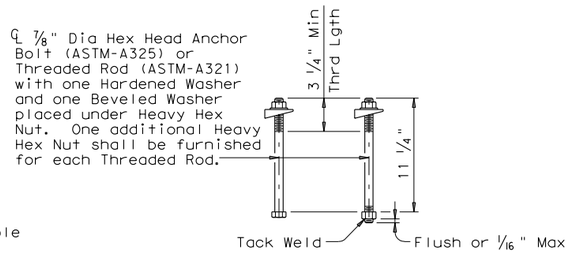


PLAN OF ANCHOR PLATE



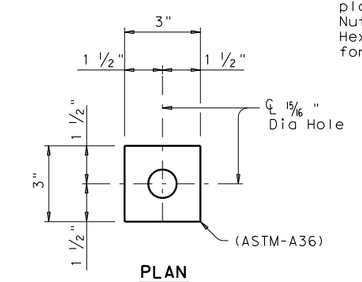
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS

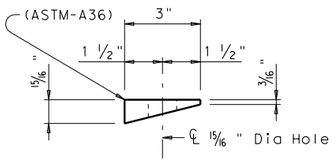


ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for T77 Base Plate)



PLAN



ELEVATION

BEVELED WASHER DETAILS

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet NCHRP Report 350 TL-3 criteria. This rail can be used for design speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for design speeds of 45 mph and less.

This railing cannot be used on horizontally curved bridges, on bridges having cross slope exceeding 2.6 percent, on bridges with expansion joints providing more than 5" movement, on bridges with varying cross slope, skews without 1'-4" Min breakback in slab or on cast-in-place retaining walls.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

All open ends of rail shall be capped.

Galvanize all steel components except reinforcing steel unless noted otherwise.

Anchor bolts for T77 base plate shall be 7/8" Dia ASTM A325 bolts (or A321 threaded rods with one tack welded heavy hex nut each) with one hardened washer and one beveled washer placed under each heavy hex nut. Nuts shall conform to A563 requirements. The untapped blanks shall be galvanized prior to cutting the threads. Threads for bolts and nuts shall have Class 2A and 2B fit tolerances in accordance with ASME B1.1.

All concrete shall be Class "S". Follow one of the options specified in Item 421 including fly ash, ground granulated blast furnace slag, silica fume, or ultra fine fly ash for the cementitious component. Do not use the 100 percent cement option. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete. Chamfer all exposed corners.

Reinforcing steel shall be Grade 60.

Epoxy coat Bars V and wU if slab reinforcing is epoxy coated.

The face of steel rail and rail curb shall be plumb unless otherwise approved by the Engineer. Steel posts shall be square to the top of curb. Grout may be used under post base plates if necessary.

Exposed edges of rail members and rail posts shall be rounded or chamfered to approximately 1/16" by grinding, unless otherwise noted.

Shop drawings for approval are required.

Erection drawings showing panel lengths, rail post spacing, and anchor bolt setting shall be submitted to the Engineer for approval.

Average weight of railing with no overlay:
166 plf total
106 plf (Conc)
60 plf (Steel).

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T77

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ACC:
LEVELS DISPLAYED
1