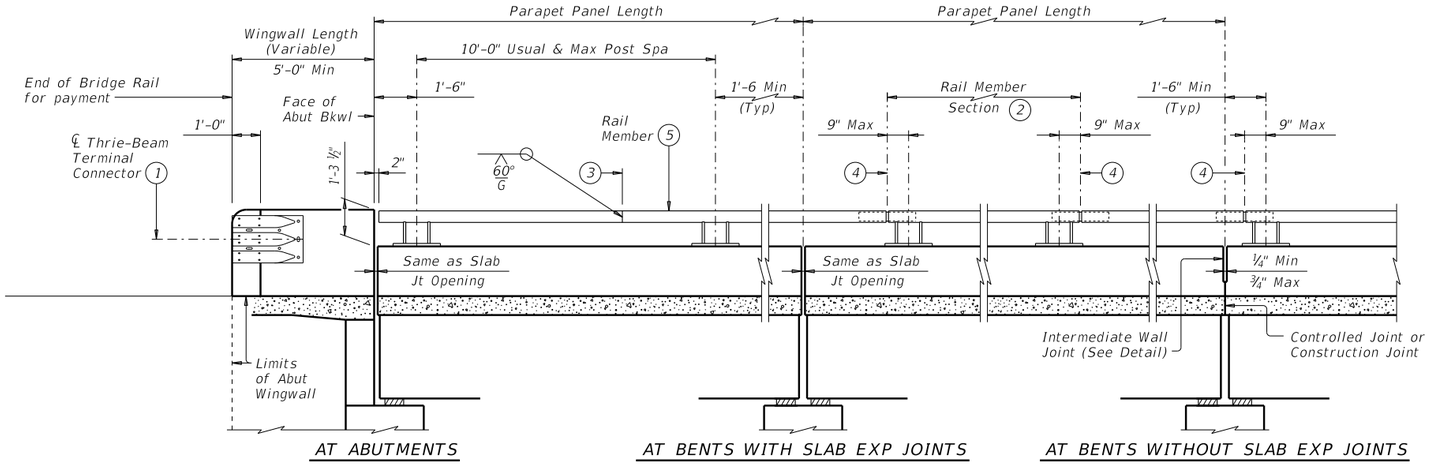
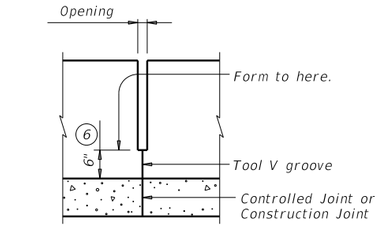
DATE:
FILE:



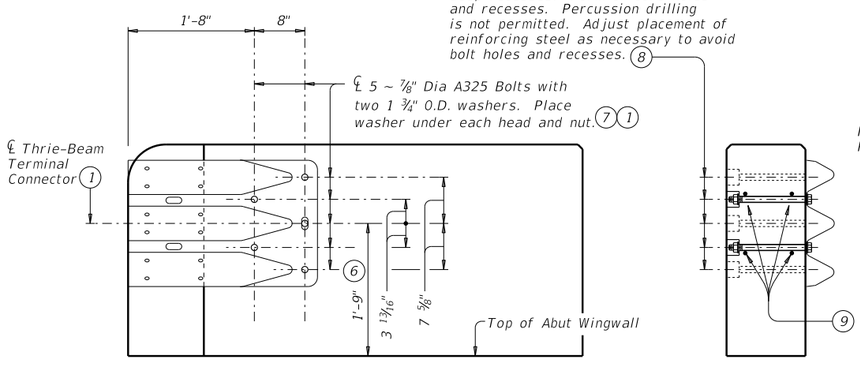
ROADWAY ELEVATION OF RAIL

(Rail Member showing Elliptical Tube Option, Rectangular Tube Option similar).



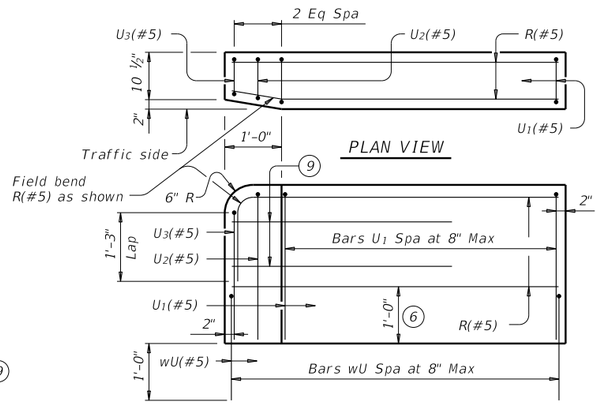
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints. Location independent of rail member splices.

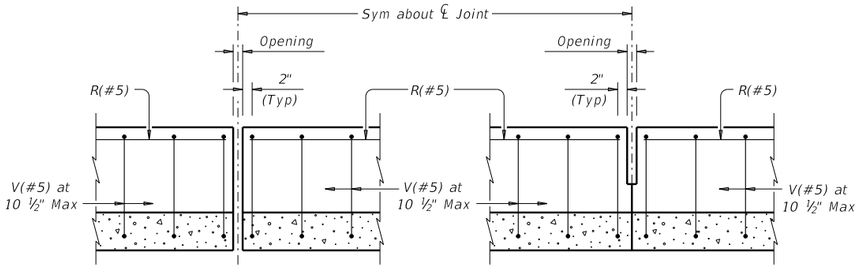


ELEVATION SECTION

TERMINAL CONNECTION DETAILS



AT ABUT WINGWALL



AT BENTS WITH SLAB EXP JOINTS AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

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

(3) 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.

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

(5) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(6) Increase 2" for structures with overlay.

(7) Provide bolts of sufficient length to extend ½" to ¾" beyond nut.

(8) Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

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

Texas Department of Transportation

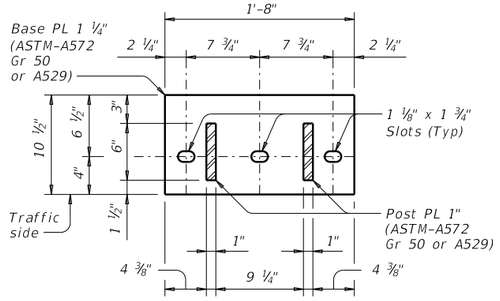
Bridge Division Standard

TRAFFIC RAIL

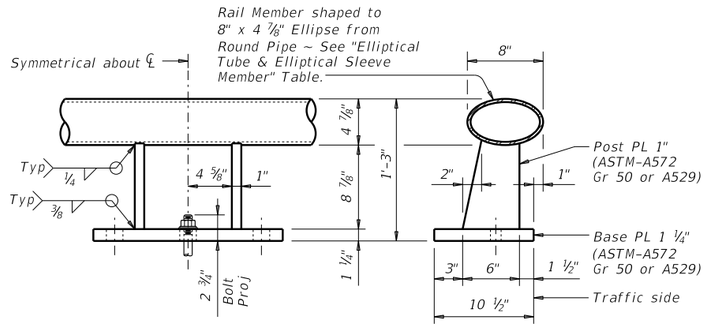
TYPE T401

FILE: rlstd006.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
03-16: Moved chamfer note to Construction Notes. Added additional epoxy classes.	DIST	COUNTY		SHEET NO.

DATE:
FILE:



SECTION THRU POST

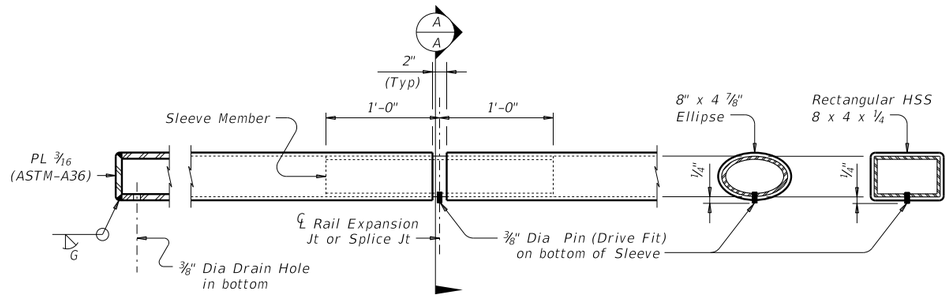


ELEVATION

SECTION THRU RAIL

ELLIPTICAL TUBE WITH RAIL POST & ANCHORAGE DETAILS

(Showing Elliptical Tube Option)



AT RAIL ENDS

AT SPLICE OR EXP JTS

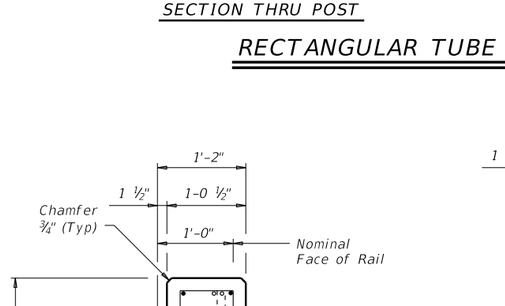
SECTION A-A (Showing Ellipse Tube Option)

SECTION A-A (Showing Rectangular Tube Option)

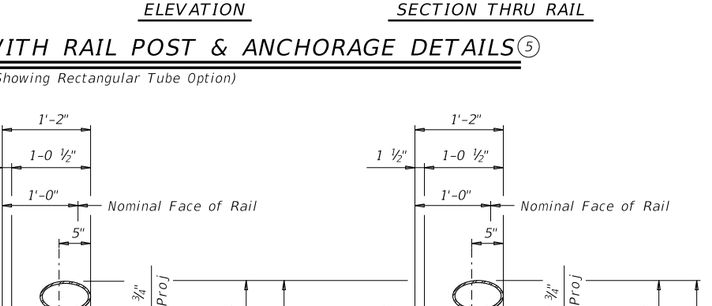
TUBE FABRICATION DETAILS (5)

ELLIPTICAL TUBE & ELLIPTICAL SLEEVE MEMBER		
8" x 4 ⅞" Ellipse	Elliptical Sleeve Member	
Material	Material	Thickness
6" Dia Std Pipe ASTM-A53 E or S Gr B)	ASTM-A53 Gr B	0.353"
	A36 or A500 Gr B	0.339"
	API-5LX52	0.224"
6 ⅝" O.D. Pipe x 0.188" API-5LX52	ASTM-A53 Gr B	0.339"
	A36 or A500 Gr B	0.325"
	API-5LX52	0.188"

Notes: Other sections of equal or greater strength are acceptable for elliptical sleeves. The major and minor diameters of the rail member may vary +/- 0.1875" from plan dimension. However, the difference between the outside diameters of the elliptical sleeve and the inside diameters of the rail member must not exceed 0.25 inches.



SECTION THRU POST



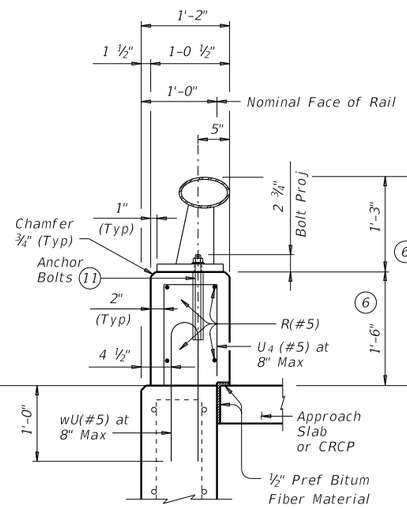
ELEVATION

SECTION THRU RAIL

RECTANGULAR TUBE WITH RAIL POST & ANCHORAGE DETAILS (5)

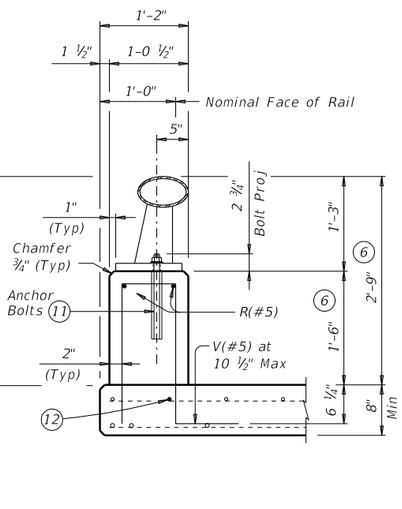
(Showing Rectangular Tube Option)

ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



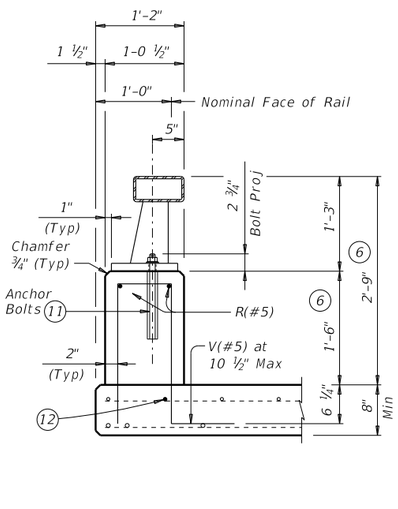
ON CIP RETAINING WALLS

(Showing Elliptical Tube Option)



ON BRIDGE SLAB

(Showing Elliptical Tube Option)



ON BRIDGE SLAB

(Showing Rectangular Tube Option)

SECTIONS THRU RAIL (5)

(5) Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

(6) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) See "Material Notes" for anchor bolt information.

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T401

FILE: rlstd006.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
03-16: Moved chamfer note to Construction Notes. Added additional epoxy classes.	DIST	COUNTY		SHEET NO.

DATE:
FILE:

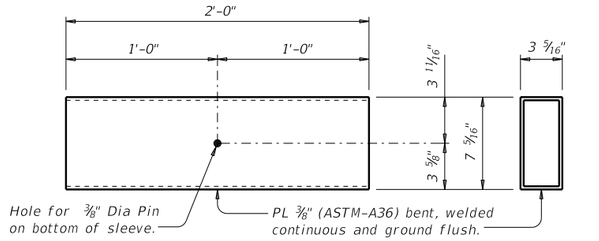
(6) Increase 2" for structures with overlay.

(11) See "Material Notes" for anchor bolt information.

(13) Slots are not allowed in areas where there is a joint in the concrete parapet between rail post.

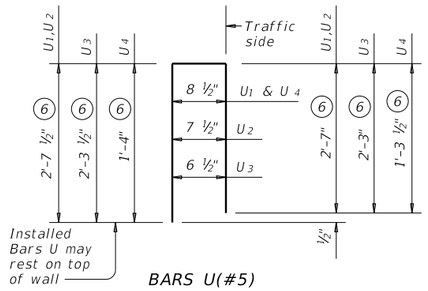
(14) Length shown for 6 ¼" Min bar embedment with no overlay. Adjust as required.

(15) Shop drawings for approval required for tubular steel sections.

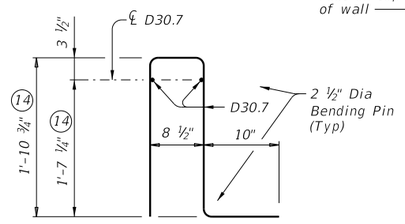


RECTANGULAR TUBE SLEEVE MEMBER DETAIL

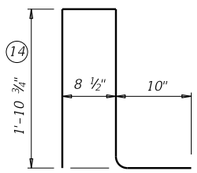
(See Tube Fabrication Detail)



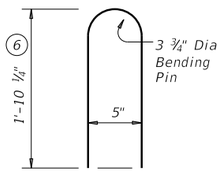
BARS U(#5)



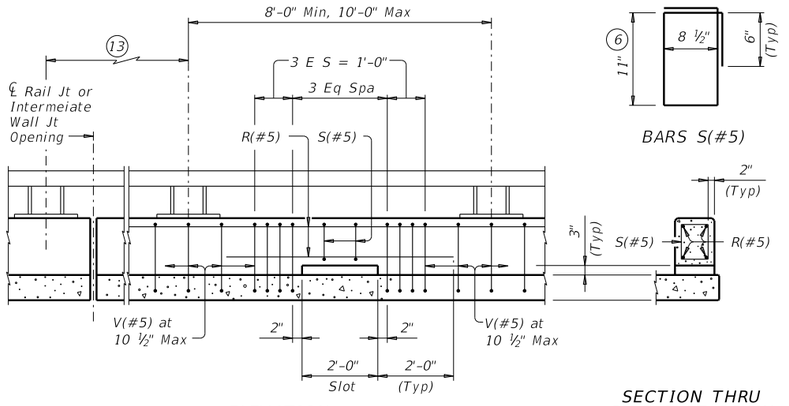
OPTIONAL WELDED WIRE REINFORCING (WWR)



BARS V(#5)

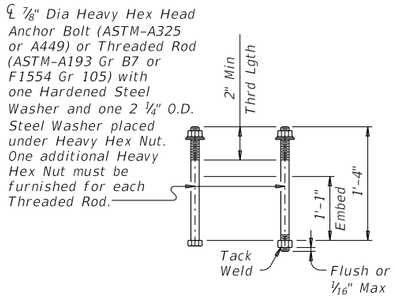


BARS wU(#5)



OPTIONAL SIDE SLOT DRAIN DETAILS

Note: Center Side Slot Drains between rail posts within the limits shown. Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (11)

RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
Rail Members	Over 2800'	29'-0"	Straight rail sections
	Over 1400'thru 2800'	14'-6"	To required radius or to chords shown (15)
	Over 700'thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius (15)

CONSTRUCTION NOTES:

This rail may be slip-formed if approved by the Engineer when epoxy adhesive anchor bolts are used.

Cap all open ends of tubular steel sections.

At the Contractor's option anchor bolts may be cast with the parapet (See Cast-in-Place Anchor Bolt Options).

Slip-forming parapet is not allowed if anchor bolts are cast with parapet wall.

Rail parapet must be plumb unless otherwise approved. Steel posts must be square to the top of parapet. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

Rail member sections must have at least two posts but not more than four.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Galvanize all steel components except reinforcing steel.

Anchor bolts must be ⅞" Dia ASTM A193 Grade B7 fully threaded rods with heavy hex nuts, one hardened washer and one (2 ¼" OD) washer each. Embed threaded rods into parapet wall with a Type III, Class C, D, E, or F epoxy anchorage system. Minimum embedment depth is 8". Anchorage system chosen must be able to achieve an ultimate tensile resistance of 34 kips per bolt. 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 instructions.

Optional cast-in-place anchor bolts must be ⅞" Dia ASTM A325 or A449 bolts (or A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one heavy hex nut and one hardened steel washer plus one 2 ¼" O.D. steel washer at each bolt. Nuts must conform to A563 requirements.

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat all rail reinforcement if slab bars are epoxy coated.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars R, and V, as shown. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows: Uncoated ~ #5 = 1'-9"
Epoxy coated ~ #5 = 2'-7"

GENERAL NOTES:

This rail has been evaluated to be of equal strength to the T4 (A) railing, which has been crash tested to meet NCHRP Report 350 TL-3 criteria. This rail can be used for 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 speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay: 263 plf total
234 plf (Conc)
29 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T401

FILE: rlstd006.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				
03-16: Moved chamfer note to Construction Notes. Added additional epoxy classes.	DIST	COUNTY		SHEET NO.