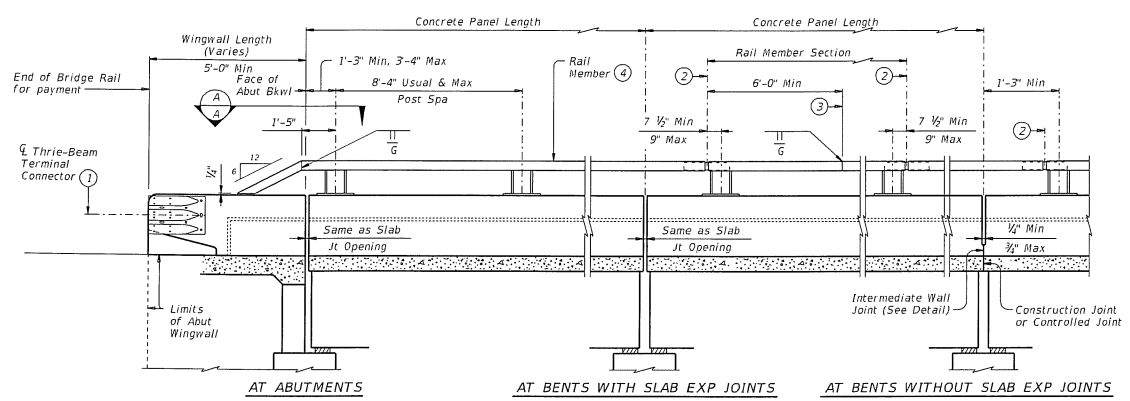


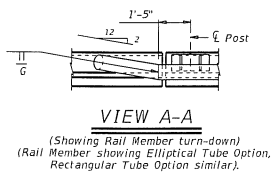
DISCUSSION: The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:



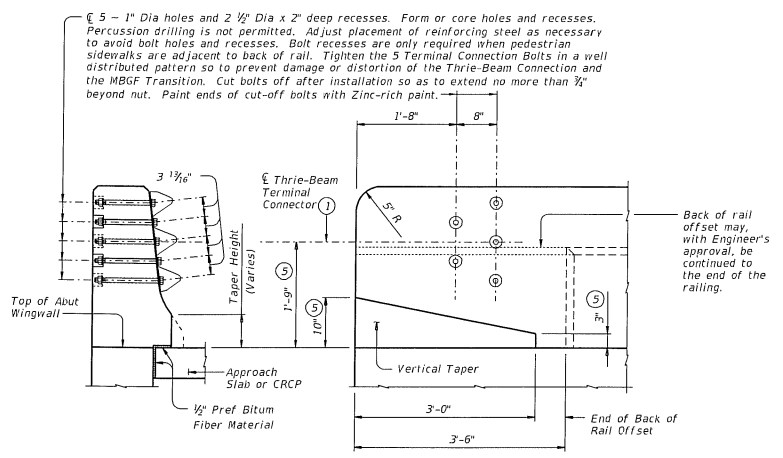
ROADWAY ELEVATION OF RAIL

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



VIEW A-A

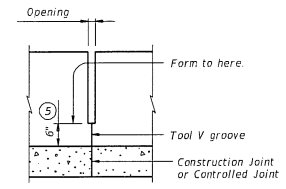
(Showing Rail Member turn-down)
(Rail Member showing Elliptical Tube Option,
Rectangular Tube Option similar).



SECTION

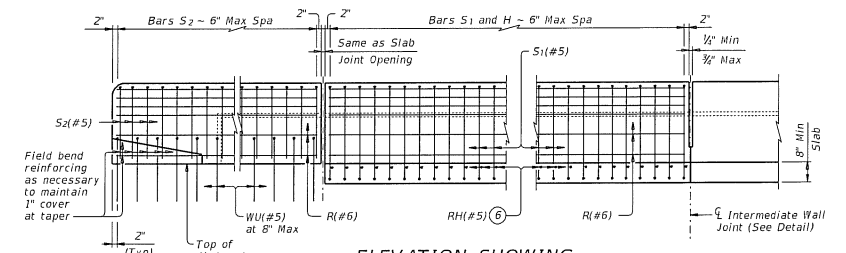
ELEVATION

TERMINAL CONNECTION DETAILS



INTERMEDIATE WALL JOINT DETAIL

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



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 unless otherwise shown in the plans.
- ② Exp Jt or Splice Jt as required.
- ③ One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove, double vee groove, or single groove. Grind smooth.
- ④ Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.
- ⑤ Increase 2" for structures with Overlay.
- ⑥ Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend Bars RH(#5) 2'-0" Min past \bar{C} of beam/girder. Space with Bars S1(#5). Bars RH(#5) match slab bar cover. Bars RH(#5) may be bundled with top slab reinforcing if spacing is equivalent. Omit Bars RH(#5) when top slab reinforcement is spaced less than 4".

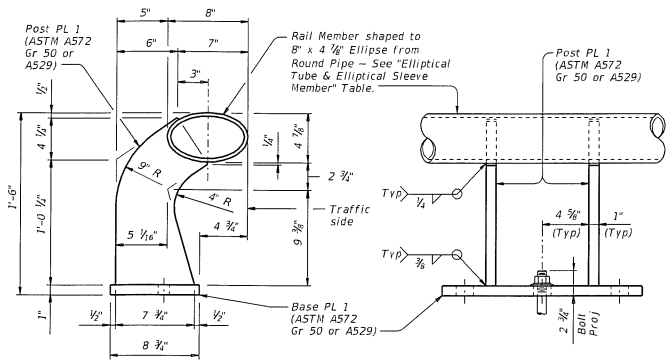
SHEET 1 OF 3

		Bridge Division Standard
<h2>TRAFFIC RAIL</h2>		
<h3>TYPE T80HT</h3>		
FILE: 11st0015-1R.dgn DATE: March 2018 REVISED:	DWG: TxDOT CONT: SECT NOB:	DES: JTR CHECK: TxDOT MESH:
DIST:	CONF:	SHEET NO:

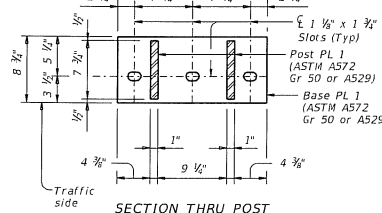
ELLIPTICAL TUBE & RECTANGULAR SLEEVE MEMBER

Material	Elliptical Sleeve Member	Material	Thickness
8" x 4 1/2" Ellipse		ASTM A53 Gr B	0.353"
6" Dia Std Pipe		ASTM A36 or A500 Gr B	0.339"
ASTM A53 E or S Gr B		API-5LX52	0.224"
6 3/8" O.D. Pipe x 0.188" API-5LX52		ASTM A53 Gr B	0.339"
		ASTM 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 cannot exceed 0.25 inches.



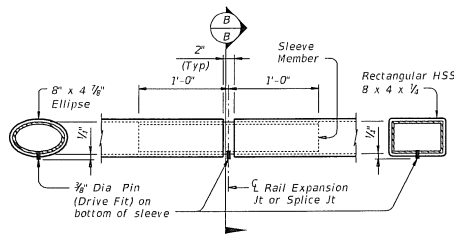
SIDE VIEW ELEVATION



SECTION THRU POST

ELLIPTICAL TUBE WITH RAIL POST AND ANCHORAGE DETAILS

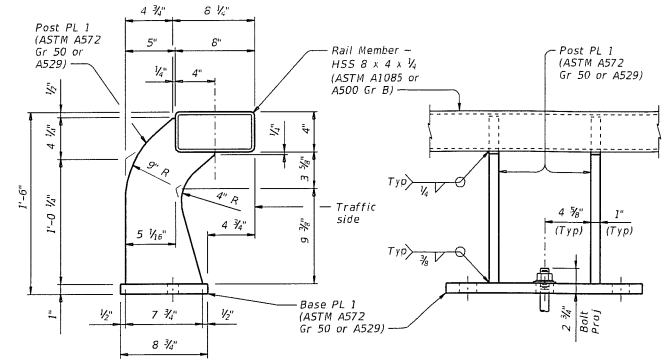
(Showing Elliptical Tube Option)



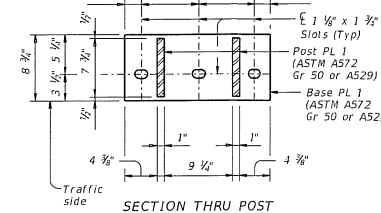
SECTION B-B AT SPlice OR EXP ITS SECTION B-B

(Showing Ellipse Tube Option) (Showing Rectangular Tube Option)

TUBE SPlice DETAIL



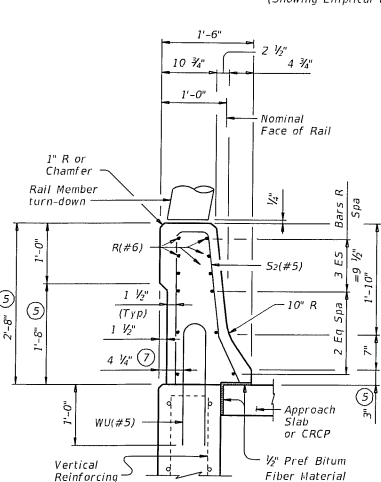
SIDE VIEW ELEVATION



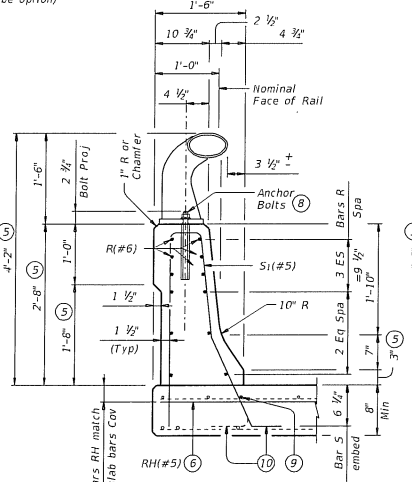
SECTION THRU POST

RECTANGULAR TUBE WITH RAIL POST AND ANCHORAGE DETAILS

(Showing Rectangular Tube Option)

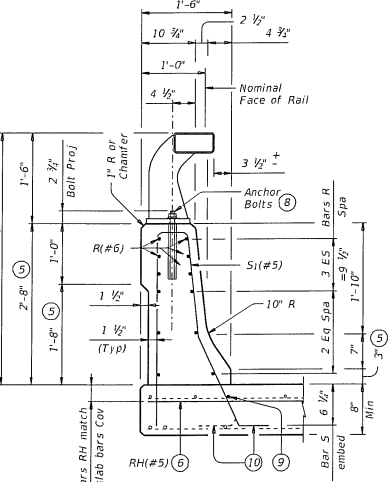


ON ABUTMENT WINGWALLS



ON BRIDGE SLAB

(Showing Elliptical Tube Option)



ON BRIDGE SLAB

(Showing Rectangular Tube Option)

SECTIONS THRU RAIL

- Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.
- Increase 2" for structures with overlay.
- Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend Bars RH(#5) 2'-0" Min past \bar{C} of beam/pier. Space with Bars S1(#5). Bars RH(#5) match slab bar cover. Bars RH(#5) may be bundled with top slab reinforcing if spacing is equivalent. Omit Bars RH(#5) when top slab reinforcing is spaced less than 4".
- 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall.
- See "Material Notes" for Anchor Bolt information.
- Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- Bar may be bent or adjusted as shown.
- Mounting this rail to retaining walls requires additional details not covered by this standard.

Bridge Division Standard

TRAFFIC RAIL

TYPE T80HT

FILE: r13r0015-18.dgn	REV: TxDOT	CHK: TxDOT	ENR: JTR	CR: TxDOT
DATE: March 2018	CONTRACT NO:	SECTION NO:	PROJECT NO:	REVISION NO:
REVISED		DATE:	BY:	CHECKED:

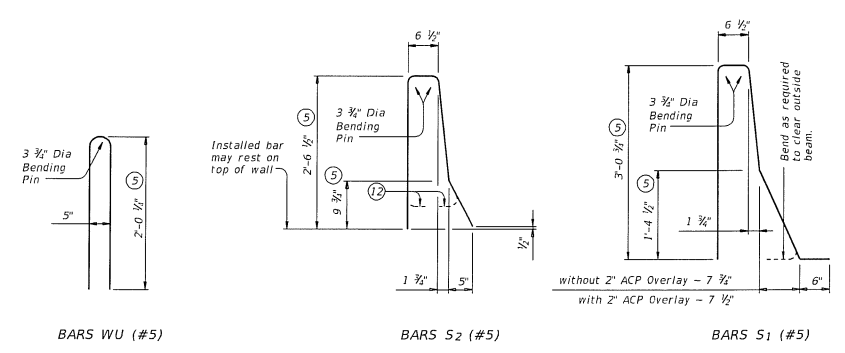
DISCUSSION: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

DESIGNER: This standard is governed by the Texas Engineering Practices Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: _____
 PRICE: _____

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



CONSTRUCTION NOTES:

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

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

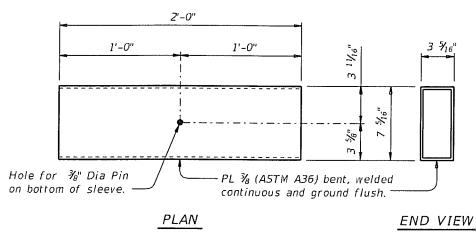
Slip-forming parapet is not allowed if anchor bolts are cast with parapet wall.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

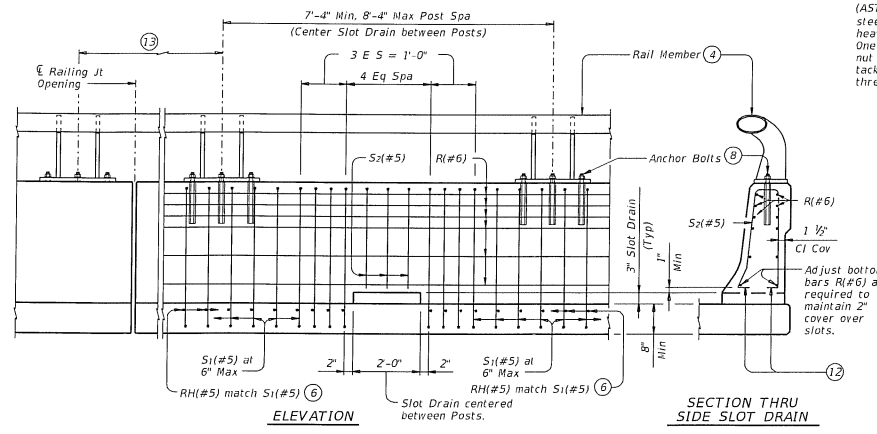
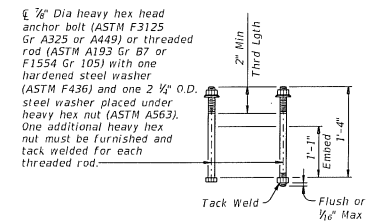
Rail parapet must be plumb unless otherwise approved. Steel posts must be square to the top of parapet. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/8" exist.

Panel lengths of tube members must be attached continuously to a minimum of three posts. Round or chamfer all exposed edges of steel components 1/8" by grinding prior to galvanizing.

Chamfer all exposed concrete corners.



- ④ Unless directed otherwise by the Engineer, the Fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.
- ⑤ Increase 2" for structures with Overlay.
- ⑥ Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend Bars RH(#5) 2'-0" Min past ϵ of beam/girder. Space with Bars S1(#5). Bars RH(#5) match slab bar cover. Bars RH(#5) may be bundled with top slab reinforcing if spacing is equivalent. Omit Bars RH(#5) when top slab reinforcement is spaced less than 4".
- ⑧ See "Material Notes" for Anchor Bolt information.
- ⑫ Bend or cut bars as required to clear drain slots.
- ⑬ Slots are not allowed in areas where there is a joint in the concrete panel between rail posts.
- ⑭ Shop drawings for approval are required for tubular steel sections.



MATERIAL NOTES:

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts must be 3/4" Dia ASTM A193 Gr B7 fully threaded rods with heavy hex nuts, one hardened steel washer (ASTM F436), and one (2 1/2" O.D.) steel washer each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 10 1/2". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, N_a , of 22 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railings".

Optional cast-in-place anchor bolts must be 3/4" Dia ASTM F3125 Gr 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 (ASTM F436) plus one (2 1/2" O.D.) steel washer at each bolt. Nuts must conform to ASTM A563 requirements.

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

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars S1, S2 and WU unless noted otherwise.

Provide bar laps, where required, as follows: Uncoated or galvanized - #6 = 2'-5" Epoxy coated - #6 = 3'-7"

GENERAL NOTES:

This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-5 rating. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used.

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.

The T80HT Rail may terminate on the structure if safety considerations so allow. In this case, there must be a custom section, detailed elsewhere in the plans, transitioning between this and a normal traffic railing such as T551. See Bridge Layout for limits.

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: 447 plf total
 415 plf (Conc)
 32 plf (Steel).

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



TRAFFIC RAIL

TYPE T80HT

FILE	REVISED	BY	DATE	CHK	DATE	APP	DATE	APP	DATE
FILE	FILE	FILE	FILE	FILE	FILE	FILE	FILE	FILE	FILE

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 are not permitted.