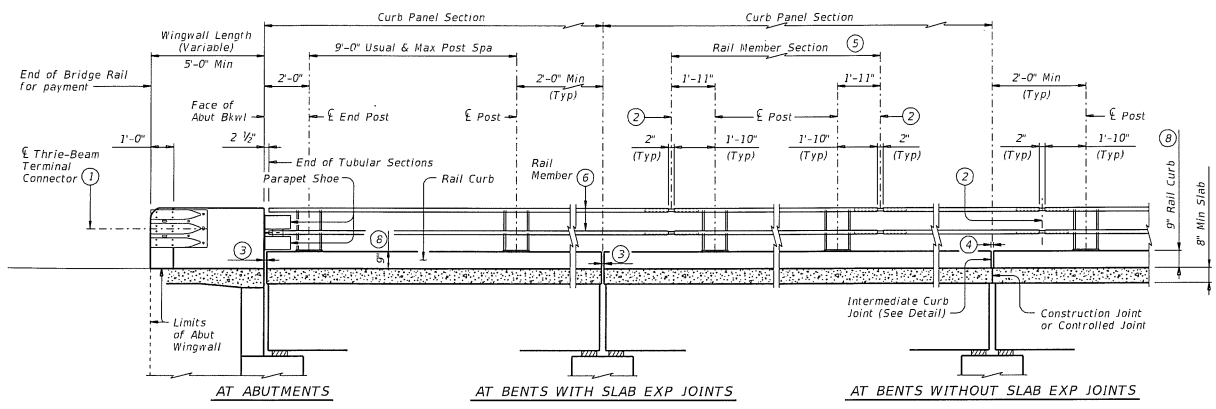
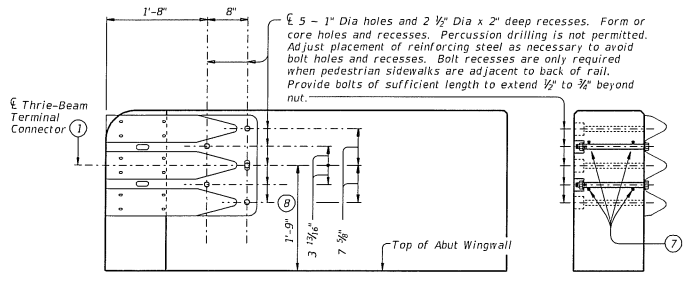


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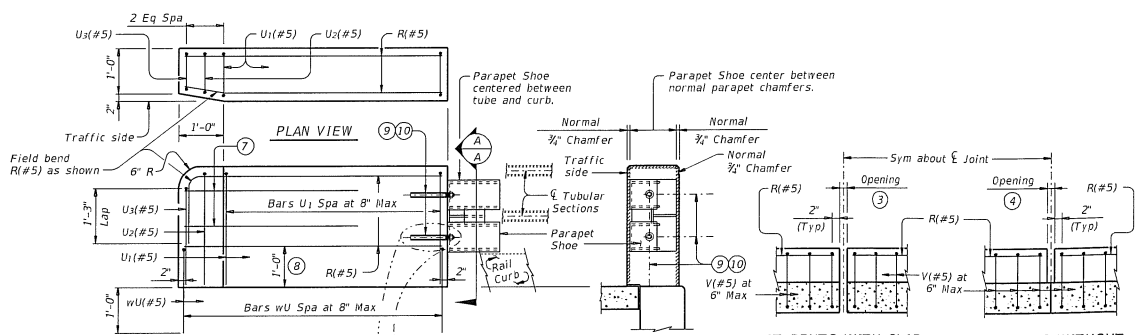


**ROADWAY ELEVATION OF RAIL**

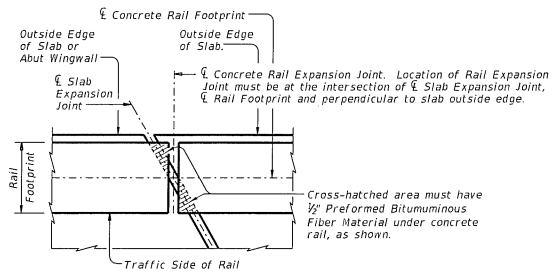
- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Expansion Joint or Splice Joint as required.
- ③ Same as slab joint opening. (5" Max Expansion Joint).
- ④ 1/2" Min, 1/2" Max.
- ⑤ Rail member sections must have at least two posts but not more than four.
- ⑥ HSS 6 x 2 x 1/4 (ASTM A1085 or A500 Gr B).
- ⑦ 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.
- ⑧ Increase 2" for structures with overlay.
- ⑨ Anchor bolts must be 3/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with heavy hex nuts and one hardened steel washer (ASTM F436) 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. Adhesive anchor embedment depth is 8". Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ⑩ Install Parapet Shoe after rail has been placed. To ease installation, temporarily brace parapet shoe until the anchorage system achieves manufacturer's recommended curing time. Anchorage system must be assembled with one hardened steel washer (ASTM F436) and one heavy hex nut (ASTM A563) each. Remove temporary bracing after anchorage systems has been firmly tightened.



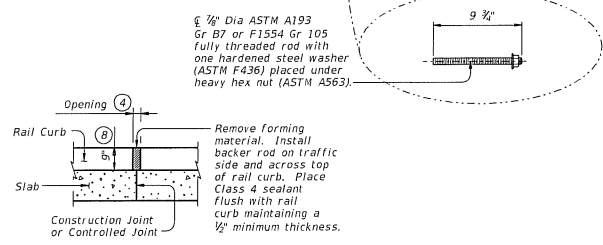
**TERMINAL CONNECTION DETAILS**



**ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT**



**PLAN OF RAIL AT EXPANSION JOINTS**  
Example showing Slab Expansion Joints without breakbacks.

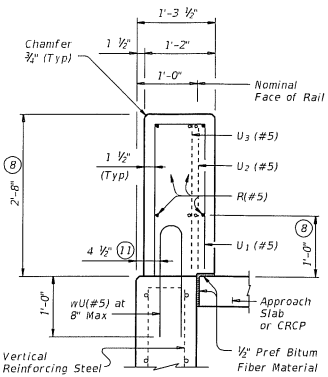


**INTERMEDIATE CURB JOINT DETAIL**  
Provide at all interior bents without slab expansion joints. Location independent of rail member splices.

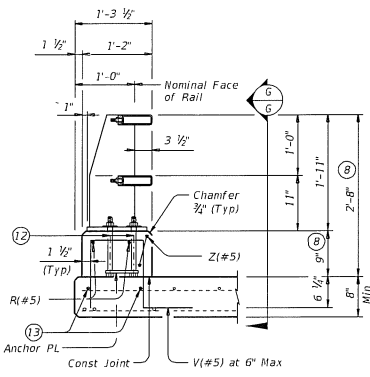
		Bridge Division Standard	
<h2 style="margin: 0;">TRAFFIC RAIL</h2>			
<h3 style="margin: 0;">TYPE TIW</h3>			
FILE: r1stc002-18.dgn	DN: TxDOT	CK: TADOT	DR: JTR
REV: 01	DATE: March 2018	CONTRACT: 0000000000	PROJECT: 0000000000
DESIGNER: [ ]	CHECKER: [ ]	APPROVER: [ ]	SHEET NO. [ ]

DATE: TITLE:

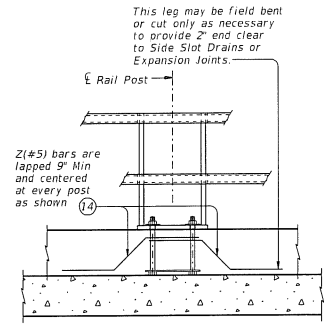
DISCUSSION: The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conception of this standard or for incorrect results or damages resulting from its use.



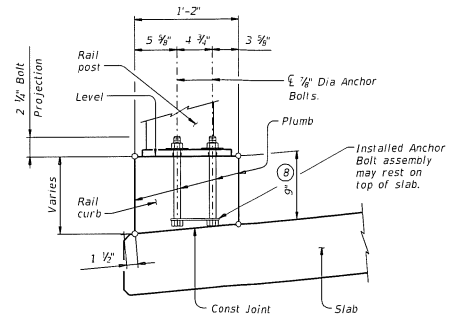
**ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS**



**ON BRIDGE SLAB**

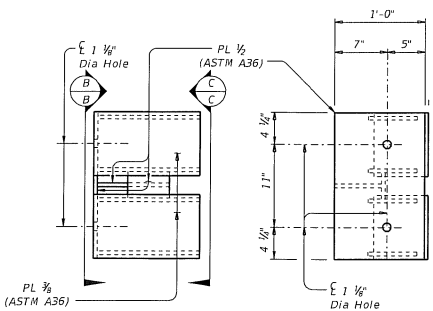


**VIEW G-G**  
Bars V and R omitted for clarity.

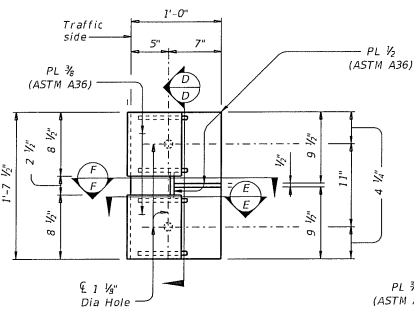


**RAIL CURB FORMING DETAIL**  
Reinforcing steel and rail curb chamfers not shown for clarity.

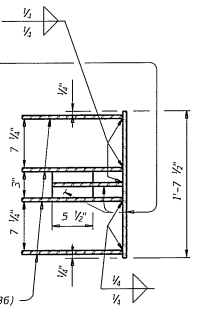
**SECTIONS THRU RAIL**



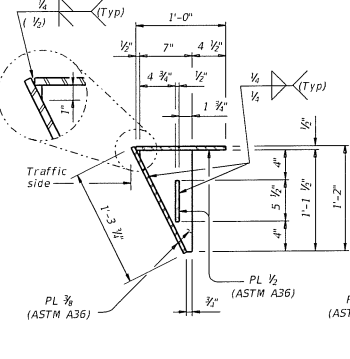
**PARAPET SHOE**  
(Parapet Shoe weight = 92 lb each, for contractor's information only.)



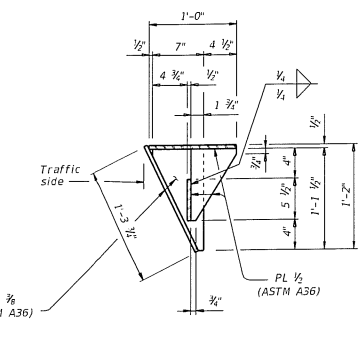
**VIEW C-C**



**SECTION D-D**

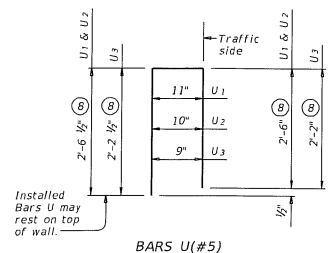


**SECTION E-E**

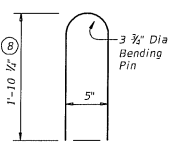


**SECTION F-F**

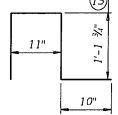
- Ⓢ Increase 2" for structures with overlay.
- Ⓣ 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- Ⓛ 1/2" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".
- Ⓜ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- Ⓨ Adjust Bars Z (#5) as necessary to avoid Bars V (#5).
- Ⓩ Length shown for 6 1/2" Min bar embedment with no overlay. Adjust as required.
- Ⓚ Increase 2 3/4" for structures with overlay.



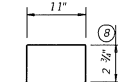
**BARS U (#5)**



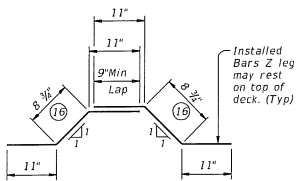
**BARS wU (#5)**



**BARS V (#5)**



**BARS VS (#5)**



**BARS Z (#5)**

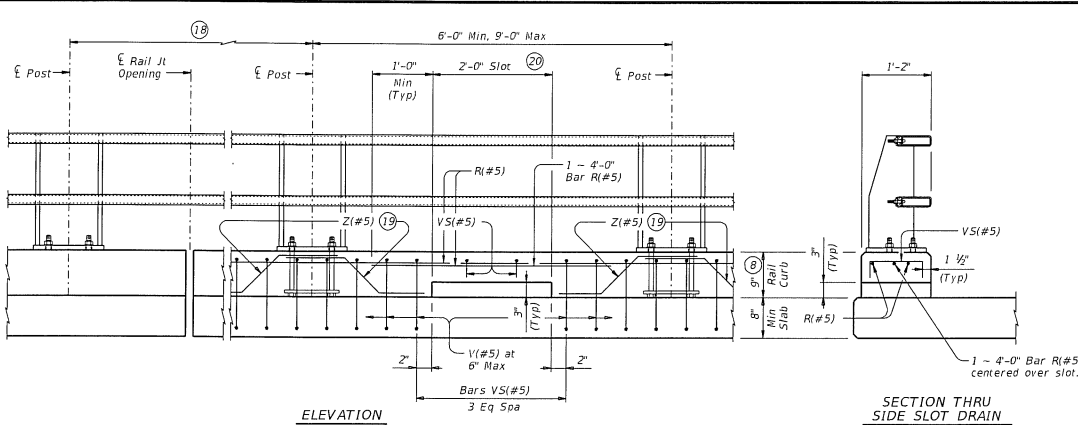
<b>TRAFFIC RAIL</b>			
<b>TYPE TIW</b>			
FILE: r1stred02-18.dgn	ENR: TxDOT	CR: TxDOT	DR: JFR
REVISED: March 2015	CONF: 108	SECT: 108	SHEET: 108
BY: [ ]	CHK: [ ]	APP: [ ]	SHEET NO. [ ]

DATE: FILE:



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DATE: FILE:



**OPTIONAL SIDE SLOT DRAIN DETAILS<sup>(2)</sup>**

**CONSTRUCTION NOTES:**

The face of tubular sections and rail curb must be plumb unless otherwise approved. Steel posts must be square to the top of curb. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/8" exist.

Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails.

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.

Round or chamfer exposed edges of rail members and rail posts to approximately 1/16" by grinding.

Chamfer all exposed concrete corners.

**MATERIAL NOTES:**

Provide ASTM A1085 or A500 Gr B for all HSS.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

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 for base plate must be 1/2" Dia ASTM F3125 Gr A325 or A449 bolts for ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each with one hardened steel washer (ASTM F436) placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Provide 3/4" Dia x 3 1/2" hex head bolts (ASTM F3125 Gr A325) for expansion or splice joints in HSS with one regular washer and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Provide 1/2" Dia round bar U-bolts (ASTM A36) with plate washer (ASTM A36) and regular lock washers placed under hex nuts that conform to ASTM A563 requirements. See "U-Bolt Detail".

Provide Class "S" concrete. 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.

Provide bar laps, where required, as follows:  
 Uncoated or galvanized - #5 = 2'-0"  
 Epoxy coated - #5 = 3'-0"

**GENERAL NOTES:**

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have 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.

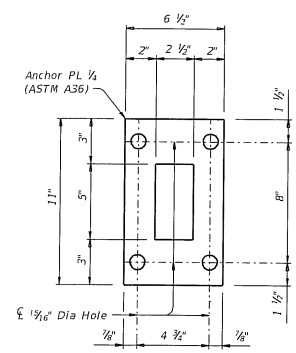
This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted.

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

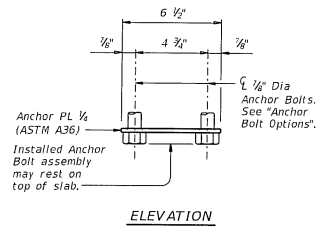
Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay:  
 173 plf total  
 131 plf (Conc)  
 42 plf (Steel).

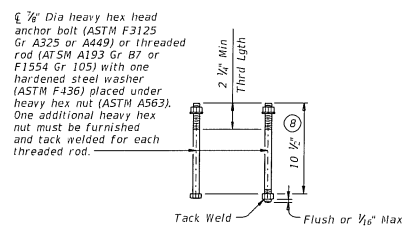
Cover dimensions are clear dimensions, unless noted otherwise  
 Reinforcing bar dimensions shown are out-to-out of bar.



**PLAN OF ANCHOR PLATE**



**ANCHOR BOLT ASSEMBLY DETAILS**



**ANCHOR BOLT OPTIONS**  
 (Showing Anchor Bolts for Base Plate)

<p><b>TRAFFIC RAIL</b></p> <p><b>TYPE TIW</b></p>			
FILE: t1std02-18.dgn	DN: TxDOT	CR: TxDOT	DR: JIR
March 2018	CON: SECT	NOB	MSH:04
REVISIONS	EXIST	COUNTY	SHEET NO.