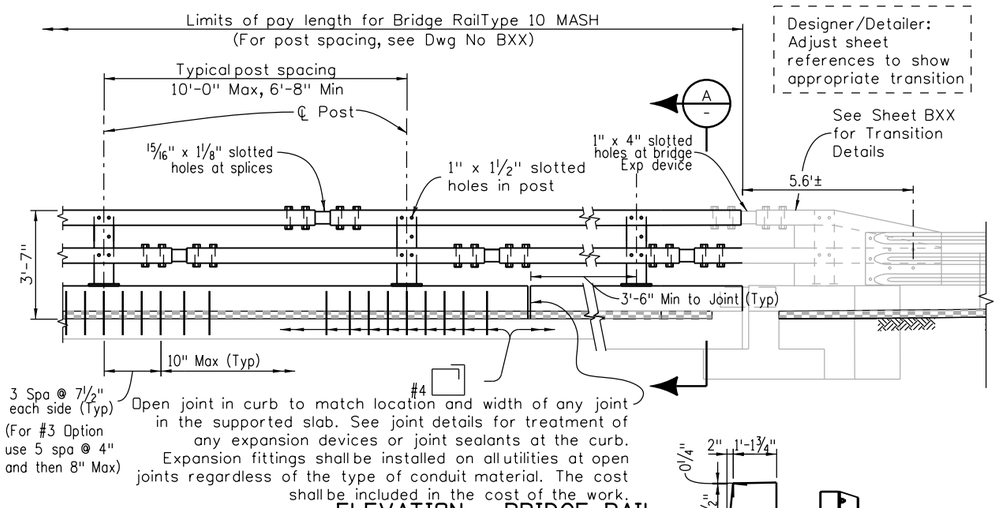
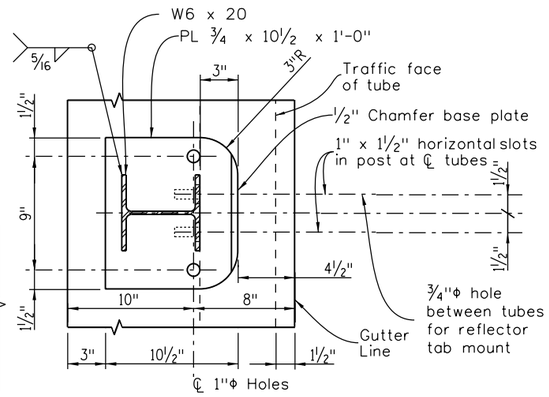
B-606-10MASH

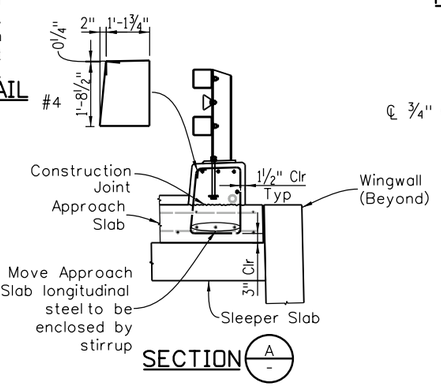
(Use with B-606-10MASH A&B, A-S, C&D, or C-S&D)



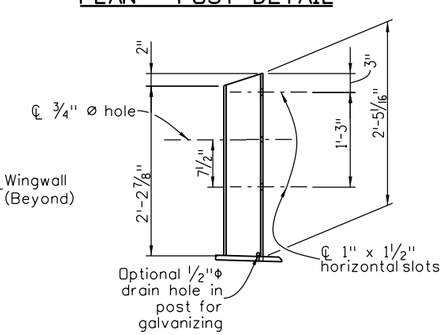
ELEVATION - BRIDGE RAIL



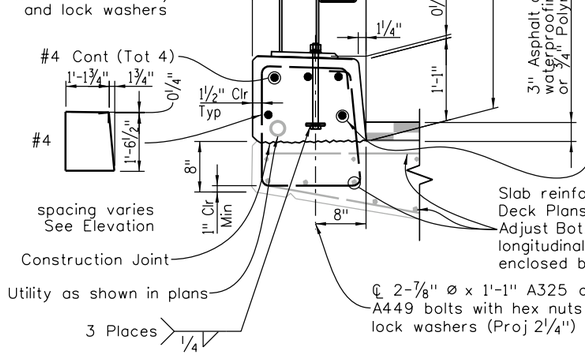
PLAN - POST DETAIL



SECTION A

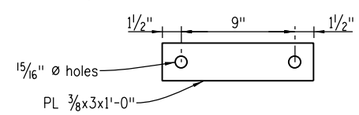


POST ELEVATION

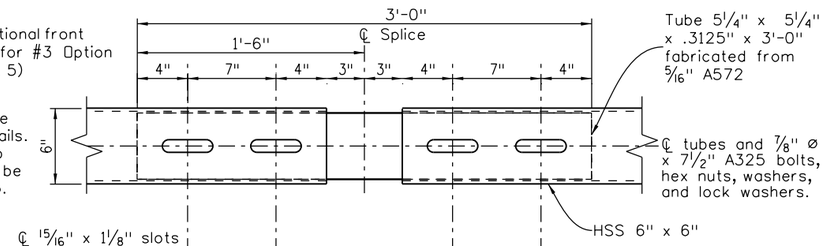


BRIDGE TYPICAL SECTION

Used when placed on concrete slab.
Bottom of stirrup parallel to top of deck steel.



ANCHOR DETAIL



at tube splice, and 1" x 4" slots at bridge Exp device. Slot both inner and outer tubes. Stagger top and bottom splices into different post spacings except at expansion joint, place at opposite ends of same post space except as shown in transitions. (Range of motion = 1'-0" at bridge expansion device.)

PLAN - TUBE SPLICE

FOR INFORMATION ONLY

DESCRIPTION	UNIT	PER LF
Concrete Sealer	SY	0.28
Structural Steel (Galvanized)	LB	49.6
Concrete Class D with Macrofiber or Class G	CY	0.059
Reinforcing Steel (High Performance) ▲	LB	8.7 (6.6 for #3 Option)

(For 8" Bridge Deck & 10 ft post spacing)

NOTES:

1. All tubes shall be ASTM A-1085. All posts, base plates, and splice tubes fabricated by welding shall be ASTM A-572 Grade 50. Post anchor, encased in concrete, shall be Grade 36 steel and need not be galvanized. All other steel shall be Grade 36 unless otherwise noted.

2. The above material and all anchor bolts and miscellaneous bolts, nuts, and washers shall be galvanized after fabrication in accordance with Section 509. Concrete, reinforcing steel, and structural steel elements shall conform to the requirements of sections 601 & 606, 602, and 509, respectively unless otherwise noted. Concrete sealer shall conform to section 515.

3. The tubes shall be shop bent or fabricated to fit horizontal curve when radius is less than 1,800 feet.

4. Tubes shall be continuous over not less than two posts, preferably 4 posts except at approach slab end joint. No welded butt splices will be allowed in the tube sections.

5. The centerline of the tube splice shall be 1'-8" minimum and 2'-6" maximum from the centerline of the posts.

6. All bolts that have lock washers shall be tightened to snug only.

7. Posts, curbs, and stirrups shall be perpendicular to the longitudinal roadway grade and cross slopes.

8. One or more 10'-0" post spaces may be reduced (6'-8" Min) in order to maintain dimensions from the end of the rail and expansion joints or concrete buttresses.

9. The top and inside face of the rail curb shall receive a coating of Item 515, Concrete Sealer, either a silane/siloxane or a type compatible with the concrete coating or sealer/stain shown in the plans.

10. Payment will be made under item 606, Bridge Rail Type 10 MASH, for all posts, post anchors, base plates, backing plates, anchor bolts, miscellaneous bolts, nuts, washers, tubes, tube expansion devices, tube splices, end plates, concrete (Class D with macrofiber or Class G), reinforcing steel, concrete sealer, and reflector tabs.

11. Prior to fabrication of this item, an electronic pdf which complies with the requirements of section 105, shall be submitted to the Engineer for information only.

12. #3 reinforcing may be substituted for #4 reinforcing with the spacing and additional bars shown.

DESIGN DATA

Design: AASHTO MASH 2016 TL-5 with rail height of 42" (by calculation), AASHTO MASH 2016 TL-4 for overlay thickness over 1" and resulting in a height of the top of rail over pavement of 36" Min (by Professional Evaluation and Crash Testing). Any changes to the bridge rail details must be approved by Staff Bridge.

Structural Steel:

AASHTO M270 Gr 36 (ASTM A709 Gr 36)	fy = 36 ksi
AASHTO M270 Gr 50 (ASTM A992/A572 Gr 50)	fy = 50 ksi
ASTM A1085	fy = 50 ksi

Concrete: Class D with Macrofiber or Class G, f'c = 4.5 ksi

▲ Reinforcing Steel: **LONG LEAD ITEM**
Splice Length = 2'-5" for #4, 1'-10" for #3
All tie wire, chairs and supports shall be stainless steel or plastic coated.
All reinforcing bends shown shall use a 4D pin diameter.

ASTM A955 fy = 75 ksi Min
Stainless steel reinforcing bars shall conform to ASTM 955, UNS Designations S24000, S31653, S31803, S32101 and S32304

ASTM A1035CS, (Grade 100) fy = 100 ksi Min
Reinforcing steel shall be low-carbon, chromium, conforming to ASTM A1035/A1035M Alloy Type 1035 CS Grade 100 with a minimum chromium content of 9.2%. Stainless steel per ASTM A955 may be substituted.

Designer/Detailer: Select reinforcing steel to specify which reinforcing is required on the project per the following requirements:

Reinforcing steel on structures and retaining walls carrying Interstate traffic (including ramps and crossing structures) and on any structures on the state highway system in Clear Creek, Grand, Gunnison, Hinsdale, Jackson, Lake, Mineral, Park, Pitkin, Rio Grande, Routt, San Juan, and Summit Counties shall be solid stainless steel (ASTM A955). Reinforcing steel in Bridge rails on structures in other locations shall ASTM A1035CS

Revision Dates	(Preliminary Stage Only)
12/19	11/21
12/19	6/20
12/19	1/20

INITIALS	DESIGN	DATE	DETAIL	DATE	QUANTITY	DATE
By						
Checked By						

All seals for this set of drawings are applied to the cover page(s)

Print Date: $DATE$
File Name: sheet_B-606-10mash.dgn
Horiz. Scale: 1:1 Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
2829 West Howard Place, 3rd Floor
Denver, CO 80204
Phone: 303-512-4079
FAX: 303-757-9197
Staff Bridge Branch

Initials

As Constructed
No Revisions:
Revised:
Void:

BRIDGE RAIL TYPE 10MASH

Designer: XXXXXXXX	Structure Numbers	X-XX-XX	Project No./Code: Project Number
Detailer: XXXXXXXX		X-XX-XX	Code
Sheet Subset: BRIDGE	Subset Sheets: BXX of XXX		Sheet Number

$PLOT_INFO$