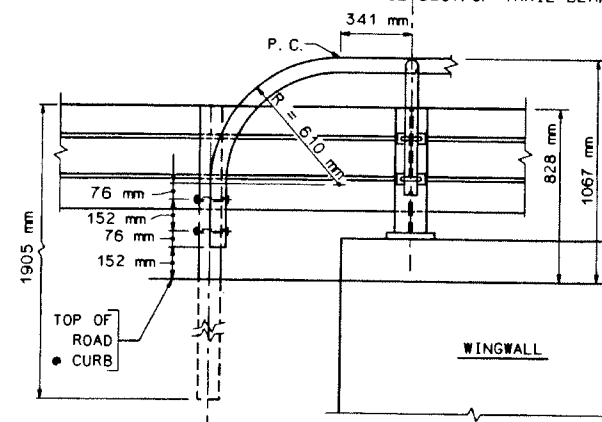


THREE BEAM NOTES:

- 
- Technical drawing of a handrail assembly. The drawing shows a side elevation of a handrail with a curved top section. Key dimensions and components are labeled:
- RAIL POST (W150x22)**: The vertical support post.
  - C OF HAND RAIL**: Center of the handrail.
  - 45 mm**: Horizontal distance from the rail post center to the start of the curve.
  - 64 mm Ø STD. PIPE**: The main handrail pipe.
  - R = 152 mm**: Radius of the curved section.
  - 6°**: Angle of the curve.
  - 16 mm GUARDRAIL BOLT (L=40 mm) NUT, WASHER(TYP.)**: Hardware used to secure the handrail.
  - 51 mm Ø STD. PIPE**: A smaller vertical pipe or support.
  - 76 mm**: Horizontal distance from the rail post center to the center of the guardrail bolts.
  - 550 mm**: Vertical distance from the top of the handrail to the top of the guardrail bolts.
  - 828 mm**: Vertical distance from the top of the handrail to the top of the wearing surface.
  - 1067 mm**: Total vertical height from the top of the handrail to the top of the wearing surface.
  - SEE DETAIL Y**: Reference to another detail for the base connection.
  - 230 mm (MIN)**: Minimum vertical clearance from the base to the top of the handrail.
  - 100 mm**: Horizontal distance from the rail post center to the center of the base bolts.
  - 125 mm**: Horizontal distance from the rail post center to the center of the base bolts.
  - 165 mm**: Horizontal distance from the rail post center to the center of the base bolts.
  - 225 mm**: Horizontal distance from the rail post center to the center of the base bolts.
  - 460 mm**: Total horizontal width of the base.
  - TOP OF WEARING SURFACE**: The ground level or surface the handrail is mounted on.
  - 140 mm (MIN)**: Minimum vertical clearance from the base to the top of the wearing surface.

	C W POST
HIGHWAY ITEM - 2 SECTIONS	BRIDGE ITEM - SINGLE
OF NESTED THRIE BEAM RAIL	SECT. OF THRIE BEAM RAIL



W150 POST

HEAVY  
HEX NUT  
TYPICAL

19 mm R.\*

20 mm P

25 mm MIN. (TYP)

2 mm MOULDED FABRIC  
BEARING PAD (M9. 16. 2)

Technical drawing of the test specimen showing dimensions and components. The specimen is a rectangular plate with a central I-beam section. Dimensions are given in mm. The overall width is 255 mm, and the overall height is 350 mm. The central I-beam section has a width of 145 mm and a height of 175 mm. The plate thickness is 20 mm. The I-beam section is made of W150x22 steel. The plate is supported by a POST. The drawing also shows a detail of a hole with a diameter of 35 mm and a distance of 6 mm from the edge.

**BOLT DETAIL**  
NOT TO SCALE

The drawing shows a vertical bolt with a central section of 250 mm and a total height of 330 mm. A bracket indicates the bolt has a 32 mm diameter (M164). The bolt is shown with a nut and washer at the top and a washer at the bottom. A horizontal arrow points to the right from the bottom washer.

Technical drawing of a rectangular plate with the following specifications:

- Overall width: 255 mm
- Overall height: 350 mm
- Top edge offset: 45 mm (TYP)
- Right edge offset: 45 mm (TYP)
- Four 35 mm  $\varnothing$  HOLES FOR 32 mm  $\varnothing$  (M164) BOLTS (TYP) arranged in a 2x2 grid.
- Center-to-center distance between holes: 16 mm  $\varnothing$
- 75 mm  $\varnothing$  HOLE CENTERED ON  $\varnothing$  (likely a typo for a specific feature or center point).

The diagram illustrates the layout of slots and posts for a three-post expansion joint. It shows a cross-section of the joint with three vertical posts. The top and bottom sections are labeled 'AT EXPANSION SPLICES' and 'AT REGULAR SPLICES' respectively. The middle section is labeled 'DIRECTION OF TRAFFIC' with an arrow pointing left. The diagram includes dimensions for slot widths (89 mm, 70 mm, 318 mm, 51 mm, 108 mm) and slot heights (23 mm x 29 mm, 23 mm x 64 mm, 19 mm x 64 mm, 19 mm x 95 mm). It also indicates the locations of standard slots, expansion slots, and posts.

89 mm 89 mm  
70 mm 70 mm  
AT EXPANSION SPLICES

318 mm

DIRECTION OF TRAFFIC

23 mm x 29 mm  
SLOTS ● STD. SPLICES  
& 23 mm x 64 mm  
SLOTS ● EXP. SPLICES

19 mm x 64 mm  
SLOTS ● STD. SPLICES  
& 19 mm x 95 mm  
EXP. SLOTS ● POSTS

AT SPLICES BETWEEN POSTS ELIMINATE THIS SLOT OR PROVIDE BUTTON HEAD BOLT.

51 mm 51 mm  
108 mm 108 mm  
AT REGULAR SPLICES

THRIE BEAM

51 mm

76 mm

29 mm

19 mm

60 mm

19 mm

51 mm

108 mm

29 mm

51 mm

40 mm

19 mm Ø STD. PIPE

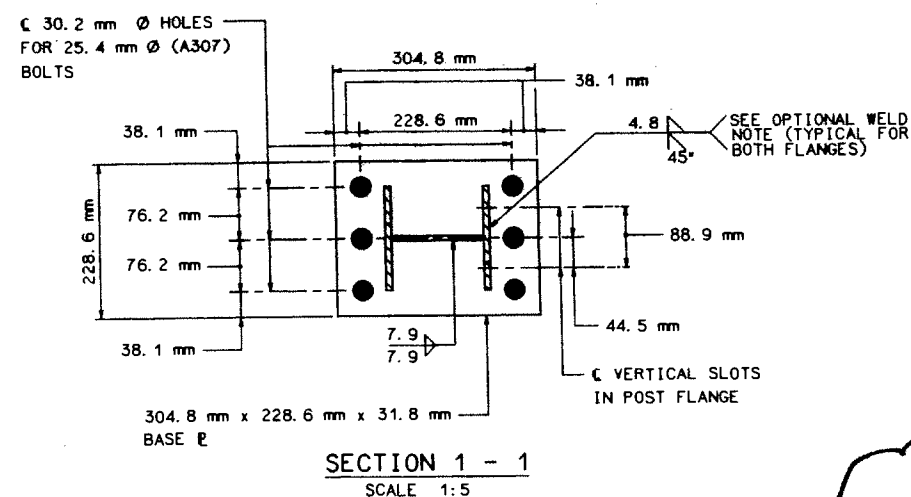
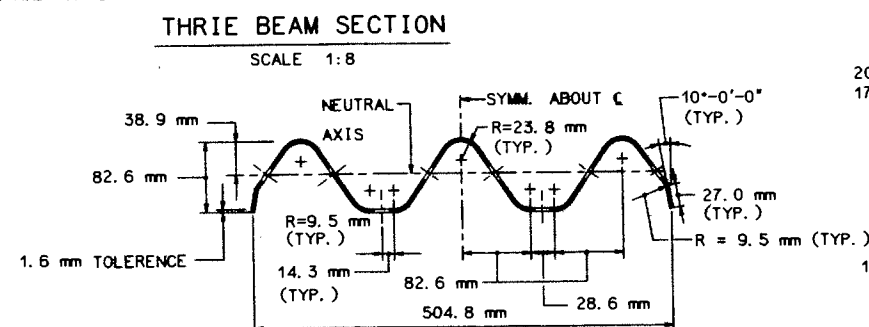
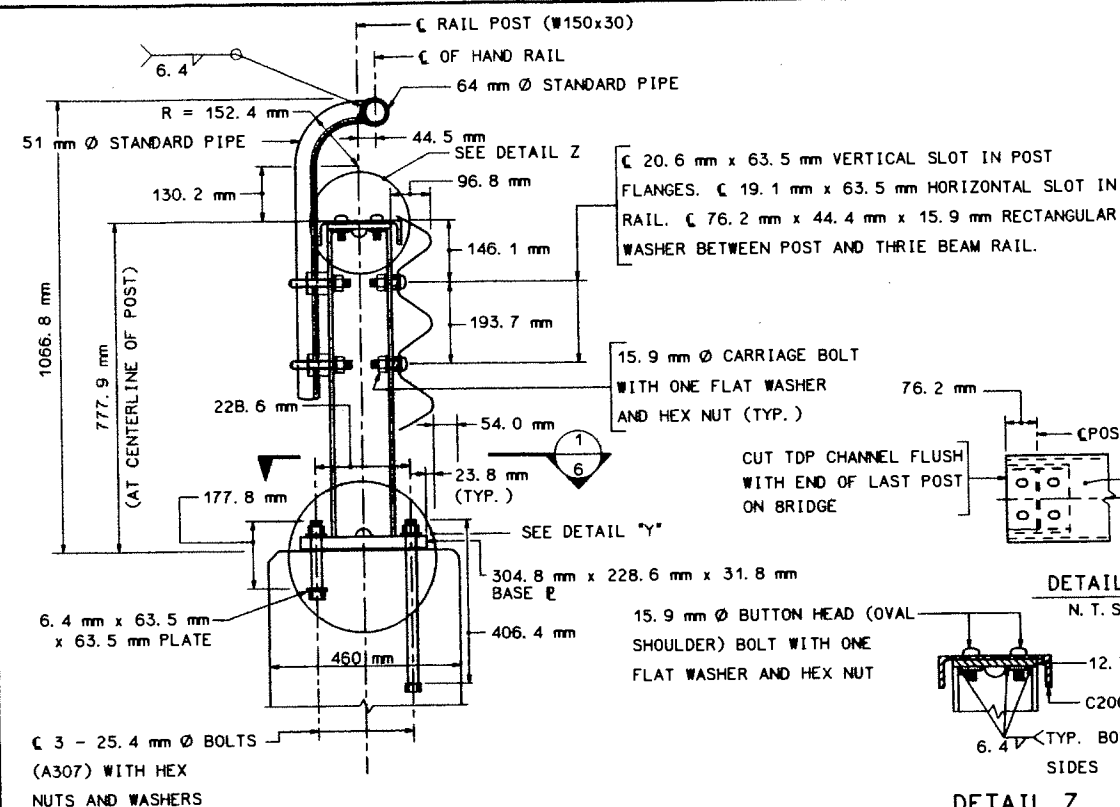
19 mm Ø U-BOLT W/ NUT, WASHER AND LOCK WASHER

W150x22

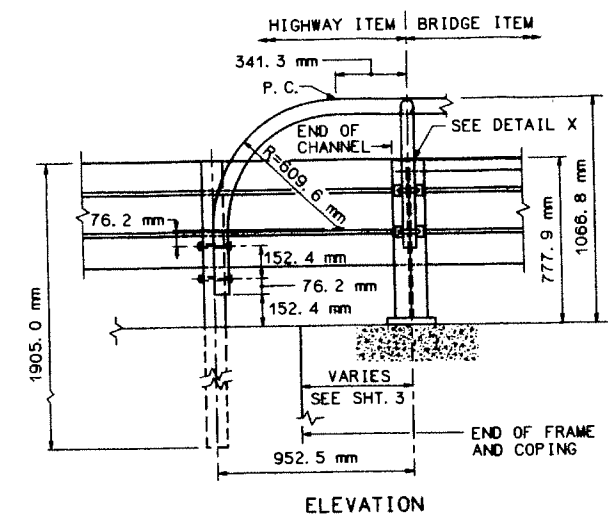
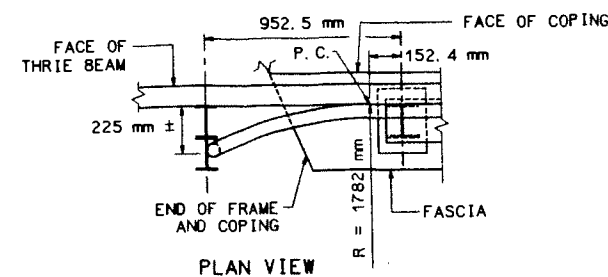
DEC. 5, 1998	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

SHEET 7 OF 7 SHEETS BRIDGE NO. B-9-4 (ATW)

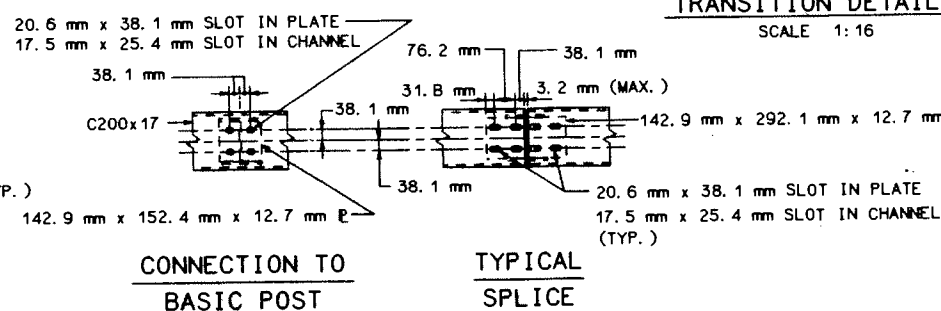
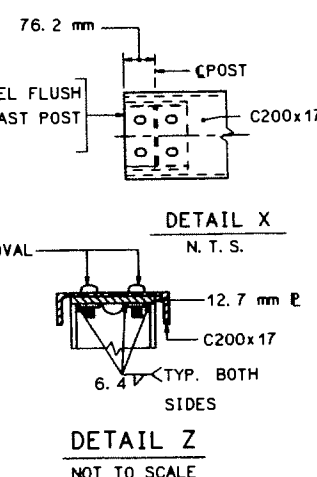
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MASS.	BRZ-0005(542)X	1997	12	22
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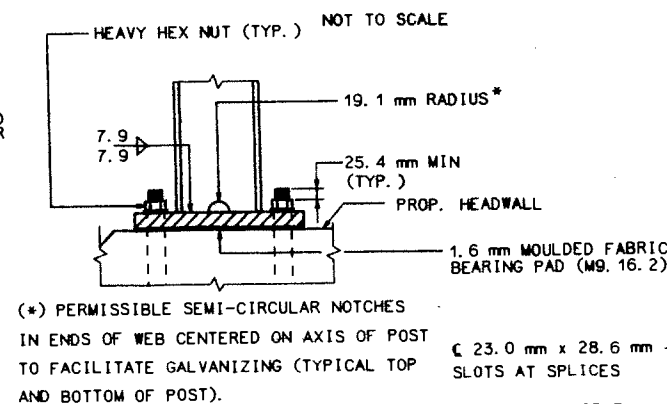
NOTE: OPTIONAL WELDING OF THE POST TO THE BASE PLATE IS A 9.5 mm FILLET WELD ALL AROUND (INCLUDING THE EDGES OF THE POST FLANGES) IN LIEU OF THE WELD SHOWN.



TRANSITION DETAILS  
SCALE 1:16



CHANNEL MEMBER DETAILS  
NOT TO SCALE

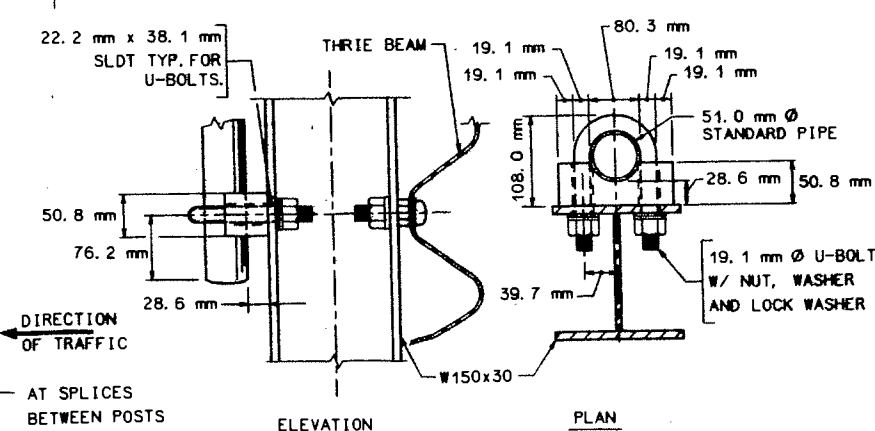


MISSOURI  
THRIE BEAM DETAILS

THRIE BEAM RAIL SPLICE DETAILS  
NOT TO SCALE

### THRIE BEAM NOTES:

1. EACH CHANNEL MEMBER SHALL BE ATTACHED CONTINUOUSLY TO A MINIMUM OF FOUR POSTS.
2. ALL STEEL CONNECTING BOLTS AND FASTENERS FOR POSTS AND RAILING, AND ALL ANCHOR BOLTS SHALL CONFORM TO ASTM A307 AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232.
3. RAIL POSTS AND ANCHOR PLATES SHALL BE SEATED ON MOULDED FABRIC BEARING PADS MEETING M9.16.2 AND HAVING THE SAME DIMENSIONS AS THE PLATE. ADDITIONAL PADS OR HALF PADS MAY BE USED IN SHIMMING FOR ALIGNMENT. POST HEIGHTS SHOWN WILL INCREASE BY THE THICKNESS OF THE PAD.
4. RAIL POSTS SHALL BE SET PERPENDICULAR TO ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION. EXCEPT THAT THE RAIL POSTS SHALL BE ALIGNED BY THE USE OF SHIMS SO THAT IN THE FINAL ADJUSTMENT NO PART SHALL DEVIATE MORE THAN ONE INCH FROM TRUE HORIZONTAL ALIGNMENT. THE SHIMS SHALL BE 76.2 mm x 44.5 mm AND PLACED BETWEEN THE POST AND THE THRIE BEAM RAIL. THE THICKNESS OF THE SHIMS SHALL BE DETERMINED BY THE CONTRACTOR AND VERIFIED BY THE ENGINEER BEFORE ORDERING MATERIAL FOR THIS WORK.
5. MINIMUM LENGTH OF THE THRIE BEAM SECTIONS IS EQUAL TO ONE POST SPACE.
6. USE 15.9 mm BUTTON HEAD, OVAL SHOULDER BOLTS WITH 15.9 mm HEX NUTS AT ALL SLOTS. THE THICKNESS OF HEX NUTS = 9.5 mm MIN.
7. THRIE BEAM GUARD RAIL STEEL SHALL CONFORM TO THE AASHTO M180, CLASS A, TYPE II AND SHALL BE 2.75 mm THICK.
8. POSTS, TOP PLATES, BASE PLATES, PLATE WASHERS, CHANNELS AND CHANNEL SPLICE PLATES SHALL BE FABRICATED FROM STEEL CONFORMING TO AASHTO M270M GR. 250 STEEL AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.
9. WASHERS SHALL BE USED AT ALL POST BOLTS (BETWEEN THE BOLT HEAD AND BEAM). THEY SHALL BE RECTANGULAR IN SHAPE (76.2 mm x 44.5 mm x 4.8 mm MIN.) AND FLAT WITH A 17.5 mm x 25.4 mm SLOT, OR WHEN NECESSARY OF SUCH DESIGN AS TO FIT THE CONTOUR OF THE BEAM. (USE A 76.2 mm x 44.5 mm x 15.9 mm RECTANGULAR WASHER BETWEEN THE POST AND THE THRIE BEAM RAIL.)
10. SPECIAL DRILLING OF THE THRIE BEAM MAY BE REQUIRED AT THE SPLICES. (ALL DRILLING DETAILS ARE TO BE SHOWN ON THE SHOP DRAWINGS.)
11. SHIM PLATES 152.4 mm x 152.4 mm x 1.6 mm MAY BE USED BETWEEN THE TOP OF THE POST AND THE CHANNEL MEMBER AS REQUIRED FOR VERTICAL ALIGNMENT.
12. HAND RAIL STEEL SHALL CONFORM TO ASTM A53 GR. B OR A501 AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.



DATE	DESCRIPTION
MAY 17, 1997	ISSUED FOR CONSTRUCTION
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