

Memorandum

SENT VIA ELECTRONIC MAIL

Subject: INFORMATION: NCHRP Report 350 Aesthetic Barriers and Bridge Rails Date: February 12, 2004

From: */Original Signed by/*
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety In Reply Refer To: HSA-10/B-64D2

To: Safety Field
Federal Lands Highway Division Engineers

Mr. Michael S. Griffith's April 9, 2003, memorandum (acceptance letter B-64D) identified several crash tested aesthetic roadside/median barriers and bridge railings that were developed in conjunction with Federal Lands Highway and the National Park Service. Since then, additional designs have been developed and successfully tested under NCHRP Report 350 guidelines or are similar to tested designs and considered to be equivalent. Information on the designs listed below was compiled by Cathy Satterfield, Safety Engineer, Central Federal Lands Highway Division, and was submitted for formal acceptance. Each design is acceptable for use on the NHS and is considered to meet NCHRP Report 350 evaluation criteria at the test levels indicated:

- Tubular Steel-Backed Timber (TSBT) Bridge Rail and Transition – TL-3 (Attachments 1 and 2)
- Steel-Backed Timber Guardrail Transition to Straight Stone Masonry Guardwall Parapet – TL-3 (Attachment 3) *
- Steel-backed Timber Round Log Rail – TL-2 (Attachment 4)
- Steel-Backed Timber Guardrail Transition to Straight Stone Masonry Guardwall Parapet – TL-2 (Attachment 5)
- Steel-Backed Timber Guardrail Transition to Curved Stone Masonry Guardwall Parapet – TL-2 (Attachment 6)

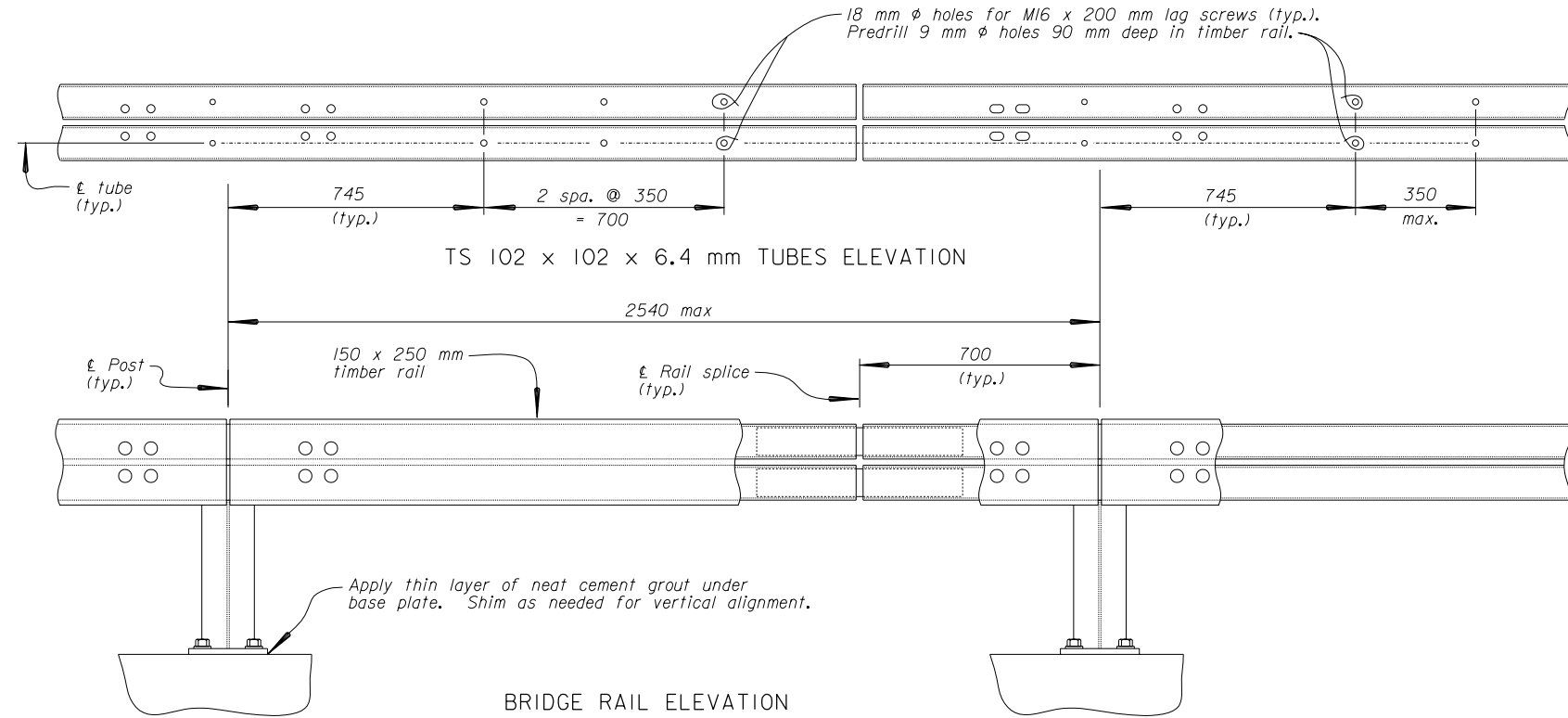
* Note that this transition is a modified version of the crash-tested design which was considered unacceptable due to occupant compartment intrusion resulting from wheel interaction with the timber rail /rubrail. The added curb creates a vertical transition profile that is similar to that of the successfully tested transition design for the Merritt Parkway aesthetic guiderail. The curb is expected to prevent the wheel from folding under the rail elements, reducing snagging to an acceptable level, and resulting in acceptable performance.



Additional drawings and specifications for the designs listed above will be posted at <http://efl.fhwa.dot.gov/techdev> under Aesthetic Barriers. In the meantime, anyone seeking detailed plans and specifications for any of these features, including CADD files (Microstation format only), should contact Ms. Cathy Satterfield via telephone at (303) 716-2035 or via e-mail at Cathy.Satterfield@fhwa.dot.gov.

6 Attachments

| REGION | STATE | PROJECT | SHEET NO. | TOTAL SHEETS |
|--------|-------|----------------------------------|-----------|--------------|
| 16 | CO | PRA ROMO 12(1) BEAR LAKE ROAD | | |



RAIL NOTES:

GENERAL: This rail is modified from the Texas Department of Transportation Traffic Rail Type T101 standard drawing dated December 2001.

MATERIALS: Steel for rail posts, base plates, shims, splice sleeves, and anchor assembly plates shall conform to ASTM A36. Structural tubing for rails shall conform to ASTM A500, Grade B. All metal components of the bridge rail except post base shims, anchor assemblies, and rail splice sleeves shall be painted. Post base shims, anchor assemblies, and rail splice sleeves shall be galvanized. Hex bolts shall conform to AASHTO M164 (ASTM A325). Hex coupling nuts shall conform to ASTM A563, Grade C, D, or DH and shall have a center stop. All other fasteners shall conform to ASTM A307. For painting see Special Contract Requirements.

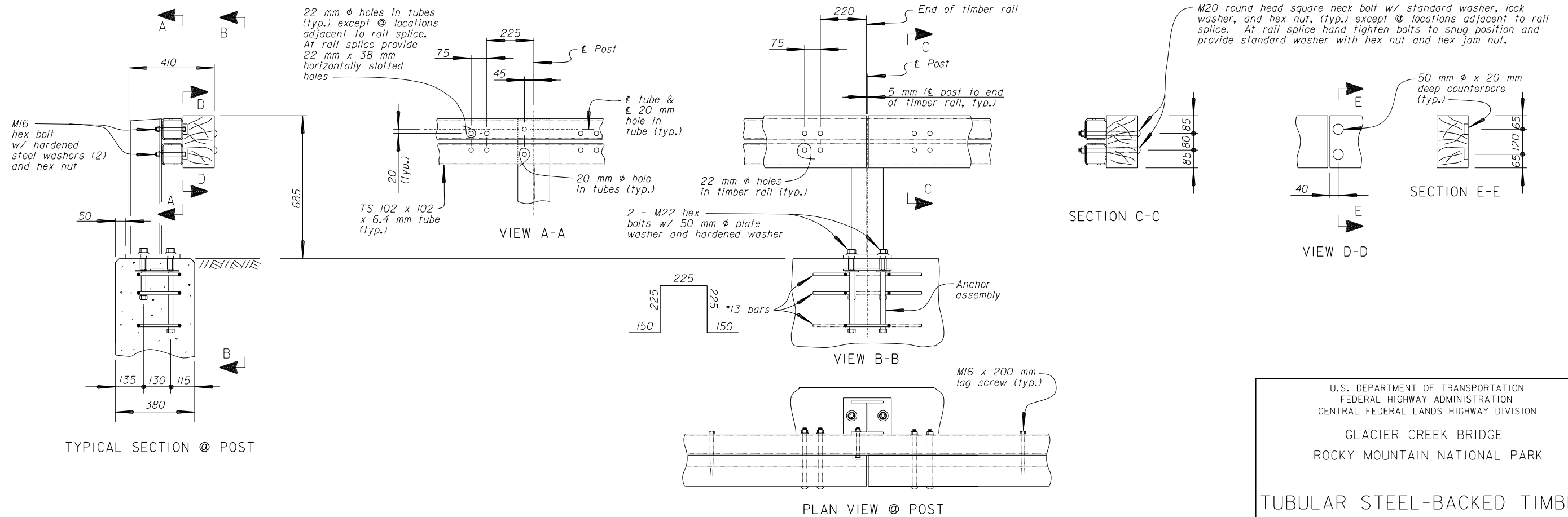
FABRICATION: Structural steel shall be shop fabricated. Submit shop drawings to the CO for approval prior to fabrication. Provide drawings showing rail section lengths, splice locations, rail post spacing, and fastener lengths. Welding shall conform to ANSI/AASHTO/AWS D1.5, and shall be by a certified welder. All steel shall be fabricated before being galvanized or painted.

RAIL SPLICE ASSEMBLIES: Section lengths of TS 102 x 102 rails shall be continuous over a minimum of three posts.

NEAT CEMENT GROUT: Provide neat cement grout consisting of a mixture of cement and water mixed to a smooth viscous paste.

ERECTION: Erect the rail parallel to grade.

TIMBER: Conform to Subsection 710.08 of the FP-96.

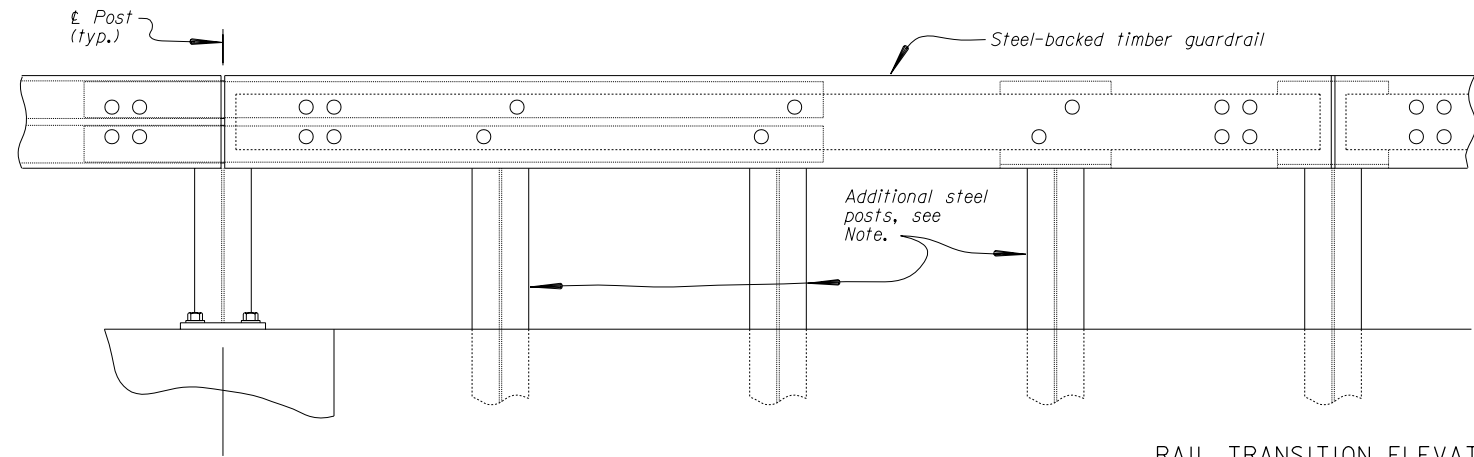


U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 CENTRAL FEDERAL LANDS HIGHWAY DIVISION
 GLACIER CREEK BRIDGE
 ROCKY MOUNTAIN NATIONAL PARK
 TUBULAR STEEL-BACKED TIMBER
 BRIDGE RAIL

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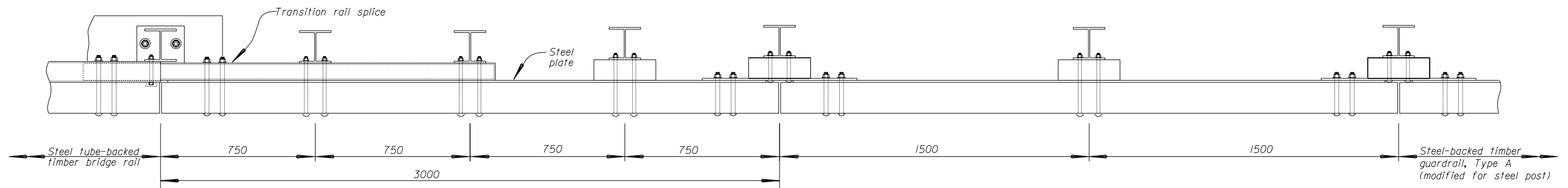
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| 16 | CO | PRA ROMO 12(1) BEAR LAKE ROAD | | |

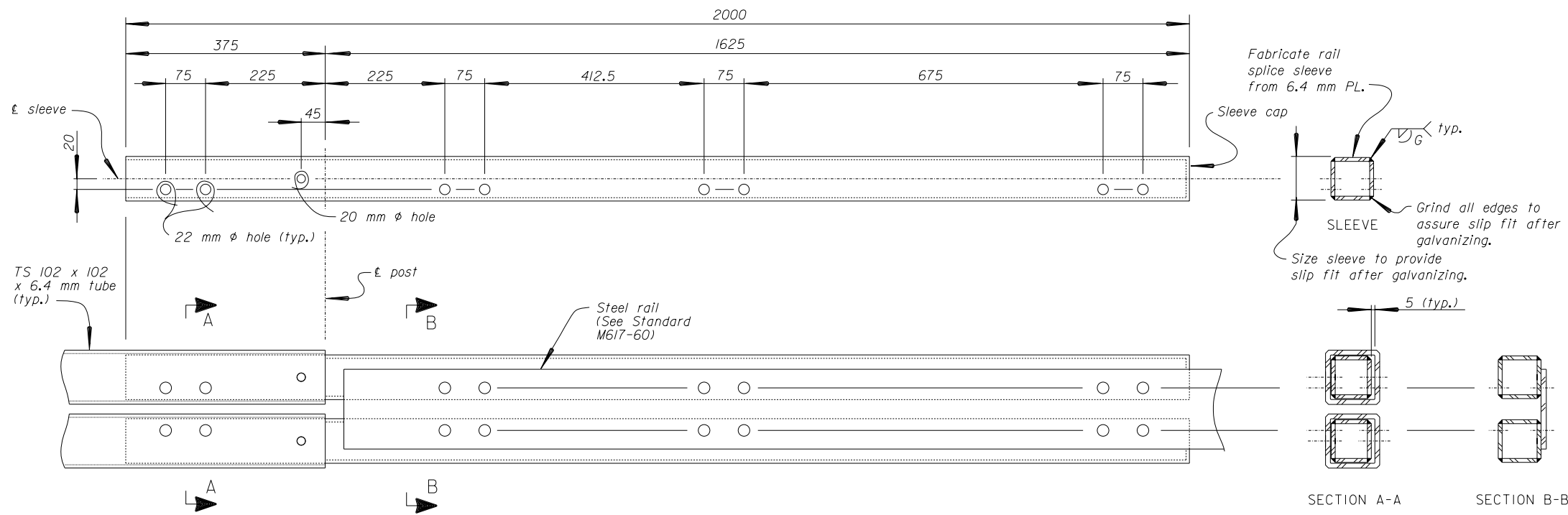


Note: At each additional post provide 2-M16 round head square neck bolts with plate washer and hex nut, a 20 x 60 mm slot in steel plate, and 18 mm ϕ holes in timber rail, steel post, and timber block. See Metric Standard M617-60, Steel-backed timber guardrail, Type A (modified for steel post).

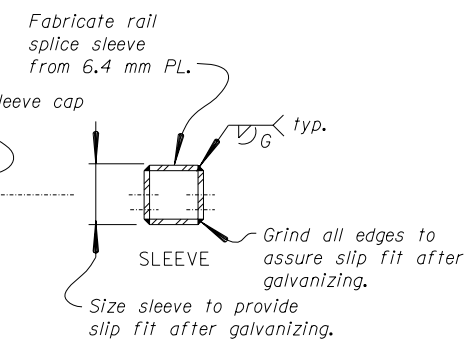
RAIL TRANSITION ELEVATION



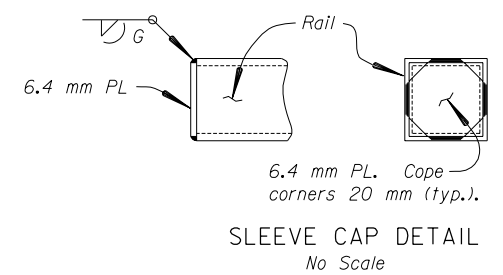
RAIL TRANSITION PLAN



TRANSITION RAIL SPLICE DETAIL
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SECTION A-A SECTION B-B



SLEEVE CAP DETAIL
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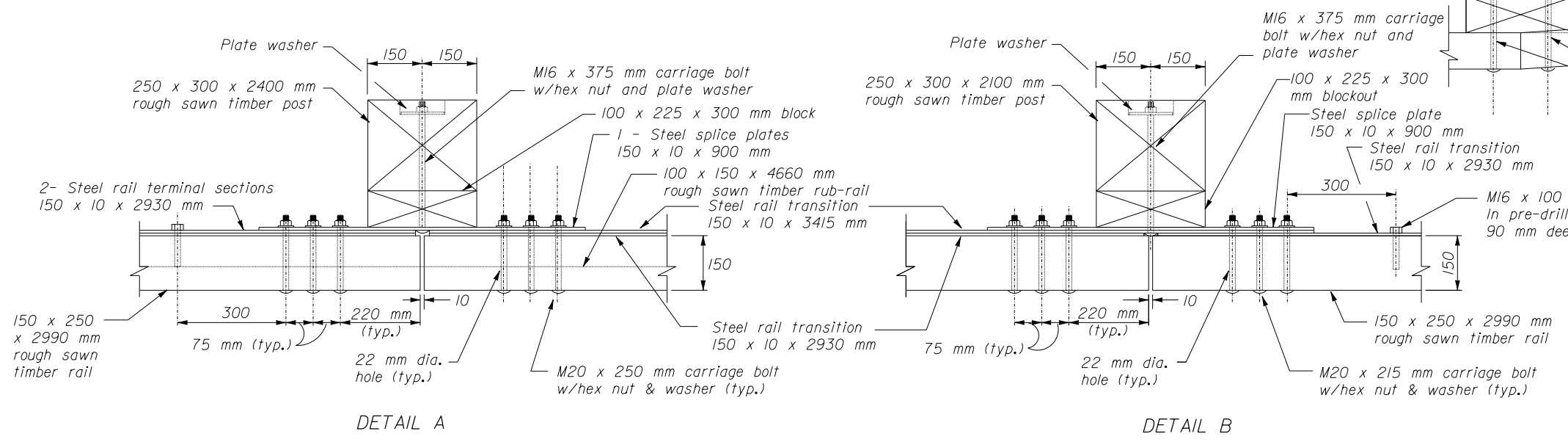
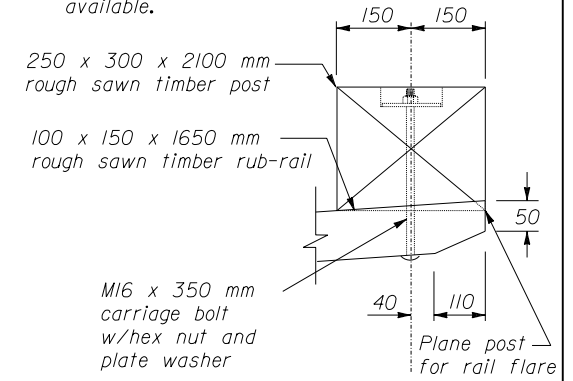
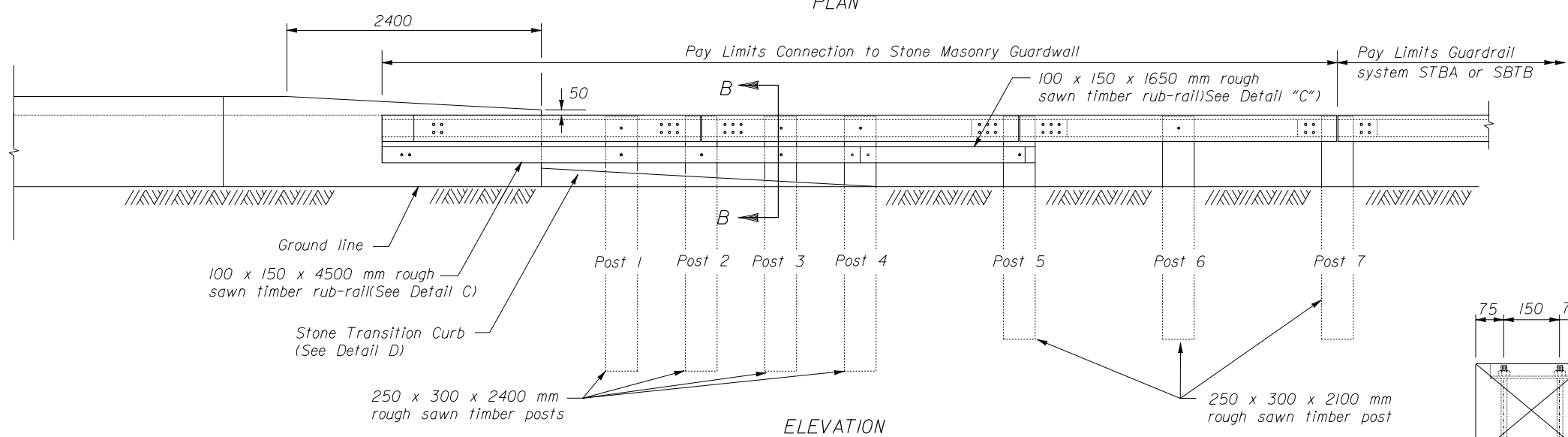
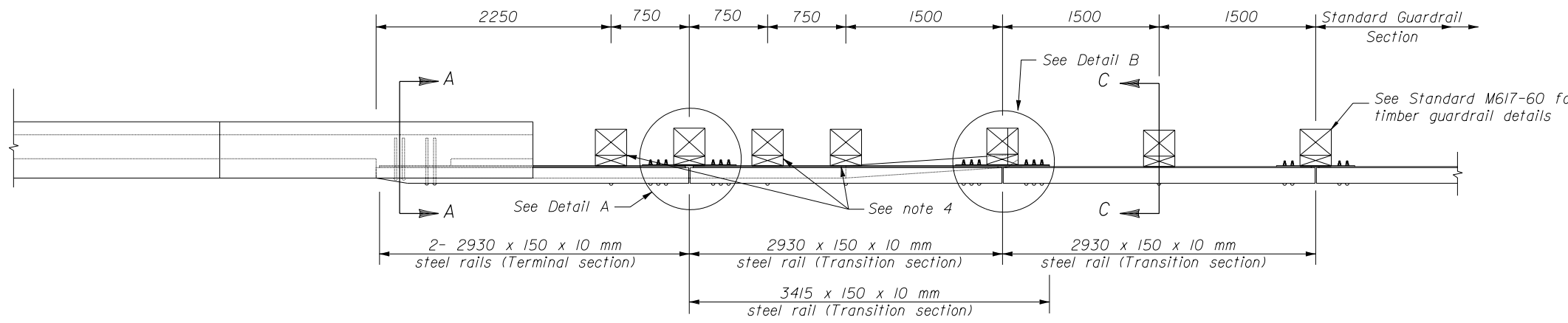
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION
GLACIER CREEK BRIDGE
ROCKY MOUNTAIN NATIONAL PARK
TUBULAR STEEL-BACKED TIMBER
BRIDGE RAIL TRANSITION

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- NOTE:**
- Dimensions not labeled are in millimeters.
 - See Detail M617-66A for Sections A-A through C-C, steel rail layouts, and other details.
 - Use weathering steel for all structural steel and fastener hardware.
 - For posts 1,3 and 4, use a 200 x 225 x 300 mm block for the blackout, and an M16 x 650 mm carriage bolt with hex nut and plate washer.
 - Furnish hardware in the metric sizes shown. Equivalent imperial sizes may be used when metric sizes are not available.



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FEDERAL LANDS HIGHWAY OFFICE

METRIC DETAIL

**STEEL-BACKED TIMBER GUARDRAIL
TEST LEVEL 3 CONNECTION TO
STONE MASONRY GUARDWALL**

DETAIL

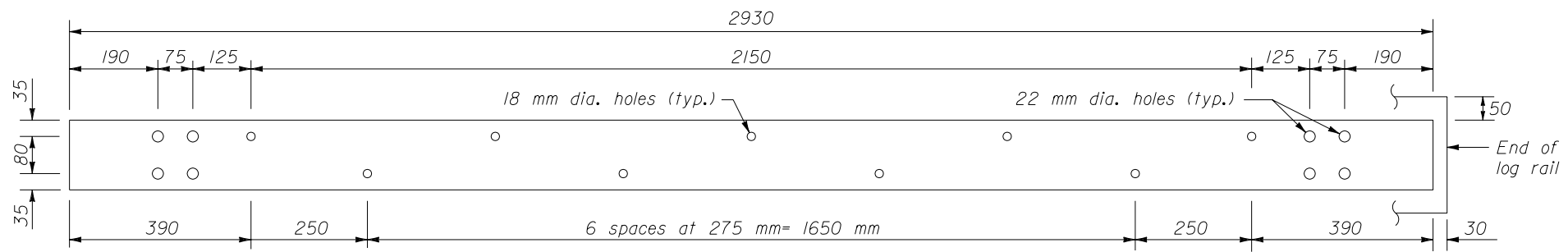
M617-xxA

REVISED: March 15, 2000

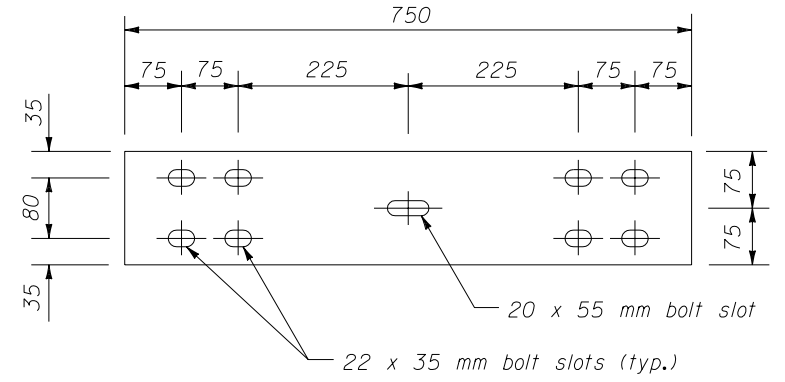
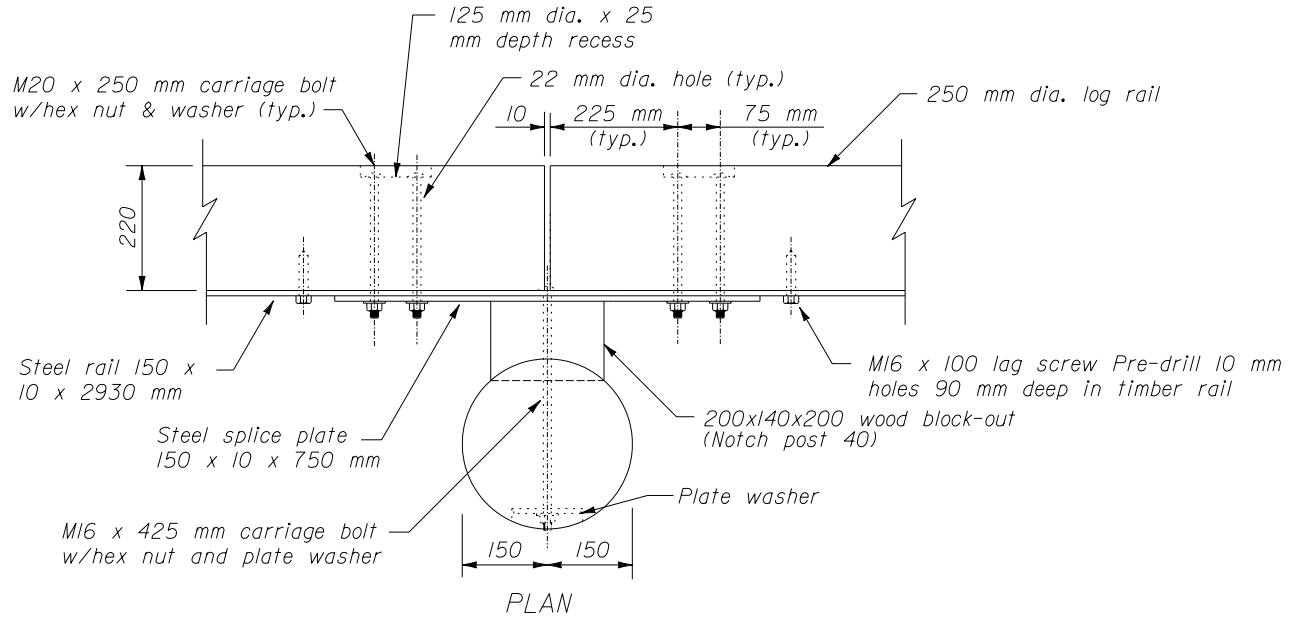
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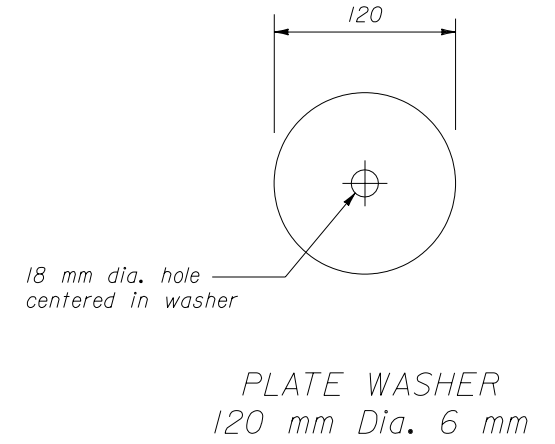
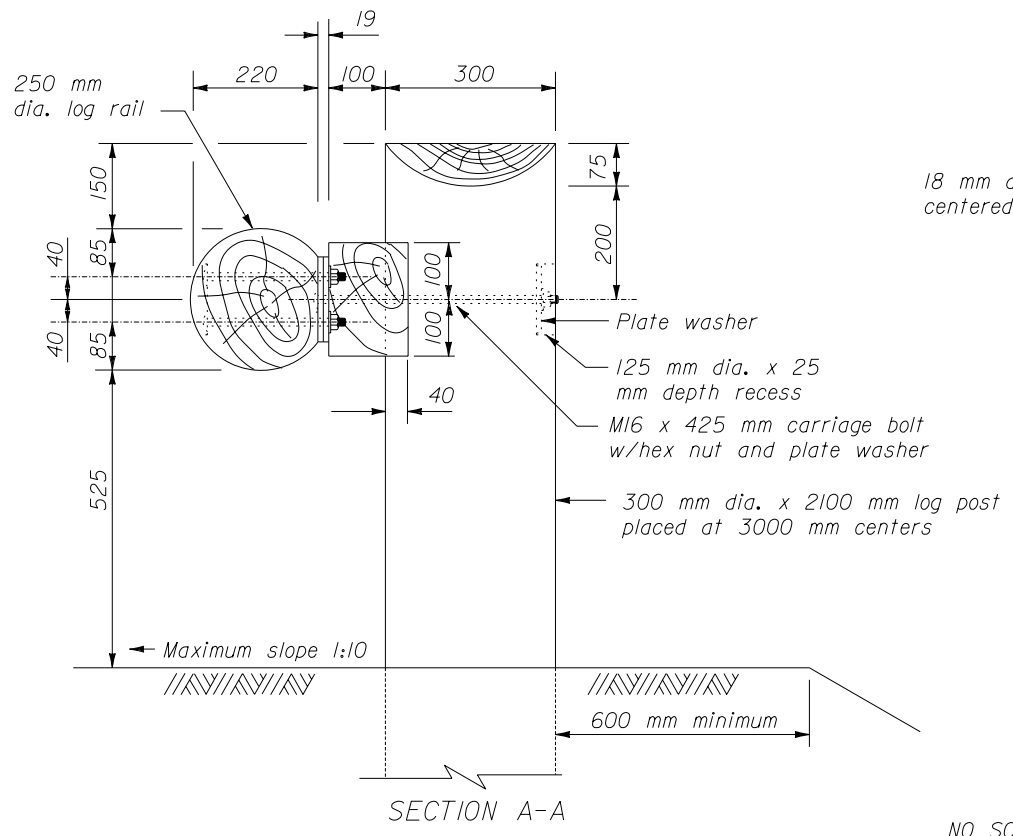
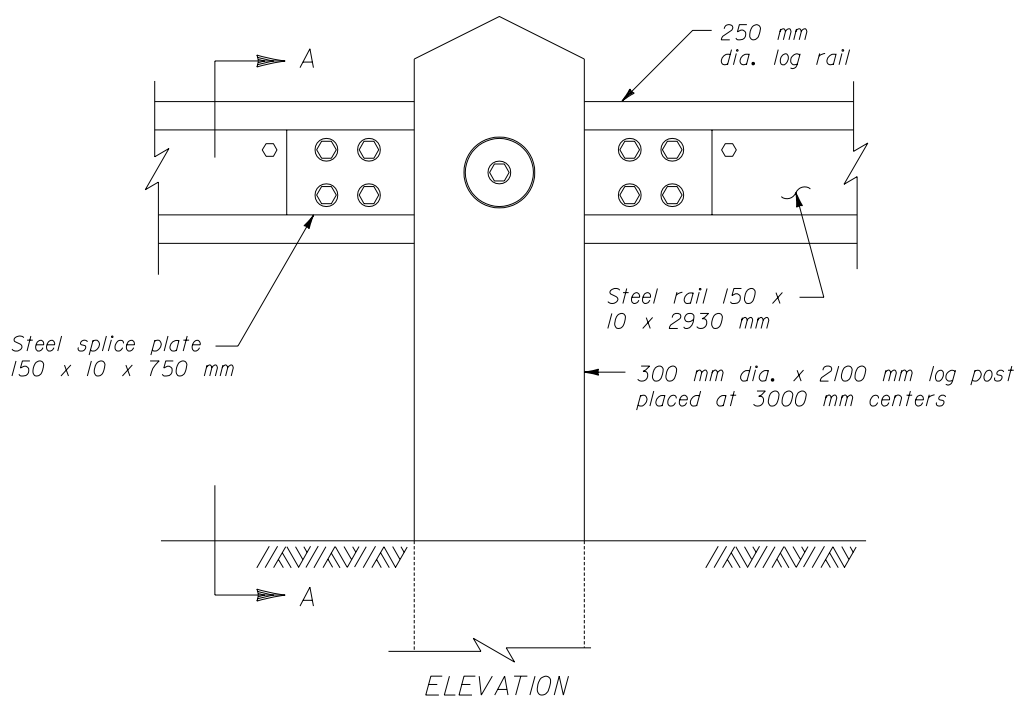


STEEL RAIL
150 x 10 x 2930 mm



STEEL SPLICE PLATE
150 X 10 X 750 mm

DRAFT - NOT FOR USE



NOTE:

1. Dimensions not labeled are in millimeters.
2. For details of the wood block-out, post notch, and general notes for Steel-Backed Log Guardrail See Standard M617-81.
3. Furnish hardware in the metric sizes shown. Equivalent imperial sizes may be used when metric sizes are not available.

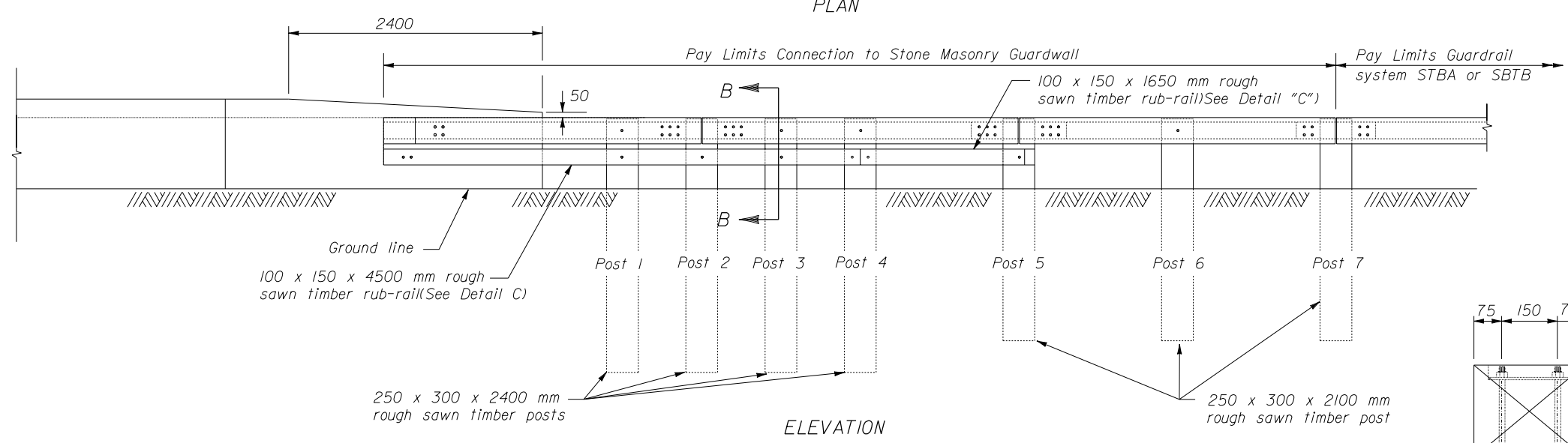
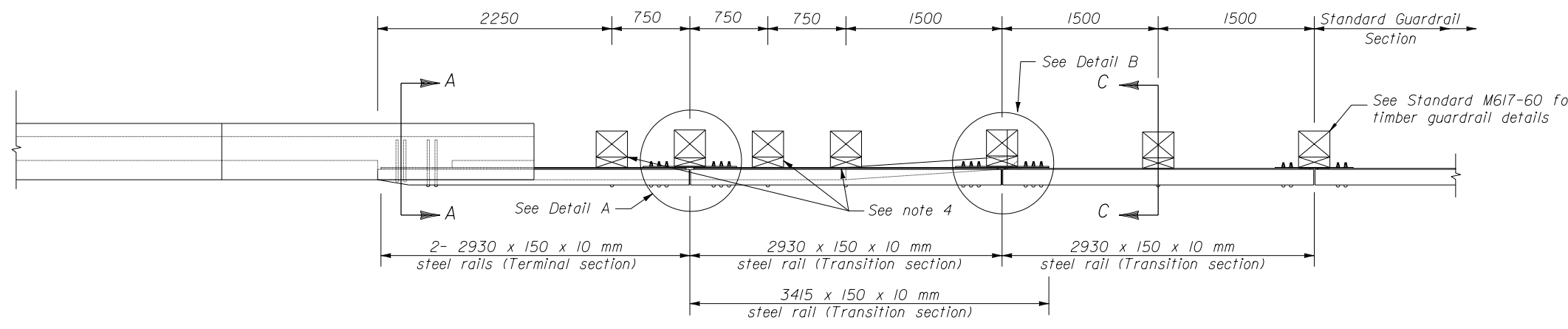
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POST CONNECTION

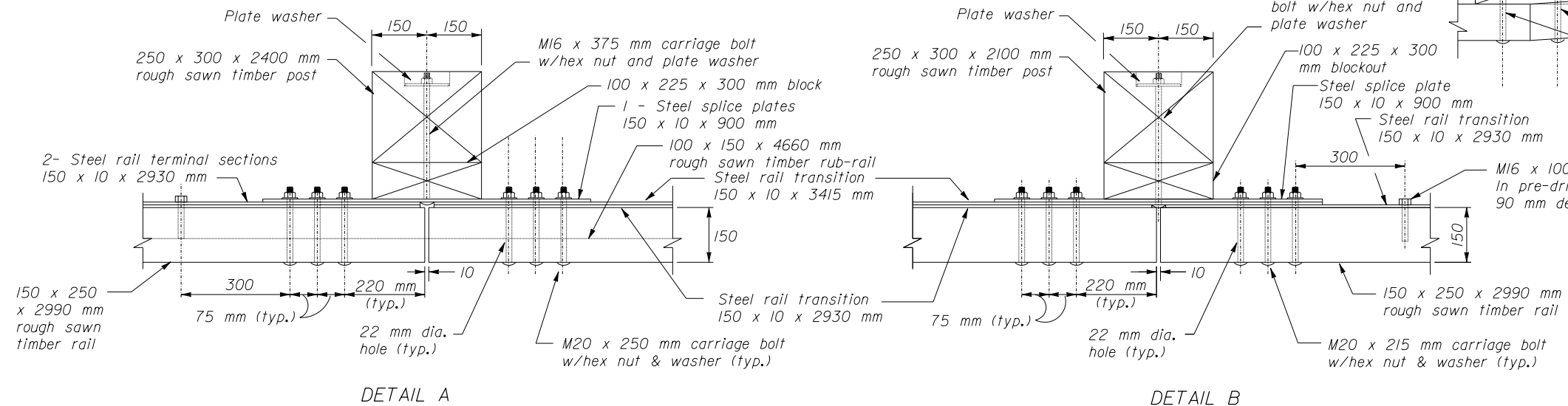
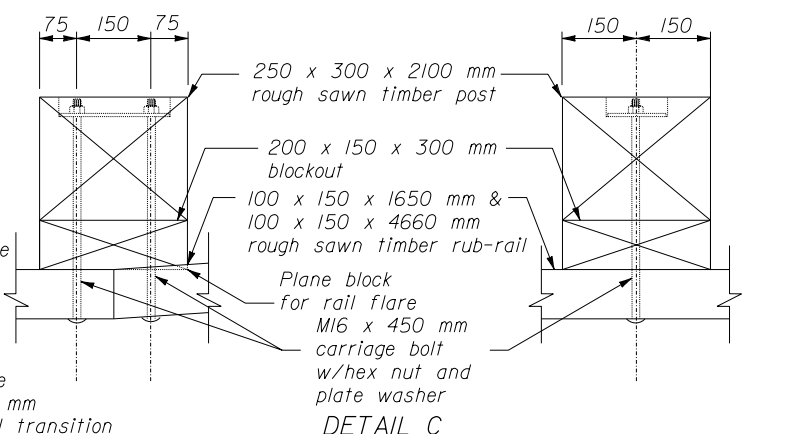
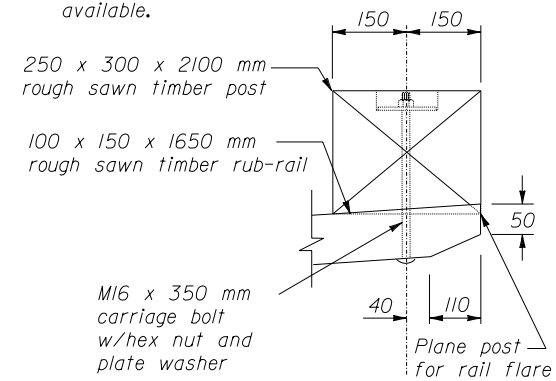
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| U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY OFFICE | |
| METRIC DETAIL STEEL-BACKED LOG RAIL | |
| REVISED: | DETAIL M617-80 |

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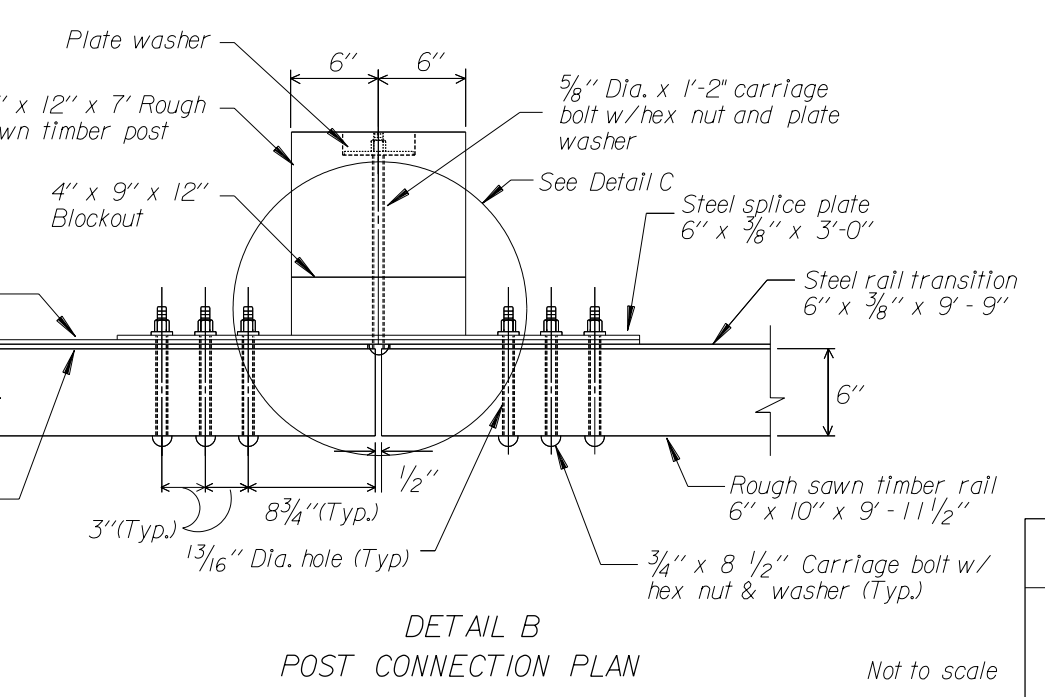
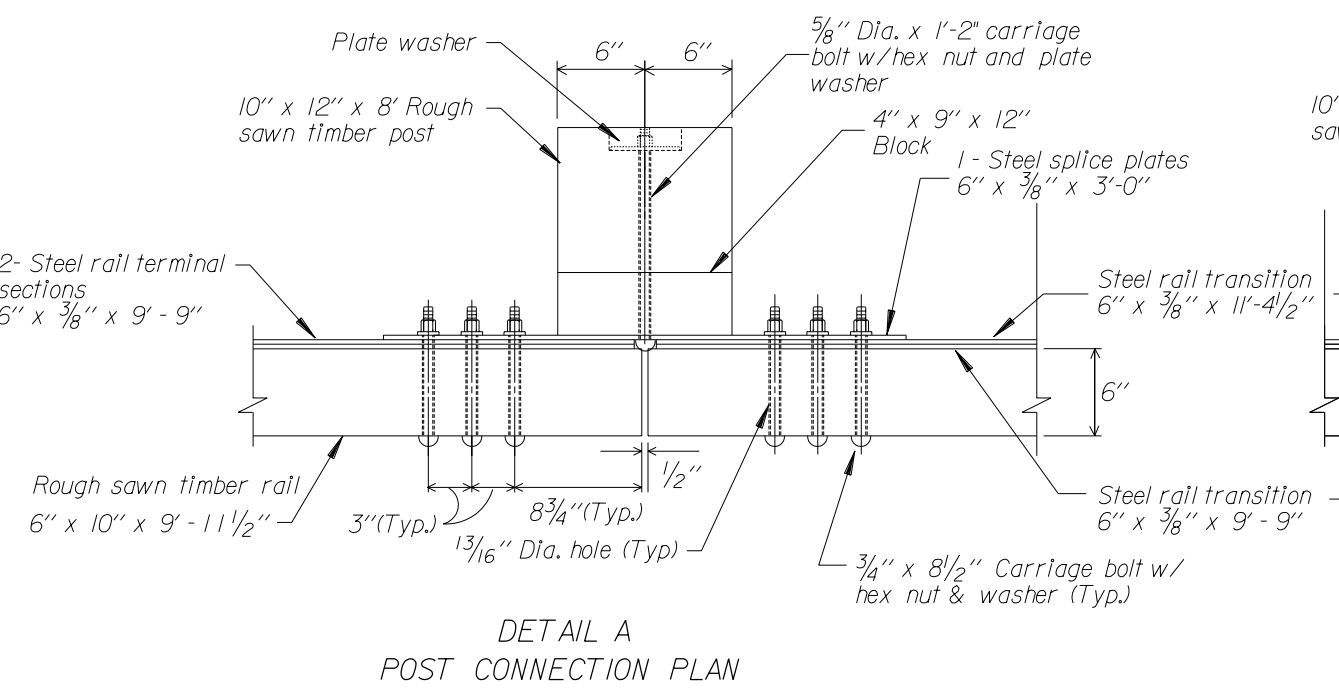
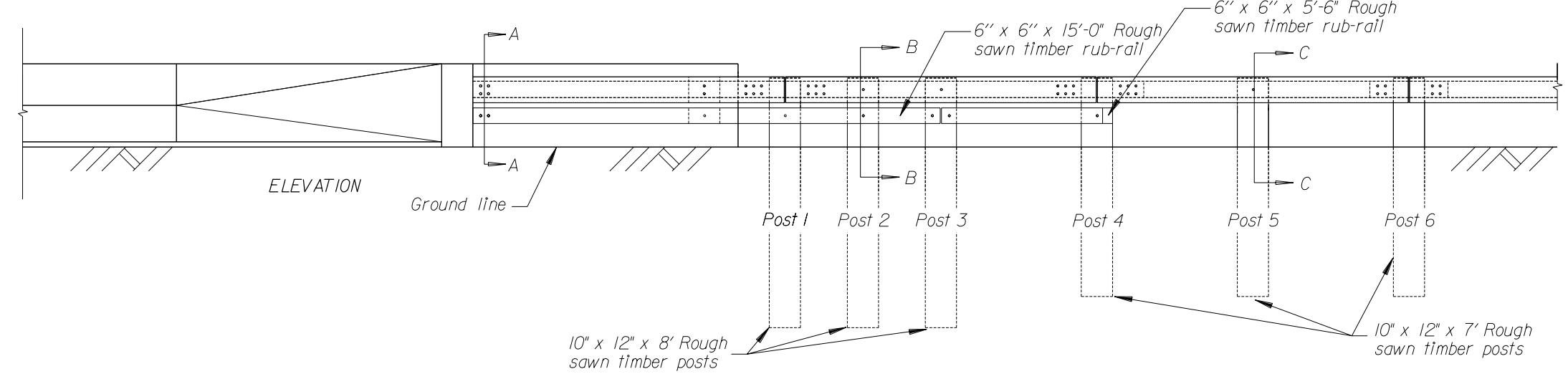
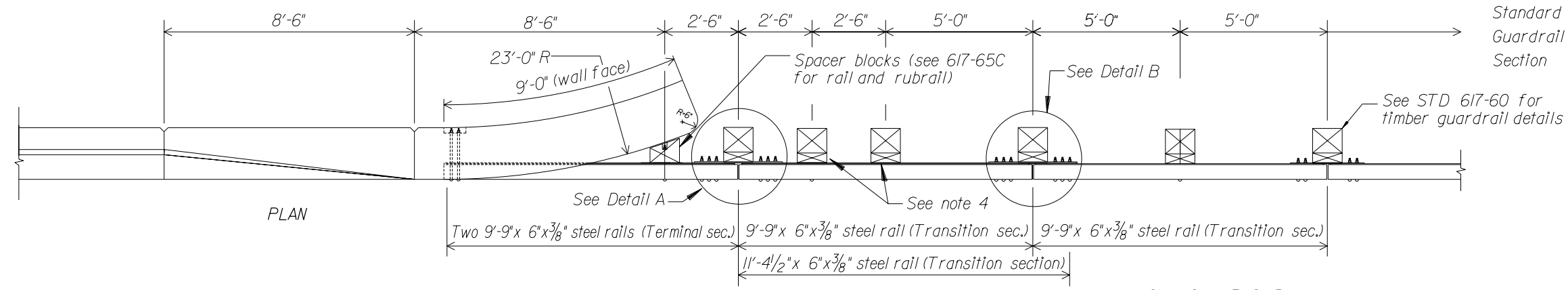
- NOTE:
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 - See Detail M617-66A for Sections A-A through C-C, steel rail layouts, and other details.
 - Use weathering steel for all structural steel and fastener hardware.
 - For posts 1,3 and 4, use a 200 x 225 x 300 mm block for the blockout, and an M16 x 650 mm carriage bolt with hex nut and plate washer.
 - Furnish hardware in the metric sizes shown. Equivalent imperial sizes may be used when metric sizes are not available.



NO SCALE

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| U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY OFFICE | |
| METRIC DETAIL | |
| STEEL-BACKED TIMBER GUARDRAIL TEST LEVEL 2 CONNECTION TO STONE MASONRY GUARDWALL | |
| REVISION: | DETAIL |
| March 15, 2000 | M617-67A |

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- Notes:
- See DET 617-65B for Sections A-A through C-C, steel rail layouts, and other details. See DET 617-65C for rubrail details, spacer blocks, and parapet connection details.
 - Use weathering steel for all structural steel and fastener hardware.

| REVISIONS | | | |
|-----------|-----------------------------|--------|-------|
| NO. | DESCRIPTION | BY | DATE |
| 1 | Steel transition rail REV. | R.J.S. | 11/90 |
| 2 | Multiple back plates | D.V.G. | 12/91 |
| 3 | Steel tube/schedule 40 pipe | D.V.G. | 11/92 |
| 4 | Increased blockout | D.V.G. | 6/93 |
| 5 | Corrected bolt lengths | D.V.G. | 11/93 |
| 6 | Added Rub-rail | D.V.G. | 9/94 |
| 7 | New detail | D.V.G. | 3/02 |

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DETAIL
STEEL-BACKED TIMBER GUARDRAIL
BRIDGE CONNECTION

Not to scale

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