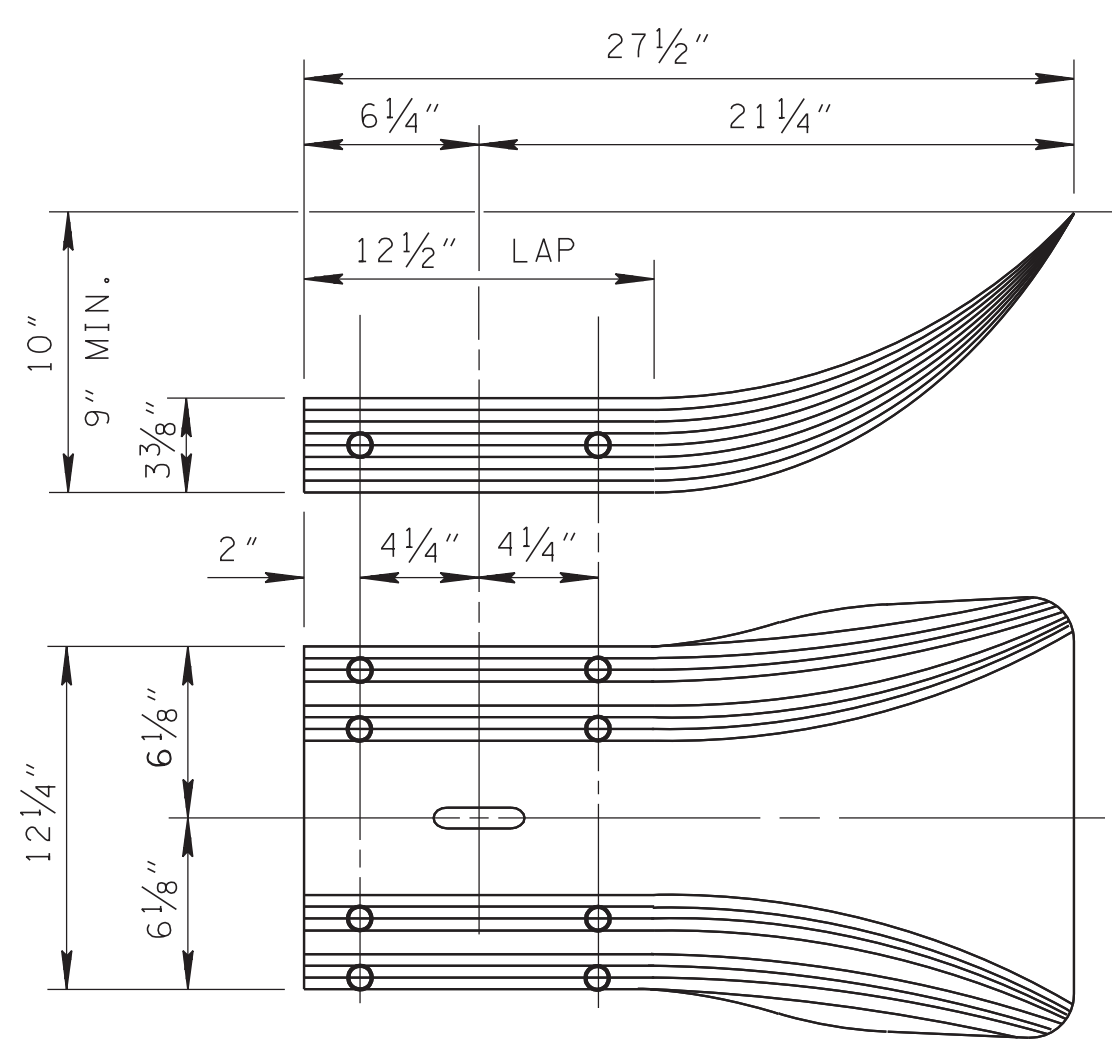
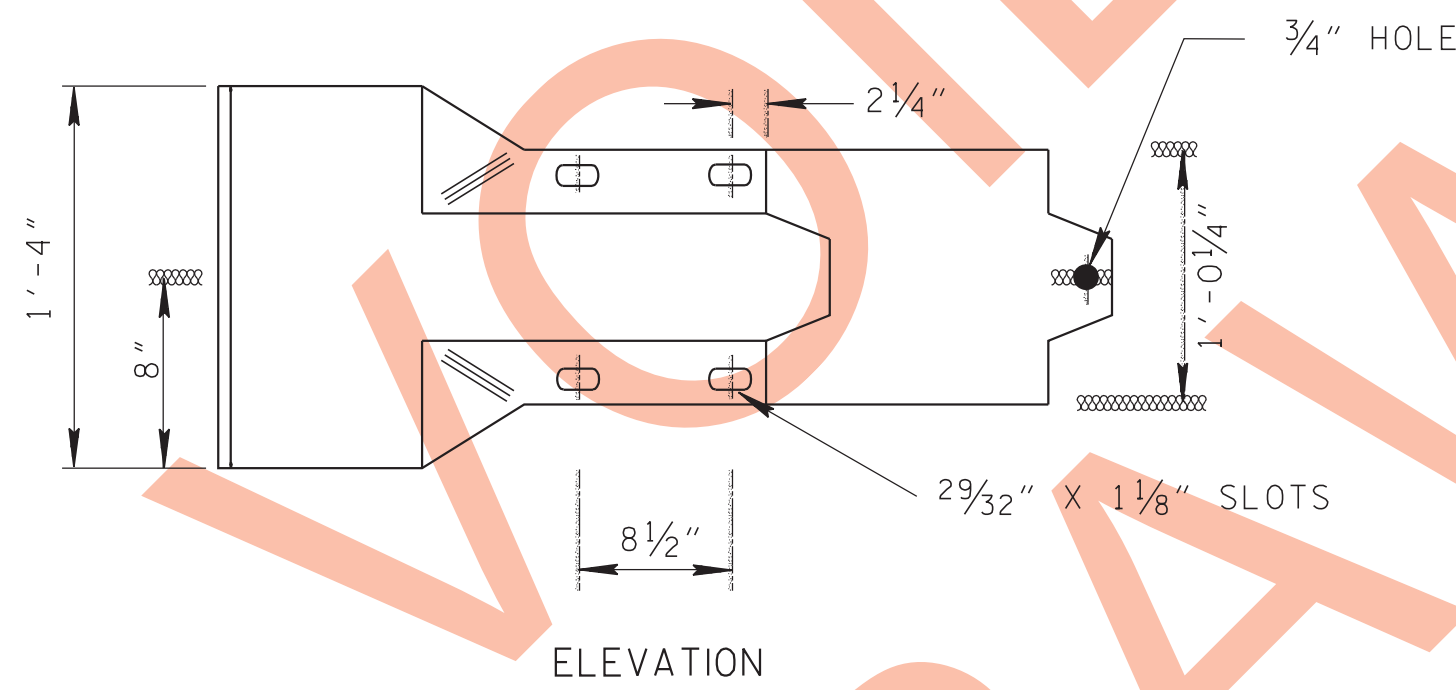
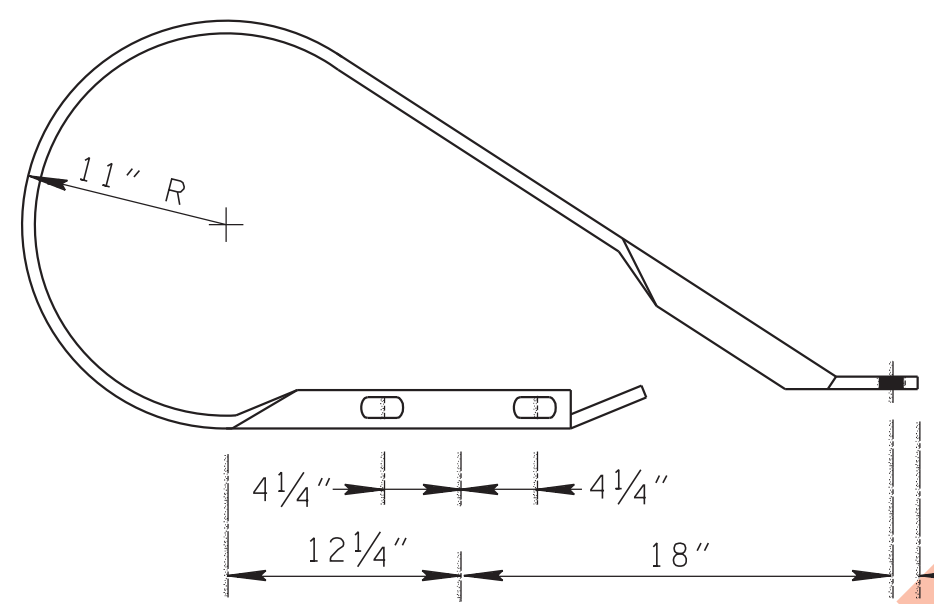


**ROUNDED END ELEMENT**  
(TO BE PERFORMED BY THE MANUFACTURER)



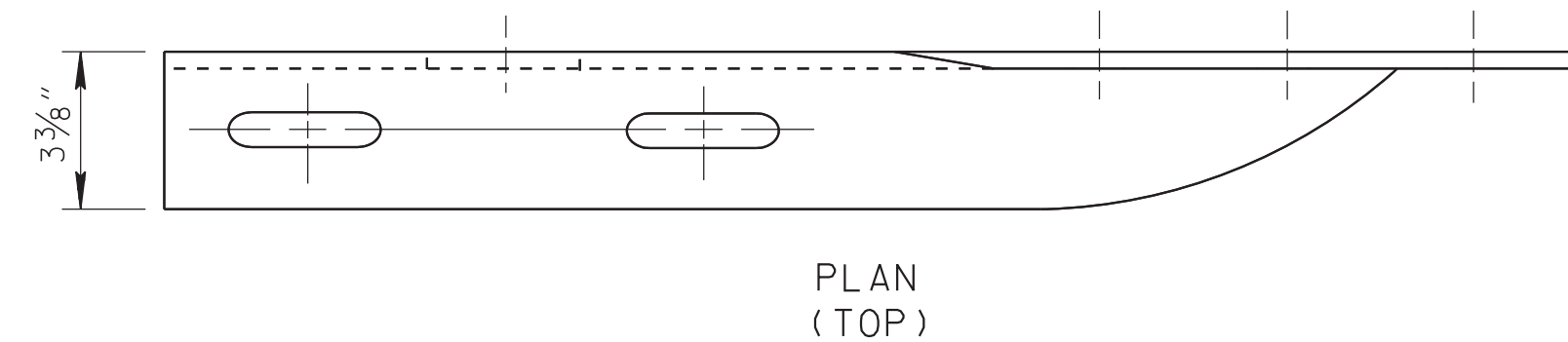
**FLARED END ELEMENT**  
(TO BE PERFORMED BY THE MANUFACTURER)



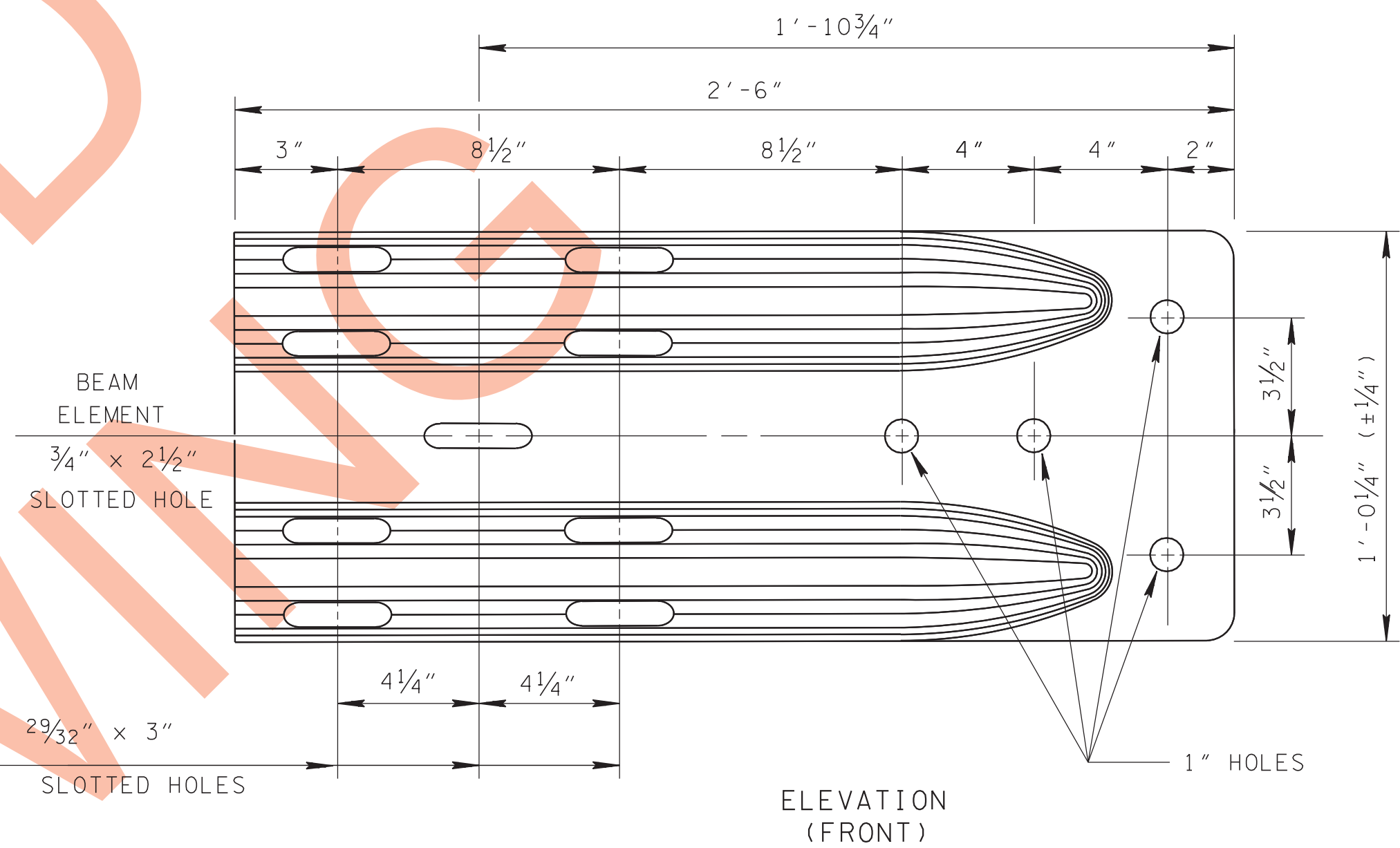
**END ELEMENT FOR GUARDRAIL TERMINAL ANCHOR TYPE 21**  
(TO BE PERFORMED BY THE MANUFACTURER)

NOTES REGARDING END TERMINALS (EXCEPT MICHIGAN SHOE)

HOLE SPACING IS THE SAME AS FOR ELEMENT DETAILS. OTHER DIMENSIONS SHOWN MAY VARY SLIGHTLY ACCORDING TO MANUFACTURERS DETAILS. ALL END ELEMENTS SHALL BE 12 GAGE STEEL CONFORMING TO THE REQUIREMENTS OF AASHTO M180, CLASS A, TYPE 2. RAIL MATERIAL SHALL HAVE A MINIMUM YIELD STRENGTH 50 KIPS PER SQUARE INCH AND A TENSILE STRENGTH OF 70 KIPS PER SQUARE INCH.



PLAN (TOP)



ELEVATION (FRONT)

THIS TERMINAL IS COMMONLY KNOWN AS "MICHIGAN END SHOE"

"MICHIGAN END SHOE" TERMINALS END ELEMENT SHALL BE 10 GAGE STEEL, MATERIAL AND GALVANIZING CONFORMING TO THE REQUIREMENTS OF AASHTO M180, CLASS B (0.135" NOMINAL) THICKNESS. TERMINAL END ELEMENT MATERIAL SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KIPS PER SQUARE INCH AND A TENSILE STRENGTH OF 70 KIPS PER SQUARE INCH.

BOLTS USED FOR ATTACHMENT OF TERMINAL ELEMENT TO BRIDGE RAIL OR GUARDRAIL TERMINAL ANCHOR, TYPE 12 OR CONCRETE MEDIAN BARRIER SHALL BE 7/8" DIAMETER HEX HEAD, CONFORMING TO THE REQUIREMENTS OF ASTM A-307, WITH ROUND FLAT WASHER, 2" OUTSIDE DIAMETER X 0.165" THICK, PLACED UNDER BOLT HEAD. BOLTS AND WASHERS TO BE GALVANIZED CONFORMING TO THE REQUIREMENTS OF ASTM A153.

SEE THE STRUCTURE PLANS AND BR-2 SERIES BRIDGE REPAIR STANDARD DRAWINGS FOR ATTACHMENT TO BRIDGE RAIL.

SEE STANDARD DRAWING S-GR-19 FOR ATTACHMENT TO GUARDRAIL TERMINAL ANCHOR TYPE 12 AND STEEL INSERT SPECIFICATIONS

SEE STANDARD DRAWINGS S-MB-1 AND S-MB-2 FOR ATTACHMENT TO CONCRETE MEDIAN BARRIER WALLS. ALL TERMINAL ELEMENT JOINTS SHALL BE OVERLAPPED SO THAT THE OUTSIDE TERMINAL EDGE OF JOINT WILL BE FACED AWAY FROM APPROACHING TRAFFIC.

- REV. 9-15-82: CHANGED S-GR-4 TO S-GR-15.
- REV. 7-1-84: CORRECTED NOTES. REQUIRED VARIOUS ELEMENTS TO BE PERFORMED BY THE MANUFACTURER.
- REV. 11-4-87: CORRECTED DIMENSION ON "MICHIGAN END SHOE".
- REV. 12-29-89: CHANGED SLOTTED HOLE DIMENSION OF "MICHIGAN SHOE" AND NOTE FOR TERMINAL JOINT OVERLAP.
- REV. 10-26-91: REDREW AND REORGANIZED SHEET. UPDATED DRAWING TO 1991 STANDARDS.
- REV. 7-29-93: IN NOTES CHANGED NUMBERING REFERENCE FOR BRIDGE REPAIR STANDARD DRAWINGS FROM M-131 SERIES TO BR-2 SERIES.
- REV. 7-29-95: ADDED END TERMINAL FOR TERMINAL ANCHOR TYPE 20 AND TYPE 21.
- REV. 7-29-98: DELETED TYPE 11 GUARDRAIL TERMINAL ANCHOR DETAIL AND MEDIAN DIVIDER END ELEMENT DETAIL.
- REV. 9-5-98: CHANGED LABELING FOR END ELEMENT FOR TYPE 21 GUARDRAIL TERMINAL.
- REV. 5-27-01: CORRECTED REFERENCES TO TYPE 12 AND 21 GUARDRAIL TERMINALS.
- REV. 9-5-03: CHANGED SPECIFICATION REQUIREMENTS FOR TERMINAL END ELEMENTS.
- REV. 6-30-05: LABELED YIELD STRENGTH AS MINIMUM VALUE.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

W-BEAM BARRIER  
TERMINAL ELEMENT  
DETAILS

S-GR-15