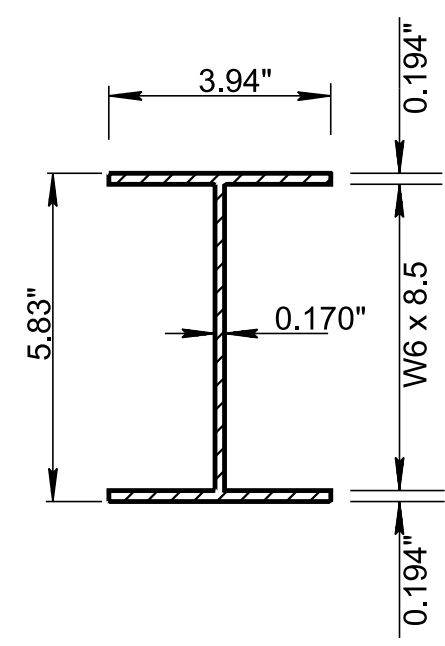
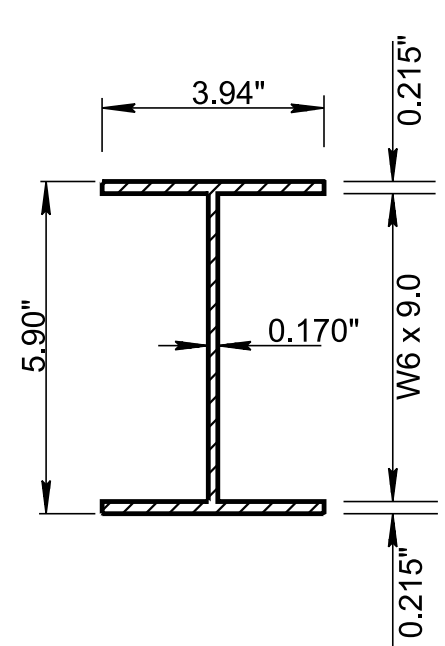


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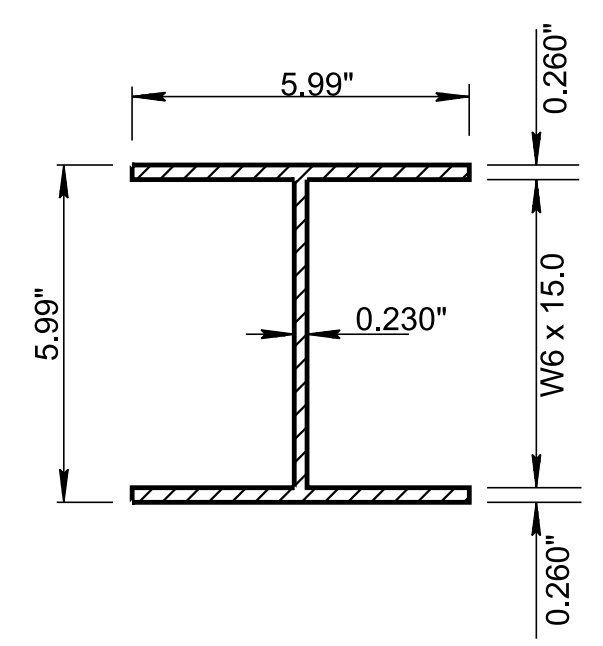
**THIS DRAWING IS TO BE USED FOR RESURFACING, MAINTENANCE, AND BRIDGE REPAIR PROJECTS ONLY, THIS DRAWING IS NOT INTENDED TO BE USED FOR NEW CONSTRUCTION OR RECONSTRUCTION PROJECTS.**



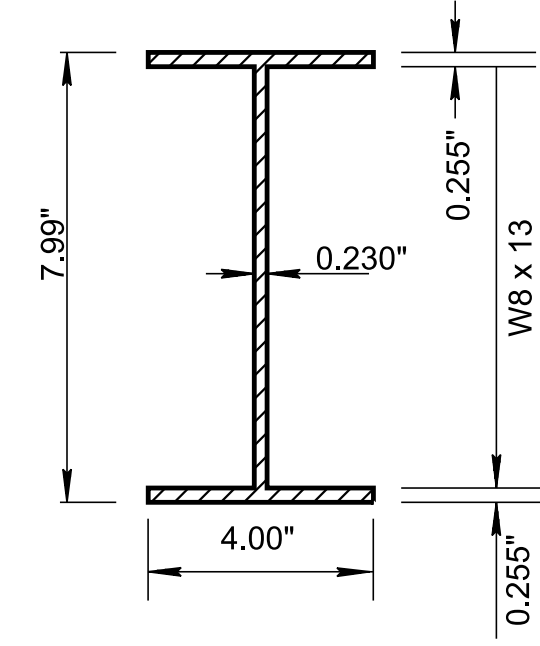
**WELDED STEEL SHAPE**



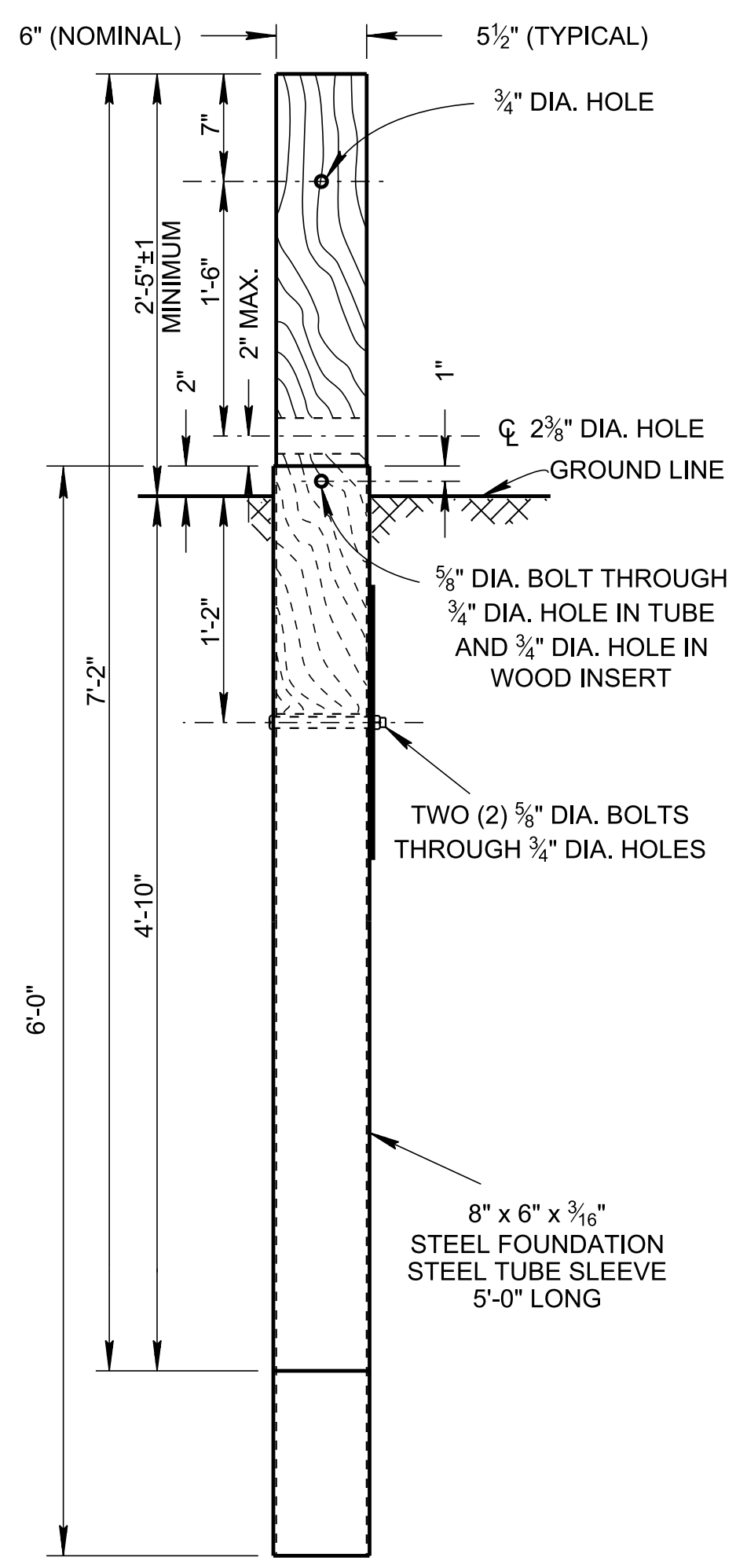
**WELDED STEEL SHAPE**



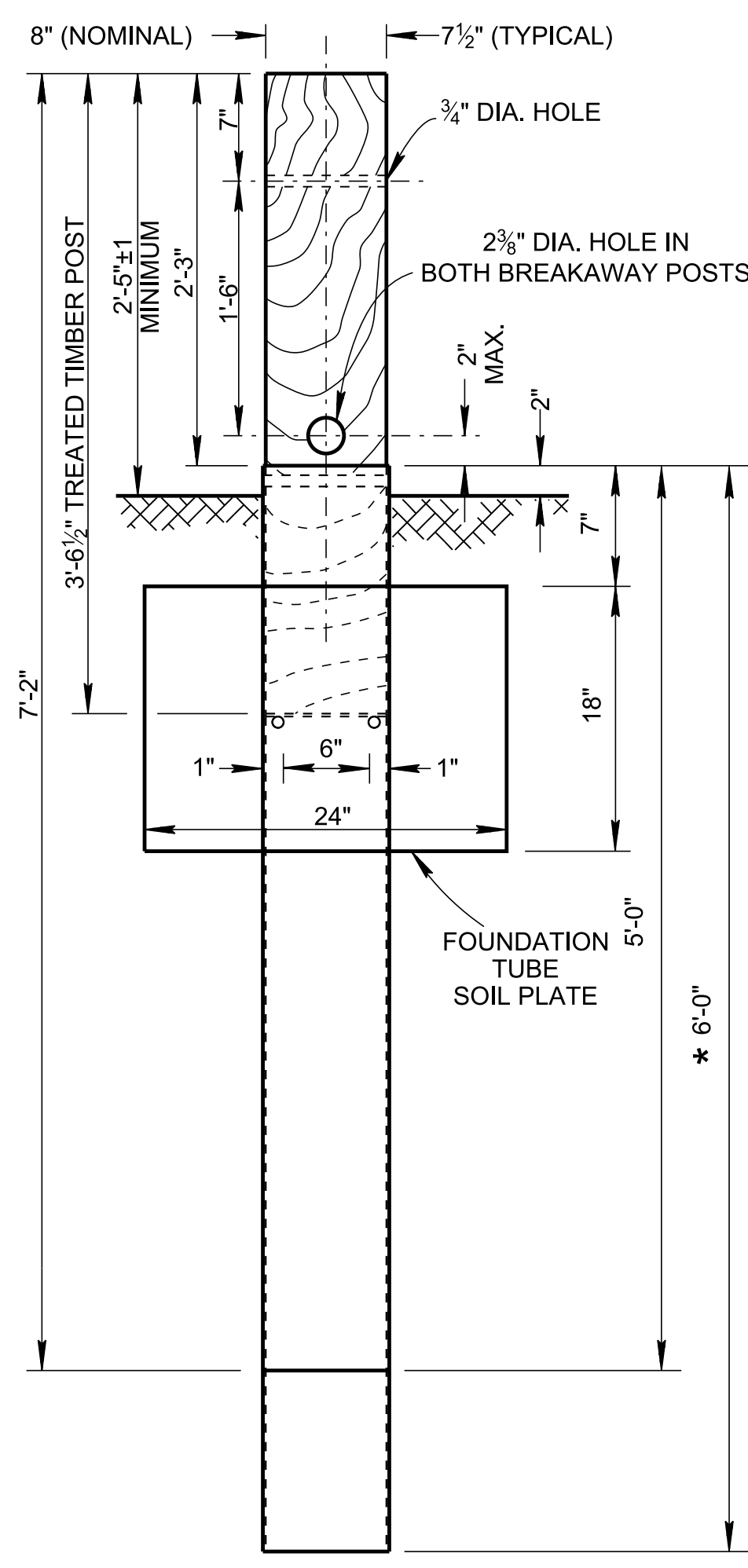
**WELDED STEEL SHAPE**



**WELDED STEEL SHAPE**

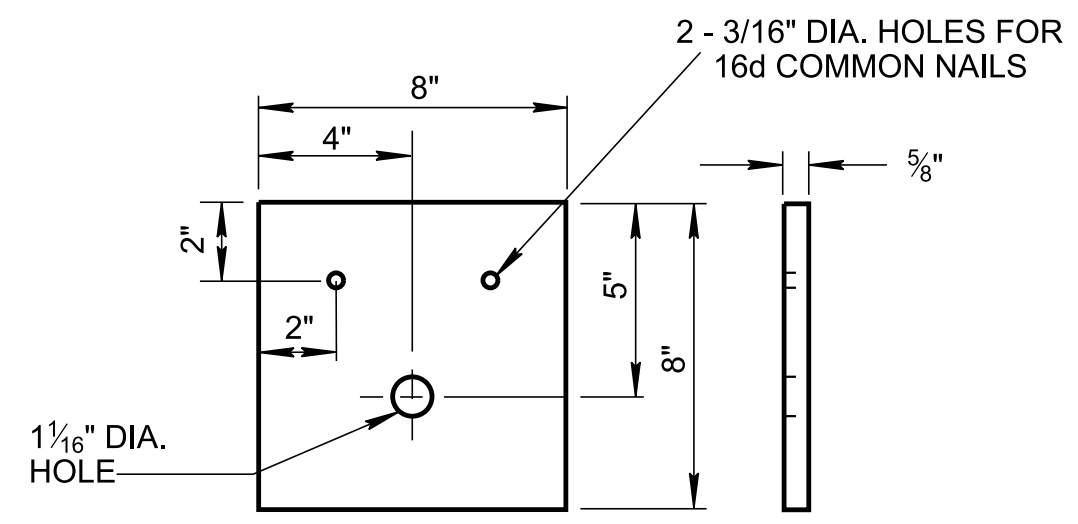


**FRONT VIEW**

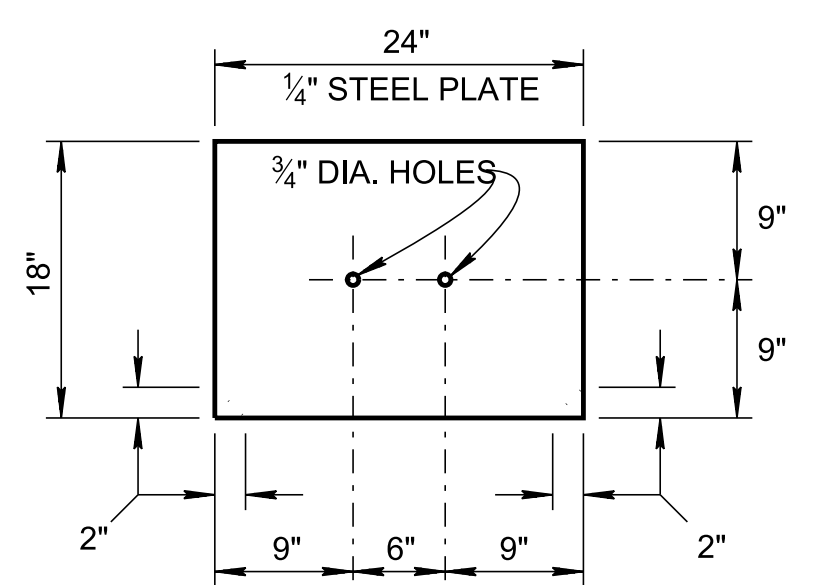


**END VIEW**

**BREAKAWAY POSTS ① & ② WITH 5'-0" STEEL TUBE SLEEVE**  
 \* 6'-0" POST MAY BE USED TO SUBSTITUTE 5' POST WITH SOIL PLATE.

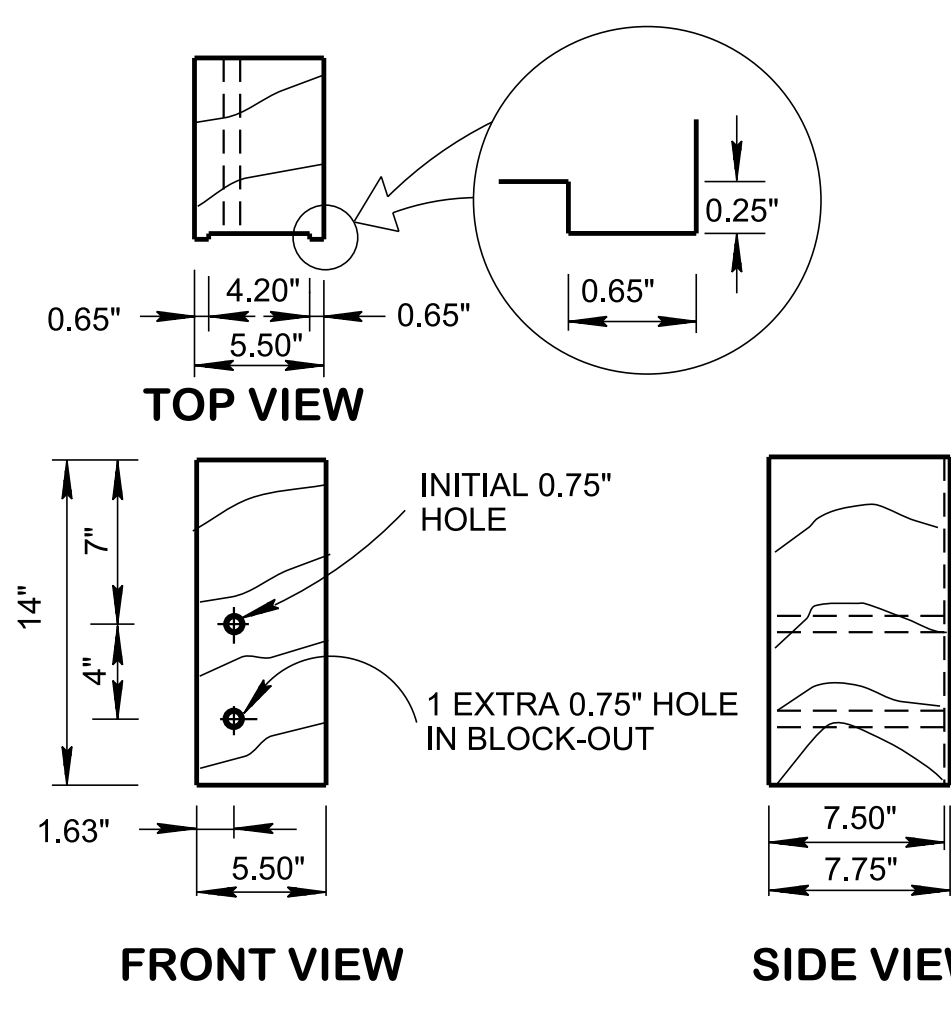


**8" x 8" STEEL BEARING PLATE**



**FOUNDATION TUBE SOIL PLATE DETAIL**

(TO BE ATTACHED TO BREAKAWAY POST ① & ② ON SIDE OPPOSITE TO END TERMINAL SECTION)  
 NOTE: THE CONTRACTOR HAS THE OPTION OF CLIPPING 2" x 2" TRIANGLES OFF BOTTOM CORNERS TO AID IN DRIVING.



**WOOD BLOCK-OUT DETAIL FOR STEEL POST WITH VERTICAL ADJUSTMENT HOLES**

**WOOD BLOCK-OUT FOR WOOD POST INSTALLATION NOTES**

ⓑ1 THE INITIAL INSTALLATION WILL REQUIRE ONE 5/8" DIAMETER X 18" LONG BUTTON HEAD BOLT WITH ROUND STEEL WASHER.

ⓑ2 THE FIRST ADJUSTMENT AND THE SECOND ADJUSTMENT WILL REQUIRE ONE 5/8" DIAMETER X 18" LONG BUTTON HEAD BOLT AND ONE 5/8" DIAMETER X 18" LONG HEX HEAD BOLT. EACH WILL HAVE ONE ROUND STEEL WASHER.

**WOOD SPECIFICATIONS**

- Ⓢ1 POSTS AND BLOCK-OUTS SHALL BE OF TIMBER WITH A STRESS GRADE OF 1200 P. S. I. OR MORE. POSTS WILL HAVE NOMINAL SIZE OF 6" X 8". BLOCK-OUTS WILL HAVE NOMINAL SIZE OF 6" X 8" (TYPICAL SIZE 5.5" X 7.5"). TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU, OR OTHER APPROPRIATE TIMBER ASSOCIATIONS. TIMBER FOR POSTS SHALL BE ROUGH SAWN (UNPLANED) WITH NOMINAL DIMENSIONS INDICATED. TIMBER FOR BLOCK-OUTS SHALL BE S4S WITH THE TYPICAL DIMENSIONS INDICATED 3.
- Ⓢ2 ALL WOOD POSTS AND BLOCK-OUTS SHALL BE TREATED WITH TIMBER PRESERVATIVE AS REQUIRED BY SUBSECTION 911.02(A) OF THE TENNESSEE STANDARD SPECIFICATION.
- Ⓢ3 WOOD POSTS AND BLOCK-OUTS SHALL BE FURNISHED WITH HOLES FOR FUTURE RAIL ADJUSTMENT IN ACCORDANCE WITH DETAILS SHOWN ON STANDARD DRAWING S-GR28-3.

**BREAKAWAY POST NOTES**

- Ⓐ THE BREAKAWAY POSTS ① AND ② WILL HAVE A 6" x 8" (NOMINAL) CROSS-SECTION AREA AND WILL HAVE A 2 3/8" DIAMETER HOLE CENTERED 2'-0" BELOW THE TOP OF THE POST ON THE 8" SIDE AS SHOWN. ALL POSTS SHALL BE ERRECTED SO THAT THE GUARDRAIL WILL HAVE A TOP-OF-RAIL HEIGHT OF 2' - 3".
- Ⓑ ALL HOLES IN WOOD POSTS ARE TO BE DRILLED BEFORE PRESERVATIVE TREATMENT.
- Ⓒ ALL CUTTING, DRILLING, AND WELDING OF STEEL COMPONENTS SHALL BE DONE BEFORE GALVANIZING.
- Ⓓ THE FINISHED CABLE ASSEMBLY WILL NOT BE ACCEPTABLE UNLESS IT IS IN TENSION WITH NO SAG.
- Ⓔ OTHER ANCHOR CABLE ASSEMBLIES PROVIDING A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS WILL BE ACCEPTABLE.
- Ⓕ SEE STANDARD DRAWING NO. S-GR28-4 FOR ADDITIONAL DETAILS AND GENERAL NOTES.
- Ⓖ THIS SYSTEM HAS BEEN EVALUATED UNDER NCHRP 350 TL-3.

**GENERAL NOTES**

- Ⓐ MATERIALS AND SPECIFICATIONS NOT SHOWN IN THESE "S-GR28" SERIES OF DRAWINGS SHALL BE IN ACCORDANCE WITH STANDARD PROVISIONS REGARDING SECTION 705.
- Ⓑ THE CONTRACTOR MAY HAVE OPTIONAL CHOICE OF EITHER THE STEEL W6 X 8.5 W6 X 9.0 HOT ROLLED OR WELDED STEEL SHAPE, OR THE WOOD POSTS WITH THEIR COMPANION BLOCK-OUTS AS SHOWN ABOVE, WITHIN THE FOLLOWING STIPULATIONS:
  - (1) THE MIXING OF ANY OF THE ABOVE POSTS TYPES ON A GIVEN PROJECT WILL BE AVOIDED IF POSSIBLE.
  - (2) SHOULD IT BECOME NECESSARY TO CHANGE THE TYPE OF POSTS ON A GIVEN PROJECT, THE POSTS SHALL NOT BE MIXED ON ANY GIVEN RUN OF GUARDRAIL. (EXCEPTION, WOOD POSTS ON GUARDRAIL TERMINALS).
- Ⓒ ON EXISTING STRUCTURES NOT HAVING A VERTICAL FACE FOR THE ATTACHMENT OF TWO RAIL ELEMENTS, USE OF THE W6 X 15.0 POSTS IS REQUIRED ON THE SEMI-RIGID TO RIGID BARRIER TRANSITION DETAILS, SEE STANDARD DRAWING S-GR28-5. THE BOLT HOLES WILL BE ORIENTED TO THE CENTER LINE OF THE FLANGE OF THE STEEL POST AND WILL BE THE SAME SIZE AND DIMENSION AS THOSE SHOWN ON STANDARD DRAWING S-GR28-3.

- Ⓓ ALL BLOCK-OUTS SHALL BE FURNISHED WITH HOLES FOR FUTURE RAIL ADJUSTMENT IN ACCORDANCE WITH DETAILS SHOWN ABOVE.
- Ⓔ METAL POSTS SHALL BE FURNISHED WITH HOLES FOR FUTURE RAIL ADJUSTMENT IN ACCORDANCE WITH DETAILS SHOWN ON STANDARD DRAWINGS S-GR28-3.
- Ⓕ W6 X 9.0 OR W6 X 8.5 POST SHALL BE USED FOR INSTALLATIONS ON BRIDGES AS SHOWN ON STANDARD DRAWING S-GR28-7.
- Ⓖ WELDED STEEL POSTS MAY BE USED AS ALTERNATES TO THE HOT ROLLED STEEL SHAPE. THEY MUST CONFORM TO ASTM A-769 AND BE GALVANIZED ACCORDING TO ASTM A-123.
- Ⓗ THIS SYSTEM HAS BEEN EVALUATED UNDER NCHRP 350 TL-3.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE  
 STANDARD DRAWING  
 DEPARTMENT OF TRANSPORTATION

GUARDRAIL  
 HARDWARE  
 DETAILS