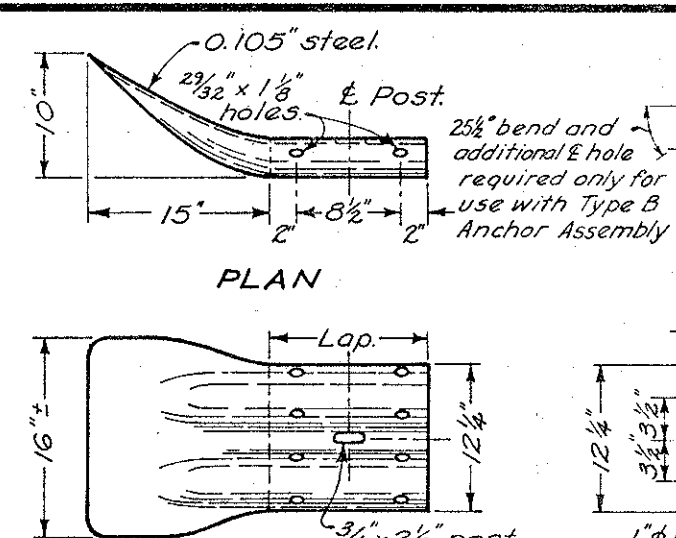
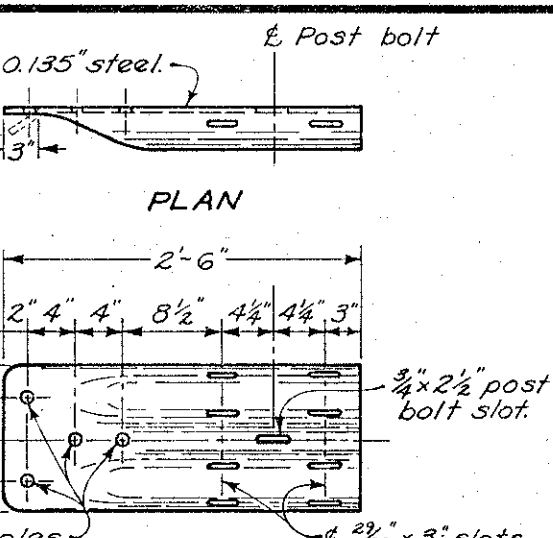


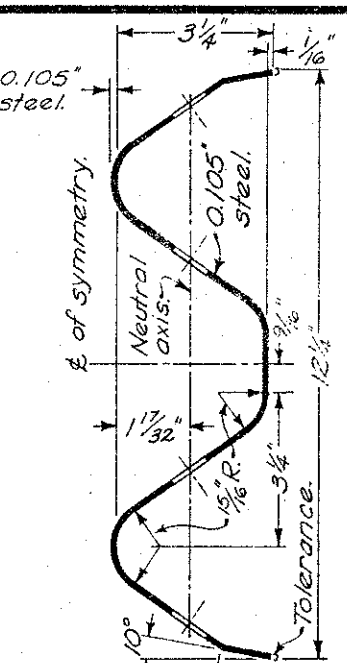
**BUFFER END SECTION**



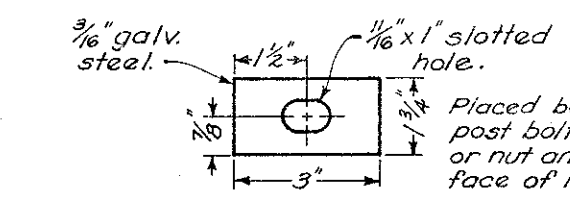
**FLARED END SECTION**



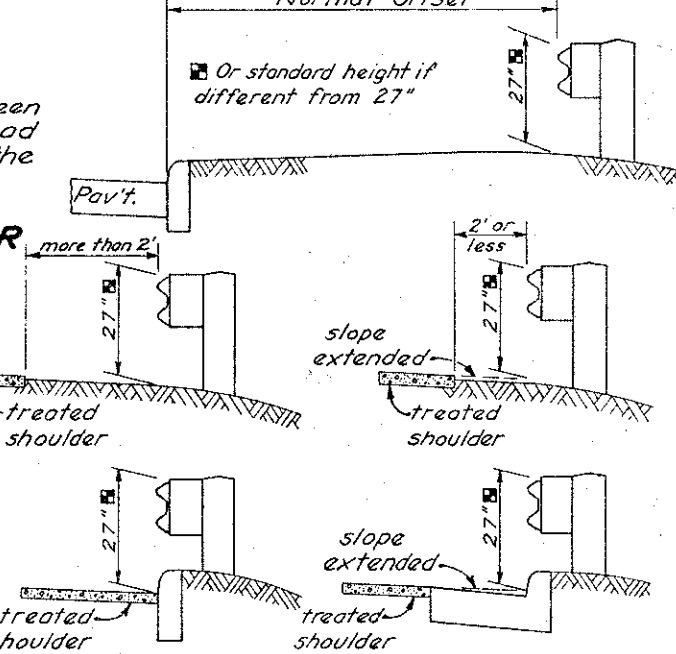
**TERMINAL CONNECTOR**



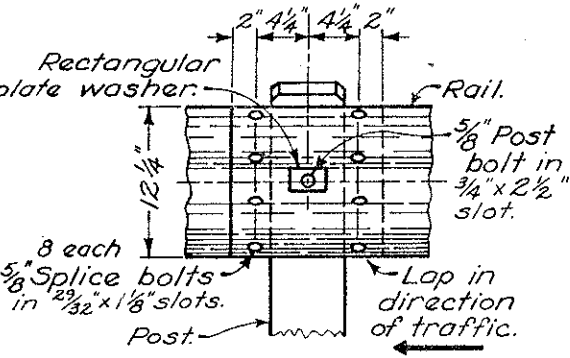
**SECTION BEAM RAIL**



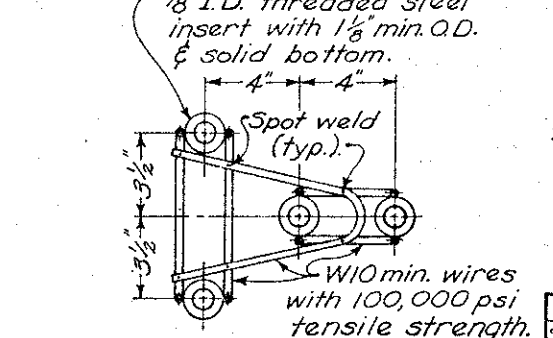
**RECTANGULAR PLATE WASHER**



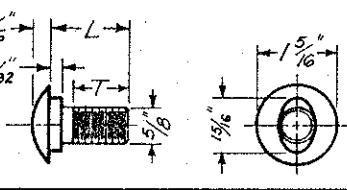
**GUARDRAIL HEIGHT**



**BEAM RAIL SPLICE**



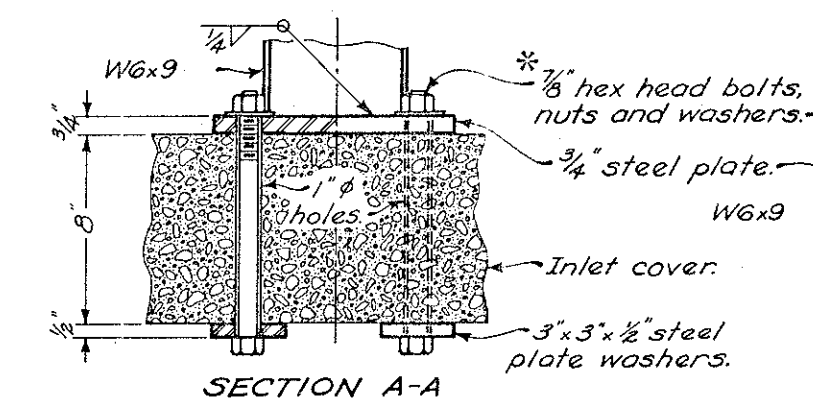
**CONCRETE INSERT ANCHOR ASSEMBLY**



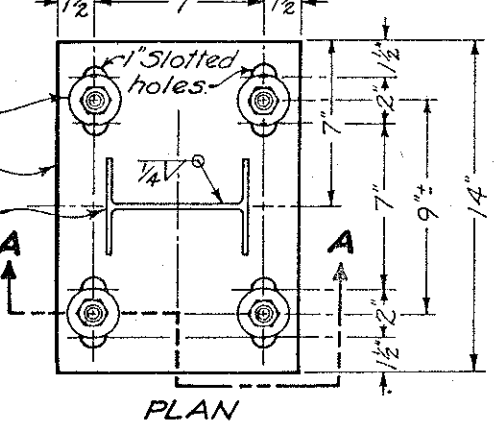
**BUTTON HEAD BOLT**

L (in)	Min. Std. Bar	Tens. min.	Bolt Use
18	20	3 1/2	Type 5: WP/WB
10	2 1/2	2 1/2	Type 4: WP Type 5: SP/WB
2	1 1/2	1 1/2	Type 4: SP Type 5: SP/SB or WP/SB
1 1/4	Full	Full	Splice bolt

WP=wood post WB=wood block  
SP=steel post SB=steel block  
Longer bolt may be needed for round WP larger than 8" dia.

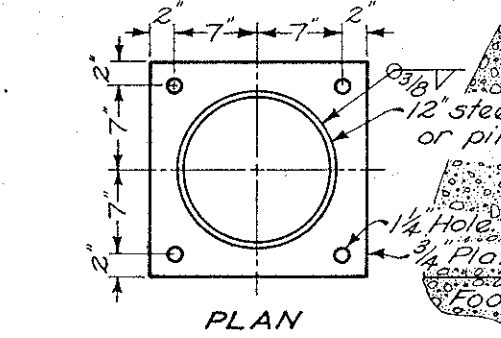


**INLET MOUNTED POST**



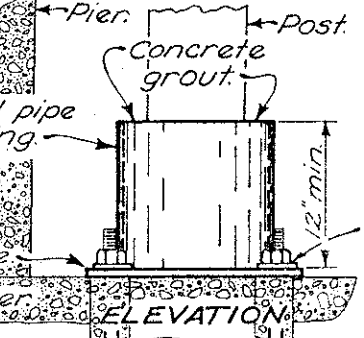
**FOOTING ANCHOR**

**CONCRETE INSERT ANCHOR ASSEMBLY**



**FOOTING ANCHOR**

**BUTTON HEAD BOLT**



**FOOTING ANCHOR**

**NOTES**

BEAM RAIL ELEMENTS shall be 12'-6" effective length, unless otherwise specified, with 3/4" x 2 1/2" post bolt slots on 6'-3" centers regardless of post spacing. Field punching or drilling of bolt holes or slots for irregularly spaced posts shall be according to 606.05.

BEAM RAIL SPLICE between two rail elements, or rail and terminal connector shall be lapped in the direction of traffic. The buffer or flared end sections shall lap on the traffic face. A 12" length of beam rail (Back-Up Plate), with a 3/4" dia. bolt hole or a 3/4" x 2 1/2" slot, shall be provided of posts not having a rail splice.

SPECIAL POST MOUNTINGS: Inlet mounted posts are required for guardrail posts located on a drainage inlet. Footing anchors are required for guardrail posts located on footers with less than 3'-5" cover except that for footer cover of 2'-6" to 3'-5" the posts may be installed by using a 4" minimum concrete encasement. The inlet mounted post may be used for footing anchors in runs with steel posts.

When standard post depth is not available due to a culvert, the guardrail posts directly over the culvert shall not be driven, but set in holes with a 4" minimum concrete encasement for the maximum post depth available.

Cost of the inlet mounted posts, footing anchors, and concrete encasement shall be included in the unit price bid for guardrail of the type required by the plan.

STEEL POSTS are specified as 9# or 15# but 8.5# and 15.5# sizes respectively may be used.

\* ANCHORS conforming to 712.01, or anchors per FF-5-325 Group II, Type 4, Class 1 or 2 or Group VIII, Type 1 or 2 with proof load certification per 712.01, may be substituted with the same bolt diameter specified. If there is any question of deteriorated concrete, expansion anchors will not be allowed, as determined by the Engineer. Where self-drilling anchors are permitted and used for guardrail construction, the holes shall be drilled with the expansion shield (not by a drill bit) and the shield shall be installed flush with the concrete surface.

The Engineer shall visually inspect, after installation, all expansion anchors used in guardrail construction. The Engineer may require the Contractor to test load any expansion anchor to 1/2 the certified proof load in direct pull. The equipment and method used shall meet the approval of the Engineer. Each expansion anchor that fails to meet the test requirements shall be reset or removed and replaced with bolts extending through the concrete or grouted in place, as directed by the Engineer.

PROTECTIVE COATING: In lieu of the requirements of 710.10, expansion shields, anchors and insert anchor assemblies installed (embedded) in concrete may be coated according to good commercial practices. Any bolts screwed into these embedded devices shall meet 710.10.

BUREAU OF LOCATION AND DESIGN  
OHIO DEPARTMENT OF TRANSPORTATION

**GUARDRAIL DETAILS**

STANDARD CONSTRUCTION DRAWING GR-1

APPROVED: [Signature] ENGR., L. & D.

DATE 12-6-76  
2-5-82