



NOTE: MAINTAIN 6'-3" POST SPACING WHEREVER POSSIBLE FOR USE WITH 25' STANDARD RAIL SECTION. SYMMETRY OF POST SPACING IS NOT NECESSARY.

GENERAL NOTE:

ALL STRUCTURAL STEEL, INCLUDING BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

FOR DETAILS OF GUARDRAIL, SEE GR-2 OF THE ROAD AND BRIDGE STANDARDS.

THE GUARDRAIL INSTALLATION SHALL CONFORM WITH SECTION 505 OF THE CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.

RAIL POSTS MAY BE VERTICAL OR PERPENDICULAR TO ADJACENT ROADWAY GRADE AND CROSS SLOPE. TOP OF PEDESTAL SHALL BE SLOPED AS NECESSARY FOR PERPENDICULAR INSTALLATION.

DETAILS ON THIS SHEET ARE TO BE USED FOR BOTH STRAIGHT AND SKEWED BOXES.

ANCHOR BOLTS SHALL BE $\frac{7}{8}$ " ϕ A307 (OR A36 THREADED RODS WITH TACK WELDED NUTS) WITH HEX NUTS AND WASHERS AS SHOWN. THREADED RODS MAY BE 0.781 MIN. DIAMETER WITH ROLLED THREADS. NUTS SHALL CONFORM TO A307 REQUIREMENTS AND SHALL BE TAPPED OR CHASED AFTER GALVANIZING. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES. BOLTS SHALL BE EMBEDDED 8" INTO THE CONCRETE.

THIS RAIL HAS BEEN SUCCESSFULLY EVALUATED BY FULL SCALE IMPACT TESTS CONDUCTED IN ACCORDANCE WITH NCHRP REPORT 153. TEST DOCUMENTATION MAY BE FOUND IN RESEARCH REPORT 230-1, "TUBULAR W-BEAM BRIDGE RAIL", OF RESEARCH STUDY 2-5-78-230 "BRIDGE RAIL TO CONTAIN HEAVY TRUCKS AND BUSES", TEXAS TRANSPORTATION INSTITUTE, OCTOBER 1978.

THIS UNIT IS ONLY TO BE USED WHEN
DESIGN SPEED IS 45 MPH OR LESS.
TESTED - NCHRP 350 TEST LEVEL 2

TUBULAR GUARD RAIL SHALL BE FURNISHED AND INSTALLED IN 25 FT. SECTIONS. TUBULAR RAIL MEMBER SHALL BE EXTENDED AND CONNECTED TO AT LEAST THE FIRST SOIL EMBEDDED POST AT EACH END OF THE STRUCTURE. MORE SUCH POSTS SHALL BE USED TO UTILIZE 25 FT. STANDARD SECTIONS. APPROACH GUARDRAIL POSTS SHALL BE SPACED AT 6'-3" ADJACENT TO THE TUBULAR RAIL SINCE ITS FLEXIBILITY IS SIMILAR TO THE STANDARD METAL BEAM GUARDRAIL. DO NOT INSTALL ADDITIONAL POSTS AT 3'-1 $\frac{1}{2}$ " CENTERS. FULLY ANCHORED GUARDRAIL MUST BE ATTACHED AT BOTH ENDS OF TUBULAR RAIL.

TESTS HAVE SHOWN THAT ALTHOUGH THIS RAIL DEFLECTS HORIZONTALLY TWO OR THREE FEET, ADEQUATE VEHICLE CONTAINMENT AND RE-DIRECTION IS ACHIEVED. THE RESULTING MORE GRADUAL DECELERATION THUS PRODUCES A SAFER CONDITION THAN AFFORDED BY OTHER BRIDGE RAILINGS.

THE CONTRACTOR SHALL DETERMINE THE NUMBER OF PEDESTALS REQUIRED FOR GUARDRAIL INSTALLATION ACROSS THE BOX, PEDESTAL HEIGHT AND DIMENSIONS OF THE BR SERIES REINFORCING BARS. THE QUANTITY OF CONCRETE (CLASS A4) AND REINFORCING STEEL USED IN THE PEDESTALS SHALL BE FIELD VERIFIED AND PAID FOR AT THE UNIT PRICE BID FOR THE CORRESPONDING BOX QUANTITIES. THE RAILING (TEXAS T-6) SHALL BE MEASURED IN 25 FT. SECTIONS AND PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR FOOT IN ACCORDANCE WITH SECTION 410.04 OF THE SPECIFICATIONS. BR SERIES BARS SHALL BE #5 IN SIZE.

FOR DETAILS OF BOX CULVERTS, SEE THE BOX CULVERT STANDARDS.

THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVERT IS LESS THAN 3'-7".

DETAILS SHOWN ARE FOR INSTALLATION ON NEW BOX CULVERTS. INSTALLATION OF PEDESTALS ON EXISTING BOX CULVERTS SHALL BE IN ACCORDANCE WITH SEC. 412.03 OF THE SPECIFICATIONS EXCEPT THAT DOWELS SHALL BE PLACED BETWEEN 3 AND 6 INCHES FROM THE EDGE OF THE PEDESTAL.

PRECAST BOXES SHALL BE TREATED AS AN EXISTING BOX FOR PEDESTAL INSTALLATION.