TST-1-99 GENERAL NOTES:

GENERAL: This drawing provides design and construction details. The project plans for each structure shall provide necessary additional railing dimensions including railing lengths, post spacings, post lengths and any other pertinent information including special notes and details. For additional guardrail details, see STD, CONST, DMW, MS-1,1, MS-2 and other drawings pertaining to design of specific guardrail types.

APPLICATION: This railing system was accepted to the NCHRP Criteria of NCHRP Report 150, the twin steel tube railing shall be used on structures designed to drain surface water over the side of the structure. This railing is not applicable to composite box beam bridges with design thicknesses slimmer than 2" or top flange thicknesses less than 3".


DESIGN DATA:

MINIMUM STEEL - MINIMUM YIELD STRENGTH - 60,000 PSI STEEL TUBING - MINIMUM YIELD STRENGTH - 46,000 PSI ALL OTHER STEEL - MINIMUM YIELD STRENGTH - 50,000 PSI

MATERIALS: Furnish shaped structural tubing according to TST-1-99. All welds in lieu of the shop weight test, weight nominal, the manufacturer shall furnish shape tubing that meets impact toughness according to ASTM T276, "NOTCHED BAR IMPACT TESTING OF METALLIC MATERIALS (CVN)." The CVN impact requirements shall be 5 ft-lb at 0°F. For each heat supplied, the manufacturer shall furnish one 1" X 8" specimen, marked with its heat number, for impact testing.

FURNISH STRUCTURAL STEEL SHAPES, PLATES AND PLATE WASHERS ACCORDING TO TST-1.

CALCULATING/CALCULANTS: CALCULATE SHAPED STRUCTURAL TUBES, POSTS, PLATES, HARDWARE AND ACCESSORIES IN ACCORDANCE WITH TST-1. PRIOR TO CALCULATING, ROUND ALL STRUCTURAL TUBING ENDS AND REMOVE BURNS FROM ALL STEEL TUBING, SHAPES AND PLATES.

HORIZONTAL CURVATURE: This standard [5-99] is applicable to structures having a railing curvature radius of 20 feet or more. For a radius of less than 20 feet, the design shall be special. For all curved structures, use curvature for horizontal rail elements according to the AASHTO / ABD BRIDGE CONSTRUCTION SPECIFICATIONS.

TUBE SPOIL: Locate spiles so that each tube segment is connected to less than two posts. Spiles shall be in the top and bottom tubes to avoid occurrences in the same panel.

FASTENERS: Furnish material conforming to the following:

All anchor bolts, sleeves, nuts, washers, and washers shall conform to ASTM A 449.

END WELDED STUDS SHALL CONFORM TO ASTM A 108.

The tube rail to post connection bolts and hex nuts shall conform to TST-10 (ASTM 5500). Refer to standard construction drawing WS-3.1 for the bridge terminal assembly connection hardware.

The hex cap screws 1/8", hex nuts and washers shall conform to ASTM A 449.

BOX BEAMS: The distance from the centerline of a guardrail post to the abutment end of the beam or to the centerline of a tie rod shall not be less than 1'-8". The distance from the centerline of a guardrail post to the face end of the beam shall not be less than 2'-10". The location of the horizontal tie rods may need to be adjusted in order to accommodate each post anchor devices.

METHOD OF MEASUREMENT: The department will measure twin steel tube bridge railing by the number of feet. The department will measure the length of railing as the distance between the centers of the flush mounted posts at the approach and trailing ends plus 4'-11".

BASIS OF PAYMENT: The department will consider the costs associated with furnishing and installing steel tubing, steel posts, post anchor devices, anchor plates, tie splice plates, steel show plates, guardrail connection plates, anchor bolts, round washers, sleeves, nuts, washers and other hardware to be included with the twin steel tube railing. The department will pay for accepted quantities at the contract price for item 1.7, railing (twin steel tube).

The department will pay for bridge terminal assembly hardware separately.