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. CONSTR. DWGS. MGS-3.1, MGS-2.1 AND OTHER DRAWINGS PERTAINING TO DESIGN OF SPECIFIC GUARDRAIL TYPES.

APPLICATION:

THIS RAILING SYSTEM HAS BEEN ACCEPTED TO THE TL-4 CRITERIA OF NCHRP REPORT 500. THE TWIN STEEL TUBE RAILING SHALL BE USED ON STRUCTURES DESIGNED TO DRAIN SURFACE WATER OVER THE SIDES OF THE STRUCTURE. THIS RAILING IS NOT APPLICABLE TO COMPOSITE BOX BEAM BRIDGES WITH DESIGN OVERHANGS GREATER THAN 2" OR TOP FLANGE THICKNESSES LESS THAN 5".


DESIGN DATA:

REINFORCING STEEL - MINIMUM YIELD STRENGTH = 60,000 PSI
ALL OTHER STEEL - MINIMUM YIELD STRENGTH = 46,000 PSI

MATERIALS:

FURNISH SHAPED STRUCTURAL TUBING ACCORDING TO T07.10 (ASTM A500, GRADE B). IN LIEU OF THE "WIRE" WEIGHT TEST, T07.10 (ASTM E691), THE MANUFACTURER MAY CHOOSE TO SUPPLY TUBING THAT MEETS IMPACT TOUGHNESS ACCORDING TO A970706E. "NOTCHED BAR IMPACT TESTING OF METALLIC MATERIALS (CVN). THE CVN IMPACT REQUIREMENTS SHALL BE 15 FT-LBS AT 0 F. FOR EACH HEAT SUPPLIED, THE MANUFACTURER SHALL FURNISH ONE 2" x 18" SPECIMEN, MARKED WITH ITS HEAT NUMBER, FOR IMPACT TESTING.

FURNISH STRUCTURAL STEEL SHAPES, PLATES AND PLATE WASHERS ACCORDING TO T07.10.

CALvanizing:

CALVANIZE ALL SHAPED STRUCTURAL TUBES, POSTS, PLATES, HARDWARE AND ACCESSORIES IN ACCORDANCE WITH T07.10. PRIOR TO CALVANIZING, ROUND ALL STRUCTURAL TUBE EDGES AND REMOVE BURRS FROM ALL STEEL TUBING, SHAPES AND PLATES.

HORIZONTAL CURVATURE:

THIS STANDARD 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, HEAT CURVE THE HORIZONTAL RAIL ELEMENTS ACCORDING TO THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS.

TUBE SPLICES:

LOCATE SPLICES SO THAT EACH TUBE SEGMENT IS CONNECTED TO TWO POSTS. STAGGER SPLICES IN THE TOP AND BOTTOM TUBES TO AVOID OCCURRENCES IN THE SAME PANEL.

FASTENERS:

FURNISH MATERIAL CONFORMING TO THE FOLLOWING:
ALL ANCHOR BOLTS, SLEEVE NUTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A 449.
END MOLDED STUDS SHALL CONFORM TO ASTM A108.
THE TUBE RAIL TO POST CONNECTION RODS AND NUTS SHALL CONFORM TO T11.10 (ASTM A325). REFER TO STANDARD CONSTRUCTION DRAWING MGS-3.1 FOR THE BRIDGE TERMINAL ASSEMBLY CONNECTION HARDWARE.
THE HEX CAP SCREWS (BOLTS), 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 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 PIER END OF THE BEAM OR TO THE CENTERLINE OF A TIE ROD 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 DEVICE.

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 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, TUBE SPLICE PLATES, STEEL SHIM PLATES, GUARDRAIL CONNECTION PLATES, ANCHOR BOLTS, 3/8 ROUND HEAD BOLTS, SLEEVE NUTS, NUTS, CAP SCREWS, 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 517, RAILING (TWIN STEEL TUBE RAILING).

THE DEPARTMENT WILL PAY FOR BRIDGE TERMINAL ASSEMBLY HARDWARE SEPARATELY.