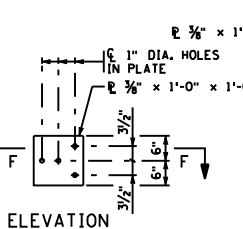


SECTION A-A

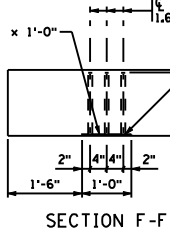
SECTION B-B

EXPANSION JOINT

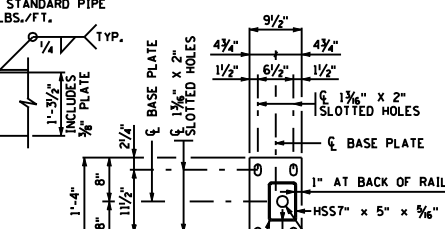
CONTROL JOINT



ELEVATION

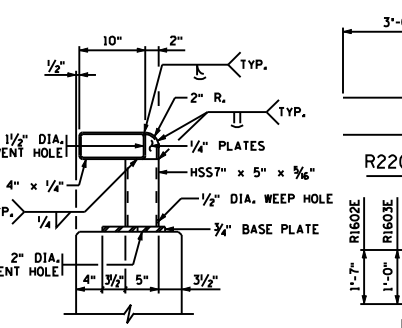


SECTION F-F

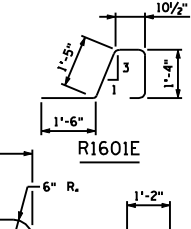


BASE PLATE

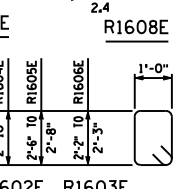
INSIDE ELEVATION OF RAILING  
CONCRETE WEARING COURSE NOT SHOWN  
RAIL MEETS TEST LEVEL 4  
REQUIREMENTS OF NCHRP REPORT 350



STRUCTURAL TUBE RAIL DETAIL

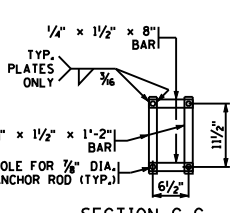


R1601E

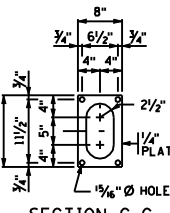


R2207E  
R1608E

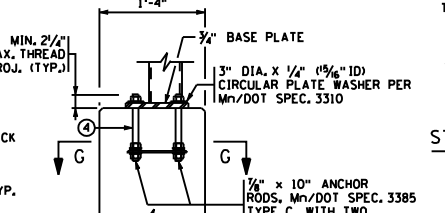
GUARDRAIL CONNECTION DETAIL  
GALVANIZE AFTER FABRICATION PER Mn/DOT SPEC. 3394  
ESTIMATED WEIGHT = 22 LBS.



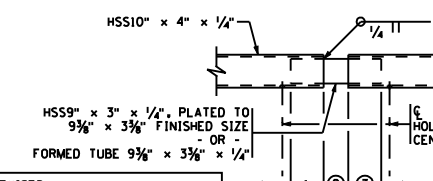
SECTION G-G ANCHOR BAR ALTERNATE



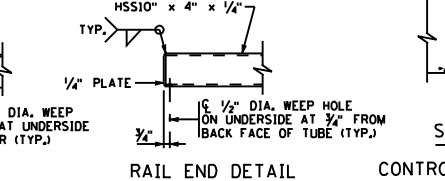
SECTION G-G ANCHOR PLATE ALTERNATE



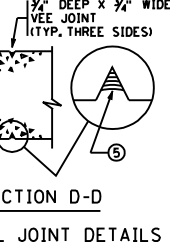
ANCHOR DETAIL



RAIL SLEEVE DETAIL



RAIL END DETAIL



SECTION D-D CONTROL JOINT DETAILS

BILL OF REINFORCEMENT FOR PARAPET

BAR	NO.	LENGTH	SHAPE	LOCATION
R1601E	---	5'-7"	BENT	PARAPET VERTICAL
R1602E	---	6'-11"	BENT	PARAPET VERTICAL
R1603E	---	4'-11"	BENT	PARAPET VERTICAL
R1604E	---	8'-7"	BENT	PARAPET VERTICAL
R1605E	- SER. OF 2	7'-11" TO 8'-3"	BENT	PARAPET VERTICAL
R1606E	- SER. OF 2	7'-3" TO 7'-5"	BENT	PARAPET VERTICAL
R2207E	---	6'-7"	BENT	PARAPET END
R1608E	---	2'-9"	BENT	PARAPET END LONGIT.
R1609E	---	---	---	PARAPET LONGITUDINAL
R1610E	---	---	---	PARAPET LONGITUDINAL
R1611E	---	---	---	PARAPET LONGITUDINAL
R1612E	---	---	---	PARAPET LONGITUDINAL

GENERAL NOTES

- FOR PAYMENT OF "TYPE P-2 (TL-4) BARRIER CONCRETE (3Y46 OR 3Y46A)" MEASURE LENGTH OF CONCRETE BARRIER BETWEEN END FACES. CONCRETE PARAPET = 396 LBS./FT. (0.098 CU. YDS./FT.)
- FOR PAYMENT OF "STRUCTURAL TUBE RAILING DESIGN T-1" MEASURE LENGTH OF RAIL FROM END TO END OF TUBING, DO NOT DEDUCT FOR JOINTS.
- FINISH ALL EDGES OF RAIL WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.
- MAX. SPACING OF CONCRETE CONTROL JOINTS SHALL BE 10 FT.
- PROVIDE CORRECT ALIGNMENT FOR ANCHORS BY PLACING THEM ACCURATELY AND NORMAL TO GRADE. SEE SPECIAL PROVISIONS.
- PROVIDE STRUCTURAL STEEL AND PLATE WASHERS PER Mn/DOT SPEC. 3310. PROVIDE STRUCTURAL TUBES PER A.S.T.M. A500, GRADE B AS SPECIFIED IN Mn/DOT SPEC. 3361.
- GALVANIZE BOLTS, NUTS, AND WASHERS PER Mn/DOT SPEC. 3392.
- GALVANIZE ALL OTHER STRUCTURAL STEEL PER Mn/DOT SPEC. 3394, AFTER FABRICATION.
- PROVIDE GUARDRAIL CONNECTION STRUCTURAL STEEL PER Mn/DOT SPEC. 3306.
- GUARDRAIL CONNECTION AND NAME PLATE IS INCIDENTAL TO "TYPE P-2 (TL-4) BARRIER CONCRETE (3Y46 OR 3Y46A)".
- PRICE BID FOR "STRUCTURAL TUBE RAILING DESIGN T-1" INCLUDES ANCHORAGES AND ALL MATERIAL ABOVE TOP OF CONCRETE BARRIER.
- ALL MATERIAL IN THE CONCRETE BARRIER IS LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.
- SEE SPECIAL PROVISIONS FOR PAINT REQUIREMENTS.
- CONTINUOUSLY GROUND THE METAL RAILING AS DIRECTED IN THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

- MAKE THICKNESS THE SAME AS SLAB IN SECTION B-B.
- 1" AT RAILING JOINTS, AT EXPANSION JOINTS, MAKE 1" LARGER THAN GAP IN EXPANSION JOINTS.
- 5" AT RAILING JOINTS AND 8" AT EXPANSION JOINTS.
- SUBSTITUTION OF CHEMICAL ANCHOR RODS FOR CAST-IN-PLACE ANCHORAGE IS NOT PERMITTED.
- SEE SPECIAL PROVISIONS FOR JOINT SEALING REQUIREMENTS.

REVISED:  
APPROVED: MARCH 30, 2010  
*David H. Johnson*  
STATE BRIDGE ENGINEER

CERTIFIED BY \_\_\_\_\_ DATE \_\_\_\_\_  
LICENSED PROFESSIONAL ENGINEER  
NAME: \_\_\_\_\_ LIC. NO. \_\_\_\_\_

STRUCTURAL TUBE RAILING (DESIGN T-1)  
AND CONCRETE PARAPET (TYPE P-2, TL-4)  
(WITH INTEGRAL END POST)

DESIGNED BY \_\_\_\_\_ DRAWN BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_  
CHECKED BY \_\_\_\_\_  
SHEET NO. \_\_\_ OF \_\_\_ SHEETS  
BRIDGE NO. \_\_\_\_\_