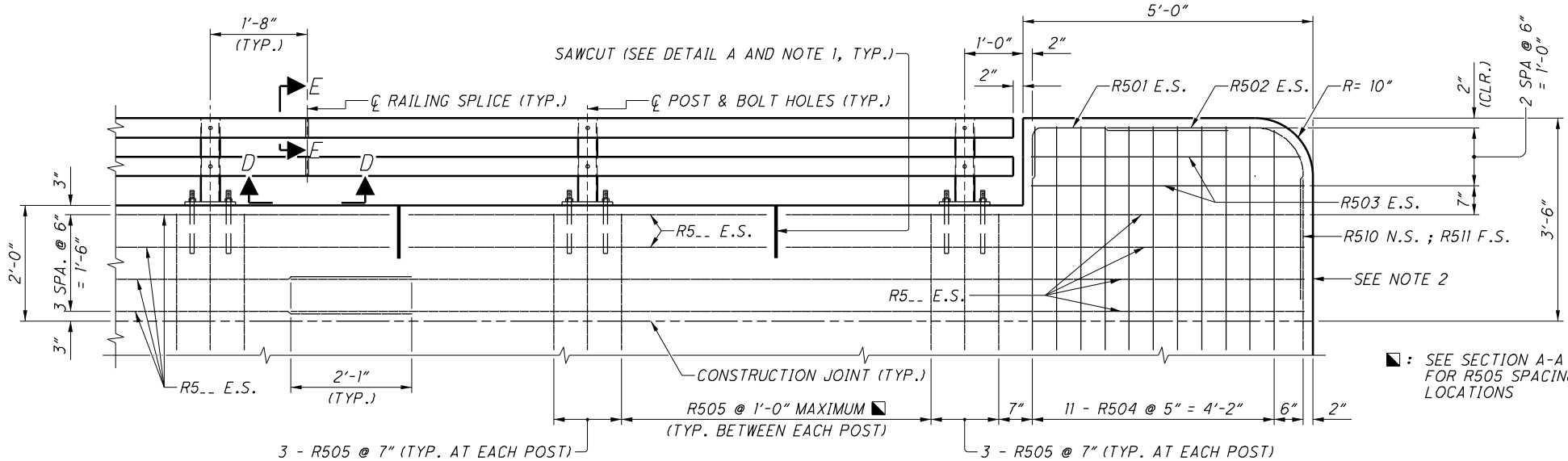
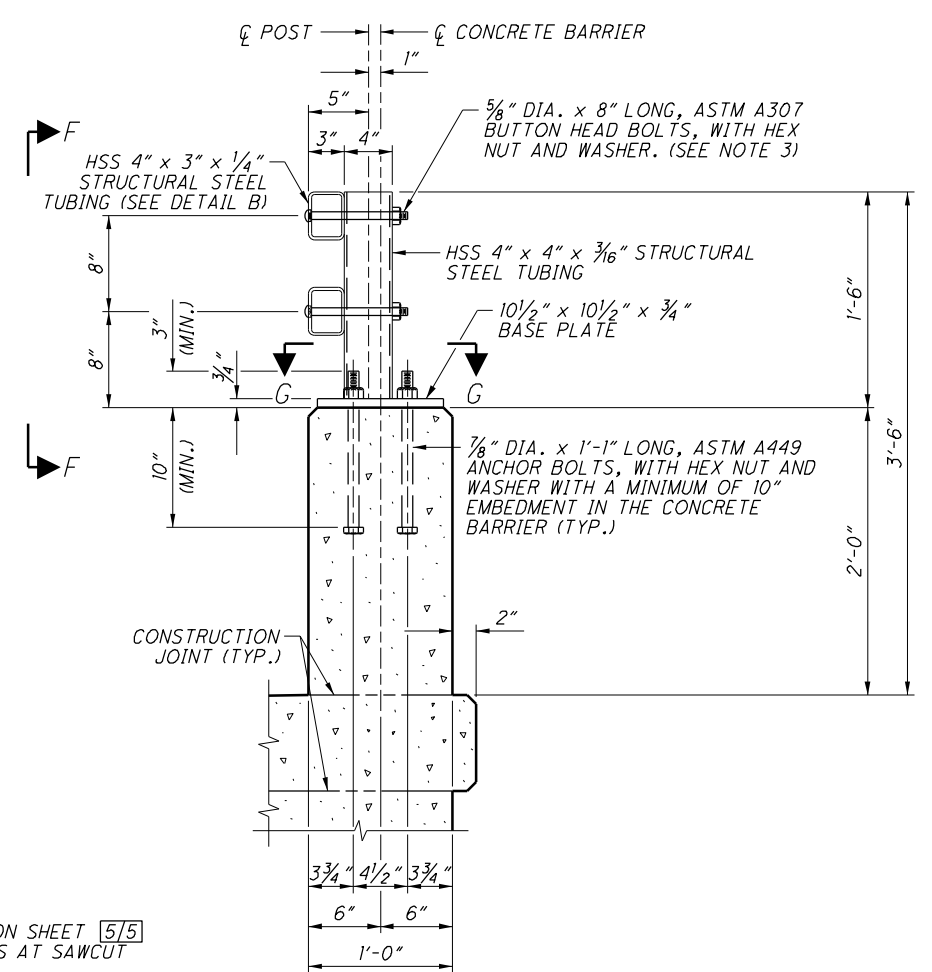


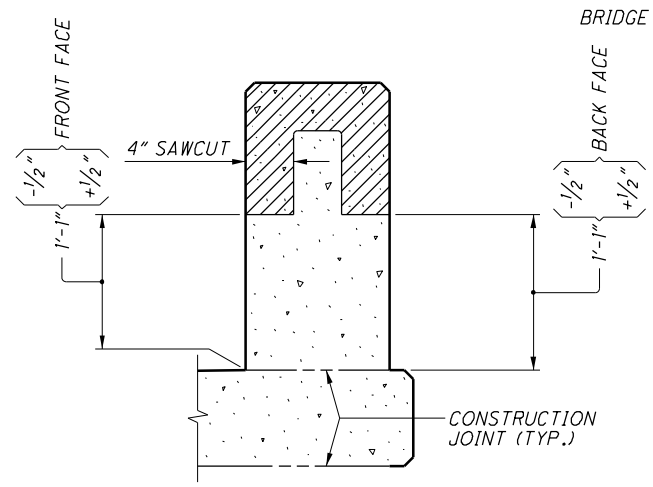
PLAN
BRIDGE SIDEWALK RAILING WITHOUT APPROACH RAILING



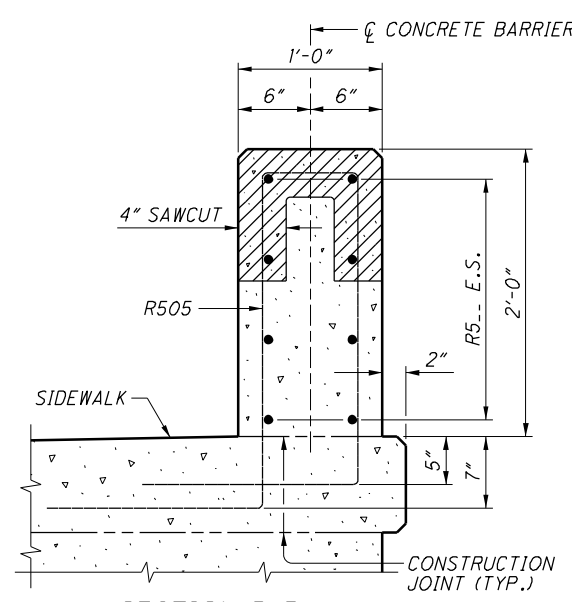
ELEVATION
BRIDGE SIDEWALK RAILING WITHOUT APPROACH RAILING



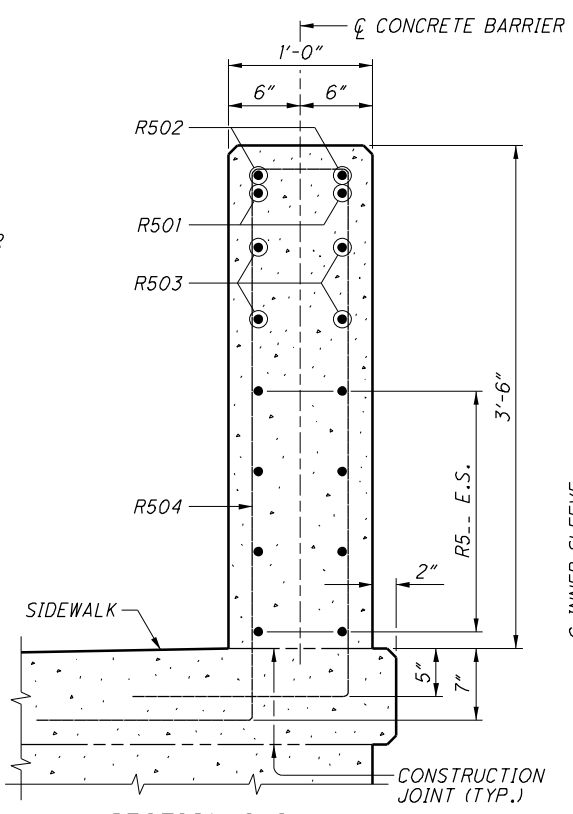
SECTION A-A
SEE NOTE 4
REINFORCING STEEL NOT SHOWN



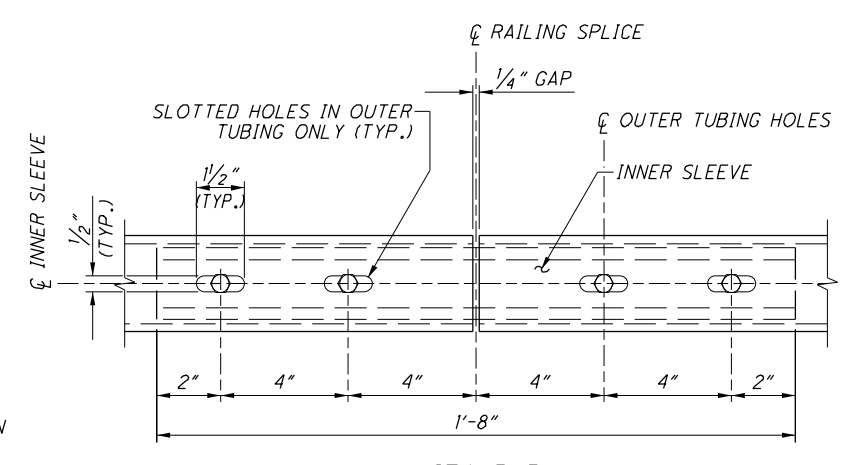
DETAIL A
SECTION THROUGH SAWCUT
SAWCUT PERIMETER = 2'-10"



SECTION B-B
RAILING NOT SHOWN



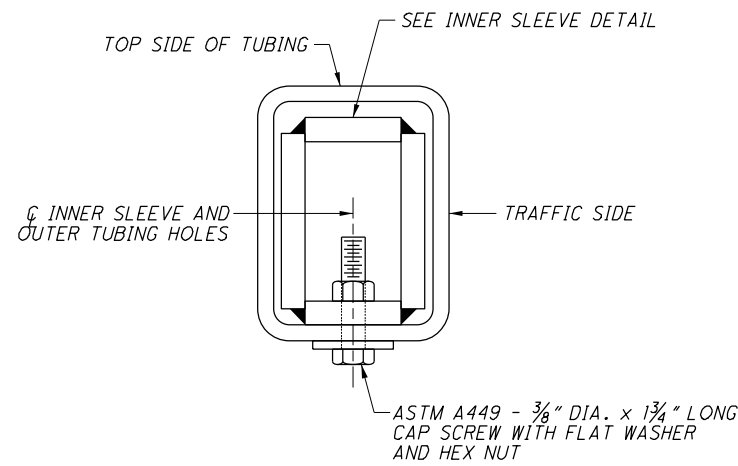
SECTION C-C
RAILING NOT SHOWN



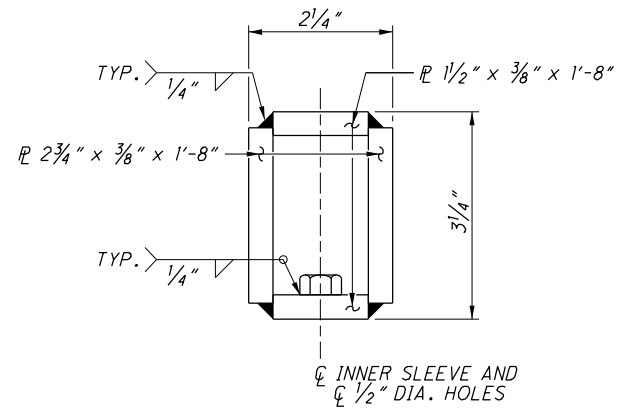
VIEW D-D
SEE NOTE 5

- LEGEND:**
- CLR. = CLEARANCE
 - DIA. = DIAMETER
 - E.S. = EACH SIDE
 - F.S. = FAR SIDE
 - HSS = HOLLOW STRUCTURAL SECTION
 - N.S. = NEAR SIDE
 - R = RADIUS
 - SPA. = SPACES

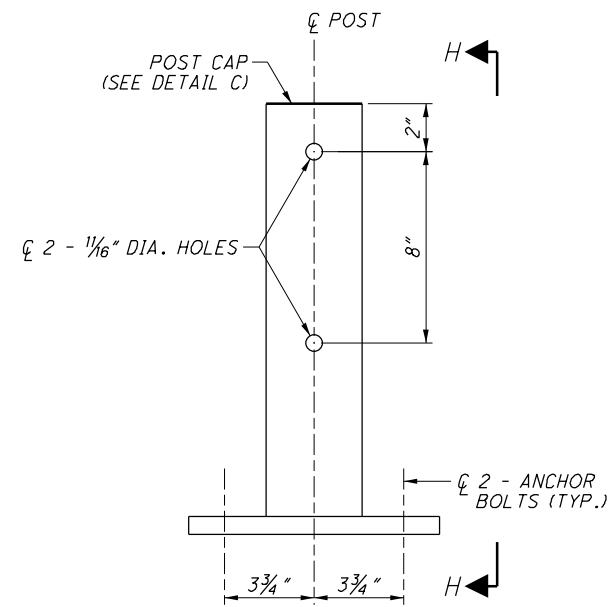
- NOTES:**
1. FOR DEFLECTION JOINT DETAILS AND GENERAL NOTES, SEE SHEET [5/5].
 2. VERTICAL SURFACE AT THE END OF WALL SHALL BE NORMAL TO GRADE.
 3. FOR RAIL-TO-POST BOLT DETAILS AND NOTES, SEE SHEET [2/5].
 4. THE HORIZONTAL RAILING ELEMENTS SHALL BE PLACED FLUSH WITH THE FACE OF THE CONCRETE BARRIER.
 5. BOLTS IN SLOTTED HOLES SHALL NOT BE DRAWN UP SO TIGHT AS TO PREVENT SLIDING BETWEEN THE OUTER TUBE AND THE INNER SLEEVE.
 6. FOR DETAIL B, SECTION E-E, VIEW F-F, SECTION G-G, AND ADDITIONAL NOTES SEE SHEET [2/5].
 7. FOR REINFORCING STEEL LIST, SEE SHEET [3/5].
 8. FOR BRIDGE SIDEWALK RAILING WITH APPROACH RAILING, SEE SHEET [3/5].



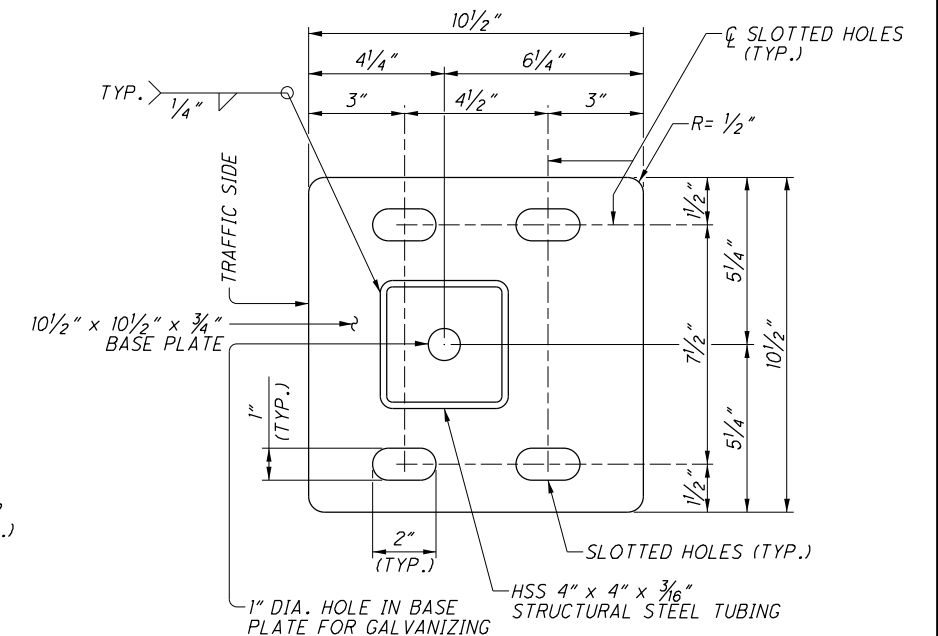
SECTION E-E
AT RAILING INTERNAL SPLICE



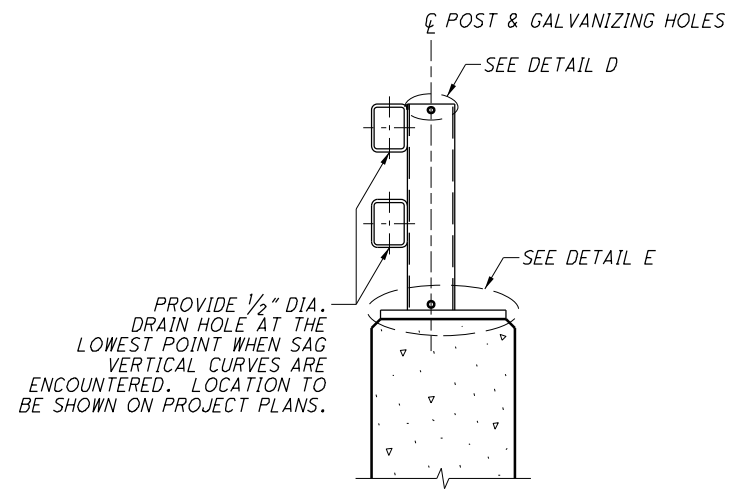
INNER SLEEVE DETAIL
AT RAILING INTERNAL SPLICE
(FINISHED DIMENSIONS)



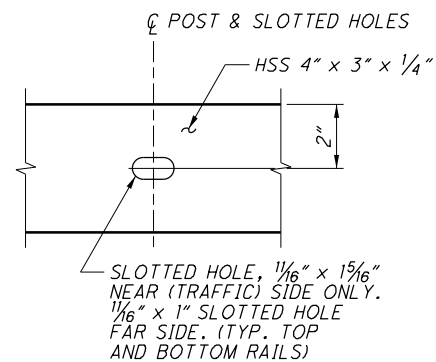
VIEW F-F
RAILING AND CONCRETE BARRIER NOT SHOWN



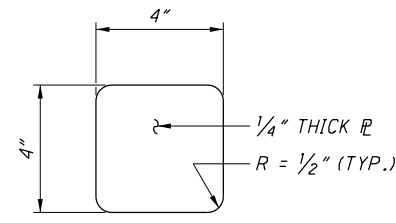
SECTION G-G
RAILING AND CONCRETE BARRIER NOT SHOWN
SEE NOTE 2



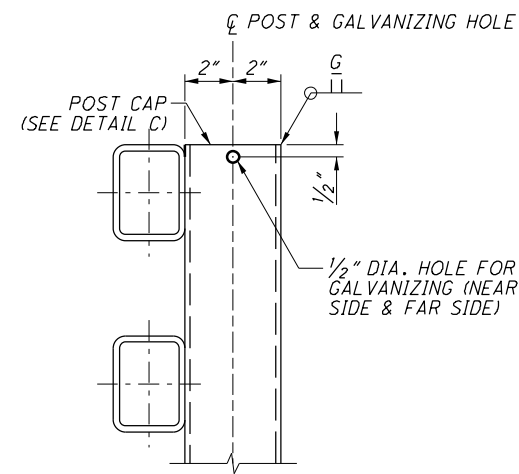
SECTION H-H
ANCHOR BOLTS NOT SHOWN



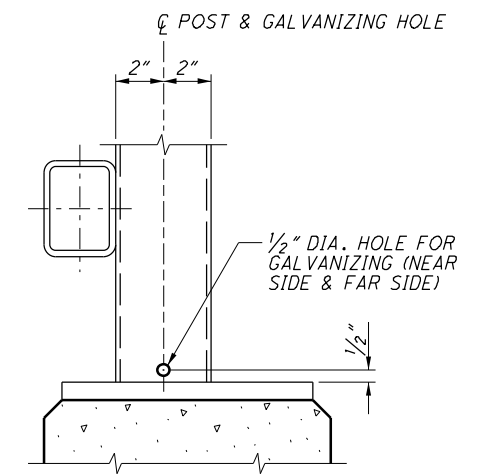
DETAIL B
SLOTTED HOLE AT STRUCTURAL STEEL TUBE RAIL



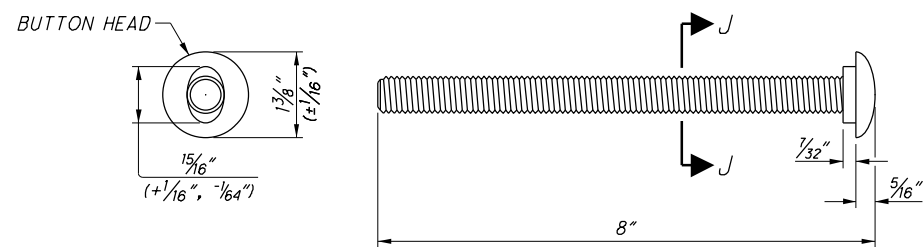
DETAIL C
POST CAP DETAIL



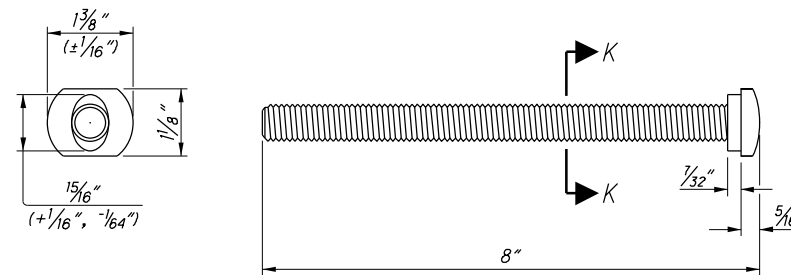
DETAIL D



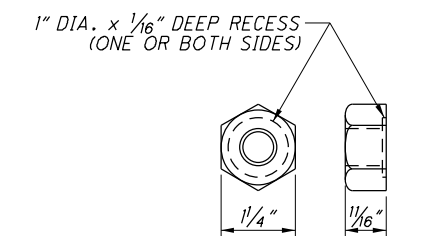
DETAIL E



VIEW J-J
ALTERNATIVE NO. 1
RAIL-TO-POST BOLT



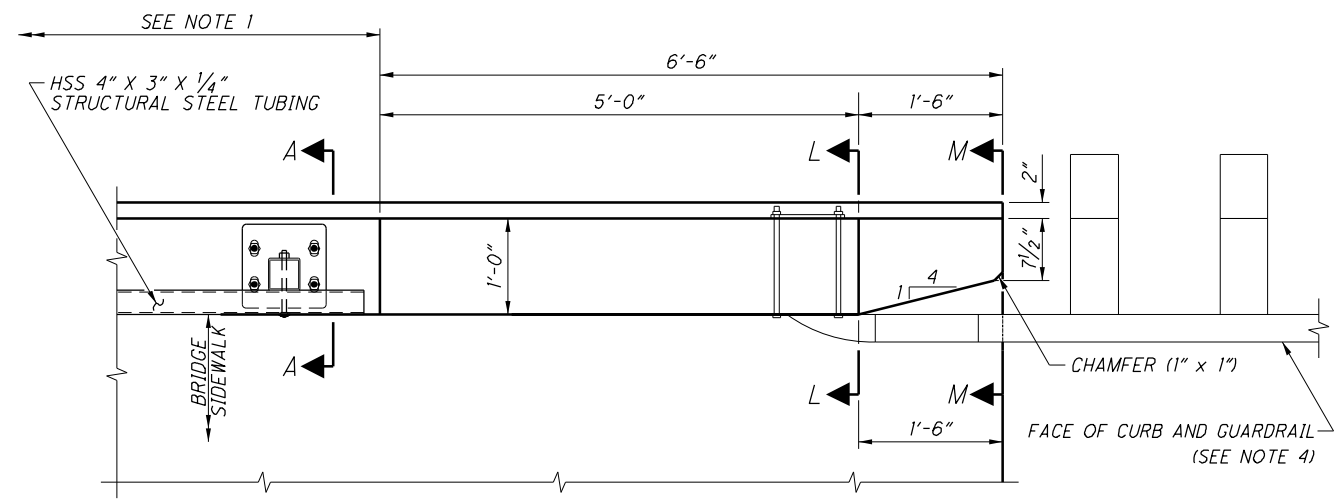
VIEW K-K
ALTERNATIVE NO. 2
RAIL-TO-POST BOLT



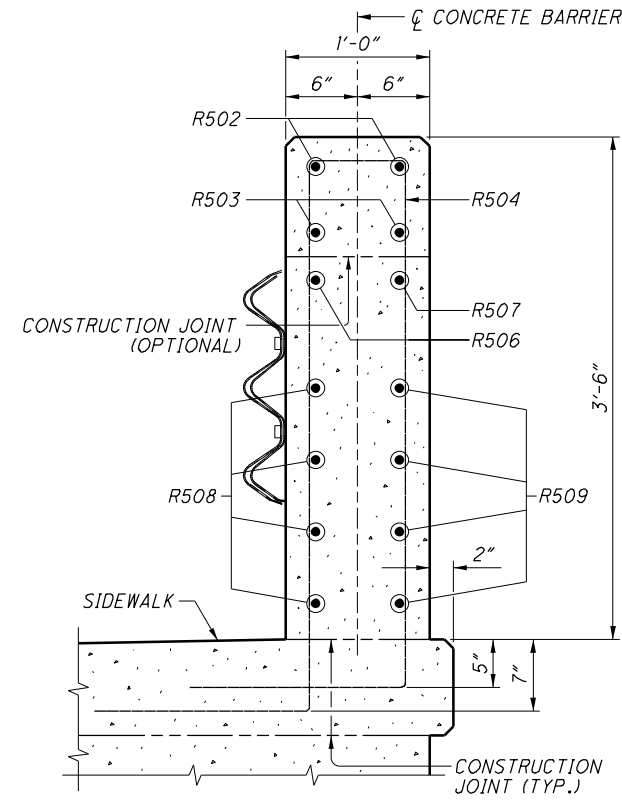
RAIL-TO-POST NUT
SEE NOTE 3

- NOTES:**
- FOR LOCATION OF DETAIL B, SECTION E-E, VIEW F-F, AND SECTION G-G, SEE SHEET [1/5].
 - FOR BRIDGE SIDEWALK RAILING WITH VANDAL PROTECTION FENCE, SEE "MODIFIED BP-1 OR BP-3" ON SHEET [4/5].
 - THE NUTS SHALL BE TIGHTENED TO THE SNUG TIGHT CONDITION TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
 - FOR RAILING DETAIL AT DECK EXPANSION JOINT, SEE SHEET [4/5].
 - FOR DEFLECTION JOINT DETAILS AND GENERAL NOTES, SEE SHEET [5/5].

LEGEND:
DIA. = DIAMETER
HSS = HOLLOW STRUCTURAL SECTION
R = RADIUS

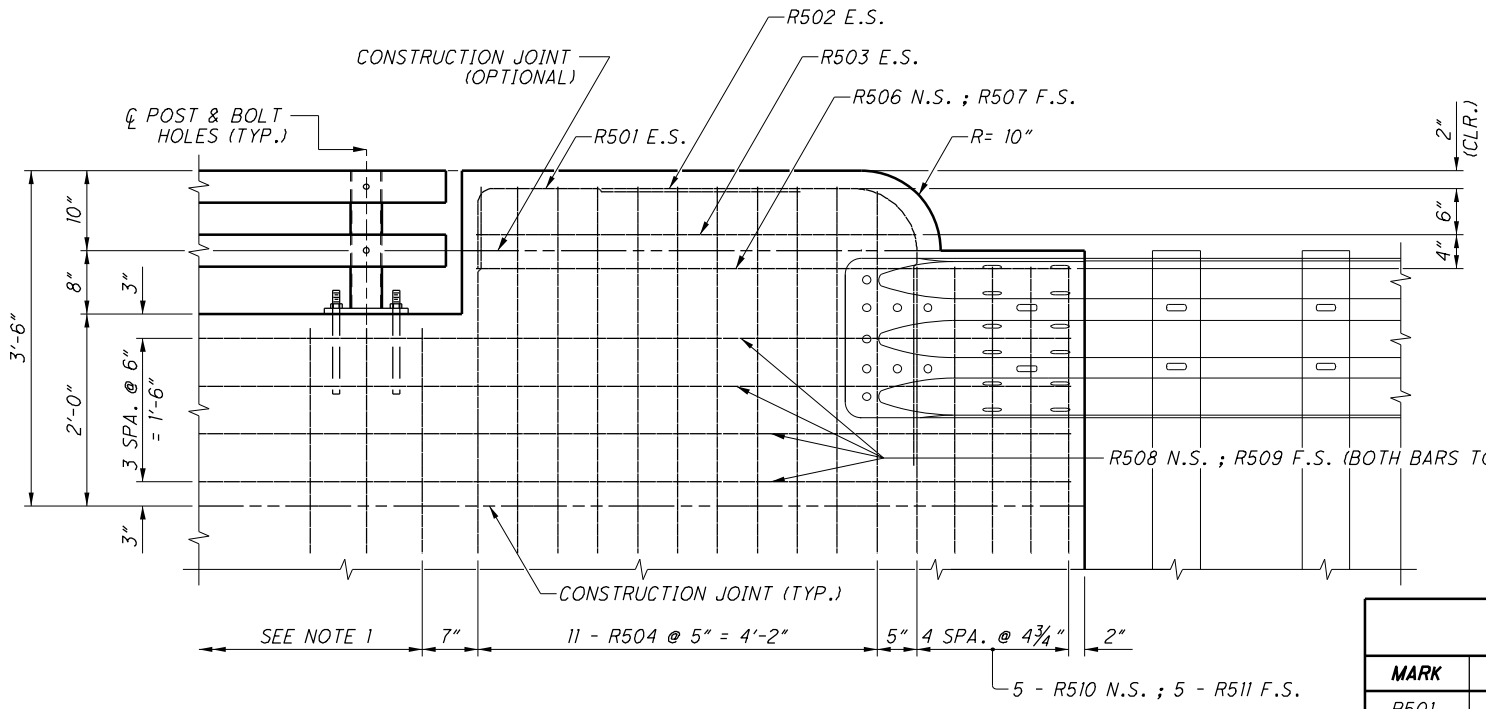


PLAN
BRIDGE SIDEWALK RAILING WITH APPROACH RAILING



SECTION L-L

SECTION M-M



ELEVATION
BRIDGE SIDEWALK RAILING WITH APPROACH RAILING

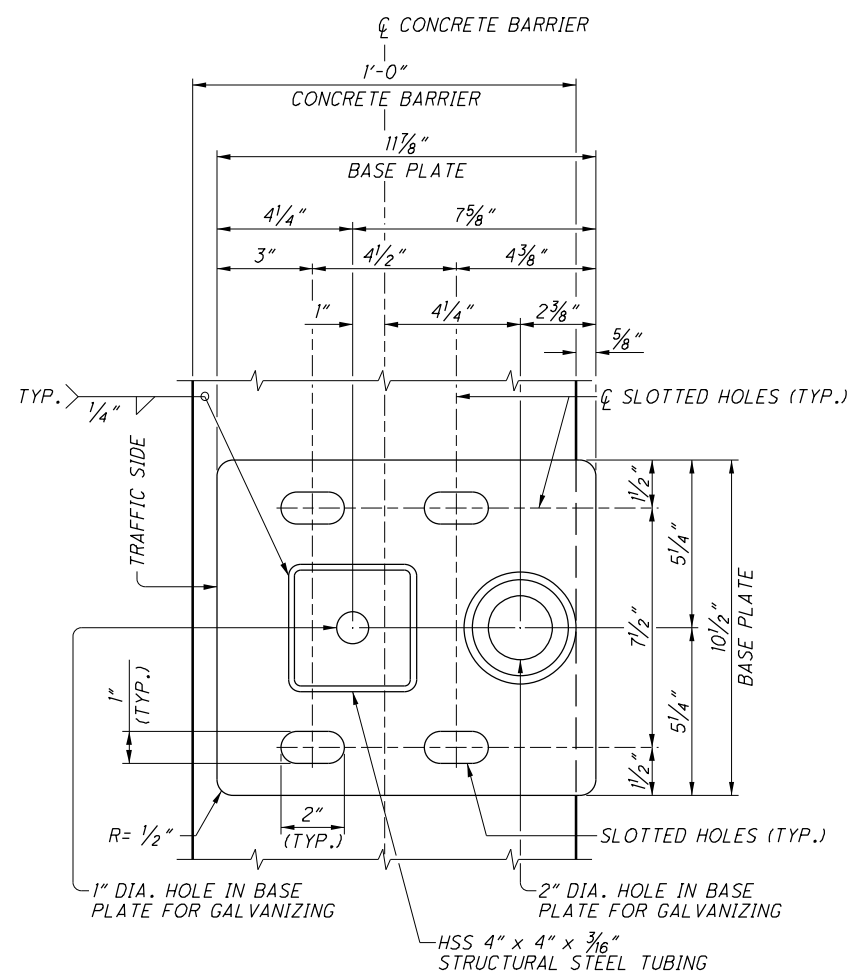
- LEGEND:**
 CLR. = CLEARANCE
 E.S. = EACH SIDE
 F.S. = FAR SIDE
 HSS = HOLLOW STRUCTURAL SECTION
 N.S. = NEAR SIDE
 R = RADIUS
 SPA. = SPACES

- NOTES:**
 1. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEET [1/5] AND [2/5].
 2. FOR SECTION A-A, SEE SHEET [1/5].
 3. FOR SAWCUT PERIMETER LENGTH, SEE DETAIL A ON SHEET [1/5].
 4. FOR BRIDGE TERMINAL ASSEMBLY, SEE STD. CONSTR. DWGS. MGS-3.1 AND MGS-3.2.
 5. FOR BRIDGE SIDEWALK RAILING WITH VANDAL PROTECTION FENCE, SEE "MODIFIED BP-1 OR BP-3" ON SHEET SHEET [4/5].
 6. FOR RAILING DETAIL AT DECK EXPANSION JOINT, SEE SHEET [4/5].
 7. FOR DEFLECTION JOINT DETAILS AND GENERAL NOTES, SEE SHEET [5/5].

REINFORCING STEEL FOR BRIDGE SIDEWALK RAILING WITH CONCRETE BARRIER

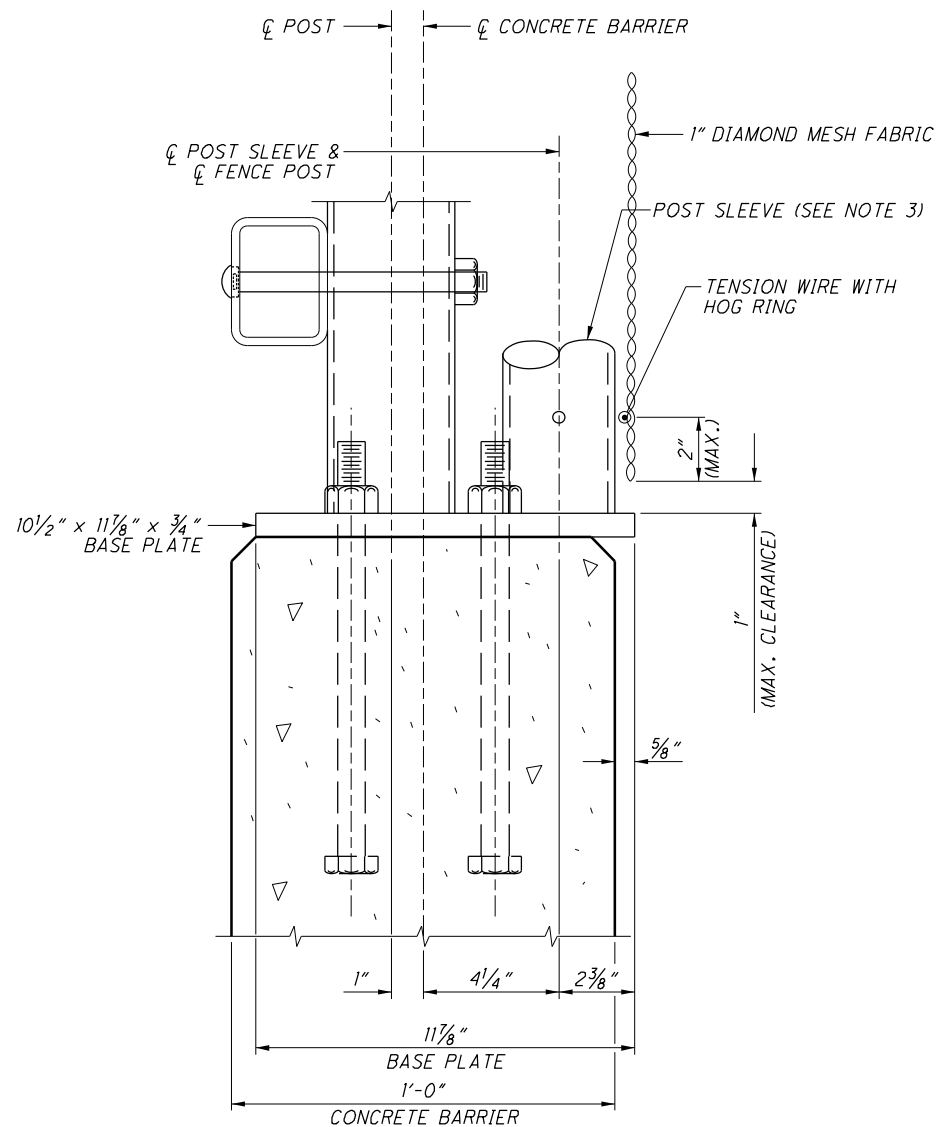
MARK	LENGTH	TYPE	BENDING DIAGRAMS
R501	4'-2"	BENT	
R502	6'-1"	BENT	
R503	4'-7"	STR	
R504	10'-10"	BENT	
R505	7'-10"	BENT	
R506	6'-3"	BENT	
R507	6'-2"	STR	
R508	⊕ + 1'-5"	BENT	
R509	⊕	STR	
R510	4'-6"	BENT	
R511	4'-4"	BENT	
R5_	⊕	STR	

⊕ SEE PROJECT PLANS.



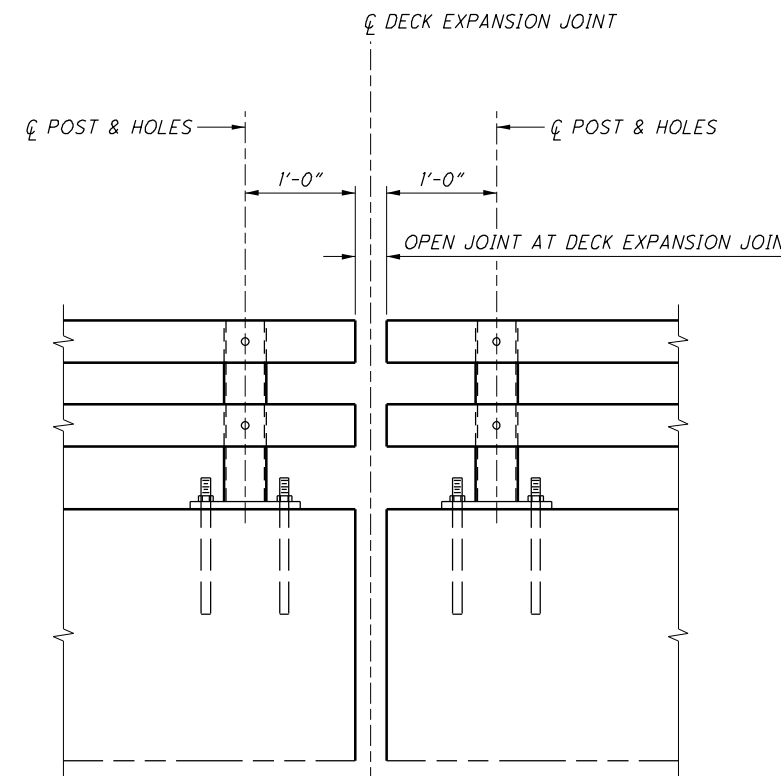
PLAN - MODIFIED BP-1 OR BP-3

SEE NOTE 1
STEEL TUBE RAILING NOT SHOWN



ELEVATION - MODIFIED BP-1 OR BP-3

SEE NOTE 1
REINFORCING STEEL NOT SHOWN



RAILING DETAIL AT DECK EXPANSION JOINT

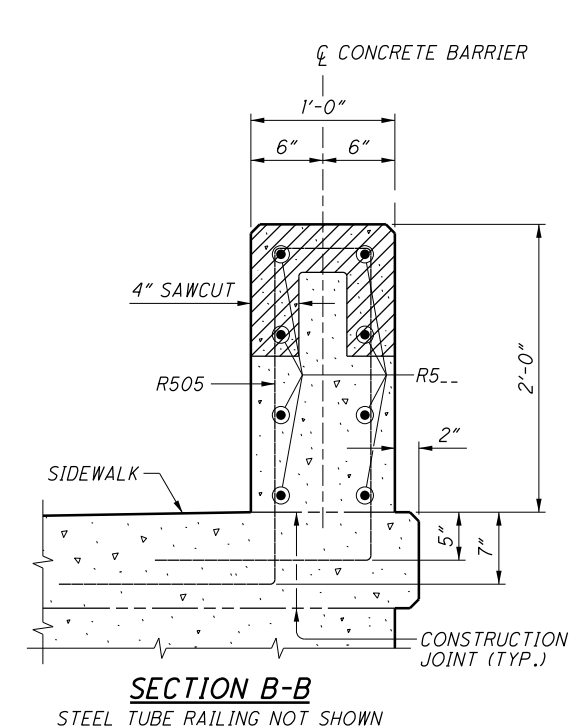
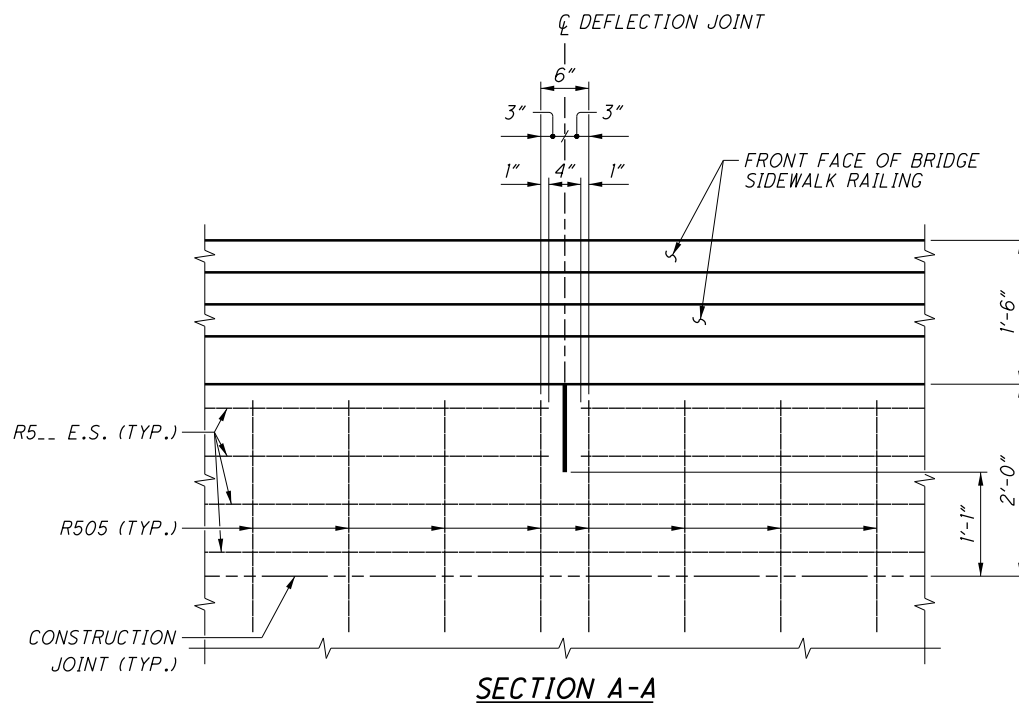
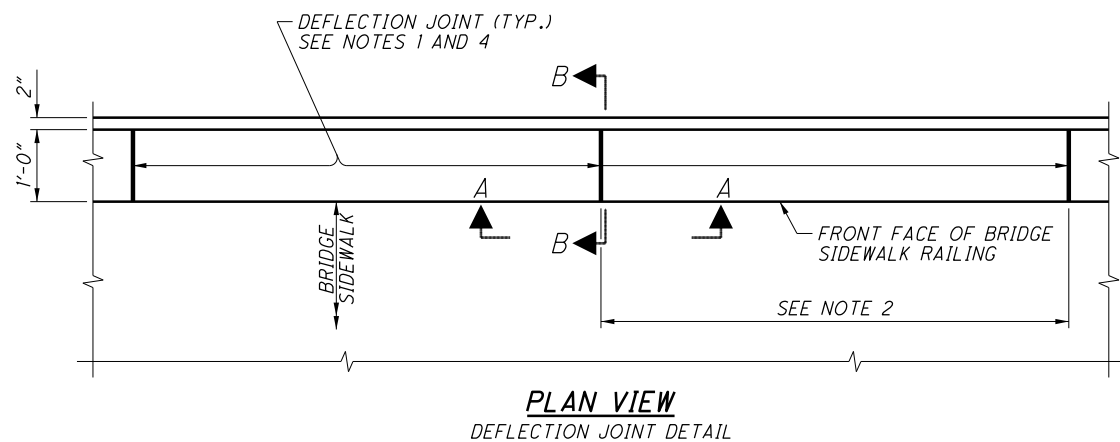
REINFORCING STEEL NOT SHOWN

LEGEND:

- DIA. = DIAMETER
- HSS = HOLLOW STRUCTURAL SECTION
- R = RADIUS

NOTES:

1. FOR BRIDGE SIDEWALK RAILING WITH VANDAL PROTECTION FENCE AS SHOWN IN STD. BRIDGE DWG. VPF-1-90, MODIFIED BP-1 OR BP-3 SHALL BE UTILIZED INSTEAD OF BP-1 OR BP-3 IN ORDER TO ACCOMODATE PLACEMENT OF VANDAL PROTECTION FENCE POSTS AND POST SLEEVES. FOR ADDITIONAL DETAILS AND NOTES ON VANDAL PROTECTION FENCE, SEE STD. BRIDGE DWG. VPF-1-90.
2. FOR DEFLECTION JOINT DETAILS AND GENERAL NOTES, SEE SHEET [5/5].
3. FABRICATE POST SLEEVE AND ATTACH TO BASE PLATE AS SHOWN ON STD. BRIDGE DWG. VPF-1-90, SHEET [3/7].



NOTES:

1. FOR THE ENTIRE LENGTH OF BRIDGE SIDEWALK BARRIER, PROJECT PLANS SHALL SHOW THE LOCATIONS OF DEFLECTION JOINTS.
2. DEFLECTION JOINT SPACING SHALL NOT EXCEED 13'-0" ON CENTERS. FOR CONTINUOUS STRUCTURES, THE DEFLECTION JOINTS WITHIN THE DEAD LOAD CONTRAFLEXURE (NEGATIVE MOMENT REGIONS OVER PIER LOCATIONS) SHALL BE SPACED NOT LESS THAN 5'-0" NOR MORE THAN 6'-6" ON CENTERS.
3. LIMITS OF SAWCUT IS SHOWN IN DETAIL A, SHEET [75]. THE 4" SAWCUT DEPTH SHOWN IN DETAIL A IS THE MINIMUM REQUIRED. HOWEVER, THE CONTRACTOR HAS AN OPTION TO PERFORM FULL DEPTH SAWCUT.

GENERAL NOTES

GENERAL:

THIS STANDARD BRIDGE DRAWING PROVIDES DESIGN AND CONSTRUCTION DETAILS. THE PROJECT PLANS SHALL PROVIDE THE NECESSARY ADDITIONAL BRIDGE SIDEWALK RAILING DIMENSIONS INCLUDING CONCRETE BARRIER LENGTH, RAILING POST SPACING, VANDAL PROTECTION POST SPACING (IF APPLICABLE), REINFORCING STEEL LIST, ESTIMATED QUANTITIES, AND ANY OTHER PERTINENT INFORMATION INCLUDING SPECIAL NOTES AND DETAILS. THE DEPARTMENT WILL NOT ALLOW SLIPFORMING OF CONCRETE BARRIER.

DESIGN CRITERIA:

BRIDGE SIDEWALK RAILING WITH CONCRETE BARRIER MEETS THE REQUIREMENTS OF NCHRP 350 TEST LEVEL 4 AND "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS", 2014.

DESIGN DATA:

CONCRETE - COMPRESSIVE STRENGTH = 4.5 KSI

REINFORCING STEEL - MINIMUM YIELD STRENGTH = 60 KSI

STRUCTURAL STEEL TUBING - MINIMUM YIELD STRENGTH = 46 KSI

ALL OTHER STEEL - MINIMUM YIELD STRENGTH = 36 KSI

STRUCTURAL STEEL TUBE SPLICES:

TUBE SPLICES ARE TO BE LOCATED SO THAT EACH TUBE SEGMENT SHALL BE CONNECTED TO NOT LESS THAN TWO (2) POSTS AND NOT MORE THAN SEVEN (7) POSTS.

STRUCTURAL STEEL MATERIALS:

FURNISH SHAPED STRUCTURAL STEEL TUBE ACCORDING TO CMS 707.10 (ASTM A500, GRADE B), REINFORCING STEEL ACCORDING TO CMS 709.00, AND STEEL FOR PLATES ACCORDING TO CMS 711.01. FOR POST SLEEVE AND HEXAGON SOCKET SET SCREW MATERIALS, SEE STD. BRIDGE DWG. VPF-1-90, SHEET [76].

FASTENERS:

FURNISH FASTENERS AS FOLLOWS: THE ANCHOR BOLTS SHALL BE HEAVY HEX ASTM A449 WITH HARDENED STEEL WASHERS AND HEAVY HEX NUTS.

THE HORIZONTAL RAIL-TO-POST CONNECTION BOLTS AND HEX NUTS SHALL CONFORM TO CMS 711.10 (ASTM A307) AND TO SHEET [25]. THE WASHERS SHALL CONFORM TO ASTM F436, TYPE 1.

THE HEX CAP SCREWS (BOLTS), HEX NUTS, AND WASHERS AT RAILING INTERNAL SPLICE, AS SHOWN IN SECTION E-E ON SHEET [25], SHALL CONFORM TO ASTM A449.

GALVANIZING:

GALVANIZE ALL SHAPED STRUCTURAL STEEL TUBES, PLATES, HARDWARE, AND ACCESSORIES ACCORDING TO CMS 711.02. ROUND ALL EXPOSED STRUCTURAL STEEL TUBE ENDS AND POST CAP EDGES PRIOR TO GALVANIZING.

HORIZONTAL CURVATURES:

THIS STANDARD BRIDGE DRAWING IS APPLICABLE TO STRUCTURES HAVING A RAILING CURVATURE RADIUS OF TWENTY (20) FEET OR MORE. FOR A RADIUS OF LESS THAN TWENTY (20) FEET, THE DESIGN SHALL BE SPECIAL. FOR STRUCTURES ON CURVATURES OF 3° OR MORE, SHAPED STRUCTURAL STEEL TUBE MAY BE FURNISHED STRAIGHT AND FORCED INTO POSITION IN THE FIELD AND THE TUBE SEGMENTS ARE TO BE ATTACHED TO NO MORE THAN THREE (3) POSTS.

DEFLECTION JOINTS FOR CONCRETE PARAPETS:

SAWCUT 1/4 INCH DEEP DEFLECTION JOINTS ALONG THE PERIMETER OF THE PARAPET WHEN THE CONCRETE IS STILL GREEN OR AS SOON AS THE SAW CAN BE OPERATED WITHOUT DAMAGING THE CONCRETE.

AFTER THE CONCRETE CURING PERIOD SPECIFIED IN CMS 511.14 HAS BEEN REACHED, PERFORM 4" SAWCUT AS SHOWN IN DETAIL A, SHEET [75].

THE CONTRACTOR HAS AN OPTION TO PERFORM FULL DEPTH SAWCUT. HOWEVER, THE SAWCUT SHALL NOT BE LESS THAN 1'-0 1/2" FROM THE TOP OF THE CONCRETE DECK SLAB.

USE AN EDGE GUIDE, FENCE, OR JIG TO ENSURE THAT THE CUT JOINT IS STRAIGHT, TRUE, AND ALIGNED ON ALL FACES OF THE PARAPET. THE JOINT WIDTH SHALL BE THE WIDTH OF THE SAW BLADE, A NOMINAL WIDTH OF 1/4 INCH.

SEAL THE PERIMETER OF THE DEFLECTION JOINTS TO A MINIMUM DEPTH OF ONE INCH WITH A POLYURETHANE OR POLYMERIC MATERIAL CONFORMING TO ASTM C920, TYPE S. LEAVE THE BOTTOM 1/2 INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE PARAPET UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO ESCAPE.

MINIMUM EMBEDMENT OF VERTICAL REINFORCING BARS:

IF THE MINIMUM EMBEDMENT SHOWN FOR THE VERTICAL REINFORCING BARS INTO THE BRIDGE DECK, APPROACH SLAB, WINGWALL, OR SIDEWALK IS NOT MET, THEN THE DESIGNER SHALL CALCULATE THE REQUIRED REINFORCEMENT ACCORDING TO SECTION 13 OF THE "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.

METHOD OF MEASUREMENT:

THE DEPARTMENT WILL MEASURE THE QUANTITY BY THE NUMBER OF FEET. THE DEPARTMENT WILL MEASURE THE LENGTH OF RAILING BETWEEN THE ENDS OF THE CONCRETE BARRIER.

BASIS OF PAYMENT:

PAYMENT FOR THE CONCRETE AND REINFORCING STEEL ABOVE OR EXTENDING ABOVE THE UPPER SURFACE OF THE SIDEWALK; SAWCUTS; CAULKING COMPOUND; ANCHOR BOLTS; STEEL PLATES; STEEL POSTS; STEEL TUBE RAILING; STEEL POST CAPS; BOLTS; HEX NUTS AND WASHERS; AND OTHER HARDWARE ARE INCLUDED FOR PAYMENT IN THE UNIT PRICE BID FOR THE MEASURED LENGTH.

FOR BRIDGE SIDEWALK RAILING WITHOUT VANDAL PROTECTION FENCE, THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES AT THE CONTRACT PRICE FOR ITEM 517, FEET, RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING).

FOR BRIDGE SIDEWALK RAILING WITH VANDAL PROTECTION FENCE, IN ADDITION TO THE ITEMS LISTED ABOVE, THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES AT THE CONTRACT PRICE FOR ITEM 517, FEET, RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING AND VANDAL PROTECTION FENCE) WHICH INCLUDES FABRICATION OF BASE PLATES WITH POST SLEEVES AND HEXAGON SOCKET SET SCREWS.

THE DEPARTMENT WILL PAY FOR ALL REMAINING VANDAL PROTECTION FENCE COMPONENTS SEPARATELY.

NOTES TO DESIGNER:

THIS STANDARD BRIDGE DRAWING IS INTENDED FOR USE WHEN THE APPROACH ROADWAY SECTION CONTAINS A CONCRETE SIDEWALK AND THE APPROACH RAILING IS ON THE OUTSIDE OF THE CONCRETE SIDEWALK. IF THE APPROACH RAILING IS LOCATED AT THE FACE OF THE CURB, THE APPROACH RAILING SHALL RUN CONTINUOUSLY ACROSS THE ENTIRE LENGTH OF THE BRIDGE. IF THE APPROACH ROADWAY SECTION HAS NO RAISED CONCRETE SIDEWALK, THE SIDEWALK THICKNESS SHALL TRANSITION TO THE FULL THICKNESS OF THE CONCRETE SIDEWALK ON THE APPROACH SLAB. TRANSITION FOR THE SIDEWALK THICKNESS SHALL NOT BE PLACED ON THE SUPERSTRUCTURE. IF THE APPROACH RAILING IS OF A DEFLECTOR PARAPET TYPE LOCATED OUTSIDE OF THE CONCRETE SIDEWALK, THE TRANSITION BETWEEN THE TWO DIFFERENT TYPES OF CONCRETE BARRIERS SHALL BE PLACED ON THE APPROACH SLAB AND THIS REQUIRES A SPECIAL DESIGN WHICH IS TO BE FULLY DETAILED IN THE STRUCTURE PORTIONS OF THE PLANS.

THE MINIMUM WIDTH OF THE SIDEWALK ON THE BRIDGE IS FIVE (5) FEET AND THE HEIGHT OF THE SIDEWALK SHALL BE EIGHT (8) INCHES MEASURED AT THE TOE OF THE CURB.