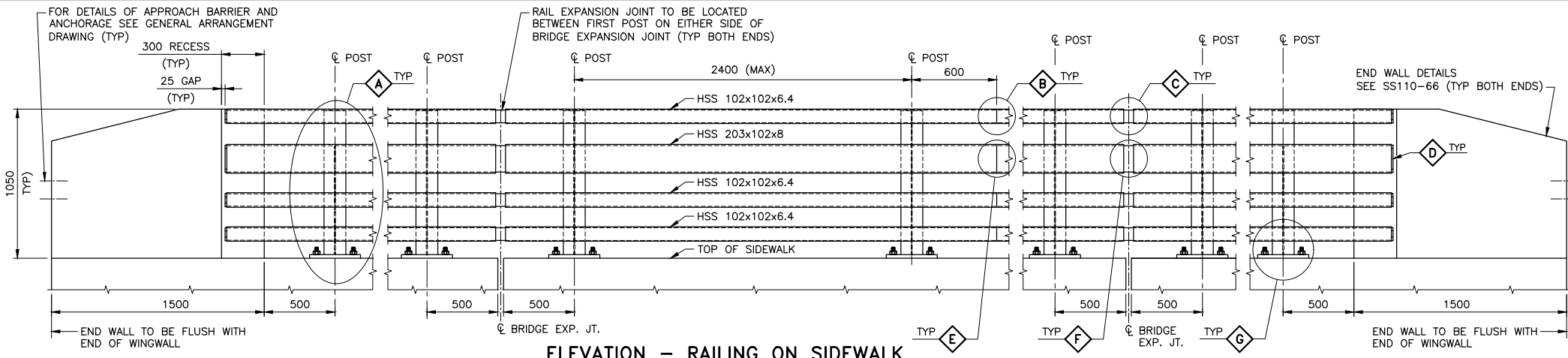


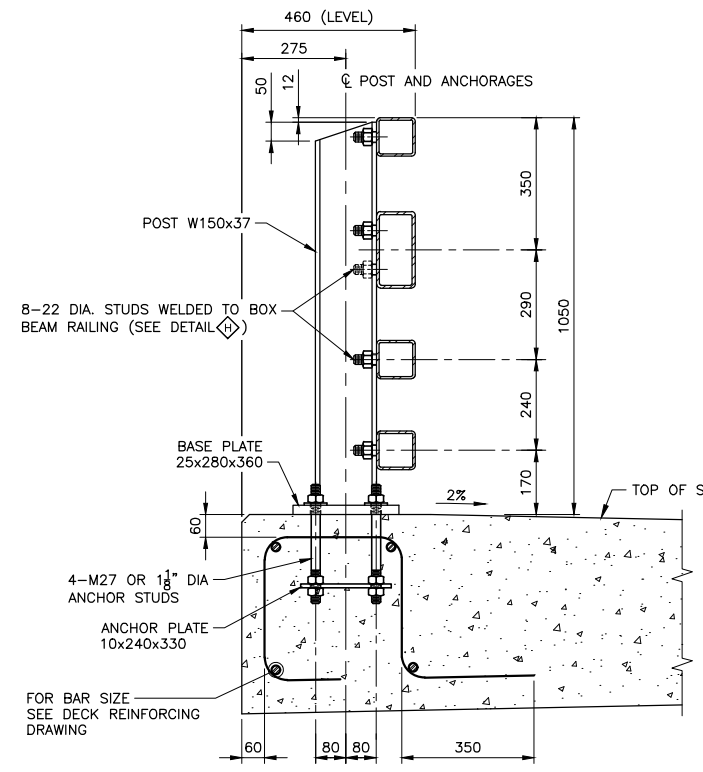
**NOTES TO DESIGNER:**

- THE IMPACT TEST TEMPERATURE SHALL BE DETERMINED BY REFERRING TO CSA S6-19, TABLE 10.14 BASED ON THE MINIMUM SERVICE TEMPERATURE OF THE STRUCTURE GIVEN IN FIGURE A3.1.2.
- FOR DECK WITH GFRP REINFORCEMENT, THE EXTRA STAINLESS STEEL BARS SHOWN AT RAIL POST LOCATION SHALL BE REPLACED WITH GFRP REBARS OF EQUIVALENT STRENGTH.
- THE 'NOTES TO DESIGNER' SHALL BE DELETED FROM THIS DRAWING PRIOR TO ISSUING.

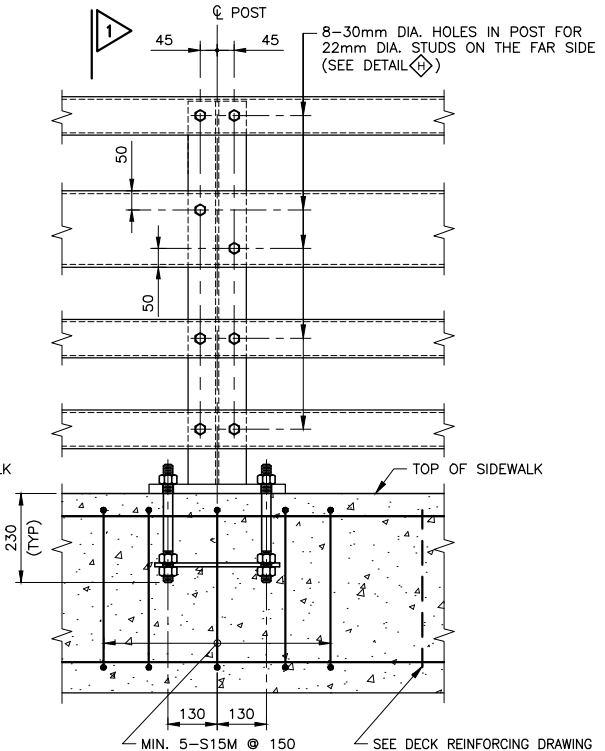
- NOTES:**
- SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
  - RAIL ELEMENTS SHALL BE HOLLOW STRUCTURAL SECTIONS GRADE 350WT, CLASS C. RAIL ELEMENT SHALL MEET THE LONGITUDINAL CHARPY V-NOTCH IMPACT TEST REQUIREMENTS OF 27 JOULES AT TEST TEMPERATURE OF \_\_\_\_ °C.  
(ASTM A500 GRADE B OR C STEEL MAY BE SUBSTITUTED FOR GRADE 350WT PROVIDED THAT THE CHARPY V-NOTCH IMPACT TEST REQUIREMENTS ARE VERIFIED BY THE SUBMISSION OF TEST DOCUMENTATION).
  - POSTS AND PLATES SHALL BE GRADE 350WT.
  - THE NOTCH TOUGHNESS REQUIREMENTS FOR POSTS AND PLATES SHALL BE THE SAME AS THOSE SPECIFIED IN NOTE 2.
  - ANCHOR STUDS, WASHERS, AND NUTS SHALL CONFORM TO ASTM A449.
  - FULL THREAD STUDS FOR FASTENING GUIDE RAILS TO POST SHALL CONFORM TO ASTM A108. LOCK NUTS SHALL BE ACCORDING TO ASTM A563. WASHERS SHALL BE ACCORDING TO ASTM F436.
  - RAILS SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT. IN THIS CASE, THE RAIL LENGTH SHALL BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
  - GALVANIZING ON MATING SURFACES OF RAILS TO HAVE UNIFORM THICKNESS NOT EXCEEDING 0.15mm TO ENSURE SLIDING FIT.
  - RAILS, POSTS, RAIL SPLICES, AND END CAPS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
  - BOLTS, ANCHOR STUDS, PLATES, WASHERS, AND NUTS SHALL BE HOT-DIP GALVANIZED. LOCK NUTS SHALL BE ZINC PLATED ACCORDING TO ASTM-B695.
  - RAILS SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150 METRES.
  - RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
  - RAILS MAY BE CUT AS REQUIRED IN THE FIELD, CUT TO BE SURFACE TREATED WITH A ZINC TOUCH-UP SOLDER, GALVAGUARD OR AN APPROVED EQUIVALENT.
  - WHEN CONNECTING TO EXISTING RAILING, RAILS MUST BE MADE CONTINUOUS AND POST SPACINGS TO BE DETERMINED WITH REFERENCE TO EXISTING POSTS.
  - GROUT SHALL NOT BE USED UNDER BASE PLATES. THIN PAD OF EPOXY GROUT MAY BE USED WHEN REQUIRED FOR FILLING THE VOIDS UNDER THE BASE PLATE.
  - POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT CONDITION AND GIVEN AN ADDITIONAL 1/3 OF A TURN.
  - BOLTS IN RAIL SPLICES SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
  - STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA.
  - PRIOR TO ASSEMBLY, APPLY LOCTITE 242, OR APPROVED EQUIVALENT THREAD-LOCKING FLUID, TO THE BOLT THREADS AT THE NUT ENGAGEMENT AREA, PER MANUFACTURER'S SPECIFICATION.



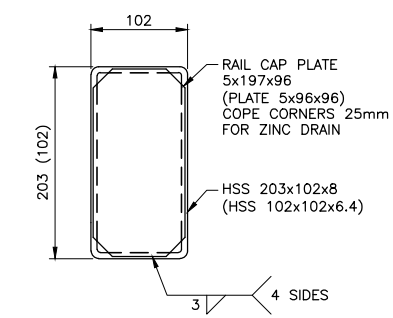
**ELEVATION - RAILING ON SIDEWALK**  
(INSIDE FACE SHOWN)



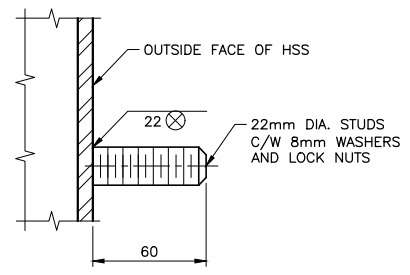
**1**



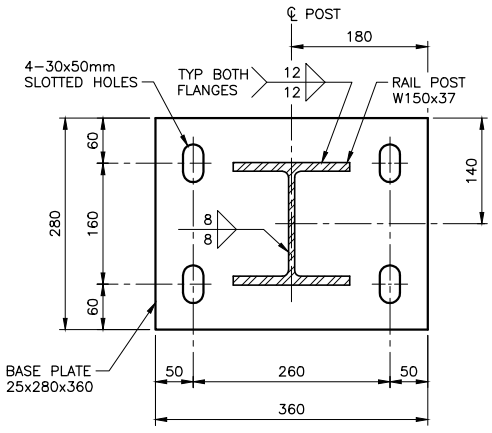
**A**



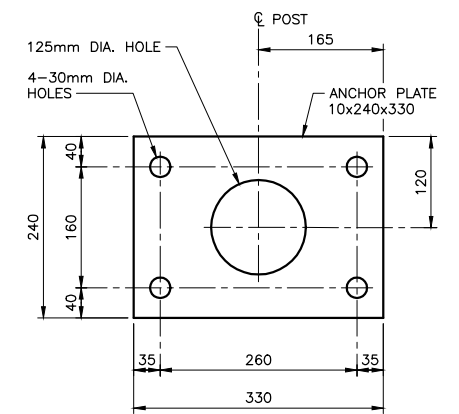
**D END CAP DETAILS**  
FOR HSS 203x102x8  
VALUE IN ( ) FOR HSS 102x102x6.4



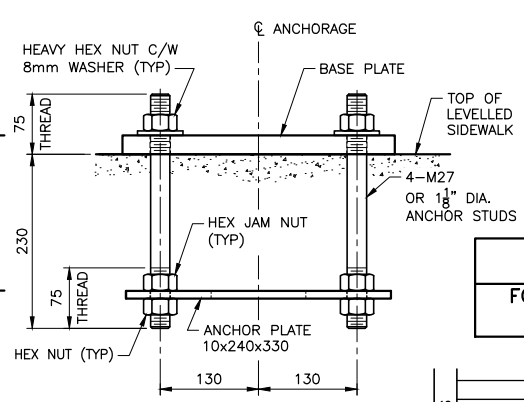
**H WELDED STUD DETAIL**  
FULL-THREAD WELDED STUD



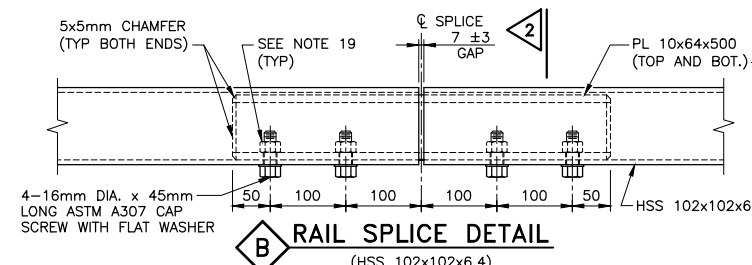
**6 BASE PLATE**



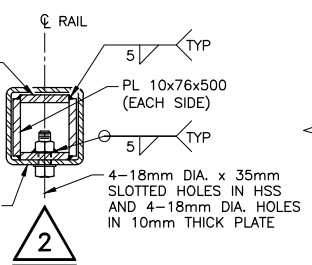
**7 ANCHOR PLATE**



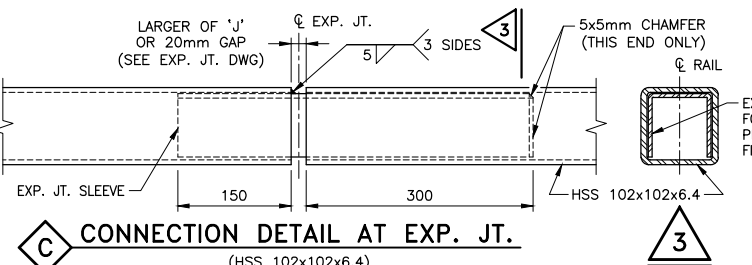
**G ANCHORAGE ASSEMBLY**



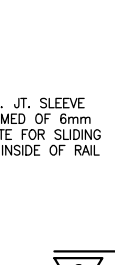
**B RAIL SPLICE DETAIL**  
(HSS 102x102x6.4)



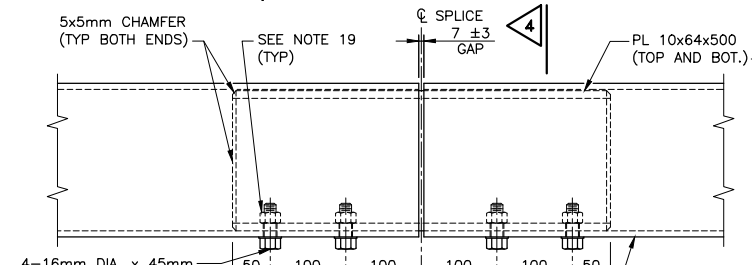
**2**



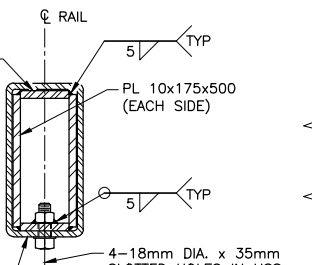
**C CONNECTION DETAIL AT EXP. JT.**  
(HSS 102x102x6.4)



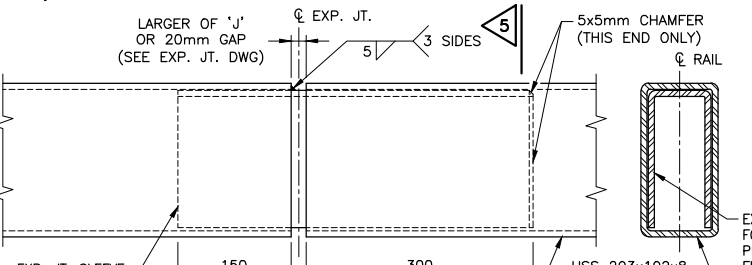
**3**



**E RAIL SPLICE DETAIL**  
(HSS 203x102x8)



**4**



**F CONNECTION DETAIL AT EXP. JT.**  
(HSS 203x102x8)



**5**

REFER TO THE STRUCTURAL MANUAL FOR PROFESSIONAL ENGINEER STAMPING REQUIREMENTS.

STANDARD DRAWING  
MAY 30, 2024  
**SS110-49**  
**FOUR TUBE RAILING ON SIDEWALK, TL-4 (WITH CONCRETE END WALL)**

DATE	BY	DESCRIPTION
DESIGN	-CHK	-CODE CSA-S6-19/LOAD
DRAWN	-CHK	-SITE

FILE NAME: C:\USERS\WZAKY\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\ADAM JAN RAILING 2023\110-49 MAY 30 2024.DWG  
MODIFIED: 2024-05-30 15:47