

2 - 19 DIA. GALV. TIMBER BOLTS (c/w ECONO DOME HEAD) AND MALLEABLE IRON WASHERS TOP AND BOTTOM (MINIMUM 75 DIAMETER)

OPTIONAL 150 x 150 GRADING STRIP CONNECTED TO RISER WITH 2 - 13 DIA. x 175 LG. LAG SCREWS/ RISER, WHERE SPECIFIED.

OPTIONAL 25 PACKING AT RISER, WHERE SPECIFIED.

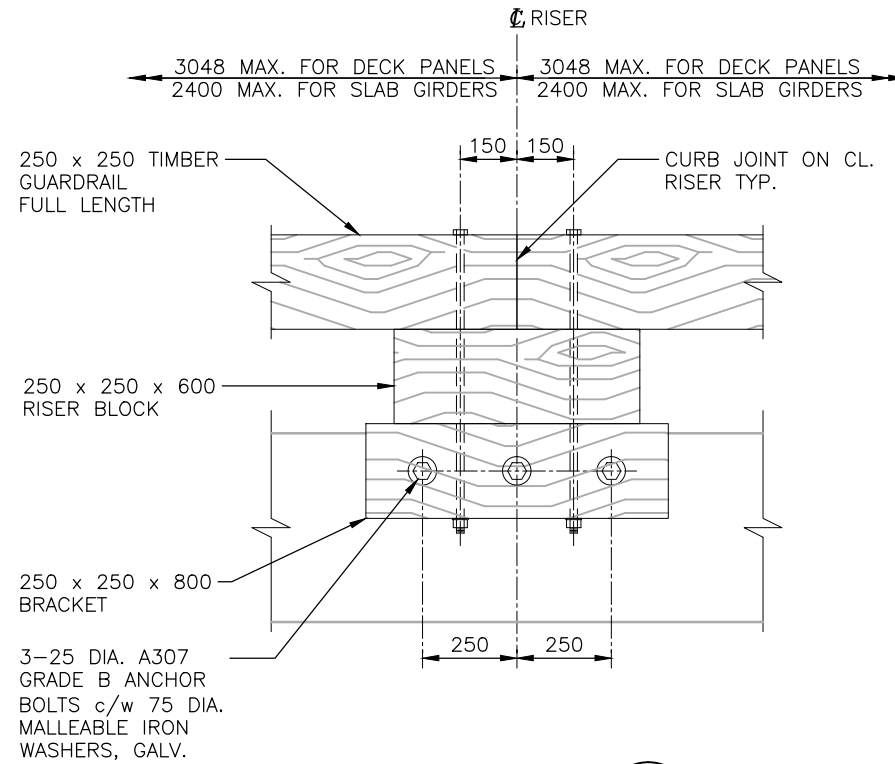
OPTIONAL 150 GRAVEL SURFACE, WHERE SPECIFIED.

CONCRETE SLAB GIRDER

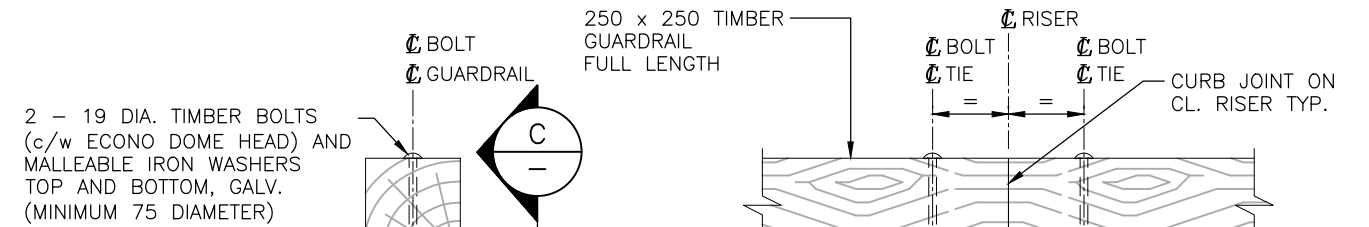
BOLT  
GUARDRAIL

A

110 FOR PRECAST CONCRETE SLABS  
100 FOR PRECAST CONCRETE DECK PANELS



TIMBER GUARDRAIL DETAIL FOR CONCRETE SLAB GIRDER/DECK PANEL SECTION A 1:20



TIMBER GUARDRAIL DETAIL FOR TIMBER DECK SECTION C 1:20

**NOTES:**

**GENERAL**

- GUARDRAILS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-1 AS DEFINED BY THE MINISTRY. GUARDRAILS HAVE NOT BEEN DESIGNED TO CONTAIN ERRANT VEHICLES.
- MAXIMUM POST SPACING AS SHOWN ON DRAWING.
- FOR GUARDRAIL ANCHOR DETAILS, SEE MINISTRY STANDARD DRAWINGS:  
STD-EC-030-09 - COMPOSITE PRECAST DECK PANEL  
STD-EC-040-08 - NON-COMPOSITE PRECAST DECK PANEL-DETAILS  
STD-EC-070-03 - PRECAST CONCRETE SLAB DETAILS (SHEET 1)

**MATERIALS**

- **TIMBER:** ALLOWABLE WOOD SPECIES, LUMBER GRADES, GRADING CRITERIA AS PER MINISTRY: BRIDGE TIMBER AND LUMBER MATERIAL STANDARD :
- **STEEL:**
  - POSTS
    - TO CSA G40.21M,
      - GRADE 350W (COATED)
      - GRADE 350A (UNCOATED)
      - GRADE 350A (UNCOATED)
    - OR TO ASTM
      - A500 GRADE C (COATED)
      - A847 (UNCOATED)
  - PLATE TO CSA G40.21M
    - GRADE 350W (COATED)
    - GRADE 350A (UNCOATED)
    - GRADE 350A (UNCOATED)
    - GRADE 300W (COATED)
- **STEEL FABRICATION:**
  - WELDING:
    - SHOP WELDING IN ACCORDANCE WITH CSA W59 FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1.
    - FIELD WELDING BY COMPANY CERTIFIED TO CSA W47.1, DIVISIONS 1, 2 OR 3.
    - MIN. 6mm FILLET WELD UNLESS OTHERWISE NOTED.
  - GUARDRAIL BRACKETS AND POST COATING TO BE EITHER:
    - GALVANIZED TO CSA G164 AS NOTED ON DRAWINGS. MINIMUM 610 g/m<sup>2</sup>; OR
    - PAINTED IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD.
  - GALVANIZING WHERE SPECIFIED, TO CSA G164, MINIMUM 610 g/m<sup>2</sup>.
- **HARDWARE:**
  - ALL HARDWARE (BOLTS, NUTS, WASHERS) TO BE GALVANIZED TO CSA G164, MINIMUM 610 g/m<sup>2</sup>.
  - **BOLTS:**
    - ASTM A307 GRADE B GALVANIZED
    - TIMBER BOLTS c/w ECONO HEAD AND MALLEABLE IRON WASHERS TOP AND BOTTOM.

**ASSUME NOT TO SCALE**

STEEL POST W150x22 @ 1905 C/C (MAX.)

GALV. W BEAM STEEL GUARDRAIL TO BC MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE STANDARD DWG. SP312-6

STEEL BRACKET

16 DIA. A307 GRADE B HEX BOLT c/w NUT & WASHER, GALV.

LESSER OF SLAB/DECK PANEL DEPTH OR 250

PL. 19x250 c/w 1-30 DIA. HOLE & 2-30x75 SLOTTED HOLES

PL. 12 GUSSET c/w 19x19 CROP, TYP.

SYMM./ POST

1905 MAX C/C

19 DIA. THRU HOLE (DECK SIDE OF POST FLANGE)

110 FOR PRECAST CONCRETE SLABS  
100 FOR PRECAST CONCRETE DECK PANELS

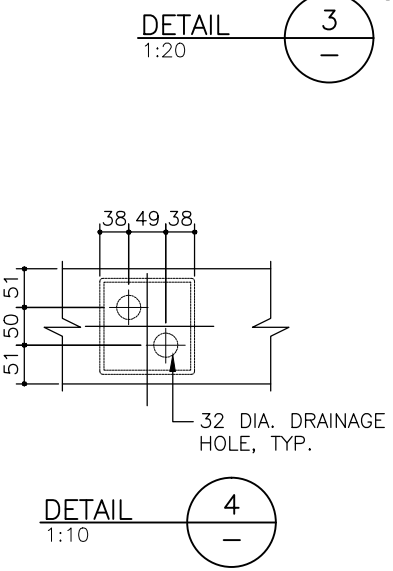
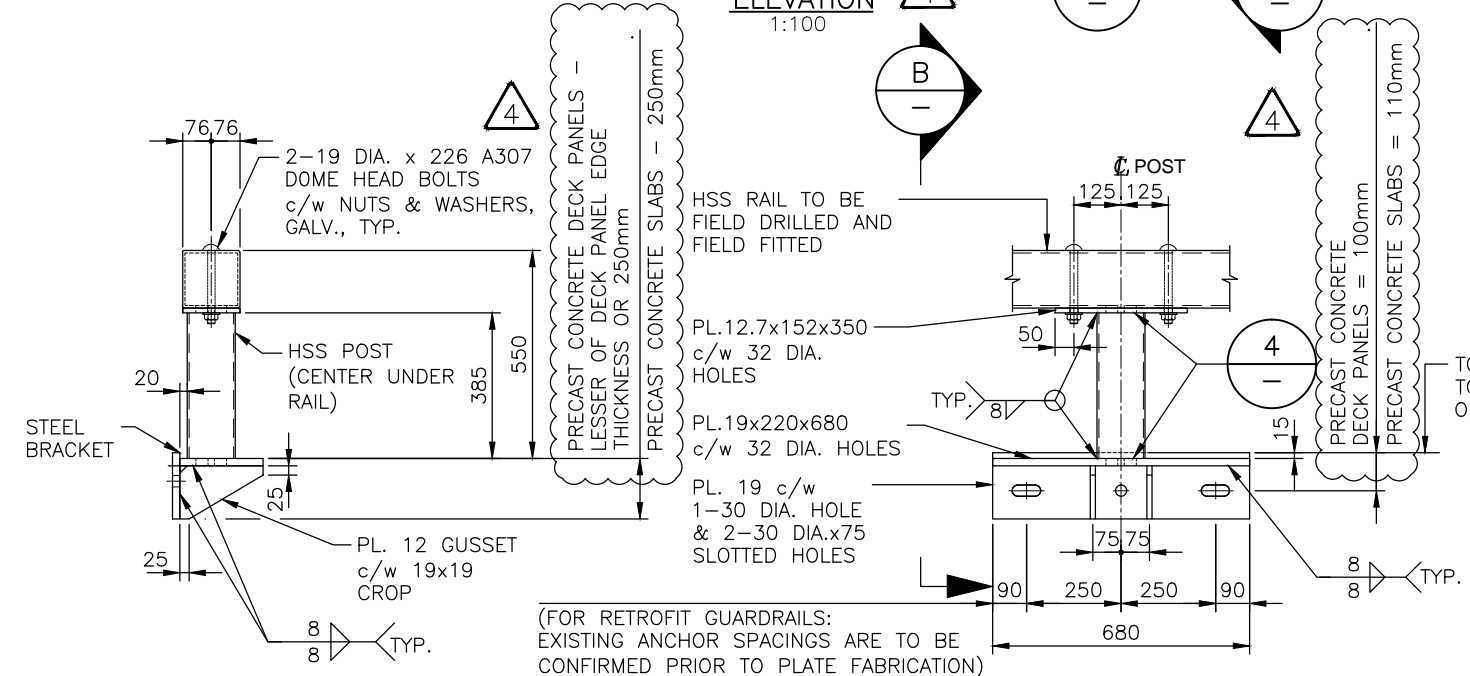
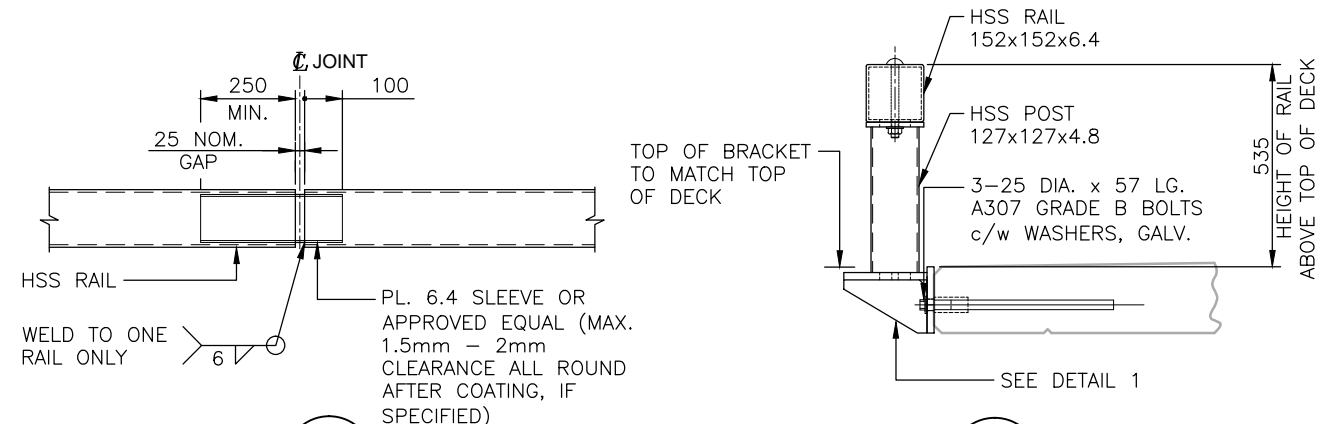
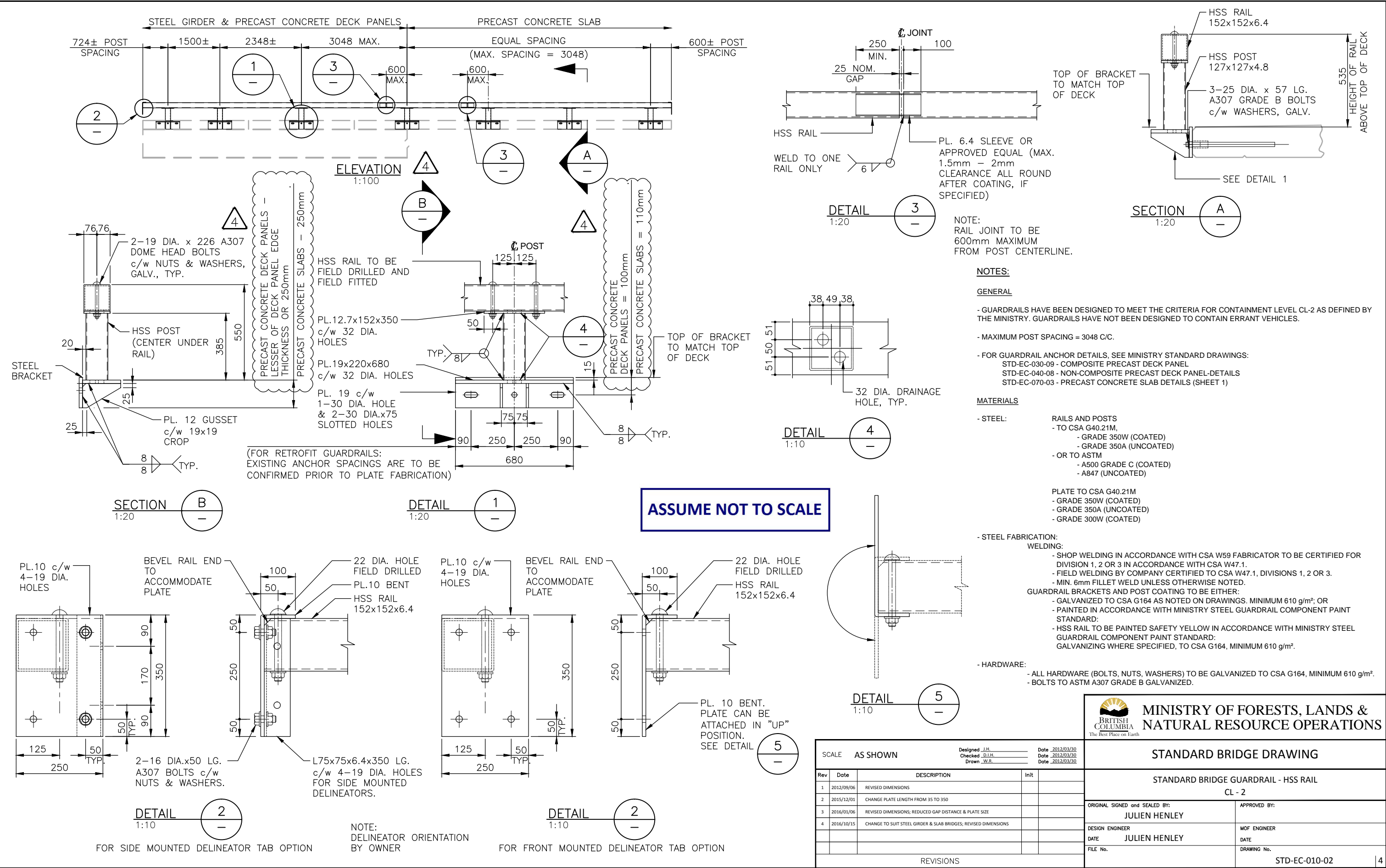
3 - 25 DIA. A307 GRADE B ANCHOR BOLTS c/w WASHERS, GALV.

B

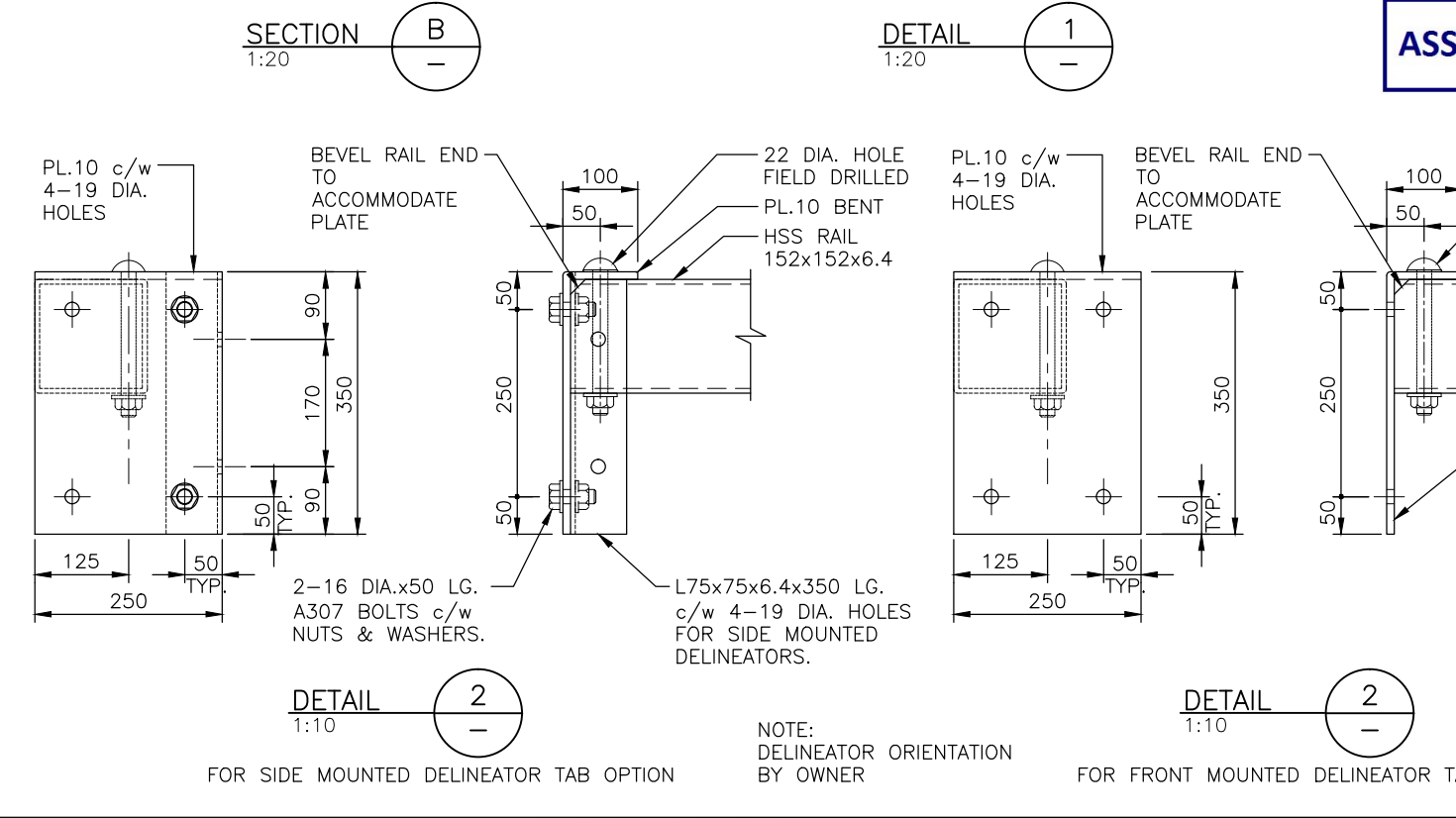
W-BEAM GUARDRAIL DETAIL FOR CONCRETE SLAB GIRDER/DECK PANEL SECTION B 1:20

SCALE AS SHOWN		Designed J.H.	Date 2012/03/30
		Checked D.L.H.	Date 2012/03/30
		Drawn W.R.	Date 2012/03/30
Rev	Date	DESCRIPTION	Init
REVISIONS			

BRITISH COLUMBIA The Best Place on Earth		<b>MINISTRY OF FORESTS, LANDS &amp; NATURAL RESOURCE OPERATIONS</b>	
<b>STANDARD BRIDGE DRAWING</b>			
<b>STANDARD BRIDGE GUARDRAIL CL - 1</b>			
ORIGINAL SIGNED and SEALED BY:		APPROVED BY:	
JULIEN HENLEY		MOF ENGINEER	
DESIGN ENGINEER		DATE	
JULIEN HENLEY		JULIEN HENLEY	
FILE No.		DRAWING No.	
		STD-EC-010-01	



**ASSUME NOT TO SCALE**



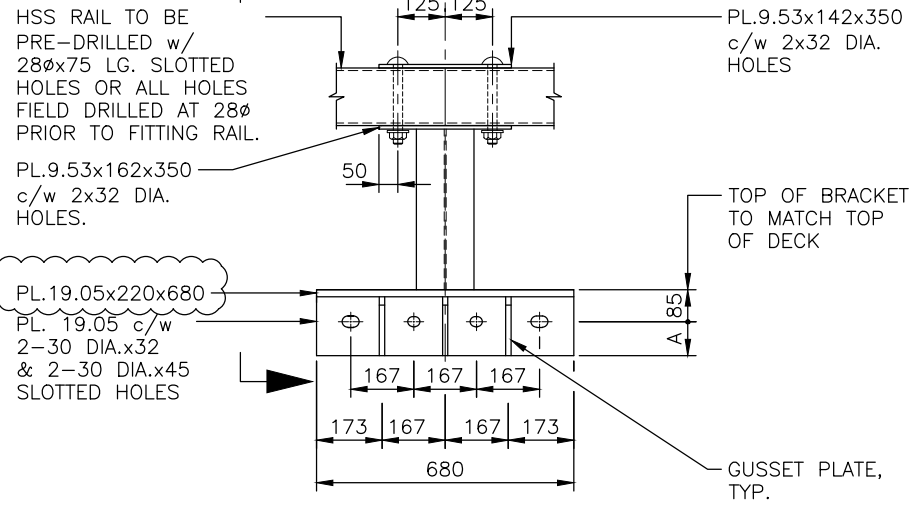
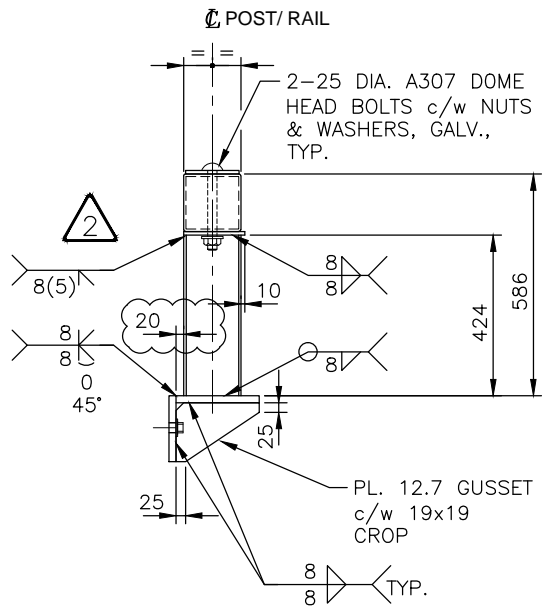
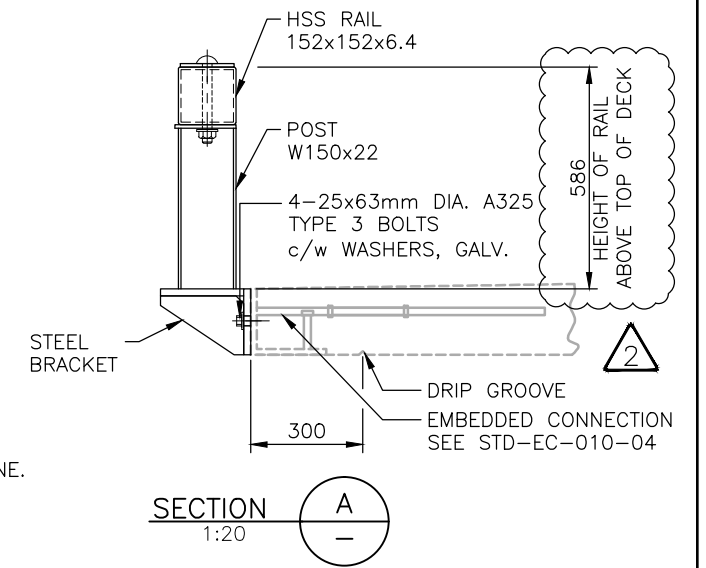
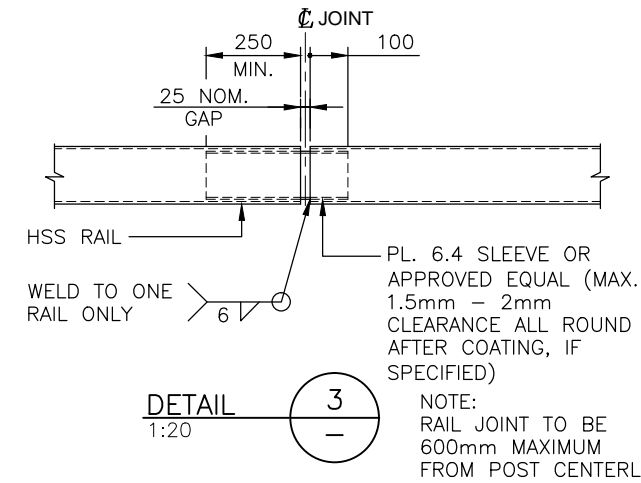
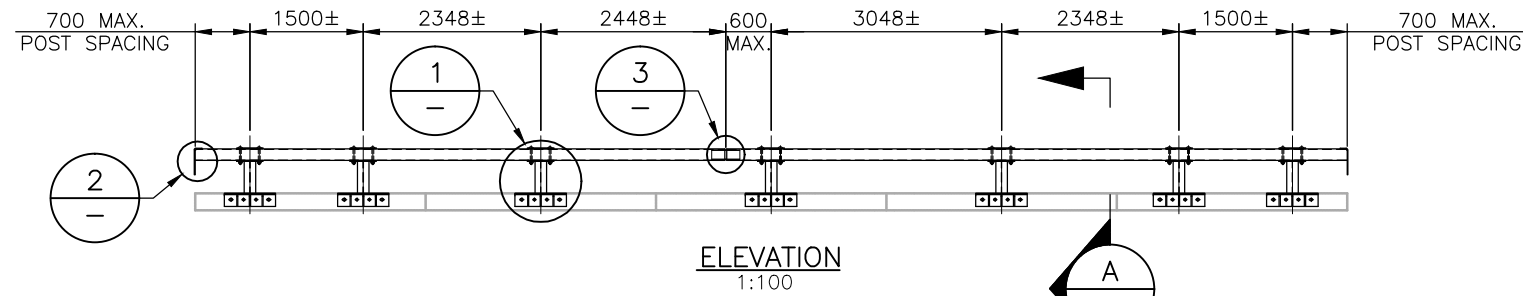
- NOTE:**  
RAIL JOINT TO BE 600mm MAXIMUM FROM POST CENTERLINE.
- NOTES:**
- GENERAL**
- GUARDRAILS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-2 AS DEFINED BY THE MINISTRY. GUARDRAILS HAVE NOT BEEN DESIGNED TO CONTAIN ERRANT VEHICLES.
  - MAXIMUM POST SPACING = 3048 C/C.
  - FOR GUARDRAIL ANCHOR DETAILS, SEE MINISTRY STANDARD DRAWINGS:
    - STD-EC-030-09 - COMPOSITE PRECAST DECK PANEL
    - STD-EC-040-08 - NON-COMPOSITE PRECAST DECK PANEL-DETAILS
    - STD-EC-070-03 - PRECAST CONCRETE SLAB DETAILS (SHEET 1)
- MATERIALS**
- STEEL:
    - RAILS AND POSTS
      - TO CSA G40.21M,
        - GRADE 350W (COATED)
        - GRADE 350A (UNCOATED)
      - OR TO ASTM
        - A500 GRADE C (COATED)
        - A847 (UNCOATED)
    - PLATE TO CSA G40.21M
      - GRADE 350W (COATED)
      - GRADE 350A (UNCOATED)
      - GRADE 300W (COATED)
  - STEEL FABRICATION:
    - WELDING:
      - SHOP WELDING IN ACCORDANCE WITH CSA W59 FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1.
      - FIELD WELDING BY COMPANY CERTIFIED TO CSA W47.1, DIVISIONS 1, 2 OR 3.
      - MIN. 6mm FILLET WELD UNLESS OTHERWISE NOTED.
    - GUARDRAIL BRACKETS AND POST COATING TO BE EITHER:
      - GALVANIZED TO CSA G164 AS NOTED ON DRAWINGS. MINIMUM 610 g/m<sup>2</sup>; OR
      - PAINTED IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:
      - HSS RAIL TO BE PAINTED SAFETY YELLOW IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:
      - GALVANIZING WHERE SPECIFIED, TO CSA G164, MINIMUM 610 g/m<sup>2</sup>.
  - HARDWARE:
    - ALL HARDWARE (BOLTS, NUTS, WASHERS) TO BE GALVANIZED TO CSA G164, MINIMUM 610 g/m<sup>2</sup>.
    - BOLTS TO ASTM A307 GRADE B GALVANIZED.

**BRITISH COLUMBIA**  
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Rev	Date	DESCRIPTION	Init
1	2012/09/06	REVISED DIMENSIONS	
2	2015/12/01	CHANGE PLATE LENGTH FROM 35 TO 350	
3	2016/01/06	REVISED DIMENSIONS; REDUCED GAP DISTANCE & PLATE SIZE	
4	2016/10/15	CHANGE TO SUIT STEEL GIRDER & SLAB BRIDGES; REVISED DIMENSIONS	

<b>STANDARD BRIDGE DRAWING</b>	
<b>STANDARD BRIDGE GUARDRAIL - HSS RAIL</b>	
<b>CL - 2</b>	
ORIGINAL SIGNED and SEALED BY: <b>JULIEN HENLEY</b>	APPROVED BY:
DESIGN ENGINEER	MOF ENGINEER
DATE <b>JULIEN HENLEY</b>	DATE
FILE No.	DRAWING No.
STD-EC-010-02	



DECK THICKNESS	A
175	90
200	115
225	140

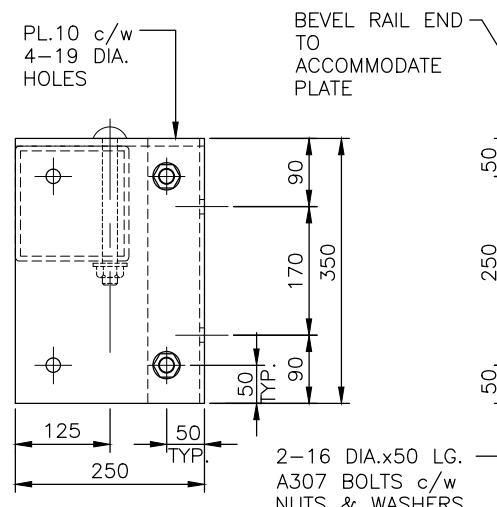
**NOTES:**

**GENERAL**

- GUARDRAILS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-3 AS DEFINED BY THE MINISTRY. GUARDRAILS HAVE NOT BEEN DESIGNED TO CONTAIN ERRANT VEHICLES.
- MAXIMUM POST SPACING = 3048 C/C.
- FOR GUARDRAIL ANCHOR DETAILS, SEE MINISTRY STANDARD DRAWINGS: STD-EC-010-04 - CL3 INSERT DETAILS

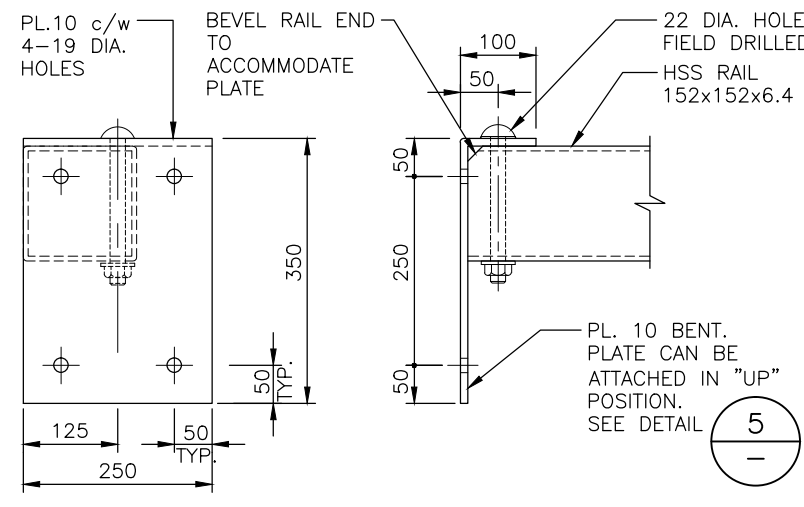
**MATERIALS**

- STEEL:
  - RAILS
    - TO CSA G40.21M
    - GRADE 350W (COATED)
    - GRADE 350A (UNCOATED)
  - OR TO ASTM
    - A500 GRADE C (COATED)
    - A847 (UNCOATED)
- POSTS TO CSA G40.21M
  - GRADE 350W (COATED)
- PLATE TO CSA G40.21M
  - GRADE 350W (COATED)
  - GRADE 350A (UNCOATED)
- STEEL FABRICATION:
  - WELDING:
    - SHOP WELDING IN ACCORDANCE WITH CSA W59 FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1.
    - FIELD WELDING BY COMPANY CERTIFIED TO CSA W47.1, DIVISIONS 1, 2 OR 3.
    - MIN. 6mm FILLET WELD UNLESS OTHERWISE NOTED.
  - GUARDRAIL BRACKETS AND POST COATING TO BE EITHER:
    - GALVANIZED TO CSA G164 AS NOTED ON DRAWINGS. MINIMUM 610 g/m<sup>2</sup>; OR
    - PAINTED IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:
    - HSS RAIL TO BE PAINTED SAFETY YELLOW IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:

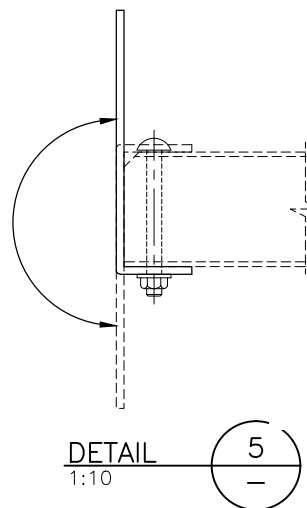


FOR SIDE MOUNTED DELINEATOR TAB OPTION

NOTE: DELINEATOR ORIENTATION BY OWNER



FOR FRONT MOUNTED DELINEATOR TAB OPTION



**ASSUME NOT TO SCALE**



**STANDARD BRIDGE DRAWING**

**STANDARD BRIDGE GUARDRAIL - HSS RAIL**

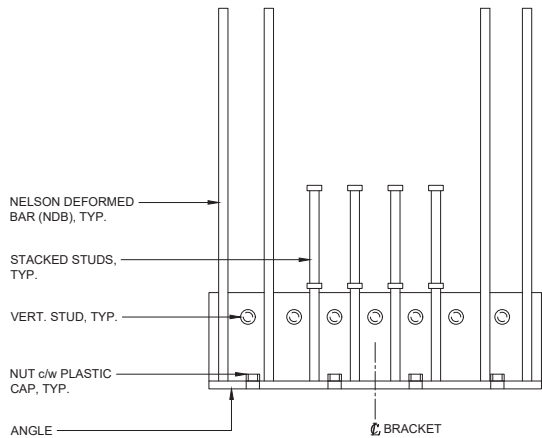
CL - 3

ORIGINAL SIGNED and SEALED BY: <b>JULIEN HENLEY</b>	APPROVED BY:
DESIGN ENGINEER	MOF ENGINEER
DATE <b>JULIEN HENLEY</b>	DATE
FILE No.	DRAWING No.

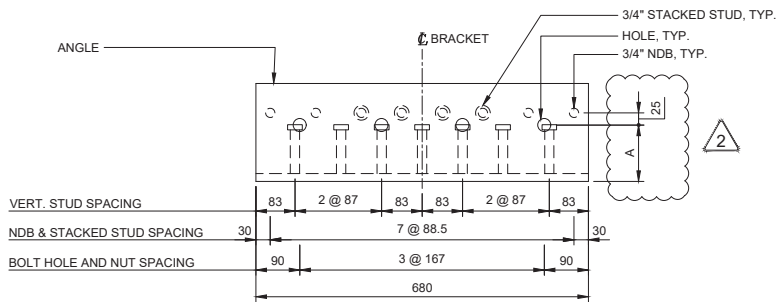
Rev	Date	DESCRIPTION	Init
1	2013/10/21	ISSUED TO CLIENT	
2	2016/01/06	REDUCED GAP DISTANCE & PLATE SIZE	

REVISIONS

STD-EC-010-03



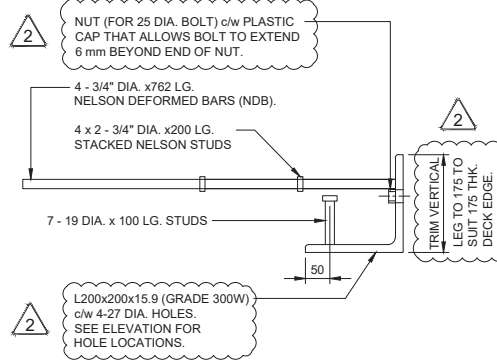
**INSERT PLAN**  
1:10



**INSERT ELEVATION**  
1:10

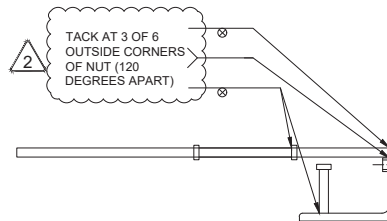
(INSERT FOR 200mm THICK DECK EDGE SHOWN)

DECK EDGE THICKNESS	A (DISTANCE BASE OF ANGLE TO CENTER OF HOLE/NUT)
175	90
200	115
225	140



**DETAIL 1**  
1:10

2 (INSERT FOR 200mm THICK DECK EDGE SHOWN)



**DETAIL 1**  
1:10

(WELDING ONLY)

2 (INSERT FOR 200mm THICK DECK EDGE SHOWN)

**NOTES:**

**GENERAL**

- INSERTS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-3 AS DEFINED BY THE MINISTRY.

- CL-3 INSERTS AND OTHER CL-3 GUARDRAIL DETAILS ARE FOR NON-SKEWED AND NON-FLARED DECK PANELS. MODIFICATIONS MAY BE REQUIRED FOR SKEWED OR FLARED DECK PANELS.

**MATERIALS**

- STEEL:
  - STUDS TO ASTM A108
  - GRADE 1015, 1018 OR 1020.
  - NELSON DEFORMED BARS (NDB) TO ASTM A108
  - GRADE 1010 - 1020.
  - MIN. Fy = 485 MPa.
  - ANGLE TO CSA G40.21M
  - GRADE 300W

NUTS TO ASTM A563 DH (GALV.) OR ASTM A194 2H (GALV.) - GRIND OFF GALV. FOR TACK WELDING. CLEAN THREADS TO FIT A325 GALV. BOLT AFTER FULL INSERT ASSEMBLY IS GALVANIZED.

**- STEEL FABRICATION:**

- WELDING:
  - SHOP WELDING IN ACCORDANCE WITH CSA W59 FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47-1.

GALVANIZING:
 

- INSERTS TO BE GALVANIZED TO ASTM A123. MINIMUM 610 g/m<sup>2</sup>. AFTER FABRICATION.

REV #	DATE	REVISION DESCRIPTION	DRAFTING	DESIGN	DESIGN CHECK / REVIEW	PROF. OF RECORD
1	AUGUST 9, 2013	ORIGINAL DRAWING	W. RILEY (ASSOC. ENG.)	J. DEENIHAN (ASSOC. ENG.)	J. HENLEY (ASSOC. ENG.)	J. HENLEY (ASSOC. ENG.)
2	MAY 28, 2021	MINOR CHANGES AND DRAWING TITLE CHANGE.	W. RILEY (ASSOC. ENG.)	M. PENNER (MINISTRY)	J. HENLEY (ASSOC. ENG.)	J. HENLEY (ASSOC. ENG.)

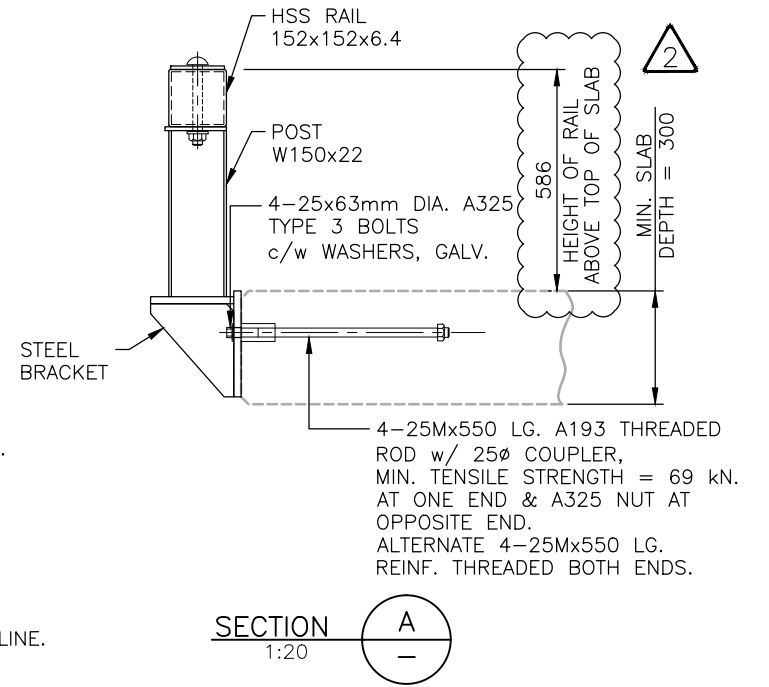
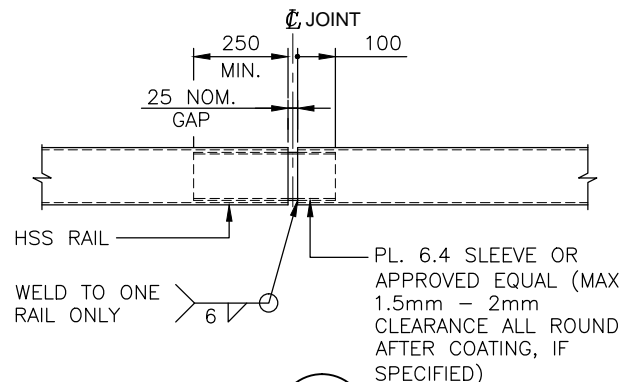
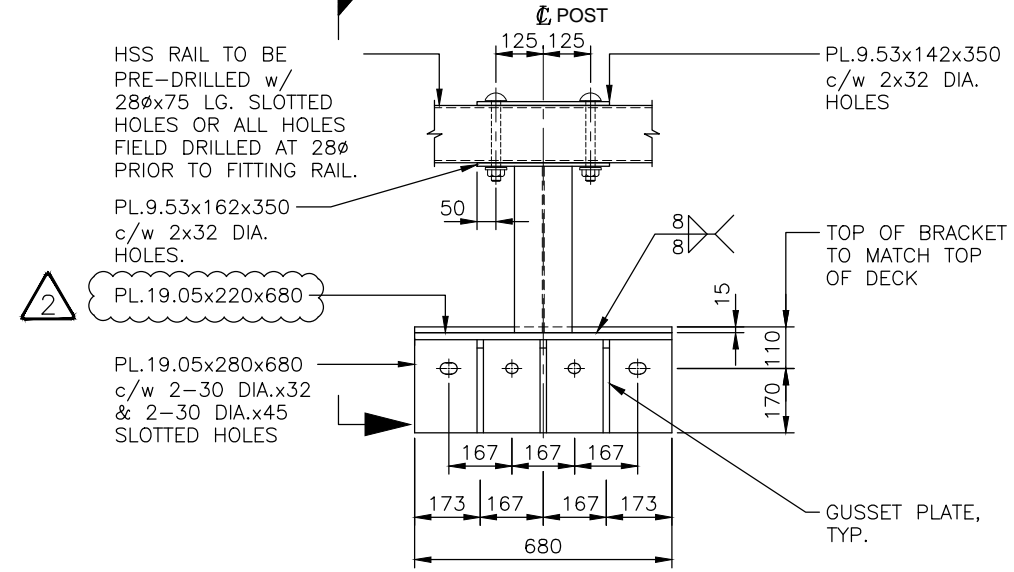
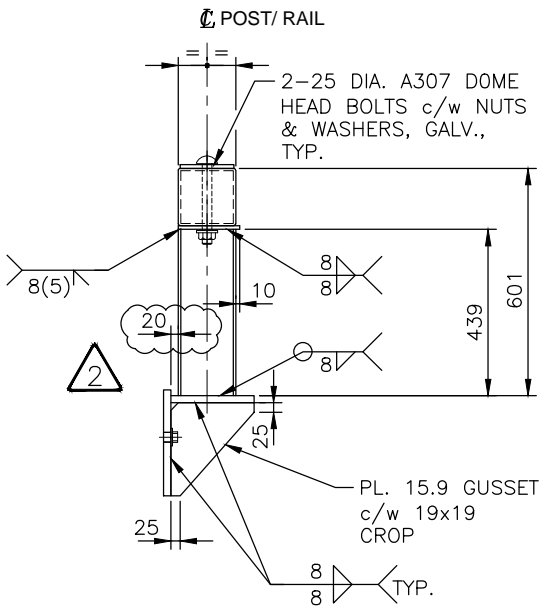
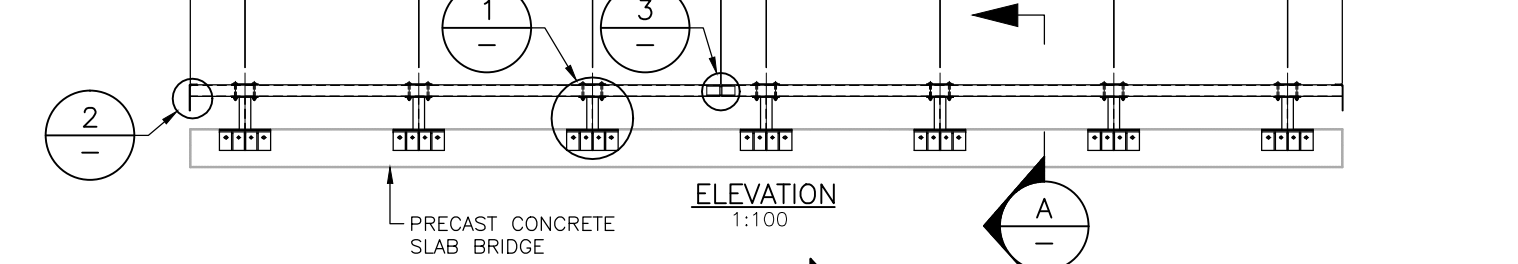


SEAL - ENGINEER OF RECORD

*J. Henley*

CHIEF ENGINEER (SIGNATURE)

700 MAX. POST SPACING    3048 MAX.    3048 MAX.    2448±    600 MAX.    3048 MAX.    3048 MAX.    3048 MAX.    700 MAX. POST SPACING



**ASSUME NOT TO SCALE**

**NOTES:**

**GENERAL**

- GUARDRAILS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-3 AS DEFINED BY THE MINISTRY. GUARDRAILS HAVE NOT BEEN DESIGNED TO CONTAIN ERRANT VEHICLES.

- MAXIMUM POST SPACING = 3048 C/C.

**MATERIALS**

- STEEL:
- RAILS
  - TO CSA G40.21M
  - GRADE 350W (COATED)
  - GRADE 350A (UNCOATED)
- OR TO ASTM
  - A500 GRADE C (COATED)
  - A847 (UNCOATED)
- POSTS TO CSA G40.21M
  - GRADE 350W (COATED)
- PLATE TO CSA G40.21M
  - GRADE 350W (COATED)
  - GRADE 350A (UNCOATED)

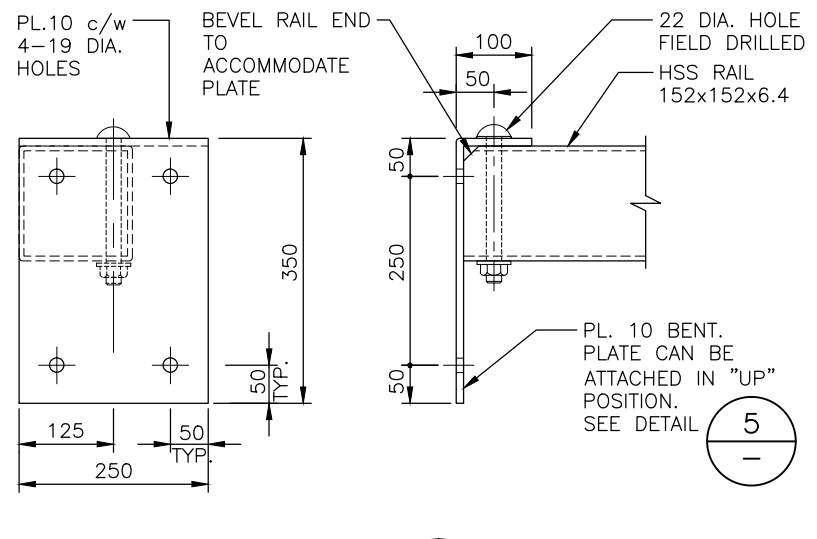
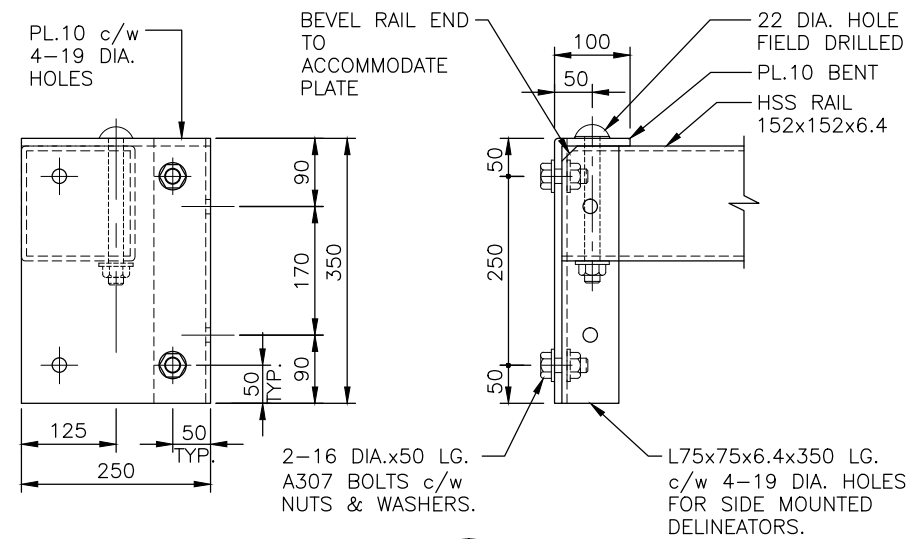
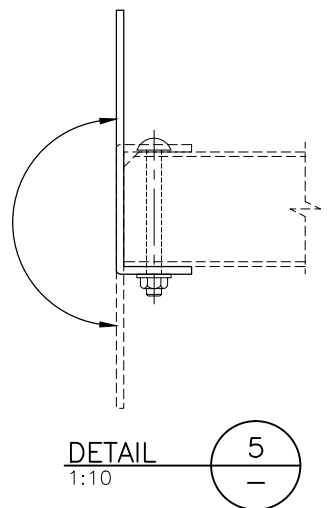
**- STEEL FABRICATION:**

**WELDING:**

- SHOP WELDING IN ACCORDANCE WITH CSA W59 FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1.
- FIELD WELDING BY COMPANY CERTIFIED TO CSA W47.1, DIVISIONS 1, 2 OR 3.
- MIN. 6mm FILLET WELD UNLESS OTHERWISE NOTED.

**GUARDRAIL BRACKETS AND POST COATING TO BE EITHER:**

- GALVANIZED TO CSA G164 AS NOTED ON DRAWINGS. MINIMUM 610 g/m<sup>2</sup>; OR
- PAINTED IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:
- HSS RAIL TO BE PAINTED SAFETY YELLOW IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD:



NOTE: DELINEATOR ORIENTATION BY OWNER

SCALE AS SHOWN    Designed J.D.    Date 2014/03/30  
Checked J.H.    Date 2014/03/30  
Drawn W.R.    Date 2014/03/30

Rev	Date	DESCRIPTION	Init
1	2014/04/16	ISSUED TO CLIENT	
2	2016/05/10	REDUCED GAP DISTANCE & PLATE SIZE	



STANDARD BRIDGE DRAWING	
STANDARD HSS GUARDRAIL FOR PRECAST CONCRETE SLAB BRIDGES CL - 3	
ORIGINAL SIGNED and SEALED BY: <b>JULIEN HENLEY</b>	APPROVED BY:
DESIGN ENGINEER DATE <b>JULIEN HENLEY</b>	MOF ENGINEER DATE
FILE No.	DRAWING No.
	STD-EC-010-06