

1 GENERAL

- 1.1 THESE STANDARD DRAWINGS APPLY ONLY TO THE DESIGN AND SUPPLY OF SIMPLE SPAN, SINGLE LANE BRIDGE SUBSTRUCTURES. THE STANDARD DRAWINGS PROVIDE DESIGN GUIDELINES AND STANDARD DETAILS.
- 1.2 VARIATIONS FROM THE STANDARD DESIGN REQUIREMENTS MAY BE ACCEPTABLE IN CERTAIN SITUATIONS. ALL SUCH VARIATIONS SHALL BE DOCUMENTED AND REQUIRE APPROVAL FROM FLNR PRIOR TO USE.
- 1.3 A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA SHALL DESIGN ALL BRIDGE COMPONENTS.
- 1.4 DEFINITIONS
- ENGINEER:
- A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA EXPERIENCED IN THE DESIGN OF STEEL AND CONCRETE BRIDGES, WHO IS RESPONSIBLE FOR THE DETAILED STRUCTURAL DESIGN OF A BRIDGE IN CONFORMANCE WITH THESE DRAWINGS
- FLNR:
- A PROFESSIONAL ENGINEER DESIGNATED BY THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS (FLNR).
- 1.5 APPLICABLE OVERALL BRIDGE LENGTH (OUT-TO-OUT):
- OVERALL BRIDGE GIRDER LENGTHS GREATER THAN 40m (130') FOR STEEL BRIDGES AND 15m (50') FOR CONCRETE BRIDGES, OR CONTINUOUS MULTI-SPAN BRIDGES WILL REQUIRE SPECIAL INVESTIGATION. DETAILS TO BE APPROVED BY FLNR PRIOR TO USE.

- 1.6 STANDARD DECK WIDTHS
- THE FOLLOWING TABLE SPECIFIES STANDARD DECK WIDTHS FOR THE DESIGNATED DESIGN VEHICLES.

DESIGN VEHICLE	STANDARD DECK WIDTH (mm)
BCL-625, L100	4268
L150, L165	4876

- THESE STANDARD DRAWINGS ARE BASED ON THESE STANDARD DECK WIDTHS.

- 1.7 STANDARD GIRDER AND COLUMN SPACING
- THE FOLLOWING TABLE SPECIFIES STANDARD GIRDER AND COLUMN / FOOTING SPACING.

DECK WIDTH mm(ft)	STANDARD COLUMN SPACING (mm) (PERPENDICULAR TO BRIDGE)
4268 (14')	3000
4876 (16')	3600
5486 (18')	4200

- 1.8 COMPONENT WEIGHTS
- PRECAST CONCRETE COMPONENT WEIGHTS SUCH AS BASE SLAB, BALLAST WALL, CAP AND FOOTINGS, SHALL BE SPECIFIED ON THE DESIGN DRAWINGS.
- 1.9 DRAWINGS INCORPORATING ENGINEERED DETAILS APPLY TO STANDARD WIDTH SQUARE BRIDGES ONLY.
- 1.10 ACCOMMODATE GRADES IN EXCESS OF 2% WITH A BEVEL PLATE OR SLOPED CAP BEAM.
- 1.11 ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
- 1.12 ENGINEER SHOULD PROVIDE A LAYOUT TABLE ON THE SHOP DRAWINGS FOR FOOTING LOCATION ON SKEWED BRIDGES.
- 1.13 FLNR PROJECT SPECIFICATIONS WILL TAKE PRECEDENCE OVER THE STANDARD DRAWINGS.
- 1.14 BEARING:
- FOR SPAN LESS THAN OR EQUAL TO 40m (130'), DEFORMATION AND TRANSLATION CAN BE ACCOMMODATED AS DETAILED IN THE STANDARD DRAWINGS.
- FOR SPAN GREATER THAN 40m (130'), ENGINEER TO DESIGN BEARINGS TO ACCOMMODATE DEFORMATION AND TRANSLATIONS.

2 DESIGN

- 2.1 DESIGN LIFE:
- BRIDGE DESIGN LIFE: 45 YEARS
- 2.2 DESIGN CODE AND FLNR REFERENCE STANDARDS:
- CAN/CSA-S6-06 C/W S6S1-10, S6S2-11 AND S6S3-13 (CSA-S6)
- FLNR BRIDGE DESIGN AND CONSTRUCTION MANUAL
- FLNR INTERIM BRIDGE DESIGN GUIDELINES
- 2.3 DESIGN VEHICLES
- REFER TO FLNR STANDARD DRAWINGS STD-EC-000-01 TO -02
- THE DESIGN DRAWINGS SHOULD CLEARLY SPECIFY THE DESIGN VEHICLE THAT WAS USED FOR THE BRIDGE DESIGN.
- 2.4 MULTI-LANE LOADING
- WHERE A BRIDGE IS ABLE TO SIMULTANEOUSLY SUPPORT MORE THAN ONE LANE OF TRAFFIC, THE ENGINEER SHOULD SEEK CLARIFICATION FROM FLNR ON HOW TO ACCOUNT FOR MULTI-LANE LOADING.

- 2.5 DYNAMIC LOAD ALLOWANCE:
- DYNAMIC LOAD ALLOWANCE SHALL BE APPLIED IN ACCORDANCE WITH CAN/CSA-S6 AND FLNR STANDARD DRAWINGS STD-EC-000-01 TO -02
- 2.6 STANDARD CONCRETE COVER:
- THE FOLLOWING ARE THE STANDARD CONCRETE COVERS, UNLESS NOTED OTHERWISE:
- CONCRETE FOOTING, ALL FACES 35 MM
- CONCRETE BALLAST WALL 35 MM
- CONCRETE CAP (ALL AROUND) 35 MM
- 2.7 BEARINGS:
- MAXIMUM AVERAGE PRESSURE ON PLAIN ELASTOMERIC BEARING NOT TO EXCEED 4.5 MPA AT SLS COMBINATION 1, INCLUDING DYNAMIC LOAD ALLOWANCE.
- WHERE LAMINATED BEARING PADS ARE USED, THEY SHOULD INCORPORATE A MINIMUM OF TWO REINFORCING PLATES AS SHOWN ON THE STANDARD DRAWINGS.

3 MATERIALS AND FABRICATION

- 3.1 STRUCTURAL STEEL FOR SUBSTRUCTURE:
- CONFORM TO CAN/CSA-G40.21M, GRADE AS FOLLOWS
- PLATES: GRADE 350A
- SECTIONS (EXCEPT COLUMN BRACING): GRADE 350A
- COLUMN BRACING, INCLUDING BASE PLATES, GUSSETS & SECTIONS, (PAINTED) GRADE 300W
- HP SECTIONS: (PAINTED) GRADE 300W
- ANY REQUIRED VARIATION REQUIRES FLNR APPROVAL.
- 3.2 STEEL PIPE
- CONFORM TO ASTM A252 GRADE 2 OR BETTER.
- 3.3 WELDING
- ALL WELDS TO BE COMPLETED IN ACCORDANCE WITH CSA W59.
- MINIMUM 6 mm FILLET WELD, U.N.O.
- 3.4 STEEL SUBSTRUCTURE FABRICATION CERTIFICATION
- STEEL CAP: FABRICATOR TO BE CERTIFIED FOR DIVISION 1 OR 2 IN ACCORDANCE WITH CSA W47.1
- OTHER STEEL COMPONENTS: FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1
- 3.5 FIELD WELDING:
- BY COMPANY CERTIFIED TO CSA W47.1 DIVISION 1, 2 OR 3
- 3.6 STRUCTURAL BOLTS:
- CONFORM TO ASTM A325 TYPE 3 M22 U.N.O. INSTALL IN ACCORDANCE WITH CAN/CSA-S6
- 3.7 ANCHOR BOLTS:
- CONFORM TO ASTM A193 GRADE B7 THREADED ROD AS INDICATED IN DRAWINGS.
- CONFORM TO ASTM A307 GRADE B GALV. AS INDICATED IN DRAWINGS
- 3.8 STUDS:
- CONFORM TO CSA W59 APPENDIX H FOR TYPE A AND B STUDS
- ASTM A108 GRADE 1015, 1018 OR 1020
- 3.9 PAINTING:
- COAT STEEL SUBSTRUCTURE INCLUDING BASE PLATES AND ANCHOR BOLTS WITH ONE COAT XYMAX MONOGUARD OR APPROVED EQUAL PRIOR TO BACKFILLING.
- 3.10 GALVANIZING:
- ALL ITEMS SPECIFIED AS GALVANIZED ARE TO BE HOT DIP GALVANIZED TO CSA G164
- 3.11 REINFORCING:
- TO CAN/CSA G30.18M GRADE 400R
- REINFORCING STEEL MUST NOT BE WELDED OR TACK WELDED
- 3.12 GROUT:
- GROUT TARGET TRAFFIC PATCH (FINE) TO BE INSTALLED ACCORDING TO MANUFACTURERS INSTRUCTIONS. EQUIVALENT PRODUCTS MUST BE APPROVED BY FLNR PRIOR TO USE.

- 3.13 PRECAST CONCRETE:
- CSA A23.1 EXPOSURE CLASS C1, F'C = 35 MPA @ 28 DAYS
- PRECAST CONCRETE TO BE FABRICATED IN ACCORDANCE WITH CSA A23.4, COMPANIES MUST BE CERTIFIED BY THE CANADIAN STANDARD ASSOCIATION (CSA), OR THE CANADIAN PRECAST / PRESTRESSED CONCRETE INSTITUTE (CPCI)
- FABRICATION TOLERANCES TO CAN/CSA-A23.4
- ALL CORNERS C/W 20X20 CHAMFER U.N.O. ON THE APPLICABLE STANDARD DRAWING.
- 3.14 PRECAST CONCRETE UNREINFORCED INTERLOCKING BLOCKS:
- MIN. f_c = 20 MPa @ 28 DAYS TO CAN/CSA A23.1 AND A23.4
- BLOCKS SHALL BE CAST MONOLITHICALLY, NO COLD JOINTS ALLOWED.
- ALL EXPOSED SURFACES SHALL HAVE A SMOOTH FINISH CONFORMING TO CSA CAN3-A23.4-00 SECTION 24.2.5 GRADE A. THE FINISH MUST NOT BE HONEYCOMBED.
- BLOCKS SIZE MUST BE 750MM x 750MM x 1500MM LONG, PROVIDED WITH SHEAR KEY.
- DIMENSIONAL TOLERANCE MUST BE ± 20 MM FOR LENGTH, WIDTH AND HEIGHT AND THE BLOCKS SHALL BE REASONABLY SQUARE. WITH THE DIAGONALS WITHIN A TOLERANCE OF ± 15 MM OF EACH OTHER.
- TOP AND BOTTOM SURFACES MUST BE FLAT TO A TOLERANCE OF ± 3 mm UNDER 600mm STRAIGHT EDGE.
- CONCRETE SHALL BE AIR ENTRAINED 4-7% TO PROTECT THE SURFACE FROM FREEZE THAW DEGRADATION.
- EACH BLOCK MUST CONTAIN A SATISFACTORY EMBEDDED LIFTING DEVICE.
- INTERLOCK PATTERN AND GEOMETRY MUST BE APPROVED BY THE MINISTRY.
- EDGED SHALL BE CHAMFERED.
- BEFORE A NEW SUPPLIER IS APPROVED TO SUPPLY CONCRETE BLOCKS TO THE FLNR FOR BRIDGE PROJECTS, THE FLNR SHALL INSPECT THE SUPPLIER'S OPERATION AND A SAMPLE OF THEIR PRODUCT FOR CONFORMANCE TO THE ABOVE SPECIFICATIONS.
- 3.15 BEARINGS:
- TO CAN/CSA-S6: OZONE RESISTING NATURAL RUBBER, (NATURAL POLYISOPRENE)
- LAMINATED BEARING REINFORCING STEEL PLATE: CAN/CSA-G40.21M, GRADE 300W
- 3.16 DOWEL BLOCKOUT:
- GALVANIZED CORRUGATED METAL STAY-IN-PLACE BLOCK-OUT FORMS

4 TRANSPORTATION AND ERECTION OF BRIDGES

- 4.1 SUPPORT PRECAST AND STEEL COMPONENTS IN SUCH A WAY THAT THEY SUSTAIN NO DAMAGE DURING TRANSPORTATION.
- 4.2 LIFTING DEVICES:
- ALL PRECAST COMPONENTS (EXCEPT UNREINFORCED INTERLOCKING CONCRETE BLOCKS) MUST UTILIZE BURKE LIFTING INSERTS (OR PRE-APPROVED EQUIVALENT) AS LIFTING DEVICES. FILL RECESS AFTER INSTALLATION USING GROUT OR ASPHALT.
- ENGINEER TO DESIGN LIFTING INSERTS TO FACILITATE LIFTING USING FOUR EQUAL LENGTH SLINGS/CHAINS.
- ONLY LOW IMPACT LIFTS ARE PERMITTED. ANGLE OF LIFT MUST NOT EXCEED 30 DEGREES FROM VERTICAL.

5 CERTIFICATION AND QUALITY CONTROL

- 5.1 PROVIDE CONCRETE TEST RESULTS BY AN APPROVED TESTING LABORATORY FOR ALL PRECAST CONCRETE COMPONENTS, EXCEPT FOR INTERLOCKING BLOCK.
- 5.2 PROVIDE MILL CERTIFICATES FOR ALL STEEL INCORPORATED INTO THE STRUCTURE.
- 5.3 CERTIFICATION TO CSA STANDARD FOR STEEL AND PRECAST CONCRETE MANUFACTURE MUST BE IN EFFECT AT THE TIME OF OPENING THE TENDERS AND ALSO THROUGHOUT THE PERIOD OF MANUFACTURE.
- 5.4 TEST RESULTS FOR STEEL:
- MILL TEST CERTIFICATES OF STRUCTURAL STEEL PLATES PLATES AND SECTIONS.
- ANY RADIOGRAPHIC OR ULTRASONIC TEST REPORTS.
- 5.5 TEST RESULTS FOR CONCRETE:
- FORMWORK RELEASE CONCRETE COMPRESSIVE STRENGTH TEST RESULTS.
- 7 DAY CONCRETE COMPRESSIVE STRENGTH TEST RESULT.
- 28 DAY CONCRETE COMPRESSIVE STRENGTH TEST RESULT.
- 5.6 IN-PLANT QUALITY ASSURANCE INSPECTION:
- ALL BRIDGE MATERIALS MUST CONFORM TO THE CURRENT MINISTRY STANDARDS AND SHALL NOT BE ACCEPTABLE WITHOUT IN-PLANT INSPECTION BY THE MINISTRY'S IN-PLANT QUALITY ASSURANCE INSPECTION AGENCY.

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED

DESIGN ENGINEER	<p>0 2 4 6 8 10 meters</p> <p>SCALE AS SHOWN</p> <p>BAR LENGTH IS 40mm ON ORIGINAL.</p>	<p>Ministry of Forests, Lands and Natural Resource Operations</p> <p style="text-align: right;">ENGINEERING BRANCH</p>																								
STANDARD BRIDGE DRAWING																										
DRAWING TITLE: GENERAL NOTES																										
<p>Checked <u>JULIEN HENLEY</u> Date <u>14/04/01</u> Drawn <u>ERFUM FARJOO</u> Date <u>14/04/01</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rev</th> <th>Date</th> <th>DESCRIPTION</th> <th>Init</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>15/03/31</td> <td>REVISED NOTES</td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Rev	Date	DESCRIPTION	Init	1	15/03/31	REVISED NOTES																		<p>DESIGNED BY: HELEN DU, P.ENG.</p> <p>COORDINATING REGISTERED PROFESSIONAL:</p> <p>FILE No.</p>	<p>APPROVED BY:</p> <p>FLNR ENGINEER:</p> <p>DRAWING No. STD-EC-050-01</p>
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