<table>
<thead>
<tr>
<th>DRAWING No.</th>
<th>DESCRIPTION</th>
<th>REV.</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STD-EC-020-01</td>
<td>Timber Deck Bridges, General Notes – Sheet 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-02</td>
<td>Timber Deck Bridges, General Notes – Sheet 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-03</td>
<td>Permanent, Continuous Timber Deck Bridge – General Arrangement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-04</td>
<td>Portable, Continuous Timber Deck Bridge – General Arrangement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-05</td>
<td>Modular Timber Deck Bridge, General Arrangement &amp; Details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-06</td>
<td>Modular Timber Bridge Deck, Attachment Details - New Bridges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD-EC-020-07</td>
<td>Modular Timber Bridge Deck, Attachment Details – Field Retrofit to Existing Bridges</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. GENERAL
1.1 THESE STANDARD DRAWINGS APPLY TO THE DESIGN AND SUPPLY OF SIMPLE SPAN SINGLE LANE GIRDER BRIDGES WITH TIMBER DECKS. THE STANDARD DRAWINGS PROVIDE DESIGN GUIDELINES AND STANDARD DETAILS.
1.2 VARIATIONS FROM THE STANDARD DESIGN REQUIREMENTS MAY BE ACCEPTABLE IN CERTAIN SPECIAL SITUATIONS. ALL SUCH VARIATIONS SHALL BE DOCUMENTED AND REQUIRE APPROVAL FROM THE MINISTRY PRIOR TO USE.
1.3 A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA SHALL DESIGN ALL BRIDGE GIRDER ELEMENTS.
1.4 DEFINITIONS
- ENGINEER: A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA EXPERIENCED IN THE DESIGN OF TIMBER DECK ON STEEL GIRDER BRIDGES, WHO IS RESPONSIBLE FOR THE DETAILED STRUCTURAL DESIGN OF A BRIDGE IN CONFORMANCE WITH THESE DRAWINGS.
- MINISTRY ENGINEER: A PROFESSIONAL ENGINEER DESIGNATED BY THE MINISTRY.

1.5 APPLICABLE OVERALL BRIDGE GIRDER LENGTH (OUT-TO-OUT):
1.5.1 TYPICAL APPLICABLE OVERALL TIMBER DECK ON STEEL GIRDER BRIDGE GIRDER LENGTH IS 6.096 m
1.5.2 OVERALL BRIDGE GIRDER LENGTHS GREATER THAN 30.48 M OR CONTINUOUS MULTI-SPAN BRIDGE DESIGN ALL BRIDGE GIRDER ELEMENTS.

1.7 STANDARD GIRDER SPACINGS
1.7.1 THE FOLLOWING TABLE SPECIFIES STANDARD GIRDER SPACINGS FOR SEVERAL DECK WIDTHS

<table>
<thead>
<tr>
<th>Deck Width (mm)</th>
<th>Standard Girder Spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4208 (14 FEET)</td>
<td>1000</td>
</tr>
<tr>
<td>4876 (16 FEET)</td>
<td>1600</td>
</tr>
</tbody>
</table>

1.8 TIMBER DECK CROSS THICK DIMENSIONS:

<table>
<thead>
<tr>
<th>Load Type</th>
<th>Girder Spacing (mm)</th>
<th>Tie Size (mm X mm)</th>
<th>Maximum Tie Spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCL-625</td>
<td>3000</td>
<td>200X250</td>
<td>400</td>
</tr>
<tr>
<td>BCL-625</td>
<td>3500</td>
<td>200X250</td>
<td>400</td>
</tr>
<tr>
<td>L-100</td>
<td>3000</td>
<td>200X300</td>
<td>400</td>
</tr>
<tr>
<td>L-100</td>
<td>3500</td>
<td>200X300</td>
<td>400</td>
</tr>
<tr>
<td>L-150</td>
<td>3000</td>
<td>250X300</td>
<td>400</td>
</tr>
<tr>
<td>L-150</td>
<td>3500</td>
<td>250X300</td>
<td>400</td>
</tr>
<tr>
<td>L-155</td>
<td>3000</td>
<td>300X300</td>
<td>305</td>
</tr>
<tr>
<td>L-155</td>
<td>3500</td>
<td>300X300</td>
<td>305</td>
</tr>
</tbody>
</table>

1.9 SUPERSTRUCTURE IDENTIFICATION MARKING:
- PER MINISTRY BRIDGE IDENTIFICATION STANDARD

ASSUME NOT TO SCALE NOT FOR CONSTRUCTION

1.10 BOLTED GIRDER FIELD SPACES:
- PROVIDE BOLTED GIRDER SPACES ON ALL BRIDGE SPANS PROCURED THROUGH A DESIGN/ SUPPLY CONTRACT FOR GIRDERS WITH AN OVERALL LENGTH (OUT-TO-OUT) LENGTH = 24.384 m (80 FEET) UNLESS APPROVED BY THE MINISTRY.
- WHERE THE CONTRACT IS DESIGN/SUPPLY AND INSTALL, BOLTED FIELD SPACES SHALL BE PROVIDED AT THE DISCRETION OF THE ENGINEER.

1.11 DIAPHRAGMS:
- PROVIDE DIAPHRAGMS AT BEARING LOCATIONS.
- PROVIDE INTERNAL DIAPHRAGMS AS REQUIRED. MAXIMUM SPACING OF INTERNAL DIAPHRAGMS NOT TO EXCEED 8.0 m

1.12 PLAN BRACING:
- PROVIDE CONTINUOUS PLAN BRACING ON ALL BRIDGES.
- ASSEMBLED STEEL GIRDER PLUS BRACING, DIAPHRAGMS AND BEARING/SKID PLATES – TOTAL WEIGHT
- TIMBER COMPONENT WEIGTHS (DECK, BALLAST WALL, CAPS AND FOOTINGS)

2. DESIGN VEHICLES

2.1 DESIGN LIFE: BRIDGE DESIGN LIFE: 45 YEARS

2.2 DESIGN CODE AND THE MINISTRY REFERENCE STANDARDS:
- DESIGN IN ACCORDANCE WITH CAN/CSA-S6 & VARIATIONS TO COMPATIBILITY WITH NATIONAL STANDARDS.
- PROVIDE CONTINUOUS PLAN BRACING ON ALL BRIDGES.

2.3 DESIGN VEHICLES
- REFER TO MINISTRY STANDARD DRAWING STD-EC-000-01 TO STD-EC-000-02
- THE FOLLOWING DESIGN VEHICLE THAT WAS USED FOR THE DESIGN DRAWING:

<table>
<thead>
<tr>
<th>Design Vehicle</th>
<th>Standard Bridge Width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCL-625, L100</td>
<td>4208 (14 FEET)</td>
</tr>
<tr>
<td>BCL-625, L150</td>
<td>4876 (16 FEET)</td>
</tr>
<tr>
<td>L-100</td>
<td>4208 (14 FEET)</td>
</tr>
<tr>
<td>L-150</td>
<td>4876 (16 FEET)</td>
</tr>
</tbody>
</table>

2.4 MULTI-LANE LOADING:
- WHERE A BRIDGE IS ABLE TO SIMULTANEOUSLY SUPPORT MORE THAN ONE LANE OF TRAFFIC, THE DESIGNER SHOULD SEEK CLARIFICATION FROM THE MINISTRY 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.

2.6 FATIGUE DESIGN FOR STEEL GIRDERS
- FATIGUE DESIGN TO BE COMPLETED IN ACCORDANCE WITH CAN/CSA-S6 WITH THE FOLLOWING MODIFICATIONS:
  - DESIGN VEHICLE: AS PER PROJECT SPECIFICATIONS
  - FOR LESS USE L150 FOR FATIGUE DESIGN LOAD
  - FATIGUE DESIGN VEHICLE TO BE CENTERED ON BRIDGE
  - LATERAL WHEEL LOAD DISTRIBUTION: 50% - 50%
  - FATIGUE STRESS RANGE for = FSR
- WHERE:
  - FSR = THE CALCULATED STRESS RANGE AT THE DETAIL DUE TO THE PASSAGE OF THE DESIGN VEHICLE
  - FSR = FATIGUE STRESS RANGE RESISTANCE

2.7 FRACTURE CRITICAL AND PRIMARY TENSION COMPONENTS
- ENGINEER TO SPECIFY FRACTURE CRITICAL AND PRIMARY TENSION COMPONENTS ON THE DESIGN DRAWINGS.

2.8 MAXIMUM LIVE LOAD DEFLECTION OF STEEL GIRDERS:
- BRIDGES MUST BE DESIGNED SO THAT LIVE LOAD DEFLECTION (CALCULATED AS THAT CAUSED BY ONE TRUCK ONLY, PLACED AT THE CENTRE LINE OF THE TRAVELLED ROADWAY, DYNAMIC LOAD ALLOWANCE INCLUDED) DOES NOT EXCEED L/450. WHERE USING THE L165 DESIGN VEHICLE, THE DEFLECTION SHALL BE CALCULATED USING THE L150 DESIGN VEHICLE

2.9 SEISMIC DESIGN:
- SEISMIC DESIGN NOT REQUIRED UNLESS OTHERWISE SPECIFIED.

3. CONSTRUCTION LOAD:
- ENGINEER MUST CONSIDER THE WEIGHT OF MATERIALS, WORK CREWS AND EQUIPMENT SUPPORTED DURING CONSTRUCTION WHEN DESIGNING THE BRIDGE. ENGINEER MUST SPECIFY MAXIMUM PERMISSIBLE CONSTRUCTION EQUIPMENT LOADS ON THE DRAWINGS.
- WHERE A BRIDGE WILL BE INSTALLED UNDER A SEPARATE CONTRACT FROM THE DESIGN/SUPPLY CONTRACT FOR THE MAIN BRIDGE COMPONENTS, AS A MINIMUM, UNLESS OTHERWISE SPECIFIED BY THE MINISTRY, THE DESIGNER SHALL CONSIDER THE FOLLOWING MINIMUM CONSTRUCTION LOADS:
  - SELF WEIGHT OF THE STRUCTURE, SUPPORTED AT THE BEARINGS, INCLUDING DECK
  - A VERTICAL LIVE LOAD OF 445 KN (40 TON EQUIPMENT + 10 TON LOAD) DISTRIBUTED OVER A LENGTH OF 4 m, POSITIONED ON THE BRIDGE TO PRODUCE THE MAXIMUM EFFECT; ECCENTRICITY = 100 mm
  - LOAD FACTORS IN ACCORDANCE WITH CAN/CSA-S6-08
  - MIN DLA = 10% (ASSUMED DESIGN SPEED = 10 Km/hr)

4. STANDARD BRIDGE DRAWING

5. TIMBER DECK BRIDGES

6. GENERAL NOTES – SHEET 1

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
ENGINEERING BRANCH

STANDARD BRIDGE DRAWING

TIMBER DECK BRIDGES

GENERAL NOTES – SHEET 1

ASSUME NOT TO SCALE NOT FOR CONSTRUCTION

SCALE AS SHOWN

DESIGNER: Date:
CHECKED: Date:
DRAWN: Date:

Rev. Date DESCRIPTION Line:

FILE NO. DRAFTING No.

STD-EC-020-01

REVISIONS

DRAWN BY AWAYEDD, P.Eng. CHIEF ENGINEER

DATE

APPROVED BY: BRIAN CHOW, P. Eng. CHIEF ENGINEER

DATE

ORIGNIAL SIGNED AND SEALED BY:

DATE

APPROVED BY:

DATE

SPECIFIC!

DATE

SPECIFIC!

DATE

SPECIFIC!

DATE

SPECIFIC!
3. MATERIALS AND FABRICATION

3.1 ALL MATERIALS UTILIZED IN FABRICATION SHALL BE NEW, NOT PREVIOUSLY USED IN ANY APPLICATION

3.2 STRUCTURAL STEEL:
- TO CAN/CSA-G40.21M
- STEEL GIRDERS FLANGES AND WEB PLATES GRADE 350AT CATEGORY 3
- OTHER STEEL PLATE: 350A
- BRACING (DIAPHRAGMS AND PLAN BRACING): GRADE 350A
- ANY REQUIRED VARIATIONS REQUIRE MINISTRY APPROVAL. IF NON WEATHERING STEEL IS APPROVED BY THE MINISTRY, A CORROSION PROTECTION SYSTEM APPROVED BY THE MINISTRY WILL BE REQUIRED.
- COMPLETE ALL WELDS IN ACCORDANCE WITH CSA W59. WELD METAL OF PRIMARY TENSION MEMBERS AND FRACTURE CRITICAL MEMBERS SHALL MEET THE CVN TOUGHNESS REQUIREMENTS OF TABLE 10.14 OF CAN/CSA-S6
- INSPECT ALL BUTT WELDS BY ULTRASONIC OR X-RAY EXAMINATION IN ACCORDANCE WITH CSA W59
- FABRICATOR TO BE CERTIFIED FOR DIVISION 1 OR 2 IN ACCORDANCE WITH CSA W47.1 THROUGHOUT THE DURATION OF THE PROJECT.
- FIELD WELDING BY COMPANY CERTIFIED TO CSA W47.1 DIVISION 1, 2 OR 3
- FABRICATE GIRDERS AS FRACTURE CRITICAL MEMBERS IN ACCORDANCE WITH CAN/CSA-S6-06, AS NOTED ON DESIGN DRAWINGS. STEEL PLATES FOR BOTTOM FLANGES AND WEBS SHALL CONFORM TO THE REQUIREMENTS FOR FRACTURE CRITICAL IN ACCORDANCE WITH CAN/CSA-S6, EXCEPT THAT CHARMY V-NOTCH TESTING RESULTS ARE ONLY REQUIRED ON A PER HEAT FREQUENCY.
- MAKE ALL-GIRDER FLANGE TO WEB WELDS USING SUBMERGED ARC WELDING.
- SHOP TRIAL FIT ALL FIELD SPlices UNLESS CNC EQUIPMENT IS USED.

3.3 STRUCTURAL BOLTS:
- ALL BOLTS INCORPORATED INTO STEEL GIRDER CONNECTIONS (BOLTED FIELD SPlices, DIAPHRAGMS AND BRACING) TO BE ASTM A325 TYPE 3 M22 U.N.O. INSTALLED IN ACCORDANCE WITH CAN/CSA-S6

3.4 GALVANIZING:
- ALL ITEMS SPECIFIED AS GALVANIZED ARE TO BE GALVANIZED TO CSA G164

3.5 BEARINGS:
- TO CAN/CSA-S6: OZONE RESISTING NATURAL RUBBER (NATURAL POLYISOPRENE)
- WHERE EXPANSION JOINTS ARE USED, ENGINEER TO INCLUDE SUFFICIENT INFORMATION TO FACILITATE INSTALLATION AT VARIOUS TEMPERATURES

3.6 TIMBER DECK MATERIALS:
- ALLOWABLE WOOD SPECIES, LUMBER GRADES, GRADING CRITERIA AND REQUIRED DOCUMENTATION SHALL BE AS PER MINISTRY: BRIDGE TIMBER AND LUMBER MATERIAL STANDARD

3.7 TIMBER DECK HARDWARE:
- LAG SCREWS, BOLTS, NUTS, WASHERS TO BE ASTM A307 (GALVANIZED)
- DECK NAILING PATTERN TO BE AS SHOWN ON DRAWINGS

3.8 TIMBER PRESERVATIVE TREATMENT:
- ALL TREATED WOOD SHALL BE COASTAL DOUGLAS-FIR, TREATED USING CHROMATE COPPER ARSENATE (CCA) TREATMENT, AND THIRD PARTY INSPECTED, IN ACCORDANCE WITH THE MINISTRY PROCESS SPECIFICATION FOR CCA TREATMENT OF COASTAL DOUGLAS-FIR WOOD

4. TRANSPORTATION AND ERECTION OF BRIDGES

4.1 SUPPORT STEEL GIRDERS IN SUCH A WAY THAT THEY SUSTAIN NO DAMAGE DURING TRANSPORTATION. WHEN TRANSPORTING STEEL GIRDERS ON THE FLAT, PROVIDE A TRANSPORTATION PLAN PREPARED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA.

5. STEEL CERTIFICATION AND QUALITY CONTROL

5.1 PROVIDE MILL CERTIFICATES FOR ALL STEEL MATERIAL.

ASSUME NOT TO SCALE
NOT FOR CONSTRUCTION
MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

DECK PLAN

DECK PLAN

TYPICAL DIAPHRAGM/DECK SECTION

4268 (4876)* WIDE DECK

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS
ENGINEERING BRANCH

STANDARD BRIDGE DRAWING

PERMANENT, CONTINUOUS TIMBER DECK BRIDGE GENERAL ARRANGEMENT

ASSUME NOT TO SCALE
NOT FOR CONSTRUCTION
MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

DECK PANEL TO GIRDER ATTACHMENT (NEW CONSTRUCTION)

1:20

19d THRU BOLT C/W MALLEXABLE IRON WASHER AND FLAT WASHER

ALTENATE 19d LAG SCREW & WASHER: 6 R/B
COUNTERSINK BOLT INTO DECK FLANGE

SECTION A

ALTERNATE LAG SCREW INSTALLATION NOTES:
- LAG SCREWS SHALL 19mm BOLTS X 200mm LONG (6 REQUIRED)
- PRE-DRILLING FOR LAG SCREW HOLES SHALL BE AS FOLLOWS:
  - 19mm C/W HOLE FOR SHAKE PENETRATION LENGTH INTO CROSSTEE ONLY
  - 12.5 mm BOL FOR FULL PENETRATION LENGTH INTO CROSSTEE ONLY
- A NON-PETROLEUM LUBRICANT (IE. SOAP) MAY BE USED TO FACILITATE INSTALLATION
- IF LAG SCREWS HAVE BEEN INSTALLED MORE THAN TWO TIMES OR IF LAG SCREWS ARE STRIPPED, USE BOLT THROUGH OPTION

MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS

STANDARD BRIDGE DRAWING

MODULAR TIMBER DECK PANELS, ATTACHMENT DETAILS—NEW BRIDGES

FILE No. STD-EC-020-06

ASSUME NOT TO SCALE
NOT FOR CONSTRUCTION