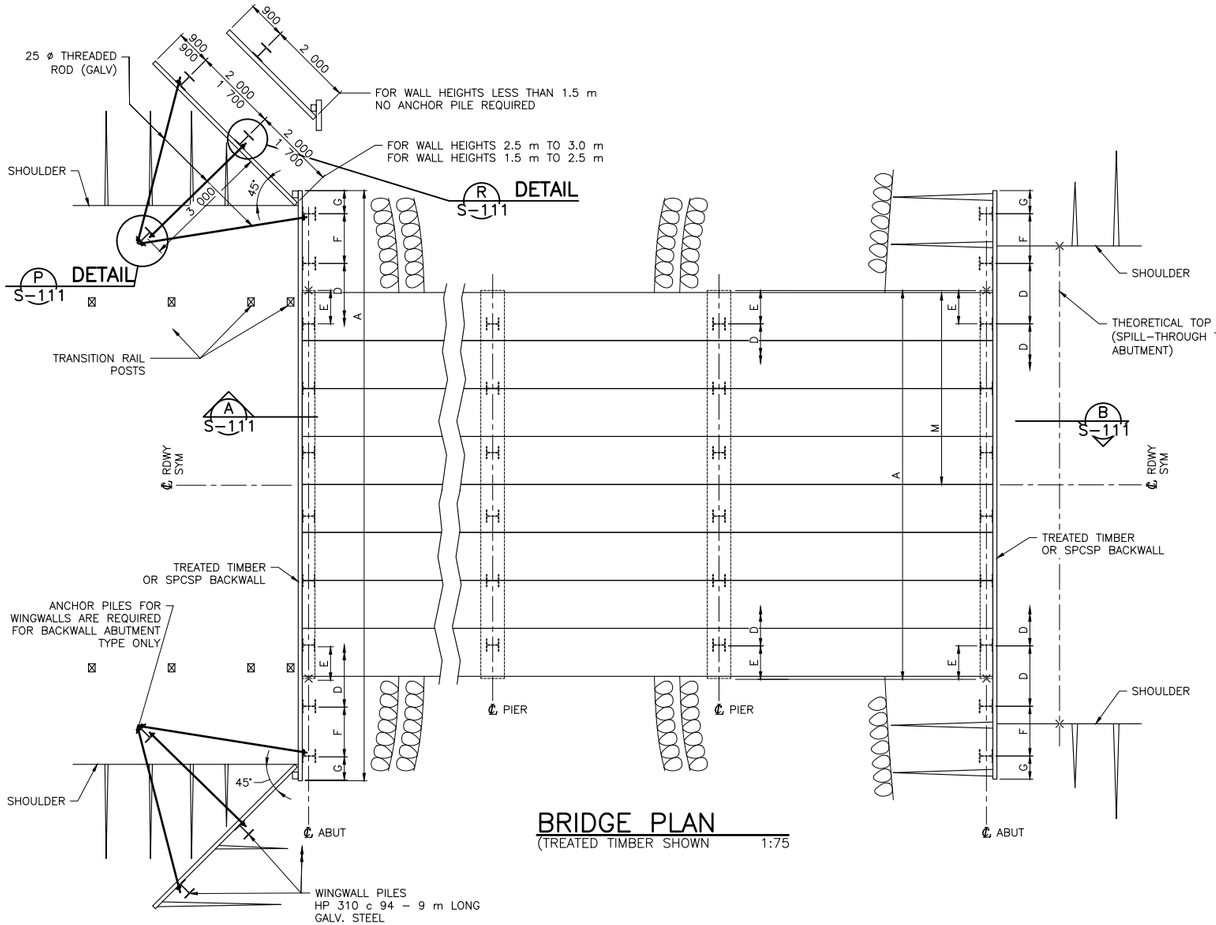
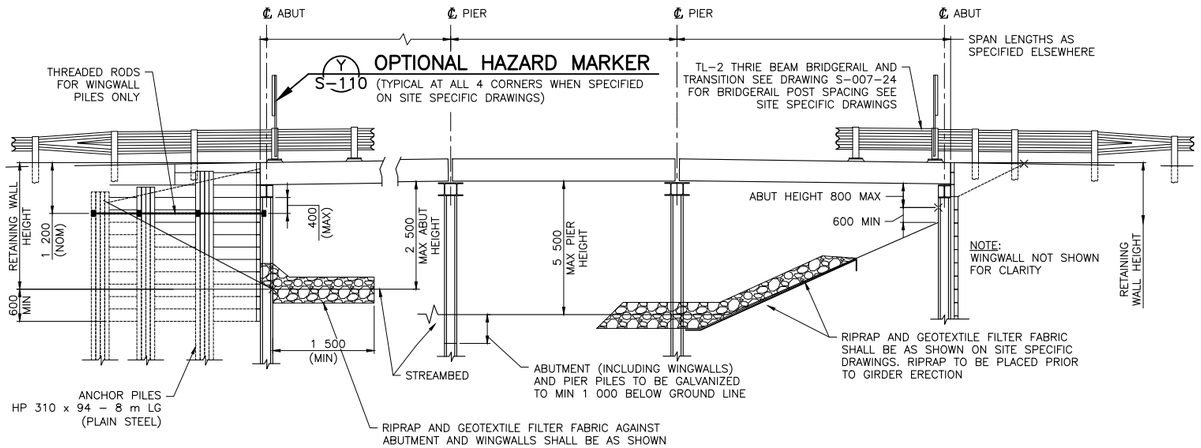


BRIDGE PLAN
(TREATED TIMBER SHOWN 1:75



BACKWALL TYPE ABUTMENT

SPILL-THROUGH TYPE ABUTMENT

NOTE:
BACKWALL TYPE ABUTMENTS ARE TO BE USED ONLY AT SINGLE SPAN, 0° SKEW BRIDGE SITES

BRIDGE ELEVATION
(TREATED TIMBER SHOWN 1:75
SPCSP SIMILAR)

GENERAL NOTES

- ALL DRAWING REFERENCES REFER TO CURRENT DRAWINGS.
- ALL DIMENSIONS ARE GIVEN IN mm UNLESS NOTED OTHERWISE.
- ROADWAY ELEVATIONS SPECIFIED ELSEWHERE ARE GIVEN TO TOP OF THEORETICAL CROWN ON CENTRELINE ROADWAY.

GEOTECHNICAL CONSIDERATIONS

- IT IS THE RESPONSIBILITY OF OTHERS USING THESE SUBSTRUCTURE DRAWINGS TO OBTAIN GEOTECHNICAL INFORMATION APPLICABLE TO THE SPECIFIC SITE AT WHICH THE SUBSTRUCTURE WILL BE CONSTRUCTED. A SITE SPECIFIC GEOTECHNICAL INVESTIGATION COMPLETED BY A QUALIFIED PROFESSIONAL ENGINEER REGISTERED WITH NAPEG SHOULD BE UNDERTAKEN PRIOR TO THE DESIGN PHASE IN ORDER TO ESTABLISH THE SUITABILITY OF THE DESIGN ASSUMPTIONS LISTED ON THESE PLANS, AND TO PROVIDE SUPPLEMENTARY INFORMATION WHERE REQUIRED.
- ADDITIONALLY, A GEOTECHNICAL INVESTIGATION IS DEEMED NECESSARY IN ORDER TO ESTABLISH THE SOIL CHARACTERISTICS AT THE SITE – THE PRESENCE AND THE EXTENT OF BOULDERS, HARD OR SOFT FORMATIONS, WATER TABLES, ARTESIAN CONDITIONS AND OTHER VARIABLES – AS THESE COULD SIGNIFICANTLY IMPACT THE CONSTRUCTION OF THE SUBSTRUCTURE AND ITS REQUIRED PERFORMANCE AND STRENGTH IF NOT IDENTIFIED AND ADDRESSED IN A TIMELY MANNER.

HYDROTECHNICAL CONSIDERATIONS

- IT IS THE RESPONSIBILITY OF OTHERS USING THESE SUBSTRUCTURE DRAWINGS TO COMPLETE A SITE SPECIFIC HYDROTECHNICAL ASSESSMENT IN ORDER TO ESTABLISH THE NEED FOR RIPRAP, TO DETERMINE THE SUITABILITY OF THE DESIGN ASSUMPTIONS LISTED ON THESE PLANS AND TO SUPPLEMENT THEM WHERE REQUIRED. CONSULTATION WITH A QUALIFIED PROFESSIONAL ENGINEER REGISTERED WITH NAPEG WITH HYDROTECHNICAL EXPERTISE PRIOR TO THE DESIGN PHASE IS RECOMMENDED.

DESIGN

- DESIGN SPECIFICATION: CSA-S6-19
- DESIGN VEHICLE: CL-800, HIGHWAY CLASS A FOR FATIGUE
- DEAD LOAD: ABUTMENT & PIER CAP SELF WEIGHT
  GIRDER SELF WEIGHT & WEARING SURFACE ALLOWANCE AS PER STANDARD SL-510 GIRDER DRAWING S-107-24
- WATER LOADS: NOT CONSIDERED FOR PIER DESIGN, ICE LOADS USED
- THE FOLLOWING LIMITING ASSUMPTIONS WERE USED FOR STRUCTURE DESIGN FOR ICE LOADS, EARTH PRESSURE, SEISMIC LOADS, THERMAL LOADS, AND WIND LOADS. THESE PLANS SHOULD NOT BE USED WHEN ACTUAL SITE CONDITIONS RESULT IN MORE SEVERE LOAD EFFECTS OR LESS EFFECTIVE RESISTANCE.
- ICE LOADS:
  EFFECTIVE CRUSHING STRENGTH = 400 kPa
  MAXIMUM ICE THICKNESS = 600 mm
  SMALL STREAM REDUCTION FACTOR = 0.7
  FLOW ANGLE BETWEEN AXIS OF PIER AND STREAM 0° DEGREES
  HEIGHT OF DECK SURFACE ABOVE STREAMBED = 6.0 m
  HEIGHT OF ICE FORCE ABOVE STREAMBED = MAXIMUM 2.5 m
  DEPTH BELOW STREAMBED TO EFFECTIVE PILE FIXITY = 2.0 m
- EARTH PRESSURE:
  UNIT WEIGHT OF SOIL γ = 22 kN/m3
  COEFFICIENT OF ACTIVE PRESSURE, ka = 0.50 (NON-FACTORED)
  COEFFICIENT OF PASSIVE PRESSURE, kp = 2.10 (NON-FACTORED)
  MAXIMUM ABUTMENT HEIGHT:
  - BACKWALL TYPE: 2.5 m
  - SPILL THROUGH TYPE: 0.8 m

  MAXIMUM ABUTMENT SKEW:
  - BACKWALL TYPE : 0°
  - SPILL THROUGH TYPE: 15° (30° IF APPROVED)

  DEPTH BELOW ABUTMENT PILE FILL LINE TO EFFECTIVE PILE FIXITY = 2.0 m
- SEISMIC: SEISMIC PERFORMANCE CATEGORY 1: Za = 1, a = 0.05 Zv = 1, v = 0.05
- THERMAL: MAXIMUM MEAN DAILY TEMPERATURE =28°C
  MIMUM MEAN DAILY TEMPERATURE = -52°C
- WIND: HOURLY MEAN WIND PRESSURE (50 YR) = 1.02 kPa
- BRAKING FORCE: CONSIDERED
- COLLISION: NOT CONSIDERED

CONSTRUCTION

- ALL CONSTRUCTION WORK SHALL CONFORM TO THE CURRENT SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- TREATED TIMBER SHALL BE PROPERLY HANDLED TO AVOID BRUISING, BREAKING OR PENETRATION OF OUTER FIBRES. LIFTING TOOLS SHALL BE APPLIED ONLY ON ENDS OF TREATED TIMBER PIECES. ALL CUTS AND BRUISES SHALL BE CAREFULLY TRIMMED. COMPATIBLE WOOD PRESERVING COMPOUND SHALL BE APPLIED TO ALL CUTS, BRUISES, FIELD CUTS, AND BOLT HOLES IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- STRUCTURAL PLATE CORRUGATED STEEL PLATES (SPCSP) SHALL BE ARRANGED SO THAT NO VERTICAL SEAMS INTERFERE WITH PILE LOCATIONS.
- PILES SHALL BE DRIVEN TO THE TIP ELEVATIONS SHOWN ON THE DRAWINGS, OR LOWER, TO ACHIEVE AT LEAST THE SPECIFIED MINIMUM BEARING CAPACITY.
- AFTER PILE DRIVING OPERATIONS HAVE STARTED, THE CONSULTANT MAY REVISE THE REQUIRED PILE TIP ELEVATIONS, PROVIDED THE MINIMUM SPECIFIED BEARING CAPACITY AND MINIMUM PENETRATION HAVE BEEN ACHIEVED.
- ALL PILES SHALL PENETRATE TO AT LEAST 5 m BELOW STREAMBED.

FACTORED PILE LOADS

ABUT PILES (kN)	SPANS	PIER PILES (kN)				
		14 m	12 m	10 m	8 m	6m
380	10 m	695	645	600		
420	12 m	740	680			
460	14 m	780				

BACKFILL – GENERAL

- THE CONTRACTOR SHALL BACKFILL ABUTMENTS WITH CARE AND IN ACCORDANCE WITH SPECIFICATIONS.

BACKFILL – BACKWALL TYPE ABUTMENTS

- THE CONTRACTOR SHALL MAINTAIN OVERALL BACKWALL STABILITY, LIMIT DEFLECTIONS DURING BACKFILLING, AND ENSURE PROPER GIRDER INSTALLATION.
- THE CONTRACTOR MAY ELECT TO ERECT THE GIRDERS PRIOR TO BACKFILLING, IN WHICH CASE THE BACKFILLING MAY COMMENCE IMMEDIATELY AFTER GIRDERS ARE SECURED IN PLACE.
- IF IT IS NECESSARY TO PARTIALLY BACKFILL PRIOR TO GIRDER ERECTION, THE CONTRACTOR SHALL PROVIDE A RESTRAINT SYSTEM AND MONITOR WALL DEFLECTIONS WITH ADEQUATE INSTRUMENTATION DURING BACKFILLING.

GIRDER INSTALLATION

- REFER TO TYPE SL-510 GIRDER DRAWINGS (LATEST REVISION) AS APPLICABLE:
  - 10 m S-101-24 AND S-102-24
  - 12 m S-103-24 AND S-104-24
  - 14 m S-105-24 AND S-106-24
  - ALL SPANS S-107-24
- FOR BACKWALL TYPE ABUTMENTS, GIRDER DOWEL SIZE AND LOCATION SHALL BE MODIFIED AS SHOWN ON DRAWINGS S-111-24
- GIRDERS SHALL BE CONNECTED TOGETHER WITH 20 mm ø A325 BOLT ASSEMBLIES, C/W DROP-IN WASHERS TO FILL THE GAP BETWEEN GIRDERS, TORQUED TO 400 Nm. GIRDERS SHALL NOT TOUCH EXCEPT THROUGH DROP-IN WASHERS. BOLTS AND WASHERS TO BE HOT-DIP GALVANIZED.
- CONNECTOR AND LIFTING HOOK POCKETS SHALL BE FILLED WITH AN APPROVED CONCRETE PATCHING MATERIAL.

MATERIALS

- GIRDER DOWELS SHALL CONFORM TO THE REQUIREMENTS OF CSA G40.21M GRADE 300W AND HOT-DIP GALVANIZED AFTER FABRICATION.
- ALL STEEL PLATE SHAPES SHALL CONFORM TO THE REQUIREMENTS OF CSA G40.21 GRADE 350W EXCEPT PIPE MATERIAL WHICH SHALL CONFORM TO THE REQUIREMENTS OF ASTM 252 GRADE 2 (Fy = 240 MPa).
- THREADED RODS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A193 B7 (Fy = 720 MPa, Fu = 860 MPa). GALVANIZING OF THREADED RODS SHALL BE IN ACCORDANCE WITH THE PROCEDURE OUTLINED FOR ANCHOR RODS IN THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- PILE BRACES AND PILE CAPS SHALL BE HOT-DIP GALVANIZED. GALVANIZING MAY BE OMITTED FROM PILE SURFACES LOCATED MORE THAN 1 000 mm BELOW GROUNDLINE. ALL FIELD WELDS OF GALVANIZED MATERIAL SHALL BE METALLIZED.
- GALVANIZING SHALL CONFORM TO THE CURRENT ASTM A123/A123M AND ASTM F2329.
- ALL WELDING SHALL CONFORM TO THE CURRENT AWS SPECIFICATION D1.5.
- WELDING IN LOW TEMPERATURES SHALL BE DONE IN ACCORDANCE WITH SECTION 13.4 OF THE SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- GALVANIZED SURFACES DAMAGED BY FIELD WELDING SHALL BE THOROUGHLY CLEANED AND METALLIZED.
- TREATED TIMBER (TT) SHALL CONFORM TO SECTION 23 – STRUCTURAL LUMBER OF THE SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- STRUCTURAL PLATE CORRUGATED STEEL PLATE (SPCSP) MATERIAL SHALL CONFORM TO SECTION 18 OF THE SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- GRANULAR BACKFILL SHALL BE PLACED TO A MINIMUM OF 95% PROCTOR DENSITY AND OTHERWISE CONFORM TO THE SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- BEARING PADS SHALL CONSIST OF NEOPRENE 60 HARDNESS AND SHALL CONFORM TO SECTION 8 – BEARINGS OF THE SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- ASPHALT IMPREGNATED FIBREBOARD (AIFB) SHALL CONFORM TO THE CURRENT ASTM D1751 FOR PREFORMED EXPANSION JOINT FILLER.

* WORK THESE DRAWINGS TOGETHER: S-108-24, S109-24, S-110-24, AND S-111-24 TOGETHER WITH SITE SPECIFIC GENERAL LAYOUT.

Government of Northwest Territories

Consultant Logo

Rev	Date	Description	Init

REVISIONS

Government of Northwest Territories

STANDARD DRAWING

TYPE SL-510 PRESTRESSED CONCRETE BRIDGES WITH STEEL SUBSTRUCTURES – SHEET 1

DESIGNED	K. HABEL	DATE	OCTOBER 25, 2024
CHECKED	K. WILLIS	DATE	OCTOBER 25, 2024
DRAWN	T. CHIU	DATE	OCTOBER 25, 2024
SCALE	AS SHOWN		

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING (B.C.) LTD.
Signature
Date 2024-11-15
PERMIT NUMBER: P 554
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

PREPARED UNDER THE DIRECTION OF
K. HABEL
ENGINEER OF RECORD
DATE OCTOBER 25, 2024

PROJECT No.

DRAWING No.
S-108-24

CANCEL PRINTS BEARING PREVIOUS LETTER

FILE: \\AE-CA\DATA\WORKING\VAN\2021-2234-00\STRU\MODEL\S-108-24.DWG
PLOTTED : October 25, 2024