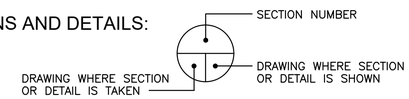
DRAWING LIST

CITY OF WPG. DRAWING NUMBER	TETRA TECH DRAWING NUMBER	SHEET NO.	DRAWING DESCRIPTION
1–0221S–D0001–001	2000120800–DWG–C1001	1	COVER SHEET
1–0221S–D0002–001	2000120800–DWG–C1002	2	DESIGN DATA AND LIST OF DRAWINGS
1–0221S–D0003–001	2000120800–DWG–C1003	3	SCOPE OF WORK
1–0221S–D0004–001	2000120800–DWG–C1004	4	GENERAL ARRANGEMENT – PLAN AND ELEVATION
1–0221S–D0005–001	2000120800–DWG–C1005	5	GENERAL ARRANGEMENT – CROSS SECTIONS
1–0221S–M0001–001	2000120800–DWG–M1001	6	MECHANICAL – NPS 18 FORCE MAIN ACROSS BRIDGE – ELEVATION
1–0221S–M0002–001	2000120800–DWG–M1002	7	MECHANICAL – NPS 18 FORCE MAIN ACROSS BRIDGE – DETAILS – SHEET 1 OF 2
1–0221S–M0002–002	2000120800–DWG–M1003	8	MECHANICAL – NPS 18 FORCE MAIN ACROSS BRIDGE – DETAILS – SHEET 2 OF 2
1–0221S–S0001–001	2000120800–DWG–S1001	9	STRUCTURAL – OVERALL EXISTING GIRDER PLAN
1–0221S–S0002–001	2000120800–DWG–S1002	10	STRUCTURAL – EXISTING GIRDER MODIFICATION SECTIONS – SHEET 1 OF 2
1–0221S–S0002–002	2000120800–DWG–S1003	11	STRUCTURAL – EXISTING GIRDER MODIFICATION SECTIONS – SHEET 2 OF 2
1–0221S–E0001–001	2000120800–DWG–E1001	12	ELECTRICAL – SITE PLAN
1–0221S–E0002–001	2000120800–DWG–E1002	13	ELECTRICAL – NORTH RIVERBANK ELECTRICAL DETAILS
1–0221S–E0003–001	2000120800–DWG–E1003	14	ELECTRICAL – SOUTH RIVERBANK ELECTRICAL DETAILS
1–0221S–E0004–001	2000120800–DWG–E1004	15	ELECTRICAL – EXISTING WASTEWATER PUMPING STATION DETAILS
1–0221S–E0005–001	2000120800–DWG–E1005	16	ELECTRICAL – RTU PANEL & WASTEWATER PUMPING STATION MISC. INSTRUMENTATION WIRING DETAILS
1–0221S–C0001–001	2000120800–DWG–C1010	17	CIVIL – NORTH RIVER BANK CONNECTION
1–0221S–C0002–001	2000120800–DWG–C1011	18	CIVIL – SOUTH RIVER BANK CONNECTION
1–0221S–C0003–001	2000120800–DWG–C1012	19	CIVIL – DETAILS
1–0221S–C0004–001	2000120800–DWG–C1013	20	CIVIL – SITE RESTORATION

REFERENCE DOCUMENTS:

- DRAWINGS FOR ST. VITAL BRIDGE PROJECT (B–5015) (1964)
- DRAWINGS FOR ST. VITAL BRIDGE OVER RED RIVER STRUCTURE REHABILITATION AND RELATED WORKS (B116) (1988)
- DRAWINGS FOR BALTIMORE FORCE MAIN (MS–3C) (1994)
- DRAWINGS FOR BALTIMORE PUMPING STATION SUBSTRUCTURE (781, 782)
- DRAWINGS FOR WASTEWATER RIVER CROSSING LEAK MONITORING (05984, 05985, 06019) (2007)
- DRAWINGS FOR 2018 BYPASS PUMP ASSEMBLE AND MANHOLE INSTALLATION (1–0117L–M0001–001) (2018)

SECTIONS AND DETAILS:



DESIGN DATA:

DESIGN SPECIFICATIONS:

FORCE MAIN STRUCTURAL STEEL PIPE SUPPORT ELEMENTS DESIGNED TO CAN/CSA S16–20, DESIGN OF STEEL STRUCTURES

CONNECTIONS TO EXISTING BRIDGE GIRDERS AND PIER MODIFICATIONS DESIGNED TO CAN/CSA S6–19, CANADIAN BRIDGE DESIGN CODE

DESIGN LOADS:

DEAD LOADS OF FORCE MAIN PIPE, CONTENTS, CONTAINMENT, SUPPORTS AND ACCESSORIES

LIVE LOAD OF LONGITUDINAL THRUST AND THERMAL EXPANSION/CONTRACTION

REINFORCING STEEL:

- BLACK STEEL REINFORCING SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA G30.18 GRADE 400W
- WHERE DISSIMILAR METALS WOULD BE IN CONTACT, NON–CONDUCTIVE SPACES OR REALIGNMENT OF REINFORCING STEEL SHALL BE REQUIRED
- MINIMUM LAP LENGTHS SHALL BE AS FOLLOWS:
  15M – 600 mm
  20M – 800 mm
  25M – 1200 mm
- REFER TO SPECIFICATION E13, REINFORCING STEEL.

STRUCTURAL CONCRETE:

CONCRETE TYPE	EXPOSURE CLASS	NOMINAL COMPRESSIVE STRENGTH	MAXIMUM AGGREGATE SIZE	AIR CONTENT CATEGORY	SPECIAL REQUIREMENTS	POST RESIDUAL CRACKING INDEX
1	C–1	35 MPa @ 28 DAYS	20mm	1	–	–
2	C–1	35 MPa @ 28 DAYS	20mm	1	–	–

TYPE 1: PIER MODIFICATIONS
TYPE 2: DRAINAGE CHANNEL

- CEMENTITIOUS MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA A3001. SILICA FUME SHALL NOT EXCEED 8% BY MASS OF CEMENT. FLY ASH SHALL BE CLASS C1 OF F AND NOT EXCEED 30% BY MASS OF CEMENT
- ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF ASTM F1554, GRADE 55, WITH THE TOP 300 mm OF THE BOLTS THREADED UNC CLASS 2A
- ANCHOR BOLTS SHALL BE ALIGNED WITH A TEMPLATE ABOVE THE TOP OF CONCRETE AND REMOVED FOLLOWING A MINIMUM 24 HOUR CURING PERIOD
- ALL EXPOSED EDGES SHALL BE CHAMFERED 20 mm
- EXISTING CONCRETE SURFACES IN CONTACT WITH NEW CONCRETE PIER SUPPORT ADDITIONS SHALL BE CLEANED AND ROUGHENED TO CSP 4 "LIGHT SCARIFICATION" TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ICRI GUIDELINE NO. 03730 AND 03732.
- MINIMUM CONCRETE COVER TO REINFORCING STEEL SHALL BE 65 mm
- REFER TO SPECIFICATION E14, STRUCTURAL CONCRETE

STRUCTURAL STEEL:

- STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA G40.21 GRADE 300W UNLESS OTHERWISE NOTED
- HIGH STRENGTH BOLTS, NUTS, AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM F3125M, GRADE A325, TYPE 1 HEAVY HEX HEAD
- NUTS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A563
- WASHERS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM F436
- HIGH STRENGTH BOLTS, NUTS, AND WASHERS SHALL BE HOT–DIP GALVANIZED TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM F2329
- ALL BOLTED CONNECTIONS SHALL BE SLIP–CRITICAL CONNECTIONS WITH FAYING SURFACES PREPARED AS NOTED ON THE STRUCTURAL DRAWINGS
- ALL SHOP WELDING AND PROVISION OF HOLES SHALL BE COMPLETED PRIOR TO HOT–DIP GALVANIZING. EXTERIOR AND INTERIOR SURFACES OF MEMBERS SHALL BE CLEANED OF ANY WELD SLAG OR OTHER DEBRIS PRIOR TO PREPARATION FOR HOT–DIP GALVANIZING
- WELDING CONSUMABLES SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF CAN.CSA W48 ELECTRODE CLASSIFICATION E49XX
- ADEQUATE VENTING AND DRAINAGE HOLES SHALL BE PROVIDED IN ENCLOSED SECTIONS TO BE HOT–DIP GALVANIZED AND WHERE SHOWN ON THE DRAWINGS
- WELDING OF STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA W59
- ALL STRUCTURAL ELEMENTS SHALL BE HOT DIP GALVANIZED
- STRUCTURAL STEEL TO BE HOT DIP GALVANIZED SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA G164 AND ASTM A123 TO A NET RETENTION OF 610 g/m^2
- FIELD APPLIED GALVANIZING SHALL BE A ZINC–BASED ALLOY ROD TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A780
- REFER TO SPECIFICATION E15, FORCE MAIN STRUCTURAL STEEL SUPPORT SYSTEM

AERIAL SUPPORTED FORCE MAIN:

- FORCE MAIN PIPE SHALL BE SCHEDULE 80S (0.5" WALL THICKNESS) STAINLESS STEEL TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A312 GRADE TP304L
- FORCE MAIN FITTINGS SHALL BE SCHEDULE 80S SEAMLESS STAINLESS STEEL BUTT WELDING FITTINGS TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A403 GRADE WP304L, AND ASME B16.9. CROTCH THICKNESS AND RADIUS OF TEES SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASME B31.3, TABLE D300
- FORCE MAIN PIPE FLANGES SHALL BE FORGED STAINLESS STEEL TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A182 GRADE F304L AND SHALL CONFORM TO ANSI B16.5 CLASS 150 WITH RAISED FACE TO MATCH THE MATING FLANGE
- FORCE MAIN BLIND FLANGES SHALL BE WELDING NECK TYPE OF FORGED STAINLESS STEEL TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A312 GRADE F304L AND SHALL CONFORM TO ANSI B16.5 CLASS 150 WITH RAISED FACE
- FLANGE BOLT–STUDS SHALL BE ALLOY STEEL TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A193 GRADEB7 WITH FULL LENGTH THREADS TO ANSI B1.1 CLASS 2A
- FLANGE NUTS SHALL BE ALLOY STEEL TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A194 GRADE 2H, HEAVY HEX, CLASS 2 FIT, TO CONFORM TO ANSI B18.2, WITH THREADS TO ANSI B1.1 CLASS 2B
- FLANGE GASKETS SHALL BE CLASS 150, TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ANSI B16.21, FLAT RING, NON–METALLIC, 1.6mm THICK
- EXPANSION JOINTS SHALL BE MANUFACTURED OF DUCTILE IRON CONFORMING TO THE TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM A536 AND AWWA C153/A21.53 AND SHALL HAVE CLASS 150 FLANGES CONFORMING TO THE DIMENSIONAL REQUIREMENTS OF AWWA C110/A21.10
- BALL VALES SHALL BE 3–PIECE CONSTRUCTION, FULL PORT, CLASS 600 TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASME B16.34, WITH CAST STAINLESS STEEL BODY TO CONFORM TO ASTM A351–CF8M, NPT END CONNECTIONS TO ASME B1.20.1 TYPE 316 STAINLESS STEEL BALL AND BLOWOUT–PROOF STEM, PTFE PACKING AND GASKETS, AND 2 ¼" STEM EXTENSION
- BEARING SUPPORT ASSEMBLY SHALL BE ANVIL FIG. 432 FOR NPS 24 (PIPE CLAMPS), ANVIL FIG. 271 FOR NPS 24 AND ANVIL FIG. 171 FOR NPS 24. ALL ANVIL ITEMS AND FASTENERS SHALL BE HOT DIP GALVANIZED TO CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA G164 AND ASTM A123 TO A NET RETENTION OF 610 g/m^2
- PIPE INSULATION SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF ASTM D1622, D6226, D2842, AND C518
- OUTER JACKET SHALL BE MINIMUM 22 GAUGE, LOCK FORMING QUALITY GALVANIZED SHEET STEEL WITH SPIRAL LOCK SEAM OR MINIMUM 3.81 mm THICK, UV INHIBITED, BLACK, CONTINUOUSLY EXTRUDED HDPE WITH PROPERTIES SUITED TO AMBIENT TEMPERATURES RANGING FROM -40^0C TO +40°C AND TESTED AND CERTIFIED FOR COLDER WEATHER HANDLING, INSTALLATION AND OPERATION TO –55°C
- MAXIMUM TEST PRESSURE FOR AERIAL PIPE = 410 kPa (60 psi), GOVERNED BY STRUCTURAL SUPPORTS
- FORCE MAIN PIPE DEFLECTIONS AS A RESULT OF FUTURE BRIDGE OFF–LOADING OF REHABILITATION HAVE BEEN CONSIDERED IN THE DESGIN AS SHOWN IN THE LOAD–DEFELECTION DIAGRAMS ON ST. VITAL BRIDGE DRAWING B–5015–109 (S–2)
- REFER TO SPECIFICATION E16, FORCE MAIN ACROSS BRIDGE

TEMPORARY WORKS:

- SHORING AND FALSE WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION AND ALL SUBSEQUENT REVISIONS OF CAN/CSA S269.1.
- REFER TO SPECIFICATION E12, REMOVAL OF EXISTING AERIAL SUPPORTED FORCE MAIN PIPE

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
Tetra Tech Canada Inc.
No. 6499

B.M. ELEV.

NO.	REVISIONS	DATE	BY
00	ISSUED FOR TENDER	20.12.22	JB

TETRA TECH

DESIGNED BY J.B. | CHECKED BY K.Y.
DRAWN BY E.V. | APPROVED BY B.M.
HOR. SCALE: / VERTICAL: AS NOTED | ACCEPTED BY ORIGINAL SIGNED | DATE 20.12.22
DATE 20.10.08 | B. JONES, P.ENG. SENIOR PROJECT ENGINEER

ORIGINAL DRAWING REVISION "00" SEALED BY J.S. BETKE 20.12.22

CONSULTANT DRAWING NO. 2000120800–DWG–C1002

Winnipeg
THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

BALTIMORE FORCE MAIN PIPE CROSSING THE ST. VITAL BRIDGE

CITY DRAWING NUMBER 1–0221S–D0002–001
SHEET 2 OF 20

DESIGN DATA AND LIST OF DRAWINGS

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