

**GENERAL NOTES**

THESE DRAWINGS TO BE READ IN CONJUNCTION WITH THE CONTRACT SPECIFICATIONS.

CONTRACTOR SHALL SITE VERIFY ALL EXISTING DIMENSIONS.

**DESIGN DATA**

**SPECIFICATIONS:**

- AREMA MANUAL FOR RAILWAY ENGINEERING, 2013.
  - CHAPTER 8: CONCRETE STRUCTURES AND FOUNDATIONS.
  - CHAPTER 15: STEEL STRUCTURES
- CAN/CSA-A23.3-04 DESIGN OF CONCRETE STRUCTURES (2007).
- CSA W59-03 WELDED STEEL CONSTRUCTION (R2008).
- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC) SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, 2004.

**LIVE LOADING**

- COOPER E 60 LOAD.
- CITY OF WINNIPEG GWWD EXISTING ROLLING STOCK.

**FOUNDATIONS:**

- THE FOUNDATION DESIGN IS BASED ON A GEOTECHNICAL INVESTIGATION REPORT DATED OCTOBER 31, 2006 BY AMEC EARTH AND ENVIRONMENTAL, A DIVISION OF AMEC AMERICAS LIMITED.
- THE GEOTECHNICAL REPORT HAS BEEN INCLUDED IN THE SPECIFICATION.

**STEEL H-PILES:**

- STEEL H-PILES TO CAN/CSA G40.21M, GRADE 350W.
- PILES SHALL BE DRIVEN TO THE REFUSAL IN ACCORDANCE WITH THE SPECIFICATIONS.
- BATTERED PILES SHALL NOT BE JACKED OR PULLED INTO THEIR FINAL POSITION.

	S.U./S.U.2
	PRIMARY LOADS
MAXIMUM SERVICE LOAD (kN)	850
MAXIMUM ALLOWABLE RESISTANCE (kN)	1670

**STRUCTURAL STEEL:**

- STRUCTURAL STEEL SHALL MEET THE MINIMUM REQUIREMENTS OF CSA/G40.20-04/G40.21-04 (R2009) GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL.
- COILED STEEL IS NOT PERMITTED.
- STEEL STRUCTURAL MEMBERS DESIGNATED AS FRACTURE CRITICAL (FCM) ARE DESIGNED AS FCM ON THE DESIGN DRAWINGS.
- STEEL STRUCTURAL MEMBERS NOT DESIGNATED AS FCM BUT USED AS PRIMARY MEMBERS (PM) ARE DESIGNATED AS PM ON THE DESIGN DRAWINGS.
- STEEL STRUCTURAL MEMBERS
  - FCM TO GRADE 350AT, CATEGORY 5
  - PM MEMBERS TO GRADE 350AT, CATEGORY 3
  - OTHER MEMBERS TO GRADE 350A
- GRADE 350AT CATEGORY 5 IMPACT TEST REQUIREMENTS ARE MINIMUM AVERAGE ENERGY 40J AT A TEST TEMPERATURE OF -20°C.
- FLANGE PLATES IN EXCESS OF 38mm SHALL BE NORMALIZED UNLESS THE STEEL MANUFACTURER CAN SUPPLY EVIDENCE TO, AND OBTAIN APPROVAL FROM CITY OF WINNIPEG THAT CONTROLLED PLATE ROLLING PROCEDURES MEETS CITY OF WINNIPEG REQUIREMENTS.
- FABRICATION SHALL BE IN ACCORDANCE WITH AREMA CHAPTER 15 PART 3.
- MILL CERTIFICATES FOR ALL STEEL BRIDGE COMPONENTS ARE TO BE SUBMITTED TO AND APPROVED BY CITY OF WINNIPEG OR ITS contract administrator PRIOR TO FABRICATION.
- SHOP DRAWINGS ARE TO BE SUBMITTED TO AND REVIEWED BY CITY OR WINNIPEG'S CONSULTANT PRIOR TO FABRICATION.
- SHOP INSPECTION OF FABRICATION OF STRUCTURAL STEEL BRIDGE SPANS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TECHNICAL SPECIFICATION.
- FULL SHOP ASSEMBLY OF ALL FCM AND PM STRUCTURAL STEEL COMPONENTS REQUIRED FOR INSPECTION PRIOR TO SHIPPING.

**CONCRETE:**

- CONCRETE TO CSA A23.1-04/A23.2-04 CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION/METHODS OF TEST FOR CONCRETE.
- SUBSTRUCTURE
  - f'c=35 MPa
  - EXPOSURE CLASS C-1
  - CATEGORY 1 AIR ENTRAINMENT
  - 20mm NOMINAL AGGREGATE.
- GROUT TO BE NON-SHRINK, NON-METALLIC, f'c=35 MPa.
- CONCRETE COVER 75mm UNLESS NOTED OTHERWISE.

**REINFORCING STEEL:**

- REINFORCING STEEL INSTALLATION DEVELOPMENT LENGTH AND SPLICING TO AREMA CHAPTER 8.
- SPLICES BETWEEN THE PILE CAP DOWELS AND THE VERTICAL REINFORCING STEEL IN THE ABUTMENT WALL AND WINGWALLS SHALL BE CLASS C SPLICE. ALL OTHER SPLICES CLASS B.
- REINFORCING STEEL TO BE DEFORMED BARS TO CAN/CSA G30.18-M92 (R2002) BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 400W.

BAR SIZE	ld (mm)	CLASS B SPLICE 1.3*ld (mm)	CLASS C SPLICE 1.7*ld (mm)
15M	400	520	680
20M	500	650	850
25M	600	845	1105
30M	900	1170	1530

**MISCELLANEOUS METAL:**

- MISCELLANEOUS METAL TO CAN/CSA G40.20-04/G40.21-04 GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL.
- STEEL PLATE GRADE 300W.
- STOCK SECTIONS TO GRADE 350W.
- HOLLOW STRUCTURAL STEEL SECTIONS TO GRADE 350W CLASS C.
- ALL GALVANIZED.

**WELDING:**

- CSA W59 WELDED STEEL CONSTRUCTION, 2003 (R2008).
- SHOP INSPECTION OF WELDING AND WELD PROPERTIES FOR STRUCTURAL STEEL BRIDGE SPANS SHALL BE IN ACCORDANCE WITH CSA W59 BY FABRICATORS CERTIFIED TO MINIMUM DIVISION 1 OR 2 OF CSA W47.1-09 CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES.
- WELD METAL SHALL HAVE CORROSION RESISTANT PROPERTIES TO THOSE OF THE PARENT MATERIALS.
- MINIMUM 6mm FILLET WELDS UNLESS NOTED OTHERWISE, TO BE COMPATIBLE WITH BASE METAL THICKNESS.

- SUBMERGED-ARC WELDING (SAW) IS REQUIRED FOR WELDS IN FCM.
- WELD PROCEDURES FOR FCM WELDS SHALL INCLUDE SUPPLEMENTAL IMPACT TESTING TO LEVEL 1 IN ACCORDANCE WITH CSA W47.1.
- FLUX CORED WELDING (FCAW) IS PERMITTED FOR NON-FCM PROVIDED ELECTRODES WITH A DESIGNATION OF H8 OR LOWER ARE USED.
- FLANGE TO WEB TEE JOINTS ON THROUGH PLATE GIRDERS MAY BE CANADIAN WELDING BUREAU (CWB) PREQUALIFIED FILLET WELDED JOINTS.
- ALL BUTT JOINTS SHALL BE CWB PREQUALIFIED COMPLETE JOINT PENETRATION WELDED JOINTS.
- ALL BUTT JOINTS IN FLANGES SHALL BE STRESS-RELIEF HEAT TREATED IN ACCORDANCE WITH CSA W59.
- ALL FLANGE TO WEB FILLET WELDS AND 25% BY LENGTH OF ALL OTHER WELDS SHALL BE TESTED BY MAGNETIC PARTICLE METHOD.
- SHOP SPLICES OF THE WEBS AND FLANGES OF THE THROUGH PLATE GIRDERS SHALL BE COMPLETED BEFORE THE WEBS AND FLANGES ARE JOINED TO EACH OTHER.
- ALL BUTT JOINTS IN FLANGES AND WEBS SHALL BE TESTED BY RADIOGRAPHIC METHOD.
- ALL FCM WELDS SHALL BE CONSIDERED AS CYCLICALLY LOADED TENSILE WELDS FOR WELD QUALITY TESTING IN ACCORDANCE WITH CSA W59.

**BOLTING:**

- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", 2004.
- BOLTS SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A325 TYPE 3 C/W ASTM A563 GRADE C3 OR DH3 HEAVY HEX NUTS AND ASTM F436 TYPE 3 HARDENED STEEL WASHERS.
- MANUFACTURERS COMPLIANCE CERTIFICATES FOR BOLTS, NUTS AND WASHERS ARE TO BE SUBMITTED TO AND APPROVED BY CITY OF WINNIPEG'S CONSULTANT PRIOR TO SUPPLY.
- HOLES TO BE 2mm IN DIAMETER LARGER THAN THE BOLT UNLESS NOTED OTHERWISE.
- BOLTS, NUTS AND WASHERS SHALL BE SUPPLIED AS A PRE-ASSEMBLED UNIT.
- ALL BOLTS SHALL BE INSTALLED BY THE TURN-OF-NUT METHOD, UNLESS NOTED OTHERWISE.
- ONLY BOLTS AND NUTS FABRICATED IN CANADA OR UNITED STATES OF AMERICA ARE PERMITTED.

**BEARINGS:**

- BEARING SHALL BE ELASTOMERIC BEARING AS DETAILED ON SHEET S204 BY GOODCO or approved equal in accordance with B7 in accordance with B7.
- BEARING MATERIAL SHALL BE EXPANSION: 60 DUROMETER  
FIXED: 60 DUROMETER

**PROTECTIVE COATINGS:**

- GALVANIZED TO CAN/CSA G164 HOT DIP GALVANIZING OR IRREGULARLY SHAPED ARTICLES. DAMAGED GALVANIZING TO ASTM A780 STANDARD PRACTICE FOR REPAIR OF DAMAGED AND UNCOATED AREAS OF HOT-DIP GALVANIZED COATINGS. ALL MATERIALS TO FIT AFTER GALVANIZING.
- METALLIZING TO CAN/CSA G189 SPRAYED METAL COATINGS FOR ATMOSPHERIC CORROSION PROTECTION. ALL MATERIALS TO FIT AFTER METALLIZING.
- NOT WITH STANDING AND IN ADDITION TO CSA G189-1996 METALLIZING SHALL BE IN ACCORDANCE WITH SSPC-CS 23.00/4WS C2.23M/NACE No.12.
- MINIMUM DRY FILM ZINC THICKNESS SHALL BE 150 MICROMETRES.
- METALLIZING TO BE SEALED USING SSPC-PAINT 27 BASIC ZINC CHROMATE-VINYL BUTYRAL WASH PRIMER FOLLOWED BY SSPC-PAINT 9 WHITE (PIGMENTED) VINYL PAINT OR APPROVED EQUIVALENTS. THE MINIMUM DRY FILM THICKNESS OF THE VINYL PAINT SHALL BE 38 MICROMETRES.
- A COMPATIBLE WATERBORNE ACRYLIC PAINT, MATCHING THE COLOUR OF OXIDIZED STEEL (SIMILAR TO CGSB 504-107 BROWN) SHALL BE APPLIED AS A TOP COAT OVER THE SEALING COATS. THE MINIMUM DRY FILM THICKNESS OF THE WATERBORNE ACRYLIC PAINT SHALL BE 50 MICROMETRES.
- THE METALIZED AREAS OF THE UNDERSIDE OF THE THROUGH PLATE GIRDERS SHALL NOT BE SEALED NOR PAINTED.

**BACKFILL AND COMPACTION:**

- GRANULAR COMPACTED TO 98% OF STANDARD PROCTOR DENSITY AT OPTIMUM MOISTURE CONTENT.
- COMMON COHESIVE BACKFILL COMPACTED TO 95% OF STANDARD PROCTOR DENSITY IN OPTIMUM MOISTURE CONTENT.
- THE ZONES OF COMPACTION SHALL BE AS SHOWN ON THE DRAWINGS.

**TEMPORARY SITE DRAINAGE:**

- CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF A TEMPORARY DRAINAGE SYSTEM FOR DEWATERING THE SUBSTRUCTURE EXCAVATIONS.

**SUPERSTRUCTURE SHIPPING, ASSEMBLY AND INSTALLATION:**

- FABRICATOR IS RESPONSIBLE FOR SHIPPING ALL MATERIAL UNASSEMBLED FOB TO SITE. LIFTING POINTS AS REQUIRED FOR THE LOADING OF STRUCTURAL STEEL FOR SHIPPING SHALL BE DESIGNED BY THE FABRICATOR.
- ERECTION MARKS SHALL BE PAINTED ON ALL MEMBERS, AND FOR WEATHERING STEEL SHALL BE PLACED IN SUITABLE INCONSPICUOUS PLACES.
- CONTRACTOR IS RESPONSIBLE FOR SITE ASSEMBLY AND INSTALLATION.
- SHOULD THE CONTRACTOR PREFER SHIPPING ALL OR SOME SUPERSTRUCTURE ELEMENTS ASSEMBLED TO SITE, COORDINATION WITH THE FABRICATOR IS REQUIRED. PROPOSED ASSEMBLED SHIPPING METHOD TO BE REVIEWED BY CITY OF WINNIPEG'S CONTRACTOR ADMINISTRATOR.

**MISCELLANEOUS NOTES:**

- THE DRAWING NOTES REPRESENT A SUMMARY OF REQUIREMENTS AND ALL ASSOCIATED SPECIFICATIONS AND DOCUMENTS ARE TO BE REFERRED AND ADHERED TO AS REQUIRED.

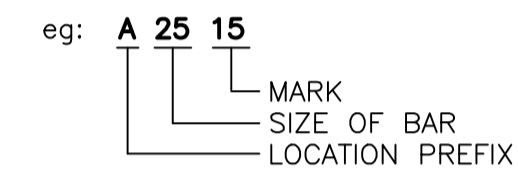
MARK	DESCRIPTION
G1	EXTERIOR GIRDER
G2	EXTERIOR GIRDER

MARK	DESCRIPTION
FB1	FLOOR BEAM
FB2	FLOOR BEAM
FB3	FLOOR BEAM
ST1	STRINGER
ST2	STRINGER
ST3	STRINGER BEAM END

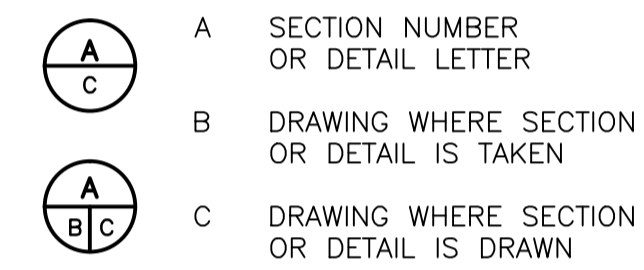
**LIST OF ABBREVIATIONS**

AREMA	AMERICAN RAILWAY ENGINEERING & MAINTENANCE-OF-WAY ASSOCIATION	No.	NUMBER
@	AT	O.F.	OUTSIDE FACE
ALT.	ALTERNATING	O/C	ON CENTRE
ALUM.	ALUMINIUM	O/O	OUTSIDE TO OUTSIDE
APPROX.	APPROXIMATE	OPH.	OPPOSITE HAND
AVE.	AVE.	PL.	PLATE
B	BOLTS	PM	PRIMARY MEMBER
BC	BEGIN CURVE	QTY.	QUANTITY
BM	BENCHMARK	R	RADIUS
B.C.	BY OTHERS	REINF.	REINFORCEMENT
B/O	BOTTOM OF	SHT.	SHEET
BOT.	BOTTOM	SP	SPACING
B/W	BOTH WAYS	SS	STAINLESS STEEL
BRG.	BEARING	STD	STANDARD
C.I.P.	CAST-IN-PLACE	STR.	STRAIGHT
CJ.	CONSTRUCTION JOINT	SU.	SUBSTRUCTURE UNIT
C.W.B.	CANADIAN WELDING BUREAU	SYM.	SYMMETRICAL
☉	CENTRE LINE	T&B	TOP & BOTTOM
C/W	COMPLETE WITH	THK.	THICK
CONC.	CONCRETE	T.P.G.	THROUGH PLATE GIRDER
CONT.	CONTINUOUS	TYP.	TYPICAL
CL.	CLEAR	T/O	TOP OF
DBL.	DOUBLE	U.N.O.	UNLESS NOTED OTHERWISE
∅	DIAMETER	U/S	UNDERSIDE
DTL.	DETAIL	VERT.	VERTICAL
DWG.	DRAWING	WM	WORKMAIN
EA.	EACH	WP	WORKING POINT
EC	END CURVE	W/	WITH
E.E.	EACH END		
E.F.	EACH FACE		
E.C.	EACH WAY		
EQ.	EQUAL		
EQ. SP.	EQUAL SPACE		
EL.	ELEVATION		
CRES.	EXISTING		
FCM	FRACTURE CRITICAL MEMBER		
F.F.	FAR FACE		
FG.	FINISHED GRADE		
GALV.	GALVANIZING		
G	GIRDER		
GRAN.	GRANULAR		
HORIZ.	HORIZONTAL		
IB	IRON BAR		
I.F.	INSIDE FACE		
LG.	LONG		
MK.	MARK		
MAX.	MAXIMUM		
m	METRE		
MIN.	MINIMUM		
mm	MILLIMETRE		
N.T.S.	NOT TO SCALE		

**REINFORCING MARK NUMBERING SYSTEM**



**SECTION AND DETAILS**



\\c01169-f01\Workproj\1137\office\113732050\drawing\04\_working\sheet\_files\mils\_77.8\32050-g-006-800.dwg Date: 2014 Apr 22 10:20pm User: Bannerman, J

<b>LOCATION APPROVED UNDERGROUND STRUCTURES</b> SUPV. U/G STRUCTURES COMMITTEE _____ DATE _____		B.M. ELEV. _____		100 - 1355 Taylor Avenue, Winnipeg MB Canada www.stantec.com		ENGINEER'S SEAL	
NOTE: LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.		DESIGNED BY: S.Y.S. CHECKED BY: M.J.B.		DRAWN BY: J.M.B. APPROVED BY: M.J.B.		CONSULTANT DRAWING NO. <b>6006</b>	
HOR. SCALE: AS NOTED VERTICAL: _____		RELEASED FOR CONSTRUCTION: _____ DATE _____		THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT ENGINEERING DIVISION		SHEET 2 OF 15 CAD FILE DRAWING NUMBER 32050-g-006-800.dwg CITY DRAWING NUMBER <b>D-13438</b>	
GREATER WINNIPEG WATER DISTRICT RAILWAY BRIDGE REPLACEMENT AT MILE 77.6 GENERAL NOTES				RAILWAY BRIDGE REPLACEMENT AT MILE 77.6 GENERAL NOTES			