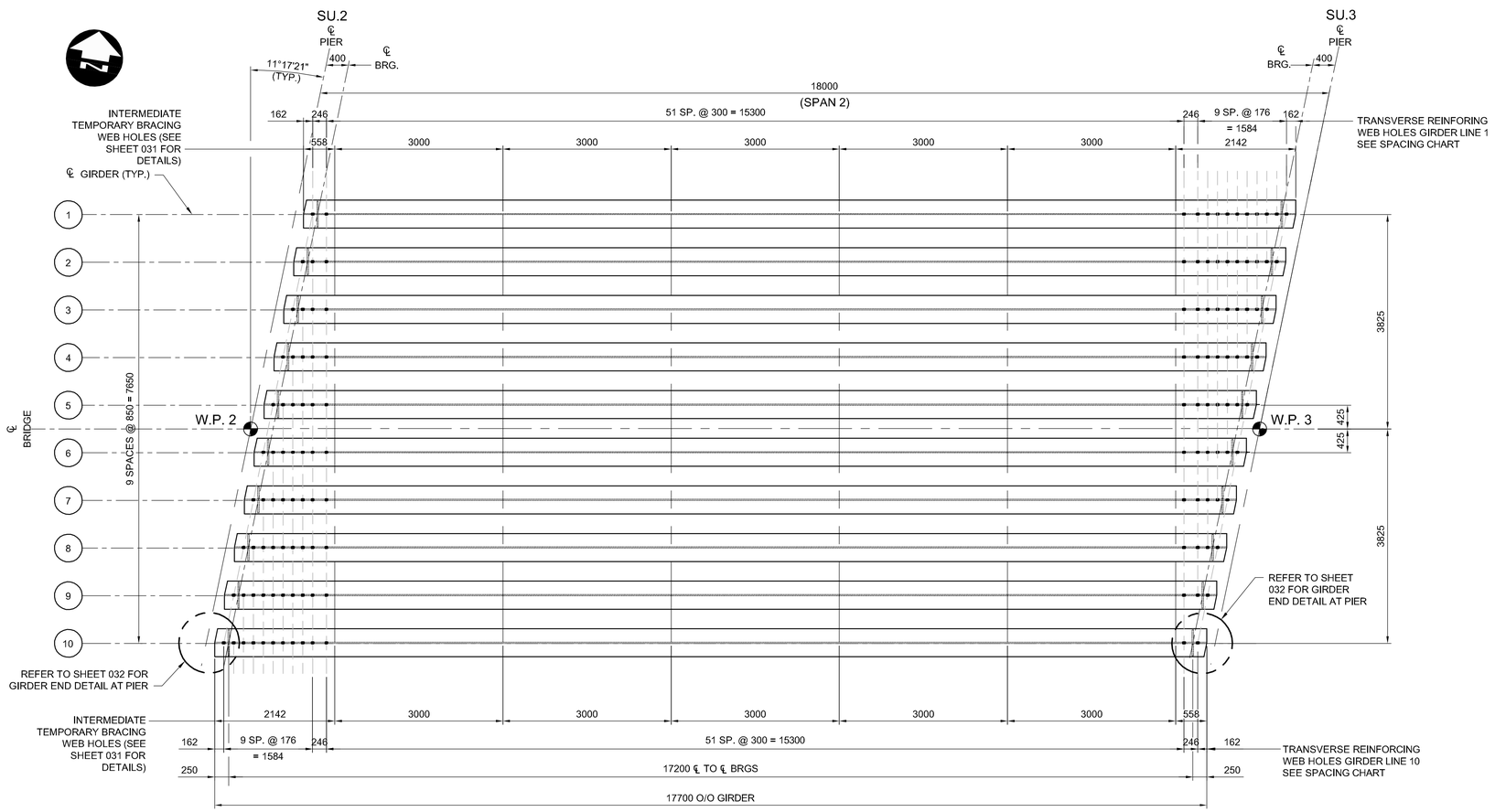
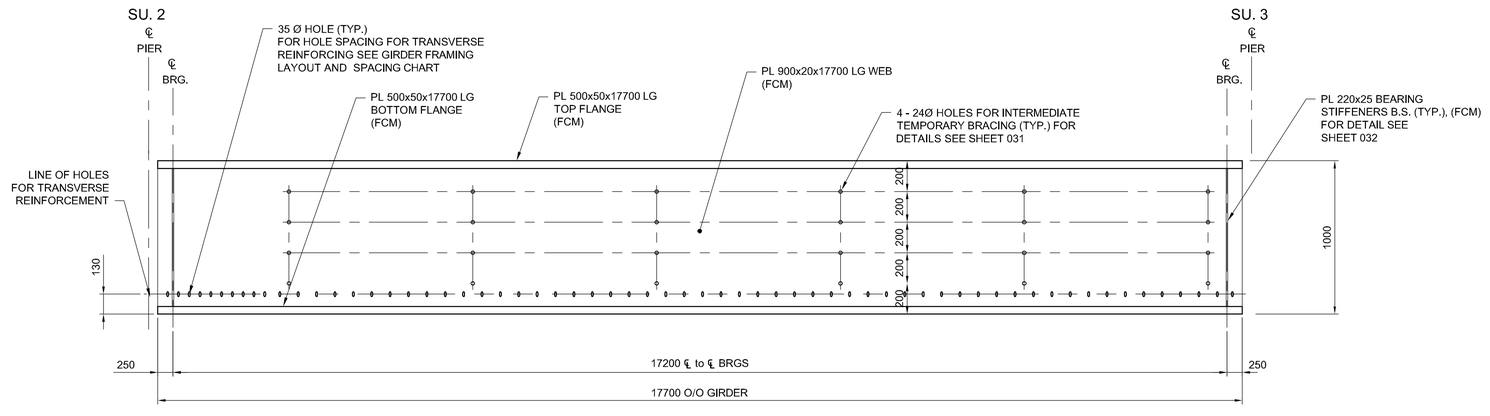


GIRDER FRAMING LAYOUT

SCALE 1:50



GIRDER MK. "G2" ELEVATION

HORZ. SCALE : 1:50
VERT. SCALE: 1:20

NOTE: GIRDER LINE 10 SHOWN.

SECTION PROPERTIES AND STRESSES

17200 mm SPAN LENGTH (C/C BEARINGS)

STEEL SECTION				
TOP FLANGE PLATE SIZE	500mm	50mm	AREA =	25000mm^2
WEB PLATE SIZE	900mm	20mm	AREA =	18000mm^2
BOTTOM FLANGE PLATE SIZE	500mm	50mm	AREA =	25000mm^2

SECTION MODULES X 10^6 [mm^3]			
n = 7.14	CONC. DECK	STEEL TOP FLANGE	STEEL BOTTOM FLANGE
STEEL ONLY	-	24.820	24.820
COMPOSITE - n	44.78	56.830	45.690
COMPOSITE - 3n	30.89	38.760	34.490

TABLE OF STRESSES

	LOAD	END REACTION	SHEAR STRESS	BENDING MOMENT	BENDING STRESS		
					STEEL		CONC. DECK
					TOP FLANGE	BOTTOM FLANGE	
	[kN/m]	[kN]	[MPa]	[kNm]	[MPa]	[MPa]	[MPa]
DEAD LOAD NON-COMPOSITE	27.36	235.30	13.07	1011.79	40.77	40.77	-
SUPERIMPOSED DEAD LOAD NON-COMPOSITE	14.84	127.99	7.11	550.37	22.17	22.17	2.50
LIVE LOAD E90 NON-COMPOSITE	-	445.50	24.75	1642.50	66.18	66.18	5.14
IMPACT I = 38.57%	-	171.82	9.55	633.48	25.52	25.52	1.98
CENTRIFUGAL FORCE	-	-	-	-	-	-	-
TOTAL GROUP A		980.61	54.48	3838.14	154.64	156.64	9.61
ALLOWABLE STRESSES (BENDING & SHEAR)			122.50		192.50	192.50	14.00
RATIO OF WORKING STRESS TO ALLOWABLE			0.44		0.80	0.80	0.69

$$\frac{D\,(LL+I)}{SPAN} = \frac{1}{1449}$$

ALLOWABLE STRESS RANGE FOR FATIGUE CATEGORY "B" FOR N> 2 000 000 CYCLES:

S Rfat = 110.30 MPa

MAXIMUM DESIGN STRESS RANGE AT BOTTOM FLANGE TO WEB WELD AT MIDSPAN (35% MEAN IMPACT LOAD) :

67.59 MPa < S Rfat

ESTIMATED QUANTITIES (PER SPAN):

- TOTAL SPAN STRUCTURAL STEEL WEIGHT (WITHOUT BRGS) 96 030 kg
- LIFTING WEIGHT OF I-GIRDER (WITH BRGS) 9 603 kg
- STRUCTURAL STEEL IN BEARINGS 2 304 kg
- CONCRETE
  - DECK 167 m^3
  - TRAINMAN'S WALKWAY 24 m^3
- WATERPROOFING 157 m^2

NOTE: ALL WEIGHTS AND QUANTITIES SHOWN ARE APPROXIMATE, CONTRACTOR IS RESPONSIBLE FOR CALCULATING EXACT LIFTING WEIGHTS OF NEW SPANS.

TRANSVERSE REINFORCEMENT HOLE SPACING - SPAN 2

GIRDER LINE	SU.2															SU.3
1	162	246	51 SPACES @ 300 = 15300													246 176 176 176 176 176 176 176 176 176 162
2	162	176	246	51 SPACES @ 300 = 15300												246 176 176 176 176 176 176 176 176 176 162
3	162	176	176	246	51 SPACES @ 300 = 15300											246 176 176 176 176 176 176 176 176 176 162
4	162	176	176	176	246	51 SPACES @ 300 = 15300										246 176 176 176 176 176 176 176 176 176 162
5	162	176	176	176	176	246	51 SPACES @ 300 = 15300									246 176 176 176 176 176 176 176 176 176 162
6	162	176	176	176	176	176	246	51 SPACES @ 300 = 15300								246 176 176 176 176 176 176 176 176 176 162
7	162	176	176	176	176	176	176	246	51 SPACES @ 300 = 15300							246 176 176 176 176 176 176 176 176 176 162
8	162	176	176	176	176	176	176	176	246	51 SPACES @ 300 = 15300						246 176 176 176 176 176 176 176 176 176 162
9	162	176	176	176	176	176	176	176	176	176	246	51 SPACES @ 300 = 15300				246 176 176 176 176 176 176 176 176 176 162
10	162	176	176	176	176	176	176	176	176	176	176	246	51 SPACES @ 300 = 15300			246 176 176 176 176 176 176 176 176 176 162

APEGM
Certificate of Authorization
Dillon Consulting Limited (MB)
No. 1789 **Date:** 2017/01/09

NO.	REVISIONS	DATE	BY
0	ISSUED FOR TENDER	17/01/09	RE

DILLON CONSULTING

DESIGNED BY	RE	CHECKED BY	SSR
DRAWN BY	NBG	APPROVED BY	DBW
HOR. SCALE	AS SHOWN	RELEASED FOR CONSTRUCTION	
VERTICAL	AS SHOWN		
DATE		DATE	

ENGINEER'S SEAL
PROVINCE OF MANITOBA
R.B. ERIC
Member 22665
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT PROJECT NUMBER
16-3353

Winnipeg

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

WAVERLEY STREET UNDERPASS AT CN MILE 3.89 RIVERS SUB
CONTRACT 2: UNDERPASS STRUCTURE, RAILWORKS, ROADWORKS, LAND DRAINAGE SEWER, PUMPING STATION AND LANDSCAPING WORKS

STEEL GIRDER DETAILS
SPAN 2 (17.20 m)

CITY DRAWING NUMBER: U-239-2016-C2-CS-029
SHEET 029 OF 085
CONSULTANT DRAWING NUMBER: C2-CS-029

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