A1 SIZE 594mm x 841mm

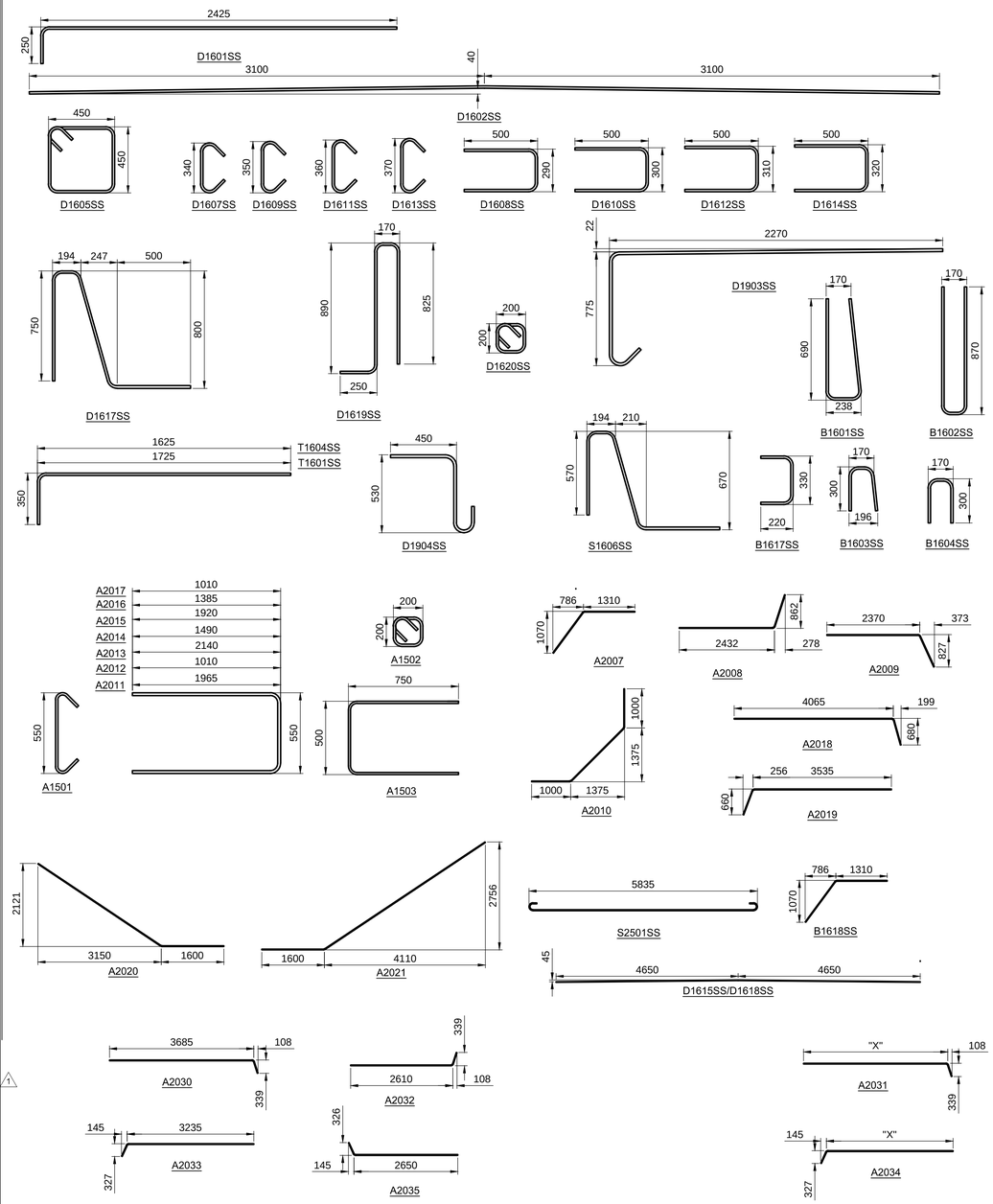
BILL OF REINFORCING STEEL (BLACK STEEL & STAINLESS STEEL)

FOR ABUTMENTS, WINGWALLS AND RETAINING WALLS (A), DECK SLAB (D), APPROACH SLABS (S), CONCRETE BARRIERS (B), REINFORCED CONCRETE CURBS (C), AND REINFORCED CONCRETE SIDEWALK (T)

MARK	TYPE	PIN DIAMETER	LENGTH (mm)	NO. BARS	MASS
A1501	BENT	-	870	189	258.16
A1502	BENT	-	1080	28	47.48
A1503	BENT	-	2000	62	194.68
A2001	STR	-	6875	14	226.67
A2002	STR	-	4320	10	101.74
A2003	STR	-	12000	60	1695.60
A2004	STR	-	5700	2	26.85
A2005	STR	-	3555	4	33.49
A2006	STR	-	3040	5	35.80
A2007	BENT	-	2640	10	62.17
A2008	BENT	-	3430	13	105.01
A2009	BENT	-	3270	13	100.11
A2010	BENT	-	3945	26	241.55
A2011	BENT	-	4480	308	3249.52
A2012	BENT	-	2570	68	411.56
A2013	BENT	-	4830	36	409.49
A2014	BENT	-	3530	26	216.14
A2015	BENT	-	4390	40	413.54
A2016	BENT	-	3320	12	93.82
A2017	BENT	-	2770	30	195.70
A2018	BENT	-	4775	4	44.98
A2019	BENT	-	4245	4	39.99
A2020	BENT	-	5400	4	50.87
A2021	BENT	-	6550	4	61.70
A2022	STR	-	3355	1	7.90
	STR	-	2905	1	6.84
	STR	-	2475	1	5.83
	STR	-	2055	1	4.84
	STR	-	4835	1	11.39
	STR	-	1175	1	2.77
	STR	-	740	1	1.74
	STR	-	305	1	0.72
A2023	STR	-	2775	1	6.54
	STR	-	2360	1	5.56
	STR	-	1955	1	4.60
	STR	-	1540	1	3.63
	STR	-	1125	1	2.65
	STR	-	710	1	1.67
	STR	-	275	1	0.65
A2024	STR	-	3795	2	17.87
	STR	-	3425	2	16.13
	STR	-	3050	2	14.37
	STR	-	2670	2	12.58
	STR	-	2295	2	10.81
	STR	-	1920	2	9.04
A2025	STR	-	5325	2	25.08
	STR	-	4935	2	23.24
	STR	-	4545	2	21.41
	STR	-	4160	2	19.59
	STR	-	3795	2	17.87
	STR	-	3425	2	16.13
	STR	-	3050	2	14.37
	STR	-	2670	2	12.58
	STR	-	2295	2	10.81
	STR	-	1920	2	9.04
A2026	STR	-	3650	6	51.57
A2027	STR	-	3160	6	44.65
A2028	STR	-	3900	4	36.74
A2029	STR	-	505	4	4.76
A2030	BENT	-	4035	4	38.01
A2031	BENT	-	3600	1	8.48
	BENT	-	3165	1	7.45
	BENT	-	2730	1	6.43
	BENT	-	2295	1	5.40
	BENT	-	1860	1	4.38
	BENT	-	1425	1	3.36
	BENT	-	990	1	2.33
	BENT	-	555	1	1.31
A2032	BENT	-	2960	13	90.62
A2033	BENT	-	3585	5	42.21
A2034	BENT	-	3170	1	7.47
	BENT	-	2755	1	6.49
	BENT	-	2340	1	5.51
	BENT	-	1925	1	4.53
	BENT	-	1510	1	3.56
	BENT	-	1095	1	2.58
	BENT	-	680	1	1.60
A2035	BENT	-	3000	13	91.85
TOTAL REINFORCING STEEL MASS - BLACK STEEL (kg):					9106.13

MARK	TYPE	PIN DIAMETER	LENGTH (mm)	NO. BARS	MASS
D1601SS	BENT	-	2675	90	379.18
D1602SS	BENT	-	6200	45	439.43
D1603SS	STR	-	6000	18	170.10
D1604SS	STR	-	7825	18	221.84
D1605SS	BENT	-	2080	90	294.84
D1606SS	STR	-	1750	90	248.06
D1607SS	BENT	-	620	376	367.16
D1608SS	BENT	-	1290	48	97.52
D1609SS	BENT	-	630	40	39.69
D1610SS	BENT	-	1300	32	65.52
D1611SS	BENT	-	640	40	40.32
D1612SS	BENT	-	1310	32	66.02
D1613SS	BENT	-	650	16	16.38
D1614SS	BENT	-	1320	24	49.90
D1615SS	BENT	-	9300	4	58.59
D1616SS	STR	-	9300	4	58.59
D1617SS	BENT	-	2280	52	186.73
D1618SS	STR	-	9300	4	58.59
D1619SS	BENT	-	2135	52	174.86
D1620SS	BENT	-	1080	28	47.63
D1901SS	STR	-	6000	70	944.16
D1902SS	STR	-	7970	70	1254.16
D1903SS	BENT	-	3275	174	1281.02
D1904SS	BENT	-	1180	88	233.43
D2901SS	STR	-	9300	89	4226.24
T1601SS	BENT	-	2075	104	339.89
T1602SS	STR	-	9300	9	131.83
T1603SS	STR	-	5835	18	165.42
T1604SS	BENT	-	1975	84	261.29
B1601SS	BENT	-	1620	100	255.15
B1602SS	BENT	-	1910	52	156.43
B1603SS	BENT	-	770	40	48.51
B1604SS	BENT	-	770	52	63.06
B1605SS	STR	-	600	23	21.74
B1606SS	STR	-	3425	24	129.47
B1607SS	STR	-	3430	12	64.83
B1608SS	STR	-	4600	24	173.88
B1609SS	STR	-	5040	12	95.26
B1610SS	STR	-	4640	16	116.93
B1611SS	STR	-	5000	16	126.00
B1612SS	STR	-	6450	8	81.27
B1613SS	STR	-	2300	72	260.82
B1614SS	STR	-	2750	88	381.15
B1615SS	STR	-	550	8	6.93
B1616SS	STR	-	5000	8	63.00
B1617SS	BENT	-	770	79	95.81
B1618SS	BENT	-	2640	8	33.26
B1619SS	STR	-	3650	8	45.99
C1601SS	STR	-	1500	2	4.73
S1601SS	STR	-	6000	42	396.90
S1602SS	STR	-	7425	42	491.16
S1603SS	STR	-	6000	80	756.00
S1604SS	STR	-	7425	80	935.55
S1605SS	STR	-	5835	88	808.73
S1606SS	BENT	-	1920	46	139.10
S1607SS	STR	-	5835	2	18.38
S1608SS	STR	-	450	10	7.09
S2501SS	BENT	-	6395	172	4440.46
TOTAL REINFORCING STEEL MASS - STAINLESS STEEL (kg):					22135.96

BENDING DIAGRAM (NTS)



BILL OF MATERIALS - BRIDGE ALUMINUM BARRIER RAIL

ITEM	NO.
SS ANCHOR BOLTS - STRAIGHT INCLUDING 2-SS WASHERS & 2-SS NUTS AS DETAILED	46
SS ANCHOR BOLTS - BENT INCLUDING 2-SS WASHERS & 2-SS NUTS AS DETAILED	46
TRAFFIC BARRIER RAIL POSTS	19
RAIL POST SHIMS	AS REQUIRED
RAIL CLAMP BARS	38
R1 RAIL END SECTION	4 (2 LEFT, 2 RIGHT)
R2 5460 RAIL	1
R3 3520 RAIL	1
R4 9385 RAIL	1
R5 3540 RAIL	1
R6 3115 RAIL	2
R7 10185 RAIL	1
END CAPS	8
SPLICE BARS	4
CAP SCREWS	92

NOTE: BRIDGE ALUMINUM BARRIER RAIL QUANTITIES SHOWN ARE TOTAL FOR BOTH SIDES OF BRIDGE. REFER TO SHEET 14 FOR RAIL LAYOUT.

BILL OF MISCELLANEOUS METAL

MARK	NO.	DESCRIPTION	SIZE	COMPONENT MASS (kg)	MASS PER UNIT (kg)	TOTAL MASS (kg)
B01	10	25Ø X 550 LONG PLAIN GALVANIZED BAR	AS DESCRIBED	2.19	2.19	21.90
B02	10	32Ø X 300 LONG GALVANIZED EXPANSION SLEEVE	AS DESCRIBED	0.09	0.09	0.90
B03	4	40Ø X 550 LONG PLAIN GALVANIZED BAR	AS DESCRIBED	5.43	543.00	2172.00
B04	4	HSS 76X51X4.8 X 300 LONG GALVANIZED	AS DESCRIBED	2.51	2.51	10.04
B05	14	51Ø X 450 LONG SS ANCHOR ROD	AS DESCRIBED	7.28	7.28	101.92

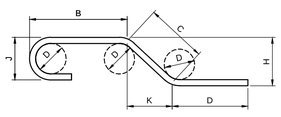
BEARING PAD SCHEDULE

MARK	NO.	DESCRIPTION	SIZE
X1	12	NATURAL RUBBER BEARING PAD 55 DURO HARDNESS	1940 X 200 X 30
X2	4	NATURAL RUBBER BEARING PAD 55 DURO HARDNESS	505 X 200 X 30

MARK	DIMENSION "X"						
A2031	3250	2815	2380	1945	1510	1075	640
A2034	2820	2405	1990	1575	1160	745	330

NOTES:

1. ALL DIMENSIONS GIVEN IN BENDING DIAGRAM ARE OUT-TO-OUT, EXCEPT RADII AND EXTENSIONS ON 90°, 135° & 180° HOOKS. EXTENSIONS ON 90°, 135° & 180° HOOKS ARE THE "A" OR "G" DIMENSIONS FOR THE STANDARD 90°, 135° & 180° HOOKS REFERENCED FROM THE RSIC "MANUAL OF STANDARD PRACTICE". RADII ARE INSIDE DIMENSIONS. ALL REINFORCING STEEL SHALL CONFORM TO THE LATEST EDITION OF CAN/CSA-S6 CLAUSE 8.14 "DETAILS OF REINFORCEMENT AND SPECIAL DETAILING PROVISIONS", UNLESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
2. ALL REINFORCING STEEL SHALL BE DEFORMED STEEL, UNLESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
3. ALL REINFORCING WITH SUFFIX "SS" SHALL BE STAINLESS STEEL CONFORMING TO THE REQUIREMENTS OF ASTM A955M, 300 SERIES, MINIMUM GRADE 420, OF ONE OF THE FOLLOWING UNS DESIGNATIONS: S31653, S31803, OR S32304.
4. ALL REINFORCING STEEL SHALL CONFORM TO THE LATEST EDITION OF CAN/CSA G30.18 "CARBON STEEL BARS FOR CONCRETE REINFORCEMENT" GRADE 400W, UNLESS NOTED OTHERWISE.
5. LIKE BARS SHALL BE BUNDLED, SECURELY TIED AND IDENTIFIED AS TO MARK AND SITE NO. BY APPROPRIATE MEANS. ALL OTHER ITEMS TO BE IDENTIFIED IN A SIMILAR FASHION.
6. UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME ALL HOOKS AND BENDS ON A BAR. WHERE SLOPE DIFFERS FROM 45° DIMENSIONS "H" AND "K" MUST BE SHOWN.



ENLARGED VIEW BAR BENDING DETAILS

BID OPPORTUNITY No. 775-2015

APEGM Certificate of Authorization MORRISON HERSHFIELD No. 1736

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPR. U/G STRUCTURES COMMITTEE — DATE

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.

BM ELEV

No.	REVISIONS	YY/MM/DD	BY
1	ISSUED FOR ADDENDUM 1	15/11/10	DAN
0	ISSUED FOR TENDER	15/10/22	DAN

MORRISON HERSHFIELD

DESIGNED BY	DAN	CHECKED BY	SAL
DRAWN BY	DML	APPROVED BY	BE
HOR. SCALE	AS SHOWN	ACCEPTED BY	DATE
VERT. SCALE	AS SHOWN	ORIGINAL DRAWING SIGNED BY: D.N. BURMEY, P.ENG.	15/10/22
DATE	15/04/24	D.N. BURMEY, P.ENG. BRIDGE PROJECTS ENGINEER	

PROFESSIONAL'S SEAL
PROVINCE OF MANITOBA
D.A. NEILSON
ORIGINAL SIGNED 15/10/22
37248
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING No.
W150005-DWG-BRIDGE.dwg

Winnipeg
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

SASKATCHEWAN AVENUE AT OMAND'S CREEK BRIDGE REPLACEMENT

BILL OF STEEL REINFORCEMENT & BILL OF MATERIALS

CITY DRAWING NUMBER B144-16-18
SHEET 18 OF 18
DRAWING No. 18
REV 1

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