

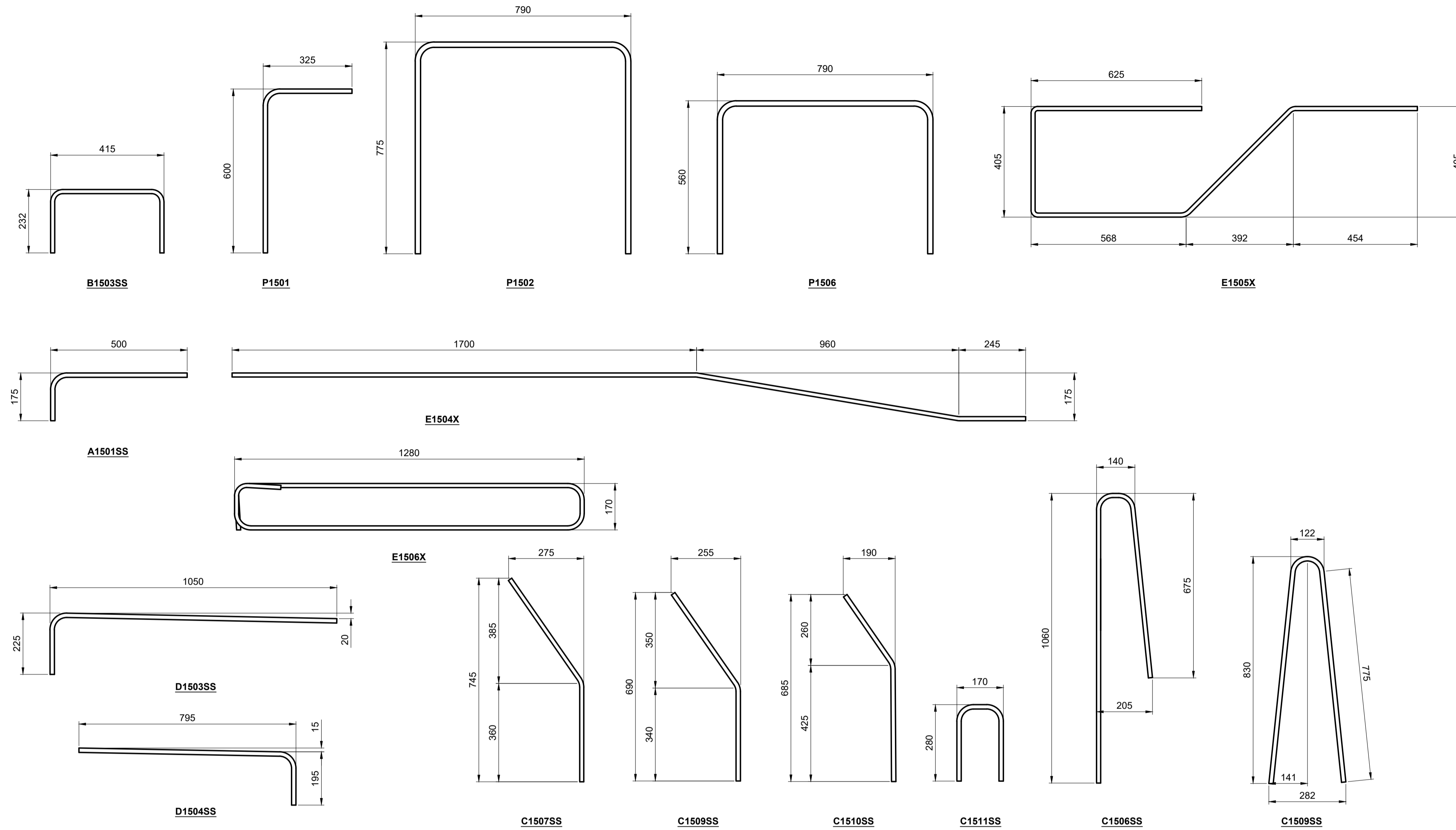
ISO A1 - 594mm x 841mm  
 Plotted: 10/05/2018 3:28 PM by Alex Heppner  
 Last Saved: 10/05/2018 2:21 PM by Alex Heppner  
 O:\Winipeg\Proj\W160034-DD\_Empress - Reinf - Overpass.dwg  
 Sheets\Detailed Design\Structural\W160034-DD\_Empress - Reinf - Overpass.dwg

**BILL OF REINFORCING STEEL (BLACK STEEL)**

APPROACH SLAB (A), ABUTMENT BACKWALL (B), BARRIER/MEDIAN/CURB (C), DECK (D), EXPANSION SLAB (E), PIER (P), ROADWAY SLAB (R)

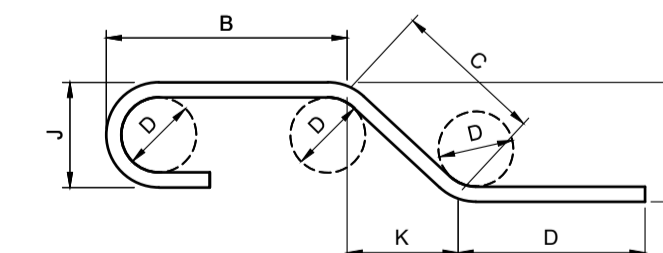
MARK	TYPE	PIN DIAMETER	LENGTH (mm)	NO. BARS	MASS
A1501SS	BENT	90	675	204	216.19
A1502SS	STR	-	4530	70	497.85
A150SS	STR	-	5120	60	482.30
B1501SS	STR	-	8150	6	76.77
B1502SS	STR	-	10275	6	96.79
B1503SS	BENT	90	879	246	339.49
C1501SS	STR	-	4250	72	480.42
C1502SS	STR	-	480	72	54.26
C1503SS	STR	-	4450	36	251.51
C1504SS	STR	-	5625	288	2543.40
C1505SS	STR	-	4780	36	270.17
C1506SS	BENT	90	1825	892	2555.80
C1507SS	BENT	90	825	892	1155.36
C1508SS	BENT	90	1735	446	1214.88
C1509SS	BENT	90	765	446	535.67
C1510SS	BENT	90	740	446	518.16
C1511SS	BENT	90	675	437	463.11
C1512SS	STR	-	4800	2	15.07
C1513SS	STR	-	5980	4	37.55
C1514SS	STR	-	12000	8	150.72
C1515SS	STR	-	4880	2	15.32
C250122	STR	-	530	117	243.39
D1501SS	STR	-	12000	52	979.68
D1502SS	STR	-	6200	26	253.08
D1503SS	BENT	90	1275	740	1481.30
D1504SS	BENT	90	990	740	1150.18
E1501X	STR	-	7370	66	763.68
E1502X	STR	-	5590	66	579.24
E1503X	STR	-	3835	82	493.72
E1504X	BENT	90	3845	82	495.01
E1505X	BENT	90	2642	82	340.13
E1506X	BENT	90	3240	82	417.12
P1501	BENT	90	925	220	319.50
P1502	BENT	90	2290	220	790.97
P1503	STR	-	4300	60	405.06
P1504	STR	-	1650	60	155.43
P1505	STR	-	1200	60	113.04
P1506	BENT	90	1910	20	59.97
R1501X	STR	-	7370	56	647.97
R1502X	STR	-	5590	56	491.47
R1503X	STR	-	3835	164	987.44
TOTAL REINFORCING STEEL MASS - PLAIN STEEL (kg):					1843.97
TOTAL REINFORCING STEEL MASS - CHROMX (kg):					5215.77
TOTAL REINFORCING STEEL MASS - STAINLESS STEEL (kg):					16078.44
TOTAL REINFORCING STEEL MASS (kg):					23138.17

**BENDING DIAGRAM (NTS)**



**NOTES:**

- 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.
- ALL REINFORCING STEEL SHALL BE DEFORMED STEEL, UNLESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
- 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.
- 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.
- 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.
- 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



**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.

NO.	REVISIONS	DATE	BY
C	ISSUED FOR ADDENDUM 1	18/10/05	BAP
B	ISSUED FOR TENDER	18/09/04	BAP
A	ISSUED FOR 95% DESIGN REVIEW	18/08/07	BAP

**MORRISON HERSHFIELD**

DESIGNED BY	AF	CHECKED BY	BAP
DRAWN BY	AH	APPROVED BY	BE
HOR SCALE	AS SHOWN	RELEASED FOR CONSTRUCTION	N/A
VERT SCALE	AS SHOWN	DATE	

PROFESSIONAL'S SEAL  
 PROVINCE OF MANITOBA  
**A. FATHI**  
 Member  
 41159  
 REGISTERED PROFESSIONAL ENGINEER

**THE CITY OF WINNIPEG**  
 PUBLIC WORKS DEPARTMENT  
 ENGINEERING DIVISION

**EMPRESS STREET PROJECT**  
 OVERPASS REHABILITATION WORKS  
 SUBSTRUCTURE AND SUPERSTRUCTURE  
 BILL OF REINFORCING

CITY DRAWING NUMBER: P-3494-116  
 SHEET 116 OF 169  
 DRAWING No. 116 REV C