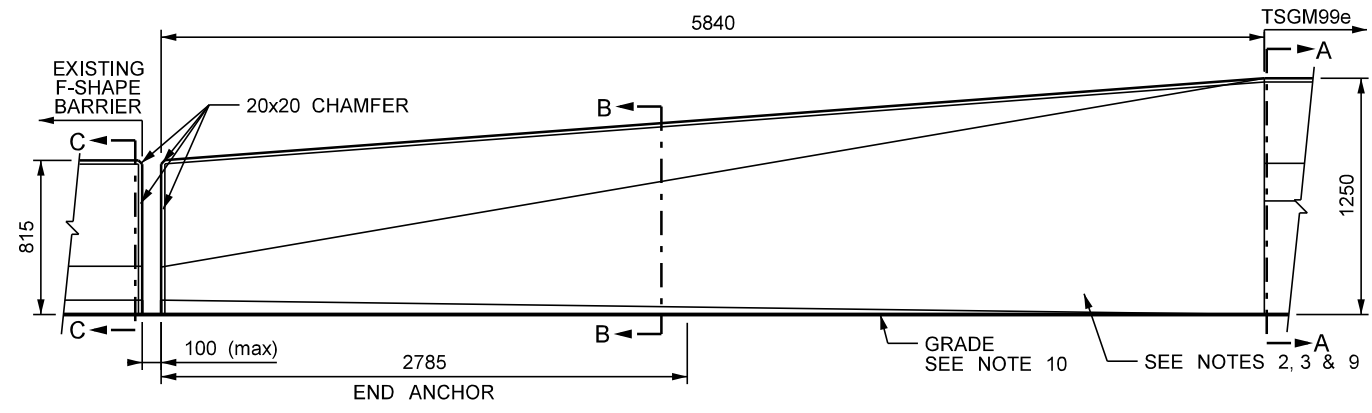
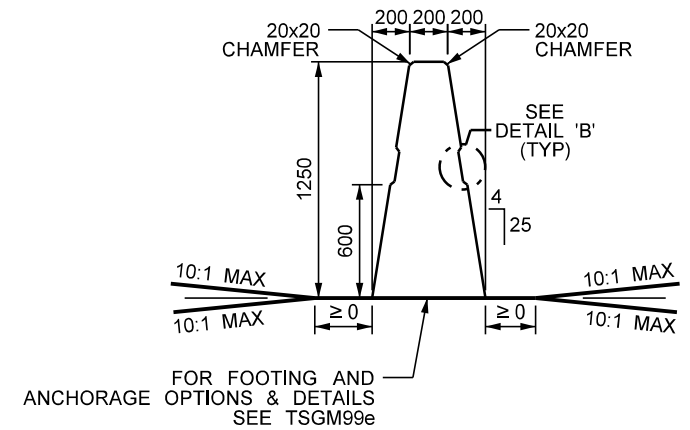


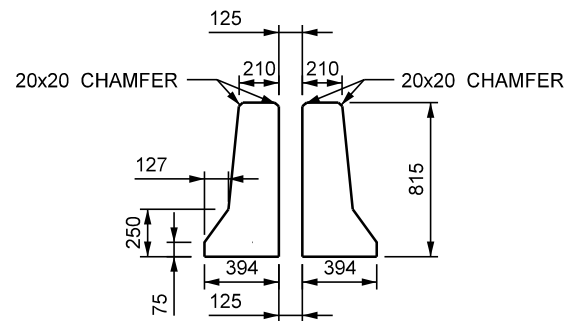
**SECTION 'B-B'**  
SCALE 1:40  
SEE NOTE 10



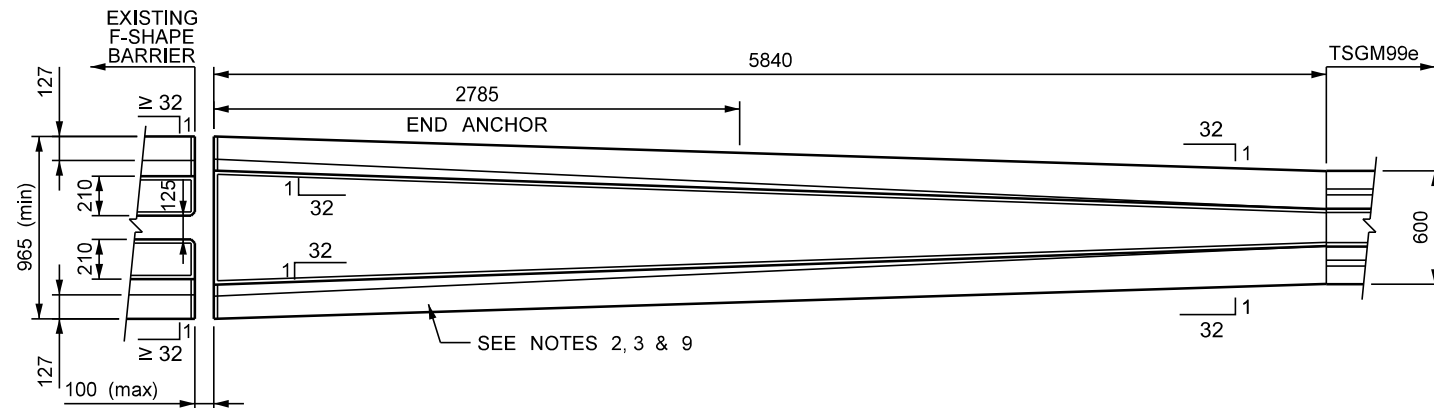
**ELEVATION**  
SCALE 1:40



**SECTION 'A-A'**  
SCALE 1:40



**SECTION 'C-C'**  
SCALE 1:40  
SEE NOTE 11



**PLAN**  
SCALE 1:40

**NOTES:**

1. ALL SCALES ARE APPROXIMATE.
2. LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY.
3. FORMED OR CUT CONTRACTION JOINTS SHALL BE CREATED AT EACH PLACE WHERE THE BARRIER SHAPE CHANGES, TO MATCH ADJACENT PAVEMENT JOINT SPACING, OR AT A MAXIMUM OF 6000 mm.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.
5. THE ORIGINAL SEALED AND SIGNED DRAWING IS IN TRAFFIC ENGINEERING.
6. ALL REINFORCING SHALL HAVE MINIMUM 75 mm COVER, UNLESS OTHERWISE NOTED.
7. CONCRETE: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH: BARRIER  $\geq 45$  MPa AND FOOTING  $\geq 35$  MPa @ 28 DAYS.
8. SEE SHEETS 4 & 5 FOR REINFORCING DETAILS.
9. TRANSVERSE REINFORCING NOT SHOWN FOR CLARITY.
10. SEE SHEET 3 FOR BELOW GRADE DESIGN OPTIONS.
11. DETAILS AND DIMENSIONS SHOWN FOR ILLUSTRATIVE PURPOSES, SEE ORIGINAL CONSTRUCTION DRAWINGS FOR SPECIFIC DETAILS.

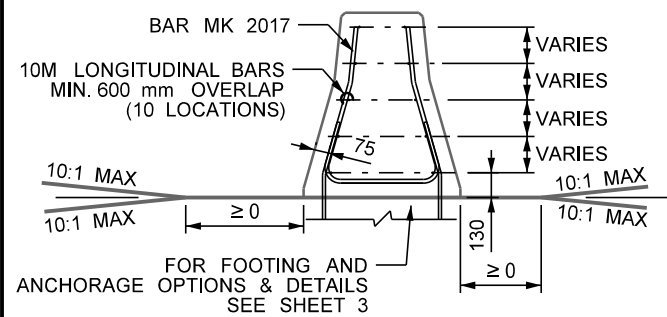
REVISIONS		
DATE	DESCRIPTION	BY



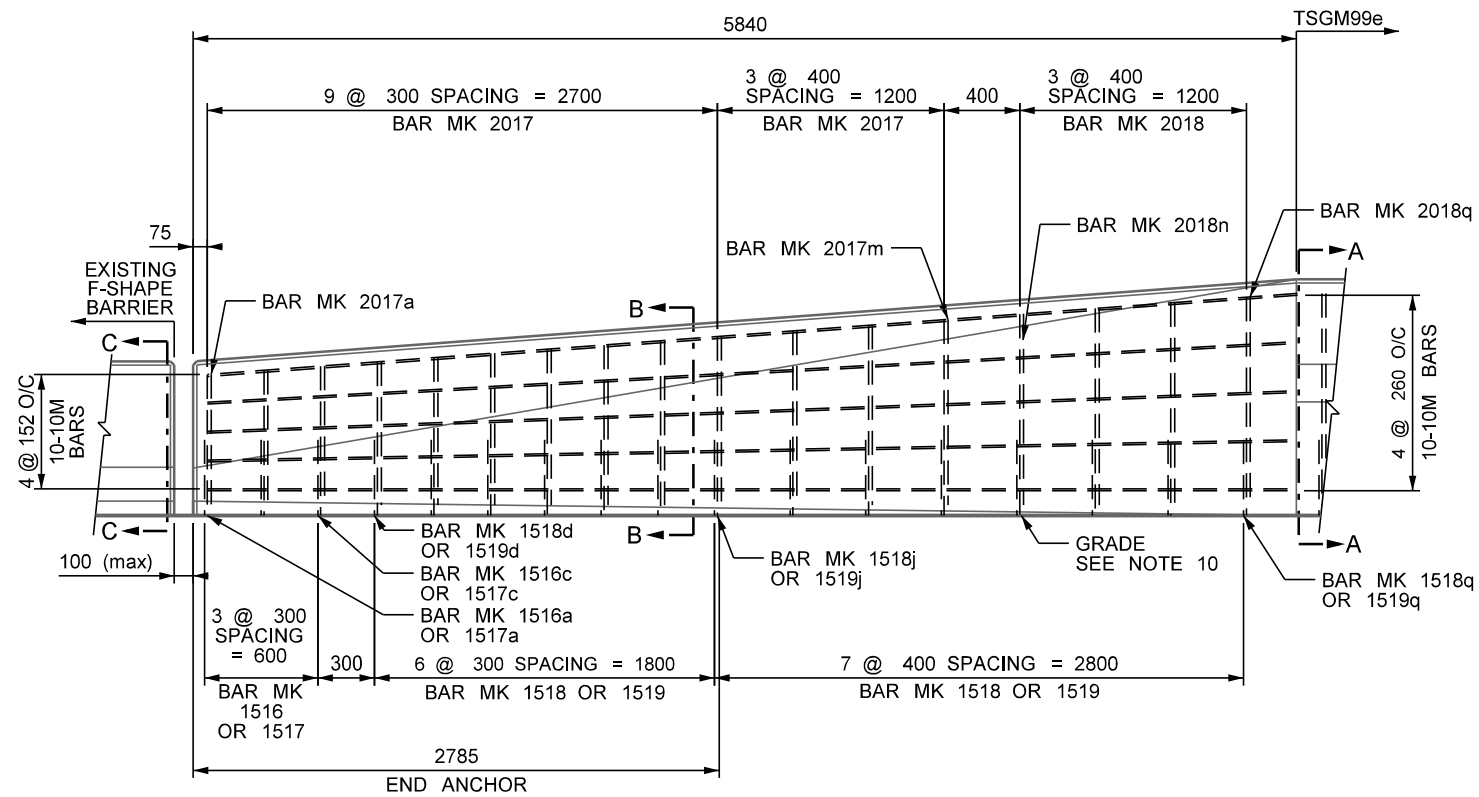
MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-5 TO DUAL TL-4 F-SHAPE VERTICAL BACK TRANSITION (1250 TO 815)

SHEET NO: 1 OF 5	DATE: 2020 - 08
DESIGNED BY:	H. LARSEN
DRAWN BY:	L. LIEBRECHT
REVIEWED BY:	N. JOYAL

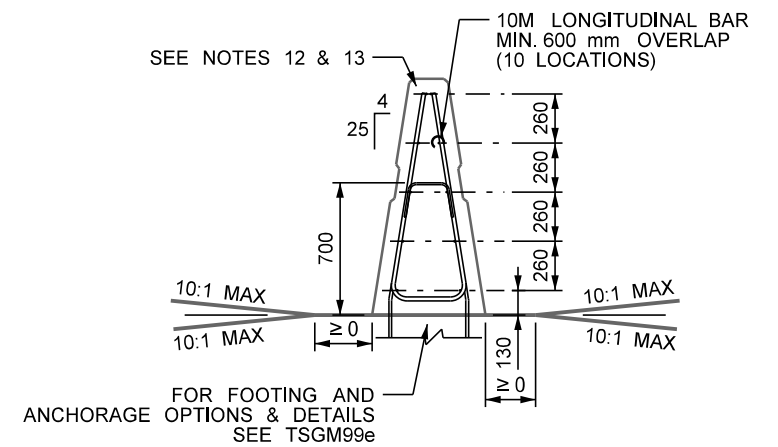
**TSTM96e**



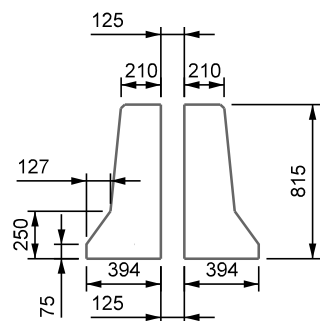
**SECTION 'B-B'**  
SCALE 1:40  
SEE NOTE 10



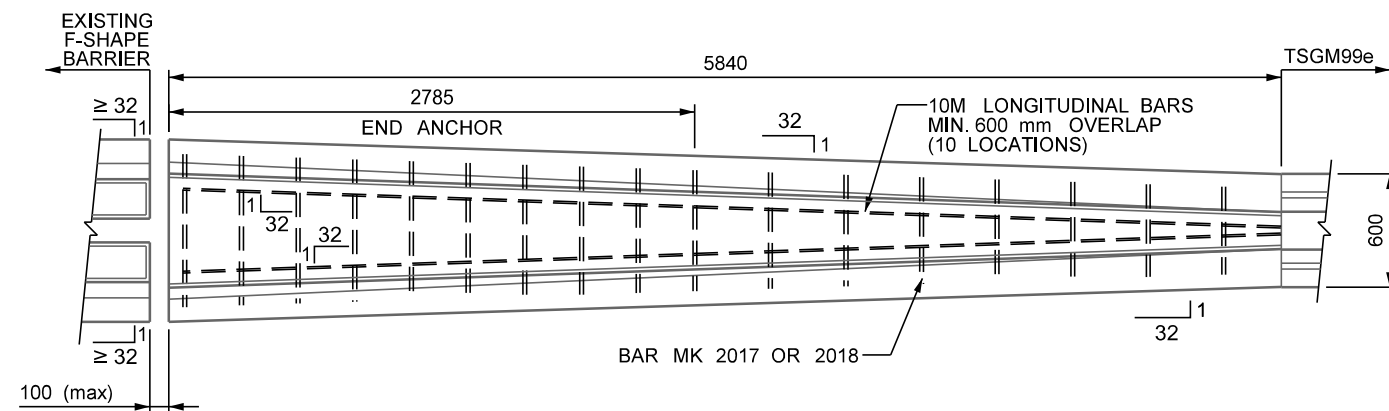
**ELEVATION**  
SCALE 1:40



**SECTION 'A-A'**  
SCALE 1:40



**SECTION 'C-C'**  
SCALE 1:40  
SEE NOTE 11



**PLAN**  
SCALE 1:40

**NOTES:**

- ALL SCALES ARE APPROXIMATE.
- LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY.
- FORMED OR CUT CONTRACTION JOINTS SHALL BE CREATED AT EACH PLACE WHERE THE BARRIER SHAPE CHANGES, TO MATCH ADJACENT PAVEMENT JOINT SPACING, OR AT A MAXIMUM OF 6000 mm.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.
- THE ORIGINAL SEALED AND SIGNED DRAWING IS IN TRAFFIC ENGINEERING.
- ALL REINFORCING SHALL HAVE MINIMUM 75 mm COVER, UNLESS OTHERWISE NOTED.
- CONCRETE: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH: BARRIER  $\geq 45$  MPa AND FOOTING  $\geq 35$  MPa @ 28 DAYS.
- SEE SHEETS 4 & 5 FOR REINFORCING DETAILS.
- TRANSVERSE REINFORCING NOT SHOWN FOR CLARITY.
- SEE SHEET 3 FOR BELOW GRADE DESIGN OPTIONS.
- DETAILS AND DIMENSIONS SHOWN FOR ILLUSTRATIVE PURPOSES, SEE ORIGINAL CONSTRUCTION DRAWINGS FOR SPECIFIC DETAILS.
- ALTERNATE LONGITUDINAL REINFORCEMENT OF TOP TWO BARS MAY BE ONE (1) SINGLE 15M BAR.
- LONGITUDINAL BARS SHALL BE SEPARATED FROM EACH OTHER A MINIMUM DISTANCE OF  $1\frac{1}{2}$  TIMES THE MAXIMUM AGGREGATE SIZE; ADJUST PLACEMENT AS REQUIRED.

REVISIONS		
DATE	DESCRIPTION	BY

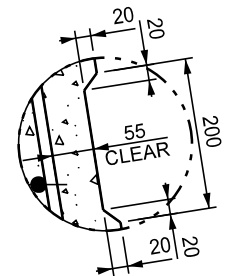
**Manitoba**  
Infrastructure  
Traffic Engineering



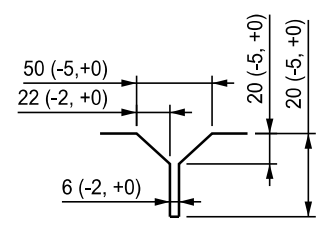
MANITOBA CONSTRAINED  
WIDTH CONSTANT SLOPE  
BARRIER - MEDIAN TL-5  
TO DUAL TL-4 F-SHAPE  
VERTICAL BACK TRANSITION  
(1250 TO 815)

SHEET NO: 2 OF 5	DATE: 2020 - 08
DESIGNED BY:	H. LARSEN
DRAWN BY:	L. LIEBRECHT
REVIEWED BY:	N. JOYAL

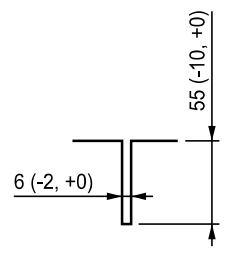
**TSTM96e**



**DETAIL 'B'**  
SCALE 1:10

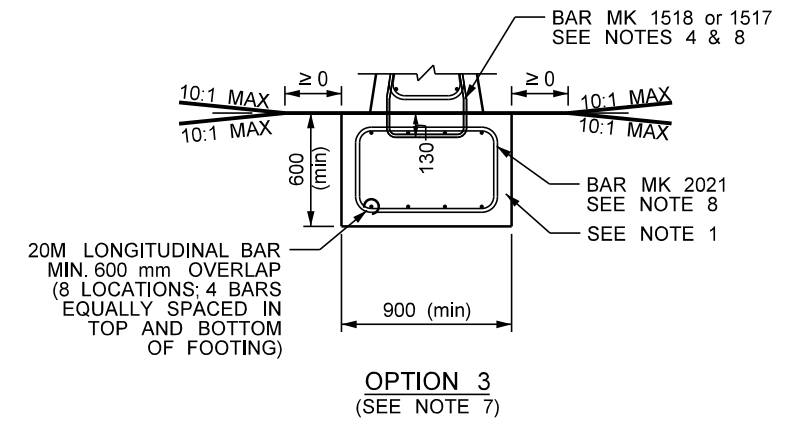
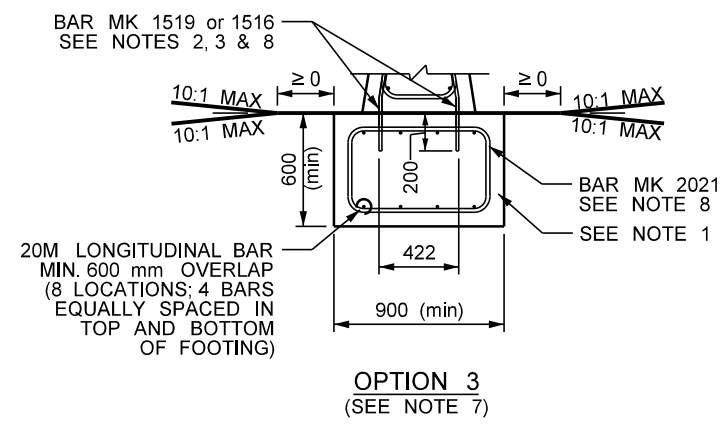
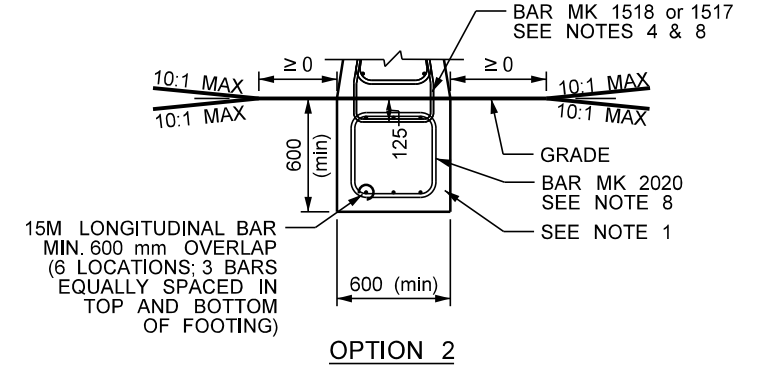
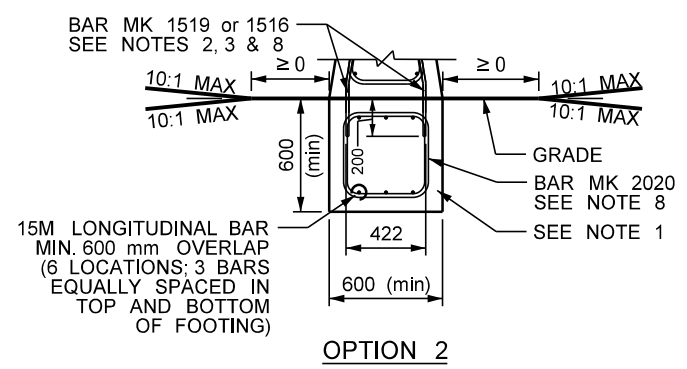
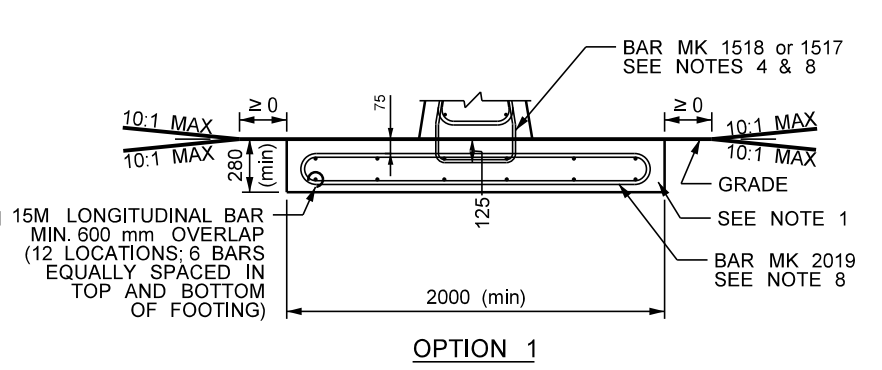
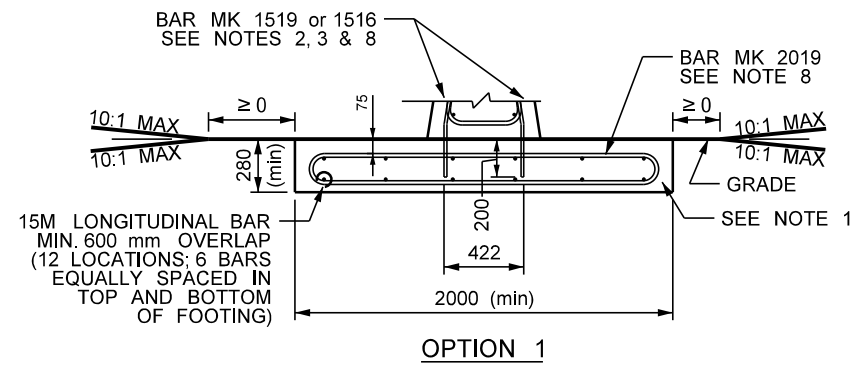


**HAND FORMED BARRIER**  
SCALE 1:5



**SLIP FORMED BARRIER (SAW CUT)**  
SCALE 1:5

**CONTRACTION JOINT DETAILS**



**SECTION 'B-B'**  
EXISTING FOOTING  
SCALE 1:40

**SECTION 'B-B'**  
NEW FOOTING  
SCALE 1:40

**NOTES:**

1. NEW OR EXISTING REINFORCED CONCRETE: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH: BARRIER  $\geq 45$  MPa AND FOOTING  $\geq 35$  MPa AT 28 DAYS.
2. HOLES IN FOOTING SHALL BE DRILLED VERTICALLY 2 mm LARGER THAN REINFORCING.
3. HOLES IN FOOTING SHALL BE PREPARED FOR EPOXY (HILTI HIT RE 500, OR APPROVED ALTERNATIVE) AS DIRECTED BY MANUFACTURER.
4. STIRRUP SHALL BE SECURELY ATTACHED TO REBAR.
5. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.
6. SEE SHEETS 4 & 5 FOR REINFORCEMENT DETAILS.
7. OPTION 3 MUST BE USED FOR END SECTION OF BARRIER.
8. SPACING TO MATCH BAR MK 2017 & 2018.
9. FOOTING TO MATCH BARRIER WIDTH.
10. ALL REINFORCING SHALL HAVE MINIMUM 75 mm COVER, UNLESS OTHERWISE NOTED.

REVISIONS		
DATE	DESCRIPTION	BY



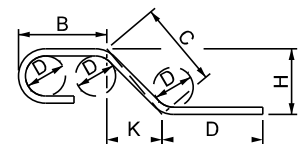
**MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-5 TO DUAL TL-4 F-SHAPE VERTICAL BACK TRANSITION (1250 TO 815)**

SHEET NO: 3 OF 5	DATE: 2020 - 08
DESIGNED BY: H. LARSEN	
DRAWN BY: L. LIEBRECHT	
REVIEWED BY: N. JOYAL	
<b>TSTM96e</b>	

MARK	TYPE	PIN DIAMETER (mm)	TOTAL LENGTH (mm)	MASS			BENDING DIAGRAM						
				kg	kg/m								
					INTERIOR SEC.	END SEC.	DIMENSION						
1516a	BENT	65	632	0.99	---	0.34	173	163	115	17			
1516b	BENT	65	634	1.00	---	0.34	198	110	118	11			
1516c	BENT	65	631	0.99	---	0.34	245	56	122	6			
1517a	BENT	65	1838	2.89	---	0.49	173	163	115	17	497		
1517b	BENT	65	1815	2.85	---	0.49	198	110	118	11	483		
1517c	BENT	65	1789	2.81	---	0.48	245	56	122	6	468		
1518d	BENT	65	1792	2.81	---	0.48	340	137	453				
1518e	BENT	65	1763	2.77	---	0.47	335	121	469				
1518f	BENT	65	1737	2.73	---	0.47	324	106	480				
1518g	BENT	65	1712	2.69	---	0.46	330	99	476				
1518h	BENT	65	1690	2.65	---	0.45	328	91	473				
1518i	BENT	65	1667	2.62	---	0.45	327	85	467				
1518j	BENT	65	1647	2.59	---	0.44	326	79	460				
1518k	BENT	65	1619	2.54	0.43	---	325	73	446				
1518l	BENT	65	1591	2.50	0.43	---	323	68	432				
1518m	BENT	65	1564	2.46	0.42	---	324	64	414				
1518n	BENT	65	1538	2.41	0.41	---	323	61	396				
1518o	BENT	65	1511	2.37	0.41	---	323	58	376				
1518p	BENT	65	1484	2.33	0.40	---	323	55	355				
1518q	BENT	65	1458	2.29	0.39	---	322	53	335				
1519d	BENT	65	628	0.99	---	0.34	340	137					
1519e	BENT	65	622	0.98	---	0.33	335	121					
1519f	BENT	65	618	0.97	---	0.33	324	106					
1519g	BENT	65	615	0.97	---	0.33	330	99					
1519h	BENT	65	613	0.96	---	0.33	328	91					
1519i	BENT	65	611	0.96	---	0.33	327	85					
1519j	BENT	65	610	0.96	---	0.33	326	79					
1519k	BENT	65	608	0.95	0.33	---	325	73					
1519l	BENT	65	607	0.95	0.33	---	323	68					
1519m	BENT	65	606	0.95	0.33	---	324	64					
1519n	BENT	65	606	0.95	0.33	---	323	61					
1519o	BENT	65	605	0.95	0.33	---	323	58					
1519p	BENT	65	605	0.95	0.33	---	323	55					
1519q	BENT	65	604	0.95	0.33	---	322	53					
2017a	BENT	125	1913	4.51	---	0.77	165	506	671	108	53	425	
2017b	BENT	125	1995	4.70	---	0.80	220	473	693	128	50	406	
2018c	BENT	125	2050	4.83	---	0.83	274	441	715	133	46	388	
2017d	BENT	125	2095	4.93	---	0.84	327	411	738	137	43	369	
2017e	BENT	125	2132	5.02	---	0.86	381	379	760	141	40	350	
2017f	BENT	125	2167	5.10	---	0.87	432	350	782	144	37	333	
2017g	BENT	125	2197	5.17	---	0.89	484	321	805	148	34	313	
2017h	BENT	125	2225	5.24	---	0.90	537	290	827	151	31	294	
2017i	BENT	125	2255	5.31	---	0.91	587	262	849	154	28	275	
2017j	BENT	125	2283	5.38	---	0.93	640	232	872	157	25	256	
2017k	BENT	125	2317	5.46	0.93	---	708	193	901	161	20	231	
2017l	BENT	125	2354	5.54	0.95	---	777	154	931	165	16	206	
2017m	BENT	125	2390	5.63	0.96	---	847	114	961	169	12	181	
2018n	BENT	125	2427	5.72	0.98	---	1009	992	187	144			
2018o	BENT	125	2461	5.80	0.99	---	1037	1021	183	127			
2018p	BENT	125	2494	5.87	1.00	---	1065	1050	179	108			
2018q	BENT	125	2528	5.95	1.02	---	1094	1080	177	87			

**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 BENDS AND HOOKS SHALL CONFORM TO CLAUSE 6.6.2 OF CSA A23.1 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 STEEL SHALL CONFORM TO CSA G30.18-M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT" GRADE 400W, UNLESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
- LIKE BARS SHALL BE BUNDLED, SECURELY TIED, AND IDENTIFIED AS TO MARK No. BY APPROPRIATE MEANS. ALL OTHER ITEMS TO BE IDENTIFIED IN A SIMILAR FASHION.
- BARS MARKED WITH THE SUFFIX "P" SHALL BE PLAIN UNDEFORMED BARS IN ACCORDANCE WITH CAN/CSA G40.21-M92 GRADE 300W.
- ALL BARS SHALL BE BENT IN ACCORDANCE WITH THE FOLLOWING DETAIL:



REVISIONS		
DATE	DESCRIPTION	BY

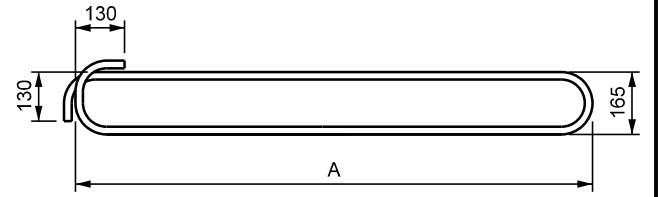


MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-5 TO DUAL TL-4 F-SHAPE VERTICAL BACK TRANSITION (1250 TO 815)

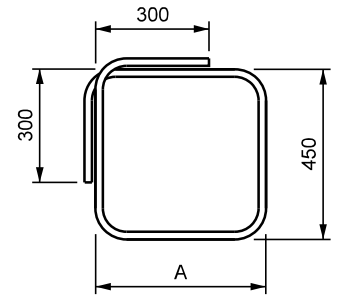
SHEET NO: 4 OF 5	DATE: 2020 - 08
DESIGNED BY: H. LARSEN	
DRAWN BY: L. LIEBRECHT	
REVIEWED BY: N. JOYAL	

TSTM96e

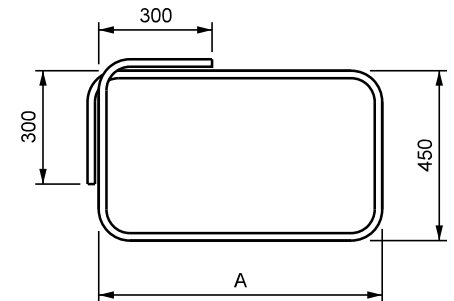
MARK	TYPE	PIN DIAMETER (mm)	TOTAL LENGTH (mm)	MASS			BENDING DIAGRAM
				kg	kg/m		
					INTERIOR SEC.	END SEC.	
							DIMENSION A
2019a	BENT	125	4893	11.52	---	1.97	2210
2019b	BENT	125	4857	11.44	---	1.96	2192
2019c	BENT	125	4819	11.35	---	1.94	2173
2019d	BENT	125	4781	11.26	---	1.93	2154
2019e	BENT	125	4743	11.17	---	1.91	2135
2019f	BENT	125	4705	11.08	---	1.90	2116
2019g	BENT	125	4667	10.99	---	1.88	2097
2019h	BENT	125	4631	10.91	---	1.87	2079
2019i	BENT	125	4593	10.82	---	1.85	2060
2019j	BENT	125	4557	10.73	---	1.84	2042
2019k	BENT	125	4507	10.61	1.82	---	2017
2019l	BENT	125	4457	10.50	1.80	---	1992
2019m	BENT	125	4407	10.38	1.78	---	1967
2019n	BENT	125	4357	10.26	1.76	---	1942
2019o	BENT	125	4307	10.14	1.74	---	1917
2019p	BENT	125	4255	10.02	1.72	---	1891
2019q	BENT	125	4207	9.91	1.70	---	1867



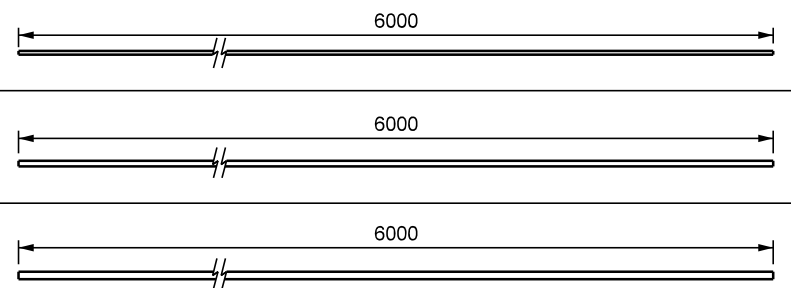
MARK	TYPE	PIN DIAMETER (mm)	TOTAL LENGTH (mm)	kg	INTERIOR SEC.	END SEC.	DIMENSION
							A
2020a	BENT	125	3003	7.07	---	1.21	810
2020b	BENT	125	2967	6.99	---	1.20	792
2020c	BENT	125	2929	6.90	---	1.18	773
2020d	BENT	125	2891	6.81	---	1.17	754
2020e	BENT	125	2853	6.72	---	1.15	735
2020f	BENT	125	2815	6.63	---	1.14	716
2020g	BENT	125	2777	6.54	---	1.12	697
2020h	BENT	125	2741	6.46	---	1.11	679
2020i	BENT	125	2703	6.37	---	1.09	660
2020j	BENT	125	2667	6.28	---	1.08	642
2020k	BENT	125	2617	6.16	1.05	---	617
2020l	BENT	125	2567	6.05	1.04	---	592
2020m	BENT	125	2517	5.93	1.02	---	567
2020n	BENT	125	2467	5.81	0.99	---	542
2020o	BENT	125	2417	5.69	0.97	---	517
2020p	BENT	125	2365	5.57	0.95	---	491
2020q	BENT	125	2317	5.46	0.93	---	467



MARK	TYPE	PIN DIAMETER (mm)	TOTAL LENGTH (mm)	kg	INTERIOR SEC.	END SEC.	DIMENSION
							A
2021a	BENT	125	3603	8.49	---	1.45	1110
2021b	BENT	125	3567	8.40	---	1.44	1092
2021c	BENT	125	3529	8.31	---	1.42	1073
2021d	BENT	125	3491	8.22	---	1.41	1054
2021e	BENT	125	3453	8.13	---	1.39	1035
2021f	BENT	125	3415	8.04	---	1.38	1016
2021g	BENT	125	3377	7.95	---	1.36	997
2021h	BENT	125	3341	7.87	---	1.35	979
2021i	BENT	125	3303	7.78	---	1.33	960
2021j	BENT	125	3267	7.69	---	1.32	942
2021k	BENT	125	3217	7.58	1.30	---	917
2021l	BENT	125	3167	7.46	1.28	---	892
2021m	BENT	125	3117	7.34	1.26	---	867
2021n	BENT	125	3067	7.22	1.24	---	842
2021o	BENT	125	3017	7.11	1.22	---	817
2021p	BENT	125	2965	6.98	1.20	---	791
2021q	BENT	125	2917	6.87	1.18	---	767

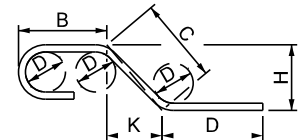


LONGITUDINAL REINFORCING - MASS (kg/m)					
BAR	INTERIOR SECTION	END SECTION	FOOTING		
			OPTION 1	OPTION 2	OPTION 3
10M	8.24	8.24	---	---	---
15M	---	---	19.78	9.89	---
20M	---	---	---	---	19.78



**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 BENDS AND HOOKS SHALL CONFORM TO CLAUSE 6.6.2 OF CSA A23.1 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 STEEL SHALL CONFORM TO CSA G30.18-M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT" GRADE 400W, UNLESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
- LIKE BARS SHALL BE BUNDLED, SECURELY TIED, AND IDENTIFIED AS TO MARK No. BY APPROPRIATE MEANS. ALL OTHER ITEMS TO BE IDENTIFIED IN A SIMILAR FASHION.
- BARS MARKED WITH THE SUFFIX "P" SHALL BE PLAIN UNDEFORMED BARS IN ACCORDANCE WITH CAN/CSA G40.21-M92 GRADE 300W.
- ALL BARS SHALL BE BENT IN ACCORDANCE WITH THE FOLLOWING DETAIL:



REVISIONS		
DATE	DESCRIPTION	BY



MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-5 TO DUAL TL-4 F-SHAPE VERTICAL BACK TRANSITION (1250 TO 815)

SHEET NO: 5 OF 5	DATE: 2020 - 08
DESIGNED BY: H. LARSEN	
DRAWN BY: L. LIEBRECHT	
REVIEWED BY: N. JOYAL	

TSTM96e