

- NOTES:

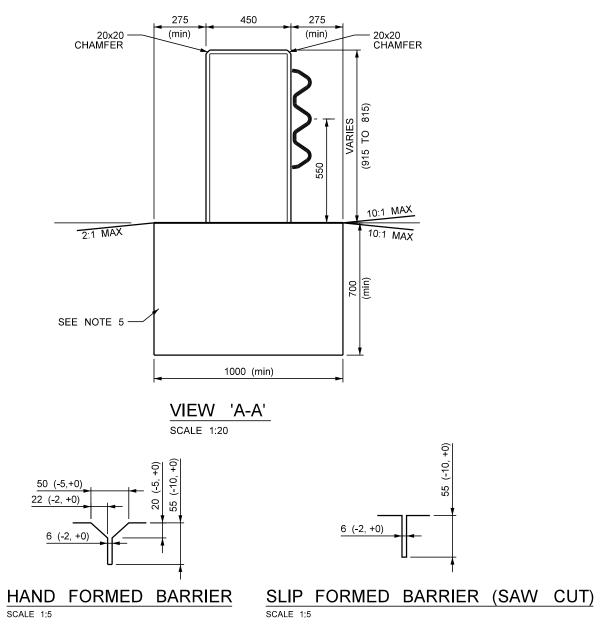
 1. ALL SCALES ARE APPROXIMATE.
 - LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY.
 - FORMED OR CUT CONTRACTION JOINTS SHALL BE CREATED AT EACH PLACE WHERE THE BARRIER SHAPE CHANGES, TO MATCH ADJACENT PAVEMENT JOINT SPACING, OR AT A MAXIMUM SPACING OF 8000 mm.
 - 4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS 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.
 - CONCRETE: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH: BARRIER ≥ 45 MPa AND FOOTING ≥ 35 MPa, @ 28 DAYS.
 - 3. SEE SHEETS 7 & 8 FOR REINFORCING DETAILS.
 - 9. TRANSVERSE REINFORCING NOT SHOWN FOR CLARITY.
 - 10. SEE SECTIONS 'A-A', 'B-B', AND 'C-C' FOR BELOW GRADE DESIGN OPTIONS.
 - 11. BLOCKOUT TO BE NAILED TO POST TO PREVENT ROTATION USING 90 mm LONG GALVANIZED NAIL.
 - 12. CUT / GRIND BOLT AS NECESSARY TO FACILITATE ASSEMBLY.
 - 13. HOLES FOR THREADED ROD ANCHORS SHALL BE CORDED AT 2 mm LARGER THAN ANCHOR DIAMETER.
 - 14. STEEL (REBAR) LOCATOR TO BE USED PRIOR TO DRILLING HOLES.

		REVISIONS	
Manilaha	BY	DESCRIPTION	DATE
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Infrastructure			
Traffic Engineering			



MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - ROADSIDE NESTED THRIE BEAM TO TL-4

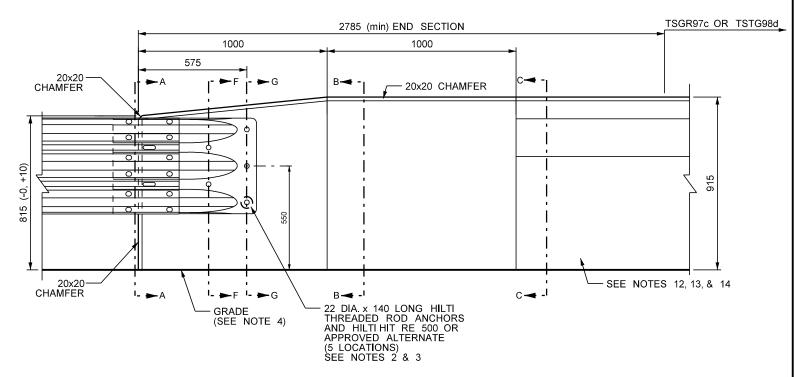
)	SHEET NO: 1 OF 8	DATE: 2020 - 08					
Ē	DESIGNED BY:	H. LARSEN					
	DRAWN BY:	L. LIEBRECHT					
	REVIEWED BY:	N. JOYAL					
	TSTB99c						



CONTRACTION JOINT DETAILS

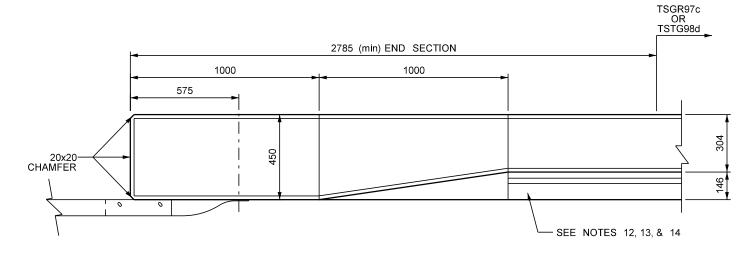
NOTES:

- ALL SCALES ARE APPROXIMATE.
- 2. HOLES FOR THREADED ROADS SHALL BE DRILLED HORIZONTAL AT 2 mm LARGER THAN DIAMETER OF THREADED ROD.
- STEEL (REBAR) LOCATER TO BE USED PRIOR TO DRILLING HOLES.
- SEE SECTIONS 'A-A', 'B-B' & 'C-C' FOR BELOW GRADE DESIGN OPTIONS.
- 5. NEW OR EXISTING REINFORCED CONCRETE FOOTING: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH ≥ 35 MPa, AT 28 DAYS.
- 6. HOLES IN FOOTING SHALL BE DRILLED VERTICALLY 2 mm LARGER THAN REINFORCING.
- . HOLES IN FOOTING SHALL BE PREPARED FOR EPOXY (HILTI HIT RE 500, OR APPROVED ALTERNATIVE) AS DIRECTED BY MANUFACTURER.
- 3. STIRRUP SHALL BE SECURELY ATTACHED TO REBAR.
- 9. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.
- 0. SEE SHEETS 7 & 8 FOR REINFORCING DETAILS.
- 11. ALL REINFORCING SHALL HAVE MINIMUM 75 mm COVER, UNLESS OTHERWISE INDICATED.
- 12. LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY.
- 13. 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 SPACING OF 6000 mm.
- 14. TRANSVERSE REINFORCING NOT SHOWN FOR CLARITY.



DETAIL 'H' - ELEVATION VIEW

SCALE 1:20



DETAIL 'H' - PLAN VIEW

SCALE 1:20

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DESCRIPTION	BY	Manilaha	
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MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - ROADSIDE NESTED THRIE BEAM TO TL-4

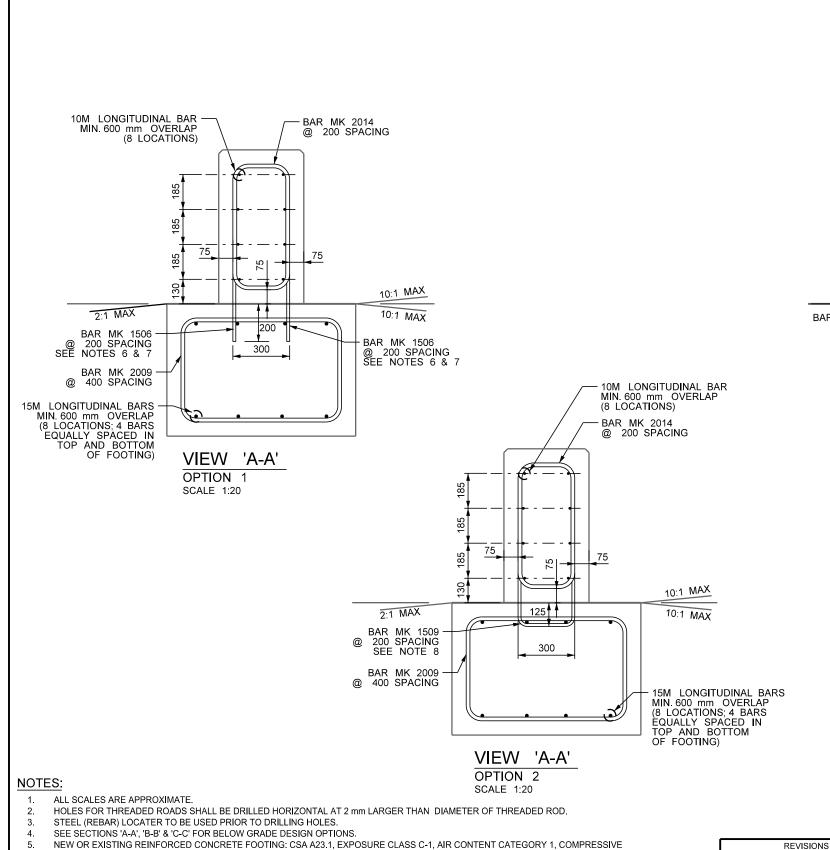
SHEET NO: 2 OF 8 DATE: 2020 - 08

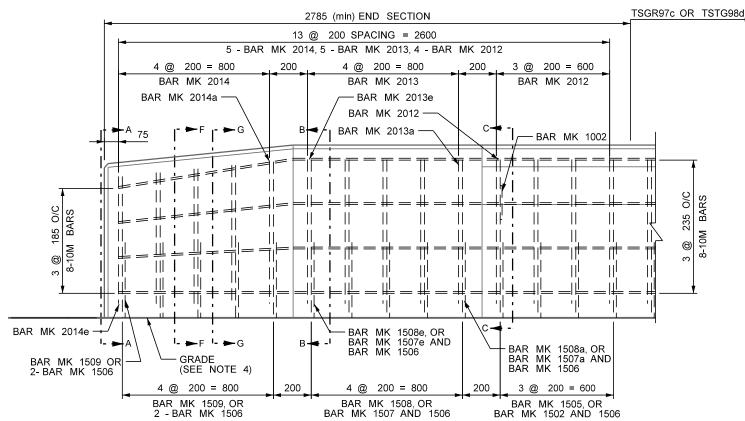
DESIGNED BY: H. LARSEN

DRAWN BY: L. LIEBRECHT

REVIEWED BY: N. JOYAL

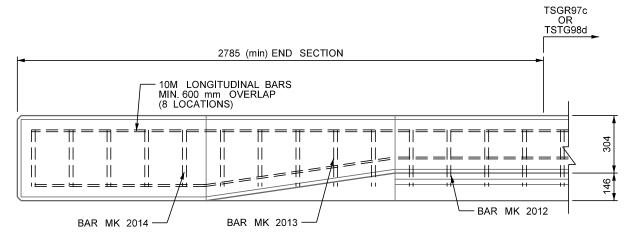
TSTB99c





DETAIL 'H' - ELEVATION VIEW

SCALE 1:20



DETAIL 'H' - PLAN VIEW

SCALE 1:20

- STRENGTH ≥ 35 MPa, AT 28 DAYS.
- HOLES IN FOOTING SHALL BE DRILLED VERTICALLY 2 mm LARGER THAN REINFORCING.
- HOLES IN FOOTING SHALL BE PREPARED FOR EPOXY (HILTI HIT RE 500, OR APPROVED ALTERNATIVE) AS DIRECTED BY MANUFACTURER.
- STIRRUP SHALL BE SECURELY ATTACHED TO REBAR.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.
- SEE SHEETS 7 & 8 FOR REINFORCING DETAILS.
- ALL REINFORCING SHALL HAVE MINIMUM 75 mm COVER, UNLESS OTHERWISE INDICATED.

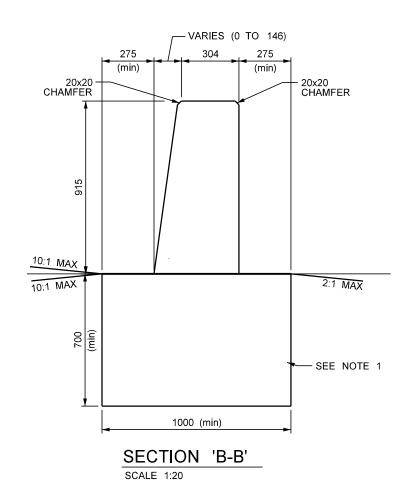
REVISIONS			
DATE	DESCRIPTION	BY	
	DATE	1	

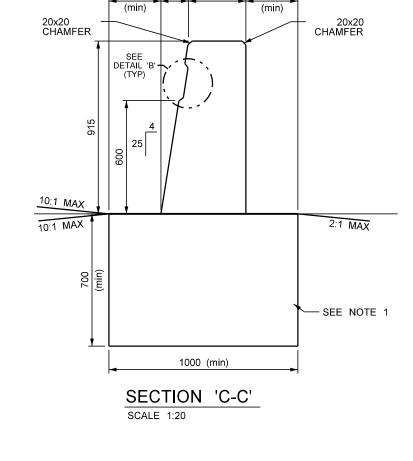




MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - ROADSIDE **NESTED THRIE BEAM** TO TL-4

SHEET NO: 3 OF 8 DATE: 2020 - 08 DESIGNED BY: H. LARSEN DRAWN BY: L. LIEBRECHT REVIEWED BY: N. JOYAL TSTB99c

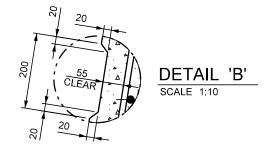




304

275

275



NOTES:

- NEW OR EXISTING REINFORCED CONCRETE FOOTING: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH ≥ 35 MPa, AT 28 DAYS.
- HOLES IN FOOTING SHALL BE DRILLED VERTICALLY 2 mm LARGER THAN REINFORCING.
 HOLES IN FOOTING SHALL BE PREPARED FOR EPOXY (HILTI HIT RE 500, OR APPROVED ALTERNATIVE) AS DIRECTED BY MANUFACTURER.
- STIRRUP SHALL BE SECURELY ATTACHED TO REBAR.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.
- SEE SHEETS 7 & 8 FOR REINFORCING DETAILS.
- ALL REINFORCING SHALL HAVE 75 mm COVER, UNLESS OTHERWISE INDICATED.

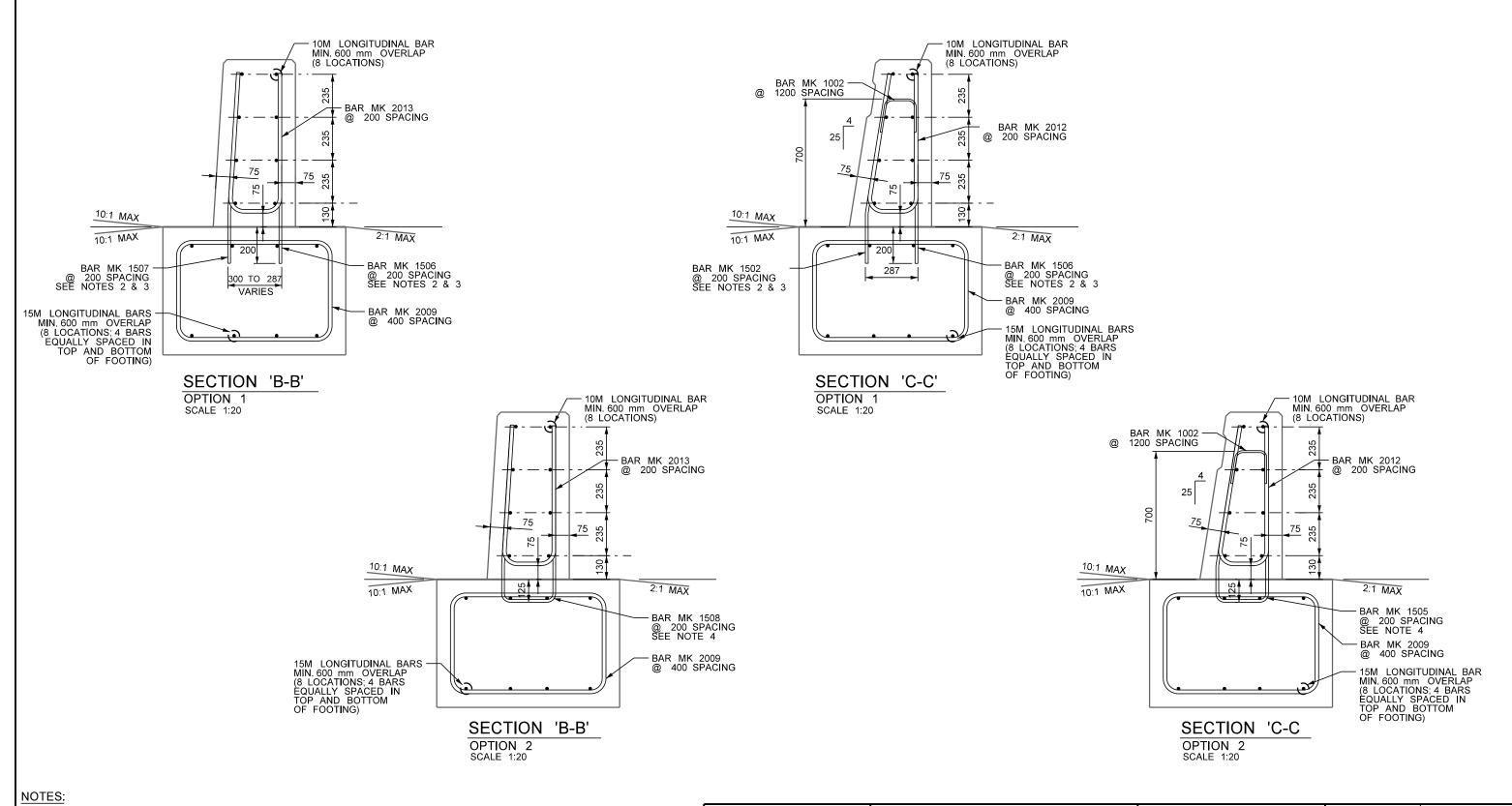
REVISIONS			
DATE	DESCRIPTION	BY	





MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - ROADSIDE NESTED THRIE BEAM TO TL-4

J	SHEET NO: 4 OF 8	DATE: 2020 - 08					
F	DESIGNED BY:	H. LARSEN					
	DRAWN BY:	L. LIEBRECHT					
	REVIEWED BY:	N. JOYAL					
	TSTB99c						



- NEW OR EXISTING REINFORCED CONCRETE FOOTING: CSA A23.1, EXPOSURE CLASS C-1, AIR CONTENT CATEGORY 1, COMPRESSIVE STRENGTH ≥ 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.
- SEE SHEETS 5 & 6 FOR REINFORCING DETAILS.
- 7. ALL REINFORCING SHALL HAVE 75 mm COVER, UNLESS OTHERWISE INDICATED.

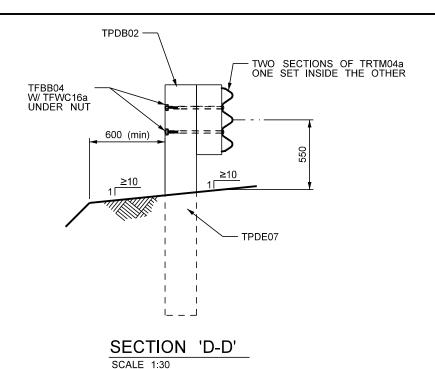
REVISIONS				
DATE	DESCRIPTION	BY		

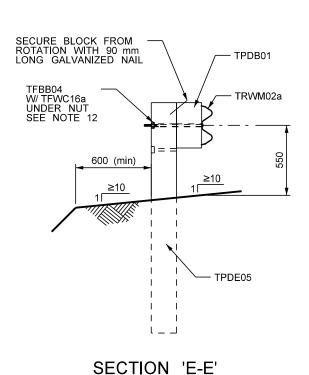
Manitoba Infrastructure
Traffic Engineering



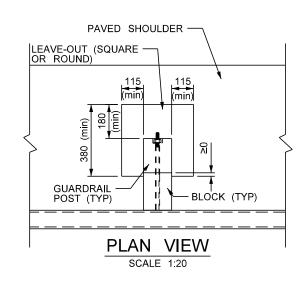
MANITOBA CONSTRAINED
WIDTH CONSTANT SLOPE
BARRIER - ROADSIDE
NESTED THRIE BEAM
TO TL-4

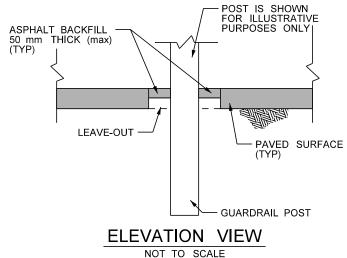
7	SHEET NO: 5 OF 8	DATE: 2020 - 08					
F	DESIGNED BY:	H. LARSEN					
	DRAWN BY:	L. LIEBRECHT					
	REVIEWED BY:	N. JOYAL					
	TSTB99c						



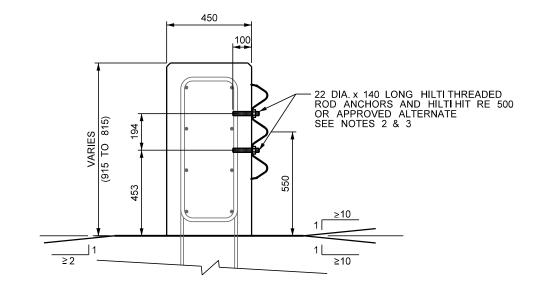


SCALE 1:30

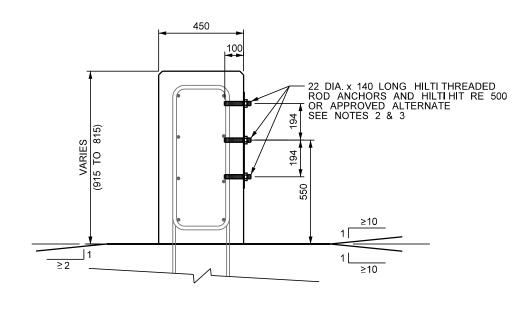




STANDARD LEAVE-OUT DETAIL



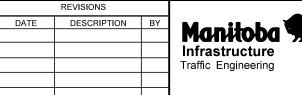
PARTIAL SECTION 'F-F'
SCALE 1:20



PARTIAL SECTION 'G-G' SCALE 1:20

NOTES:

- 1. ALL SCALES ARE APPROXIMATE.
- 2. HOLES FOR THREADED RODS SHALL BE DRILLED HORIZONTAL AT 2 mm LARGER THAN DIAMETER OF THREADED ROD.
- 3. STEEL (REBAR) LOCATOR TO BE USED PRIOR TO DRILLING HOLES.





MANITOBA CONSTRAINED
WIDTH CONSTANT SLOPE
BARRIER - ROADSIDE
NESTED THRIE BEAM
TO TL-4

ח	SHEET NO:6 OF 8	DATE: 2020 - 08					
F	DESIGNED BY:	H. LARSEN					
_	DRAWN BY:	L. LIEBRECHT					
	REVIEWED BY:	N. JOYAL					
	TSTB99c						

					MASS		
MARK	TYPE	PIN DIAMETER	TOTAL LENGTH	_	kg/m	1	BENDING DIAGRAM
I WIN COLOR		(mm)	(mm)	kg	INTERIOR	END	BENDING BUILDING
					SEC.	SEC.	
							20 , 167 ,
1002	BENT	65	503	0.39		0.14	29
1002	BENT	03	303	0.59		0.14	2
							48
							<u> </u>
							<u>51</u> ►
							1 I
1502	BENT	65	604	0.95		1.65	310
1302	BENT	03	004	0.93		1.00	, γ
							I I I
							728
							<u> </u>
							<u>► <</u>
							236 →
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1505	BENT	65	1300	2.04		3.55	252
							<u> </u>
							287
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							n-
							1
1506	STR	0	600	0.94		1.63	000
							<u> </u>
							DIMENSION
							A
1507a	BENT	65	603	0.95		0.33	44 A A
1507b 1507c	BENT BENT	65 65	602 601	0.95 0.94		0.33 0.33	34 24
1507d	BENT	65	600	0.94		0.33	15
1507e	BENT	65	600	0.94		0.33	5 0,
							33
							<u>↓</u> 000
							↑
							<u>+</u> U <u>+</u>
<u> </u>							DIMENSION
							A B
1508a 1508b	BENT	65 65	1299	2.04		0.71	44 287 34 290 A
1508b	BENT BENT	65	1301 1303	2.04 2.05		0.71 0.71	34 290 24 293 236
1508d	BENT	65 65 65	1306	2.05		0.71	15 297 The notation of the contract of the con
1508e	BENT	65	1308	2.05		0.71	5 299 J
							I II WI V
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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 CONFORMED STEED 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.
- 6. ALL BARS SHALL BE BENT IN ACCORDANCE WITH THE FOLLOWING DETAIL:

		REVISIONS	
	BY	DESCRIPTION	DATE
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MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-4 AT 915

SHEET NO: 7 OF 8	DATE: 2020 - 08
DESIGNED BY:	H. LARSEN
DRAWN BY:	L. LIEBRECHT
REVIEWED BY:	N. JOYAL

TSTB99c

	MASS						
MARK	TYPE	PIN DIAMETER (mm)	TOTAL LENGTH (mm)	kg	kg/m INTERIOR END		BENDING DIAGRAM
		(,	(*****)		SEC.	SEC.	
1509	BENT	65	1450	2.28		3.97	300
2009	BENT	125	3283	7.73		40.33	300
2012	BENT	125	1741	4.41		7.67	775
							DIMENSION A B C
2013a 2013b 2013c 2013d 2013e	BENT BENT BENT BENT BENT	125 125 125 125 125 125	1742 1745 1749 1753 1757	4.41 4.42 4.43 4.44 4.45	 	1.53 1.54 1.54 1.54 1.55	773 181 108 770 208 84 767 235 59 766 261 35 765 288 11
							DIMENSION A
2014a 2014b	BENT	125	2599	6.12		2.13	753
2014c	BENT BENT	125 125	2561 2521	6.03 5.94		2.10	714
2014d 2014e	BENT BENT	125 125	2481 2441	5.84 5.75		2.03 2.00	694 674
							A
	LONGITUDINAL REINFORCING - MASS (kg/m) INTERIOR FND FOOTING						
BAR	INTERIOR SECTION		END SECTION OPTION 1	OP.	TION 2 OF	PTION 3	
10M			6.59				6000
15M		13.19 13.19			6000		
20M	20M —-				-		6000
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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. UNIT ESS NOTED OTHERWISE IN THE BILL OF REINFORCING STEEL.
- 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: 6.

REVISIONS						
DATE	DESCRIPTION BY					
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MANITOBA CONSTRAINED WIDTH CONSTANT SLOPE BARRIER - MEDIAN TL-4 AT 915

SHEET NO: 8 OF 8	DATE: 2020 - 08					
DESIGNED BY:	H. LARSEN					
DRAWN BY:	L. LIEBRECHT					
REVIEWED BY:	N. JOYAL					
TSTB99c						