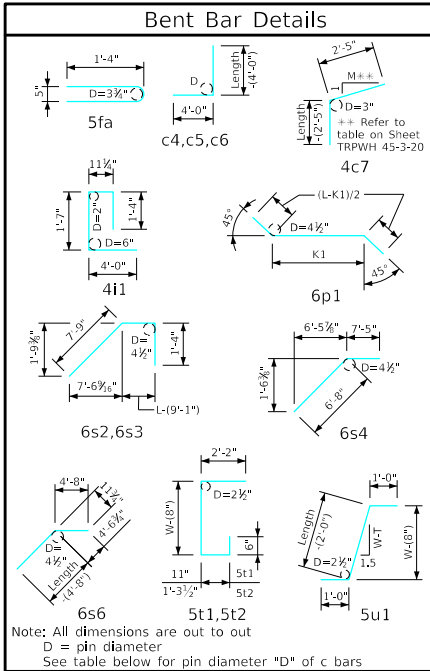


ENGLISHLRFDDESIGNEDTRIPLECULVERTS.DGN - TRPWH 45-6-20 S2 - THIS SHEET ISSUED 07-2020.



c Bar Pin Diameter	
Bar Size	D
5	3 3/4"
6	4 1/2"

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap.

Bill of Reinforcing for One Headwall 45° Skew Span x Culvert Height

Location	Shape	12' x 6'				12' x 5'				12' x 4'						
		Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.			
Fence Anchor (Galv.)	5fa	2	2'-10	6	5fa	2	2'-10	6	5fa	2	2'-10	6				
Wingwall, F.F.H.	5b1	2	30'-9	64	5b1	2	26'-6	55	5b1	2	22'-3	46				
Wingwall, F.F.H.	5b2	10 Var.	2 Each 11'-9 to 28'-9	211	5b2	8 Var.	2 Each 24'-6 to 26'-9	151	5b2	6 Var.	2 Each 20'-3 to 21'-9	100				
Wingwall, B.F.H.	4b3	2	31'-0	41	4b3	2	26'-9	36	4b3	2	22'-6	30				
Wingwall, B.F.H.	4b4	8 Var.	2 Each 16'-4 to 29'-1	121	4b4	6 Var.	2 Each 24'-10 to 24'-10	82	4b4	4 Var.	2 Each 20'-7 to 20'-7	49				
Interior Wall, Both F.H.	5b5	18 Var.	2 Each 9'-0 to 29'-10	365	5b5	14 Var.	2 Each 25'-7 to 25'-7	254	5b5	10 Var.	2 Each 21'-3 to 21'-3	160				
Wingwall, F.F.V.	4c1	72 Var.	2 Each 2'-8 to 8'-10	277	4c1	46 Var.	2 Each 7'-10 to 7'-10	161	4c1	36 Var.	2 Each 6'-8 to 6'-8	112				
Wingwall, F.F.V.	c2	--	--	--	c2	--	--	--	c2	--	--	--				
Wingwall, F.F.V. (O)	4c3	2	9'-1	12	4c3	2	8'-1	11	4c3	2	7'-1	9				
Wingwall, F.F.V. (A)	4c3	3	9'-1	18	4c3	3	8'-1	16	4c3	3	7'-1	14				
Wingwall, B.F.V.	5c4	54 Var.	2 Each 6'-10 to 12'-11	556	6c4	60 Var.	2 Each 10'-11 to 11'-11	845	6c4	48 Var.	2 Each 8'-10 to 10'-11	640				
Wingwall, B.F.V. (O)	5c5	1	13'-1	14	6c5	1	12'-1	18	6c5	1	11'-1	17				
Wingwall, B.F.V. (A)	5c5	4	13'-1	55	6c5	4	12'-1	73	6c5	4	11'-1	67				
Wingwall, B.F.V.	5c6	16	9'-0	150	c6	--	--	--	c6	--	--	--				
Interior Wall, Both F,V	4c7	4	3'-10	10	4c7	4	3'-10	10	4c7	4	3'-10	10				
Interior Wall, Both F,V	4c8	102 Var.	2 Each 1'-6 to 6'-3	264	4c8	84 Var.	2 Each 5'-3 to 5'-3	189	4c8	68 Var.	2 Each 4'-3 to 4'-3	131				
Interior Wall, Both F,V	4c9	4	6'-7	18	4c9	4	5'-7	15	4c9	4	4'-7	12				
Apron, Longit., Bott.	4d1	39	30'-6	795	4d1	39	26'-3	684	4d1	39	22'-0	573				
Apron, Longit., Top	6f1	39	30'-6	1787	6f1	39	26'-3	1538	6f1	39	22'-0	1289				
Parapet, Vertical	4i1	75	7'-10	392	4i1	75	7'-10	392	4i1	75	7'-10	392				
Parapet, Horiz.	7j1	4	54'-8	467	7j1	4	54'-8	467	7j1	4	54'-8	467				
Apron, Trans., Top	5m1	18	39'-2	735	5m1	10	39'-2	409	5m1	1	39'-2	41				
Apron, Trans., Top	5m2	73 Var.	2'-3 to 38'-3	1542	5m2	73 Var.	2'-0 to 38'-0	1523	5m2	73 Var.	2'-3 to 38'-3	1542				
Apron, Trans., Bott.	5m3	19	50'-8	1052	5m3	16	50'-8	886	5m3	13	50'-8	720				
Curtain, Horiz.	6p1	5	54'-8	429	6p1	5	54'-8	429	6p1	5	54'-8	429				
Wing Slope, Both F.	6s1	4	22'-2	133	6s1	4	17'-9	107	6s1	4	13'-5	81				
Wing Slope, Both F. (O)	6s2	2	9'-8	29	6s2	2	9'-8	29	6s2	2	9'-8	29				
Wing Slope, Both F. (A)	6s3	2	10'-5	31	6s3	2	10'-5	31	6s3	2	10'-5	31				
Wing Slope, F.F.	6s4	2	14'-1	42	6s4	2	14'-1	42	6s4	2	14'-1	42				
Wing Slope, F.F.	6s5	2	19'-8	59	6s5	2	15'-4	46	6s5	2	11'-0	33				
Interior Wall, Both F.	6s6	4	31'-1	187	6s6	4	26'-8	160	6s6	4	22'-4	134				
Curtain, Vert.	5t1	54	6'-5	361	5t1	54	6'-5	361	5t1	54	6'-5	361				
Curtain, Vert. Ends	5t2	4	6'-10	29	5t2	4	6'-10	29	5t2	4	6'-10	29				
Bracket, Vert.	5u1	4	5'-4	22	5u1	4	5'-4	22	5u1	4	5'-4	22				
Estimated Quantities One Headwall	Reinf. Steel	10,274 LB				9077 LB				7618 LB						
	Concrete	Parapet Δ	4.9	Wingwalls	11.5	Apron =	56.9	73.3	Concrete	Parapet Δ	4.9	Wingwalls	5.6	Apron =	41.7	52.2

Δ Includes top of wingwall quantities.
* Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.

(A) - Indicates bar located at acute corner.
(O) - Indicates bar located at obtuse corner.
Refer to Sheet TRPWH 45-1-20 for acute and obtuse corner locations.

Headwall Notes:

- This headwall is based on a 3:1 slope normal to centerline of roadway.
- The sides of the apron are to be formed to ensure correct line and grade.
- All apron reinforcing steel is to be supported by bar chairs at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.
- Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown. Clearance to the bottom ends of vertical bars shall be 3 inches.
- Concrete quantities are estimated from back of parapet.
- Horizontal tails of bars "b" & "s" estimated to extend 2'-5" beyond back of parapet (into end of barrel). Longitudinal bars "4d1" and "6f1" estimated to project into end section of barrel a minimum of 2'-5" beyond back of parapet. The "length" column reflects total number of feet necessary to meet these requirements.
- Dimensions are in feet and inches unless otherwise noted.

LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER	IOWADOT Highway Division	
		Standard Design - Triple Reinforced Concrete Box Culverts	
		Parallel Wing Headwalls	
		July, 2020	
		Quantity Tabulation 12'-0" Span 45° Skew	TRPWH 45-6-20 Sheet 2 of 2