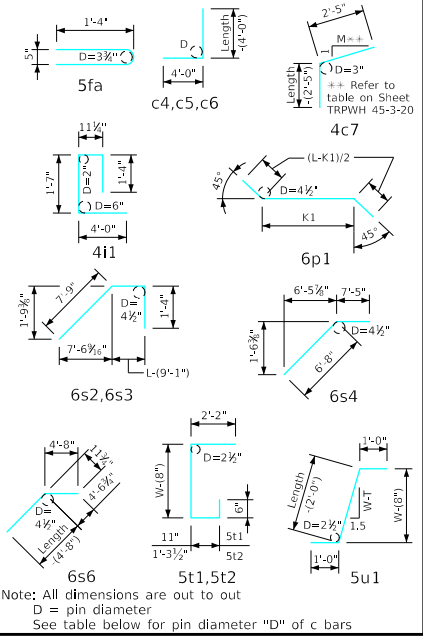


ENGLISHLRFDDESIGNEDTRIPLECULVERTS.DGN - TRPWH 45-6-20 S1 - THIS SHEET ISSUED 07-2020.

Bent Bar Details



c Bar Pin Diameter	
Bar Size	D
5	3 3/8"
6	4 1/2"

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

Location	Shape	12' x 12'				12' x 11'				12' x 10'				12' x 9'				12' x 8'				12' x 7'			
		Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.	Bar No.	No.	Length	Wt.
Fence Anchor (Galv.)	5fa	2	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6	5fa	2	2'-10"	6
Wingwall, F.F.H.	5b1	2	2	56'-2	122	5b1	2	51'-11	113	5b1	2	47'-8	104	5b1	2	43'-5	96	5b1	2	39'-2	82	5b1	2	34'-11	73
Wingwall, F.F.H.	5b2	22	2	Each 11'-9 to 54'-2	776	5b2	20	2	Each 11'-9 to 49'-11	658	5b2	18	2	Each 11'-9 to 45'-9	550	5b2	16	2	Each 11'-9 to 41'-6	449	5b2	14	2	Each 11'-9 to 37'-3	358
Wingwall, B.F.H.	4b3	2	2	56'-9	79	4b3	2	52'-6	73	4b3	2	48'-3	67	4b3	2	43'-10	62	4b3	2	39'-7	53	4b3	2	35'-3	47
Wingwall, B.F.H.	4b4	20	2	Each 16'-7 to 54'-9	489	4b4	18	2	Each 16'-7 to 50'-6	413	4b4	16	2	Each 16'-5 to 46'-1	340	4b4	14	2	Each 16'-5 to 41'-10	276	4b4	12	2	Each 16'-5 to 37'-7	216
Interior Wall, Both F.H.	5b5	42	2	Each 8'-9 to 55'-5	1441	5b5	38	2	Each 8'-9 to 51'-2	1213	5b5	34	2	Each 8'-8 to 46'-11	1001	5b5	30	2	Each 8'-9 to 42'-8	815	5b5	26	2	Each 8'-10 to 38'-5	641
Wingwall, F.F.V.	5c1	104	2	Each 2'-8 to 14'-8	940	5c1	96	2	Each 2'-8 to 13'-9	822	4c1	88	2	Each 2'-8 to 12'-9	453	4c1	80	2	Each 2'-8 to 11'-10	387	4c1	72	2	Each 2'-8 to 10'-9	340
Wingwall, F.F.V.	5c2	50	2	Each 9'-1 to 14'-9	621	5c2	42	2	Each 9'-1 to 13'-10	502	4c2	32	2	Each 9'-1 to 12'-8	232	4c2	24	2	Each 9'-1 to 11'-9	167	c2	--	--	--	--
Wingwall, F.F.V. (O)	5c3	2	2	15'-1	31	5c3	2	14'-1	29	4c3	2	13'-1	17	4c3	2	12'-1	16	4c3	2	11'-1	15	4c3	2	10'-1	13
Wingwall, F.F.V. (A)	5c3	3	3	15'-1	47	5c3	3	14'-1	44	4c3	3	13'-1	26	4c3	3	12'-1	24	4c3	3	11'-1	22	4c3	3	10'-1	20
Wingwall, B.F.V.	6c4	104	2	Each 6'-10 to 18'-10	2005	5c4	96	2	Each 6'-10 to 17'-11	1239	5c4	88	2	Each 6'-10 to 16'-11	1090	5c4	80	2	Each 6'-10 to 16'-0	953	5c4	70	2	Each 6'-10 to 14'-10	791
Wingwall, B.F.V. (O)	6c5	1	1	19'-1	29	5c5	1	18'-1	19	5c5	1	17'-1	18	5c5	1	16'-1	17	5c5	1	15'-1	16	5c5	1	14'-1	15
Wingwall, B.F.V. (A)	6c5	4	4	19'-1	115	5c5	4	18'-1	75	5c5	4	17'-1	71	5c5	4	16'-1	67	5c5	4	15'-1	63	5c5	4	14'-1	59
Wingwall, B.F.V.	6c6	68	9	9'-0	919	6c6	60	9'-0	811	6c6	50	9'-0	676	6c6	42	9'-0	568	5c6	34	9'-0	319	5c6	26	9'-0	244
Interior Wall, Both F.V	4c7	4	4	3'-10	10	4c7	4	3'-10	10	4c7	4	3'-10	10	4c7	4	3'-10	10	4c7	4	3'-10	10	4c7	4	3'-10	10
Interior Wall, Both F.V	4c8	202	2	Each 1'-6 to 12'-3	928	4c8	186	2	Each 1'-6 to 11'-3	792	4c8	170	2	Each 1'-6 to 10'-4	672	4c8	152	2	Each 1'-6 to 9'-3	546	4c8	136	2	Each 1'-6 to 8'-4	447
Interior Wall, Both F.V	4c9	4	4	12'-7	34	4c9	4	11'-7	31	4c9	4	10'-7	28	4c9	4	9'-7	26	4c9	4	8'-7	23	4c9	4	7'-7	20
Apron, Longit., Bott.	4d1	39	55	11	1520	4d1	39	51'-8	1409	4d1	39	47'-6	1300	4d1	39	43'-3	1190	4d1	39	39'-0	1016	4d1	39	34'-9	905
Apron, Longit., Top	6f1	39	55	11	3417	6f1	39	51'-8	3168	6f1	39	47'-6	2924	6f1	39	43'-3	2675	6f1	39	39'-0	2285	6f1	39	34'-9	2036
Parapet, Vertical	4i1	77	7	10	403	4i1	77	7	10	403	4i1	75	7	10	392	4i1	75	7	10	392	4i1	75	7	10	392
Parapet, Horiz.	7j1	4	56	1	478	7j1	4	56	1	478	7j1	4	55	1	470	7j1	4	55	1	470	7j1	4	54	1	467
Apron, Trans., Top	6m1	69	40	2	4413	6m1	60	40	2	3838	6m1	52	39	6	3085	5m1	44	39	6	1813	5m1	35	39	6	1442
Apron, Trans., Top	6m2	74	2	38	2279	6m2	74	2	39	2306	6m2	73	2	38	2239	5m2	73	2	38	1535	5m2	73	2	38	1523
Apron, Trans., Bott.	6m3	73	52	11	6067	5m3	67	52	11	3809	6m3	31	51	11	2530	6m3	28	51	11	2285	6m3	25	51	11	2040
Curtain, Horiz.	6p1	6	55	10	525	6p1	6	55	10	525	6p1	6	55	10	518	6p1	6	55	10	518	6p1	6	54	8	429
Wing Slope, Both F.	6s1	4	48	4	305	6s1	4	43	1	278	6s1	4	39	7	238	6s1	4	35	3	212	6s1	4	30	10	185
Wing Slope, Both F. (O)	6s2	2	9	5	28	6s2	2	9	5	28	6s2	2	9	7	29	6s2	2	9	7	29	6s2	2	9	7	29
Wing Slope, Both F. (A)	6s3	2	10	5	31	6s3	2	10	5	31	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	6s4	2	14	1	42	6s4	2	14	1	42
Wing Slope, F.F.	6s5	2	45	10	145	6s5	2	41	6	132	6s5	2	37	2	112	6s5	2	32	9	98	6s5	2	28	5	85
Interior Wall, Both F.	6s6	4	56	11	356	6s6	4	52	7	330	6s6	4	48	5	305	6s6	4	44	0	279	6s6	4	39	8	238
Curtain, Vert.	5t1	54	7	11	446	5t1	54	7	8	432	5t1	54	7	5	418	5t1	54	7	2	404	5t1	54	6	11	390
Curtain, Vert, Ends	5t2	4	8	4	35	5t2	4	8	1	34	5t2	4	7	10	33	5t2	4	7	7	32	5t2	4	7	4	31
Bracket, Vert.	5u1	4	6	7	27	5u1	4	6	5	27	5u1	4	6	2	26	5u1	4	5	11	25	5u1	4	5	9	24
Estimated Quantities One Headwall	Reinf. Steel	29,109 LB				24,120 LB				20,053 LB				16,515 LB				14,256 LB				11,049 LB			
	Concrete	169.5 CY				153.0 CY				128.3 CY				114.2 CY				100.7 CY				85.3 CY			

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap. (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	IOWA DOT 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 1 of 2