

Bill of Reinforcing for One Headwall 30° Skew Span x Culvert Height												
Bar	Location	Shape	8' x 6'			8' x 5'			8' x 4'			Bar
			No.	Length	Wt.	No.	Length	Wt.	No.	Length	Wt.	
5fa	Fence Anchor (Galv.)		2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	5fa
4b1	Wingwall, B.F.H, Long		1	30'-2	20	1	26'-0	17	1	21'-10	15	4b1
4b2	Wingwall, B.F.H, Short		1	23'-6	16	1	20'-5	14	1	17'-3	12	4b2
4b3	Wingwall, B.F.H, Long		4 Var.	15'-8 to 28'-3	59	3 Var.	15'-8 to 24'-1	40	2 Var.	15'-8 to 19'-10	24	4b3
4b4	Wingwall, B.F.H, Short		4 Var.	12'-10 to 22'-1	47	3 Var.	12'-9 to 19'-0	32	2 Var.	12'-9 to 15'-10	19	4b4
5b5	Wingwall, F.F.H, Long		1	30'-2	31	1	26'-0	27	1	21'-10	23	5b5
5b6	Wingwall, F.F.H, Short		1	23'-6	25	1	20'-5	21	1	17'-4	18	5b6
5b7	Wingwall, F.F.H, Long		5 Var.	11'-7 to 28'-3	104	4 Var.	11'-7 to 24'-1	74	3 Var.	11'-7 to 19'-11	49	5b7
5b8	Wingwall, F.F.H, Short		5 Var.	9'-9 to 22'-1	83	4 Var.	9'-9 to 19'-0	60	3 Var.	9'-8 to 15'-11	40	5b8
5b9	Interior Wall, Both F.H,		9 Var.	6'-2 to 17'-6	111	7 Var.	6'-3 to 15'-2	78	5 Var.	6'-6 to 12'-10	50	5b9
4c1	Wingwall, F.F.V, Long		26 Var.	2'-8 to 8'-8	98	22 Var.	2'-8 to 7'-8	76	18 Var.	2'-8 to 6'-9	57	4c1
4c2	Wingwall, F.F.V, Short		20 Var.	2'-8 to 8'-9	76	17 Var.	2'-8 to 7'-10	60	14 Var.	2'-8 to 6'-10	44	4c2
4c3	Wingwall, F.F.V, Long		--	--	--	--	--	--	--	--	--	4c3
4c4	Wingwall, F.F.V, Short		--	--	--	--	--	--	--	--	--	4c4
4c5	Wingwall, F.F.V, Long		2	7'-7	10	2	6'-7	9	2	5'-7	7	4c5
4c6	Wingwall, F.F.V, Short		1	7'-7	5	1	6'-7	4	1	5'-7	4	4c6
4c7	Interior Wall, Both F.V,		2	3'-11	5	2	3'-11	5	2	3'-11	5	4c7
4c8	Interior Wall, Both F.V,		27 Var.	1'-9 to 6'-4	73	22 Var.	1'-8 to 5'-3	51	18 Var.	1'-8 to 4'-4	36	4c8
5c9	Wingwall, B.F.V, Long		11 Var.	2'-8 to 5'-1	44	11 Var.	2'-8 to 5'-1	44	11 Var.	2'-8 to 5'-1	44	5c9
5c10	Wingwall, B.F.V, Short		5 Var.	2'-8 to 4'-0	17	5 Var.	2'-8 to 4'-0	17	5 Var.	2'-8 to 4'-0	17	5c10
5c11	Wingwall, B.F.V, Long		15 Var.	9'-4 to 12'-8	172	11 Var.	9'-4 to 11'-8	120	7 Var.	9'-4 to 10'-9	73	5c11
5c12	Wingwall, B.F.V, Short		15 Var.	8'-4 to 12'-9	165	12 Var.	8'-4 to 11'-10	126	9 Var.	8'-4 to 10'-10	90	5c12
6c13	Wingwall, B.F.V, Long		8	10'-6	126	--	--	--	--	--	--	6c13
6c13	Wingwall, B.F.V, Short		7	10'-6	110	--	--	--	--	--	--	6c13
5c14	Wingwall, B.F.V, Long		2	11'-7	24	2	10'-7	22	2	9'-7	20	5c14
5c14	Wingwall, B.F.V, Short		1	11'-7	12	1	10'-7	11	1	9'-7	10	5c14
4d1	Apron, Longit., Bott.		11	18'-1	133	11	15'-9	116	11	13'-5	99	4d1
4d2	Apron, Longit., Bott, Long		3	23'-9	48	3	19'-7	39	3	15'-4	31	4d2
4d3	Apron, Longit., Bott, Short		3	18'-7	37	3	15'-5	31	3	12'-4	25	4d3
6f1	Apron, Longit., Top		16	18'-1	435	16	15'-9	379	16	13'-5	322	6f1
6f2	Apron, Longit., Top Long		5 Var.	5'-3 to 14'-7	74	4 Var.	5'-3 to 12'-4	53	3 Var.	5'-3 to 10'-0	34	6f2
6f3	Apron, Longit., Top Short		4 Var.	5'-5 to 14'-10	61	3 Var.	6'-2 to 12'-6	42	2 Var.	7'-0 to 10'-3	26	6f3
6f4	Apron, Longit., Top Long		1	30'-2	45	1	26'-0	39	1	21'-10	33	6f4
6f5	Apron, Longit., Top Short		1	23'-6	35	1	20'-5	31	1	17'-4	26	6f5
4i1	Parapet, Vertical		33	6'-4	140	33	6'-4	140	33	6'-4	140	4i1
7j1	Parapet, Horizontal		4	20'-8	169	4	20'-8	169	4	20'-8	169	7j1
6m1	Apron, Trans., Top		8 Var.	19'-5 to 20'-9	241	8 Var.	19'-5 to 20'-9	241	8 Var.	19'-5 to 20'-9	241	6m1
6m2	Apron, Trans., Top		7 Var.	21'-0 to 23'-3	233	4 Var.	21'-0 to 22'-2	130	1	21'-0	32	6m2
6m3	Apron, Trans., Top		12 Var.	5'-4 to 17'-6	206	12 Var.	4'-8 to 16'-10	194	12 Var.	4'-0 to 16'-2	182	6m3
6m4	Apron, Trans., Bott.		12 Var.	14'-4 to 21'-10	326	10 Var.	14'-4 to 20'-5	261	8 Var.	14'-4 to 19'-1	201	6m4
6p1	Curtain, Horizontal		4	19'-6	117	4	19'-6	117	4	19'-6	117	6p1
6p2	Curtain, Horizontal, Long		4	16'-0	96	4	13'-11	84	4	11'-11	72	6p2
6p3	Curtain, Horizontal, Short		4	9'-8	58	4	8'-8	52	4	7'-7	46	6p3
6s1	Wing Slope, Both F., Long		2	8'-0	24	2	8'-0	24	2	8'-0	24	6s1
6s2	Wing Slope, Both F., Short		2	6'-11	21	2	6'-11	21	2	6'-11	21	6s2
6s3	Wing Slope, Both F., Long		2	23'-2	70	2	18'-10	57	2	14'-7	44	6s3
6s4	Wing Slope, Both F., Short		2	18'-4	55	2	15'-1	45	2	11'-10	36	6s4
6s5	Wing Slope, F.F, Long		1	29'-3	44	1	23'-0	38	1	20'-8	31	6s5
6s6	Wing Slope, F.F, Short		1	23'-8	36	1	20'-5	31	1	17'-1	26	6s6
6s7	Interior Wall, Both F.H,		2	18'-4	55	2	15'-10	48	2	13'-4	40	6s7
5t1	Curtain, Vertical		25	6'-5	167	23	6'-5	154	21	6'-5	141	5t1
Estimated Quantities			Reinf. Steel			Reinf. Steel			Reinf. Steel			
One Headwall			Concrete			Concrete			Concrete			
			Parapet Δ			2.3			2.3			
			Wingwalls			7.5			3.7			
			Apron *			21.6			18.2			
			4374 LB			3457 LB			2828 LB			
			31.4 CY			26.0 CY			20.9 CY			

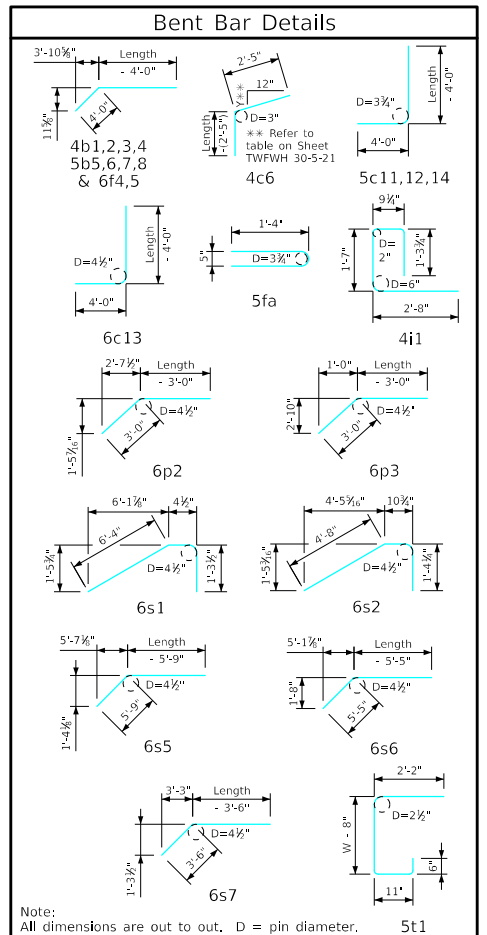
Δ Includes top of wingwall quantities.
 * Assumes apron and floor are equal thickness, adjust concrete quantities for transition where apron and floor thickness are not equal.

Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap. Lengths shown for bars over 40'-0" long do not include lap.

"Short" Denotes Short Wingwall
 "Long" Denotes Long Wingwall

Headwall Notes:

- See Sheet TWFHW G1-21 for General Notes, Specifications, and Design Stresses.
- 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 "d", "6f1", "6f4" and "6f5" 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 - Twin Reinforced Concrete Box Culverts	
		Flared Wing Headwalls	
		February, 2021	
		Quantity Tabulation	TWFHW
		8'-0" Span	30-8-21
		30° Skew	Sheet 2 of 2