

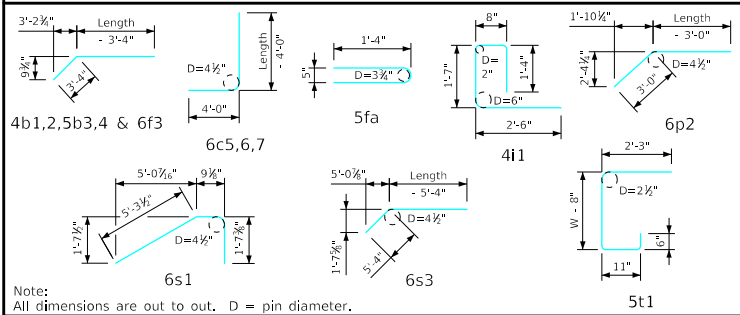
Bill of Reinforcing for One Headwall 0° Skew Span x Culvert Height

Bar	Location	Shape	14' x 7'			14' x 6'			14' x 5'			14' x 4'			Bar		
			No.	Length	Wt.	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	2	2'-10"	6	5fa		
4b1	Wingwall, B.F.H.		2	25'-9"	34	2	22'-8"	30	2	19'-7"	26	2	16'-6"	22	4b1		
4b2	Wingwall, B.F.H.		10 Var.	2 Each 11'-11 to 24'-4	121	8 Var.	2 Each 11'-11 to 21'-3	89	6 Var.	2 Each 11'-11 to 18'-2	60	4 Var.	2 Each 11'-11 to 15'-1	36	4b2		
5b3	Wingwall, F.F.H.		2	25'-9"	54	2	22'-8"	47	2	19'-7"	41	2	16'-6"	34	5b3		
5b4	Wingwall, F.F.H.		12 Var.	2 Each 8'-11 to 24'-4	208	10 Var.	2 Each 8'-11 to 21'-3	157	8 Var.	2 Each 8'-11 to 18'-2	113	6 Var.	2 Each 8'-11 to 15'-1	75	5b4		
4c1	Wingwall, F.F.V.		46 Var.	2 Each 2'-10 to 10'-0	197	40 Var.	2 Each 2'-10 to 9'-0	158	32 Var.	2 Each 2'-10 to 7'-9	113	26 Var.	2 Each 2'-10 to 6'-9	83	4c1		
4c2	Wingwall, F.F.V.		--	--	--	--	--	--	--	--	--	--	--	--	4c2		
4c3	Wingwall, F.F.V.		2	8'-9"	12	2	7'-9"	10	4	6'-9"	18	4	5'-9"	15	4c3		
5c4	Wingwall, B.F.V.		12 Var.	2 Each 2'-10 to 4'-6	46	12 Var.	2 Each 2'-10 to 4'-6	46	12 Var.	2 Each 2'-10 to 4'-6	46	12 Var.	2 Each 2'-10 to 4'-6	46	5c4		
6c5	Wingwall, B.F.V.		34 Var.	2 Each 8'-10 to 14'-0	583	28 Var.	2 Each 8'-10 to 13'-0	459	20 Var.	2 Each 8'-10 to 11'-9	309	14 Var.	2 Each 8'-10 to 10'-9	206	6c5		
6c6	Wingwall, B.F.V.		16	10'-6"	252	--	--	--	--	--	--	--	--	--	6c6		
6c7	Wingwall, B.F.V.		2	12'-9"	38	2	11'-9"	35	4	10'-9"	65	4	9'-9"	59	6c7		
4d1	Apron, Longit., Bott.		9	17'-11"	108	9	15'-11"	96	9	13'-11"	84	9	11'-11"	72	4d1		
4d2	Apron, Longit., Bott.		6	20'-10"	84	6	17'-8"	71	6	14'-7"	58	6	11'-6"	46	4d2		
6f1	Apron, Longit., Top		13	17'-11"	350	13	15'-11"	311	13	13'-11"	272	13	11'-11"	233	6f1		
6f2	Apron, Longit., Top		10 Var.	2 Each 3'-11 to 14'-10	141	8 Var.	2 Each 4'-7 to 12'-10	105	6 Var.	2 Each 5'-4 to 10'-10	73	4 Var.	2 Each 6'-1 to 8'-10	45	6f2		
6f3	Apron, Longit., Top		2	25'-9"	77	2	22'-8"	68	2	19'-7"	59	2	16'-6"	50	6f3		
4i1	Parapet, Vertical		29	6'-1"	118	29	6'-1"	118	29	6'-1"	118	29	6'-1"	118	4i1		
9j1	Parapet, Horizontal		4	15'-2"	206	4	15'-2"	206	4	15'-2"	206	4	15'-2"	206	9j1		
6m1	Apron, Trans., Top		21 Var.	15'-4 to 22'-10	602	18 Var.	15'-4 to 21'-9	501	15 Var.	15'-4 to 20'-7	405	13 Var.	15'-4 to 19'-10	343	6m1		
6m2	Apron, Trans., Bott.		14 Var.	9'-9 to 16'-3	273	12 Var.	9'-9 to 15'-3	225	10 Var.	9'-9 to 14'-3	180	8 Var.	9'-9 to 13'-3	138	6m2		
6p1	Curtain, Horizontal		4	14'-3"	86	4	14'-3"	86	4	14'-3"	86	4	14'-3"	86	6p1		
6p2	Curtain, Horizontal		8	12'-4"	148	8	11'-1"	133	8	9'-10"	118	8	8'-7"	103	6p2		
6s1	Wing Slope, Both F.		4	7'-8"	46	4	7'-8"	46	4	7'-8"	46	4	7'-8"	46	6s1		
6s2	Wing Slope, Both F.		4	20'-10"	125	4	17'-7"	106	4	14'-4"	86	4	11'-1"	67	6s2		
6s3	Wing Slope, F.F.		2	26'-11"	81	2	23'-8"	71	2	20'-5"	61	2	17'-2"	52	6s3		
5t1	Curtain, Vertical		23	6'-9"	162	21	6'-6"	142	19	6'-6"	129	17	6'-6"	115	5t1		
Estimated Quantities One Headwall			Reinf. Steel			3322 LB			2778 LB			2302 LB					
			Concrete			29.2 CY			24.3 CY			20.1 CY			16.2 CY		
			Parapet Δ			1.7			1.7			1.7			1.7		
			Wingwalls			6.5			5.0			3.7			2.5		
			Apron *			21.0			17.6			14.7			12.0		

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.

Bent Bar Details



Headwall Notes:

- See Sheet FWH G2-21 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" and "6f3" 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 - Single Reinforced Concrete Box Culverts	
		Flared Wing Headwalls	
		February, 2021	
		Quantity Tabulation 14'-0" Span 0° Skew	FWH 0-6-21 Sheet 2 of 2