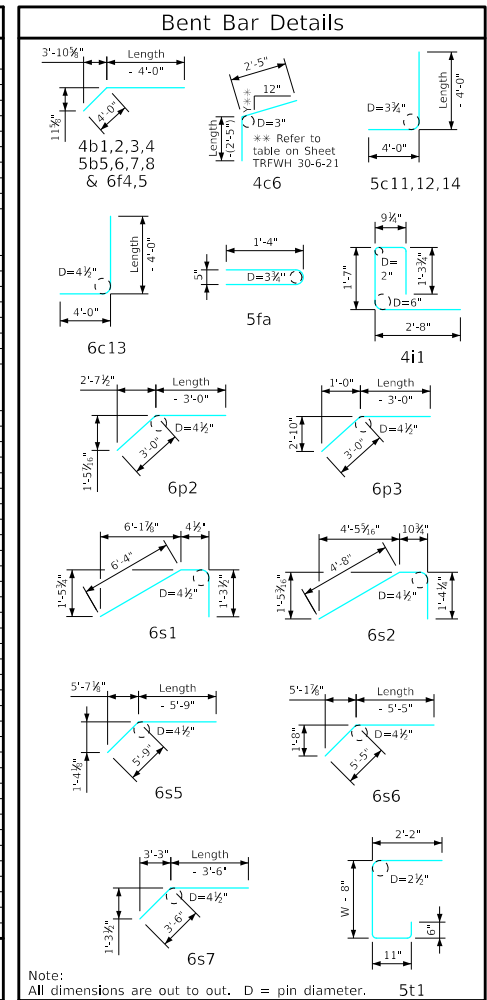


Bill of Reinforcing for One Headwall 30° Skew Span x Culvert Height														
Bar	Location	Shape	10' x 7'			10' x 6'			10' x 5'			10' x 4'		
			No.	Length	Wt.	No.	Length	Wt.	No.	Length	Wt.	No.	Length	Wt.
5fa	Fence Anchor (Galv.)		2	2'-10"	6	2	2'-10"	6	2	2'-10"	6	2	2'-10"	6
4b1	Wingwall, B.F.H, Long		1	34'-4"	23	1	30'-2"	20	1	26'-0"	17	1	21'-10"	15
4b2	Wingwall, B.F.H, Short		1	26'-7"	18	1	23'-6"	16	1	20'-5"	14	1	17'-3"	12
4b3	Wingwall, B.F.H, Long		5 Var.	15'-8" to 32'-5"	80	4 Var.	15'-8" to 28'-3"	59	3 Var.	15'-8" to 24'-1"	40	2 Var.	15'-8" to 19'-10"	24
4b4	Wingwall, B.F.H, Short		5 Var.	12'-10" to 25'-3"	64	4 Var.	12'-10" to 22'-1"	47	3 Var.	12'-9" to 19'-0"	32	2 Var.	12'-9" to 15'-10"	19
5b5	Wingwall, F.F.H, Long		1	34'-5"	36	1	30'-2"	31	1	26'-0"	27	1	21'-10"	23
5b6	Wingwall, F.F.H, Short		1	26'-8"	28	1	23'-6"	25	1	20'-5"	21	1	17'-4"	18
5b7	Wingwall, F.F.H, Long		6 Var.	11'-7" to 32'-5"	138	5 Var.	11'-7" to 28'-3"	104	4 Var.	11'-7" to 24'-1"	74	3 Var.	11'-7" to 19'-11"	49
5b8	Wingwall, F.F.H, Short		6 Var.	9'-9" to 25'-3"	110	5 Var.	9'-9" to 22'-1"	83	4 Var.	9'-9" to 19'-0"	60	3 Var.	9'-8" to 15'-11"	40
5b9	Interior Wall, Both F.H.		22 Var.	2 Each 6'-1" to 19'-10"	297	18 Var.	2 Each 6'-2" to 17'-6"	222	14 Var.	2 Each 6'-3" to 15'-2"	156	10 Var.	2 Each 6'-6" to 12'-10"	101
4c1	Wingwall, F.F.V, Long		31 Var.	2'-9" to 9'-11"	131	26 Var.	2'-9" to 8'-9"	100	22 Var.	2'-9" to 7'-9"	77	18 Var.	2'-9" to 6'-10"	58
4c2	Wingwall, F.F.V, Short		23 Var.	2'-9" to 9'-10"	97	20 Var.	2'-9" to 8'-10"	77	17 Var.	2'-9" to 7'-11"	61	14 Var.	2'-9" to 6'-11"	45
4c3	Wingwall, F.F.V, Long		--	--	--	--	--	--	--	--	--	--	--	--
4c4	Wingwall, F.F.V, Short		--	--	--	--	--	--	--	--	--	--	--	--
4c5	Wingwall, F.F.V, Long		1	8'-8"	6	2	7'-8"	10	2	6'-8"	9	2	5'-8"	8
4c5	Wingwall, F.F.V, Short		1	8'-8"	6	1	7'-8"	5	1	6'-8"	4	1	5'-8"	4
4c6	Interior Wall, Both F.V.		4	4'-1"	11	4	4'-0"	11	4	4'-0"	11	4	4'-0"	11
4c7	Interior Wall, Both F.V.		64 Var.	2 Each 1'-10" to 7'-5"	198	54 Var.	2 Each 1'-10" to 6'-5"	149	44 Var.	2 Each 1'-9" to 5'-4"	114	36 Var.	2 Each 1'-9" to 4'-5"	74
4c8	Interior Wall, Both F.V.		4	7'-6"	20	4	6'-6"	17	4	5'-6"	15	4	4'-6"	12
5c9	Wingwall, B.F.V, Long		11 Var.	2'-9" to 5'-2"	45	11 Var.	2'-9" to 5'-2"	45	11 Var.	2'-9" to 5'-2"	45	11 Var.	2'-9" to 5'-2"	45
5c10	Wingwall, B.F.V, Short		5 Var.	2'-9" to 4'-1"	18	5 Var.	2'-9" to 4'-1"	18	5 Var.	2'-9" to 4'-1"	18	5 Var.	2'-9" to 4'-1"	18
5c11	Wingwall, B.F.V, Long		20 Var.	9'-5" to 13'-11"	243	15 Var.	9'-5" to 12'-9"	173	11 Var.	9'-5" to 11'-9"	121	7 Var.	9'-5" to 10'-10"	74
5c12	Wingwall, B.F.V, Short		18 Var.	8'-5" to 13'-10"	209	15 Var.	8'-5" to 12'-10"	166	12 Var.	8'-5" to 11'-11"	127	9 Var.	8'-5" to 10'-11"	91
6c13	Wingwall, B.F.V, Long		13	10'-6"	205	8	10'-6"	126	--	--	--	--	--	--
6c13	Wingwall, B.F.V, Short		10	10'-6"	158	7	10'-6"	110	--	--	--	--	--	--
5c14	Wingwall, B.F.V, Long		1	12'-8"	13	2	11'-8"	24	2	10'-8"	22	2	9'-8"	20
5c14	Wingwall, B.F.V, Short		1	12'-8"	13	1	11'-8"	12	1	10'-8"	11	1	9'-8"	10
4d1	Apron, Longit., Bott.		21	20'-4"	285	21	18'-1"	254	21	15'-9"	221	21	13'-5"	188
4d2	Apron, Longit., Bott. Long		3	27'-11"	56	3	23'-9"	48	3	19'-7"	39	3	15'-4"	31
4d3	Apron, Longit., Bott. Short		3	21'-8"	43	3	18'-7"	37	3	15'-5"	31	3	12'-4"	25
6f1	Apron, Longit., Top		31	20'-4"	947	31	18'-1"	842	31	15'-9"	733	31	13'-5"	625
6f2	Apron, Longit., Top Long		6 Var.	5'-3" to 16'-11"	100	5 Var.	5'-3" to 14'-7"	74	4 Var.	5'-3" to 12'-4"	53	3 Var.	5'-3" to 10'-0"	34
6f3	Apron, Longit., Top Short		4 Var.	7'-9" to 17'-2"	75	4 Var.	5'-5" to 14'-10"	61	3 Var.	6'-2" to 12'-6"	42	2 Var.	7'-0" to 10'-3"	26
6f4	Apron, Longit., Top Long		1	34'-5"	52	1	30'-2"	45	1	26'-0"	39	1	21'-10"	33
6f5	Apron, Longit., Top Short		1	26'-8"	40	1	23'-6"	35	1	20'-5"	31	1	17'-4"	26
4f1	Parapet, Vertical		63	6'-4"	267	63	6'-4"	267	63	6'-4"	267	63	6'-4"	267
7f1	Parapet, Horizontal		4	37'-8"	308	4	37'-8"	308	4	37'-8"	308	4	37'-8"	308
6m1	Apron, Trans., Top		12 Var.	35'-3" to 37'-3"	653	9 Var.	35'-3" to 36'-9"	487	6 Var.	35'-3" to 36'-2"	322	3 Var.	35'-3" to 35'-7"	160
6m2	Apron, Trans., Top		2 Var.	30'-1" to 31'-5"	92	5 Var.	26'-1" to 31'-3"	215	8 Var.	22'-1" to 31'-2"	320	11 Var.	18'-1" to 31'-1"	406
6m3	Apron, Trans., Top		22 Var.	5'-7" to 28'-11"	570	19 Var.	4'-11" to 24'-11"	426	16 Var.	4'-3" to 20'-11"	302	13 Var.	3'-7" to 16'-11"	200
6m4	Apron, Trans., Bott.		14 Var.	31'-4" to 40'-3"	756	12 Var.	31'-4" to 38'-10"	632	10 Var.	31'-4" to 37'-6"	517	8 Var.	31'-4" to 36'-2"	406
6p1	Curtain, Horizontal		4	36'-6"	219	4	36'-6"	219	4	36'-6"	219	4	36'-6"	219
6p2	Curtain, Horizontal, Long		4	18'-0"	108	4	16'-0"	96	4	13'-11"	84	4	11'-11"	72
6p3	Curtain, Horizontal, Short		4	10'-9"	65	4	9'-8"	58	4	8'-8"	52	4	7'-7"	46
6s1	Wing Slope, Both F., Long		2	8'-0"	24	2	8'-0"	24	2	8'-0"	24	2	8'-0"	24
6s2	Wing Slope, Both F., Short		2	6'-11"	21	2	6'-11"	21	2	6'-11"	21	2	6'-11"	21
6s3	Wing Slope, Both F., Long		2	27'-5"	82	2	23'-2"	70	2	19'-10"	57	2	14'-7"	44
6s4	Wing Slope, Both F., Short		2	21'-8"	65	2	18'-4"	55	2	15'-1"	45	2	11'-10"	36
6s5	Wing Slope, F.F, Long		1	33'-7"	50	1	29'-3"	44	1	25'-0"	38	1	20'-8"	31
6s6	Wing Slope, F.F, Short		1	26'-11"	40	1	23'-8"	36	1	20'-5"	31	1	17'-1"	26
6s7	Interior Wall, Both F.H.		4	20'-10"	125	4	18'-4"	110	4	15'-10"	95	4	13'-4"	80
5t1	Curtain, Vertical		42	6'-8"	292	39	6'-5"	261	37	6'-5"	248	35	6'-5"	234
			Reinf. Steel 7508 LB			6381 LB			5211 LB			4345 LB		
Estimated Quantities One Headwall			Concrete 55.5 CY			3.6 8.9 34.3			3.6 4.6 29.2			3.6 4.4 24.4		



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 TRFWH 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.

IOWADOT Highway Division

Standard Design - Triple Reinforced Concrete Box Culverts

Flared Wing Headwalls

February, 2021

Quantity Tabulation 10'-0" Span 30° Skew	TRFWH 30-8-21 Sheet 2 of 2
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LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER