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

Location	Shape	12' x 6' Bar	No.	Length	Wt.	12' x 5' Bar	No.	Length	Wt.	12' x 4' 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	22'-3	46	5b1	2	19'-3	40	5b1	2	16'-3	34
Wingwall, F.F.H.		5b2	10 Var.	2 Each 8'-10 to 20'-10	155	5b2	8 Var.	2 Each 8'-10 to 17'-10	111	5b2	6 Var.	2 Each 8'-10 to 14'-10	74
Wingwall, B.F.H.		4b3	2	22'-3	30	4b3	2	19'-3	26	4b3	2	16'-3	22
Wingwall, B.F.H.		4b4	8 Var.	2 Each 11'-10 to 20'-10	87	4b4	6 Var.	2 Each 11'-10 to 17'-10	59	4b4	4 Var.	2 Each 11'-10 to 14'-10	36
Interior Wall, Both F.H.		5b5	18 Var.	2 Each 6'-7 to 21'-10	267	5b5	14 Var.	2 Each 6'-9 to 18'-9	186	5b5	10 Var.	2 Each 7'-1 to 15'-9	119
Wingwall, F.F.V.		4c1	50 Var.	2 Each 2'-8 to 8'-8	189	4c1	32 Var.	2 Each 2'-8 to 7'-8	110	4c1	26 Var.	2 Each 2'-8 to 6'-8	81
Wingwall, F.F.V.		c2	--	--	--	c2	--	--	--	c2	--	--	--
Wingwall, F.F.V. (L)		4c3	2	9'-1	12	4c3	2	8'-1	11	4c3	2	7'-1	9
Wingwall, F.F.V. (R)		4c3	2	9'-1	12	4c3	2	8'-1	11	4c3	2	7'-1	9
Wingwall, B.F.V.		5c4	38 Var.	2 Each 6'-4 to 12'-4	370	5c4	42 Var.	2 Each 6'-4 to 11'-4	387	5c4	26 Var.	2 Each 6'-4 to 10'-4	226
Wingwall, B.F.V. (L)		5c5	2	12'-7	26	5c5	2	11'-7	24	5c5	2	10'-7	22
Wingwall, B.F.V. (R)		5c5	2	12'-7	26	5c5	2	11'-7	24	5c5	2	10'-7	22
Wingwall, B.F.V.		5c6	14	8'-6	124	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	74 Var.	2 Each 1'-7 to 6'-4	196	4c8	62 Var.	2 Each 1'-7 to 5'-4	143	4c8	50 Var.	2 Each 1'-6 to 4'-4	97
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	22'-3	580	4d1	39	19'-3	502	4d1	39	16'-3	423
Apron, Longit., Top		6f1	39	22'-3	1303	6f1	39	19'-3	1128	6f1	39	16'-3	952
Parapet, Vertical		4i1	75	6'-5	321	4i1	75	6'-5	321	4i1	75	6'-5	321
Parapet, Horizontal		7j1	4	38'-8	316	7j1	4	38'-8	316	7j1	4	38'-8	316
Apron, Trans., Top		5m1	27	39'-2	1103	5m1	23	39'-2	940	5m1	19	39'-2	776
Apron, Trans., Top		m2	--	--	--	m2	--	--	--	m2	--	--	--
Apron, Trans., Bott.		4m3	19	34'-10	442	4m3	21	34'-10	489	4m3	13	34'-10	302
Curtain, Horiz.		6p1	5	39'-2	294	6p1	5	39'-2	294	6p1	5	39'-2	294
Wing Slope, Both F.		6s1	4	16'-9	101	6s1	4	13'-7	82	6s1	4	10'-5	63
Wing Slope, Both F. (L)		6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23
Wing Slope, Both F. (R)		6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23
Wing Slope, F.F.		6s4	2	11'-5	34	6s4	2	11'-5	34	6s4	2	11'-5	34
Wing Slope, F.F.		6s5	2	14'-2	43	6s5	2	11'-0	33	6s5	2	7'-10	24
Interior Wall, Both F.		6s6	4	22'-10	137	6s6	4	19'-8	118	6s6	4	16'-7	100
Curtain, Vert.		5t1	38	6'-5	254	5t1	38	6'-5	254	5t1	38	6'-5	254
Curtain, Vert. Ends		5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27
Bracket, Vert.		5u1	4	5'-4	22	5u1	4	5'-4	22	5u1	4	5'-4	22
Estimated Quantities One Headwall	Reinf. Steel			6597 LB				5769 LB				4733 LB	
	Concrete Parapet Δ	3.5		51.9 CY		3.5		44.3 CY		3.5		36.9 CY	
	Concrete Wingwalls	8.1				5.9				3.9			
	Concrete Apron ✳	40.3				34.9				29.5			

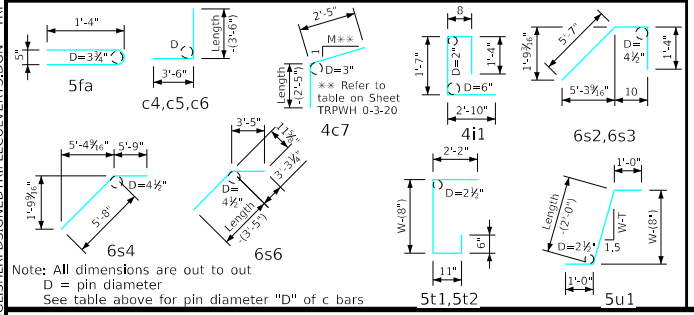
Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap.

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.

(L) - Indicates bar located at left corner.
(R) - Indicates bar located at right corner.
Refer to Sheet TRPWH 0-1-20 for left and right corner locations.

c Bar Pin Diameter	
Bar Size	D
5	3¾"
6	4½"

Bent Bar Details



Note: All dimensions are out to out
D = pin diameter
See table above for pin diameter "D" of c bars

Headwall Notes:

1. This headwall is based on a 3:1 slope normal to centerline of roadway.
2. The sides of the apron are to be formed to ensure correct line and grade.
3. 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.
4. 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.
5. Concrete quantities are estimated from back of parapet.
6. 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.
7. 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
0° Skew

TRPWH
0-6-20
Sheet 2 of 2

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