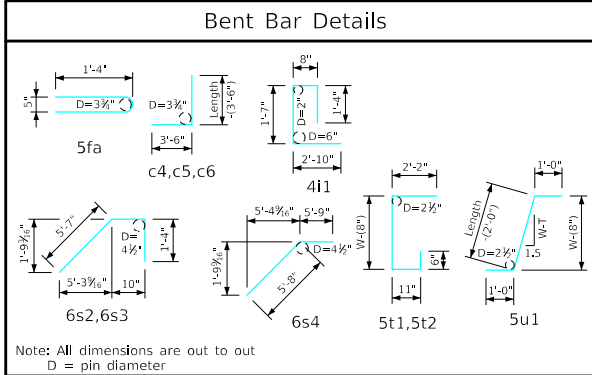


ENGLISHLRFDESIGNEDCULVERTS.DGN - PWH 0-11-20 - THIS SHEET ISSUED 07-2020.

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

Location	Shape	5' x 6'				5' x 5'				5' x 4'				5' x 3'				4' x 4'				3' x 3'							
		Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.	Bar	No.	Length	Wt.
Fence Anchor (Galv.)		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	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	5b1	2	13'-3"	28	5b1	2	16'-3"	34	5b1	2	16'-3"	34	5b1	2	13'-3"	28
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	5b2	4 Var.	2 Each 8'-10 to 11'-10	43	5b2	6 Var.	2 Each 8'-10 to 14'-10	74	5b2	4 Var.	2 Each 8'-10 to 11'-10	43	5b2	4 Var.	2 Each 8'-10 to 11'-10	43
Wingwall, B.F.H.		4b3	2	22'-3"	30	4b3	2	19'-3"	26	4b3	2	16'-3"	22	4b3	2	13'-3"	18	4b3	2	16'-3"	22	4b3	2	16'-3"	22	4b3	2	13'-3"	18
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	4b4	2	11'-10"	16	4b4	4 Var.	2 Each 11'-10 to 14'-10	36	4b4	2	11'-10"	16	4b4	2	11'-10"	16
Wingwall, F.F.V.		4c1	50 Var.	2 Each 2'-5 to 8'-5	181	4c1	32 Var.	2 Each 2'-5 to 7'-5	105	4c1	26 Var.	2 Each 2'-5 to 6'-5	77	4c1	20 Var.	2 Each 2'-5 to 5'-5	52	4c1	26 Var.	2 Each 2'-5 to 6'-5	77	4c1	20 Var.	2 Each 2'-5 to 5'-5	52	4c1	20 Var.	2 Each 2'-5 to 5'-5	52
Wingwall, F.F.V.		c2	--	--	--	c2	--	--	--	c2	--	--	--	c2	--	--	--	c2	--	--	--	c2	--	--	--	c2	--	--	--
Wingwall, F.F.V. (L)		4c3	2	8'-10"	12	4c3	2	7'-10"	10	4c3	2	6'-10"	9	4c3	2	5'-10"	8	4c3	2	6'-10"	9	4c3	2	6'-10"	9	4c3	2	5'-10"	8
Wingwall, F.F.V. (R)		4c3	2	8'-10"	12	4c3	2	7'-10"	10	4c3	2	6'-10"	9	4c3	2	5'-10"	8	4c3	2	6'-10"	9	4c3	2	6'-10"	9	4c3	2	5'-10"	8
Wingwall, B.F.V.		5c4	38 Var.	2 Each 6'-1 to 12'-1	360	5c4	32 Var.	2 Each 6'-1 to 11'-1	286	5c4	26 Var.	2 Each 6'-1 to 10'-1	219	5c4	20 Var.	2 Each 6'-1 to 9'-1	158	5c4	26 Var.	2 Each 6'-1 to 10'-1	219	5c4	20 Var.	2 Each 6'-1 to 9'-1	158	5c4	20 Var.	2 Each 6'-1 to 9'-1	158
Wingwall, B.F.V. (L)		5c5	2	12'-4"	26	5c5	2	11'-4"	24	5c5	2	10'-4"	22	5c5	2	9'-4"	19	5c5	2	10'-4"	22	5c5	2	9'-4"	19	5c5	2	9'-4"	19
Wingwall, B.F.V. (R)		5c5	2	12'-4"	26	5c5	2	11'-4"	24	5c5	2	10'-4"	22	5c5	2	9'-4"	19	5c5	2	10'-4"	22	5c5	2	9'-4"	19	5c5	2	9'-4"	19
Wingwall, B.F.V.		5c6	14	8'-6"	124	c6	--	--	--	c6	--	--	--	c6	--	--	--	c6	--	--	--	c6	--	--	--	c6	--	--	--
Apron, LongR. Bott.		4d1	6	22'-3"	89	4d1	6	19'-3"	77	4d1	6	16'-3"	65	4d1	6	13'-3"	53	4d1	5	16'-3"	54	4d1	4	13'-3"	35	4d1	4	13'-3"	35
Apron, LongR. Top		6f1	6	22'-3"	201	6f1	6	19'-3"	173	6f1	6	16'-3"	146	6f1	6	13'-3"	119	6f1	5	16'-3"	122	6f1	4	13'-3"	80	6f1	4	13'-3"	80
Parapet, Vertical		4i1	11	6'-5"	47	4i1	11	6'-5"	47	4i1	11	6'-5"	47	4i1	11	6'-5"	47	4i1	9	6'-5"	39	4i1	7	6'-5"	30	4i1	7	6'-5"	30
Parapet, Horiz.		7j1	4	6'-2"	50	7j1	4	6'-2"	50	7j1	4	6'-2"	50	7j1	4	6'-2"	50	7j1	4	6'-2"	42	7j1	4	6'-2"	34	7j1	4	6'-2"	34
Apron, Trans. Top		5m1	20	6'-8"	139	5m1	17	6'-8"	118	5m1	14	6'-8"	97	5m1	11	6'-8"	76	5m1	14	6'-8"	83	5m1	11	6'-8"	74	5m1	11	6'-8"	74
Apron, Trans. Bott.		m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--	m2	--	--	--
Apron, Trans. Bott.		4m3	19	2'-4"	30	4m3	16	2'-4"	25	4m3	13	2'-4"	20	4m3	10	2'-4"	16	m3	--	--	--	m3	--	--	--	m3	--	--	--
Curtain, Horiz.		6p1	5	6'-8"	50	6p1	5	6'-8"	50	6p1	5	6'-8"	50	6p1	5	6'-8"	50	6p1	5	6'-8"	43	6p1	5	6'-8"	43	6p1	5	6'-8"	43
Wing Slope, Both F.		6s1	4	16'-9"	101	6s1	4	13'-7"	82	6s1	4	10'-5"	63	6s1	4	7'-3"	44	6s1	4	10'-5"	63	6s1	4	7'-3"	44	6s1	4	7'-3"	44
Wing Slope, Both F. (L)		6s2	2	7'-9"	23	6s2	2	7'-9"	23	6s2	2	7'-9"	23	6s2	2	7'-9"	23	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	6s3	2	7'-9"	23	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	6s4	2	11'-5"	34	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	6s5	2	4'-8"	14	6s5	2	7'-10"	24	6s5	2	7'-10"	24	6s5	2	4'-8"	14
Curtain, Vert.		5t1	6	6'-5"	40	5t1	6	6'-5"	40	5t1	6	6'-5"	40	5t1	6	6'-5"	40	5t1	5	6'-5"	33	5t1	4	6'-5"	27	5t1	4	6'-5"	27
Curtain, Vert. Ends		5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27	5t2	4	6'-5"	27
Bracket, Vert.		5u1	4	5'-3"	22	5u1	4	5'-3"	22	5u1	4	5'-3"	22	5u1	4	5'-3"	22	5u1	4	5'-3"	22	5u1	4	5'-3"	22	5u1	4	5'-3"	22
Estimated Quantities One Headwall	Reinf. Steel	1984 LB				1525 LB				1261 LB				1013 LB				1162 LB				857 LB							
	Parapet Δ	1.0				1.0				1.0				1.0				0.9				0.9							
	Concrete	12.3 CY				10.2 CY				8.3 CY				6.5 CY				7.6 CY				5.4 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.
 (L) - Indicates bar located at left corner.
 (R) - Indicates bar located at right corner.
 Refer to Sheet PWH 0-1-20 for left and right corner locations.
 Note: Weight of bars over 40'-0" long include an allowance of 2'-5" for lap.



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		
		Standard Design - Single Reinforced Concrete Box Culverts	
		Parallel Wing Headwalls	
		July, 2020	
		Quantity Tabulation	PWH 0-11-20
		5'-0", 4'-0" & 3'-0" Spans	0° Skew