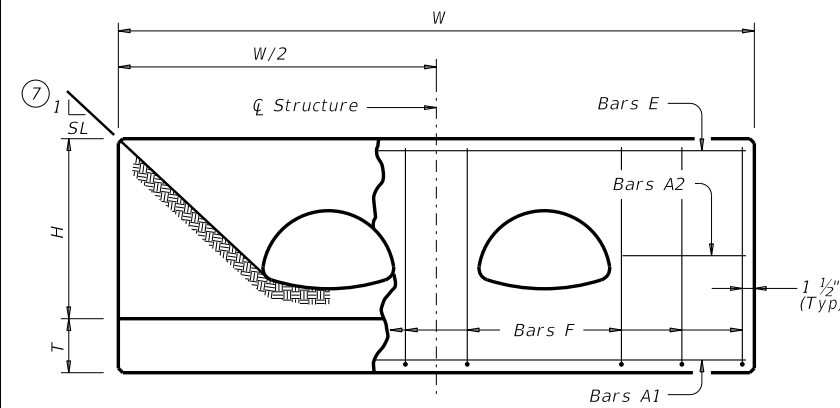
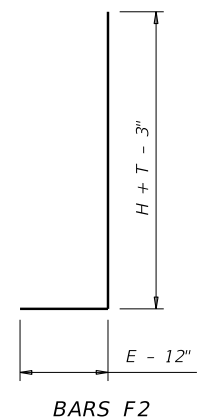


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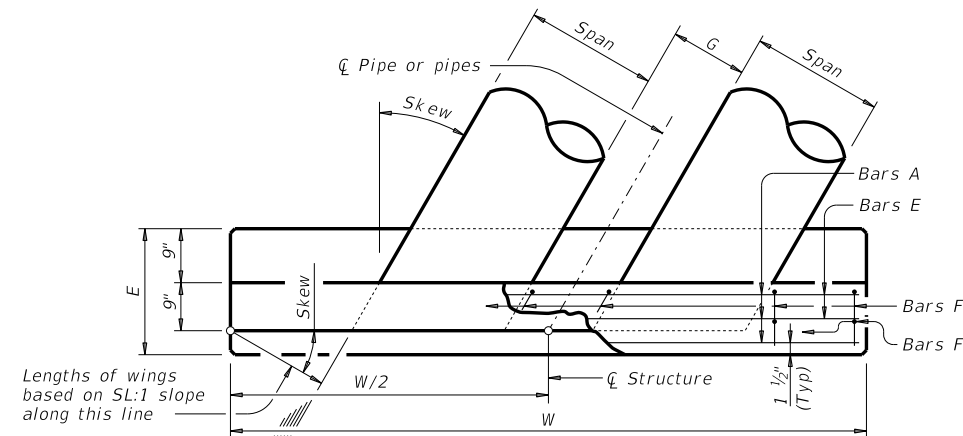
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope Design	Size of Pipe Arch		15° Skew						30° Skew						45° Skew						
	Span	Rise	Values for One Pipe			Values To Be Added For Each Add'l Pipe			Values for One Pipe			Values To Be Added For Each Add'l Pipe			Values for One Pipe			Values To Be Added For Each Add'l Pipe			
			W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	
2:1	1	17"	13"	10'-1"	131	1.2	2'-6"	28	0.2	11'-3"	153	1.3	2'-9 3/4"	30	0.3	13'-9"	180	1.6	3'-5"	33	0.4
	2	21"	15"	11'-2"	142	1.3	3'-0"	33	0.3	12'-5"	164	1.5	3'-4 1/4"	35	0.4	15'-2"	195	1.8	4'-1 3/4"	39	0.4
	3	28"	20"	13'-6"	187	1.9	3'-10 1/4"	44	0.5	15'-0"	214	2.1	4'-4"	45	0.5	18'-5"	252	2.5	5'-3 3/4"	59	0.7
	4	35"	24"	15'-5"	253	2.3	4'-9"	51	0.6	17'-3"	287	2.6	5'-3 1/2"	63	0.7	21'-1"	335	3.2	6'-5 3/4"	69	0.9
	5	42"	29"	17'-9"	315	3.3	5'-7 1/4"	70	0.9	19'-10"	355	3.7	6'-3"	73	1.0	24'-3"	411	4.5	7'-8"	80	1.2
	6	49"	33"	19'-9"	348	3.9	6'-5 1/2"	78	1.1	22'-0"	388	4.3	7'-2 1/2"	82	1.2	27'-0"	474	5.3	8'-10"	102	1.5
	7	57"	38"	22'-2"	447	4.9	7'-5"	87	1.4	24'-9"	495	5.4	8'-3 1/4"	93	1.6	30'-3"	597	6.6	10'-1 3/4"	115	1.9
	8	64"	43"	24'-6"	515	5.8	8'-5 1/2"	112	1.7	27'-4"	568	6.4	9'-5 1/4"	117	1.9	33'-6"	711	7.9	11'-6 1/2"	141	2.3
	9	71"	47"	26'-6"	585	6.7	9'-4 3/4"	121	2.1	29'-6"	643	7.5	10'-6"	127	2.3	36'-2"	794	9.2	12'-10 1/4"	153	2.8
3:1	1	17"	13"	14'-5"	185	1.7	2'-6"	29	0.3	16'-1"	209	1.9	2'-9 3/4"	30	0.3	19'-8"	257	2.3	3'-5"	34	0.4
	2	21"	15"	15'-9"	213	1.9	3'-0 1/4"	34	0.3	17'-7"	240	2.1	3'-4 1/4"	35	0.4	21'-7"	278	2.6	4'-1 3/4"	39	0.4
	3	28"	20"	19'-0"	273	2.7	3'-10 3/4"	43	0.5	21'-2"	301	3.0	4'-4"	46	0.5	25'-11"	366	3.6	5'-3 3/4"	59	0.7
	4	35"	24"	21'-8"	363	3.3	4'-9"	51	0.6	24'-2"	402	3.7	5'-3 1/2"	62	0.7	29'-7"	481	4.5	6'-5 3/4"	69	0.9
	5	42"	29"	24'-10"	441	4.7	5'-7 1/4"	70	0.9	27'-9"	506	5.2	6'-3"	73	1.0	33'-11"	599	6.4	7'-8"	82	1.2
	6	49"	33"	27'-6"	507	5.5	6'-5 1/2"	78	1.1	30'-8"	578	6.2	7'-2 1/2"	83	1.2	37'-7"	703	7.6	8'-10"	102	1.5
	7	57"	38"	30'-10"	666	6.9	7'-5"	88	1.4	34'-4"	725	7.7	8'-3 1/4"	93	1.6	42'-1"	876	9.4	10'-1 3/4"	115	1.9
	8	64"	43"	34'-0"	754	8.2	8'-5 1/2"	112	1.7	37'-11"	847	9.1	9'-5 1/4"	117	1.9	46'-5"	1,013	11.1	11'-6 1/2"	141	2.3
	9	71"	47"	36'-8"	841	9.5	9'-4 3/4"	121	2.1	40'-11"	942	10.6	10'-6"	127	2.3	50'-1"	1,149	13.0	12'-10 1/4"	153	2.8
4:1	1	17"	13"	18'-9"	240	2.2	2'-6"	29	0.3	20'-11"	267	2.4	2'-9 3/4"	30	0.3	25'-7"	324	3.0	3'-5"	33	0.4
	2	21"	15"	20'-5"	272	2.5	3'-0 1/4"	33	0.3	22'-10"	302	2.7	3'-4 1/4"	35	0.4	27'-11"	362	3.4	4'-1 3/4"	38	0.4
	3	28"	20"	24'-6"	358	3.5	3'-10 3/4"	43	0.5	27'-4"	391	3.9	4'-4"	45	0.5	33'-6"	480	4.7	5'-3 3/4"	59	0.7
	4	35"	24"	27'-10"	468	4.3	4'-9"	51	0.6	31'-1"	533	4.8	5'-3 1/2"	62	0.7	38'-1"	646	5.9	6'-5 3/4"	69	0.9
	5	42"	29"	31'-11"	587	6.0	5'-7 1/4"	70	0.9	35'-7"	639	6.7	6'-3"	74	1.0	43'-7"	788	8.3	7'-8"	82	1.2
	6	49"	33"	35'-3"	664	7.2	6'-5 1/2"	79	1.1	39'-4"	744	8.0	7'-2 1/2"	83	1.2	48'-2"	910	9.8	8'-10"	102	1.5
	7	57"	38"	39'-5"	860	8.9	7'-5"	88	1.4	44'-0"	956	9.9	8'-3 1/4"	93	1.6	53'-10"	1,156	12.2	10'-1 3/4"	114	1.9
	8	64"	43"	43'-6"	994	10.6	8'-5 1/2"	112	1.7	48'-6"	1,097	11.8	9'-5 1/4"	117	1.9	59'-5"	1,344	14.4	11'-6 1/2"	141	2.3
	9	71"	47"	46'-10"	1,096	12.3	9'-4 3/4"	122	2.1	52'-3"	1,211	13.7	10'-6"	127	2.3	64'-0"	1,509	16.8	12'-10 1/4"	152	2.8
6:1	1	17"	13"	27'-4"	361	3.2	2'-6"	29	0.3	30'-6"	396	3.6	2'-9 3/4"	30	0.3	37'-4"	478	4.4	3'-5"	33	0.3
	2	21"	15"	29'-9"	402	3.6	3'-0 1/4"	33	0.3	33'-2"	437	4.0	3'-4 1/4"	36	0.4	40'-8"	542	4.9	4'-1 3/4"	39	0.5
	3	28"	20"	35'-7"	513	5.1	3'-10 3/4"	43	0.5	39'-8"	570	5.6	4'-4"	46	0.5	48'-7"	694	6.9	5'-3 3/4"	60	0.7
	4	35"	24"	40'-3"	685	6.3	4'-9"	51	0.6	44'-11"	759	7.0	5'-3 1/2"	64	0.7	55'-0"	935	8.6	6'-5 3/4"	70	0.9
	5	42"	29"	46'-1"	857	8.8	5'-7 1/4"	72	0.9	51'-5"	944	9.8	6'-3"	74	1.0	62'-11"	1,180	12.0	7'-8"	80	1.3
	6	49"	33"	50'-10"	981	10.5	6'-5 1/2"	79	1.1	56'-8"	1,101	11.7	7'-2 1/2"	82	1.2	69'-5"	1,357	14.3	8'-10"	101	1.5
	7	57"	38"	56'-8"	1,273	13.0	7'-5"	88	1.4	63'-3"	1,408	14.5	8'-3 1/4"	92	1.6	77'-5"	1,724	17.7	10'-1 3/4"	114	1.9
	8	64"	43"	62'-6"	1,457	15.3	8'-5 1/2"	111	1.7	69'-8"	1,611	17.1	9'-5 1/4"	116	1.9	85'-4"	1,993	21.0	11'-6 1/2"	140	2.3
	9	71"	47"	67'-2"	1,623	17.9	9'-4 3/4"	120	2.1	75'-0"	1,820	20.0	10'-6"	126	2.3	91'-10"	2,198	24.4	12'-10 1/4"	152	2.8

- (1) Total quantities include one 3'-1" lap for bars over 60 ft in length.
- (2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
- (3) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- (4) K is measure from top of curb to inside face of pipe.
- (5) Dimensions shown are usual and maximum.
- (6) Quantities shown are for one structure end only (one headwall).
- (7) Indicated slope is perpendicular to centerline pipe or pipes.

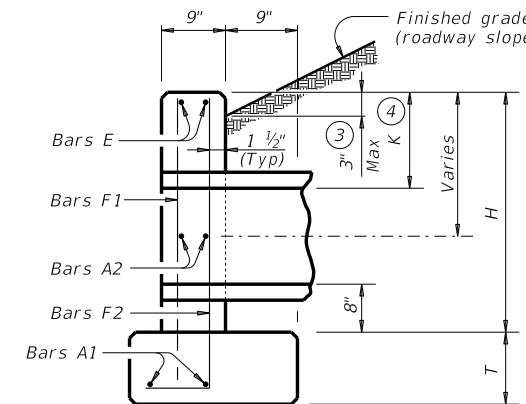


ELEVATION



PLAN OF SKEWED PIPES

Showing 30° skew



SECTION AT CENTER OF PIPE

TABLE OF CONSTANT DIMENSIONS

Design	Size of Pipe Arch		G	K (5)	H	T	E
	Span	Rise					
1	17"	13"	1'-0"	1'-0"	2'-7"	0'-10"	1'-6"
2	21"	15"	1'-2"	1'-0"	2'-9"	0'-10"	1'-6"
3	28"	20"	1'-5"	1'-0"	3'-2"	0'-10"	1'-10"
4	35"	24"	1'-8"	1'-0"	3'-6"	0'-10"	2'-0"
5	42"	29"	1'-11"	1'-0"	3'-11"	1'-0"	2'-4"
6	49"	33"	2'-2"	1'-0"	4'-3"	1'-0"	2'-6"
7	57"	38"	2'-5"	1'-0"	4'-8"	1'-0"	2'-10"
8	64"	43"	2'-10"	1'-0"	5'-1"	1'-0"	3'-0"
9	71"	47"	3'-2"	1'-0"	5'-5"	1'-0"	3'-4"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1'-6"	~
E	#5	~	2
F	#5	1'-0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED ARCH PIPE CULVERTS

CH-PW-A-S

FILE: CD-CH-PWAS-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
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