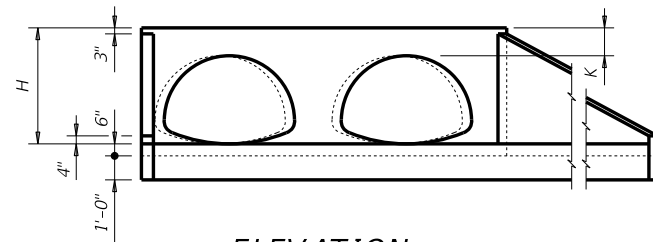


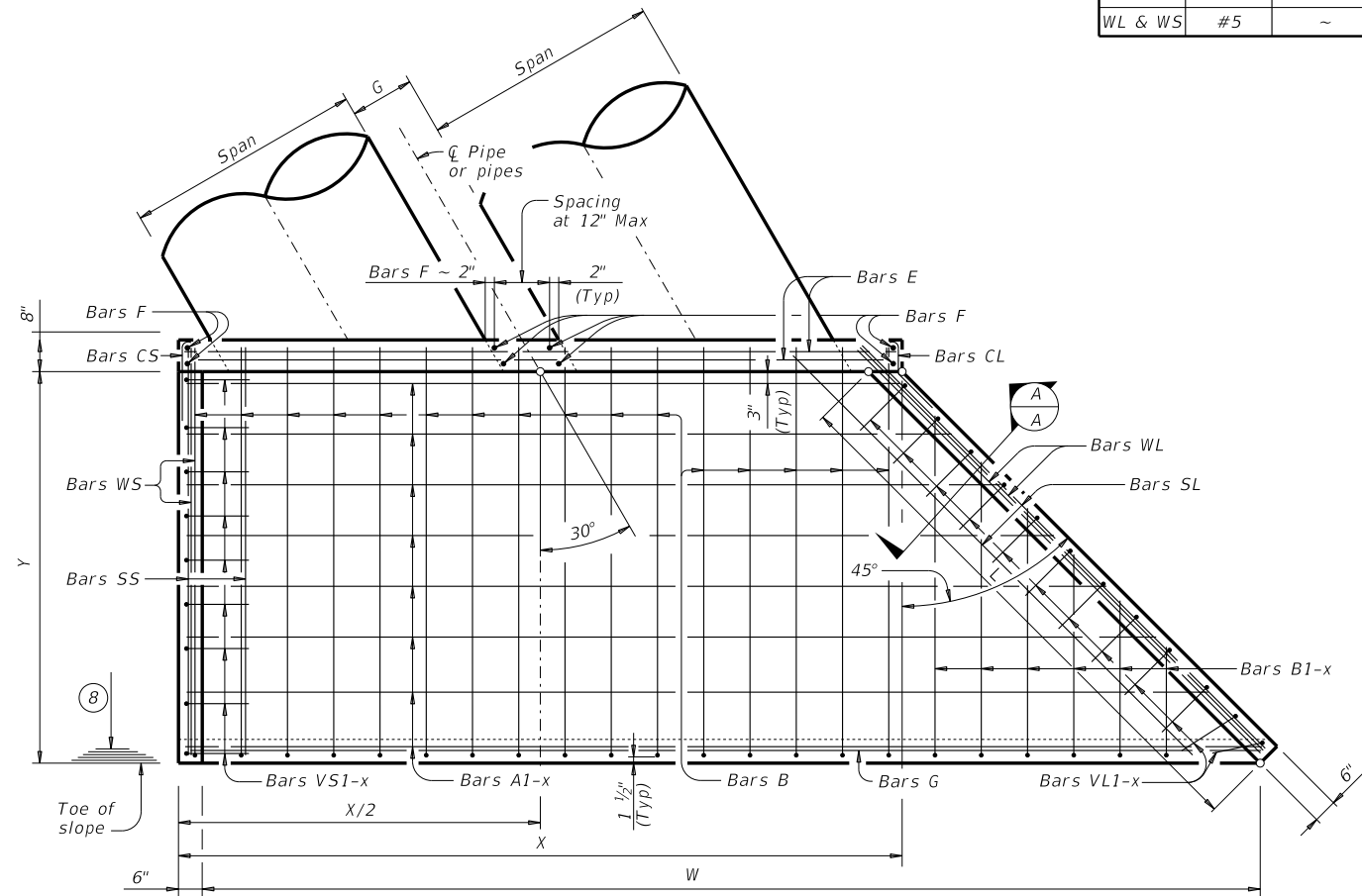
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TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (6)

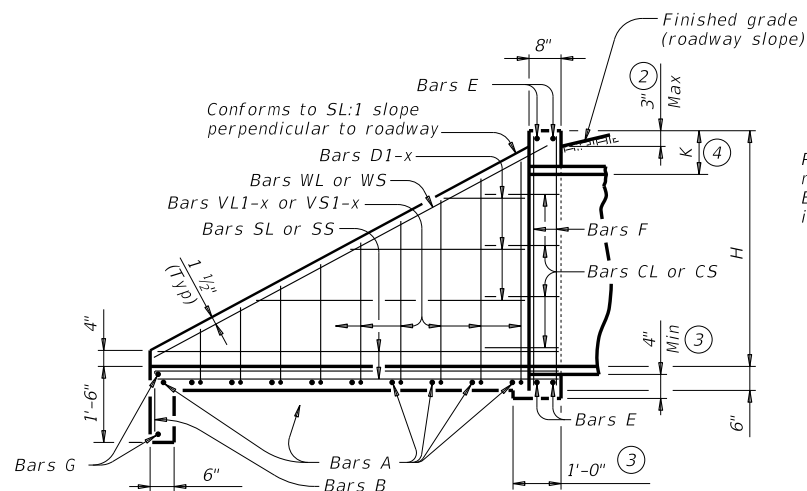
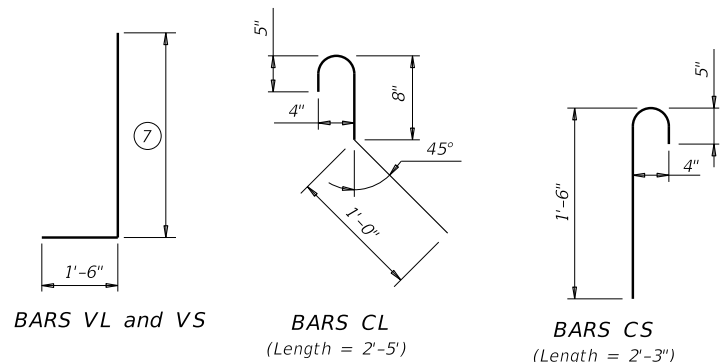
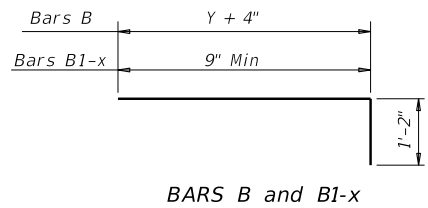
Slope	Design	Size of Pipe Arch		Values for One Pipe						Values to be Added for Each Add'l Pipe			
		Span	Rise	W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	X and W	Reinf (Lbs)	Conc (CY) (1)	
2:1	1	17"	13"	5' - 4 3/4"	3' - 7 1/4"	3' - 0"	4' - 3"	109	0.7	2' - 9 1/2"	39	0.4	
	2	21"	15"	6' - 1 1/4"	3' - 11 3/4"	3' - 4"	4' - 8 1/2"	120	0.9	3' - 4 1/2"	46	0.5	
	3	28"	20"	7' - 7 1/2"	4' - 8"	4' - 2"	5' - 10 3/4"	158	1.2	4' - 4"	65	0.7	
	4	35"	24"	8' - 11 1/2"	5' - 4"	4' - 10"	6' - 10"	192	1.5	5' - 3 1/2"	88	0.9	
	5	42"	29"	10' - 5 1/2"	6' - 0"	5' - 8"	8' - 0 1/4"	230	2.0	6' - 3"	109	1.2	
	6	49"	33"	11' - 9 3/4"	6' - 8 1/4"	6' - 4"	8' - 11 1/2"	261	2.4	7' - 2 1/2"	124	1.5	
	7	57"	38"	13' - 5"	7' - 5 1/2"	7' - 2"	10' - 1 3/4"	308	2.9	8' - 3 1/4"	149	1.9	
	8	64"	43"	14' - 11"	8' - 1 1/2"	8' - 0"	11' - 3 3/4"	355	3.5	9' - 5 1/4"	186	2.3	
	9	71"	47"	16' - 3"	8' - 9 1/2"	8' - 8"	12' - 3"	402	4.1	10' - 5 3/4"	215	2.8	
3:1	1	17"	13"	6' - 10 3/4"	3' - 7 1/4"	4' - 6"	6' - 4 1/4"	140	1.1	2' - 9 1/2"	41	1.4	
	2	21"	15"	7' - 9 1/4"	3' - 11 3/4"	5' - 0"	7' - 0 3/4"	160	1.3	3' - 4 1/2"	52	1.6	
	3	28"	20"	9' - 8 1/2"	4' - 8"	6' - 3"	8' - 10"	211	1.8	4' - 4"	72	1.8	
	4	35"	24"	11' - 4 1/2"	5' - 4"	7' - 3"	10' - 3"	257	2.3	5' - 3 1/2"	98	1.1	
	5	42"	29"	13' - 3 1/2"	6' - 0"	8' - 6"	12' - 0 1/4"	315	2.9	6' - 3"	126	1.5	
	6	49"	33"	14' - 11 3/4"	6' - 8 1/4"	9' - 6"	13' - 5 1/4"	361	3.6	7' - 2 1/2"	145	1.9	
	7	57"	38"	17' - 0"	7' - 5 1/2"	10' - 9"	15' - 2 1/2"	431	4.4	8' - 3 1/4"	178	2.4	
	8	64"	43"	18' - 11"	8' - 1 1/2"	12' - 0"	16' - 11 3/4"	500	5.4	9' - 5 1/4"	221	3.0	
	9	71"	47"	20' - 7"	8' - 9 1/2"	13' - 0"	18' - 4 3/4"	559	6.2	10' - 5 3/4"	255	3.6	
4:1	1	17"	13"	8' - 4 3/4"	3' - 7 1/4"	6' - 0"	8' - 5 3/4"	179	1.4	2' - 9 1/2"	46	0.5	
	2	21"	15"	9' - 5 1/4"	3' - 11 3/4"	6' - 8"	9' - 5 1/4"	202	1.7	3' - 4 1/2"	58	0.7	
	3	28"	20"	11' - 9 1/2"	4' - 8"	8' - 4"	11' - 9 1/2"	270	2.4	4' - 4"	81	1.0	
	4	35"	24"	13' - 9 1/2"	5' - 4"	9' - 8"	13' - 8"	334	3.1	5' - 3 1/2"	112	1.4	
	5	42"	29"	16' - 1 1/2"	6' - 0"	11' - 4"	16' - 0 1/4"	396	4.1	6' - 3"	139	1.8	
	6	49"	33"	18' - 1 3/4"	6' - 8 1/4"	12' - 8"	17' - 11"	475	4.9	7' - 2 1/2"	170	2.3	
	7	57"	38"	20' - 7"	7' - 5 1/2"	14' - 4"	20' - 3 1/4"	555	6.2	8' - 3 1/4"	204	3.0	
	8	64"	43"	22' - 11"	8' - 1 1/2"	16' - 0"	22' - 7 1/2"	658	7.5	9' - 5 1/4"	256	3.7	
	9	71"	47"	24' - 11"	8' - 9 1/2"	17' - 4"	24' - 6 1/4"	733	8.7	10' - 5 3/4"	295	4.4	
6:1	1	17"	13"	11' - 4 3/4"	3' - 7 1/4"	9' - 0"	12' - 8 3/4"	256	2.2	2' - 9 1/2"	53	0.7	
	2	21"	15"	12' - 9 1/4"	3' - 11 3/4"	10' - 0"	14' - 1 3/4"	295	2.7	3' - 4 1/2"	68	0.9	
	3	28"	20"	15' - 11 1/2"	4' - 8"	12' - 6"	17' - 8 1/4"	401	3.9	4' - 4"	100	1.3	
	4	35"	24"	18' - 7 1/2"	5' - 4"	14' - 6"	20' - 6"	486	5.1	5' - 3 1/2"	132	1.8	
	5	42"	29"	21' - 9 1/2"	6' - 0"	17' - 0"	24' - 0 1/2"	602	6.7	6' - 3"	172	2.5	
	6	49"	33"	24' - 5 3/4"	6' - 8 1/4"	19' - 0"	26' - 10 1/2"	723	8.2	7' - 2 1/2"	212	3.2	
	7	57"	38"	27' - 9"	7' - 5 1/2"	21' - 6"	30' - 5"	861	10.4	8' - 3 1/4"	264	4.1	
	8	64"	43"	30' - 11"	8' - 1 1/2"	24' - 0"	33' - 11 1/4"	1,017	12.6	9' - 5 1/4"	325	5.1	
	9	71"	47"	33' - 7"	8' - 9 1/2"	26' - 0"	36' - 9 1/4"	1,149	14.7	10' - 5 3/4"	382	6.1	



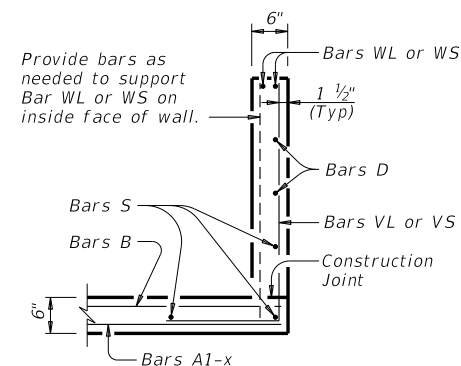
ELEVATION
(Showing dimensions.)



PLAN



TYPICAL WING ELEVATION



SECTION A-A

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
CL & CS	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
SL & SS	#4	~	6
VL & VS	#4	1' - 0"	~
WL & WS	#5	~	4

TABLE OF CONSTANT DIMENSIONS

Design	Size of Pipe Arch		G	K (5)	H
	Span	Rise			
1	17"	13"	1' - 0"	1' - 0"	2' - 1"
2	21"	15"	1' - 2"	1' - 0"	2' - 3"
3	28"	20"	1' - 5"	1' - 0"	2' - 8"
4	35"	24"	1' - 8"	1' - 0"	3' - 0"
5	42"	29"	1' - 11"	1' - 0"	3' - 5"
6	49"	33"	2' - 2"	1' - 0"	3' - 9"
7	57"	38"	2' - 5"	1' - 0"	4' - 2"
8	64"	43"	2' - 10"	1' - 0"	4' - 7"
9	71"	47"	3' - 2"	1' - 0"	4' - 11"

- Quantities shown are for metal pipe and will increase slightly for concrete pipe installations.
- 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.
- Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.
- K is measured from top of curb to inside face of pipe.
- Dimensions shown are usual and maximum.
- Quantities shown are for one structure end only (one headwall).
- Min Length = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L} \right)$
Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L} \right) - 1"$
- Lengths of wings based on SL:1 slope along this line.

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.

Texas Department of Transportation **Bridge Division Standard**

CONCRETE HEADWALLS WITH FLARED WINGS FOR 30° SKEW ARCH PIPE CULVERTS

CH-FW-A-30

FILE: CD-CH-FWA30-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
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