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633.01	Precast Conc. Endwall for Single Pipe Culverts

GENERAL NOTES:

1. All corners are to be chamfered 1".
2. The contractor will be required to place (2) #6 bars "Y" in the top of all endwalls for pipe culverts 42" and over with a minimum of 3" cover and a length of 6" less than endwall.
3. Forms are to be used for construction of bottom slab.
4. Wall thickness (T) shown is not to be interpreted to mean the thickness acceptable, but is used only in computing endwall quantities.
5. If contractor elects to use construction joint at bottom of pipe and pours base separately, the top of the base shall be left rough.
6. When contractor elects to use construction joint at bottom of pipe, bar "X" (dowels) shall be placed in the base as shown on plans, spacing of bars to be approximately 12" centers unless engineers direct otherwise.
7. When skew angle of pipe is over 45°, use G-1 dimensions for 45° plus 6" for each 5° over 45°, G2 dimension will be the new dimension divided by the cosine of the angle of pipe skew.
8. Class "AA" concrete shall be used.
9. All pipes will meet the NCDOT-Division of Highways specifications for load bearing capacities.



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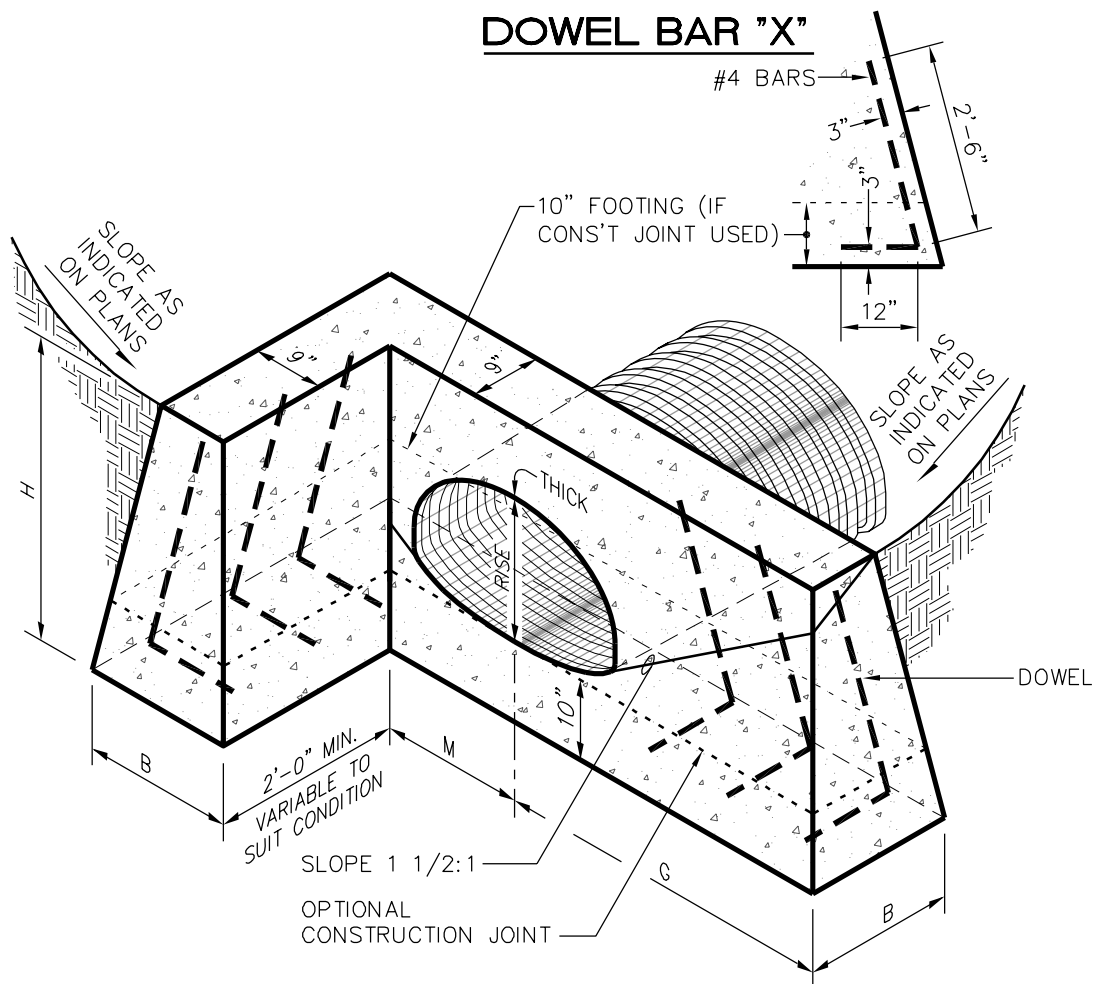
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ENDWALLS NOTES

DOWEL BAR "X"**REINFORCING QUANTITIES**

SPAN	18"	22"	25"	29"	36"	43"	50"	58"	65"	72"
BARS	X	←							→	X
QTY.	5	5	5	6	6	7	7	7	8	8
LBS.	12	12	12	14	14	16	16	16	19	19

DIMENSIONS AND CONCRETE QUANTITIES

COMMON DIMENSIONS USING C.M. ARCH PIPE							TOTAL CONC.
SPAN	RISE	THICK	H	B	G	M	CU. YD.
18"	11"	.064	2'-7"	1'-4"	2'-5"	1'-0"	0.604
22"	13"	.064	2'-9"	1'-5"	2'-9"	1'-2"	0.712
25"	16"	.064	3'-0"	1'-6"	3'-3"	1'-4"	0.877
29"	18"	.079	3'-2"	1'-7"	3'-7"	1'-6"	1.015
36"	22"	.079	3'-6"	1'-9"	4'-3"	1'-9"	1.306
43"	27"	.079	3'-11"	2'-0"	5'-1"	2'-1"	1.796
50"	31"	.109	4'-3"	2'-2"	5'-9"	2'-4"	2.206
58"	36"	.109	4'-8"	2'-4"	6'-7"	2'-8"	2.794
65"	40"	.138	5'-0"	2'-6"	7'-4"	3'-0"	3.387
72"	44"	.138	5'-4"	2'-8"	8'-0"	3'-3"	3.995

QUANTITIES BASED ON 2'-0"

**18" THRU 72" PIPE
ARCH PIPE**

NOTES:

1. See Std. detail No. 630.01 for general notes.



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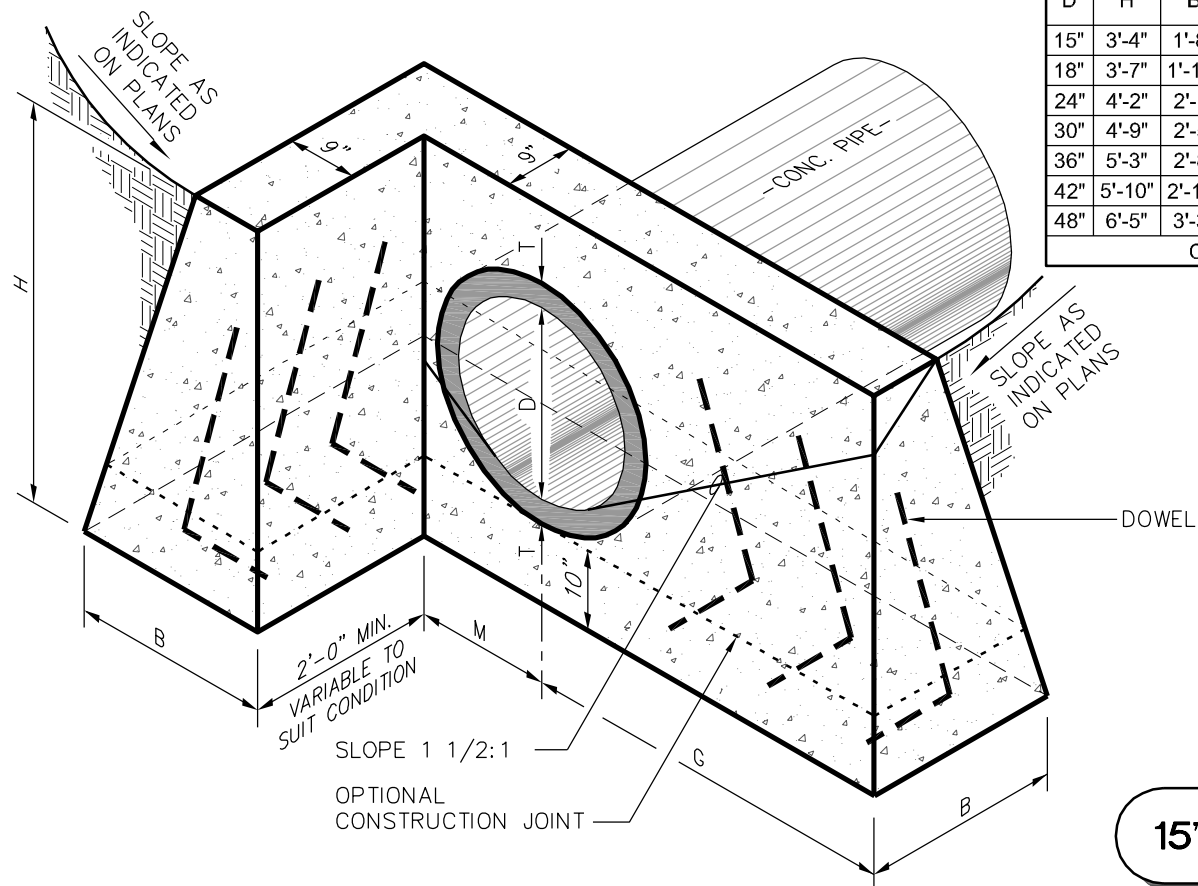
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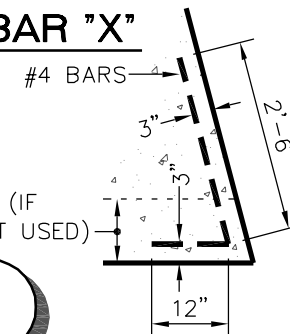
STD. CONC. "L" ENDWALL FOR SINGLE PIPE CULVERTS

**DIMENSIONS AND CONCRETE QUANTITIES**

COMMON DIMENSIONS							COMMON DIMENSIONS				
D	H	B	G	M	T	CU. YD.	H	B	G	M	CU. YD.
15"	3'-4"	1'-8"	2'-9"	1'-10"	1 7/8"	0.960	3'-0"	1'-5"	2'-6"	0'-11"	0.770
18"	3'-7"	1'-10"	3'-2"	1'-2"	2"	1.193	3'-3"	1'-8"	2'-11"	1'-0"	0.964
24"	4'-2"	2'-1"	4'-0"	1'-5"	2 1/2"	1.711	3'-9"	1'-11"	3'-8"	1'-3"	1.385
30"	4'-9"	2'-5"	4'-7"	1'-9"	2 1/4"	2.394	4'-3"	2'-2"	4'-5"	1'-6"	1.908
36"	5'-3"	2'-8"	5'-6"	2'-0"	3"	3.169	4'-9"	2'-5"	5'-2"	1'-9"	2.544
42"	5'-10"	2'-11"	6'-4"	2'-4"	3 1/2"	4.139	5'-3"	2'-8"	5'-11"	2'-0"	3.301
48"	6'-5"	3'-3"	7'-2"	2'-11"	4"	5.422	5'-9"	2'-11"	6'-8"	2'-3"	4.193
CONCRETE PIPE							METAL PIPE				

REINFORCING QUANTITIES

SPAN	15"	18"	24"	30"	36"	42"CM	42"RC	48"CM	48"RC
BARS	X	X	X	X	X	X	Y	X	Y
QTY.	5	5	6	6	7	7	2	8	2
LBS.	12	12	14	14	16	47	49	52	55

DOWEL BAR "X"10" FOOTING (IF
CONST JOINT USED)**15" THRU 48" PIPE****NOTES:**

- See Std. detail No. 630.01 for general notes.



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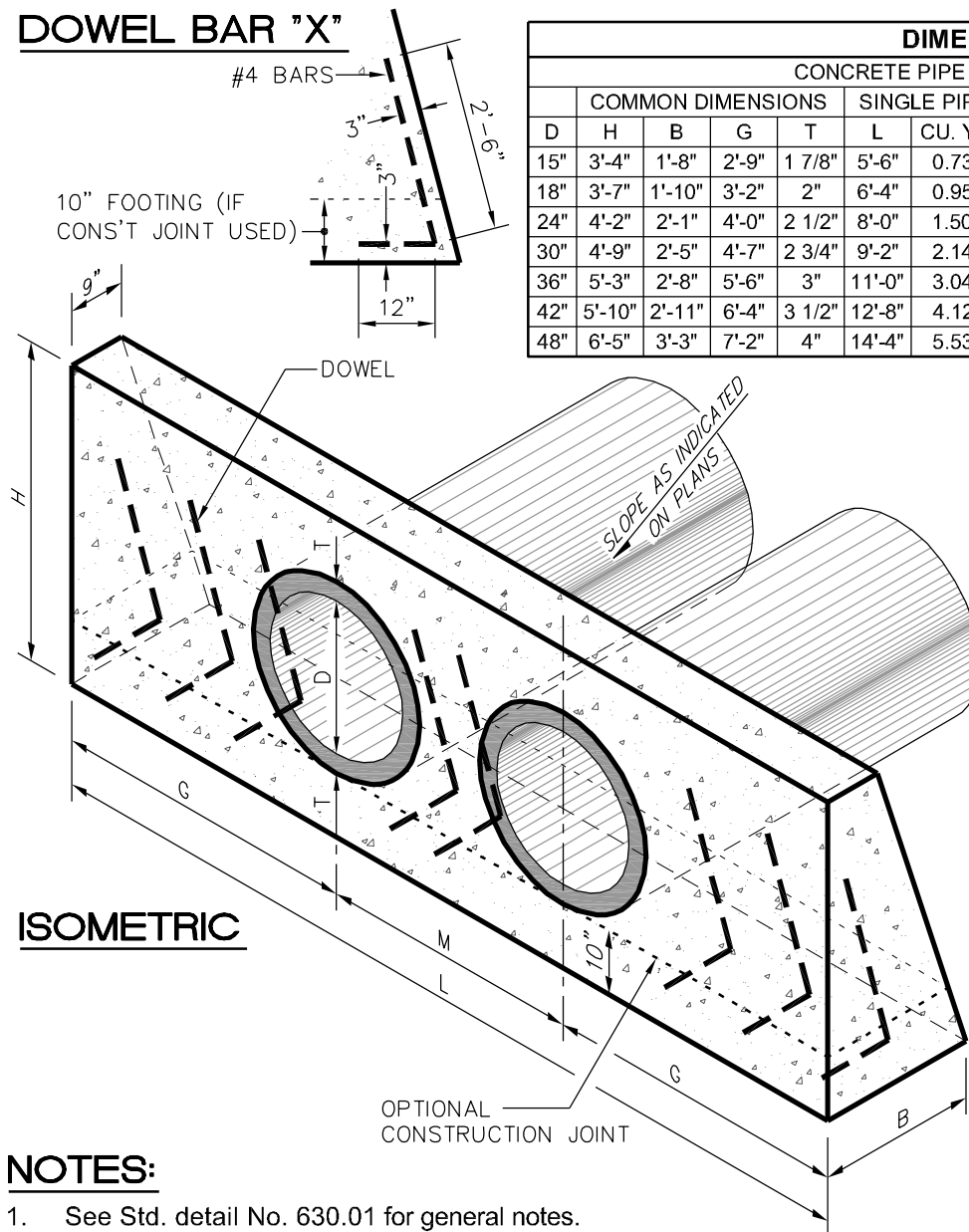
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STD. CONC. "L" ENDWALL FOR SINGLE PIPE CULVERTS

DOWEL BAR "X"**DIMENSIONS AND CONCRETE QUANTITIES**

CONCRETE PIPE										CORRUGATED METAL PIPE							
COMMON DIMENSIONS					SINGLE PIPE		DOUBLE PIPE			COMMON DIMS.			SINGLE PIPE		DOUBLE PIPE		
D	H	B	G	T	L	CU. YD.	M	L	CU. YD.	H	B	G	L	CU. YD.	M	L	CU. YD.
15"	3'-4"	1'-8"	2'-9"	1 7/8"	5'-6"	0.734	2'-2"	7'-8"	0.970	3'-0"	1'-6"	2'-6"	5'-0"	0.573	1'-11"	6'-11"	0.780
18"	3'-7"	1'-10"	3'-2"	2"	6'-4"	0.958	2'-7"	8'-11"	1.274	3'-3"	1'-8"	2'-11"	5'-10"	0.767	2'-3"	8'-1"	1.014
24"	4'-2"	2'-1"	4'-0"	2 1/2"	8'-0"	1.506	3'-5"	11'-5"	2.010	3'-9"	1'-11"	3'-8"	7'-4"	1.200	3'-0"	10'-4"	1.597
30"	4'-9"	2'-5"	4'-7"	2 3/4"	9'-2"	2.145	4'-3"	13'-5"	2.920	4'-3"	2'-2"	4'-5"	8'-10"	1.757	3'-9"	12'-7"	2.340
36"	5'-3"	2'-8"	5'-6"	3"	11'-0"	3.040	5'-0"	16'-0"	4.086	4'-9"	2'-5"	5'-2"	10'-4"	2.455	4'-6"	14'-10"	3.288
42"	5'-10"	2'-11"	6'-4"	3 1/2"	12'-8"	4.120	5'-10"	18'-6"	5.534	5'-3"	2'-8"	5'-11"	11'-10"	3.310	5'-3"	17'-1"	4.434
48"	6'-5"	3'-3"	7'-2"	4"	14'-4"	5.535	6'-8"	21'-0"	7.427	5'-9"	2'-11"	6'-8"	13'-4"	4.337	6'-0"	19'-4"	5.812

DOWELS IN ENDWALL WITH REINFORCED CONC. PIPE

L	PIPE DIA.	SINGLE PIPE							DOUBLE PIPE						
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"
O	BARS	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5
M	QTY.	-	-	-	-	-	-	2	1	1	2	2	2	2	2
G	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5
TOT. LBS.		9	9	14	14	19	55	65	12	12	19	19	23	77	92

SEE NOTE

DOWELS IN ENDWALL WITH CORRUGATED METAL PIPE

L	PIPE DIA.	SINGLE PIPE							DOUBLE PIPE						
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"
O	BARS	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5
M	QTY.	-	-	-	-	-	-	2	1	1	1	2	2	2	2
G	QTY.	2	2	3	3	4	4	5	2	2	3	3	4	4	5
TOT. LBS.		9	9	14	14	19	53	62	12	12	16	19	23	73	85

SEE NOTES

15" THRU 48" PIPE
90° SKEW

NOTES:

1. See Std. detail No. 630.01 for general notes.



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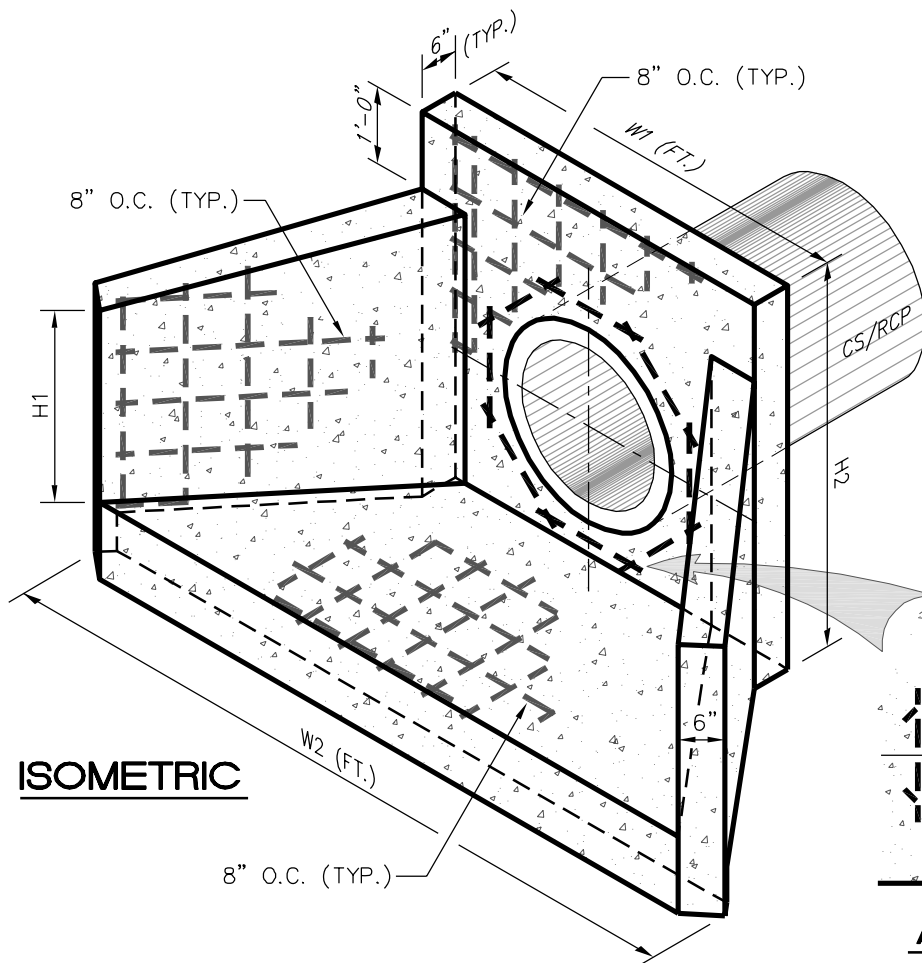
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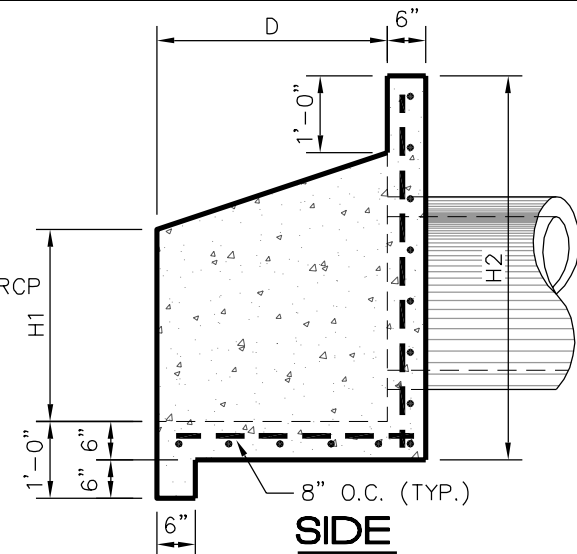
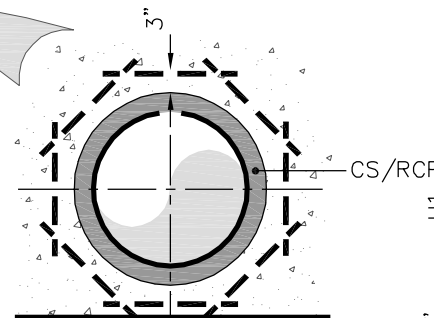
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STD. CONC. ENDWALL FOR SINGLE & DOUBLE PIPE CULVERTS



ENDWALL DIMENSIONS						
FT.	MINIMUM	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.	MIN./MAX.
PIPE DIA.	BAR SIZE	H1 (FT.)	H2 (FT.)	D (FT.)	W1	W2
1.0	#5 @ 8"	1.25 / 2.00	2.00 / 3.75	1.25 / 1.75	3.00 / 3.75	5.50 / 6.00
1.25	#5 @ 8"	1.25 / 2.00	3.00 / 3.75	1.25 / 2.00	3.50 / 3.75	6.50 / 6.75
1.50	#5 @ 8"	1.25 / 2.00	3.00 / 4.25	1.50 / 2.50	3.50 / 3.75	6.50 / 6.75
2.0	#5 @ 8"	1.50 / 2.50	4.00 / 4.75	1.75 / 2.50	4.00 / 4.25	7.50 / 8.25
2.5	#5 @ 8"	2.50 / 3.50	4.00 / 6.00	2.00 / 3.00	4.50 / 5.50	10.00 / 11.50
3.0	#5 @ 8"	3.00 / 3.50	5.00 / 6.00	2.75 / 3.50	5.25 / 5.75	11.50 / 11.75
3.5	#5 @ 8"	3.25 / 4.50	6.00 / 6.75	3.25 / 3.50	6.00 / 6.75	12.00 / 13.25
4.0	#5 @ 8"	3.50 / 4.50	6.50 / 7.00	3.25 / 3.50	6.50 / 6.75	13.00 / 13.25
4.5	#5 @ 8"	4.00 / 5.00	6.50 / 8.50	3.25 / 4.00	7.00 / 9.25	13.50 / 15.75
5.0	#5 @ 8"	4.50 / 5.00	7.00 / 8.50	3.25 / 4.00	7.25 / 9.25	13.75 / 15.75
5.5	#5 @ 8"	4.50 / 5.00	7.50 / 8.50	3.25 / 4.00	7.25 / 9.25	14.00 / 15.75
6.0	#5 @ 8"	4.50 / 5.00	7.50 / 8.50	3.25 / 4.00	7.75 / 9.25	14.75 / 16.75



NOTE: THE MINIMUM BAR SIZE SHALL BE #5 BARS AT 8" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED

NOTES:

- See Std. detail No. 630.01 for general notes.



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PRECAST CONC. ENDWALL FOR SINGLE PIPE CULVERTS

**12" THRU 72" PIPE
90° SKEW**