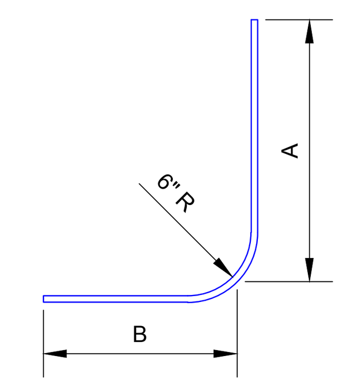
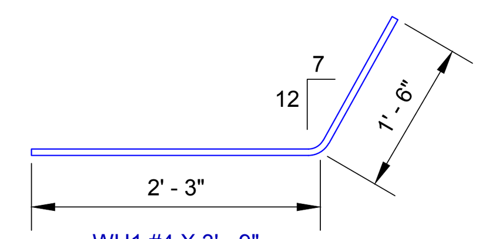
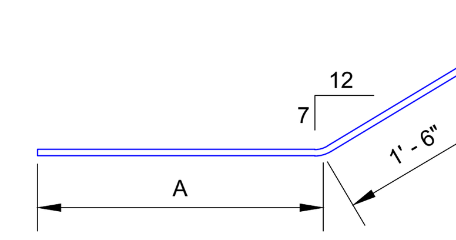


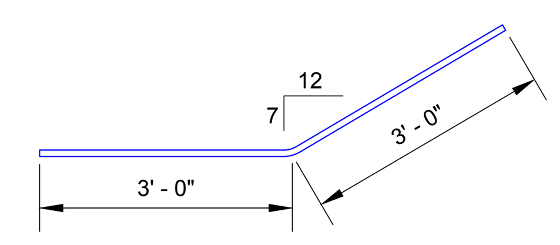
WV1, WV2 & WV3 (SEE TABLE)



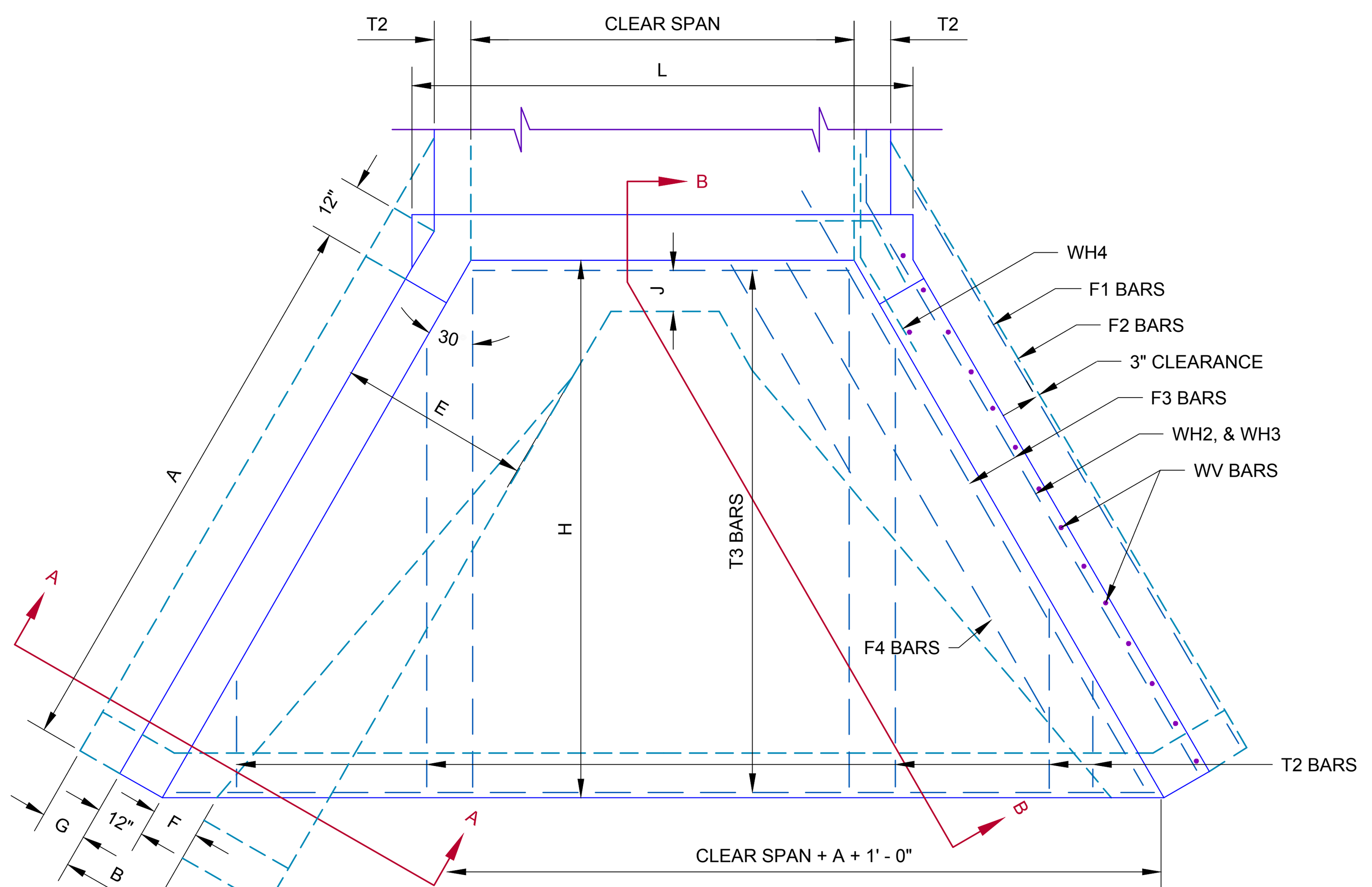
WH1 #4 X 3' - 9"

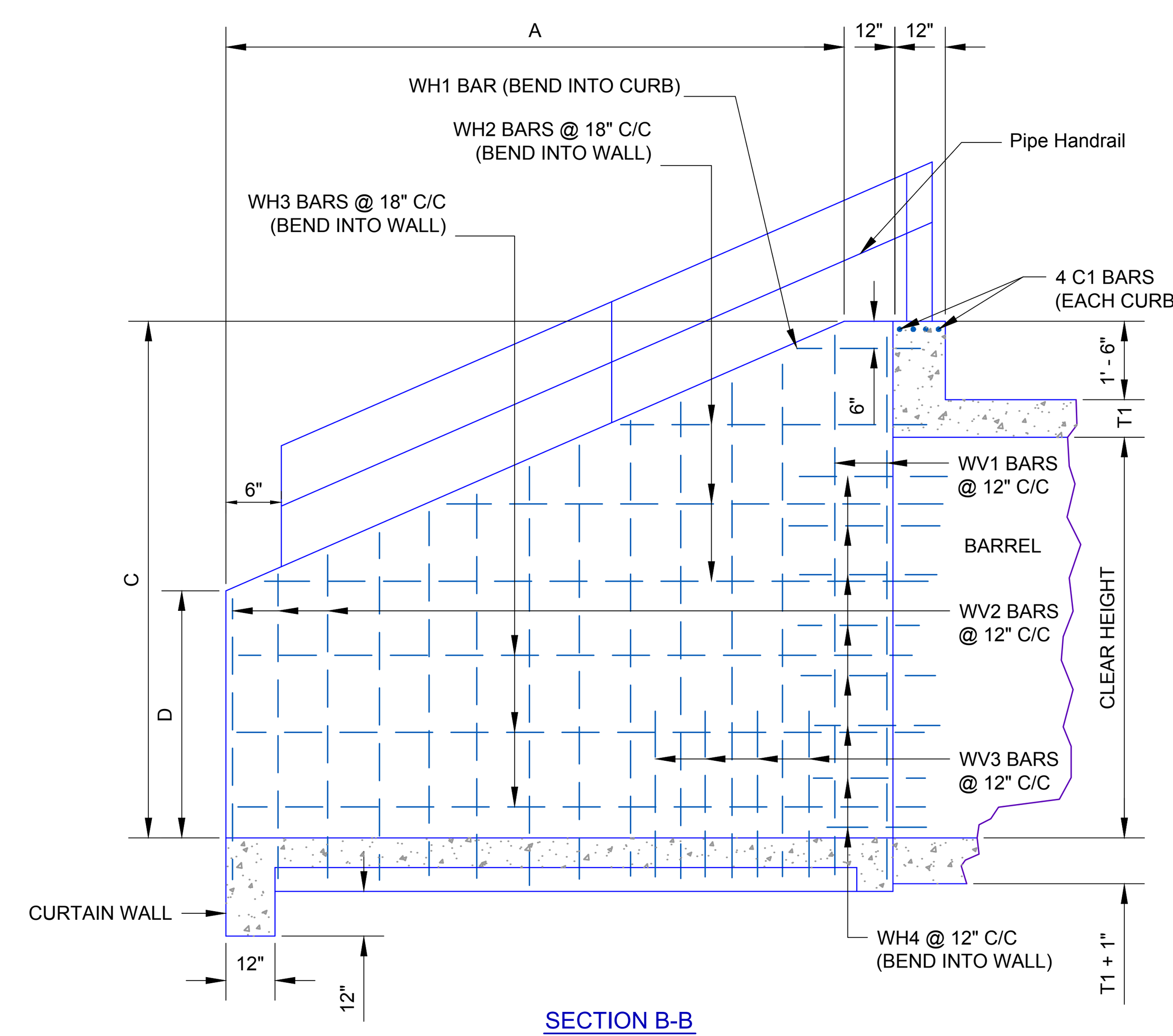


WH2 & WH3 (SEE TABLE)

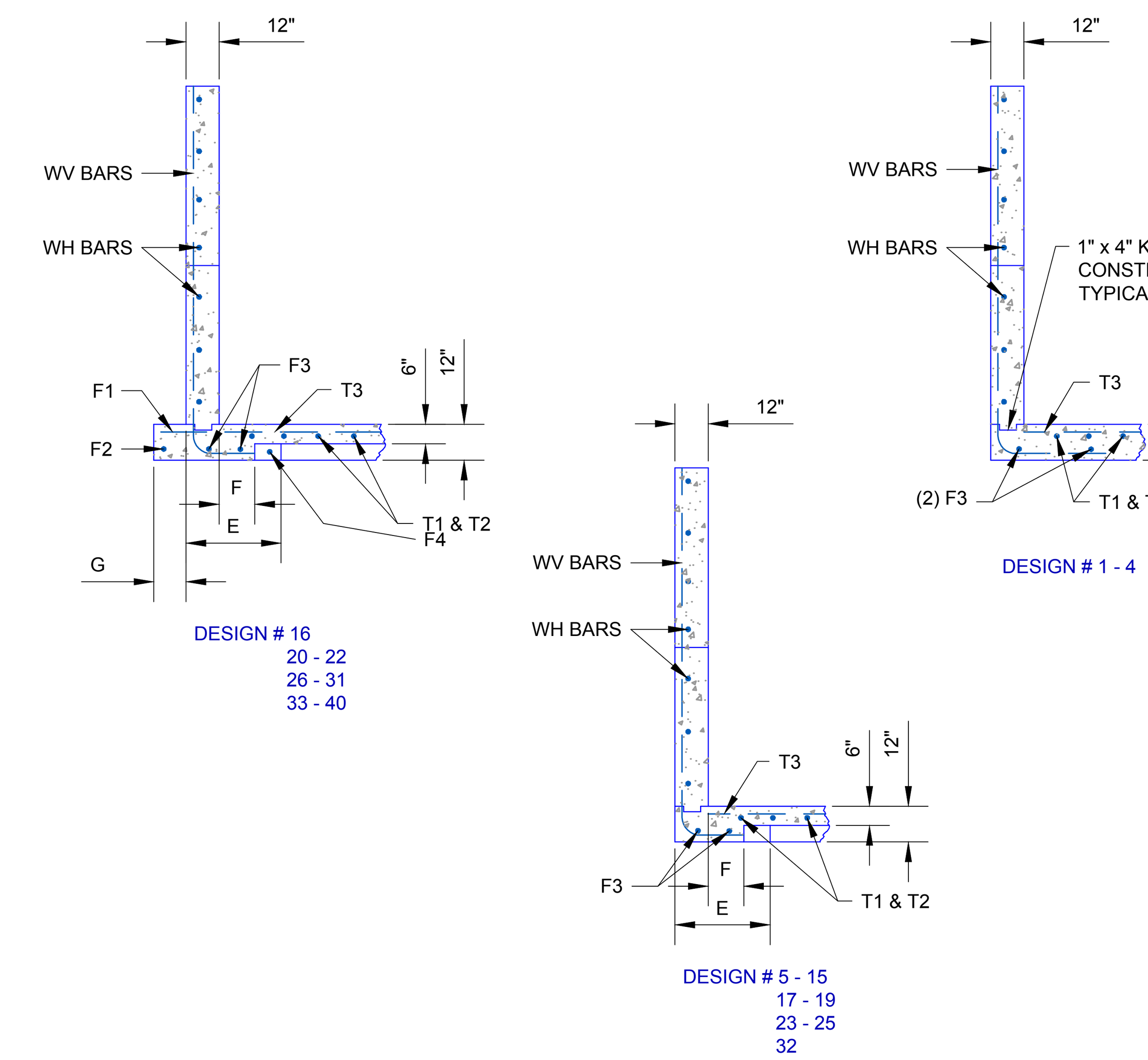


WH3 X 6' - 0"

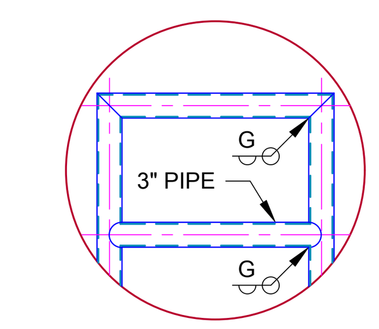




SECTION B-B

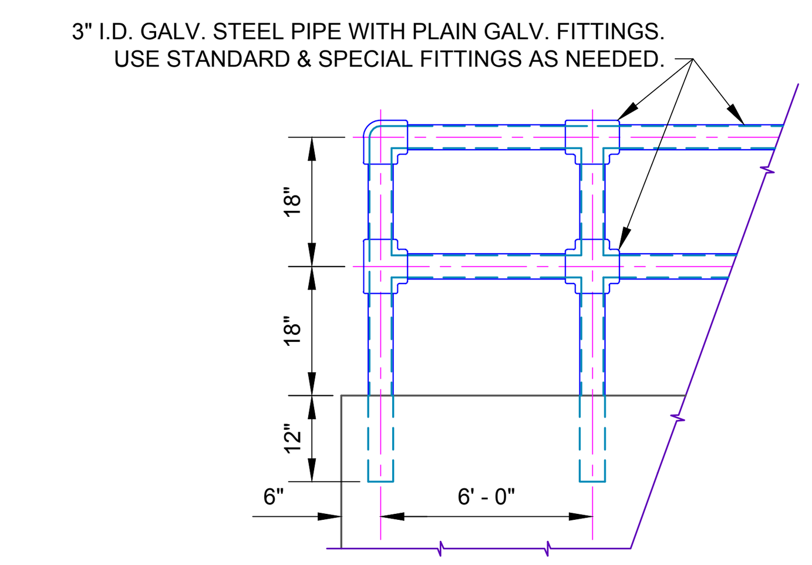


SECTION A-A



ALTERNATE DETAIL

(USUING WELD CONNECTIONS ON PIPE HANDRAILS)



PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.

NOTE: PIPE HANDRAIL SHALL BE CONSTRUCTED ON TOP OF THE HEADWALL AND ALONG BOTH WINGWALLS.

DESIGN #	CLEAR SPAN	CLEAR HEIGHT	A	B	C	D	E	F	G	H	J	L	T1	T2	8 - C1 #4 AS SHOWN LENGTH
1	2'	2'	3' - 0"	1' - 0"	4' - 0"	2' - 8 1/2"	1' - 0"	0	0	3' - 5 5/8"		4' - 3 3/4"	6"	6"	4' - 0"
2	3'	2'	3' - 0"	1' - 0"	4' - 0 1/4"	2' - 8 1/2"	1' - 0"	0	0	3' - 5 5/8"		5' - 3 3/4"	6 3/4"	6"	5' - 0"
3		2.5'	3' - 8"	1' - 0"	4' - 6 1/4"	2' - 11"	1' - 0"	0	0	4' - 0 1/2"		5' - 3 3/4"	6 3/4"	6"	5' - 0"
4		3'	4' - 5"	1' - 0"	5' - 0 1/4"	3' - 1"	1' - 0"	0	0	4' - 8 1/4"		5' - 3 3/4"	6 3/4"	6"	5' - 0"
5	4'	2'	3' - 2"	2' - 0"	4' - 1"	2' - 8 1/2"	2' - 0"	1' - 0"	0	3' - 7 1/4"	1' - 0"	6' - 3 3/4"	7"	6"	6' - 0"
6		2.5'	3' - 10"	2' - 3"	4' - 7"	2' - 11"	2' - 3"	1' - 3"	0	4' - 2 1/4"	1' - 0"	6' - 3 3/4"	7"	6"	6' - 0"
7		3'	4' - 7"	2' - 3"	5' - 1"	3' - 1"	2' - 3"	1' - 3"	0	4' - 10"	1' - 0"	6' - 3 3/4"	7"	6"	6' - 0"
8		4'	6' - 0"	2' - 9"	6' - 1"	3' - 5 1/2"	2' - 9"	1' - 9"	0	6' - 0 3/4"	1' - 0"	6' - 3 3/4"	7"	6"	6' - 0"
9	5'	2'	3' - 2"	2' - 0"	4' - 11 1/2"	2' - 9"	2' - 0"	1' - 0"	0	3' - 7 1/4"	1' - 0"	7' - 3 3/4"	7 1/2"	6"	7' - 0"
10		3'	4' - 8"	2' - 3"	5' - 1 1/2"	3' - 11 1/2"	2' - 3"	1' - 3"	0	4' - 10 7/8"	1' - 0"	7' - 3 3/4"	7 1/2"	6"	7' - 0"
11		4'	6' - 1"	2' - 9"	6' - 1 1/2"	3' - 6"	2' - 9"	1' - 9"	0	6' - 1 5/8"	1' - 0"	7' - 3 3/4"	7 1/2"	6"	7' - 0"
12		5'	7' - 7"	3' - 6"	7' - 1 1/2"	3' - 10"	3' - 6"	2' - 6"	0	7' - 5 1/4"	1' - 0"	7' - 3 3/4"	7 1/2"	6"	7' - 0"
13	6'	3'	4' - 8"	2' - 3"	5' - 2"	3' - 2"	2' - 3"	1' - 3"	0	4' - 10 7/8"	1' - 0"	8' - 3 3/4"	8"	6"	8' - 0"
14		4'	6' - 2"	2' - 9"	6' - 2"	3' - 6"	2' - 9"	1' - 9"	0	6' - 2 1/2"	1' - 0"	8' - 3 3/4"	8"	7"	8' - 0"
15		5'	7' - 8"	3' - 6"	7' - 2"	3' - 10"	3' - 6"	2' - 6"	0	7' - 6 1/8"	1' - 0"	8' - 3 3/4"	8"	8"	8' - 0"
16		6'	9' - 1"	2' - 0"	8' - 2"	4' - 3"	3' - 9"	1' - 0"	1' - 0"	8' - 8 3/4"	1' - 0"	8' - 3 3/4"	8"	8"	8' - 0"
17	8'	3'	4' - 10"	2' - 3"	5' - 3"	3' - 2"	2' - 3"	1' - 3"	0	5' - 0 5/8"	1' - 0"	10' - 3 3/4"	9"	8"	10' - 0"
18		4'	6' - 3"	2' - 9"	6' - 3"	3' - 6 1/2"	2' - 9"	1' - 9"	0	6' - 3 3/8"	1' - 0"	10' - 3 3/4"	9"	8"	10' - 0"
19		5'	7' - 9"	3' - 6"	7' - 3"	3' - 11"	3' - 6"	2' - 6"	0	7' - 6 7/8"	1' - 0"	10' - 3 3/4"	9"	8"	10' - 0"
20		6'	9' - 3"	2' - 0"	8' - 3"	4' - 3"	2' - 9"	1' - 0"	1' - 0"	8' - 10 1/2"	1' - 0"	10' - 3 3/4"	9"	9"	10' - 0"
21		7'	10' - 8"	2' - 0"	9' - 3"	4' - 7 1/2"	3' - 6"	1' - 0"	1' - 0"	10' - 1 1/4"	1' - 0"	10' - 3 3/4"	9"	9"	10' - 0"
22		8'	12' - 2"	2' - 0"	10' - 3"	5' - 0"	4' - 0"	1' - 0"	1' - 0"	11' - 4 7/8"	1' - 0"	10' - 3 3/4"	9"	9"	10' - 0"
23	10'	3'	4' - 11"	2' - 3"	5' - 4"	3' - 2 1/2"	2' - 3"	1' - 3"	0	5' - 1 1/2"	1' - 0"	12' - 3 3/4"	10"	8"	12' - 0"
24		4'	6' - 5"	2' - 9"	6' - 4"	3' - 7"	2' - 9"	1' - 9"	0	6' - 5 1/8"	1' - 0"	12' - 3 3/4"	10"	8"	12' - 0"
25		5'	7' - 11"	3' - 6"	7' - 4"	3' - 11"	3' - 6"	2' - 6"	0	7' - 8 5/8"	1' - 0"	12' - 3 3/4"	10"	8"	12' - 0"
26		6'	9' - 4"	2' - 0"	8' - 4"	4' - 3 1/2"	2' - 9"	1' - 0"	1' - 0"	8' - 11 3/8"	1' - 0"	12' - 3 3/4"	10"	9"	12' - 0"
27		7'	10' - 10"	2' - 0"	9' - 4"	4' - 8"	3' - 6"	1' - 0"	1' - 0"	10' - 3"	1' - 0"	12' - 3 3/4"	10"	9"	12' - 0"
28		8'	12' - 3"	2' - 0"	10' - 4"	5' - 0"	4' - 0"	1' - 0"	1' - 0"	11' - 5 3/4"	1' - 0"	12' - 3 3/4"	10"	9"	12' - 0"
29		9'	13' - 9"	2' - 0"	11' - 4"	5' - 4 1/2"	4' - 9"	1' - 0"	1' - 0"	12' - 9 1/4"	1' - 0"	12' - 3 3/4"	10"	9"	12' - 0"
30		10'	15' - 2"	2' - 0"	12' - 4"	5' - 9"	5' - 9"	1' - 0"	1' - 0"	14' - 0"	1' - 0"	12' - 3 3/4"	10"	9"	12' - 0"
31		12'	18' - 2"	3' - 6"	14' - 4"	6' - 6"	7' - 0"	2' - 6"	2' - 6"	16' - 7 1/8"	3' - 10 1/2"	12' - 3 3/4"	10"	9"	12' - 0"
32	12'	5'	8' - 0"	3' - 6"	7' - 5"	3' - 11 1/2"	3' - 6"	2' - 6"	1' - 0"	7' - 9 1/8"	1' - 0"	14' - 3 3/4"	11"	9"	14' - 0"
33		6'	9' - 6"	2' - 0"	8' - 5"	4' - 4"	2' - 9"	1' - 0"	1' - 0"	9' - 1 1/8"	1' - 0"	14' - 3 3/4"	11"	9"	14' - 0"
34		7'	10' - 11"	2' - 0"	9' - 5"	4' - 8 1/2"	3' - 6"	1' - 0"	1' - 0"	10' - 3 7/8"	1' - 0"	14' - 3 3/4"	11"	9"	14' - 0"
35		8'	12' - 5"	2' - 0"	10' - 5"	5' - 0 1/2"	4' - 0"	1' - 0"	1' - 0"	11' - 7 3/8"	1' - 0"	14' - 3 3/4"	11"	9"	14' - 0"
36		9'	13' - 10"	2' - 0"	11' - 5"	5' - 5"	4' - 9"	1' - 0"	1' - 0"	12' - 10 1/8"	1' - 0"	14' - 3 3/4"	11"	9"	14' - 0"
37		10'	15' - 4"	2' - 0"	12' - 5"	5' - 9"	5' - 9"	1' - 0"	1' - 0"	14' - 1 3/4"	1' - 0"	14' - 3 3/4"	11"	10"	14' - 0"
38		11'	16' - 9"	2' - 0"	13' - 5"	6' - 2"	7' - 0"	1' - 0"	1' - 0"	15' - 4 1/2"	2' - 0"	14' - 3 3/4"	11"	10"	14' - 0"
39		12'	18' - 3"	3' - 6"	14' - 5"	6' - 6"	7' - 0"	2' - 6"	2' - 6"	16' - 8"	2' - 0"	14' - 3 3/4"	11"	10"	14' - 0"
40		14'	21' - 2"	4' - 0"	16' - 5"	7' - 3"	7' - 0"	3' - 0"	3' - 0"	19' - 2 3/8"	2' - 0"	14' - 3 3/4"	11"	11"	14' - 0"

DESIGN #	F1 BARS @ + 12" C/C #	F1 SIZE	F1 LENGTH	F2 #4 BARS @ 18" C/C #	F2 LENGTH	F3 #4 BARS @ 18" C/C #	F3 LENGTH	F4 #4 BARS @ 18" C/C 4 SETS OF	F4 LENGTH MIN	F4 LENGTH MAX	F4 LENGTH AVG	T1 #4 BARS @ 12" C/C #	T1 LENGTH	T2 #4 BARS @ 12" C/C 4 SETS OF	T2 LENGTH MIN	T2 LENGTH MAX	T2 LENGTH AVG	T3 #4 BARS @ 12" C/C 4 SETS OF	T3 LENGTH MIN	T3 LENGTH MAX	T3 LENGTH AVG	WH1 #4 x 3' - 9" AS SHOWN #
1						8	2' - 10"					6	3' - 2"	1	1' - 5"	1' - 5"	1' - 5"	4	2' - 2"	5' - 8"	3' - 11"	4
2						8	2' - 10"					8	3' - 2"	1	1' - 5"	1' - 5"	1' - 5"	4	3' - 2"	6' - 8"	4' - 11"	4
3						8	4' - 6"					8	3' - 8"	1	1' - 11"	1' - 11"	1' - 11"	5	3' - 2"	7' - 10"	5' - 6"	4
4						12	5' - 3"					8	4' - 4"	1	2' - 7"	2' - 7"	2' - 7"	5	3' - 2"	7' - 10"	5' - 6"	4
5						8	4' - 0"					10	3' - 3"	1	1' - 6"	1' - 6"	1' - 6"	4	4' - 2"	7' - 8"	5' - 11"	4
6						8	4' - 8"					10	3' - 10"	1	2' - 1"	2' - 1"	2' - 1"	5	4' - 2"	8' - 10"	6' - 6"	4
7						8	5' - 5"					10	4' - 6"	2	1' - 1"	2' - 9"	1' - 11"	5	4' - 2"	8' - 10"	6' - 6"	4
8						12	6' - 10"					10	5' - 8"	2	2' - 3"	3' - 11"	3' - 1"	7	4' - 2"	11' - 2"	7' - 8"	4
9						8	4' - 0"					12	3' - 3"	1	1' - 6"	1' - 6"	1' - 6"	4	5' - 2"	8' - 8"	6' - 11"	4
10						8	5' - 6"					12	4' - 7"	2	1' - 2"	2' - 10"	2' - 0"	5	5' - 2"	9' - 10"	7' - 6"	4
11						12	6' - 11"					12	5' - 11"	2	2' - 6"	4' - 2"	3' - 4"	7	5' - 2"	12' - 2"	8' - 8"	4
12						12	8' - 5"					12	7' - 1"	3	1' - 11"	5' - 5"	3' - 8"	8	5' - 2"	13' - 4"	9' - 3"	4
13						8	5' - 6"					14	4' - 7"	2	1' - 2"	2' - 10"	2' - 0"	5	6' - 2"	10' - 10"	6' - 6"	4
14						12	7' - 0"					14	5' - 11"	2	2' - 6"	4' - 2"	3' - 4"	7	6' - 2"	13' - 2"	9' - 8"	4
15						12	8' - 6"					14	7' - 2"	3	2' - 0"	5' - 6"	3' - 9"	8	6' - 2"	14' - 4"	10' - 3"	4
16	44	#4	2' - 0"	4	11' - 1"	8	9' - 11"	1		4' - 6"	4' - 6"	14	8' - 5"	4	1' - 6"	6' - 8"	4' - 1"	8	6' - 2"	15' - 6"	10' - 10"	4
17						8	5' - 8"					18	4' - 9"	2	1' - 2"	3' - 0"	2' - 1"	6	8' - 2"	14' - 0"	11' - 1"	4
18						12	7' - 1"					18	4' - 9"	2	2' - 6"	4' - 2"	3' - 4"	7	8' - 2"	15' - 2"	11' - 8"	4
19						12	8' - 7"					18	4' - 9"	3	2' - 0"	5' - 6"	3' - 9"	8	8' - 2"	16' - 4"	12' - 3"	4
20	44	#4	2' - 0"	4	11' - 3"	8	10' - 1"					18	4' - 9"	4	1' - 8"	6' - 10"	4' - 3"	9	8' - 2"	17' - 6"	12' - 10"	4
21	48	#4	2' - 0"	4	12' - 8"	8	11' - 6"	1		3' - 6"	3' - 6"	18	4' - 9"	5	1' - 1"	7' - 11"	4' - 6"	11	8' - 2"	19' - 10"	14' - 0"	4
22	56	#4	2' - 0"	4	14' - 2"	8	13' - 0"	1		6' - 0"	6' - 0"	18	4' - 9"	5	2' - 5"	9' - 5"	5' - 11"	12	8' - 2"	21' - 0"	14' - 7"	4
23						8	5' - 9"					22	4' - 10"	2	1' - 5"	3' - 1"	2' - 3"	6	10' - 2"	16' - 0"	13' - 1"	4
24						12	7' - 3"					22	6' - 1"	2	2' - 8"	4' - 4"	3' - 6"	7	10' - 2"	17' - 2"	13' - 8"	4
25						12	8' - 9"					22	7' - 5"	3	2' - 2"	5' - 8"	3' - 11"	8	10' - 2"	18' - 4"	14' - 3"	4
26	44	#4	2' - 0"	4	11' - 4"	8	10' - 2"					22	8' - 7"	4	1' - 8"	6' - 10"	4' - 3"	10	10' - 2"	20' - 8"	15' - 5"	4
27	48	#4	2' - 0"	4	12' - 10"	8	11' - 8"	1		2' - 9"	2' - 9"	22	9' - 11"	5	1' - 4"	8' - 2"	4' - 9"	11	10' - 2"	21' - 10"	16' - 0"	4
28	56	#4	2' - 0"	4	14' - 3"	8	13' - 1"	1		4' - 6"	4' - 6"	22	11' - 2"	5	2' - 7"	9' - 5"	6' - 0"	12	10' - 2"	23' - 0"	16' - 7"	4
29	60	#4	2' - 0"	4	15' - 9"	8	14' - 7"	2	2' - 9"	8' - 3"	5' - 6"	22	12' - 5"	6	2' - 0"	10' - 8"	6' - 4"	13	10' - 2"	24' - 2"	17' - 2"	4
30	68	#4	2' - 0"	4	17' - 2"	8	16' - 0"	2	6' - 2"	11' - 0"	9' - 1"	22	13' - 8"	7	1' - 7"	11' - 11"	6' - 9"	15	10' - 2"	26' - 6"	18' - 4"	4
31	80	#4	3' - 6"	8	20' - 2"	12	19' - 0"	2	6' - 2"	12' - 6"	9' - 4"	22	16' - 3"	8	2' - 4"	14' - 6"	8' - 5"	17	10' - 2"	28' - 10"	19' - 6"	4
32						12	8' - 10"					26	7' - 5"	3	2' - 2"	5' - 8"	3' - 11"	8	12' - 2"	20' - 4"	16' - 3"	
33	44	#4	2' - 0"	4	11' - 6"	8	10' - 4"					26	8' - 9"	4	1' - 10"	7' - 0"	4' - 5"	10	12' - 2"	22' - 8"	17' - 5"	
34	48	#4	2' - 0"	4	12' - 11"	8	11' - 9"					26	10' - 0"	5	1' - 5"	8' - 3"	4' - 10"	11	12' - 2"	23' - 10"	18' - 0"	
35	56	#4	2' - 0"	4	14' - 5"	8	13' - 3"	1		5' - 2"	5' - 2"	26	11' - 3"	5	2' - 8"	9' - 6"	6' - 1"	12	12' - 2"	25' - 0"	18' - 7"	
36	60	#4	2' - 0"	4	15' - 10"	8	14' - 8"	1		8' - 0"	8' - 0"	26	12' - 6"	6	2' - 1"	10' - 9"	6' - 5"	13	12' - 2"	26' - 2"	19' - 2"	
37	68	#4	2' - 0"	4	17' - 4"	8	16' - 2"	2	6' - 0"	11' - 0"	8' - 6"	26	13' - 10"	7	1' - 9"	12' - 1"	6' - 11"	15	12' - 2"	28' - 6"	20' - 4"	
38	72	#4	2' - 0"	4	18' - 9"	8	17' - 7"	3	5' - 2"	13' - 8"	9' - 5"	26	15' - 0"	8	1' - 1"	13' - 3"	7' - 2"	16	12' - 2"	29' - 8"	20' - 11"	
39	80	#4	3' - 6"	4	20' - 3"	12	19' - 1"	2	6' - 5"	12' - 5"	9' - 5"	26	16' - 4"	8	2' - 5"	14' - 7"	8' - 6"	17	12' - 2"	30' - 2"	21' - 2"	
40	92	#4	4' - 0"	12	23' - 2"	12	22' - 0"	2	6' - 6"	16' - 6"	11' - 5"	26	18' - 10"	10	1' - 7"	17' - 1"	9' - 4"	20	12' - 2"	34' - 4"	23' - 3"	

DESIGN #	WH2 #4 BARS @ 18" C/C 4 SETS OF	WH2 DIM "A" MIN	WH2 DIM "A" MAX	WH2 TOTAL AVERAGE LENGTH	WH3 #4 BARS @ 18" C/C 4 SETS OF	WH3 LENGTH	WH4 #4 x 6' - 0" AS SHOWN 4 SETS OF	8 - WV1 BARS (4 SETS OF 12) @ 12" C/C SIZE	WV1 LENGTH DIM "A"	WV1 LENGTH DIM "B"	WV1 LENGTH TOTAL	WV2 BARS @ 12" C/C 4 SETS OF	WV2 SIZE	WV2 DIM "A" MIN	WV2 DIM "A" MAX	WV2 DIM "B" MIN	WV2 DIM "B" MAX	WV2 TOTAL AVERAGE LENGTH	WV3 BARS @ 12" C/C 4 SETS OF	WV3 SIZE	WV3 LENGTH DIM "A"	WV3 LENGTH DIM "B"	WV3 LENGTH TOTAL	TOTAL QUANTITIES REINF. STEEL LBS.	CONC. C.Y.	DESIGN #
1					2	6' - 5"		#4	4' - 6"	1' - 10"	6' - 4"	3	#4	3' - 3"	4' - 1"	1' - 10"	1' - 10"	5' - 6"						200	4.7	1
2					2	6' - 5"		#4	4' - 6"	1' - 10"	6' - 4"	3	#4	3' - 3"	4' - 1"	1' - 10"	1' - 10"	5' - 6"						220	5.3	2
3					2	7' - 1"		#4	5' - 0"	2' - 1"	7' - 1"	3	#4	3' - 9"	4' - 7"	2' - 1"	2' - 1"	6' - 3"						250	6.3	3
4					2	7' - 10"		#4	5' - 6"	2' - 10"	8' - 4"	4	#4	3' - 9"	5' - 1"	2' - 10"	2' - 10"	7' - 3"						330	7.8	4
5					2	6' - 7"		#4	4' - 7"	1' - 7"	6' - 2"	3	#4	3' - 4"	4' - 2"	1' - 7"	1' - 7"	5' - 4"						240	5.7	5
6					3	7' - 3"		#4	5' - 1"	1' - 10"	6' - 11"	4	#4	3' - 10"	4' - 8"	1' - 10"	1' - 10"	6' - 1"						310	6.7	6
7	1		6' - 4"	7' - 10"	2	8' - 0"		#4	5' - 7"	1' - 10"	7' - 5"	4	#4	3' - 10"	5' - 2"	1' - 10"	1' - 10"	6' - 4"						330	7.9	7
8	1		6' - 4"	7' - 10"	3	9' - 5"		#4	6' - 7"	2' - 4"	8' - 11"	6	#4	4' - 0"	6' - 2"	2' - 4"	2' - 4"	7' - 5"						490	10.7	8
9					2	6' - 7"		#4	4' - 8"	1' - 7"	6' - 3"	3	#4	3' - 5"	4' - 3"	1' - 7"	1' - 7"	5' - 5"						250	6.1	9
10	1		6' - 4"	7' - 10"	2	8' - 1"		#4	5' - 8"	1' - 10"	7' - 6"	4	#4	4' - 1"	5' - 3"	1' - 10"	1' - 10"	6' - 6"						350	8.5	10
11	1		6' - 4"	7' - 10"	2	9' - 6"		#4	6' - 8"	2' - 4"	9' - 0"	6	#4	4' - 1"	6' - 3"	2' - 4"	2' - 4"	7' - 6"						490	11.3	11
12	1		6' - 4"	7' - 10"	3	11' - 0"		#4	7' - 8"	3' - 1"	10' - 9"	7	#4	5' - 5"	7' - 3"	3' - 1"	3' - 1"	9' - 5"						650	14.9	12
13	1		6' - 4"	7' - 10"	2	8' - 1"		#4	5' - 8"	1' - 9"	7' - 5"	4	#4	3' - 5"	5' - 3"	1' - 9"	1' - 9"	6' - 4"						370	9.0	13
14	1		6' - 4"	7' - 10"	2	9' - 7"		#4	6' - 8"	2' - 3"	8' - 11"	6	#4	4' - 1"	6' - 3"	2' - 3"	2' - 3"	7' - 5"						510	12.0	14
15	1		6' - 4"	7' - 10"	2	11' - 1"		#4	7' - 8"	3' - 0"	10' - 8"	7	#4	4' - 9"	7' - 3"	3' - 0"	3' - 0"	9' - 0"						670	15.6	15
16	2	6' - 4"	9' - 10"	9' - 7"	3	9' - 9"		#4	8' - 8"	3' - 3"	11' - 11"	9	#4	4' - 9"	8' - 3"	1' - 6"	3' - 0"	8' - 9"						870	20.8	16
17	1		6' - 4"	7' - 10"	2	8' - 3"		#4	5' - 9"	1' - 10"	7' - 7"	4	#4	4' - 0"	5' - 4"	1' - 10"	1' - 10"	6' - 6"						430	10.2	17
18	1		6' - 4"	7' - 10"	2	9' - 8"		#4	6' - 9"	2' - 4"	9' - 1"	6	#4	4' - 2"	6' - 4"	2' - 4"	2' - 4"	7' - 7"						570	13.2	18
19	1		6' - 4"	7' - 10"	3	11' - 2"		#4	7' - 9"	3' - 1"	10' - 10"	7	#4	4' - 10"	7' - 4"	3' - 1"	3' - 1"	9' - 2"						730	16.9	19
20	2	6' - 4"	9' - 10"	9' - 7"	3	12' - 8"		#4	8' - 9"	2' - 4"	11' - 1"	9	#4	4' - 10"	8' - 4"	1' - 7"	2' - 3"	8' - 6"						930	21.7	20
21	2	6' - 4"	9' - 10"	9' - 7"	3	14' - 1"		#4	9' - 9"	3' - 1"	12' - 10"	10	#4	5' - 4"	9' - 4"	1' - 7"	2' - 11"	9' - 7"						1,110	26.3	21
22	3	6' - 4"	13' - 4"	11' - 4"	3	15' - 7"	9	#4	10' - 9"	3' - 7"	14' - 4"	12	#4	5' - 8"	9' - 4"	1' - 6"	3' - 6"	10' - 0"	4	#4	2' - 0"	3' - 2"	5' - 2"	1,530	31.2	22
23	1		6' - 4"	7' - 10"	2	8' - 4"		#4	5' - 10"	1' - 10"	7' - 8"	4	#4	4' - 1"	5' - 5"	1' - 10"	1' - 10"	6' - 7"						480	11.2	23
24	1		6' - 4"	7' - 10"	3	9' - 10"		#4	6' - 10"	2' - 4"	9' - 2"	6	#4	4' - 3"	6' - 5"	2' - 4"	2' - 4"	7' - 8"						650	14.5	24
25	2	6' - 4"	9' - 10"	9' - 7"	3	11' - 4"		#4	7' - 10"	3' - 1"	10' - 11"	7	#4	4' - 11"	7' - 5"	3' - 1"	3' - 1"	9' - 3"						820	18.4	25
26	2	6' - 4"	9' - 10"	9' - 7"	3	12' - 9"		#4	8' - 10"	1' - 9"	10' - 7"	9	#4	4' - 11"	8' - 5"	1' - 6"	2' - 2"	8' - 6"						1,010	23.3	26
27	2	6' - 4"	9' - 10"	9' - 7"	4	14' - 3"		#4	9' - 10"	2' - 6"	12' - 4"	10	#4	5' - 5"	9' - 5"	1' - 6"	2' - 10"	9' - 7"						1,220	28.0	27
28	3	6' - 4"	13' - 4"	11' - 4"	3	15' - 8"	9	#4	10' - 10"	3' - 0"	13' - 10"	12	#4	5' - 7"	10' - 5"	1' - 5"	3' - 5"	10' - 5"	4	#4	2' - 0"	3' - 2"	5' - 2"	1,610	32.9	28
29	3	6' - 4"	13' - 4"	11' - 4"	4	17' - 2"	10	#4	11' - 10"	3' - 9"	15' - 7"	13	#4	6' - 3"	11' - 5"	1' - 6"	4' - 0"	11' - 7"	6	#4	3' - 0"	3' - 2"	6' - 2"	1,790	38.6	29
30	4	6' - 4"	16' - 10"	13' - 1"	4	18' - 7"	11	#4	12' - 10"	4' - 9"	17' - 7"	15	#4	6' - 3"	12' - 5"	1' - 6"	5' - 1"	12' - 7"	9	#5	4' - 0"	3' - 2"	7' - 2"	2,430	44.7	30
31	4	6' - 4"	16' - 10"	13' - 1"	5	21' - 7"	12	#6	14' - 10"	6' - 6"	21' - 4"	18	#6	7' - 0"	14' - 6"	2' - 9"	6' - 3"	15' - 3"	9	#6	5' - 0"	4' - 0"	9' - 0"	4,470	63.9	31
32	2	6' - 4"	9' - 10"	9' - 7"	2	11' - 5"		#4	7' - 11"	3' - 1"	11' - 0"	8	#4	4' - 6"	7' - 6"	3' - 3"	3' - 3"	9' - 3"						860	19.7	32
33	2	6' - 4"	9' - 10"	9' - 7"	3	12' - 11"		#4	8' - 11"	2' - 3"	11' - 2"	9	#4	5' - 0"	8' - 6"	1' - 6"	2' - 2"	8' - 7"						1,090	24.9	33
34	2	6' - 4"	9' - 10"	9' - 7"	4	14' - 4"		#4	9' - 11"	3' - 0"	12' - 11"	10	#4	5' - 8"	9' - 6"	1' - 8"	2' - 10"	9' - 10"						1,290	29.6	34
35	3	6' - 4"	13' - 4"	11' - 4"	3	15' - 10"	9	#4	10' - 11"	3' - 6"	14' - 5"	12	#4	5' - 10"	10' - 6"	1' - 6"	3' - 4"	10' - 7"	4	#4	2' - 0"	3' - 2"	5' - 2"	1,700	34.8	35
36	3	6' - 4"	13' - 4"	11' - 4"	4	17' - 3"	10	#4	11' - 11"	4' - 3"	16' - 2"	13	#4	6' - 4"	11' - 6"	1' - 7"	4' - 3"	11' - 10"	6	#4	3' - 0"	3' - 2"	6' - 2"	2,000	40.4	36
37	4	6' - 4"	16' - 8"	13' - 0"	4	18' - 9"	11	#4	12' - 11"	5' - 3"	18' - 2"	15	#4	6' - 6"	12' - 6"	1' - 5"	5' - 1"	12' - 9"	9	#5	4' - 0"	3' - 2"	7' - 2"	2,530	46.8	37
38	4	6' - 4"	16' - 8"	13' - 0"	4	20' - 2"	12	#5	13' - 11"	6' - 6"	20' - 5"	16	#5	7' - 0"	13' - 6"	1' - 7"	6' - 1"	14' - 1"	9	#6	4' - 0"	4' - 2"	8' - 2"	3,370	53.9	38
39	4	6' - 4"	16' - 8"	13' - 0"	5	21' - 8"	13	#5	14' - 11"	6' - 6"	21' - 5"	18	#5	7' - 2"	14' - 6"	3' - 0"	6' - 4"	15' - 6"	11	#7	6' - 0"	4' - 6"	10' - 6"	4,460	66.1	39
40	5	6' - 4"	20' - 2"	14' - 9"	5	24' - 8"	15	#6	16' - 11"	6' - 6"	23' - 3"	21	#6	7' - 10"	16' - 6"	3' - 6"	6' - 4"	17' - 1"	13	#8	5' - 9"	4' - 6"	10' - 3"	6,720	83.3	40

The City of
Oklahoma City
Public Works Department
Engineering Division

APPROVED BY:
ERIC J. WENGER, P.E.
CITY ENGINEER
DATE: 12-7-2017

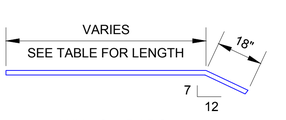
DRAWN: JMR

DATE: 11-18-15

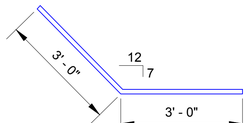
STANDARD REINFORCED CONCRETE BOX - ONE CELL - FLARED WING

Drawing Number

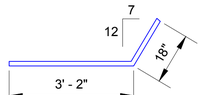
D-401



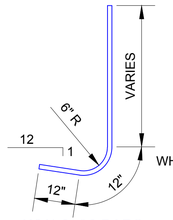
WH2 & 3 BARS



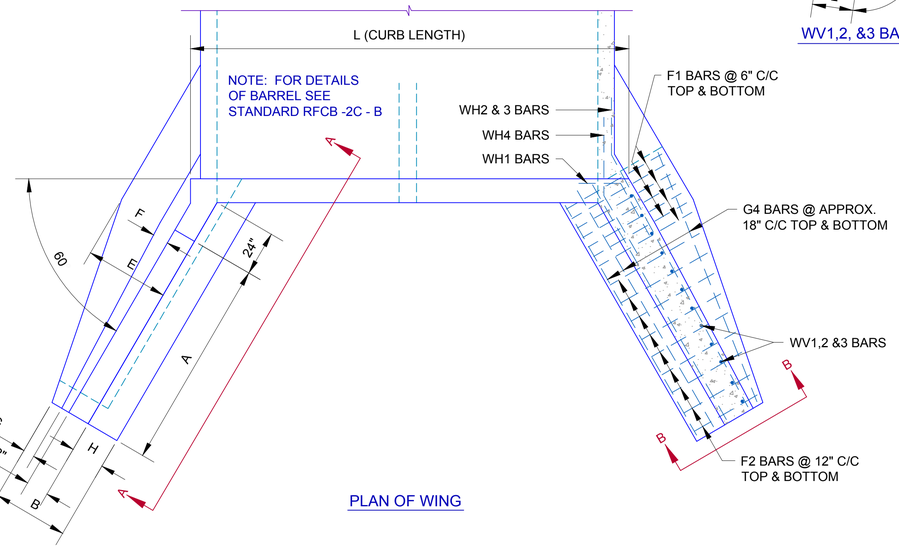
WH4 BARS



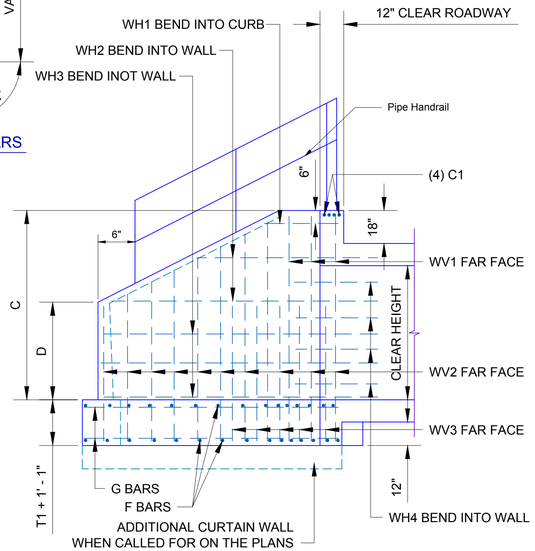
WH1 BARS



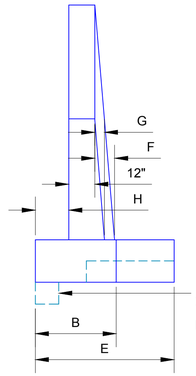
WV1,2, &3 BARS



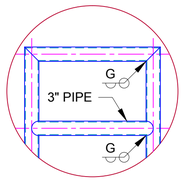
PLAN OF WING



SECTION A-A



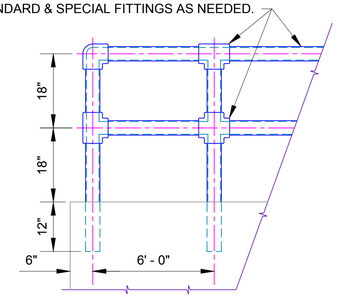
SECTION B-B



ALTERNATE DETAIL

(USUING WELD CONNECTIONS ON PIPE HANDRAILS)

3" I.D. GALV. STEEL PIPE WITH PLAIN GALV. FITTINGS.
USE STANDARD & SPECIAL FITTINGS AS NEEDED.



PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.

4 WINGS - 2 CURBS - 2 CUTOFF WALLS

NOTE: QUANTITIES SHOWN INCLUDE CURB, WINGS AND CUTOFF WALLS FOR ONE UPSTREAM & ONE DOWNSTREAM END BARREL.

CLEAR SPAN	CLEAR HEIGHT	DIMENSIONS										REINFORCING																												TOTAL QUANTITIES	
		A	B	C	D	E	F	G	H	L	T1	C1 BARS #6 AS SHOWN		F1 BARS #4 AS SHOWN		F2 BARS #4 @ 12" C/C		G BARS #4 @ 18" C/C AS SHOWN		WH1 BARS #4 AS SHOWN		WH2 BARS #4 @ 18" C/C			WH3 BARS #4 @ 12" C/C			WH4 BARS #4 @ 12" C/C		WV1 BARS @ 12" C/C			WV2 BARS @ 12" C/C			WV3 BARS @ 12" C/C				
												#	(STR.) LENGTH	#	(STR.) LENGTH	4 SETS OF	(STR.) LIMITS OF VAR.	#	(STR.) LENGTH	#	(STR.) LENGTH	4 SETS OF	(STR.) LIMITS OF VAR.		4 SETS OF	(STR.) LIMITS OF VAR.		#	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	STEEL LBS.	CONC. CU. YDS
8	4	5' - 11"	2' - 9 1/2"	6' - 2 1/2"	3' - 7"	4' - 1"	6"	3 1/2"	1' - 0"	19' - 0 3/4"	8 1/2"	8	18' - 9"	48	3' - 9"	14	2' - 6" @ 3' - 7"	32	8' - 3"	4	4' - 8"	1	9' - 0"		2	10' - 10" @ 11' - 0"		24	6' - 0"	12	#4	8' - 10"	6	#4	6' - 3" @ 8' - 6"						1,100	20.0
	5	7' - 4"	2' - 10"	7' - 2 1/2"	4' - 0"	4' - 7"	7"	3 3/4"	1' - 0"	19' - 0 3/4"	8 1/2"	8	18' - 9"	48	4' - 3"	16	2' - 6" @ 4' - 1"	32	9' - 7"	4	4' - 8"	2	9' - 0"		2	12' - 13" @ 12' - 8"		28	6' - 0"	12	#4	9' - 10"	7	#4	7' - 1" @ 9' - 6"						1,200	25.3
	6	8' - 10"	3' - 5"	8' - 2 1/2"	4' - 4"	5' - 1"	8 1/2"	4 1/4"	1' - 6"	19' - 0 3/4"	8 1/2"	8	18' - 9"	48	4' - 9"	18	3' - 1" @ 4' - 7"	32	11' - 2"	4	4' - 8"	2	9' - 0" @ 12' - 7"		3	13' - 11" @ 14' - 5"		32	6' - 0"	12	#4	10' - 10"	9	#4	7' - 0" @ 10' - 6"						1,400	32.8
10	4	5' - 11"	2' - 10"	6' - 3 3/4"	3' - 8"	4' - 2"	6"	3 1/2"	1' - 0"	23' - 0 3/4"	9 3/4"	8	22' - 9"	48	3' - 10"	14	2' - 6" @ 3' - 8"	32	8' - 5"	4	4' - 8"	1	9' - 0"		2	10' - 10" @ 11' - 0"		24	6' - 0"	12	#4	9' - 0"	6	#4	6' - 5" @ 8' - 9"						1,100	21.6
	6	8' - 10"	3' - 5"	8' - 3 3/4"	4' - 5"	5' - 2"	8 1/4"	4 1/2"	1' - 6"	23' - 0 3/4"	9 3/4"	8	22' - 9"	48	4' - 10"	18	3' - 1" @ 4' - 8"	32	11' - 4"	4	4' - 8"	2	9' - 0" @ 12' - 7"		3	13' - 11" @ 14' - 5"		32	6' - 0"	12	#4	11' - 0"	9	#4	7' - 3" @ 10' - 9"						1,500	34.7
	8	11' - 9"	3' - 7"	10' - 3 3/4"	5' - 2"	6' - 2"	10 1/4"	5 1/4"	1' - 6"	23' - 0 3/4"	9 3/4"	8	22' - 9"	48	5' - 10"	19	3' - 3" @ 5' - 8"	40	14' - 3"	4	4' - 8"	3	9' - 0" @ 16' - 2"		3	17' - 1" @ 17' - 7"		40	6' - 0"	12	#4	13' - 0"	12	#4	8' - 0" @ 12' - 9"	16	#4	3' - 7"			2,000	50.7
	10	14' - 8"	4' - 0"	12' - 3 3/4"	5' - 10"	7' - 2"	1' - 0 1/4"	6"	2' - 0"	23' - 1 3/4"	9 3/4"	8	22' - 10"	56	6' - 10"	30	3' - 8" @ 6' - 8"	48	17' - 6"	4	4' - 8"	4	9' - 2" @ 20' - 0"		3	20' - 4" @ 21' - 0"		48	6' - 0"	12	#4	15' - 0"	15	#4	8' - 7" @ 14' - 9"	36	#4	5' - 7"			2,800	71.3
	12	17' - 7"	4' - 6"	14' - 3 3/4"	6' - 7"	8' - 2"	1' - 2 1/4"	6 3/4"	2' - 0"	23' - 2 3/4"	9 3/4"	8	22' - 11"	56	7' - 10"	36	4' - 2" @ 7' - 8"	48	20' - 5"	4	4' - 8"	4	9' - 4" @ 20' - 2"		4	23' - 6" @ 24' - 3"		56	6' - 0"	12	#5	17' - 0"	18	#4	9' - 6" @ 16' - 9"	36	#5	5' - 8"			3,900	95.7
12	6	8' - 10"	3' - 5"	8' - 5 1/2"	4' - 7"	5' - 2"	8 1/2"	4 1/2"	1' - 6"	27' - 0 3/4"	11 1/2"	8	26' - 9"	48	4' - 10"	18	3' - 1" @ 4' - 8"	32	11' - 4"	4	4' - 8"	2	9' - 0" @ 12' - 7"		3	13' - 11" @ 14' - 5"		32	6' - 0"	12	#4	11' - 1"	9	#4	7' - 4" @ 10' - 10"						1,600	37.1
	8	11' - 9"	3' - 7"	10' - 5 1/2"	5' - 4"	6' - 2"	10 1/2"	5 1/4"	1' - 6"	27' - 0 3/4"	11 1/2"	8	26' - 9"	48	5' - 10"	19	3' - 3" @ 5' - 8"	40	14' - 4"	4	4' - 8"	3	9' - 0" @ 16' - 2"		3	17' - 1" @ 17' - 7"		40	6' - 0"	12	#4	13' - 1"	12	#4	8' - 1" @ 12' - 10"	16	#4	3' - 7"			2,100	53.8
	10	14' - 8"	4' - 0"	12' - 5 1/2"	6' - 0"	7' - 2"	1' - 0 1/2"	6"	2' - 0"	27' - 1 3/4"	11 1/2"	8	26' - 10"	56	6' - 10"	30	3' - 8" @ 6' - 8"	48	17' - 6"	4	4' - 8"	4	9' - 2" @ 20' - 0"		3	20' - 4" @ 21' - 0"		48	6' - 0"	12	#4	15' - 1"	12	#4	8' - 8" @ 14' - 10"	36	#4	5' - 7"			2,800	75.2
	12	17' - 7"	4' - 6"	14' - 5 1/2"	6' - 8"	8' - 2"	1' - 2 1/2"	6 3/4"	2' - 0"	27' - 2 3/4"	11 1/2"	8	26' - 11"	56	7' - 10"	36	4' - 2" @ 7' - 8"	48	20' - 5"	4	4' - 8"	4	9' - 4" @ 20' - 2"		4	23' - 6" @ 24' - 3"		56	6' - 0"	12	#5	17' - 1"	18	#4	9' - 7" @ 16' - 10"	36	#5	5' - 8"			4,000	100.6

NOTES:

ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT OKLAHOMA CITY STANDARD SPECIFICATIONS.

REINFORCING STEEL IN BOTTOM SLAB (FOOTING) SHALL BE SUPPORTED ON BAR CHAIRS. CHAIRS SHALL BE SUPPORTED ON TIMBER PLANKS OR CLASS "C" CONCRETE STRIPS PLACED AT 4' C/C.

REINFORCING STEEL IN TOP SLAB SHALL BE SUPPORTED ON SLAB SPACERS.

REINFORCING STEEL IN THE WALLS SHALL BE HELD IN PLACE BY METAL CHAIRS. MAXIMUM SPACING OF THE CHAIRS SHALL BE 6'.

COST OF METAL CHAIRS, WOOD PLANK OR CONCRETE STRIPS SHALL BE INCLUDED OTHER ITEMS OF WORK.

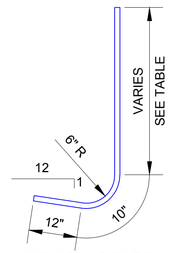
The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 05-03-13
DRAWN: VSC
DATE: 05-03-13

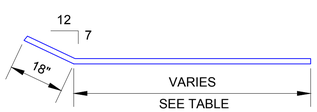
STANDARD REINFORCED CONCRETE BOX - TWO CELL - FLARED WING

Drawing Number
D-402

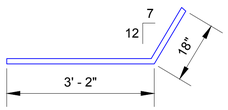
\\ci.okc.\okcPW-Sec.ion\CITYACAD-STDS\D-402 VSC 05-03-13



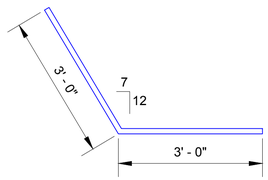
WV1,2, & 3 BARS



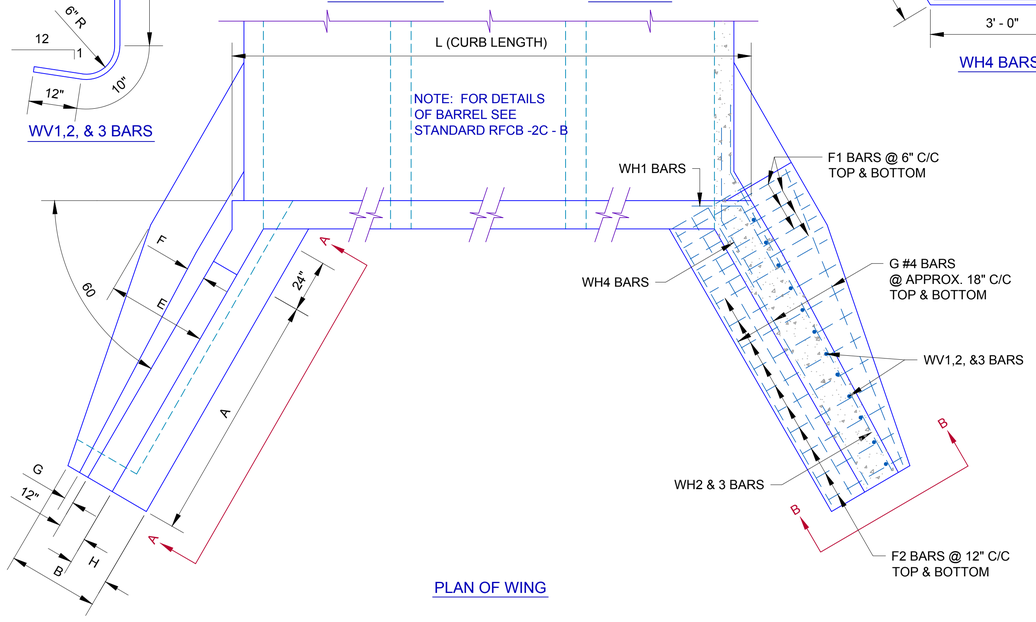
WH2, & 3 BARS



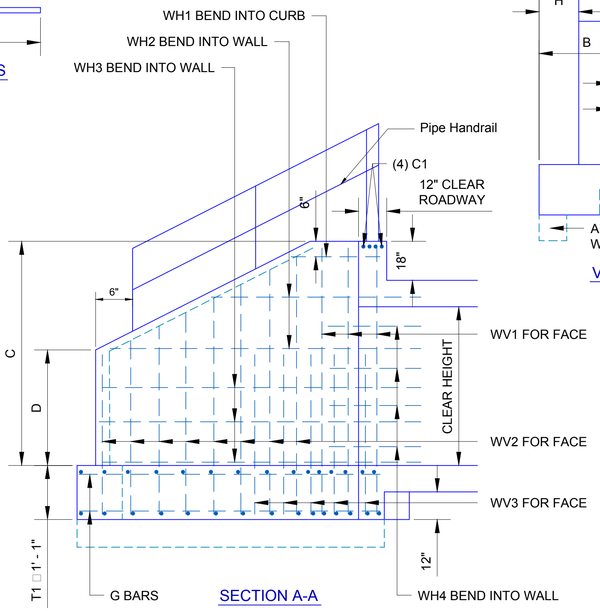
WH1 BARS



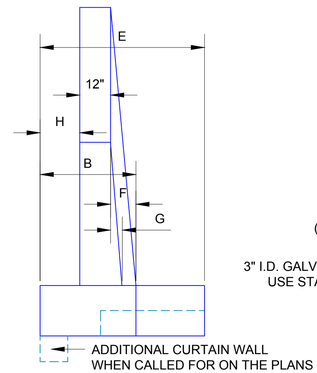
WH4 BARS



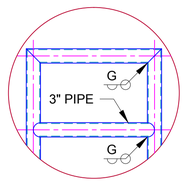
PLAN OF WING



SECTION A-A



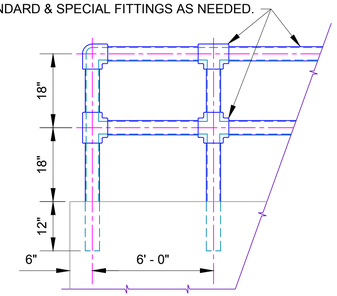
VIEW B-B



ALTERNATE DETAIL

(USUING WELD CONNECTIONS ON PIPE HANDRAILS)

3" I.D. GALV. STEEL PIPE WITH PLAIN GALV. FITTINGS.
USE STANDARD & SPECIAL FITTINGS AS NEEDED.



PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.

4 WINGS - 2 CURBS - 2 CUTOFF WALLS

□NOTE: QUANTITIES SHOWN INCLUDE CURB, WINGS AND CUTOFF WALLS FOR ONE UPSTREAM & ONE DOWNSTREAM END BARREL.

CLEAR SPAN	CLEAR HEIGHT	DIMENSIONS										REINFORCING																								TOTAL QUANTITIES □	
		A	B	C	D	E	F	G	H	L	T1	C1 BARS #6 AS SHOWN		F1 BARS #4 AS SHOWN		F2 BARS #4 @ 12" C/C			G BARS #4 @ 18" C/C AS SHOWN			WH1 BARS #4 AS SHOWN			WH2 BARS #4 @ 18" C/C			WH3 BARS #4 @ 12" C/C			WH4 BARS #4 @ 12" C/C			WV1 BARS @ 12" C/C			WV2 BARS @ 12" C/C			WV3 BARS @ 12" C/C				
												#	(STR.) LENGTH	#	(STR.) LENGTH	4 SETS OF	(STR.) LIMITS OF VAR.	#	(STR.) LENGTH	#	(STR.) LENGTH	4 SETS OF	(STR.) LIMITS OF VAR.	4 SETS OF	(STR.) LIMITS OF VAR.	#	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	#	SIZE	(STR.) LENGTH	STEEL LBS.	CONC. CU. YDS
8	4	5' - 11"	2' - 9 1/2"	6' - 2 1/2"	3' - 7"	4' - 1"	6"	3 1/2"	1' - 0"	27' - 9 3/4"	8 1/2"	8	27' - 6"	48	3' - 9"	14	2' - 6" ◎ 3' - 7"	32	8' - 3"	4	4' - 8"	1	9' - 0"	2	10' - 10" ◎ 11' - 0"	24	6' - 0"	12	#4	8' - 10"	6	#4	6' - 3" ◎ 8' - 6"				1,100	21.6
	5	7' - 4"	2' - 10"	7' - 2 1/2"	4' - 0"	4' - 7"	7"	3 3/4"	1' - 0"	27' - 9 3/4"	8 1/2"	8	27' - 6"	48	4' - 3"	16	2' - 6" ◎ 4' - 1"	32	9' - 7"	4	4' - 8"	2	9' - 0"	2	12' - 13" ◎ 12' - 8"	28	6' - 0"	12	#4	9' - 10"	7	#4	7' - 1" ◎ 9' - 6"				1,300	26.9
	6	8' - 10"	3' - 5"	8' - 2 1/2"	4' - 4"	5' - 1"	8 1/2"	4 1/4"	1' - 6"	27' - 9 3/4"	8 1/2"	8	27' - 6"	48	4' - 9"	18	3' - 1" ◎ 4' - 7"	32	11' - 2"	4	4' - 8"	2	9' - 0" ◎ 12' - 7"	3	13' - 11" ◎ 14' - 5"	32	6' - 0"	12	#4	10' - 10"	9	#4	7' - 0" ◎ 10' - 6"				1,500	34.4
10	4	5' - 11"	2' - 10"	6' - 3 3/4"	3' - 8"	4' - 2"	6"	3 1/2"	1' - 0"	33' - 9 3/4"	9 3/4"	8	33' - 6"	48	3' - 10"	14	2' - 6" ◎ 3' - 8"	32	8' - 5"	4	4' - 8"	1	9' - 0"	2	10' - 10" ◎ 11' - 0"	24	6' - 0"	12	#4	9' - 0"	6	#4	6' - 5" ◎ 8' - 9"				1,200	23.6
	6	8' - 10"	3' - 5"	8' - 3 3/4"	4' - 5"	5' - 2"	8 1/4"	4 1/2"	1' - 6"	33' - 9 3/4"	9 3/4"	8	33' - 6"	48	4' - 10"	18	3' - 1" ◎ 4' - 8"	32	11' - 4"	4	4' - 8"	2	9' - 0" ◎ 12' - 7"	3	13' - 11" ◎ 14' - 5"	32	6' - 0"	12	#4	11' - 0"	9	#4	7' - 3" ◎ 10' - 9"				1,600	36.7
	8	11' - 9"	3' - 7"	10' - 3 3/4"	5' - 2"	6' - 2"	10 1/4"	5 1/4"	1' - 6"	33' - 9 3/4"	9 3/4"	8	33' - 6"	48	5' - 10"	24	3' - 3" ◎ 5' - 8"	40	14' - 3"	4	4' - 8"	3	9' - 0" ◎ 16' - 2"	3	17' - 1" ◎ 17' - 7"	40	6' - 0"	12	#4	13' - 0"	12	#4	8' - 0" ◎ 12' - 9"	16	#4	3' - 7"	2,200	52.7
	10	14' - 8"	4' - 0"	12' - 3 3/4"	5' - 10"	7' - 2"	1' - 0 1/4"	6"	2' - 0"	33' - 11 3/4"	9 3/4"	8	33' - 8"	56	6' - 10"	30	3' - 8" ◎ 6' - 8"	48	17' - 6"	4	4' - 8"	4	9' - 2" ◎ 20' - 0"	3	20' - 4" ◎ 21' - 0"	48	6' - 0"	12	#4	15' - 0"	15	#4	8' - 7" ◎ 14' - 9"	36	#4	5' - 7"	2,900	73.1
	12	17' - 7"	4' - 6"	14' - 3 3/4"	6' - 7"	8' - 2"	1' - 2 1/4"	6 3/4"	2' - 0"	33' - 1 3/4"	9 3/4"	8	33' - 10"	56	7' - 10"	36	4' - 2" ◎ 7' - 8"	48	20' - 5"	4	4' - 8"	4	9' - 4" ◎ 20' - 2"	4	23' - 6" ◎ 24' - 3"	56	6' - 0"	12	#5	17' - 0"	18	#5	9' - 6" ◎ 16' - 9"	36	#5	5' - 8"	4,000	97.8
12	4	5' - 11"	2' - 9 1/2"	6' - 5 1/2"	3' - 10"	4' - 2"	6 1/2"	3 1/2"	1' - 0"	39' - 9 3/4"	11 1/2"	8	39' - 6"	48	3' - 10"	14	2' - 6" ◎ 3' - 8"	32	8' - 5"	4	4' - 8"	1	9' - 0"	2	10' - 10" ◎ 11' - 0"	24	6' - 0"	12	#4	9' - 1"	6	#4	6' - 8" ◎ 8' - 10"				1,300	25.7
	6	8' - 10"	3' - 5"	8' - 5 1/2"	4' - 7"	5' - 2"	8 1/2"	4 1/2"	1' - 6"	39' - 9 3/4"	11 1/2"	8	39' - 6"	48	4' - 10"	18	3' - 1" ◎ 4' - 8"	32	11' - 4"	4	4' - 8"	2	9' - 0" ◎ 12' - 7'	3	13' - 11" ◎ 14' - 5"	32	6' - 0"	12	#4	11' - 1"	9	#4	7' - 4" ◎ 10' - 10"				1,700	39.5
	8	11' - 9"	3' - 7"	10' - 5 1/2"	5' - 4"	6' - 2"	10 1/2"	5 1/4"	1' - 6"	39' - 9 3/4"	11 1/2"	8	39' - 6"	48	5' - 10"	24	3' - 3" ◎ 5' - 8"	40	14' - 3"	4	4' - 8"	3	9' - 0" ◎ 16' - 2"	3	17' - 1" ◎ 17' - 7"	40	6' - 0"	12	#4	13' - 1"	12	#4	8' - 1" ◎ 12' - 10"	16	#4	3' - 7"	2,200	56.1
	10	14' - 8"	4' - 0"	12' - 5 1/2"	6' - 0"	7' - 2"	1' - 0 1/2"	6"	2' - 0"	39' - 11 3/4"	11 1/2"	8	39' - 8"	56	6' - 10"	30	3' - 8" ◎ 6' - 8"	48	17' - 6"	4	4' - 8"	3	9' - 2" ◎ 20' - 0"	3	20' - 4" ◎ 21' - 0"	48	6' - 0"	12	#4	15' - 1"	15	#4	8' - 8" ◎ 14' - 10"	36	#4	5' - 7"	3,000	78.0
	12	17' - 7"	4' - 6"	14' - 5 1/2"	6' - 8"	8' - 2"	1' - 2 1/2"	6 3/4"	2' - 0"	40' - 1 3/4"	11 1/2"	8	39' - 10"	56	7' - 10"	36	4' - 2" ◎ 7' - 8"	48	20' - 5"	4	4' - 8"	4	9' - 4" ◎ 20' - 2"	4	23' - 6" ◎ 24' - 3"	56	6' - 0"	12	#5	17' - 1"	18	#5	9' - 7" ◎ 16' - 10"	36	#5	5' - 8"	4,100	103.0
	14	20' - 6"	4' - 11"	16' - 5 1/2"	7' - 5"	9' - 2"	1' - 4 1/2"	8"	2' - 6"	40' - 3 3/4"	11 1/2"	8	40' - 0"	56	8' - 10"	42	4' - 7" ◎ 8' - 10"	56	23' - 7"	4	4' - 8"	5	9' - 6" ◎ 24' - 0"	4	26' - 10" ◎ 27' - 7"	64	6' - 0"	12	#6	19' - 1"	21	#6	10' - 0" ◎ 18' - 11"	40	#6	6' - 3"	5,800	134.0

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 05-03-13

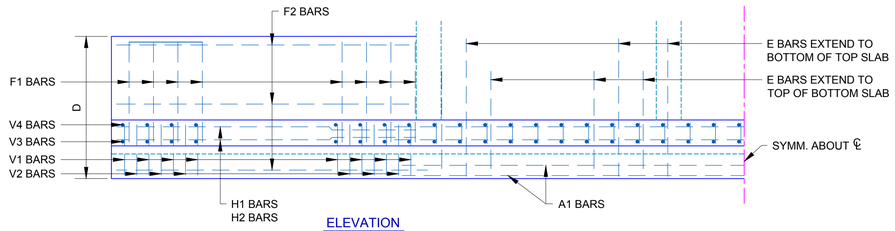
DRAWN: VSC — DATE: 05-03-13

STANDARD REINFORCED CONCRETE BOX - THREE CELL - FLARED WING

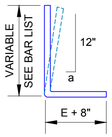
Drawing Number

D-403

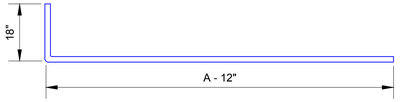
\\ci.okc.lokc\PW-Sec.ion\CITYACAD-STDS\D-403 VSC 05-03-13



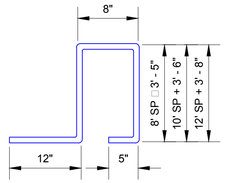
ELEVATION



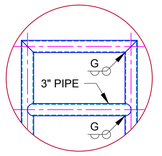
V1 & V2 BARS



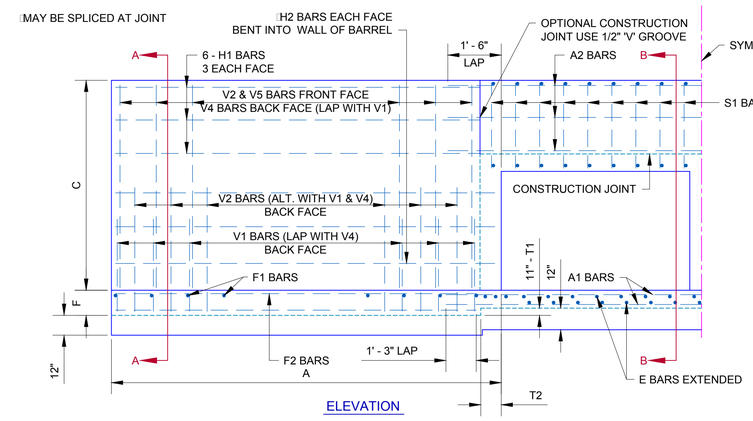
H2 BARS
SEE TABLE FOR LENGTH



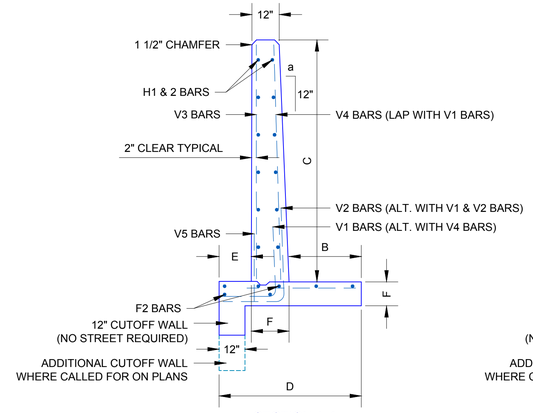
S1 BARS



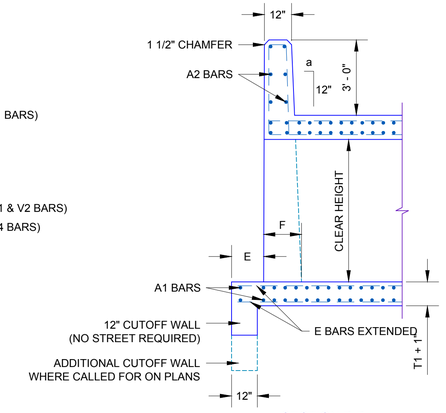
ALTERNATE DETAIL
(USUING WELD CONNECTIONS ON PIPE HANDRAILS)



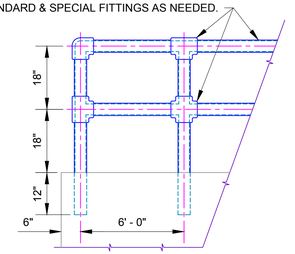
ELEVATION



SECTION A-A



SECTION B-B



PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.

4 WINGS - 2 CURBS - 2 - CUTOFF WALLS

□NOTE: QUANTITIES SHOWN INCLUDE CURB, WINGS AND CUTOFF WALLS FOR ONE UPSTREAM & ONE DOWNSTREAM END BARREL.

CLEAR SPAN	CLEAR HEIGHT	DIMENSIONS								REINFORCING																												TOTAL QUANTITIES □	
		A	B	C	D	E	F	a	T1	A1 BARS #4 @ 12" C/C		A2 BARS #6 @ 18" C/C		F1 BARS				F2 BARS #4 @18" C/C		H1 BARS #6 @18" C/C		H2 BARS #4 @18" C/C		S1 BARS #4 @12" C/C		V1 BARS				V2 BARS				V3 BARS #4 @18" C/C		V4 BARS				V5 BARS #4 @ 18" C/C			
										#	(STR.) LENGTH	#	(STR.) LENGTH	#	SIZE	SPACE	(STR.) LENGTH	#	(STR.) LENGTH	#	(STR.) LENGTH	#	(STR.) LENGTH	#	(STR.) LENGTH	#	SIZE	SPACE	(STR.) LENGTH	#	SIZE	SPACE	(STR.) LENGTH	#	(STR.) LENGTH	#	SIZE	SPACE	(STR.) LENGTH	#	(STR.) LENGTH	STEEL LBS.	CONC. CU. YDS
8	4	11' - 5"	3' - 0"	7' - 8 1/2"	5' - 6"	1' - 6"	1' - 0"	0	8 1/2"	8	20' - 9"	12	21' - 3"	36	#4	15"	4' - 3"	24	10' - 6"	24	10' - 6"	32	11' - 11"	38	8' - 11"	32	#5	18"	4' - 6"	28	#4	18"	7' - 8"	32	7' - 5"	32	#5	18"	7' - 5"	32	1' - 9"	2,500	29.5
	5	13' - 5"	3' - 3"	8' - 8 1/2"	6' - 0"	1' - 9"	1' - 0"	0	8 1/2"	8	20' - 9"	12	21' - 3"	44	#5	15"	4' - 6"	28	12' - 6"	24	12' - 6"	32	13' - 11"	38	8' - 11"	36	#5	18"	4' - 9"	32	#5	18"	8' - 6"	36	8' - 5"	36	#5	18"	8' - 5"	36	1' - 9"	3,000	36.8
	6	15' - 5"	3' - 6"	9' - 8 1/2"	6' - 6"	2' - 0"	1' - 0"	0	8 1/2"	8	20' - 9"	12	21' - 3"	60	#6	12"	4' - 9"	28	14' - 6"	24	14' - 6"	40	15' - 11"	38	8' - 11"	60	#5	12"	5' - 0"	56	#4	12"	9' - 4"	44	9' - 5"	60	#5	12"	9' - 5"	44	1' - 9"	4,000	45.2
10	4	11' - 7 1/2"	3' - 0"	7' - 9 3/4"	5' - 6"	1' - 6"	1' - 0"	0	9 3/4"	8	24' - 9"	12	25' - 3"	36	#4	15"	4' - 3"	28	10' - 8"	24	10' - 8"	32	12' - 2"	46	9' - 1"	32	#5	18"	4' - 6"	28	#4	18"	7' - 8"	32	7' - 6"	32	#5	18"	7' - 6"	32	1' - 9"	2,700	31.9
	6	15' - 7 1/2"	3' - 6"	9' - 9 3/4"	6' - 6"	2' - 0"	1' - 0"	0	9 3/4"	8	24' - 9"	12	25' - 3"	64	#6	12"	4' - 9"	28	14' - 8"	24	14' - 8"	40	16' - 2"	46	9' - 1"	60	#5	12"	5' - 0"	56	#4	12"	9' - 5"	44	9' - 6"	60	#5	12"	9' - 6"	44	1' - 9"	4,200	47.7
	8	19' - 7 1/2"	4' - 0"	11' - 9 3/4"	7' - 3"	2' - 3"	1' - 0"	0	9 3/4"	8	24' - 9"	12	25' - 3"	92	#6	10"	5' - 3"	32	18' - 8"	24	18' - 8"	48	20' - 2"	46	9' - 1"	80	#6	12"	5' - 3"	76	#6	12"	10' - 10"	52	11' - 6"	80	#6	12"	11' - 6"	52	1' - 9"	7,100	66.1
	10	23' - 7 1/2"	4' - 9"	13' - 9 3/4"	9' - 3"	3' - 2"	1' - 4"	5/16"	9 3/4"	8	25' - 0"	12	25' - 6"	160	#6	7"	6' - 3"	40	22' - 7"	24	22' - 7"	56	24' - 2"	48	9' - 1"	96	#7	12"	6' - 2"	92	#6	12"	12' - 11"	64	13' - 6"	96	#7	12"	13' - 6"	64	1' - 9"	11,000	102.6
	12	27' - 7 1/2"	5' - 10"	15' - 9 3/4"	11' - 0"	3' - 9"	1' - 5"	5/16"	9 3/4"	8	25' - 3"	12	25' - 9"	164	#7	8"	7' - 6"	44	26' - 6"	24	26' - 6"	72	28' - 2"	48	9' - 1"	112	#8	12"	6' - 9"	108	#7	12"	14' - 9"	76	15' - 6"	112	#8	12"	15' - 6"	76	1' - 9"	17,100	135.7
12	6	15' - 11"	3' - 6"	9' - 11 1/2"	6' - 6"	2' - 0"	1' - 0"	0	11 1/2"	8	28' - 9"	12	26' - 3"	64	#6	12"	4' - 9"	28	15' - 0"	24	15' - 0"	40	16' - 5"	54	9' - 5"	60	#5	12"	5' - 0"	56	#4	12"	9' - 6"	44	9' - 8"	60	#5	12"	9' - 8"	44	1' - 9"	4,400	51.1
	8	19' - 11"	4' - 0"	11' - 11 1/2"	7' - 3"	2' - 3"	1' - 0"	0	11 1/2"	8	28' - 9"	12	26' - 3"	92	#6	10"	5' - 3"	32	19' - 0"	24	19' - 0"	48	20' - 5"	54	9' - 5"	80	#6	12"	5' - 3"	76	#6	12"	10' - 11"	52	11' - 8"	80	#6	12"	11' - 8"	52	1' - 9"	7,300	69.7
	10	23' - 11"	4' - 9"	13' - 11 1/2"	9' - 3"	3' - 2"	1' - 4"	5/16"	11 1/2"	8	29' - 0"	12	26' - 6"	116	#6	10"	6' - 3"	40	22' - 11"	24	22' - 11"	56	24' - 5"	56	9' - 5"	96	#7	12"	6' - 2"	92	#6	12"	13' - 1"	64	13' - 8"	96	#7	12"	13' - 8"	64	1' - 9"	11,200	105.3
	12	27' - 11"	5' - 10"	15' - 11 1/2"	11' - 0"	3' - 9"	1' - 5"	5/16"	11 1/2"	8	29' - 3"	12	26' - 9"	148	#7	9"	7' - 6"	44	26' - 10"	24	26' - 10"	72	28' - 5"	56	9' - 5"	112	#8	12"	6' - 9"	108	#7	12"	14' - 10"	76	15' - 8"	112	#8	12"	15' - 8"	76	1' - 9"	17,400	141.2

NOTES:

ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT OKLAHOMA CITY STANDARD SPECIFICATIONS.

REINFORCING STEEL IN BOTTOM SLAB (FOOTING) SHALL BE SUPPORTED ON BAR CHAIRS. CHAIRS SHALL BE SUPPORTED ON TIMBER PLANKS OR CLASS "C" CONCRETE STRIPS PLACED AT 4' C/C.

REINFORCING STEEL IN TOP SLAB SHALL BE SUPPORTED ON SLAB SPACERS.

REINFORCING STEEL IN THE WALLS SHALL BE HELD IN PLACE BY METAL CHAIRS. MAXIMUM SPACING OF THE CHAIRS SHALL BE 6'.

COST OF METAL CHAIRS, WOOD PLANK OR CONCRETE STRIPS SHALL BE INCLUDED OTHER ITEMS OF WORK.

QUANTITIES SHOWN INCLUDE CURB, WINGS & CUTOFF WALL FOR ONE UPSTREAM & ONE DOWNSTREAM END OF BARREL.

CONSTRUCT 2" Ø WEEP HOLES (MAXIMIM) AS DRIECTED BY THE ENGINEER. ALL COST OF THE HOLES TO BE INCLUDED IN OTHER ITEMS OF WORK.

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY:
ERIC J. WENGER, P.E.
CITY ENGINEER
DATE: 02-06-13

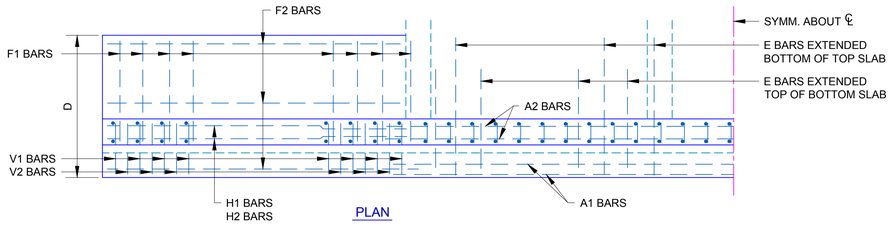
DRAWN: VSC

DATE: 02-06-13

STANDARD REINFORCED CONCRETE BOX - TWO CELL - STRAIGHT WING

Drawing Number
D-404

\\ci.okc.local\PW-Section\CITYACAD-STDS\D-4040 VSC 02-06-13



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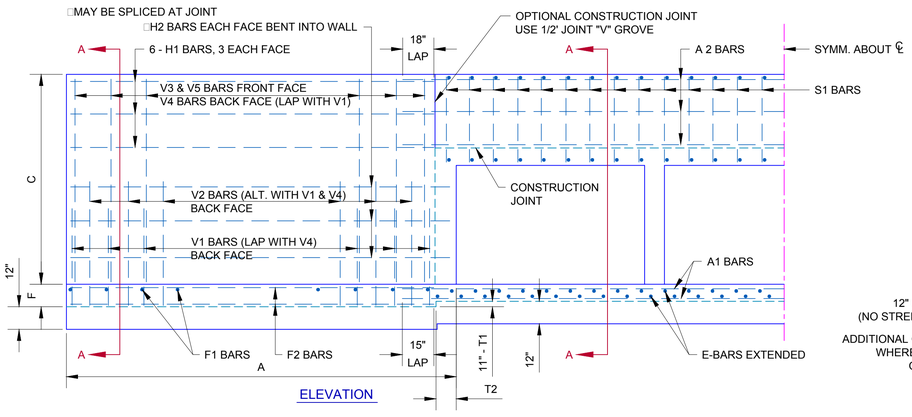
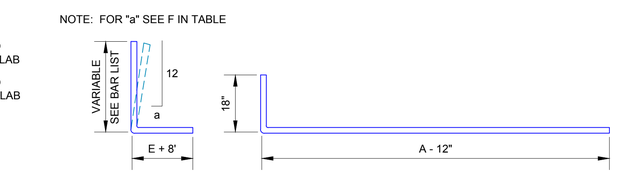
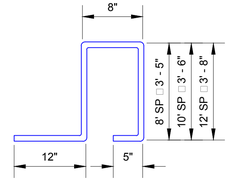


ELEVATION

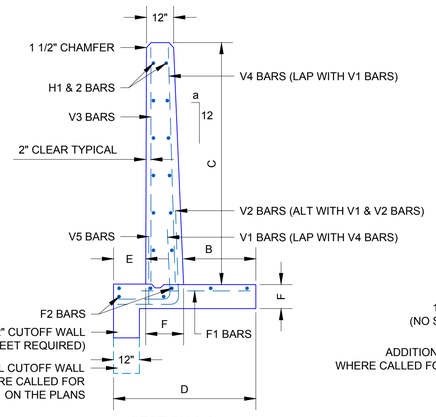


V1 & V2 BARS

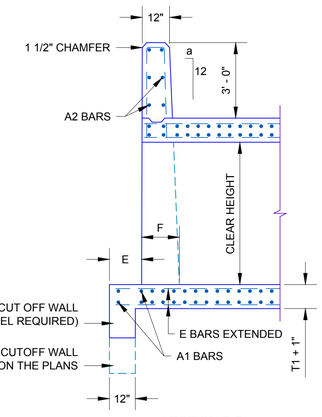
H2 BARS
SEE TABLE FOR LENGTH



S1 BARS



SECTION A-A



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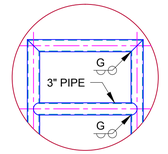
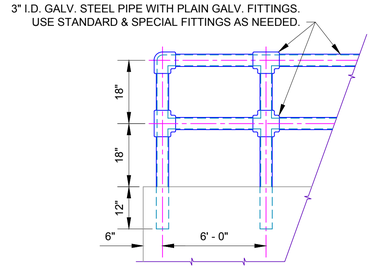


ALTERNATE DETAIL

(USUING WELD CONNECTIONS ON PIPE HANDRAILS)



PIPE HANDRAIL DETAIL

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.

4 WINGS - 2 CURBS - 2 - CUTOFF WALLS

NOTE: QUANTITIES SHOWN INCLUDE CURB, WINGS AND CUTOFF WALLS FOR ONE UPSTREAM & ONE DOWNSTREAM END BARREL.

CLEAR SPAN	CLEAR HEIGHT	DIMENSIONS A	B	C	D	E	F	a	T1	REINFORCING A1 BARS #4 @ 12" C/C #	(STR.) LENGTH	A2 BARS #6 @ 18" C/C #	(STR.) LENGTH	F1 BARS #	SIZE	SPACE	(STR.) LENGTH	F2 BARS #4 @18" C/C #	(STR.) LENGTH	H1 BARS #6 @18" C/C #	(STR.) LENGTH	H2 BARS #4 @18" C/C #	(STR.) LENGTH	S1 BARS #4 @12" C/C #	(STR.) LENGTH	V1 BARS #	SIZE	SPACE	(STR.) LENGTH	V2 BARS #	SIZE	SPACE	(STR.) LENGTH	V3 BARS #4 @18" C/C #	(STR.) LENGTH	V4 BARS #	SIZE	SPACE	(STR.) LENGTH	V5 BARS #4 @ 18" C/C #	(STR.) LENGTH	TOTAL QUANTITIES STEEL LBS.	CONC. CU. YDS
8	4	11' - 5"	3' - 0"	7' - 8 1/2"	5' - 6"	1' - 6"	1' - 0"	0	8 1/2"	8	29' - 6"	12	30' - 0"	36	#4	15"	4' - 3"	24	10' - 6"	24	10' - 6"	32	11' - 11"	56	8' - 11"	32	#5	18"	4' - 6"	28	#4	18"	7' - 8"	32	7' - 5"	32	#5	18"	7' - 5"	32	1' - 9"	2,700	32.8
	5	13' - 5"	3' - 3"	8' - 8 1/2"	6' - 0"	1' - 9"	1' - 0"	0	8 1/2"	8	29' - 6"	12	30' - 0"	44	#5	15"	4' - 6"	28	12' - 6"	24	12' - 6"	32	13' - 11"	56	8' - 11"	36	#5	18"	4' - 9"	32	#5	18"	8' - 6"	36	8' - 5"	36	#5	18"	8' - 5"	36	1' - 9"	3,300	40.3
	6	15' - 5"	3' - 6"	9' - 8 1/2"	6' - 6"	2' - 0"	1' - 0"	0	8 1/2"	8	29' - 6"	12	30' - 0"	60	#6	12"	4' - 9"	28	14' - 6"	24	14' - 6"	40	15' - 11"	56	8' - 11"	60	#5	12"	5' - 0"	56	#4	12"	9' - 4"	44	9' - 5"	60	#5	12"	9' - 5"	44	1' - 9"	4,300	48.6
10	4	11' - 7 1/2"	3' - 0"	7' - 9 3/4"	5' - 6"	1' - 6"	1' - 0"	0	9 3/4"	8	35' - 6"	12	36' - 0"	36	#4	15"	4' - 3"	28	10' - 8"	24	10' - 8"	32	12' - 2"	68	9' - 1"	32	#5	18"	4' - 6"	28	#4	18"	7' - 8"	32	7' - 6"	32	#5	18"	7' - 6"	32	1' - 9"	3,000	36.1
	6	15' - 7 1/2"	3' - 6"	9' - 9 3/4"	6' - 6"	2' - 0"	1' - 0"	0	9 3/4"	8	35' - 6"	12	36' - 0"	64	#6	12"	4' - 9"	28	14' - 8"	24	14' - 8"	40	16' - 2"	68	9' - 1"	60	#5	12"	5' - 0"	56	#4	12"	9' - 5"	44	9' - 6"	60	#5	12"	9' - 6"	44	1' - 9"	4,600	52.3
	8	19' - 7 1/2"	4' - 0"	11' - 9 3/4"	7' - 3"	2' - 3"	1' - 0"	0	9 3/4"	8	35' - 6"	12	36' - 0"	92	#6	10"	5' - 3"	32	18' - 8"	24	18' - 8"	48	20' - 2"	68	9' - 1"	80	#6	12"	5' - 3"	76	#6	12"	10' - 10"	52	11' - 6"	80	#6	12"	11' - 6"	52	1' - 9"	7,400	70.8
	10	23' - 7 1/2"	4' - 9"	13' - 9 3/4"	9' - 3"	3' - 2"	1' - 4"	5/16"	9 3/4"	8	35' - 0"	12	36' - 4"	160	#6	7"	6' - 3"	44	22' - 7"	24	22' - 7"	56	24' - 2"	70	9' - 1"	96	#7	12"	6' - 2"	92	#6	12"	12' - 11"	64	13' - 6"	96	#7	12"	13' - 6"	64	2' - 1"	11,500	116.4
	12	27' - 7 1/2"	5' - 10"	15' - 9 3/4"	11' - 0"	3' - 9"	1' - 5"	5/16"	9 3/4"	8	36' - 2"	12	36' - 8"	164	#7	8"	7' - 6"	48	26' - 6"	24	26' - 6"	72	28' - 2"	70	9' - 1"	112	#8	12"	6' - 9"	108	#7	12"	14' - 9"	76	15' - 6"	112	#8	12"	15' - 6"	76	2' - 2"	17,800	159.6
12	4	11' - 11"	3' - 0"	7' - 11 1/2"	5' - 6"	1' - 6"	1' - 0"	0	11 1/2"	8	41' - 6"	12	42' - 0"	40	#4	15"	4' - 3"	24	11' - 0"	24	11' - 0"	32	12' - 5"	80	9' - 5"	32	#5	18"	4' - 6"	28	#4	12"	7' - 9"	32	7' - 8"	32	#5	18"	7' - 8"	32	1' - 9"	3,200	40.0
	6	15' - 11"	3' - 6"	9' - 11 1/2"	6' - 6"	2' - 0"	1' - 0"	0	11 1/2"	8	41' - 6"	12	42' - 0"	64	#6	12"	4' - 9"	28	15' - 0"	24	15' - 0"	40	16' - 5"	80	9' - 5"	60	#5	12"	5' - 0"	56	#4	12"	9' - 6"	44	9' - 8"	60	#5	12"	9' - 8"	44	1' - 9"	4,800	56.8
	8	19' - 11"	4' - 0"	11' - 11 1/2"	7' - 3"	2' - 3"	1' - 0"	0	11 1/2"	8	41' - 6"	12	42' - 0"	92	#6	10"	5' - 3"	32	19' - 0"	24	19' - 0"	48	20' - 5"	80	9' - 5"	80	#6	12"	5' - 3"	76	#6	12"	10' - 11"	52	11' - 8"	80	#6	12"	11' - 8"	52	1' - 9"	7,700	75.7
	10	23' - 11"	4' - 9"	13' - 11 1/2"	9' - 3"	3' - 2"	1' - 4"	5/16"	11 1/2"	8	41' - 10"	12	42' - 4"	116	#6	10"	6' - 3"	40	22' - 11"	24	22' - 11"	56	24' - 5"	82	9' - 5"	96	#7	12"	6' - 2"	92	#6	12"	13' - 1"	64	13' - 8"	96	#7	12"	13' - 8"	64	2' - 1"	11,400	122.6
	12	27' - 11"	5' - 10"	15' - 11 1/2"	11' - 0"	3' - 9"	1' - 5"	5/16"	11 1/2"	8	42' - 2"	12	42' - 8"	148	#7	9"	7' - 6"	44	26' - 10"	24	26' - 10"	72	28' - 5"	82	9' - 5"	112	#8	12"	6' - 9"	108	#7	12"	14' - 10"	76	15' - 8"	112	#8	12"	15' - 8"	76	2' - 2"	17,800	166.7
	14	31' - 11"	6' - 9"	17' - 11 1/2"	12' - 6"	4' - 6"	1' - 6"	5/16"	11 1/2"	8	42' - 6"	12	43' - 0"	204	#7	8 1/2"	8' - 3"	48	30' - 9"	24	30' - 9"	40	32' - 5"	82	9' - 5"	128	#9	12"	4' - 6"	124	#8	12"	16' - 11"	88	17' - 8"	112	#8	12"	17' - 8"	88	2' - 3"	62,500	219.0

NOTES:

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REINFORCING STEEL IN TOP SLAB SHALL BE SUPPORTED ON SLAB SPACERS.

REINFORCING STEEL IN THE WALLS SHALL BE HELD IN PLACE BY METAL CHAIRS. MAXIMUM SPACING OF THE CHAIRS SHALL BE 6'.

COST OF METAL CHAIRS, WOOD PLANK OR CONCRETE STRIPS SHALL BE INCLUDED OTHER ITEMS OF WORK.

QUANTITIES SHOWN INCLUDE CURB, WINGS & CUTOFF WALL FOR ONE UPSTREAM & ONE DOWNSTREAM END OF BARREL.

CONSTRUCT 2" Ø WEEP HOLES (MAXIMIM) AS DRIECTED BY THE ENGINEER. ALL COST OF THE HOLES TO BE INCLUDED IN OTHER ITEMS OF WORK.

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E.
CITY ENGINEER
DATE: 02-06-13

DRAWN: VSC

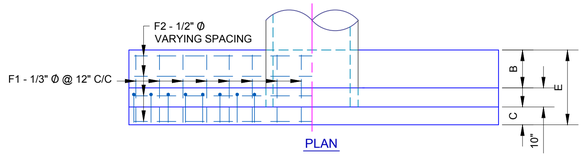
DATE: 02-06-13

STANDARD REINFORCED CONCRETE BOX - THREE CELL - STRAIGHT WING

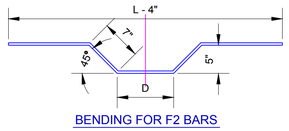
Drawing Number

D-405

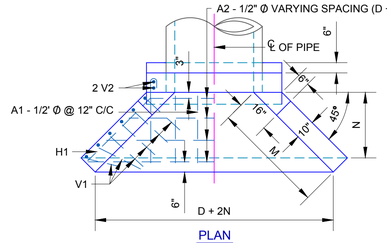
\\ci.okc.\okcPW-Section\CITYACAD-STDS\D-405 VSC 02-06-13



PLAN



BENDING FOR F2 BARS



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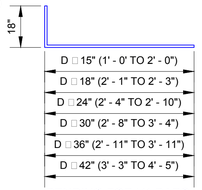
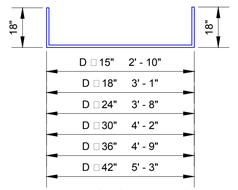
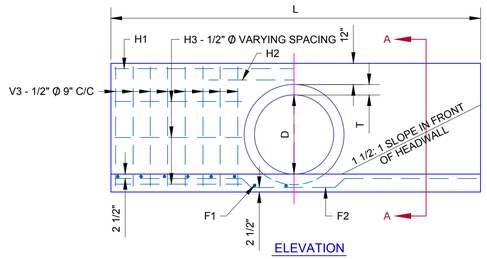


BENDING FOR V1 BARS



BENDING FOR V2 BARS



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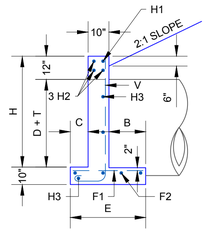
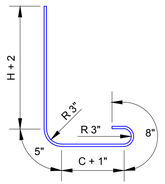
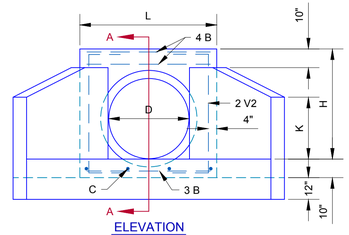
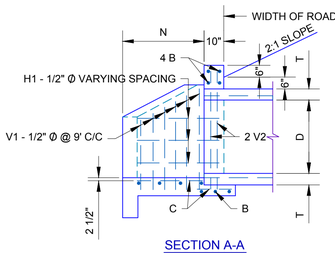


SECTION A-A

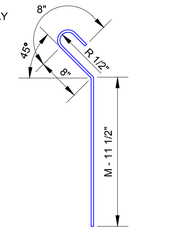




ELEVATION



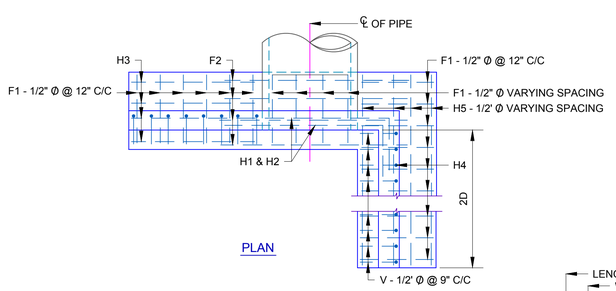
SECTION A-A



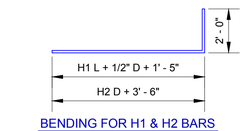
BENDING FOR H1 BARS

DIMENSIONS & QUANTITIES FOR STRAIGHT HEADWALLS								□FOR ONE HEADWALL															
DIMENSIONS								REINFORCING STEEL														QUANTITIES □	
								F1 - 1/2" Ø		F2 - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		H3 - 1/2" Ø		V - 1/2" Ø			
D	AREA SQ FT	T	H	L	E	B	C	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CLASS "A" CONC C.Y.	REINF. STEEL LBS
15"	1.23	2 1/2"	2' - 5 1/2"	6' - 0"	2' - 2"	10"	6"	6	1' - 10"	3	6' - 0"	1	5' - 8"	3	5' - 3"	4	2' - 0"	6	4' - 3"	.78	56
18"	1.77	2 1/2"	2' - 8 1/2"	7' - 0"	2' - 3"	11"	6"	8	1' - 11"	3	7' - 0"	1	6' - 8"	3	5' - 6"	4	2' - 4"	8	4' - 6"	.98	70
24"	3.14	3"	3' - 3"	9' - 0"	2' - 7"	1' - 3"	6"	10	2' - 3"	3	9' - 0"	1	8' - 8"	3	6' - 0"	4	3' - 1"	10	5' - 1"	1.46	95
30"	4.91	3 1/2"	3' - 9 1/2"	11' - 0"	2' - 10"	1' - 4"	8"	12	2' - 6"	3	11' - 0"	1	10' - 8"	3	6' - 6"	6	3' - 9"	12	5' - 9"	2.00	122
36"	7.07	4"	4' - 4"	14' - 0"	3' - 1"	1' - 7"	8"	14	2' - 9"	4	14' - 0"	1	13' - 8"	3	7' - 0"	6	5' - 0"	14	6' - 4"	2.85	170
42"	9.62	4 1/2"	4' - 10 1/2"	16' - 0"	3' - 4"	1' - 8"	10"	16	3' - 0"	4	16' - 0"	1	15' - 8"	3	7' - 6"	6	5' - 8"	16	7' - 0"	3.58	198

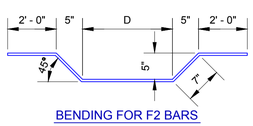
DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 45° WINGS									□FOR ONE HEADWALL																		
DIMENSIONS									REINFORCING STEEL																	QUANTITIES □	
									A1 - 1/2" Ø		A - 1/2" Ø		B - 1/2" Ø		C - 1/2" Ø		H1 - 1/2" Ø		V1 - 1/2" Ø		V - 1/2" Ø			
D	AREA SQ FT	T	H	K	L	M	N	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CLASS "A" CONC C.Y.	REINF. STEEL LBS
15"	1.23	2 1/4"	2' - 5 1/4"	1' - 5"	3' - 7"	1' - 9"	1' - 3"	4	1' - 0"	2	3' - 9" AV.	7	3' - 3"	3	1' - 6"	4	2' - 1"	4	3' - 5" AV.	4	5' - 10"	.74	57
18"	1.77	2 1/2"	2' - 8 1/2"	1' - 7"	3' - 10"	2' - 1 1/2"	1' - 6"	4	1' - 2"	2	4' - 3" AV.	7	3' - 6"	3	1' - 6"	4	2' - 6"	4	3' - 8" AV.	4	6' - 1"	.91	61
24"	3.14	3"	3' - 3"	1' - 10 1/2"	4' - 4"	2' - 10"	2' - 0"	5	1' - 8"	3	5' - 3" AV.	7	4' - 0"	3	1' - 6"	6	3' - 2"	6	4' - 1" AV.	4	6' - 8"	1.37	85
30"	4.91	3 1/2"	3' - 9 1/2"	2' - 2"	4' - 10"	3' - 6 1/2"	2' - 6"	5	2' - 2"	3	6' - 3" AV.	7	4' - 6"	4	1' - 6"	6	3' - 11"	8	4' - 6" AV.	4	7' - 2"	1.77	104
36"	7.07	4"	4' - 4"	2' - 5 1/2"	5' - 4"	4' - 3"	3' - 0"	6	2' - 8"	4	7' - 3" AV.	7	5' - 0"	4	1' - 6"	6	4' - 7"	10	4' - 11" AV.	4	7' - 9"	2.29	130
42"	9.62	4 1/2"	4' - 10 1/2"	2' - 9"	5' - 10"	4' - 1 1/2"	3' - 6"	6	3' - 2"	4	8' - 3" AV.	7	5' - 6"	4	1' - 6"	6	5' - 4"	12	5' - 4" AV.	4	8' - 3"	2.89	151



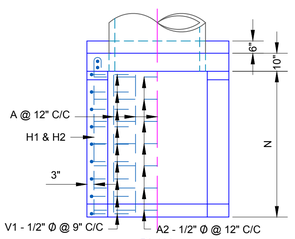
PLAN



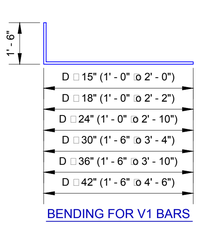
BENDING FOR H1 & H2 BARS



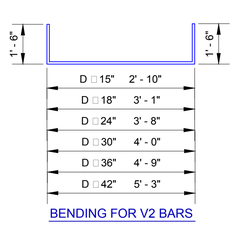
BENDING FOR F2 BARS



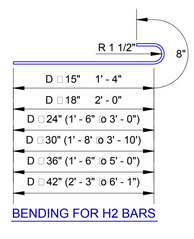
PLAN



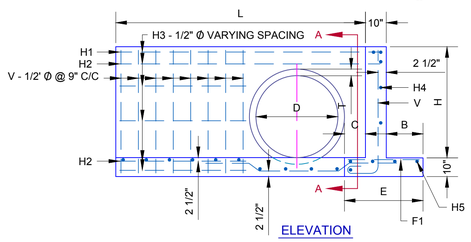
BENDING FOR V1 BARS



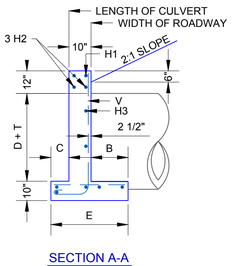
BENDING FOR V2 BARS



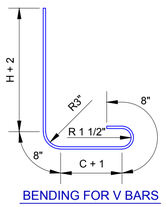
BENDING FOR H2 BARS



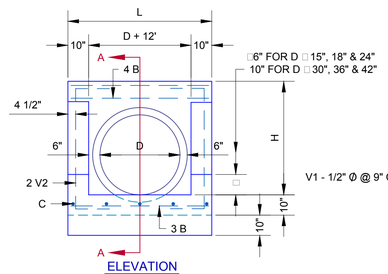
ELEVATION



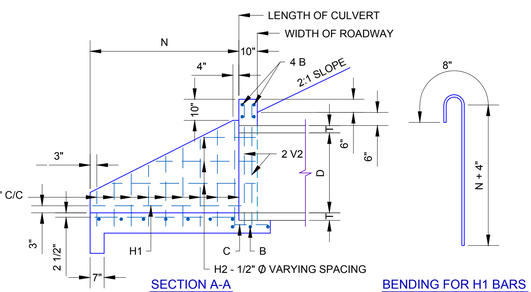
SECTION A-A



BENDING FOR V BARS



ELEVATION



SECTION A-A

BENDING FOR H1 BARS

DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 90° WINGS								□FOR ONE HEADWALL																					
DIMENSIONS								REINFORCED STEEL																				QUANTITIES □	
								F1 - 1/2" Ø		F2 - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		H3 - 1/2" Ø		H4 - 1/2" Ø		H5 - 1/2" Ø		V - 1/2" Ø			
D	AREA SQ FT	T	H	L	E	B	C	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CLASS "A" CONC C.Y.	REINF. STEEL LBS
15"	1.23	2 1/4"	2' - 5 1/4"	3' - 0"	2' - 2"	10"	6"	10	1' - 10"	3	6' - 5"	1	7' - 0"	3	6' - 9"	5	2' - 0"	2	3' - 0"	4	3' - 10"	7	2' - 0"	1.09	84
18"	1.77	2 1/2"	2' - 8 1/2"	3' - 6"	2' - 3"	11"	6"	10	1' - 11"	3	6' - 8"	1	7' - 8"	3	7' - 0"	5	2' - 4"	2	3' - 6"	4	4' - 5"	9	2' - 4"	1.32	97
24"	3.14	3"	3' - 3"	4' - 6"	2' - 7"	1' - 3"	6"	14	2' - 3"	3	7' - 2"	1	8' - 11"	3	7' - 6"	6	3' - 1"	3	4' - 6"	4	5' - 9"	11	3' - 1"	1.94	131
30"	4.91	3 1/2"	3' - 9 1/4"	5' - 6"	2' - 10"	1' - 4"	8"	16	2' - 6"	3	7' - 8"	1	10' - 2"	3	8' - 0"	6	3' - 9"	3	5' - 6"	4	6' - 10"	14	3' - 9"	2.59	163
36"	7.07	4"	4' - 4"	7' - 0"	3' - 1"	1' - 7"	8"	16	2' - 9"	4	8' - 2"	1	11' - 11"	3	8' - 6"	7	5' - 0"	4	6' - 6"	4	8' - 1"	17	5' - 0"	3.47	216
42"	9.62	4 1/2"	4' - 10 1/2"	8' - 0"	3' - 4"	1' - 8"	10"	19	3' - 0"	4	8' - 8"	1	13' - 2"	3	9' - 0"	7	5' - 8"	4	7' - 6"	4	9' - 2"	19	5' - 8"	4.32	252

DIMENSIONS & QUANTITIES FOR HEADWALLS WITH U-TYPE WINGS										□FOR ONE HEADWALL																					
DIMENSIONS										REINFORCED STEEL																				QUANTITIES □	
										A1 - 1/2" Ø		A2 - 1/2" Ø		B - 1/2" Ø		C - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		V1 - 1/2" Ø		V2 - 1/2" Ø			
D	AREA SQ FT	T	H	L		N		#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CLASS "A" CONC C.Y.	REINF. STEEL LBS
15"	1.23	2 1/4"	2' - 5 1/4"	3' - 11"		6' - 6"		3	2' - 2"	3	3' - 7"	7	3' - 7"	3	1' - 6"	2	3' - 6"	2	2' - 0"	8	3' - 0" AV.	4	5' - 10"	.95	71
18"	1.77	2 1/4"	2' - 8 1/4"	3' - 1"		3' - 1"		3	2' - 9"	4	3' - 10"	7	3' - 10"	3	1' - 6"	2	4' - 1"	2	2' - 8"	8	3' - 1" AV.	4	6' - 1"	1.15	79
24"	3.14	3"	3' - 3"	4' - 2"		4' - 2"		4	3' - 10"	5	4' - 4"	7	4' - 4"	4	1' - 6"	2	5' - 2"	4	2' - 11" AV.	12	3' - 5" AV.	4	6' - 8"	1.60	109
30"	4.91	3 1/4"	3' - 9 1/4"	4' - 3"		4' - 3"		4	2' - 6"	5	4' - 10"	7	4' - 10"	4	1' - 6"	2	5' - 3"	4	3' - 5" AV.	12	3' - 11" AV.	4	7' - 2"	1.91	120
36"	7.07	4"	4' - 4"	5' - 4"		5' - 4"		5	2' - 9"	6	5' - 4"	7	5' - 4"	5	1' - 6"	2	6' - 4"	6	3' - 11" AV.	14	4' - 2" AV.	4	7' - 9"	2.48	152
42"	9.62	4 1/4"	4' - 10 1/4"	6' - 5"		6' - 5"		5	3' - 0"	7	5' - 10"	7	5' - 10"	5	1' - 6"	2	7' - 5"	6	4' - 10" AV.	18	4' - 6" AV.	4	8' - 3"	3.12	186

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH OKLAHOMA CITY STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
3. ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
4. ALL REINFORCED STEEL SHALL CONFORM TO ASTM SPEC. A-305-49.

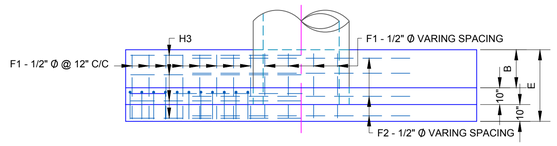
The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER
DATE: 02-06-13
DRAWN: VSC
DATE: 02-06-13

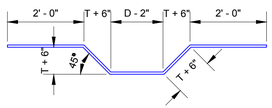
CAST IN PLACE CONCRETE HEADWALLS FOR 15" TO 42" REINFORCED CONCRETE PIPES

Drawing Number
D-406

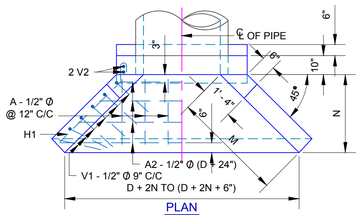
E:/CITY/ACAD2000-STD/D-406.DWG VSC 02-06-13



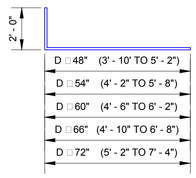
PLAN



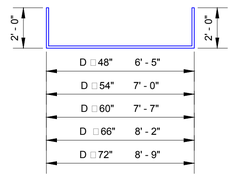
BENDING FOR F2 BARS



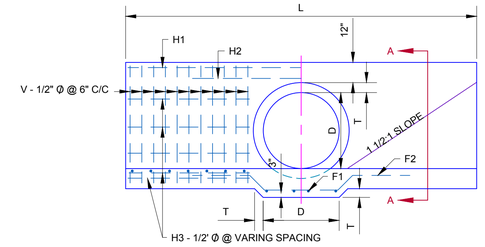
PLAN



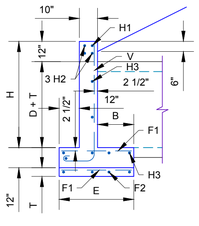
BENDING FOR V1 BARS



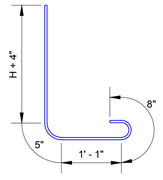
BENDING FOR V2 BARS



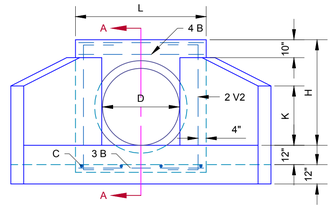
ELEVATION



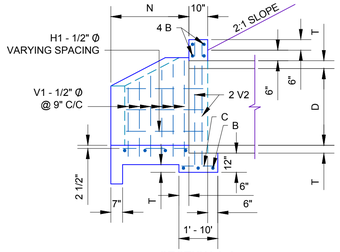
SECTION A-A



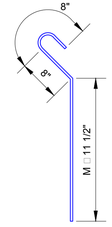
BENDING FOR V BARS



ELEVATION



SECTION A-A



BENDING FOR H1 BARS

DIMENSIONS & QUANTITIES FOR STRAIGHT HEADWALLS — □ FOR ONE HEADWALL

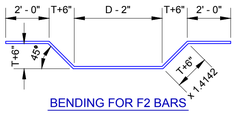
DIMENSIONS							REINFORCING STEEL												QUANTITIES □	
							F1 - 1/2" Ø		F2 - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		H3 - 1/2" Ø		V - 1/2" Ø		CLASS "A"	REINF.
D	AREA SQ FT	T	H	L	E	B	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CONC C.Y.	STEEL LBS
48"	12.57	5"	5' - 5"	18' - 0"	3' - 9"	1' - 11"	18	3' - 5"	4	10' - 5"	1	17' - 8"	3	8' - 0"	14	6' - 5"	28	7' - 11"	5.14	305
54"	15.90	5 1/2"	5' - 11 1/2"	20' - 0"	4' - 0"	2' - 2"	20	3' - 8"	4	11' - 0"	1	19' - 8"	3	8' - 6"	16	7' - 1"	30	8' - 6"	6.19	355
60"	19.63	6"	6' - 6"	22' - 0"	4' - 3"	2' - 5"	24	3' - 11"	5	11' - 8"	1	21' - 8"	3	9' - 0"	18	7' - 10"	32	9' - 0"	7.34	421
66"	23.76	6 1/2"	7' - 0 1/2"	24' - 0"	4' - 6"	2' - 8"	25	4' - 2"	5	12' - 3"	1	23' - 8"	3	9' - 6"	18	8' - 6"	36	9' - 6"	8.58	476
72"	28.27	7"	7' - 7"	26' - 0"	4' - 10"	3' - 0"	27	4' - 6"	5	12' - 10"	1	25' - 8"	3	10' - 0"	18	9' - 3"	38	10' - 1"	10.01	529

DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 45° WINGS — □ FOR ONE HEADWALL

DIMENSIONS								REINFORCED STEEL																QUANTITIES □	
								A1 - 1/2" Ø		A - 1/2" Ø		B - 1/2" Ø		C - 1/2" Ø		H1 - 1/2" Ø		V1 - 1/2" Ø		V - 1/2" Ø		CLASS "A"	REINF.
D	AREA SQ FT	T	H	K	L	M	N	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CONC C.Y.	STEEL LBS
48"	12.57	5"	5' - 5"	3' - 2"	6' - 4"	5' - 3 1/2"	3' - 9"	7	3' - 5"	4	9' - 0" AV.	7	6' - 0"	5	1' - 6"	8	5' - 8"	12	6' - 6" AV.	4	10' - 5"	3.81	184
54"	15.90	5 1/2"	5' - 11 1/2"	3' - 6"	6' - 10"	5' - 10 1/2"	4' - 2"	7	3' - 10"	5	9' - 11" AV.	7	6' - 6"	5	1' - 6"	8	6' - 3"	14	6' - 11" AV.	4	11' - 0"	4.54	214
60"	19.63	6"	6' - 6"	3' - 10"	7' - 4"	6' - 5 1/2"	4' - 7"	8	4' - 3"	5	10' - 10" AV.	7	7' - 0"	6	1' - 6"	10	6' - 10"	16	7' - 4" AV.	4	11' - 7"	5.33	253
66"	23.76	6 1/2"	7' - 0 1/2"	4' - 2"	7' - 10"	7' - 1"	5' - 0"	8	4' - 8"	5	11' - 9" AV.	7	7' - 6"	6	1' - 6"	10	7' - 5"	18	7' - 9" AV.	4	12' - 2"	6.20	281
72"	28.27	7"	7' - 7"	2' - 5 1/2"	8' - 4"	7' - 9 1/2"	5' - 6"	9	5' - 2"	6	12' - 9" AV.	7	8' - 0"	6	1' - 6"	10	8' - 2"	20	8' - 3" AV.	4	12' - 9"	7.22	325

PLAN

BENDING FOR H1 & H2 BARS



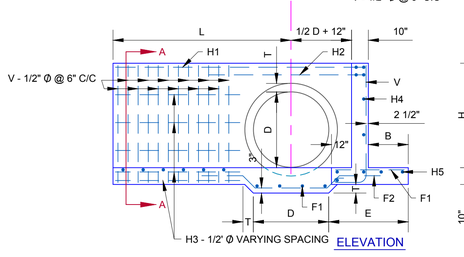
BENDING FOR F2 BARS

PLAN

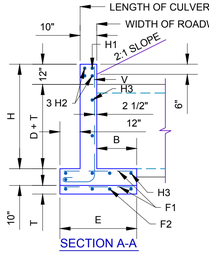
BENDING FOR V1 BARS

BENDING FOR V2 BARS

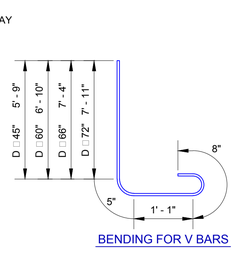
BENDING FOR H2 BARS



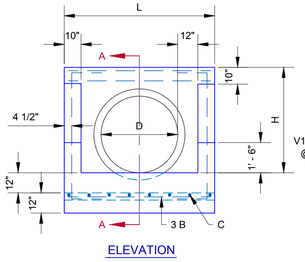
ELEVATION



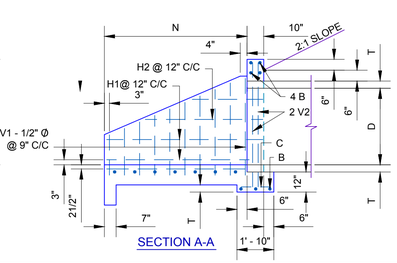
SECTION A-A



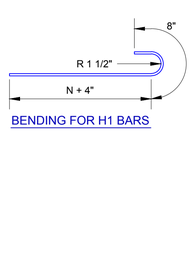
BENDING FOR V BARS



ELEVATION



SECTION A-A



BENDING FOR H1 BARS

DIMENSIONS & QUANTITIES FOR HEADWALLS WITH 90° WINGS — □ FOR ONE HEADWALL

DIMENSIONS							REINFORCED STEEL														QUANTITIES □	
							F1 - 1/2" Ø		F2 - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		H3 - 1/2" Ø		H4 - 1/2" Ø		H5 - 1/2" Ø		V - 1/2" Ø		CLASS "A"	REINF.
D	AREA SQ FT	T	H	L	E	B	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CONC C.Y.	STEEL LBS
48"	12.57	5"	5' - 0"	9' - 0"	3' - 9"	1' - 11"	22	3' - 5"	4	10' - 5"	1	14' - 0"	3	10' - 0"	7	6' - 5"	4	8' - 6"	4	10' - 5"	30	7' - 11"	6.14	347
54"	15.90	5 1/2"	5' - 11 1/2"	10' - 0"	4' - 0"	2' - 2"	24	3' - 8"	4	11' - 0"	1	15' - 8"	3	10' - 6"	8	7' - 1"	4	9' - 6"	5	11' - 8"	33	8' - 6"	7.39	410
60"	19.63	6"	6' - 6"	11' - 0"	4' - 3"	2' - 5"	26	3' - 11"	5	11' - 8"	1	16' - 11"	3	11' - 0"	9	7' - 10"	5	10' - 6"	5	12' - 11"	36	9' - 0"	8.75	482
66"	23.76	6 1/2"	7' - 0 1/4"	12' - 0"	4' - 6"	2' - 8"	30	4' - 2"	5	12' - 3"	1	18' - 2"	3	11' - 6"	9	8' - 6"	5	11' - 6"	5	14' - 2"	40	9' - 6"	10.23	551
72"	28.27	7"	7' - 7"	13' - 0"	4' - 10"	3' - 0"	31	4' - 6"	5	12' - 10"	1	19' - 5"	3	12' - 0"	9	9' - 3"	5	12' - 6"	5	15' - 6"	43	10' - 1"	11.95	612

DIMENSIONS & QUANTITIES FOR HEADWALLS WITH U-TYPE WINGS — □ FOR ONE HEADWALL

DIMENSIONS						REINFORCED STEEL																QUANTITIES □	
						A1 - 1/2" Ø		A2 - 1/2" Ø		B - 1/2" Ø		C - 1/2" Ø		H1 - 1/2" Ø		H2 - 1/2" Ø		V1 - 1/2" Ø		V2 - 1/2" Ø		CLASS "A"	REINF.
D	AREA SQ FT	T	H	L	N	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	CONC C.Y.	STEEL LBS
48"	12.57	5"	5' - 5"	7' - 8"	6' - 6"	7	6' - 2"	7	7' - 4"	7	7' - 4"	7	1' - 6"	4	7' - 6"	4	4' - 10" AV.	18	5' - 8" AV.	4	10' - 5"	4.56	234
54"	15.90	5 1/2"	5' - 11 1/2"	8' - 2"	3' - 1"	7	7' - 3"	8	7' - 10"	7	7' - 10"	7	1' - 6"	4	8' - 7"	6	4' - 11" AV.	20	5' - 10" AV.	4	11' - 0"	5.49	270
60"	19.63	6"	6' - 6"	8' - 8"	4' - 2"	8	8' - 4"	9	8' - 4"	7	8' - 4"	7	1' - 6"	4	9' - 8"	6	6' - 0" AV.	24	6' - 2" AV.	4	11' - 7"	6.50	321
66"	23.76	6 1/2"	7' - 0 1/2"	9' - 2"	4' - 3"	8	9' - 5"	10	8' - 10"	7	8' - 10"	8	1' - 6"	4	10' - 9"	8	6' - 1" AV.	26	6' - 5" AV.	4	12' - 2"	7.58	364
72"	28.27	7"	7' - 7"	5' - 4"	9' - 8"	9	10' - 6"	11	9' - 4"	7	9' - 4"	8	1' - 6"	4	11' - 10"	8	7' - 2" AV.	30	6' - 9" AV.	4	12' - 9"	8.75	423

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH OKLAHOMA CITY STANDARD SPECIFICATIONS.
2. ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
3. ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
4. ALL REINFORCED STEEL SHALL CONFORM TO AASHO M-179 (ASTM C-76)
5. MINIMUM DEPTH OF FILL OVER CULVERTS SHALL BE 1' - 0".
6. WALL THICKNESS (DIMENSION "T"0 OF PIPES SHOWN, ARE TAKEN FROM "WALL B" COLUMN OF ASTM AND AASHO TABLES.

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 02-06-13

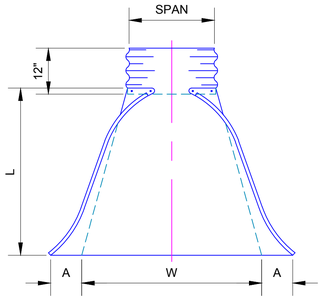
DRAWN: VSC — DATE: 02-06-13

CAST-IN-PLACE CONCRETE HEADWALLS FOR 48" TO 72" REINFORCED CONCRETE PIPE

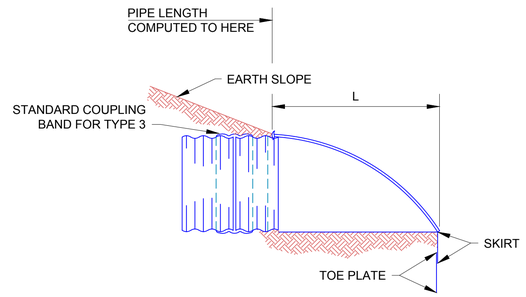
Drawing Number

D-407

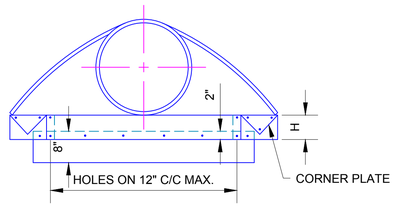
E:/CITY/ACAD2000-STD/D-407.DWG VSC 02-04-13



PLAN VIEW

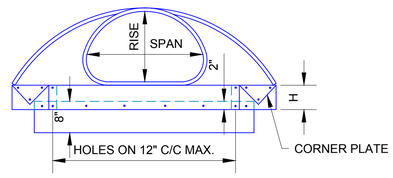


SIDE VIEW



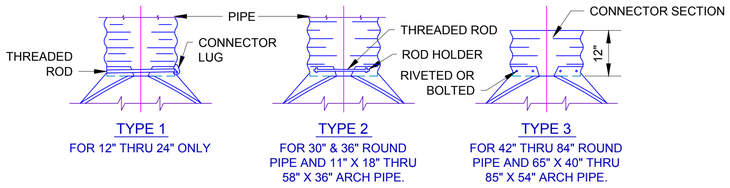
END VIEW
ROUND METAL PIPE END SECTION

DIMENSIONS OF END SECTION FOR ROUND METAL PIPE								
SPAN	GA.	A ± 1	B (MAX.)	H ± 1	L ± 1/2	W ± 2	APPROX. SLOPE	SPAN
IN.		IN.	IN.	IN.	IN.	IN.		IN.
18	16	8	10	6	31	36	2 1/2 : 1	1
24	16	10	13	6	41	48	2 1/2 : 1	1
30	14	12	16	8	51	60	2 1/2 : 1	1
36	14	14	19	9	60	72	2 1/2 : 1	2
42	12	16	22	11	69	84	2 1/2 : 1	2
48	12	18	27	12	78	90	2 1/4 : 1	2



END VIEW
ARCH METAL PIPE END SECTION

DIMENSIONS OF END SECTION FOR METAL PIPE ARCH									
SPAN	RISE	GA.	A ± 1	B (MAX.)	H ± 1	L ± 1/2	W ± 2	APPROX. SLOPE	SPAN
IN.	IN.		IN.	IN.	IN.	IN.	IN.		IN.
22	13	16	7	10	6	23	36	2 1/2 : 1	1
29	18	16	9	14	6	32	48	2 1/2 : 1	1
43	22	14	10	16	8	39	60	2 1/2 : 1	1
36	27	14	12	18	8	46	75	2 1/2 : 1	1
50	31	12	13	21	9	53	85	2 1/2 : 1	2
58	36	12	18	26	12	63	90	2 1/4 : 1	2
65	40	12	18	30	12	70	102	2 1/2 : 1	2
72	44	12	18	33	12	77	114	2 1/4 : 1	3

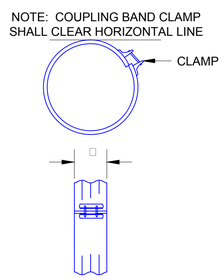


TYPE 1
FOR 12" THRU 24" ONLY

TYPE 2
FOR 30" & 36" ROUND PIPE AND 11" X 18" THRU 58" X 36" ARCH PIPE.

TYPE 3
FOR 42" THRU 84" ROUND PIPE AND 65" X 40" THRU 85" X 54" ARCH PIPE.

TYPICAL METAL END SECTION CONNECTIONS



STANDARD COUPLING BAND
□ 7" FOR UP TO 36" DIAMETER, 12" FOR 36" DIAMETER AND UP.

GENERAL NOTES FOR METAL END SECTIONS:

1. WHEN PREFABRICATED END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIALS AS THAT OF THE PIPE, WHICH THEY ARE INSTALLED.

2. FOR MATERIAL OF ALUMINUM ALLOY END SECTION, SEE SUBSECTION 726.65 OF THE CURRENT OKLAHOMA STANDARD SPECIFICATIONS.

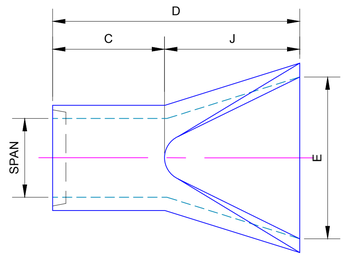
3. FOR MATERIALS OF GALVANIZED METAL END SECTION, SEE SUBSECTION 726.17 OF THE CURRENT OKLAHOMA STANDARD SPECIFICATIONS.

4. CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE OF THE SAME GAGE & MATERIAL AS THE SKIRT AND SHALL BE INCLUDED IN THE BID FOR END SECTION.

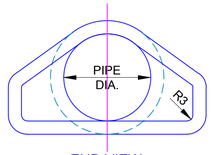
5. TOE PLATES WILL BE REQUIRED FOR ALL METAL END SECTIONS UNLESS SOLID ROCK IS ENCOUNTERED. HOLES IN TOE PLATE ARE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP. 3/8" BOLTS TO BE FURNISHED. LENGTH TO TOE PLATES FOR ROUND PIPE SECTION IS W + 10" TO 12" TO 30" DIAMETER PIPE, W + 22" FOR 36" TO 48" DIAMETER PIPE. LENGTH OF TOE PLATES FOR ARCH PIPE END SECTION IS W + 10" FOR A RISE OF 11" TO 27" AND W + 18 FOR A RISE OF 31" TO 44".

6. IF TYPE 3 END SECTION IS USED AS OPTIONAL PIPE, THE LENGTH OF PIPE IS TO BE REDUCED BY 12" FOR EACH END SECTION.

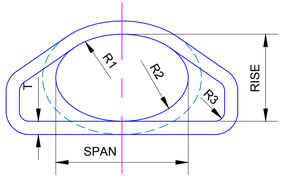
7. ANY STRUCTURAL EXCAVATION REQUIRED FOR INSTALLATION OF PREFABRICATED END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.



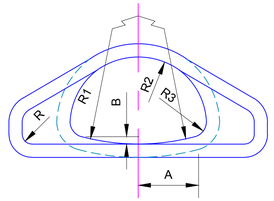
PLAN VIEW



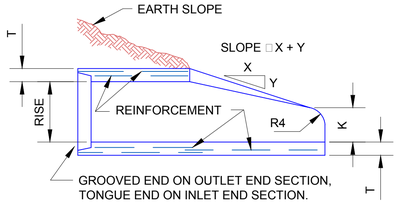
END VIEW
ARCH METAL PIPE END SECTION



END VIEW
ELIPTICAL CONCRETE PIPE END SECTION



END VIEW
ARCH CONCRETE PIPE END SECTION



LONGITUDINAL SECTION

DIMENSIONS OF PRECAST END SECTION FOR PIPES										
SPAN	K	J	C	D	E	T	R3	R4	R5	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
18	9	27	46	73	36	2 1/2	3	3	6	3 TO 1
24	8 1/2	43 1/2	30	73 1/2	48	3	3	3	7	3 TO 1
30	12	54	19 3/4	73 3/4	60	3 1/2	3	3	8	3 TO 1
36	15	63	34 3/4	73 3/4	72	4	3	3	10 1/2	3 TO 1
42	21	63	35	98	78	4 1/2	3	3	10 1/2	3 TO 1
48	24	72	26	98	84	5	6	6	14	3 TO 1

DIMENSIONS OF PRE-CAST END SECTIONS FOR ELLIPTICAL PIPES													
SPAN	RISE	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
23	14	6	20	3	3		2 3/4	8	27	45	72	36	3 TO 1
30	19	8 1/4	26 1/4	3	3	7	3 1/4	8 1/2	39	33	72	48	3 TO 1
34	22	9 1/4	29 17/32	3	3	8	3 1/2	9	46	26	72	54	3 TO 1
38	24	10 1/4	32 3/4	3	3	9	3 3/4	9 1/2	54	18	72	60	3 TO 1
42	27	11 7/16	36 3/16	3	3	10 1/2	3 3/4	10 3/8	57	15	72	66	3 TO 1
45	29	12 1/4	39 1/4	3	3	12	4 1/2	11 1/4	60	36	96	72	3 TO 1
49	32	13 9/16	42 21/32	3	3	12 1/2	4 3/4	12	60	36	96	75	3 TO 1
53	34	14 3/4	46	6	6	13	5	15 3/4	60	36	96	78	3 TO 1
60	38	16 1/2	51 3/4	6	6	14	5 1/2	21	60	36	96	84	3 TO 1
68	43	18 21/32	58 13/32	6	6	16	6	25 1/2	60	36	96	90	3 TO 1

DIMENSIONS OF PRE-CAST END SECTION FOR ARCH-PIPES																
SPAN	RISE	A	B	R	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	
28 1/2	18	10 7/8	3 3/4	3	40 11/16	14 3/4	4 5/8	3	7	3 1/2	8 1/2	39	33	72	48	3 TO 1
36 1/4	22 1/2	13 5/8	3 13/16	3	51	18 3/4	6 1/8	3	8	4	9 1/2	50	46	96	60	3 TO 1
43 3/4	26 5/8	17 1/8	4 1/8	6	62	22 1/2	6 1/2	3	10 1/2	4 1/2	11 1/8	60	36	96	72	3 TO 1
51 1/8	31 1/16	20	5 1/16	6	73	26 1/4	7 3/4	3	12 1/2	4 1/2	15 13/16	60	36	96	78	3 TO 1
58 1/2	36	22 3/4	6	6	84	30	8 7/8	3	14	5	21	60	36	96	84	3 TO 1
65	40	25	6 3/4	6	92 1/2	33 1/2	10	6	16	5 1/2	25 1/2	60	36	96	90	3 TO 1
73	45	28 1/2	7 1/2	6	105	37 1/2	11 1/16	6		6	31	60	36	96	96	3 TO 1

BASIS OF PAYMENT FOR METAL END SECTIONS:

GALVANIZED METAL END SECTION - ROUND EA.
GALVANIZED METAL END SECTION - ARCH EA.

WHEN USED AS OPTIONAL END SECTION BETWEEN METAL, ALUMINUM ALLOY & CONCRETE, THE BASIS OF PAYMENT SHALL BE:

SP. PREFABRICATED CULVERT END SECTION - ROUND EA.
SP. PREFABRICATED CULVERT END SECTION - ARCH EA.

GENERAL NOTES FOR PRECAST END SECTIONS:

1. WHEN PREFABRICATED END SECTIONS ARE OPTIONAL, THEY SHALL BE OF THE SAME MATERIALS AS THAT OF THE PIPE, WHICH THEY ARE INSTALLED.

2. DIMENSIONS SHOWN FOR PREFABRICATED END SECTIONS ARE SUBJECT TO MANUFACTURES TOLERANCES.

3. ANY STRUCTURAL EXCAVATION REQUIRED FOR INSTALLATION OF PREFABRICATED END SECTIONS SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS OF WORK.

BASIS OF PAYMENT FOR PRECAST END SECTIONS:

PRECAST CONCRETE CULVERT END SECTION - ROUNDED EA.
PRECAST CONCRETE CULVERT END SECTION - ELLIPTICAL EA.
PRECAST CONCRETE CULVERT END SECTION - ARCH EA.

□IF ELIPTICAL CONCRETE IS USED, THE ELIPTICAL CONCRETE END SECTION SHALL BE USED.

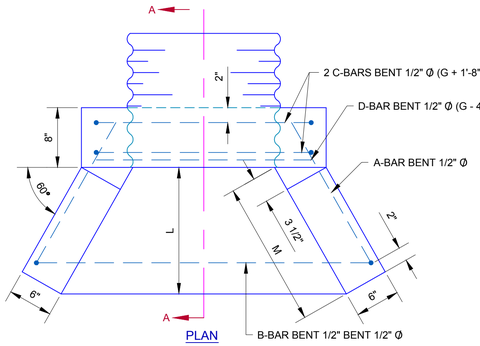
The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 02-06-13
DRAWN: VSC — DATE: 02-06-13

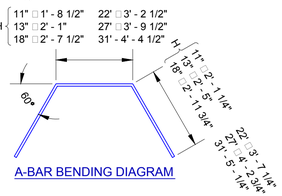
STANDARD PREFABRICATED CULVERT SECTIONS

Drawing Number
D-408

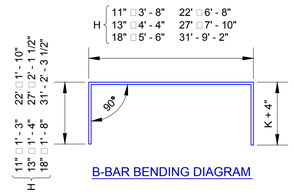
E:/CITY/ACAD2000-STD/D-408.DWG VSC 02-06-13



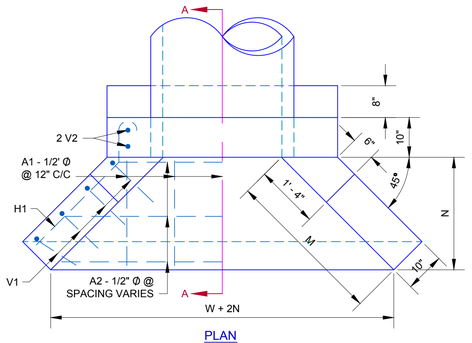
PLAN



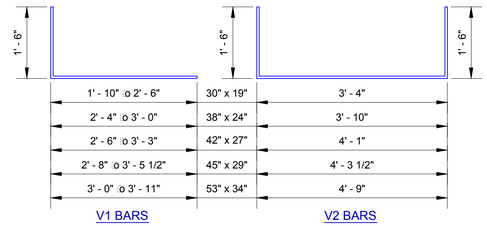
A-BAR BENDING DIAGRAM



B-BAR BENDING DIAGRAM

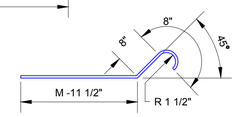


PLAN

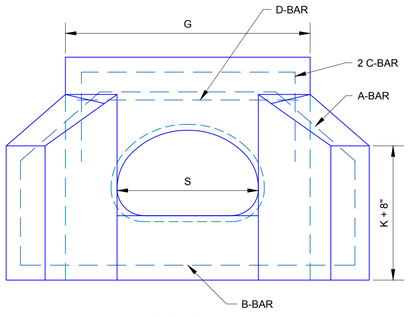


V1 BARS V2 BARS

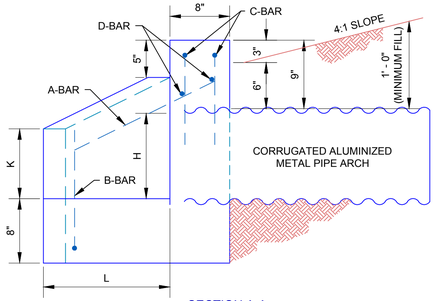
BAR BENDING DIAGRAMS



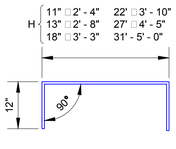
H1 BARS



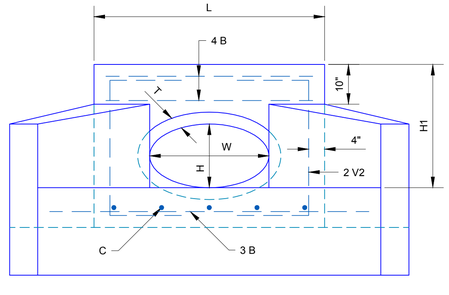
ELEVATION



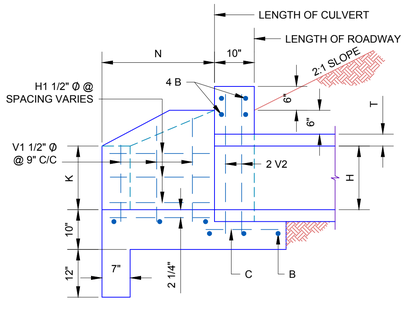
SECTION A-A



C-BAR BENDING DIAGRAM



ELEVATION



SECTION A-A

METAL PIPE ARCH

DIMENSIONS AND QUANTITIES FOR STEEL FOR METAL PIPE ARCH

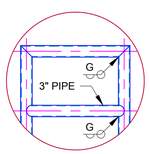
S	H	A-BARS				B-BARS				C-BARS				D-BARS			
		FORM	#	SIZE	LENGTH	FORM	#	SIZE	LENGTH	FORM	#	SIZE	LENGTH	FORM	#	SIZE	LENGTH
18"	11"	BENT	1	1/2" Ø	5' - 11"	BENT	1	1/2" Ø	6' - 2"	BENT	2	1/2" Ø	4' - 4"	STR.	1	1/2" Ø	2' - 4"
22"	13"	BENT	1	1/2" Ø	6' - 11"	BENT	1	1/2" Ø	7' - 0"	BENT	2	1/2" Ø	4' - 8"	STR.	1	1/2" Ø	2' - 8"
29"	18"	BENT	1	1/2" Ø	8' - 7"	BENT	1	1/2" Ø	8' - 10"	BENT	2	1/2" Ø	5' - 3"	STR.	1	1/2" Ø	3' - 3"
36"	22"	BENT	1	1/2" Ø	10' - 5"	BENT	1	1/2" Ø	10' - 4"	BENT	2	1/2" Ø	5' - 10"	STR.	1	1/2" Ø	3' - 10"
43"	27"	BENT	1	1/2" Ø	12' - 3"	BENT	1	1/2" Ø	12' - 1"	BENT	2	1/2" Ø	6' - 5"	STR.	1	1/2" Ø	4' - 5"
50"	31"	BENT	1	1/2" Ø	14' - 5"	BENT	1	1/2" Ø	13' - 9"	BENT	2	1/2" Ø	7' - 0"	STR.	1	1/2" Ø	5' - 0"

DIMENSIONS FOR CONCRETE

S	H	AREA SQ. FT.	K	G	L	M
18"	11"	1.2	11"	2' - 8"	1' - 7"	1' - 10"
22"	13"	1.8	1' - 0"	3' - 0"	1' - 10"	2' - 1 1/2"
29"	18"	3.1	1' - 4"	3' - 7"	2' - 4"	2' - 8 1/2"
36"	22"	4.9	1' - 6"	4' - 2"	2' - 10"	3' - 3 1/2"
43"	27"	7.1	1' - 9 1/2"	4' - 9"	3' - 4 1/2"	3' - 11"
50"	31"	9.6	1' - 11 1/2"	5' - 4"	4' - 1/2"	4' - 8"

QUANTITIES FOR TWO END WALLS

H	CLASS "A" CONC. C.Y.	REINFORCING STEEL LBS.
11"	0.66	31
13"	0.82	35
18"	1.23	42
22"	1.66	49
27"	2.23	56
31"	2.92	63

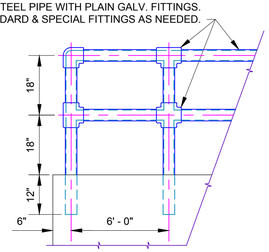


ALTERNATE DETAIL

(USING WELD CONNECTIONS ON PIPE HANDRAILS)

HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT PAINTED WITH TWO COATS OF ALUMINUM PAINT.

3" I.D. GALV. STEEL PIPE WITH PLAIN GALV. FITTINGS.
USE STANDARD & SPECIAL FITTINGS AS NEEDED.



PIPE HANDRAIL DETAIL

CONCRETE ELLIPTICAL PIPE

DIMENSIONS & QUANTITIES FOR CAST-IN-PLACE 45° HEADWALLS □FOR ONE HEADWALL

DIMENSIONS									REINFORCING STEEL												* QUANTITY	
W	H	AREA SQ. FT.	T	H	K	L	M	N	A1 - 1/2" Ø		A2 - 1/2" Ø		B - 1/2" Ø		C - 1/2" Ø		H1 - 1/2" Ø		V1 - 1/2" Ø		V2 - 1/2" Ø		CLASS "A" CONC. CU. YD.	REINFORCED STEEL LBS.
									#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH	#	LENGTH		
30"	19"	3.3	3 1/4"	2' - 10 1/4"	1' - 4"	4' - 10 1/4"	2' - 6"	1' - 9"	5	1' - 5"	3	5' - 8" A□	7	4' - 6 1/2"	4	1' - 6"	8	2' - 10 1/2"	12	3' - 8" A□	4	6' - 4"	1.27	104
38"	24"	5.1	3 3/4"	3' - 3 3/4"	1' - 10"	5' - 6 1/4"	3' - 1"	2' - 1 1/2"	6	1' - 10"	3	6' - 9" A□	7	5' - 2 1/4"	4	1' - 6"	12	3' - 5 1/2"	16	4' - 2" A□	4	6' - 10"	1.87	140
42"	27"	6.3	3 3/4"	3' - 6 3/4"	2' - 0"	5' - 10 1/4"	3' - 5"	2' - 4 1/2"	6	2' - 1"	3	7' - 1" A□	7	5' - 6 1/4"	4	1' - 6"	12	3' - 9 1/2"	16	4' - 4 1/2" A□	4	7' - 1"	2.09	149
45"	29"	7.4	4 1/2"	3' - 9 1/2"	2' - 2"	6' - 1 1/4"	3' - 8"	2' - 7 1/8"	7	2' - 3"	4	7' - 9" A□	7	5' - 9 1/4"	4	1' - 6"	12	4' - 1/2"	16	4' - 6 1/4" A□	4	7' - 3"	2.38	163
53"	34"	10.2	5"	4' - 3"	2' - 6"	6' - 9 1/4"	4' - 3"	3' - 0"	7	2' - 8"	4	8' - 8" A□	7	6' - 5 1/4"	5	1' - 6"	12	4' - 7 1/2"	20	4' - 11 1/2" A□	4	7' - 9"	3.01	195

GENERAL NOTES

All construction shall be in accordance with the latest edition of the Oklahoma City Specifications.

All Exposed Concrete Edges shall have a 3/4" Chamfer.

All Exposed Concrete Surfaces shall have a Carborundum Finish.

Minimum depth of fill over Culvert shall be 1' - 0".

The City of Oklahoma City
Public Works Department
Engineering Division

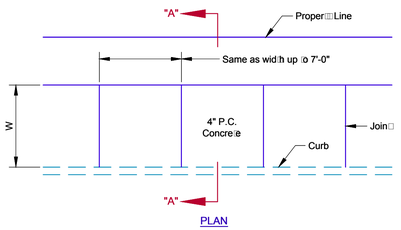
APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 02-06-13
DRAWN: VSC — DATE: 02-06-13

CAST-IN-PLACE CONCRETE HEADWALLS FOR ELLIPTICAL OR ARCH PIPE

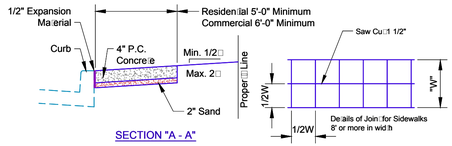
Drawing Number
D-409

E:/CITY/ACAD2000-STD/D-409.DWG VSC 02-06-13

DETAILS FOR SIDEWALK
LOCATED AT CURB



PLAN

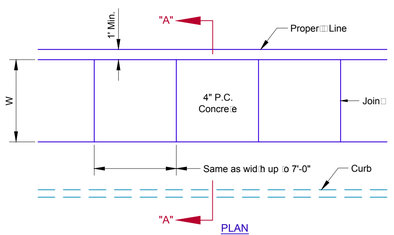


SECTION "A - A"

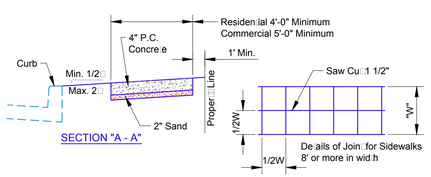
NOTES:

1. 1/2" x 4" premolded expansion ma□erial around Power Poles or o□her s□ruc□ures in walk wi□h a□leas□36" of clear □ra□el space.
2. Expansion Join□s maximum dis□ance □ 100', use 1/2" x 4" premolded expansion ma□erial.
3. Con□rac□ion Join□s maximum dis□ance □ 7', saw cu□ 1 1/2" deep and fill wi□h sealan□
4. Saw cu□ join□s wi□hin 24 hours.
5. Use 1/2" x 4" premolded expansion □oin□a□curb and a□jad□acen□Proper□□Lines.
6. All □oin□s □o be sealed. Premolded expansion ma□erial □o be remo□ed □o a dep□h of 1/2" prior □o appl□ing sealan□

DETAIL FOR SIDEWALK
LOCATED AWAY FOM CURB



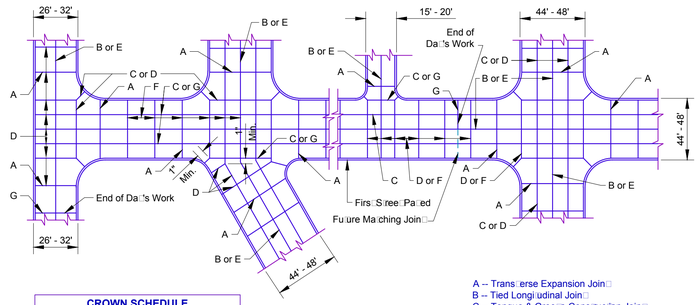
PLAN



SECTION "A - A"

NOTES:

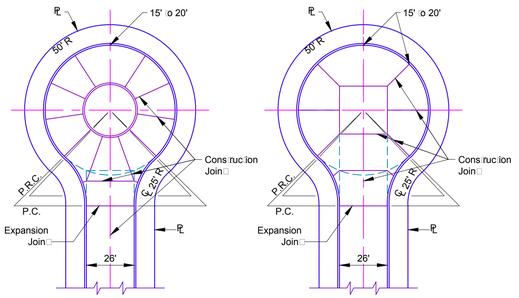
1. 1/2" x 4" premolded expansion ma□erial around Power Poles or o□her s□ruc□ures in walk wi□h a□leas□36" of clear □ra□el space.
2. Expansion Join□s maximum dis□ance □ 100', use 1/2" x 4" premolded expansion ma□erial.
3. Con□rac□ion Join□s maximum dis□ance □ 7', saw cu□ 1 1/2" deep and fill wi□h sealan□
4. Saw cu□ join□s wi□hin 24 hours.
5. All □oin□s □o be sealed. Premolded expansion ma□erial □o be remo□ed □o a dep□h of 1/2" prior □o appl□ing sealan□



CROWN SCHEDULE		
FULL WIDTH	To 33' wi□h 6" Curb	32' & o□er wi□h 8" Curbs
	2 1/2"	4"

A -- Trans□erse Expansion Join□
B -- Tied Longi□udinal Join□
C -- Tongue & Groo□e Cons□ruc□ion Join□
D -- Con□rac□ion Join□
E -- Longi□udinal Cons□ruc□ion Join□
F -- Doweled Con□rac□ion Join□
G -- Doweled Cons□ruc□ion Join□

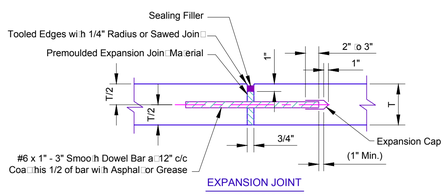
JOINT LAYOUT DETAILS



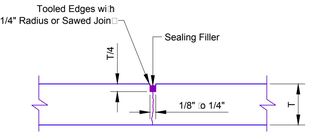
STANDARD CUL-DE-SAC, 38' R
• OPEN CENTER •

STANDARD CUL-DE-SAC, 38' R

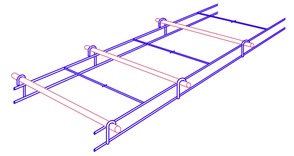
JOINT LAYOUT DETAILS

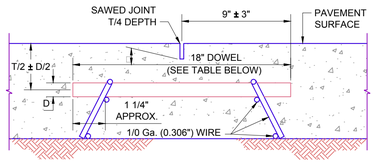


EXPANSION JOINT
TYPE "A"

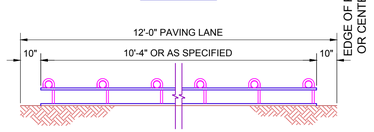


CONTRACTION JOINT
TYPE "D" (ALT. TYPE "F")

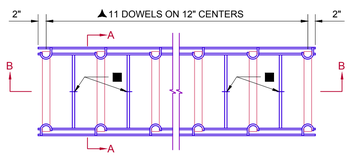




SECTION A-A



SECTION B-B



PLAN VIEW

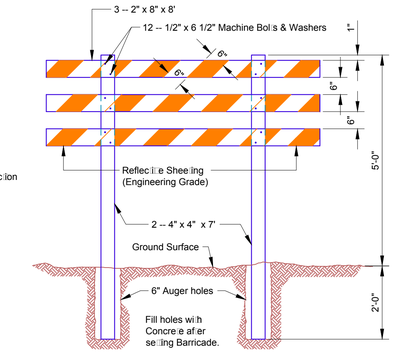
DOWEL BARS ▲ SPACING & SIZE DATA			
(T) SLAB DEPTH	DOWEL DIA.	TOTAL DOWEL LENGTH	C/C DOWEL SPACING
6" - 7"	3/4"	15"	12"
8" - 11"	1 1/4"	18"	12"
12" - 16"	1 1/2"	18"	12"

■ SPACER: FOUR EA. 7 GAGE (0.177") WIRES PER UNIT, NOTCHED @ MIDPOINT OF WIRE SPACER IN FIELD AFTER PLACEMENT REGULAR DOWELS GREASED

DOWELED CONTRACTION JOINT DETAILS
TYPE "F" (ALT TYPE "D")

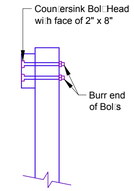
NOTES:

T□pe "F" □o be used for con□inuous pours onl□□
Do no□ use for headers a□da□s end s□opping poin□



NOTE:

Markings for Barricade Rails are □o be Orange and Whi□e. Markings are □o be 6" wide and a□ached a□45°angles as se□ forth in □he la□es□edi□ion of □he Uniform Traffic Con□rol De□ices Manual

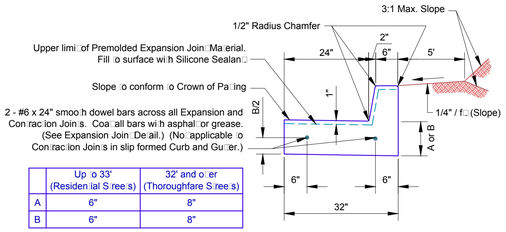


NOTES:

4" X 4" X 7' Timber are □o be #2 or be□er S4S Yellow Pine, Wolman□ed or Pen□a Trea□ed.

2" x 8" x 8' Timber are are □o be #2 or be□er S4S Yellow Pine KD.

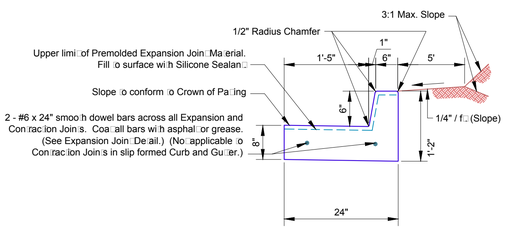
STANDARD REFLECTOR TYPE BARRICADE



	Up □o 33' (Residen□ial S□ree□s)	32' and o□er (Thoroughfare S□ree□s)
A	6"	8"
B	6"	8"

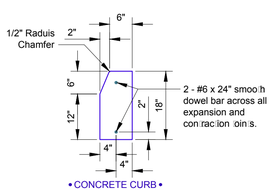
NOTE: Maximum spacing of 1/2" Expansion Join□s □o be 100' c/c wi□h Con□rac□ion Join□s 15' - 20' apar□ □o ma□ch Dri□ewa□□Re□urns. (Expansion Join□spacing, no□applicable □o slip formed Curb and Gu□□er.)

CONCRETE CURB & GUTTER DETAIL

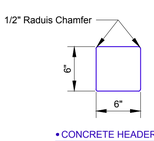


NOTE: Maximum spacing of 1/2" Expansion Join□s □o be 100' c/c wi□h Con□rac□ion Join□s 15' - 20' apar□ □o ma□ch Dri□ewa□□Re□urns. (Expansion Join□spacing, no□applicable □o slip formed Curb and Gu□□er.)

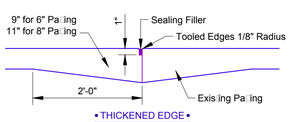
CONCRETE CURB & GUTTER DETAIL FOR DOWNTOWN



• CONCRETE CURB •

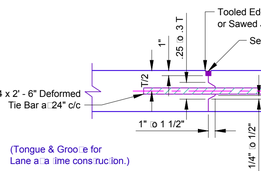


• CONCRETE HEADER •



• THICKENED EDGE •

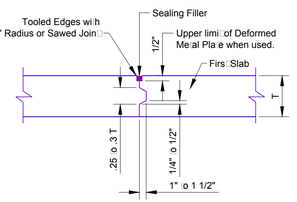
MISCELLANEOUS DETAILS



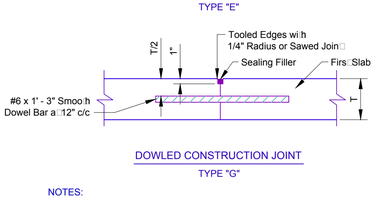
TIED JOINT
TYPE "B"

(Tongue & Groo□e for
Lane a□a□ime cons□ruc□ion.)

TIED CONSTRUCTION JOINT
TYPE "E"



TONGUE & GROOVE CONSTRUCTION
TYPE "C"



DOWELED CONSTRUCTION JOINT
TYPE "G"

NOTES:

Smoo□h Dowel Bars across Expansion Join□s shall be pro□ided wi□h Expansion Caps, and coa□ed wi□h Asphal□or Grease, (T□pe A & G).

Groo□es in Join□s ma□□be formed b□□ (1) □emporar□embedmen□of a sui□able Mandrel, (2) ins□alla□ion of a □hin s□rip of premoulded Join□Filler Ma□erial, (3) sawing □he Pa□emen□af□er □he Concre□e has hardened.

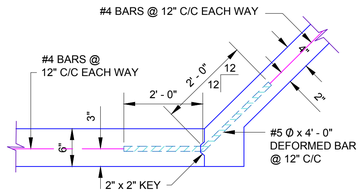
The City of Oklahoma City
Public Works Department
Engineering Division

DATE: 02-07-13
APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER
VSC
DRAWN:
02-07-13
DATE:

STANDARD TYPICAL SECTIONS MISCELLANEOUS DETAILS

Drawing Number
D-500

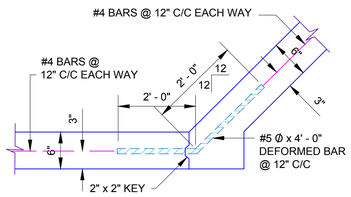
\\ci.okc.lokct\PW-Sec□ion\CITYACAD-STDSID-500 VSC 02-07-13



LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 4" SIDE WALLS
4" WALLS FOR DEPTH OF 0' TO 5'
WALL DETAIL "A"

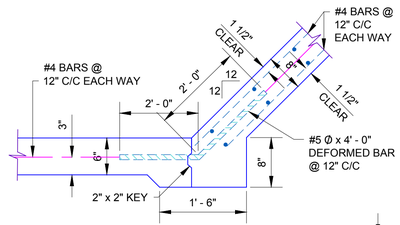
CONCRETE CHANNEL LINER JOINT DETAIL



LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 4" SIDE WALLS
6" WALLS FOR DEPTH OF 0' TO 5'
WALL DETAIL "B"

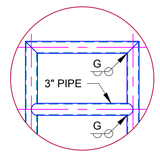
CONCRETE CHANNEL LINER JOINT DETAIL



LONGITUDINAL CONSTRUCTION JOINT

FOR 6" BOTTOM & 6" SIDE WALLS
8" WALLS FOR 2/3 THE WALL HEIGHT ABOVE 5'
WALL DETAIL "C"

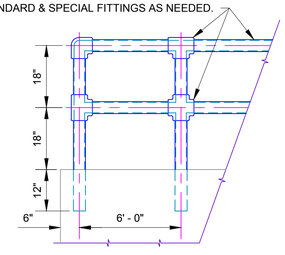
CONCRETE CHANNEL LINER JOINT DETAIL



ALTERNATE DETAIL

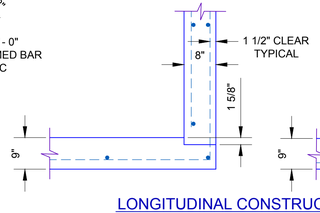
(USUING WELD CONNECTIONS ON PIPE HANDRAILS)

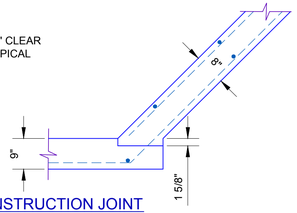
3" I.D. GALV. STEEL PIPE WITH PLAIN GALV. FITTINGS.
USE STANDARD & SPECIAL FITTINGS AS NEEDED.



PIPE HANDRAIL DETAIL

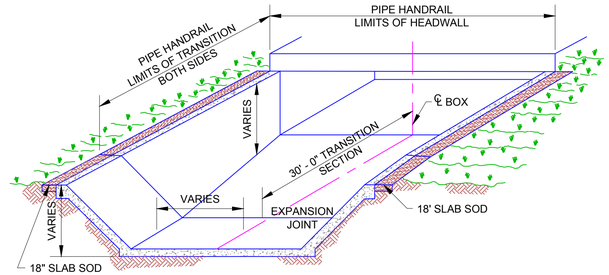
HANDRAIL NOTES: WELD CONNECTIONS MAY BE USED FOR PIPE HANDRAIL. WELD CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH & SPOT POINTED WITH TWO COATS OF ALUMINUM PAINT.





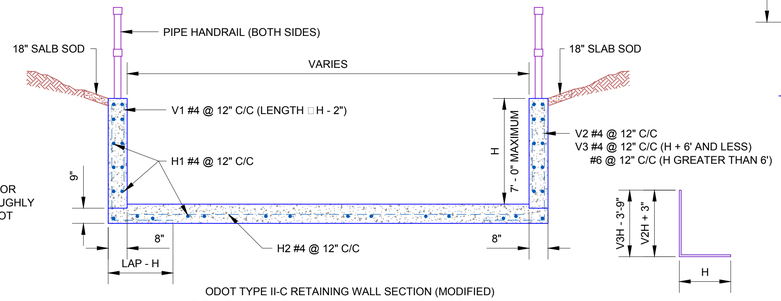
LONGITUDINAL CONSTRUCTION JOINT

THROUGH TRANSITION SECTION



30' TRANSITION TO R.C. BOXES
VERTICAL 1:1 SIDE SLOPE

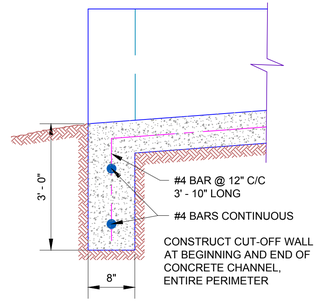
CONCRETE CHANNEL LINER JOINT DETAIL



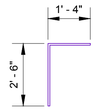
ODOT TYPE II-C RETAINING WALL SECTION (MODIFIED)

CONCRETE CHANNEL LINER JOINT DETAIL

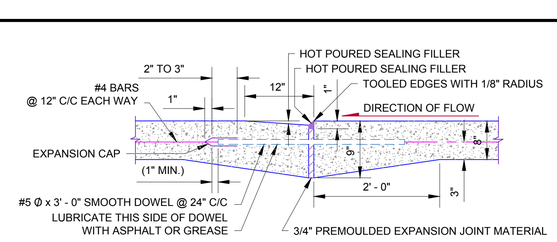
BAR BENDING DIAGRAM



CUT-OFF WALL DETAIL

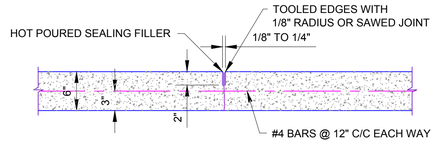


TYPICAL #4 BAR
(FOR CUT-OFF WALL)



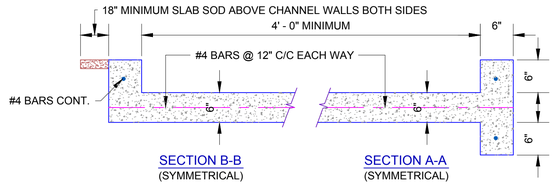
TYPICAL TRANSVERSE EXPANSION JOINT

SPACED AT 100 FOOT C/C MAXIMUM



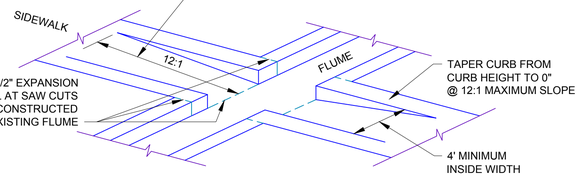
CONTRACTION JOINT

SPACED AT 20 FOOT C/C
(ALSO USE JOINT LONGITUDINALLY AT CENTERLINE OF CHANNEL FOR BOTTOM WIDTHS OF 12 FOOT AND OVER)

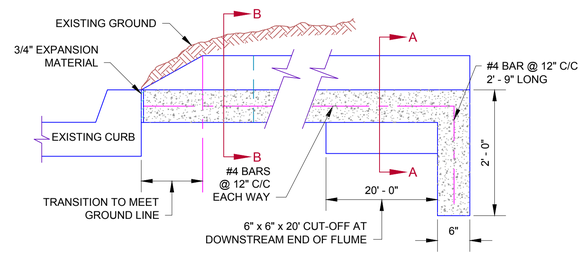


CONSTRUCTION JOINT

SPACED AT 20 FOOT C/C
(ALSO USE JOINT LONGITUDINALLY AT CENTERLINE OF CHANNEL FOR BOTTOMS OF 12 FOOT AND OVER)



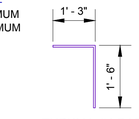
SIDEWALK RAMP AT FLUME CROSSING



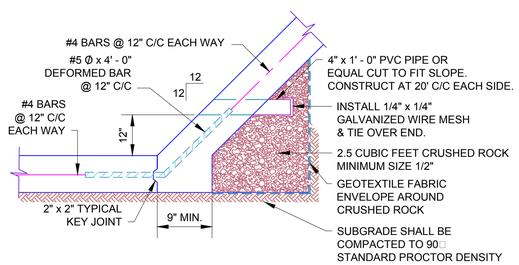
PROFILE

CONCRETE FLUME DETAIL

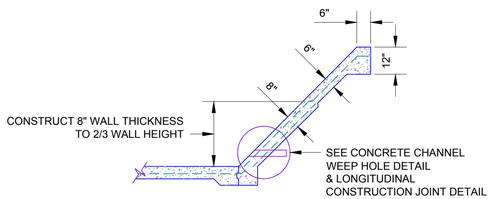
NOTE: 3/4" EXPANSION JOINT @ 100' MAXIMUM
SAWED CONSTRUCTION JOINT @ 20' MAXIMUM



TYPICAL #4 BAR
(FOR CONCRETE FLUME)



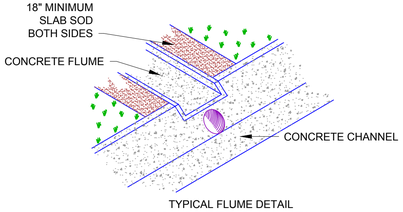
TYPICAL CONCRETE CHANNEL LINER DETAIL



CONCRETE CHANNEL LINER JOINT DETAIL

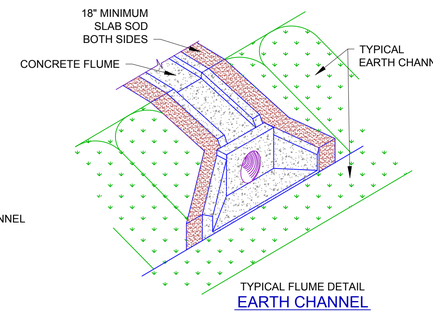
FOR WALL HEIGHT ABOVE 5'

CONCRETE CHANNEL WEEP HOLE DETAIL



TYPICAL FLUME DETAIL

CONCRETE CHANNEL



TYPICAL FLUME DETAIL

EARTH CHANNEL

OKLAHOMA CITY
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

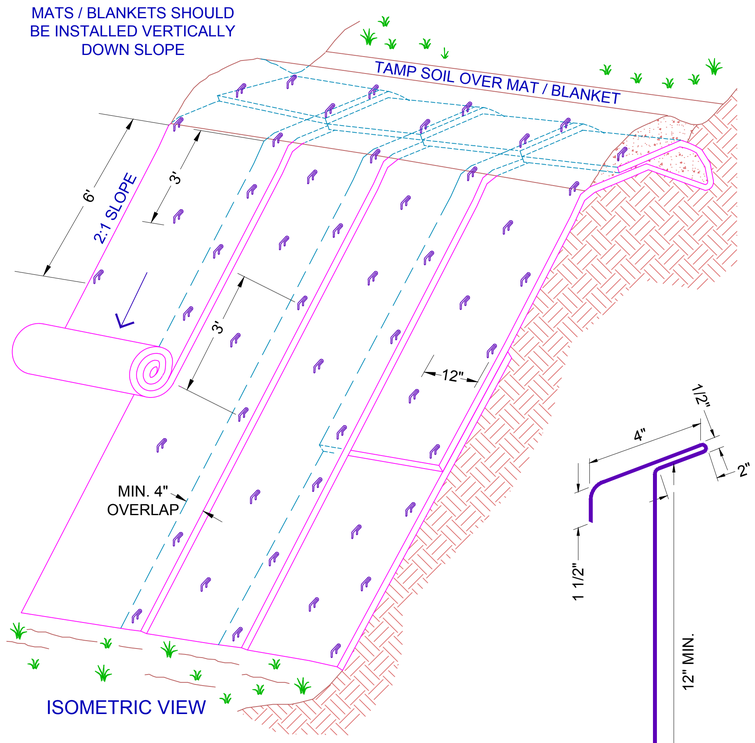
STANDARD CHANNEL LINER & FLUME DETAILS

APPROVED BY:
PAUL T. ABRUM, P.E.
CITY ENGINEER

DATE: 7-11-01

DRAWN:	DATE:	DWG. N0.
V.S.C.	06/27/01	D-501

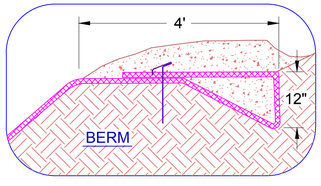
E:/CITY/ACAD2000-STD/D-501.DWG VSC 06/27/01



ISOMETRIC VIEW

TYPICAL SLOPE
SOIL STABILIZATION

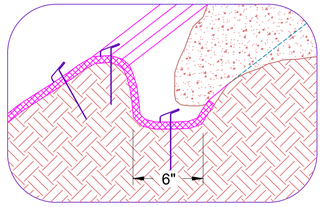
'T' STAPLE DETAIL



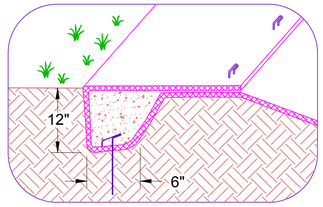
NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS CLODS, STICKS AND GRASS. MATS / BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

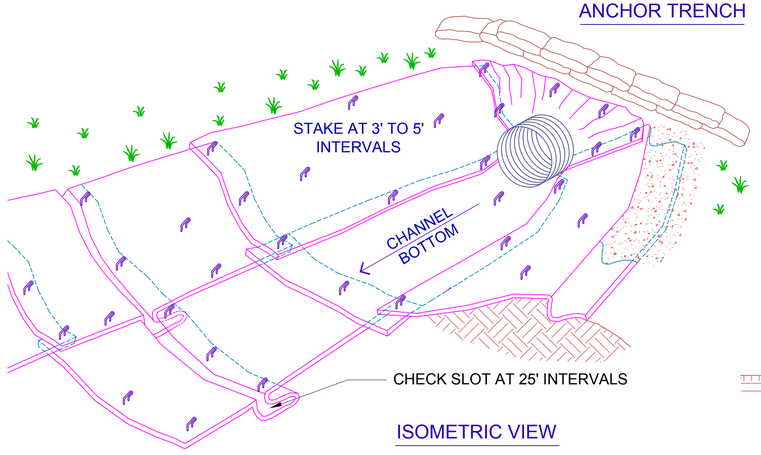
EROSION BLANKET & TURF REINFORCEMENT MATS SLOPE INSTALLATION



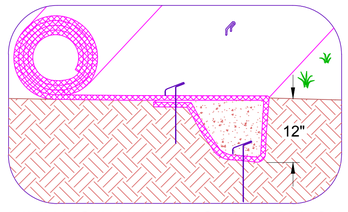
LONGITUDINAL ANCHOR TRENCH



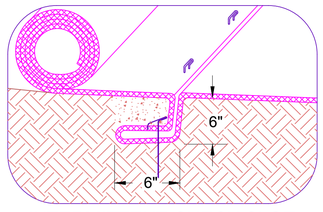
TERMINAL SLOPE AND CHANNEL
ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL ANCHOR TRENCH

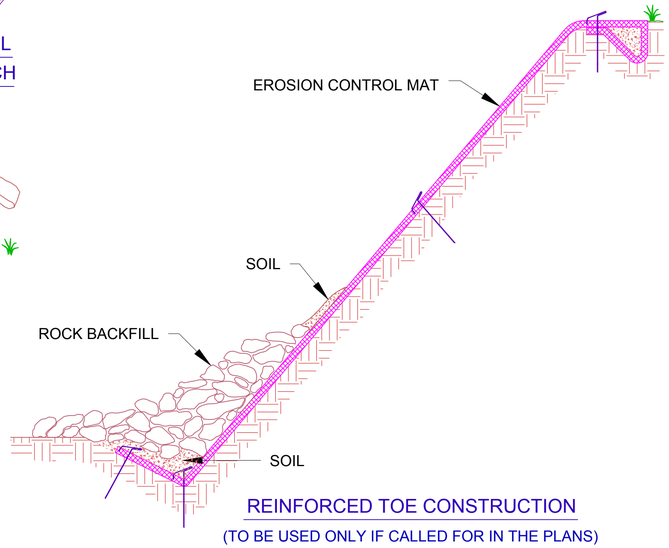


INTERMITTENT CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURE'S SPECIFICATIONS.
2. STAKING OF STAPLING LAYOUT PER MANUFACTURES SPECIFICATIONS.

EROSION BLANKET & TURF REINFORCEMENT MATS CHANNEL INSTALLATION



REINFORCED TOE CONSTRUCTION
(TO BE USED ONLY IF CALLED FOR IN THE PLANS)

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER
DATE: 05-02-13
DRAWN: VSC
DATE: 05-02-13

NYLON EROSION CONTROL MAT TYPICAL INSTALLATION DETAILS

Drawing Number
D-502

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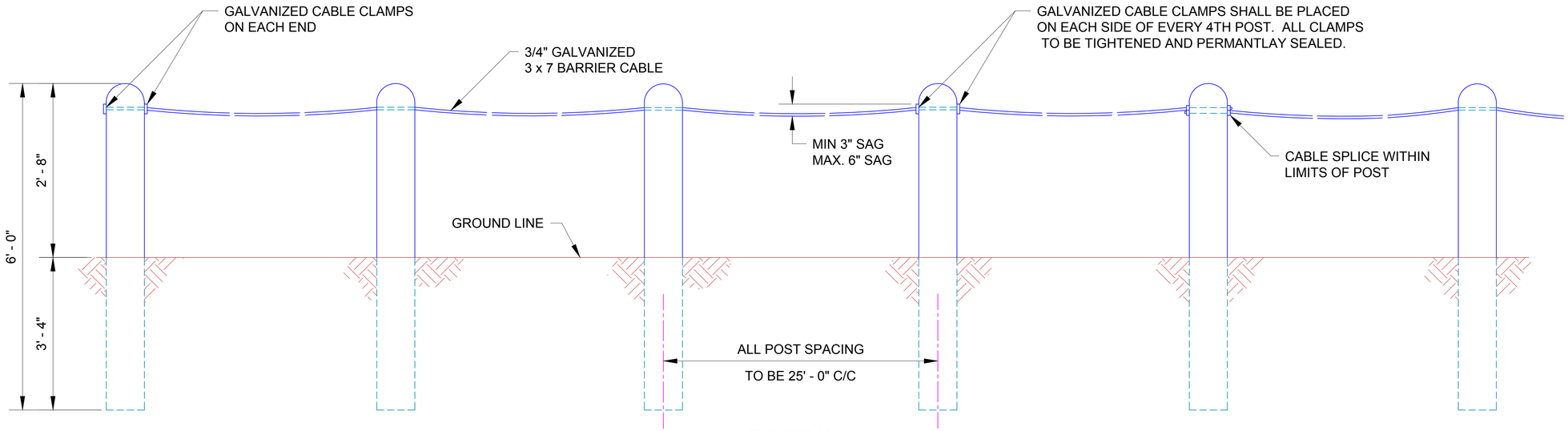
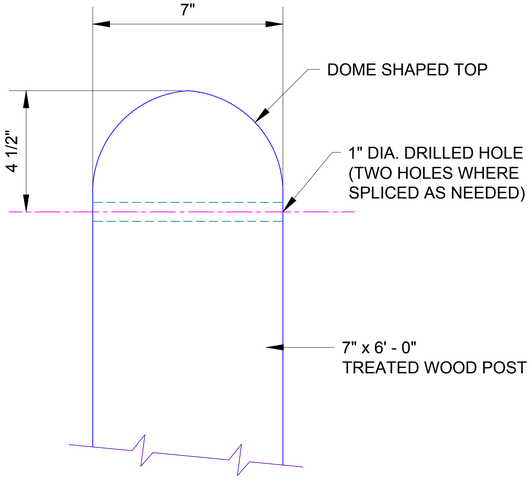
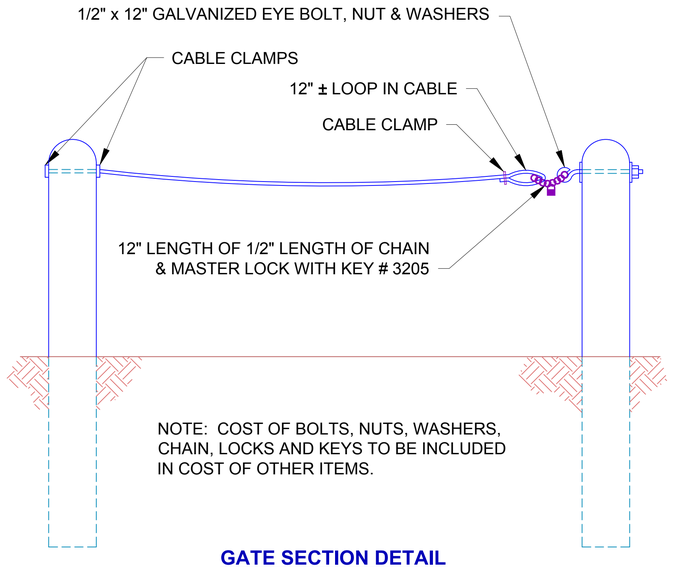


ELEVATION

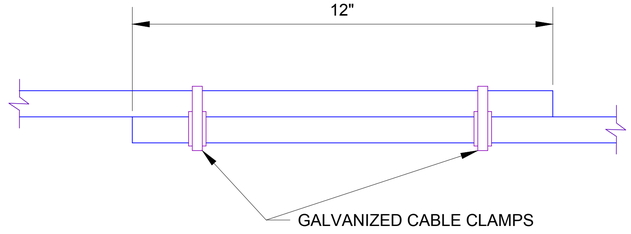


WOOD POST



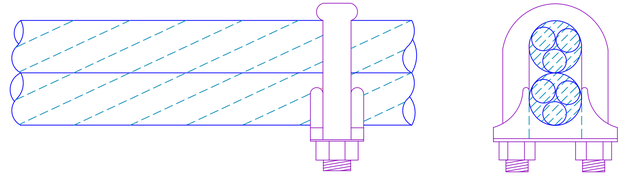
NOTE: COST OF BOLTS, NUTS, WASHERS, CHAIN, LOCKS AND KEYS TO BE INCLUDED IN COST OF OTHER ITEMS.

GATE SECTION DETAIL



NOTE: CABLE LENGTH TO BE AS CONTINUOUS AS REASONABLE WORKABILITY PERMITS, THEN SPLICE THROUGH POST AS SHOWN.

CABLE SPLICE



TYPICAL GALVANIZED CABLE CLAMP

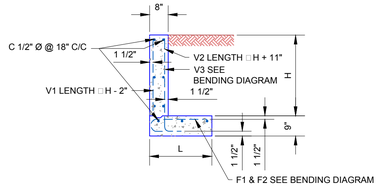
The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY: ERIC J. WENGER, P.E. CITY ENGINEER — DATE: 05-03-13
DRAWN: VSC
DATE: 05-03-13

STANDARD CABLE FENCE DETAIL

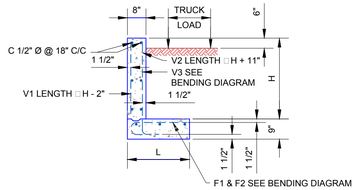
Drawing Number
D-503

\\ci.okc.\okci\PW-Sec ion\CITYACAD-STDS\D-503 VSC 05-03-13



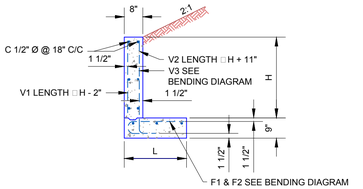
TYPE I A

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	--------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.11	0.146
4	4' - 0"	3' - 3"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.34	0.189
5	5' - 0"	4' - 0"	1/2" Ø @ 12"	--------	10	5/8" Ø @ 18"	1/2" Ø @ 12"	--------	16.29	0.235
6	6' - 0"	4' - 8"	5/8" Ø @ 12"	--------	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	22.00	0.278
7	7' - 0"	5' - 0"	1/2" Ø @ 12"	--------	14	7/8" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.76	0.321
8	8' - 0"	6' - 0"	7/8" Ø @ 12"	--------	17	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	40.67	0.364
9	9' - 0"	6' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	57.51	0.407



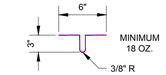
TYPE I B

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 10"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.95	0.164
4	4' - 0"	3' - 7"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.56	0.198
5	5' - 0"	4' - 4"	5/8" Ø @ 12"	--------	12	5/8" Ø @ 18"	1/2" Ø @ 12"	--------	19.16	0.244
6	6' - 0"	5' - 1"	1/2" Ø @ 12"	--------	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	25.64	0.298
7	7' - 0"	5' - 10"	7/8" Ø @ 12"	--------	15	7/8" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	6' - 7"	1/2" Ø @ 12"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.380



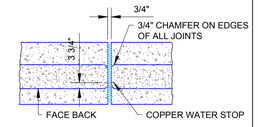
TYPE I C

DESIGN NUMBER	H	L	F1 BAR	F2 BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	--------	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 7"	1/2" Ø @ 12"	--------	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.11	0.146
4	4' - 0"	3' - 4"	1/2" Ø @ 12"	--------	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.40	0.191
5	5' - 0"	4' - 1"	5/8" Ø @ 12"	--------	12	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	18.25	0.237
6	6' - 0"	4' - 11"	1/2" Ø @ 12"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	27.62	0.285
7	7' - 0"	5' - 8"	1/2" Ø @ 12"	7/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	39.78	0.330



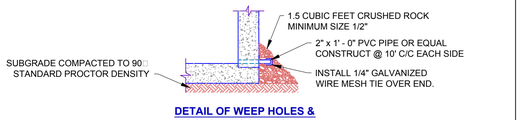
DETAIL OF COPPER WATER STOP

NOTE: COPPER WATER STOP SHALL BE INSTALLED FULL HEIGHT OF WALL IN ALL VERTICAL EXPANSION JOINTS. ALL COSTS INCLUDING PREMOULDED EXPANSION MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR RETAINING WALL.

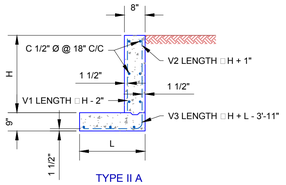


DETAIL OF EXPANSION & CONSTRUCTION JOINT

PLACE JOINTS @ 30' INTERVALS "MAXIMUM"

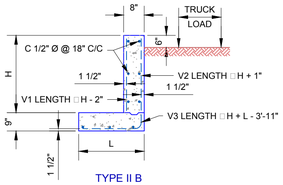


DETAIL OF WEEP HOLES & CONSTRUCTION JOINT



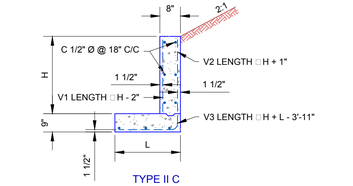
TYPE II A

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.55	0.105
3	3' - 0"	2' - 1"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.06	0.132
4	4' - 0"	2' - 11"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	12.40	0.180
5	5' - 0"	3' - 11"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	15.51	0.232
6	6' - 0"	5' - 1"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.20	0.289
7	7' - 0"	6' - 5"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.99	0.351
8	8' - 0"	7' - 10"	18	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	44.04	0.415



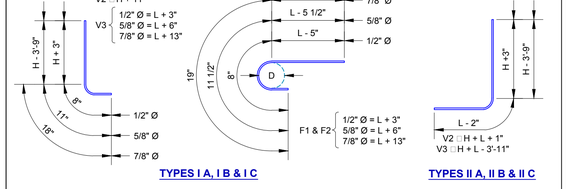
TYPE II B

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 2"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.66	0.110
3	3' - 0"	3' - 3"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.50	0.164
4	4' - 0"	4' - 5"	10	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	14.07	0.221
5	5' - 0"	5' - 8"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	21.86	0.281
6	6' - 0"	7' - 2"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	31.12	0.347
7	7' - 0"	8' - 8"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	41.90	0.414



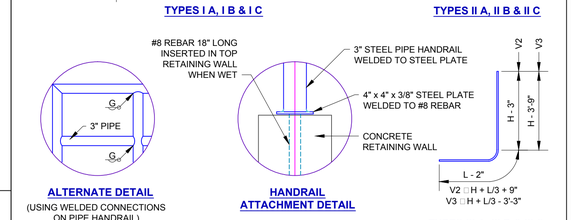
TYPE II C

DESIGN NUMBER	H	L	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	7.55	0.105
3	3' - 0"	2' - 7"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.39	0.146
4	4' - 0"	3' - 8"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	12.90	0.201
5	5' - 0"	4' - 11"	12	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	20.86	0.260
6	6' - 0"	6' - 4"	15	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.53	0.324
7	7' - 0"	8' - 0"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	3/4" Ø @ 12"	40.45	0.395



TYPES I A, I B & I C

TYPES II A, II B & II C

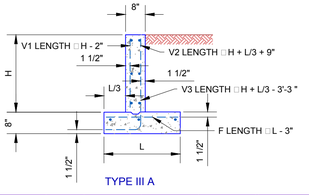


ALTERNATE DETAIL

(USING WELDED CONNECTIONS ON PIPE HANDRAIL)

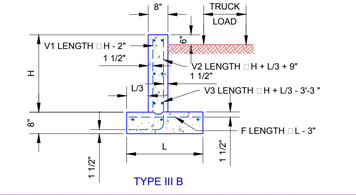
HANDRAIL ATTACHMENT DETAIL

TYPES III A, III B & III C



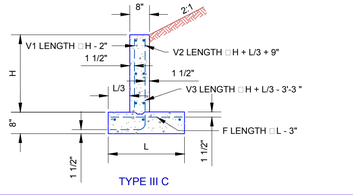
TYPE III A

DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.099
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	10.72	0.123
4	4' - 0"	2' - 8"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.10	0.165
5	5' - 0"	3' - 3"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	16.07	0.204
6	6' - 0"	3' - 10"	1/2" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	19.04	0.243
7	7' - 0"	4' - 5"	1/2" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	26.40	0.282
8	8' - 0"	5' - 0"	1/2" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	34.17	0.321
9	9' - 0"	5' - 7"	1/2" Ø @ 12"	19	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	50.84	0.360



TYPE III B

DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.099
3	3' - 0"	2' - 5"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.10	0.134
4	4' - 0"	3' - 1"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.47	0.175
5	5' - 0"	3' - 9"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	16.51	0.216
6	6' - 0"	4' - 4"	5/8" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	24.48	0.255
7	7' - 0"	4' - 11"	1/2" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	30.52	0.294
8	8' - 0"	5' - 7"	7/8" Ø @ 12"	17	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	46.35	0.335



TYPE III C

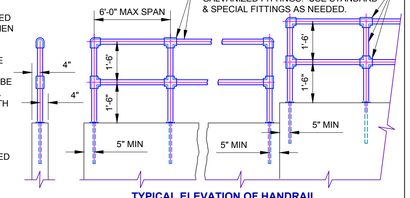
DESIGN NUMBER	H	L	F BAR	C BAR	V1 BAR	V2 BAR	V3 BAR	QUANTITIES	
			SIZE SPC.	# REQ'D	SIZE SPC.	SIZE SPC.	SIZE SPC.	REINF STEEL LBS. PER L.F.	CONC. C.Y. PER LF.
2	2' - 0"	2' - 0"	1/2" Ø @ 12"	6	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	8.28	0.105
3	3' - 0"	2' - 0"	1/2" Ø @ 12"	8	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	11.95	0.164
4	4' - 0"	2' - 7"	1/2" Ø @ 12"	9	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	13.56	0.198
5	5' - 0"	3' - 2"	1/2" Ø @ 12"	11	1/2" Ø @ 18"	1/2" Ø @ 12"	--------	19.16	0.244
6	6' - 0"	3' - 9"	5/8" Ø @ 12"	13	1/2" Ø @ 18"	1/2" Ø @ 12"	1/2" Ø @ 12"	25.64	0.298
7	7' - 0"	4' - 5"	3/4" Ø @ 12"	14	1/2" Ø @ 18"	1/2" Ø @ 12"	5/8" Ø @ 12"	36.83	0.335
8	8' - 0"	5' - 0"	1" Ø @ 12"	16	1/2" Ø @ 18"	1/2" Ø @ 12"	7/8" Ø @ 12"	54.97	0.380

HANDRAIL NOTES:

PIPE HANDRAIL SHALL BE PLACED ON RETAINING WALLS ONLY WHEN CALLED FOR ON THE PLANS.

WELDED CONNECTIONS MAY BE USED FOR PIPE HANDRAILS. WELDED CONNECTIONS SHALL BE THOROUGHLY CLEANED OF ALL LOOSE SCALE, GROUND SMOOTH AND SPOT PAINTED WITH TWO COATS OF ALUMINUM PAINT.

SHOP DETAILS FOR ALL PIPE HANDRAILS SHALL BE SUBMITTED FOR APPROVAL.



TYPICAL ELEVATION OF HANDRAIL

GENERAL NOTES:
ALL CONSTRUCTION AND MATERIAL SHALL BE IN ACCORDANCE WITH THE OKLAHOMA CITY STANDARD SPECIFICATIONS
ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER.
ALL CONCRETE SHALL BE CLASS "A" CONCRETE 3500 PSI.
EXPANSION JOINTS SHALL BE AT A MAXIMUM OF 30'-0" INTERVALS.
ALL REINFORCING STEEL BARS SHALL BE DEFORMED BARS COLD BENT, NO WELDS PERMITTED.
ALL EXPOSED CONCRETE SURFACES SHALL HAVE A CARBORUNDUM FINISH.
THIS DETAIL ADAPTED FROM O.D.O.T RETAINING WALL RW-1.

The City of Oklahoma City
Public Works Department
Engineering Division

APPROVED BY:
ERIC J. WENGER, P.E.
CITY ENGINEER

DATE: 05-03-13

DRAWN: VSC

DATE: 05-03-13

RETAINING WALLS

Drawing Number

D-504

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