

APPROVED BY: DATE: 6/22/2023  
ERIC J. WENGER, P.E.  
CITY ENGINEER

THESE STANDARD DRAWINGS AND ASSOCIATED CALCULATIONS HAVE BEEN PREPARED BY CEC CORPORATION UNDER CONTRACT WITH THE CITY OF OKLAHOMA CITY.

**R.C.B. CULVERTS - END SECTION DETAILS**  
**TRIPLE CELL - 9' HEIGHT - 0° SKEW**  
SHEET NO. 1 OF 2

Drawing Number  
RCB-076

**APRON AND HEADWALL BAR LIST**

MARK	SIZE	FORM	9' SPAN			10' SPAN			11' SPAN			12' SPAN		
			NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION
ABD1	#4	STR.	66	4'-3"		72	4'-3"		78	4'-3"		84	4'-3"	
ABD2	#4	BNT.	4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"	
AD	#4	STR.	4	34'-0"		4	34'-0"		4	34'-0"		4	34'-0"	
AL1	#4	STR.	66	30'-7"		72	30'-7"		78	30'-7"		84	30'-7"	
AL2	#4	STR.	68	16'-1" AVG.	2'-4" TO 29'-10"	68	16'-1" AVG.	2'-4" TO 29'-10"	68	16'-1" AVG.	2'-4" TO 29'-10"	68	16'-1" AVG.	2'-4" TO 29'-10"
AT1	#4	STR.	4	67'-0"		4	70'-0"		4	73'-0"		4	76'-4"	
AT2	#4	STR.	4	64'-8" AVG.	62'-11" TO 66'-5"	6	66'-7" AVG.	63'-8" TO 69'-6"	9	67'-10" AVG.	63'-2" TO 72'-6"	12	69'-5" AVG.	63'-0" TO 75'-10"
AT3	#5	STR.	4	64'-8" AVG.	62'-11" TO 66'-5"	6	66'-7" AVG.	63'-8" TO 69'-6"	9	67'-10" AVG.	63'-2" TO 72'-6"	12	69'-5" AVG.	63'-0" TO 75'-10"
AT4	#4	STR.	26	44'-9" AVG.	30'-3" TO 59'-3"	24	46'-8" AVG.	33'-4" TO 60'-0"	21	47'-11" AVG.	36'-4" TO 59'-6"	18	49'-6" AVG.	39'-8" TO 59'-4"
AT5	#5	STR.	26	44'-9" AVG.	30'-3" TO 59'-3"	24	46'-8" AVG.	33'-4" TO 60'-0"	21	47'-11" AVG.	36'-4" TO 59'-6"	18	49'-6" AVG.	39'-8" TO 59'-4"
CH	#4	STR.	4	30'-4"		4	33'-4"		4	36'-4"		4	39'-8"	
CL1	#4	BNT.	35	4'-4"		38	4'-4"		41	4'-4"		44	4'-4"	
CL2	#4	BNT.	35	4'-4"		38	4'-4"		41	4'-4"		44	4'-4"	

- ① 4 SETS OF 17 BARS
- ② LENGTH INCLUDES 2'-6" LAP

**QUANTITIES**

ITEM	UNIT	9' SPAN	10' SPAN	11' SPAN	12' SPAN
CLASS AA CONCRETE	C.Y.	78.2	82.1	85.8	90.2
REINFORCING STEEL	LB.	9,340	9,670	10,010	10,340
PIPE RAILING	L.F.	99	102	105	108

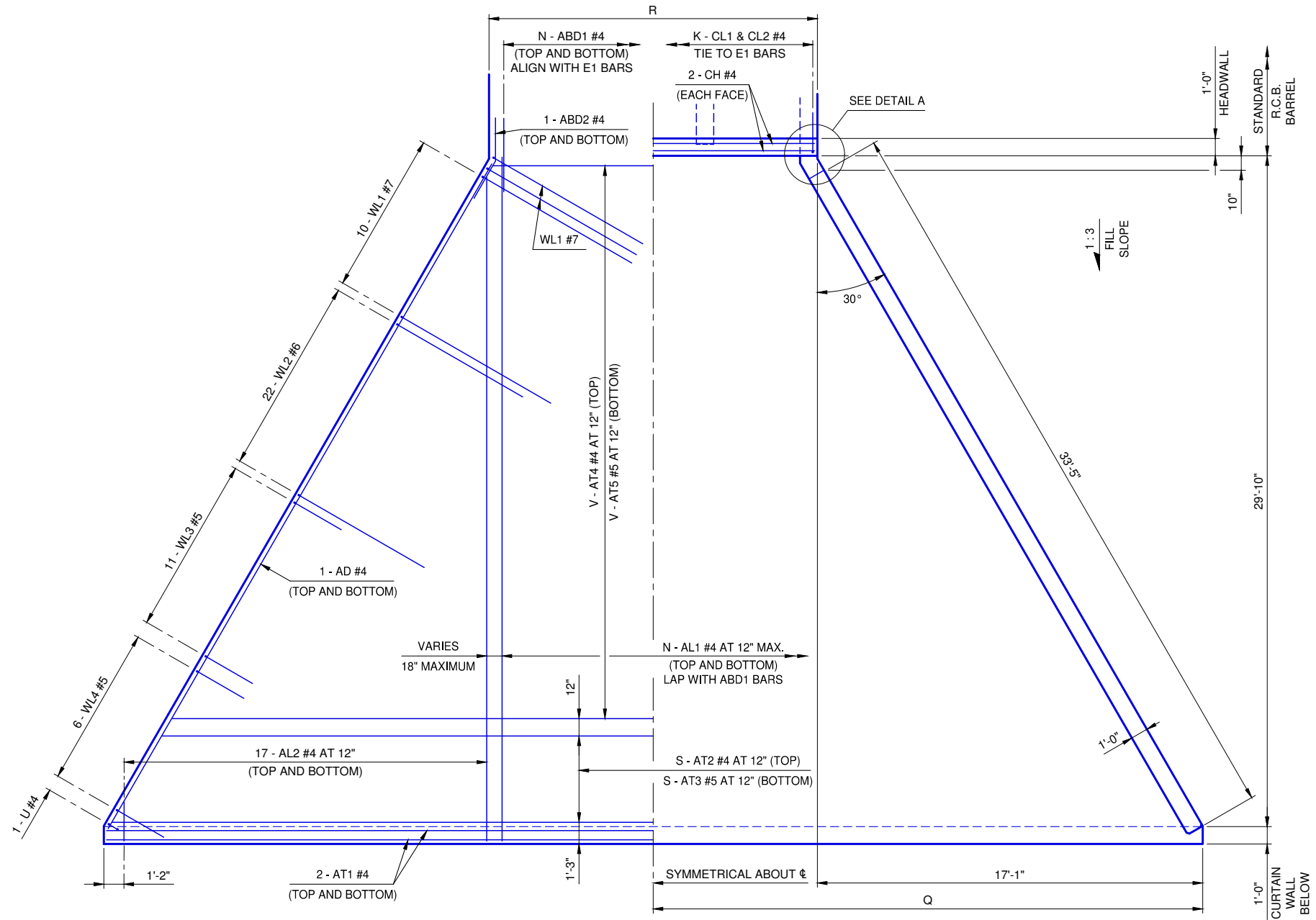
NOTE:  
QUANTITIES ARE FOR ONE END SECTION WHICH INCLUDES ONE HEADWALL, ONE APRON AND TWO WINGWALLS. PIPE RAILING IS BASED ON PLAN DIMENSION AT CENTERLINE OF RAILING.

**APRON VARIABLES**

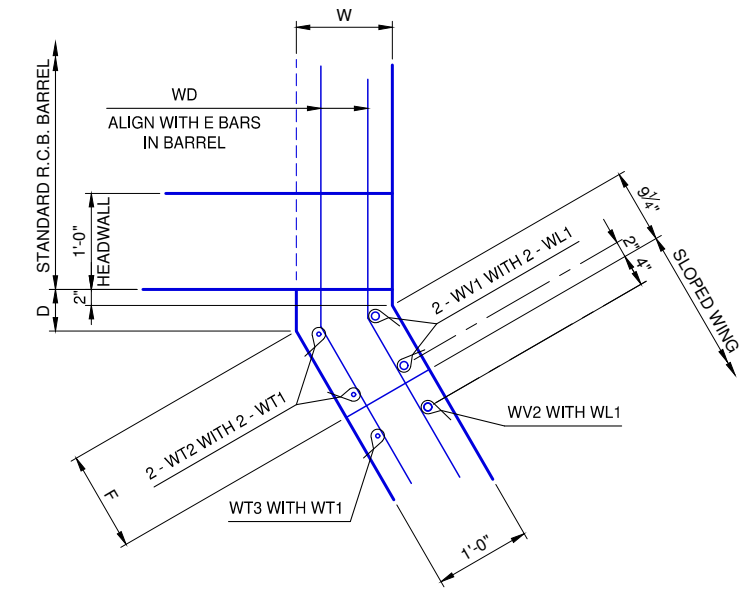
SPAN	DIMENSIONS		NUMBER OF BARS			
	R	Q	K	N	S	V
9'	30'-8"	32'-5"	35	33	4	26
10'	33'-8"	33'-11"	38	36	6	24
11'	36'-8"	35'-5"	41	39	9	21
12'	40'-0"	37'-1"	44	42	12	18

**WINGWALL DIMENSIONS**

SPAN	W	D	F
9'	11"	6 15/16"	10 7/16"
10'	11"	6 15/16"	10 7/16"
11'	11"	6 15/16"	10 7/16"
12'	12"	5 3/16"	1'-0 7/16"

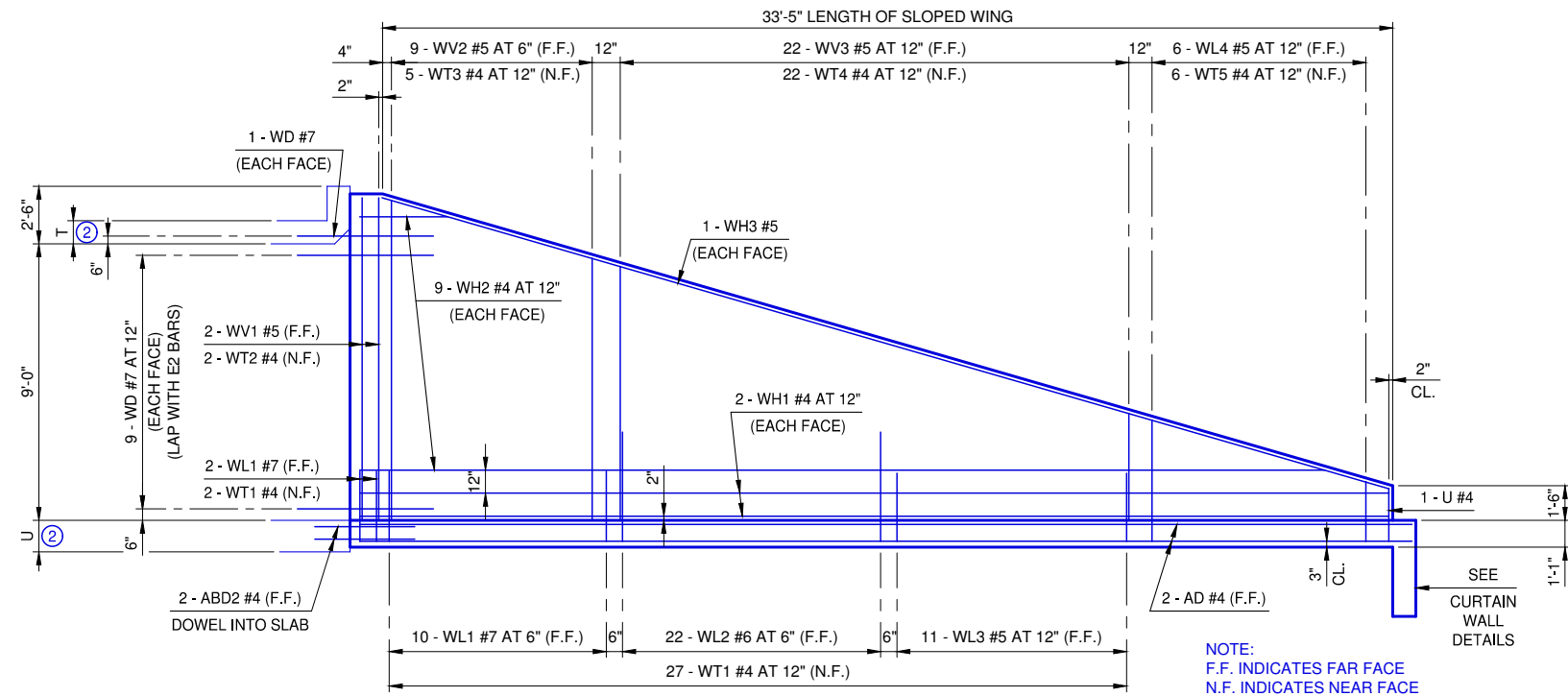


**APRON PLAN**



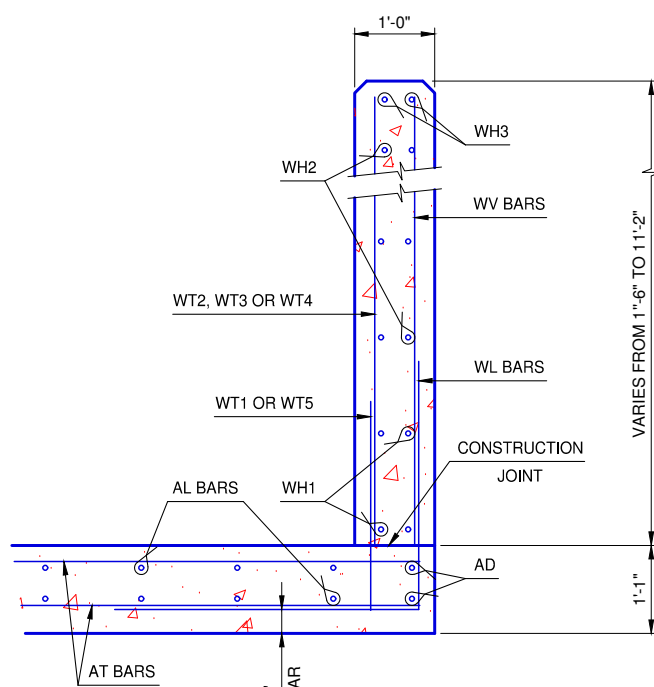
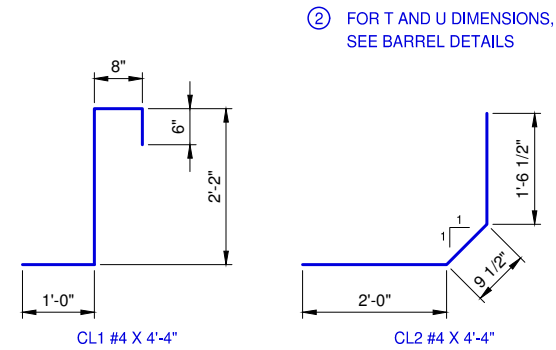
**DETAIL A**

REVISION NO.
DATE

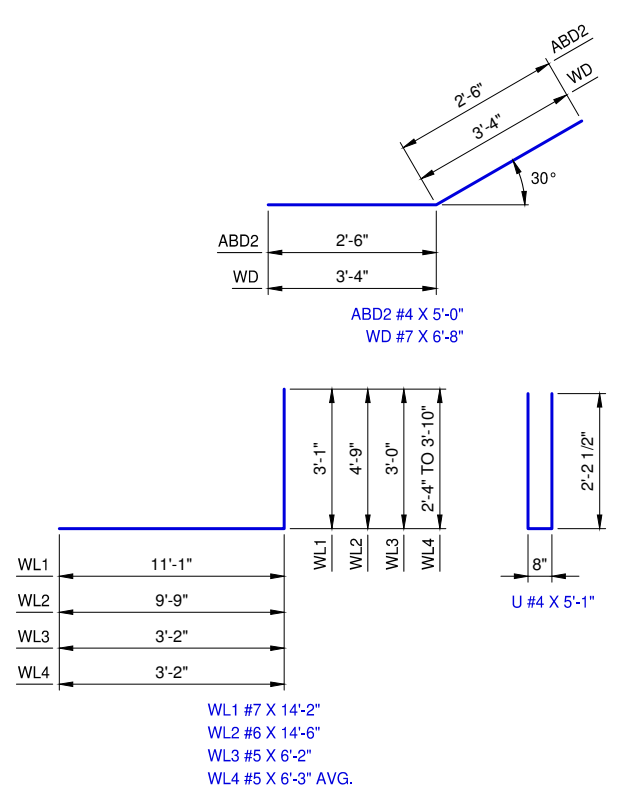


WINGWALL ELEVATION

SEE STD. RCB-015 PipeRailing FOR DETAILS OF RAIL REQUIRED ON TOP OF HEADWALL AND WINGS



TYPICAL SECTION THRU WING



**ADJUSTMENT IN NUMBER OF BARREL BARS IN END SECTION**

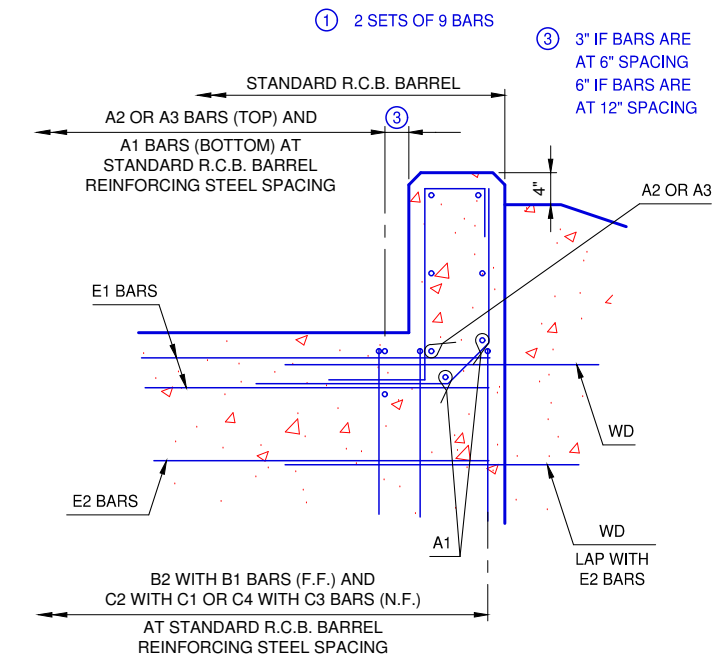
SPAN	BAR MARKS								
	A1	A2	A3	B1	B2	C1	C2	C3	C4
9'		-1				-4	-4	+2	+2
10'		-1				-4	-4	+2	+2
11'		-1				-4	-4	+2	+2
12'		-1	-2			-4	-4	+2	+2

NOTE:  
TO CONSTRUCT ONE END SECTION AS SHOWN, THE NUMBER OF BARS SHOWN NEED TO BE ADDED TO OR SUBTRACTED FROM THE TOTAL WEIGHT OF REINFORCING FOR THE BARREL. THIS WEIGHT ADJUSTMENT IS INCLUDED IN THE END SECTION QUANTITY. SEE BARREL DETAILS FOR BAR LENGTHS, SIZES AND BENDS.

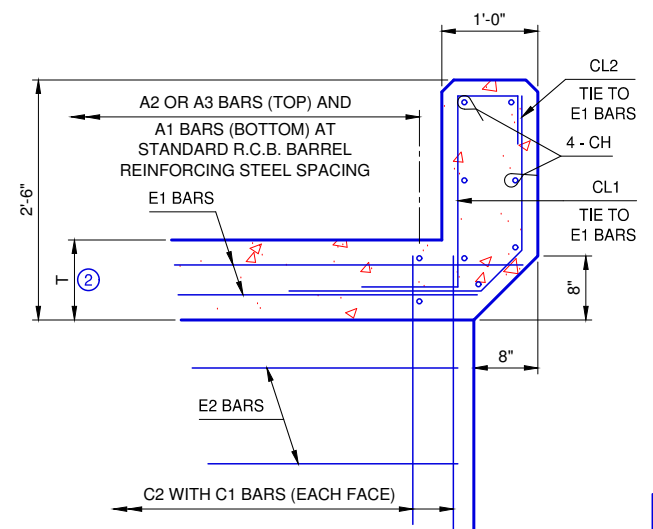
**WINGWALL BAR LIST**

ONE WINGWALL SHOWN, TWO REQUIRED

MARK	SIZE	NO.	FORM	LENGTH	LENGTH VARIATION
WD	#7	20	BNT.	6'-8"	
WH1	#4	4	STR.	34'-3"	
WH2	#4	18	STR.	17'-7" AVG.	3'-9" TO 31'-5"
WH3	#5	2	STR.	34'-7"	
WL1	#7	12	BNT.	14'-2"	
WL2	#6	22	BNT.	14'-6"	
WL3	#5	11	BNT.	6'-2"	
WL4	#5	6	BNT.	6'-3" AVG.	5'-6" TO 7'-0"
WT1	#4	27	STR.	2'-6"	
WT2	#4	2	STR.	11'-0"	
WT3	#4	5	STR.	10'-3" AVG.	9'-8" TO 10'-10"
WT4	#4	22	STR.	6'-4" AVG.	3'-4" TO 9'-4"
WT5	#4	6	STR.	3'-1" AVG.	2'-4" TO 3'-10"
WV1	#5	2	STR.	11'-0"	
WV2	#5	9	STR.	10'-3" AVG.	9'-8" TO 10'-10"
WV3	#5	22	STR.	6'-4" AVG.	3'-4" TO 9'-4"
U	#4	1	BNT.	5'-1"	



HEADWALL DETAIL AT EXTERIOR WALL



HEADWALL DETAIL AT INTERIOR WALL

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CITY ENGINEER

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R.C.B. CULVERTS - END SECTION DETAILS  
TRIPLE CELL - 9' HEIGHT - 0° SKEW

SHEET NO. 2 OF 2

Drawing Number  
RCB-077