

APRON AND HEADWALL BAR LIST

MARK	SIZE	FORM	5' SPAN			6' SPAN			7' SPAN			8' SPAN			9' SPAN			10' SPAN			11' SPAN			12' SPAN		
			NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION	NO.	LENGTH	LENGTH VARIATION
ABD1	#4	STR.	28	4'-3"		32	4'-3"		36	4'-3"		40	4'-3"		44	4'-3"		48	4'-3"		52	4'-3"		56	4'-3"	
ABD2	#4	BNT.	4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"		4	5'-0"	
AD	#4	STR.	4	20'-2"		4	20'-2"		4	20'-2"		4	20'-2"		4	20'-2"		4	20'-2"		4	20'-2"		4	20'-2"	
AL1	#4	STR.	28	18'-7"		32	18'-7"		36	18'-7"		40	18'-7"		44	18'-7"		48	18'-7"		52	18'-7"		56	18'-7"	
AL2	#4	STR.	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"	40	10'-1" AVG.	2'-4" TO 17'-10"
AT1	#4	STR.	4	32'-6"		4	34'-6"		4	36'-6"		4	38'-6"		4	40'-6"		4	42'-6"		4	44'-6"		4	46'-9"	
AT2	#4	STR.	18	22'-1" AVG.	12'-3" TO 31'-11"	18	24'-1" AVG.	14'-3" TO 33'-11"	18	26'-1" AVG.	16'-3" TO 35'-11"	18	28'-1" AVG.	18'-3" TO 37'-11"	18	30'-1" AVG.	20'-3" TO 39'-11"	18	32'-1" AVG.	22'-3" TO 41'-11"	18	34'-1" AVG.	24'-3" TO 43'-11"	18	36'-4" AVG.	26'-6" TO 46'-2"
AT3	#5	STR.	18	22'-1" AVG.	12'-3" TO 31'-11"	18	24'-1" AVG.	14'-3" TO 33'-11"	18	26'-1" AVG.	16'-3" TO 35'-11"	18	28'-1" AVG.	18'-3" TO 37'-11"	18	30'-1" AVG.	20'-3" TO 39'-11"	18	32'-1" AVG.	22'-3" TO 41'-11"	18	34'-1" AVG.	24'-3" TO 43'-11"	18	36'-4" AVG.	26'-6" TO 46'-2"
CH	#4	STR.	4	12'-2"		4	14'-2"		4	16'-2"		4	18'-2"		4	20'-2"		4	22'-2"		4	24'-2"		4	26'-5"	
CL1	#4	BNT.	16	4'-4"		18	4'-4"		20	4'-4"		22	4'-4"		24	4'-4"		26	4'-4"		28	4'-4"		30	4'-4"	
CL2	#4	BNT.	16	4'-4"		18	4'-4"		20	4'-4"		22	4'-4"		24	4'-4"		26	4'-4"		28	4'-4"		30	4'-4"	

①

① 4 SETS OF 10 BARS

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.

QUANTITIES

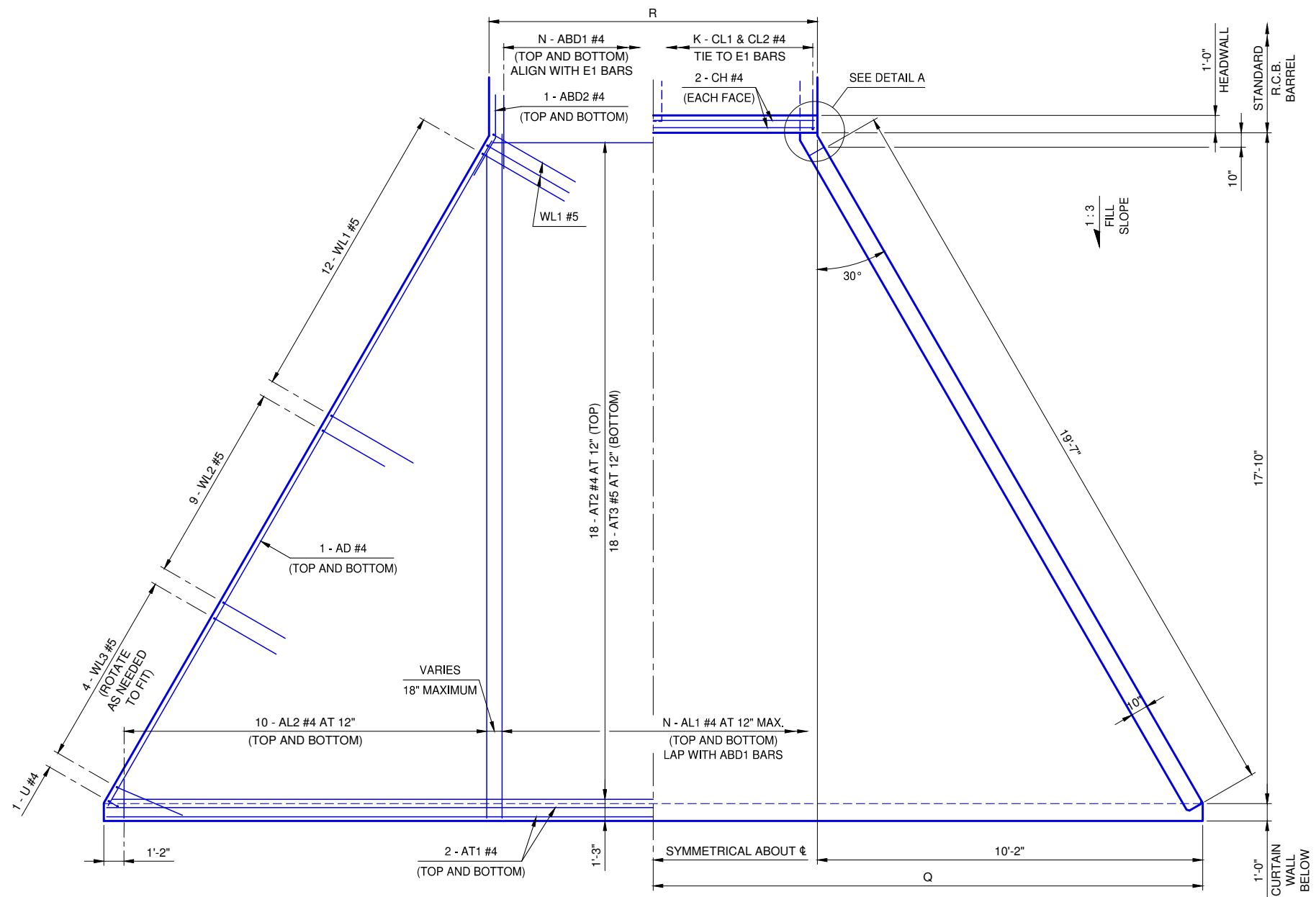
ITEM	UNIT	5' SPAN	6' SPAN	7' SPAN	8' SPAN	9' SPAN	10' SPAN	11' SPAN	12' SPAN
CLASS AA CONCRETE	C.Y.	20.0	21.3	22.6	23.9	25.1	26.4	27.7	29.0
REINFORCING STEEL	LB.	2,960	3,110	3,250	3,360	3,500	3,650	3,790	3,940
PIPE RAILING	L.F.	53	55	57	59	61	63	65	68

APRON VARIABLES

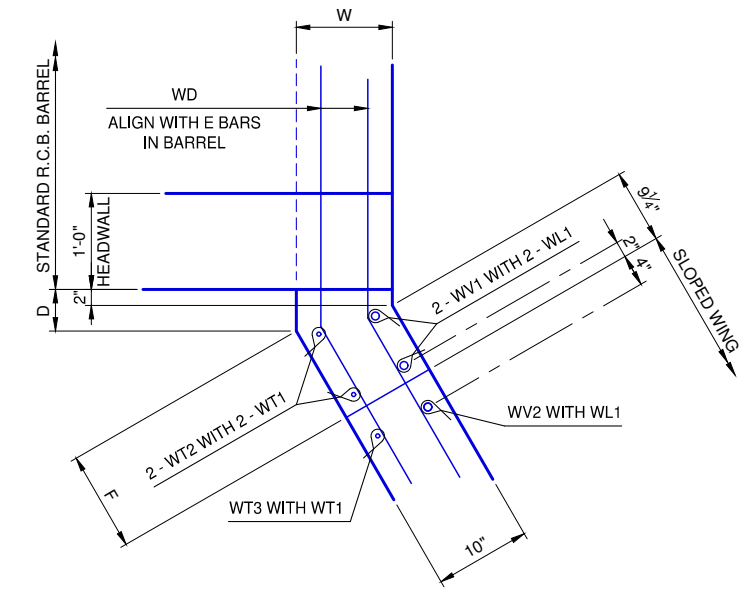
SPAN	DIMENSIONS				NO. OF BARS	
	R	Q	K	N		
5'	12'-6"	16'-5"	16	14		
6'	14'-6"	17'-5"	18	16		
7'	16'-6"	18'-5"	20	18		
8'	18'-6"	19'-5"	22	20		
9'	20'-6"	20'-5"	24	22		
10'	22'-6"	21'-5"	26	24		
11'	24'-6"	22'-5"	28	26		
12'	26'-9"	23'-6 1/2"	30	28		

WINGWALL DIMENSIONS

SPAN	DIMENSIONS			
	W	D	F	
5'	10"	4 11/16"	11 15/16"	
6'	10"	4 11/16"	11 15/16"	
7'	10"	4 11/16"	11 15/16"	
8'	10"	4 11/16"	11 15/16"	
9'	10"	4 11/16"	11 15/16"	
10'	10"	4 11/16"	11 15/16"	
11'	10"	4 11/16"	11 15/16"	
12'	11"	2 15/16"	1'-1 15/16"	



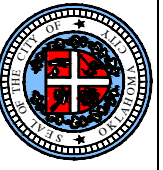
APRON PLAN



DETAIL A

REVISION NO.
DATE

The City of
Oklahoma City
 Public Works Department
 Engineering Division



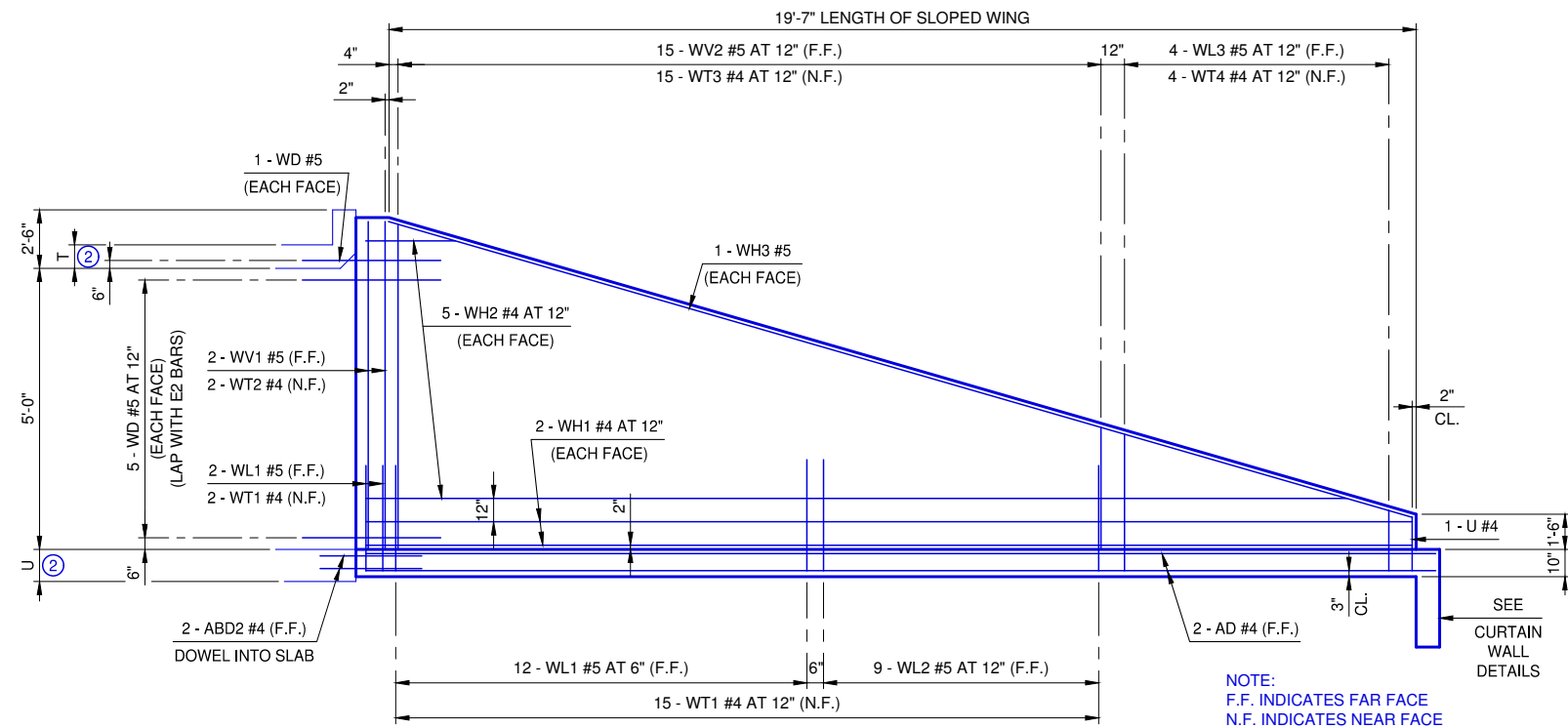
APPROVED BY: DATE: 6/22/2023
 ERIC J. WENGER, P.E.
 CITY ENGINEER

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
DOUBLE CELL - 5' HEIGHT - 0° SKEW

SHEET NO. 1 OF 2

Drawing Number
 RCB-044



WINGWALL ELEVATION

NOTE:
F.F. INDICATES FAR FACE
N.F. INDICATES NEAR FACE

ADJUSTMENT IN NUMBER OF BARREL BARS IN END SECTION

SPAN	BAR MARKS								
	A1	A2	A3	B1	B2	C1	C2	C3	C4
5'	+1			+2	+2	+2	+2		
6'	+1			+2	+2	+2	+2		
7'	+1			+2	+2	-2	-2	+2	+2
8'						-2	-2	+2	+2
9'						-2	-2	+2	+2
10'						-2	-2	+2	+2
11'						-2	-2	+2	+2
12'						-2	-2	+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

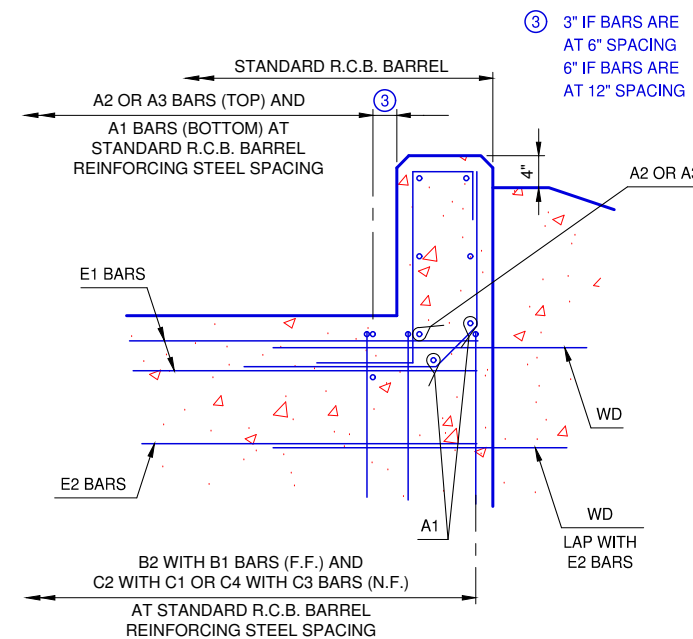
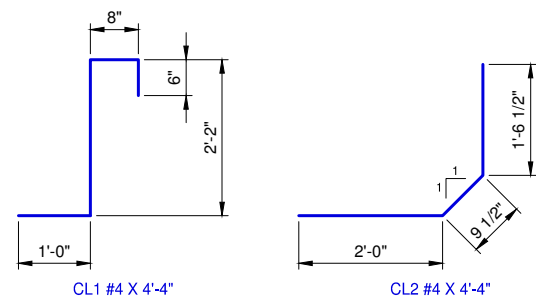
ONE WINGWALL SHOWN, TWO REQUIRED

MARK	SIZE	NO.	FORM	LENGTH	LENGTH VARIATION
WD	#5	12	BNT.	5'-8"	
WH1	#4	4	STR.	20'-2"	
WH2	#4	10	STR.	10'-5" AVG.	3'-6" TO 17'-4"
WH3	#5	2	STR.	20'-2"	
WL1	#5	14	BNT.	8'-1"	
WL2	#5	9	BNT.	6'-9"	
WL3	#5	4	BNT.	6'-10" AVG.	6'-5" TO 7'-3"
WT1	#4	17	STR.	2'-3"	
WT2	#4	2	STR.	7'-0"	
WT3	#4	15	STR.	4'-10" AVG.	2'-10" TO 6'-10"
WT4	#4	4	STR.	2'-8" AVG.	2'-3" TO 3'-1"
WV1	#5	2	STR.	7'-0"	
WV2	#5	15	STR.	4'-10" AVG.	2'-10" TO 6'-10"
U	#4	1	BNT.	4'-5"	

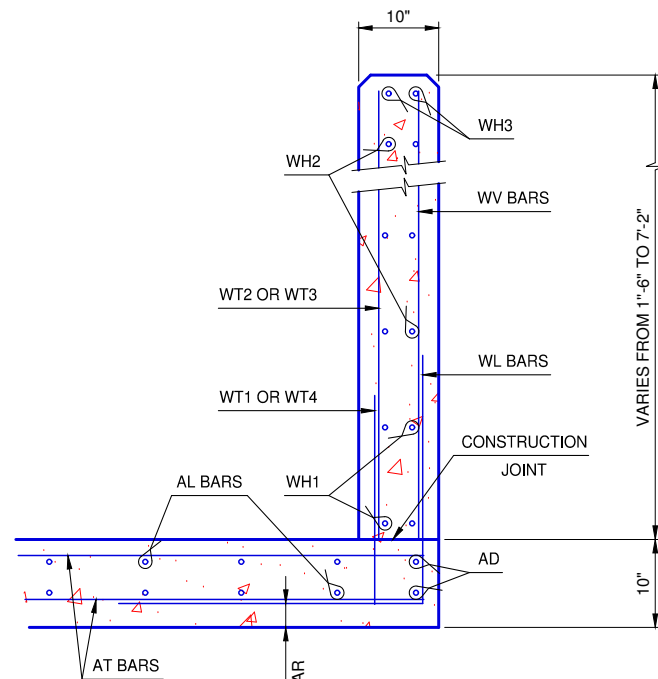
① 2 SETS OF 5 BARS

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

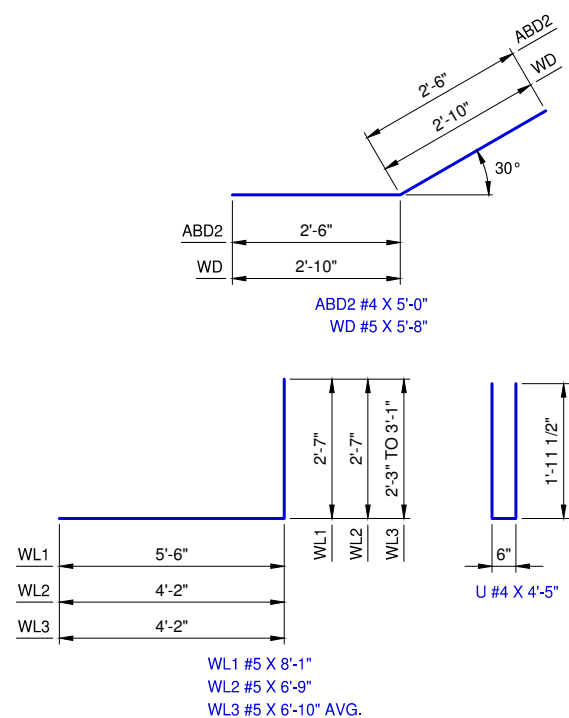
② FOR T AND U DIMENSIONS, SEE BARREL DETAILS



HEADWALL DETAIL AT EXTERIOR WALL



TYPICAL SECTION THRU WING



HEADWALL DETAIL AT INTERIOR WALL

REVISION NO.	
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R.C.B. CULVERTS - END SECTION DETAILS
DOUBLE CELL - 5' HEIGHT - 0° SKEW
SHEET NO. 2 OF 2

Drawing Number
RCB-045