Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

RIGHT ANGLE

Mark	Bend	90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	15	9'-3	16	9'-3	16	9'-3	17	9'-3	18	9'-3	19	9'-3	19	9'-3	20	9'-3	20	9'-3	21	9'-3
j	str	8	17'-0	8	18'-0	8	19'-0	8	20'-0	8	21'-0	8	22'-0	8	23'-0	8	24'-0	8	25'-0	8	26'-0
k	E	15	7'-0	16	7'-0	16	7'-0	17	7'-0	18	7'-0	19	7'-0	19	7'-0	20	7'-0	20	7'-0	21	7'-0
r1	str	9	10'-6	9	11'-3	9	12'-3	9	13'-3	9	14'-0	11	15'-6	11	16'-0	11	17'-0	11	17'-9	13	18'-6
r2	str	4	5'-6	4	7'-0	4	8'-6	4	10'-0	4	11'-0	4	11'-0	4	12'-0	4	14'-0	4	15'-0	4	14'-0
r3	str					2	6'-0	2	7'-6	4	6'-0	2	8'-0	4	7'-0	4	8'-0	4	9'-6	4	8'-6
r4	str																	2	7'-0	2	4'-6
r5	str																				
s	str	31	2'-0	33	2'-0	36	2'-0	38	2'-0	41	2'-0	43	2'-0	46	2'-0	48	2'-0	51	2'-0	53	2'-0
t1	str	3	8'-0	3	8'-6	3	8'-9	3	9'-3	3	9'-9	3	10'-3	3	10'-9	3	11'-0	4	11'-6	4	12'-0
t2	str	3	10'-3	3	11'-0	3	11'-0	3	11'-6	3	12'-0	3	12'-3	3	12'-9	3	13'-3	3	14'-0	4	15'-0
t3	str	3	12'-3	3	13'-3	3	13'-0	3	13'-6	3	14'-6	3	14'-3	3	14'-9	3	15'-6	3	16'-6	3	18'-0
t4	str	3	14'-6	3	15'-9	2	15'-0	3	15'-9	3	16'-9	3	16'-0	3	17'-0	3	17'-6	3	18'-9	3	20'-3
t5	str					2	16'-9	2	18'-0	3	19'-3	3	18'-0	3	19'-0	3	19'-9	3	21'-3	3	22'-6
t6	str											2	20'-0	2	21'-0	3	22'-0	3	23'-9	3	25'-0
t7	str																				

15° SKEW

Mark	Bend	90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	13	9'-3	14	9'-3	14	9'-3	15	9'-3	15	9'-3	16	9'-3	16	9'-3	17	9'-3	17	9'-3	18	9'-3
j	str	8	19'-0	8	19'-9	8	20'-6	8	21'-3	8	22'-0	8	22'-9	8	23'-6	8	24'-6	8	25'-3	8	26'-0
k	E	13	7'-0	14	7'-0	14	7'-0	15	7'-0	15	7'-0	16	7'-0	16	7'-0	17	7'-0	17	7'-0	18	7'-0
r1	str	9	11'-0	9	11'-6	10	12'-0	10	12'-3	10	12'-9	11	13'-3	12	13'-9	12	14'-3	12	14'-9	13	15'-0
r2	str	2	9'-3	2	9'-9	2	9'-3	2	10'-3	3	9'-3	2	11'-6	2	11'-0	2	12'-0	2	12'-6	2	13'-0
r3	str	2	6'-9	2	7'-0	2	6'-3	2	7'-6	2	6'-6	2	9'-3	2	8'-3	2	9'-0	2	9'-0	2	10'-3
r4	str	2	4'-0	2	4'-3	2	3'-6	2	4'-9	2	4'-0	2	7'-3	2	5'-6	2	6'-0	2	5'-6	2	7'-6
r5	str																				
r6	str																				
r7	str																				
r8	str																				
s	str	34	2'-0	36	2'-0	37	2'-0	38	2'-0	40	2'-0	41	2'-0	42	2'-0	44	2'-0	45	2'-0	46	2'-0
t1	str	2	8'-0	2	8'-6	3	9'-0	3	9'-6	2	10'-0	2	10'-6	3	11'-0	3	11'-6	2	12'-0	2	12'-6
t2	str	2	9'-6	2	10'-3	2	10'-9	2	11'-3	2	11'-6	2	12'-0	2	12'-9	2	13'-3	2	13'-6	2	14'-3
t3	str	2	11'-3	2	11'-9	2	12'-6	2	13'-0	2	13'-3	2	13'-9	2	14'-6	2	15'-0	2	15'-3	2	16'-0
t4	str	2	13'-0	2	13'-6	2	14'-6	2	15'-0	2	15'-0	2	15'-6	2	16'-6	2	17'-0	2	17'-0	2	17'-6
t5	str	2	14'-9	2	15'-3	2	16'-3	2	16'-9	2	16'-6	2	17'-0	2	18'-3	2	18'-6	2	18'-6	2	19'-3
t6	str	2	16'-9	2	17'-0	2	18'-0	2	18'-6	2	18'-3	2	18'-9	2	20'-3	2	20'-3	2	20'-3	2	21'-0
t7	str									2	20'-0	2	20'-6	2	22'-0	2	22'-0	2	21'-9	2	22'-9
t8	str																	2	23'-6	2	24'-6
t9	str																				
t10	str																				
t11	str	1	18'-0	1	18'-6	1	19'-3	1	20'-0	1	20'-6	1	21'-3	1	22'-0	1	22'-6	1	23'-3	1	24'-0

30° SKEW

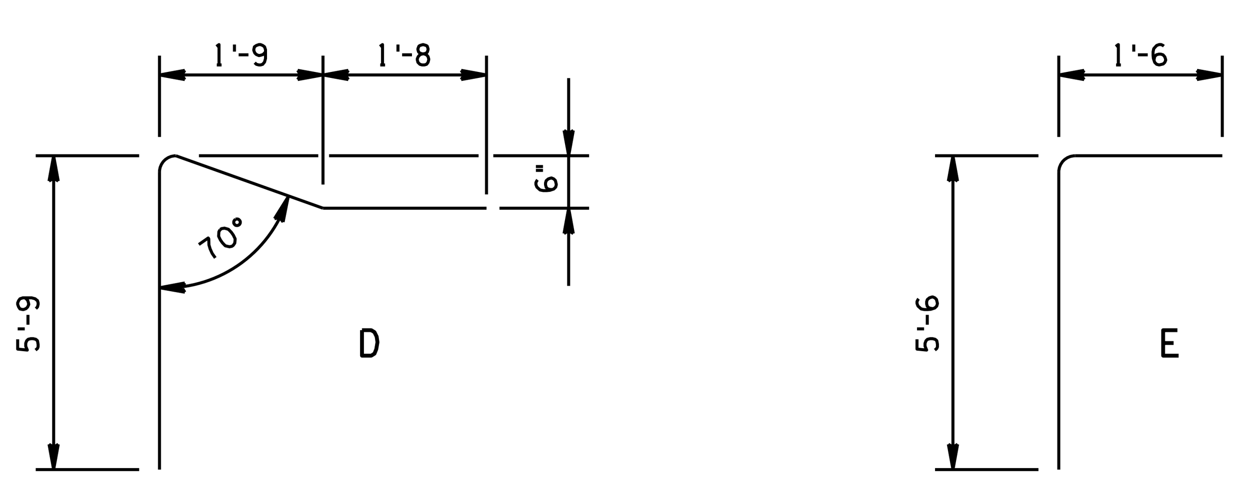
Mark	Bend	90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	15	9'-3	16	9'-3	17	9'-3	17	9'-3	18	9'-3	19	9'-3	20	9'-3	20	9'-3	21	9'-3	22	9'-3
j	str	8	22'-0	8	23'-3	8	24'-6	8	25'-6	8	26'-9	8	28'-0	8	29'-3	8	30'-6	8	31'-9	8	33'-0
k	E	15	7'-0	16	7'-0	17	7'-0	17	7'-0	18	7'-0	19	7'-0	20	7'-0	20	7'-0	21	7'-0	22	7'-0
r1	str	9	10'-6	10	11'-0	10	11'-6	11	12'-0	11	12'-6	12	13'-0	13	13'-6	13	14'-0	14	14'-6	14	15'-0
r2	str	2	9'-0	2	9'-6	2	10'-0	2	10'-6	2	11'-6	2	11'-6	2	12'-0	2	13'-0	2	13'-0	2	14'-0
r3	str	2	7'-3	2	7'-9	2	8'-3	2	8'-9	2	9'-9	2	9'-9	2	10'-3	2	11'-3	2	11'-6	2	12'-6
r4	str	2	5'-9	2	6'-3	2	6'-9	2	7'-3	2	8'-3	2	8'-3	2	8'-9	2	9'-6	2	10'-0	2	10'-9
r5	str	2	4'-0	2	4'-6	2	5'-0	2	5'-6	2	6'-6	2	6'-6	2	7'-0	2	7'-9	2	8'-6	2	9'-3
r6	str									1	6'-0	1	6'-0	1	6'-0	2	6'-0	2	7'-0	2	7'-6
r7	str																			2	6'-0
r8	str																				
r9	str																				
s	str	33	2'-0	35	2'-0	37	2'-0	39	2'-0	41	2'-0	43	2'-0	45	2'-0	47	2'-0	49	2'-0	51	2'-0
t1	str	2	9'-3	2	9'-9	2	10'-3	2	11'-0	2	11'-6	2	12'-0	2	12'-6	2	13'-0	2	13'-9	2	14'-3
t2	str	2	11'-9	2	12'-0	2	12'-6	2	13'-6	2	13'-9	2	14'-6	2	14'-9	2	15'-3	2	16'-0	2	16'-6
t3	str	2	14'-0	2	14'-6	2	15'-0	2	15'-9	2	16'-0	2	16'-9	2	17'-3	2	17'-9	2	18'-6	2	18'-9
t4	str	2	16'-6	2	16'-9	2	17'-3	2	18'-3	2	18'-6	2	19'-3	2	19'-6	2	20'-0	2	20'-9	2	21'-0
t5	str	2	19'-0	2	19'-3	2	19'-6	2	20'-6	2	20'-9	2	21'-6	2	21'-9	2	22'-6	2	23'-3	2	23'-6
t6	str					1	22'-0	2	33'-0	2	23'-0	2	24'-0	2	24'-3	2	24'-9	2	25'-6	2	25'-9
t7	str													1	26'-6	1	27'-3	2	28'-0	2	28'-0
t8	str																				
t9	str											1	15'-0			1	16'-0			1	23'-0
t10	str	1	21'-6	1	22'-9	1	24'-0	1	25'-3	1	26'-6	1	27'-9	1	29'-0	1	30'-3	1	31'-6	1	32'-9

45° SKEW

Mark	Bend	90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	21	9'-3	22	9'-3	23	9'-3	24	9'-3	25	9'-3	26	9'-3	27	9'-3	28	9'-3	29	9'-3	30	9'-3
j	str	8	31'-0	8	32'-6	8	34'-0	8	35'-6	8	37'-3	8	38'-9	8	40'-3	8	41'-9	8	43'-6	8	45'-0
k	E	21	7'-0	22	7'-0	23	7'-0	24	7'-0	25	7'-0	26	7'-0	27	7'-0	28	7'-0	29	7'-0	30	7'-0
r1	str	11	9'-0	12	9'-6	13	10'-0	14	10'-6	14	11'-0	15	11'-6	16	12'-0	16	12'-6	17	13'-0	17	13'-6
r2	str	3	7'-9	3	8'-6	3	8'-9	3	9'-3	3	9'-9	3	10'-0	3	10'-6	3	11'-0	3	11'-6	3	12'-6
r3	str	3	6'-3	3	7'-0	3	7'-3	3	7'-9	3	8'-6	3	8'-9	3	9'-3	3	9'-9	3	10'-3	3	11'-0
r4	str	3	5'-0	3	5'-9	3	5'-9	3	6'-6	3	7'-6	3	7'-3	3	7'-9	3	8'-3	3	8'-9	3	9'-6
r5	str	3	3'-6	3	4'-3	3	4'-6	3	5'-0	2	6'-3	3	6'-0	3	6'-6	3	7'-0	3	7'-3	3	8'-0
r6	str									2	5'-3	3	4'-6	2	5'-6	2	6'-0	2	6'-6	3	6'-6
r7	str													2	4'-6	2	5'-0	2	5'-6	3	5'-0
r8	str																			2	4'-0
r9	str																				
r10	str																				
s	str	39	2'-0	41	2'-0	43	2'-0	45	2'-0	47	2'-0	49	2'-0	51	2'-0	53	2'-0	55	2'-0	57	2'-0
t1	str	2	12'-0	2	12'-9	2	13'-3	2	14'-0	2	14'-9	2	15'-3	2	16'-0	2	16'-9	2	17'-3	2	18'-0
t2	str	2	16'-0	2	16'-9	2	17'-3	2	18'-0	2	18'-6	2	19'-3	2	20'-3	2	20'-9	2	21'-6	2	22'-3
t3	str	2	20'-0	2	20'-9	2	21'-6	2	22'-3	2	22'-6	2	23'-6	2	24'-6	2	25'-0	2	25'-6	2	26'-6
t4	str	2	24'-0	2	24'-9	2	25'-9	2	26'-6	2	26'-3	2	27'-9	2	28'-9	2	29'-3	2	29'-9	2	30'-6
t5	str	1	28'-0	1	28'-9	1	30'-0	2	30'-6	2	30'-3	2	31'-9	2	33'-0	2	33'-3	2	34'-0	2	34'-9
t6	str									1	34'-0	1	36'-0	1	37'-3	2	37'-6	2	38'-0	2	39'-0
t7	str																				
t8	str																				
t9	str																			1	28'-0
t10	str	1	30'-6	1	32'-0	1	33'-6	1	35'-3	1	36'-9	1	38'-3	1	39'-9	1	41'-3	1	43'-0	1	44'-6

QUANTITIES

	PIPE Dia.	REINF. Lbs.	CONCRETE C.Y.
RIGHT ANGLE	90"	115	2.2
	96"	125	2.5
	102"	140	2.7
	108"	160	3.0
	114"	195	3.3
	120"	235	3.8
	126"	245	4.1
	132"	275	4.6
	138"	305	5.0
	144"	345	5.5
15° SKEW	90"	95	2.8
	96"	105	3.0
	102"	120	3.2
	108"	130	3.4
	114"	150	3.7
	120"	170	4.0
	126"	185	4.3
	132"	200	4.6
	138"	220	4.9
	144"	250	5.1
30° SKEW	90"	150	3.4
	96"	170	3.8
	102"	185	4.1
	108"	225	4.5
	114"	235	4.8
	120"	255	5.2
	126"	285	5.7
	132"	305	6.2
	138"	330	6.6
	144"	370	7.1
45° SKEW	90"	230	5.6
	96"	255	6.0
	102"	270	6.4
	108"	315	6.8
	114"	345	7.4
	120"	385	7.9
	126"	405	8.5
	132"	450	9.0
	138"	475	9.5
	144"	525	10.2



BENDS

NOTE:

All reinforcing bars are #4.
The apron quantities take into consideration the cutoff walls being omitted along outlet headwalls.

NOTE:

For General Notes and additional Details, see SD 6.30 (1 of 5) and SD 6.36 (1 of 4).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	7-12
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan
APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

PIPE CULVERT HEADWALLS
OUTLET APRON STEEL LIST
2 : 1 SLOPE

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.36 (2 of 4)
LOCATION | SHEET NO. OF

22-JAN-2016 14:40 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.30 Series\SD636-1 to 4\sd636-2_0116.dgn