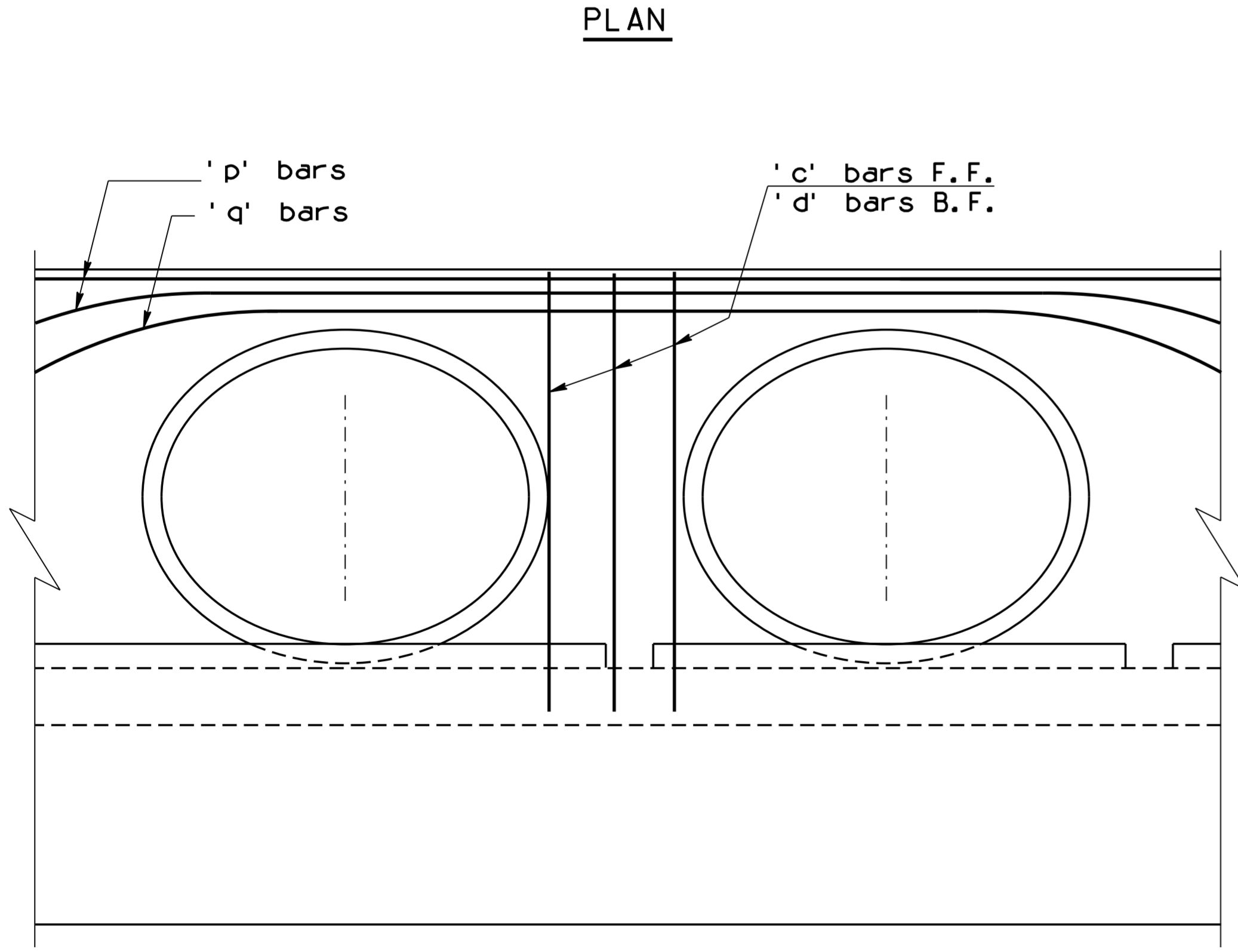
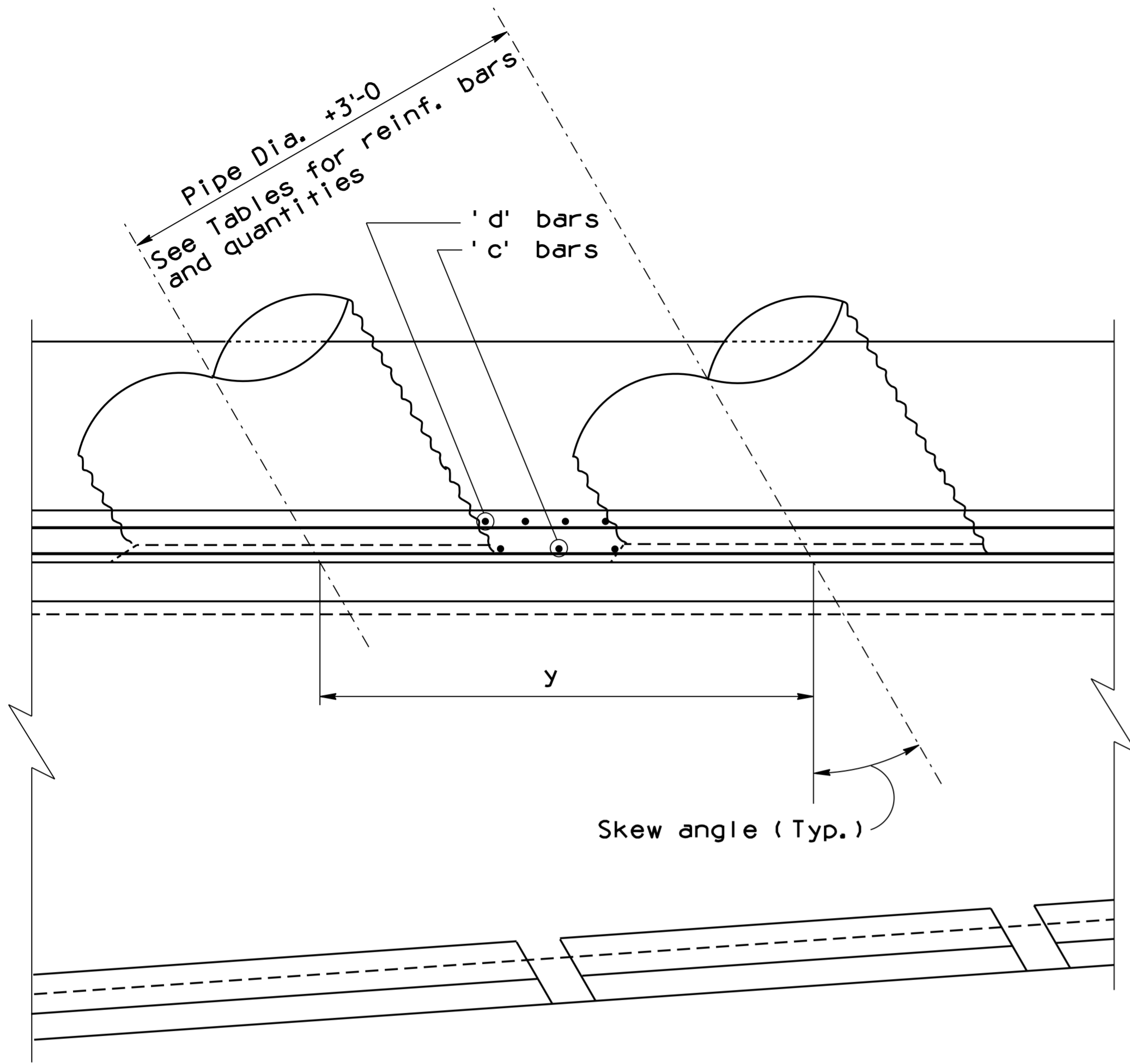


Note to Designer:  
 The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability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

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



ELEVATION

DIMENSION Y ( FT. )										
SKEW	PIPE Dia. ( Inches )									
	90°	96°	102°	108°	114°	120°	126°	132°	138°	144°
RT. $\Delta$	10'-6	11'-0	11'-6	12'-0	12'-6	13'-0	13'-6	14'-0	14'-6	15'-0
15°	10'-10 1/2	11'-4 5/8	11'-10 3/8	12'-5 3/8	12'-11 1/4	13'-5 1/2	13'-11 3/4	14'-5 3/8	15'-0 3/8	15'-6 3/8
30°	12'-1 1/2	12'-8 3/8	13'-3 3/8	13'-10 1/4	14'-5 1/4	15'-0 3/8	15'-7	16'-2	16'-8 3/8	17'-3 3/8
45°	14'-10 1/4	15'-6 5/8	16'-3 3/8	16'-11 5/8	17'-8 3/8	18'-4 5/8	19'-1 1/8	19'-9 5/8	20'-6 3/8	21'-2 1/2

BAR LENGTH ADJUSTMENT PER ADDITIONAL PIPE ( FT. )											
SKEW	MARK *	PIPE Dia. ( Inches )									
		90°	96°	102°	108°	114°	120°	126°	132°	138°	144°
RT. $\Delta$	j, n1, n2, p, q and t1 to t7	10'-6	11'-0	11'-6	12'-0	12'-6	13'-0	13'-6	14'-0	14'-6	15'-0
15°	g, n1, n2, p, q and t1 to t11	10'-9	11'-3	12'-0	12'-6	13'-0	13'-6	14'-0	14'-6	15'-0	15'-6
30°	g, n1, n2, p, q and t1 to t10	12'-0	12'-9	13'-3	13'-9	14'-6	15'-0	15'-6	16'-3	16'-9	17'-3
45°	g, n1, n2, p, q and t1 to t10	14'-9	15'-6	16'-3	17'-0	17'-9	18'-3	19'-0	19'-9	20'-6	21'-3

\* Increase bar length for single pipes by dimensions in table for each additional pipe.

REINF. BAR QUANTITIES PER ADDITIONAL PIPE ( Lbs. )												
PIPE Dia.	RT. $\Delta$			15°			30°			45°		
	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1
90°	550	630	710	605	660	710	645	640	735	770	730	840
96°	585	710	765	650	740	780	695	720	800	910	850	940
102°	740	800	880	680	790	860	825	805	925	970	940	1020
108°	770	915	940	850	905	985	905	870	980	1070	1095	1120
114°	895	1000	1035	950	1030	1035	960	1010	1145	1260	1175	1305
120°	980	1045	1155	970	1105	1195	1100	1065	1210	1350	1270	1410
126°	1055	1120	1255	1125	1165	1260	1180	1180	1335	1395	1320	1470
132°	1220	1300	1330	1205	1300	1410	1275	1240	1395	1690	1615	1640
138°	1355	1415	1485	1400	1460	1475	1370	1425	1495	1825	1715	1690
144°	1425	1475	1630	1485	1550	1660	1415	1520	1682	1910	1775	1775

No. OF ADDITIONAL BARS REQUIRED FOR ADDITIONAL PIPE											
SKEW	MARK	PIPE Dia. ( Inches )									
		90	96	102	108	114	120	126	132	138	144
RT. $\Delta$	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	4	4	4	4	4	4
	e8, r1, s	10	10	11	11	12	12	13	13	14	14
	h, k	6	7	7	7	8	8	8	8	9	9
15°	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	4	4	4	4	4	4
	e8, r1, s	10	11	11	12	12	13	13	14	14	15
	h, k	7	7	7	8	8	8	9	9	10	10
30°	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	4	4	4	4	4	4
	e9, r1, s	11	12	13	13	14	14	15	15	16	17
	h, k	8	8	8	9	9	10	10	10	11	11
45°	c	4	4	4	4	4	4	4	4	4	4
	d	5	5	5	5	5	5	5	5	5	5
	e9, r1, s	14	15	16	16	17	18	18	19	20	20
	h, k	10	10	10	11	11	12	12	13	13	13

CONCRETE QUANTITIES PER ADDITIONAL PIPE ( C. Y. )												
PIPE Dia.	RT. $\Delta$			15°			30°			45°		
	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1
90°	10.6	12.4	13.0	11.1	12.8	13.3	12.4	13.3	14.1	15.2	15.7	16.0
96°	11.7	13.5	14.2	12.0	13.8	14.4	13.3	14.3	15.2	16.5	17.1	17.4
102°	12.7	14.5	15.3	12.9	14.9	15.7	14.4	15.7	16.3	17.8	18.6	19.0
108°	13.7	15.6	16.4	13.9	16.1	17.0	15.4	16.7	17.6	19.2	20.2	20.4
114°	14.6	16.7	17.8	14.9	17.3	18.4	16.6	18.1	18.9	20.5	21.6	21.9
120°	16.1	17.9	19.0	15.9	18.5	19.8	17.8	19.3	20.3	21.9	23.3	23.7
126°	17.0	19.2	20.5	17.0	19.9	21.3	18.9	20.8	21.6	23.5	25.1	25.5
132°	18.3	20.4	21.9	18.1	21.2	22.7	20.2	22.3	23.0	25.0	26.7	27.1
138°	19.6	21.7	23.3	19.2	22.6	24.4	21.5	23.6	24.4	26.4	28.5	28.8
144°	20.9	23.1	24.8	20.4	24.0	26.0	22.8	25.0	25.9	28.1	30.5	30.8

NOTES:

Multipipe culvert headwall quantities are obtained by multiplying quantity shown in tables by the number of additional pipes and adding to single pipe headwall quantity. Number of bars and quantities shown in tables are for one headwall.

NOTE:

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

DESIGN APPROVED <i>Shafiq U. Hasan</i>		ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL	
APPROVED FOR DISTRIBUTION <i>Teon A. Nehme</i>		PIPE CULVERT HEADWALLS MULTI-PIPE WITH OUTLET APRON	
ROUTE	PROJECT NO.	FA NO.	DRAWING NO. SD 6.35 (2 of 2)
LOCATION			SHEET NO. OF