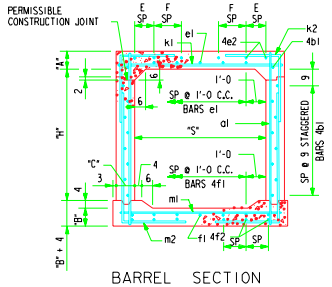
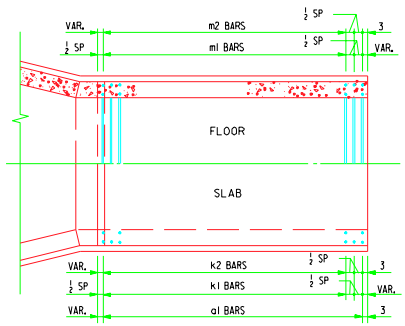
VARIABLE DIMENSIONS AND QUANTITIES FOR BARREL SECTIONS

DIMENSIONS							BAR LIST																														QUANTITIES				
							a1			b1			e1			e2 SPACING			f1			f2			k1			m1			k2					m2				CONCRETE YD ³/FT				STEEL
FILL	S	H	A	B	C	D	SIZE	SP	L	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	E	F	NO.	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	SP	NO.	SIZE	SP	L	SIZE	SP	L	h	v	SIZE	SP	L	h	v	SLAB	FLOOR	WALLS	TOTAL	LBS/FT
0	12	6	10.5	11	9	9	5	12	7'-8	4	9	16	5	12	11	4	12	15	11	4	12	13	4	13	8	8	12	13'-2	6	9	13'-8	6	9	10'-11	7'-7	3'-4	6	9	10'-9	4'-3	6'-6	.470	.513	.312	1.295	216.92
1	12	6	11.5	11.5	9	9	6	9	7'-10	4	9	16	5	12	11	4	12	12	6	4	12	13	4	16	6	8	12	13'-2	6	9	13'-8	6	9	6'-3	2'-10	3'-5	6	9	10'-6	3'-11	6'-7	.512	.534	.312	1.358	206.84
2	12	6	9.5	10	9	9	4	9	7'-6	4	9	16	5	12	11	4	15	15	6	4	12	13	4	16	6	9	12	13'-2	6	6	13'-8	8	12	8'-3	3'-5	4'-10	8	12	10'-3	3'-10	6'-5	.428	.469	.312	1.209	248.45
3	12	6	8	10	9	9	4	9	7'-5	4	9	16	4	12	11	4	15	15	6	4	12	13	4	15	6	7	9	13'-2	8	12	13'-8	6	9	6'-5	3'-4	3'-1	6	9	9'-9	3'-4	6'-5	.366	.469	.312	1.147	208.97
4 - 7	12	6	8	10	9	9	4	9	7'-5	4	9	16	4	12	11	4	14	14	6	4	12	13	4	14	6	6	6	13'-2	8	9	13'-8	7	9	7'-10	3'-2	4'-8	7	9	8'-9	3'-2	5'-7	.366	.469	.312	1.147	233.26
8 - 12	12	6	9.5	11.5	9	9	4	9	7'-8	4	9	16	4	12	11	4	15	15	6	4	12	13	4	15	6	7	6	13'-2	9	9	13'-8	9	12	9'-2	3'-4	5'-10	9	12	9'-10	3'-4	6'-6	.428	.534	.312	1.274	306.95
13 - 15	12	6	10.5	12.5	9	9	6	9	7'-10	4	9	16	4	12	11	4	11	11	6	4	12	13	4	15	6	7	6	13'-2	9	9	13'-8	8	12	8'-8	2'-9	5'-11	9	12	9'-11	3'-4	6'-7	.470	.577	.312	1.359	308.05
16 - 20	12	6	13	15	10	9	7	12	8'-3	4	9	16	4	12	11	4	16	-	4	4	12	13	4	16	4	9	9	13'-4	8	6	13'-10	6	6	5'-11	2'-5	3'-6	6	6	9'-3	2'-5	6'-10	.583	.695	.347	1.625	296.84
21 - 25	12	6	15	17.5	11	9	5	12	8'-7	4	9	16	4	12	11	4	16	-	4	4	12	13	4	16	4	8	6	13'-6	8	6	14'-0	6	6	7'-9	2'-6	5'-3	6	6	8'-0	2'-7	5'-5	.678	.814	.383	1.875	294.82
0	12	8	11	11	9	9	5	12	9'-9	4	9	22	5	12	11	4	12	15	11	4	12	13	4	13	8	8	12	13'-2	6	9	13'-8	6	9	10'-11	7'-7	3'-4	6	9	12'-9	4'-3	8'-6	.491	.513	.423	1.427	233.71
1	12	8	12	11.5	9	9	6	9	9'-10	4	9	22	5	12	11	4	16	-	4	4	12	13	4	16	6	8	12	13'-2	6	9	13'-8	5	9	6'-1	2'-8	3'-5	6	9	12'-5	3'-10	8'-7	.532	.534	.423	1.489	217.13
2	12	8	9.5	10.5	9	9	4	9	9'-7	4	9	22	5	12	11	4	14	14	6	4	12	13	4	16	6	8	9	13'-2	6	6	13'-8	7	9	8'-1	3'-3	4'-10	7	9	11'-2	3'-7	7'-7	.428	.491	.423	1.342	260.05
3	12	8	8	10.5	9	9	6	9	9'-5	4	9	22	4	12	11	4	15	15	6	4	12	13	4	14	6	6	6	13'-2	8	12	13'-8	6	9	6'-5	3'-4	3'-1	6	9	11'-9	3'-3	8'-6	.366	.491	.423	1.280	231.97
4 - 7	12	8	8	10.5	9	9	4	9	9'-5	4	9	22	4	12	11	4	13	13	6	4	12	13	4	13	6	9	12	13'-2	8	9	13'-8	7	9	7'-9	3'-1	4'-8	7	9	10'-7	3'-0	7'-7	.366	.491	.423	1.280	259.03
8 - 12	12	8	9.5	12	9	9	4	9	9'-8	4	9	22	4	12	11	4	11	11	6	4	12	13	4	16	4	7	6	13'-2	9	9	13'-8	7	9	7'-7	2'-9	4'-10	7	9	10'-5	2'-8	7'-9	.428	.556	.423	1.407	276.42
13 - 15	12	8	10.5	12.5	9	9	4	9	9'-10	4	9	22	4	12	11	4	15	15	6	4	12	13	4	15	6	9	9	13'-2	8	6	13'-8	9	12	9'-3	3'-4	5'-11	9	12	11'-11	3'-4	8'-7	.470	.577	.423	1.470	347.74
16 - 20	12	8	13	15	10	9	7	12	10'-3	4	9	22	4	12	11	4	16	-	4	4	12	13	4	16	4	8	6	13'-4	8	6	13'-10	6	6	5'-10	2'-4	3'-6	6	6	11'-3	2'-5	8'-10	.583	.695	.470	1.748	329.74
21 - 25	12	8	15	17.5	11	9	5	12	10'-7	4	9	22	4	12	11	4	16	-	4	4	12	13	4	16	4	8	6	13'-6	8	6	14'-0	6	6	7'-9	2'-6	5'-3	6	6	10'-0	2'-7	7'-5	.678	.814	.518	2.010	315.26
0	12	10	11	11	10	9	6	9	11'-9	4	9	28	5	12	11	4	12	15	11	4	12	13	4	14	8	8	12	13'-4	6	9	13'-10	6	9	11'-0	7'-8	3'-4	6	9	14'-11	4'-5	10'-6	.499	.520	.594	1.613	274.45
1	12	10	11.5	12	10	9	6	9	11'-10	4	9	28	5	12	11	4	15	15	6	4	12	13	4	16	6	8	12	13'-4	6	9	13'-10	6	9	6'-11	3'-6	3'-5	6	9	14'-8	4'-1	10'-7	.520	.564	.594	1.678	252.00
2	12	10	9.5	10.5	10	9	7	12	11'-7	4	9	28	5	12	11	4	16	16	6	4	12	13	4	16	6	8	9	13'-4	6	6	13'-10	7	12	7'-7	3'-7	4'-0	7	12	14'-4	3'-10	10'-6	.436	.498	.594	1.528	283.50
3	12	10	8	10	10	9	7	12	11'-5	4	9	28	4	12	11	4	16	16	6	4	12	13	4	16	6	6	6	13'-4	7	9	13'-10	7	12	7'-5	3'-7	3'-10	7	12	14'-0	3'-7	10'-5	.372	.477	.594	1.443	264.79
4 - 7	12	10	8	10.5	10	9	4	9	11'-5	4	9	28	4	12	11	4	14	14	6	4	12	13	4	14	6	9	12	13'-4	8	9	13'-10	7	9	8'-0	3'-4	4'-8	7	9	12'-11	3'-4	9'-7	.372	.498	.594	1.464	282.58
8 - 12	12	10	9.5	12	10	6	4	6	11'-8	4	9	28	4	12	11	4	13	13	6	4	12	13	4	13	6	7	6	13'-4	9	9	13'-10	8	12	8'-0	3'-2	4'-10	8	12	13'-8	3'-1	10'-7	.436	.564	.594	1.594	319.26
13 - 15	12	10	10.5	13	10	9	7	12	11'-10	4	9	28	4	12	11	4	16	-	4	4	12	13	4	16	4	7	6	13'-4	9	9	13'-10	6	6	6'-1	2'-9	3'-4	6	6	13'-4	2'-8	10'-8	.478	.608	.594	1.680	328.45
16 - 20	12	10	13	15.5	10.5	6	5	6	12'-3	4	9	28	4	12	11	4	16	-	4	4	12	13	4	16	4	9	9	13'-5	8	6	13'-11	6	6	6'-1	2'-7	3'-6	6	6	13'-6	2'-7	10'-11	.588	.722	.623	1.933	349.00
21 - 25	12	10	15	17.5	11	6	4	6	12'-7	4	9	28	4	12	11	4	14	14	8	4	12	13	4	15	6	8	6	13'-6	8	6	14'-0	9	12	10'-10	4'-7	6'-3	9	12	14'-6	3'-6	11'-0	.678	.814	.654	2.146	411.97
0	12	12	10.5	11.5	12	9	5	9	13'-9	4	9	32	5	12	11	4	9	18	10	4	12	13	4	14	8	8	12	13'-8	6	9	14'-2	5	6	12'-7	7'-8	4'-11	5	6	15'-3	4'-8	10'-7	.494	.557	.862	1.913	278.26
1	12	12	11	12	12	9	6	9	13'-10	4	9	32	5	12	11	4	13	13	8	4	12	13	4	13	8	8	12	13'-8	6	9	14'-2	6	9	8'-6	4'-5	4'-1	6	9	16'-4	4'-6	11'-10	.515	.579	.862	1.956	280.58
2	12	12	9.5	11.5	12	9	4	9	13'-8	4	9	32	5	12	11	4	16	16	6	4	12	13	4	16	6	9	12	13'-8	8	12	14'-2	8	12	10'-1	4'-3	5'-10	8	12	15'-9	4'-3	11'-6	.451	.557	.862	1.870	313.39
3	12	12	8	10.5	12	9	6	9	13'-5	4	9	32	4	12	11	4	16	16	6	4	12	13	4	16	6	8	12	13'-8	8	12	14'-2	5	6	8'-9	4'-1	4'-8	5	6	14'-4	3'-10	10'-6	.386	.512	.862	1.760	276.84
4 - 7	12	12	8	11	12	9	4	9	13'-6	4	9	32	4	12	11	4	16	16	6	4	12	13	4	16	6	7	9	13'-8	9	12	14'-2	8	12	9'-6	3'-10	5'-8	8	12	15'-3	3'-9	11'-6	.386	.534	.862	1.782	302.79
8 - 12	12	12	9.5	12.5	12	9	6	12	13'-9	4	9	32	4	12	11	4	14	14	6	4	12	13	4	13	6	9	12	13'-8	7	6	14'-2	6	6	8'-3	3'-5	4'-10	6	6	14'-4	3'-4	11'-0	.451	.601	.862	1.914	333.68
13 - 15	12	12	10.5	13.5	12	9	6	12	13'-11	4	9	32	4	12	11	4	13	13	6	4	12	13	4	12	6	7	6	13'-8	7	6	14'-2	6	6	9'-2	3'-3	5'-11	6	6	13'-2	3'-1	10'-1	.494	.646	.862	2.002	339.16
16 - 20	12	12	13	15.5	12	6	4	6	14'-3	4	9	32	4	12	11	4	11	11	6	4	12	13	4	11	6	9	9	13'-8	8	6	14'-2	7	6	9'-1	3'-0	6'-1	7	6	14'-0	3'-0	11'-0	.602	.736	.862	2.200	415.79
21 - 25	12	12	15	18	12	6	4	6	14'-8	4	9	32	4	12	11	4	12	12	6	4	12	13	4	11	6	8	6	13'-8	8	6	14'-2	7	6	9'-5	3'-2	6'-3	7	6	14'-3	3'-0	11'-3	.688	.847	.862	2.397	430.87

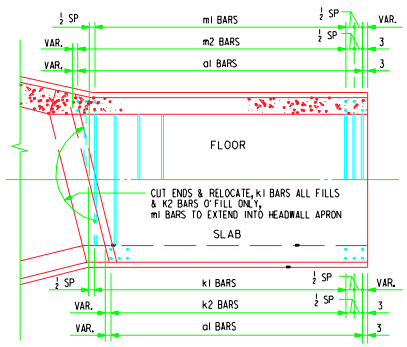


BARREL SECTION



PLAN - 0° SKEW

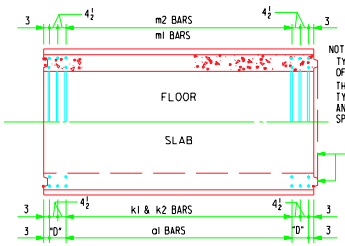
(KEYWAY NOT SHOWN)



PLAN - SKEW TYPICAL

(KEYWAY NOT SHOWN)

NOTE : ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.



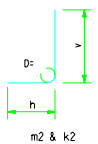
STANDARD SECTION PLAN VIEW

(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)

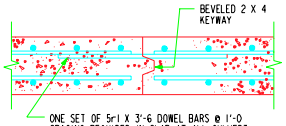
NOTE:
TYPICAL FOR LENGTHS OF 38', 35', 32', 29', AND 26'.
THESE LENGTHS ARE SHOWN AS TYPICAL BECAUSE ALL TRANSVERSE AND VERTICAL REINFORCING STEEL SPACING REPEATS IN 3' INTERVALS.

BENT BAR DETAIL

BARS	D
4	3
5	3½
6	4½
7	5½
8	6
9	9½



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.



ONE SET OF 5rl X 3'-6 DOWEL BARS @ 1'-0 SPACING REQUIRED IN SLAB AT ALL CULVERT BARREL JOINTS, EXCEPT JOINTS WITH BELL JOINTS. 5rl BARS REQUIRED = 13, TOTAL WEIGHT = 47 LBS.

TOP SLAB CONSTRUCTION JOINT DETAIL

NOTES:

1. SEE DRAWING RCB-G1-87 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.

LATEST REVISION DATE : 8-1-89

APPROVED BY : William A. Knudsgaard

STANDARD DESIGN

CULVERT BARREL DETAILS

FOR
REINFORCED CONCRETE BOX CULVERTS

HIGHWAY DIVISION
IOWA DEPARTMENT OF TRANSPORTATION

MAY , 1987

RCB 12-1-87

REVISED: 8/89; "F" SPCG. FOR e2 BAR CHANGED KEYWAY DETAIL & NOTE ADDED. LONGITUDINAL BARREL STEEL NOTE ADDED.
RCB12.SOI

XXXXXXXXXXSYSTEMTIME XXXXXXXUSERNAME XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXDGNSPEC