VARIABLE DIMENSIONS AND QUANTITIES FOR BARREL SECTIONS

BAR LIST

FILL	a1 SIZE	a1 SP	a1 LENGTH	a2 SIZE	a2 SP	a2 LENGTH	b1 SIZE	b1 SP	b1 NO.	b2 SIZE	b2 SP	b2 NO.	e1 SIZE	e1 SP	e1 NO.	e2 SIZE	e2 SP	e2 NO.	f1 SIZE	f1 SP	f1 NO.	f2 SIZE	f2 SP	f2 NO.	k1 SIZE	k1 SP	k1 LENGTH	k2 SIZE	k2 SP	k2 LENGTH
0	5	12	7'-8	5	4.5	7'-8	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	5	12	21'-11	5	12	8'-1
1	5	12	7'-9	5	4.5	7'-9	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	5	12	21'-11	5	12	8'-0
2	5	12	7'-5	5	4.5	7'-5	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	5	12	21'-11	6	12	8'-3
3	4	9	7'-5	4	4.5	7'-5	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	9	21'-11	4	9	6'-7
4	4	9	7'-5	4	4.5	7'-5	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	12	21'-11	5	12	7'-1
5-7	4	9	7'-5	4	4.5	7'-5	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	12	21'-11	5	12	7'-0
8-10	5	12	7'-6	4	4.5	7'-6	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	5	12	21'-11	5	12	6'-4
11-13	5	12	7'-9	4	4.5	7'-9	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	5	15	21'-11	6	15	7'-4
14-16	5	12	7'-11	4	4.5	7'-11	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	9	21'-11	5	9	7'-1
17-19	5	12	8'-2	4	4.5	8'-2	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	9	21'-11	5	9	7'-3
20-22	4	12	8'-4	4	4.5	8'-4	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	9	21'-11	5	9	7'-6
23-25	4	12	8'-7	4	4.5	8'-7	4	9	16	4	9	9	5	12	18	4	18	16	4	12	22	4	18	16	4	9	21'-11	5	9	7'-10

FILL	k4 SIZE	k4 SP	k4 LENGTH	k4 h	k4 v	k5 SIZE	k5 SP	k5 LENGTH	k5 h	k5 v	k6 SIZE	k6 SP	k6 LENGTH	k7 SIZE	k7 SP	k7 LENGTH	k9 SIZE	k9 SP*	k9 LENGTH
0	4	12	4'-10	1'-8	3'-2	5	12	4'-10	1'-8	3'-2	4	12	21'-11	5	12	5'-2	4	4.5	21'-11
1	4	12	4'-11	1'-9	3'-2	5	12	4'-10	1'-8	3'-2	5	15	17'-8	5	15	4'-8	5	7.5	21'-11
2	5	12	5'-1	2'-1	3'-0	5	12	4'-9	1'-9	3'-0	5	12	16'-7	6	12	5'-5	5	4.5	21'-11
3	4	9	4'-9	1'-10	2'-11	4	9	4'-8	1'-9	2'-11	5	12	15'-2	5	12	4'-7	5	4.5	21'-11
4	4	9	4'-8	1'-9	2'-11	4	9	4'-8	1'-9	2'-11	5	12	14'-10	5	12	4'-5	5	4.5	21'-11
5-7	4	9	4'-8	1'-9	2'-11	4	9	4'-8	1'-9	2'-11	5	12	14'-8	6	12	4'-11	5	4.5	21'-11
8-10	5	12	4'-9	1'-9	3'-0	5	12	4'-9	1'-9	3'-0	6	12	14'-6	6	12	4'-7	6	4.5	21'-11
11-13	5	12	4'-10	1'-9	3'-1	5	12	4'-9	1'-8	3'-1	7	15	14'-8	7	15	4'-9	7	7.5	21'-11
14-16	5	12	4'-11	1'-9	3'-2	5	12	4'-10	1'-8	3'-2	5	9	14'-7	6	9	4'-11	5	4.5	21'-11
17-19	5	12	5'-2	1'-10	3'-4	5	12	4'-11	1'-7	3'-4	5	9	14'-7	6	9	4'-11	5	4.5	21'-11
20-22	5	12	5'-4	1'-11	3'-5	5	12	5'-0	1'-7	3'-5	6	12	14'-8	7	12	5'-2	6	4.5	21'-11
23-25	5	12	5'-11	2'-5	3'-6	5	12	5'-6	2'-0	3'-6	6	12	14'-9	7	12	5'-4	6	4.5	21'-11

FILL	m1 SIZE	m1 SP	m1 LENGTH	m2 SIZE	m2 SP	m2 LENGTH	m4 SIZE	m4 SP	m4 LENGTH	m4 h	m4 v	m5 SIZE	m5 SP	m5 LENGTH	m5 h	m5 v
0	4	12	22'-5	5	12	6'-8	5	12	7'-9	1'-7	6'-2	5	12	7'-9	1'-7	6'-2
1	4	12	22'-5	5	12	6'-11	5	12	7'-9	1'-7	6'-2	5	12	7'-9	1'-7	6'-2
2	5	12	22'-5	5	12	6'-5	5	12	7'-10	1'-9	6'-1	5	12	7'-8	1'-7	6'-1
3	4	12	22'-5	5	12	7'-0	4	9	7'-10	1'-9	6'-1	4	9	7'-8	1'-7	6'-1
4	4	12	22'-5	5	12	6'-11	4	9	7'-10	1'-9	6'-1	4	9	7'-8	1'-7	6'-1
5-7	5	12	22'-5	5	12	6'-1	4	9	7'-8	1'-7	6'-1	4	9	7'-8	1'-7	6'-1
8-10	4	9	22'-5	5	9	6'-11	5	12	7'-11	1'-9	6'-2	5	12	7'-9	1'-7	6'-2
11-13	4	9	22'-5	5	9	7'-0	5	12	7'-10	1'-7	6'-3	5	12	7'-10	1'-7	6'-3
14-16	4	9	22'-5	5	9	7'-2	5	12	7'-11	1'-7	6'-4	5	12	7'-11	1'-7	6'-4
17-19	4	9	22'-5	5	9	7'-4	5	12	8'-2	1'-8	6'-6	5	12	8'-1	1'-7	6'-6
20-22	4	9	22'-5	5	9	7'-7	5	12	8'-4	1'-9	6'-7	5	12	8'-2	1'-7	6'-7
23-25	4	9	22'-5	5	9	7'-11	5	12	8'-6	1'-10	6'-8	5	12	8'-3	1'-7	6'-8

m6 SIZE	m6 SP	m6 LENGTH	m7 SIZE	m7 SP	m7 LENGTH	m9 SIZE	m9 SP*	m9 LENGTH	FILL
4	9	22'-5	4	9	3'-10	4	4.5	22'-5	0
5	12	22'-5	5	12	3'-11	5	4.5	22'-5	1
5	9	15'-8	5	9	4'-0	5	4.5	22'-5	2
4	9	15'-0	5	9	4'-6	4	4.5	22'-5	3
4	9	14'-10	5	9	4'-6	4	4.5	22'-5	4
5	9	14'-8	5	9	3'-11	5	4.5	22'-5	5-7
5	9	14'-9	6	9	4'-7	5	4.5	22'-5	8-10
7	15	14'-11	7	15	4'-8	7	7.5	22'-5	11-13
5	9	14'-9	6	9	4'-10	5	4.5	22'-5	14-16
5	9	14'-10	6	9	4'-11	5	4.5	22'-5	17-19
5	9	14'-10	6	9	5'-0	5	4.5	22'-5	20-22
6	12	15'-0	7	12	5'-2	6	4.5	22'-5	23-25

FILL	DIMENSIONS S	H	A	B	C	D*	E*	F*	G*	J*	U	V	W	X	Y	Z	QUANTITIES CONCRETE YD ^{3}/FT SLAB	FLOOR	WALLS	TOTAL	STEEL LBS/FT
0	10	6	10.5	10.5	9	9	4.5	9	12	12	1'-10	11'-0	2'-7	2'-7	11'-3	1'-11	.779	.794	.467	2.040	271.29
1	10	6	11	11	9	9	4.5	9	18	12	1'-11	6'-9	2'-4	2'-6	11'-3	1'-11	.813	.829	.467	2.109	276.37
2	10	6	8.5	10	9	9	4.5	9	12	12	1'-8	5'-8	2'-9	2'-8	4'-6	2'-0	.641	.759	.467	1.867	301.05
3	10	6	8	10	9	9	4.5	4.5	12	12	2'-6	4'-3	2'-3	2'-4	3'-10	2'-3	.607	.759	.467	1.833	245.61
4	10	6	8	10	9	9	4.5	4.5	12	12	2'-4	3'-11	2'-3	2'-5	3'-8	2'-3	.607	.759	.467	1.833	242.92
5-7	10	6	8	10	9	9	4.5	4.5	12	12	2'-5	3'-9	2'-6	2'-10	3'-6	2'-0	.607	.759	.467	1.833	259.42
8-10	10	6	8.5	10.5	9	9	4.5	9	12	12	2'-10	3'-7	2'-4	2'-6	3'-7	2'-4	.641	.794	.467	1.902	290.29
11-13	10	6	10	12	9	9	7.5	9	18	18	2'-6	3'-9	2'-5	2'-8	3'-9	2'-4	.744	.900	.467	2.111	298.26
14-16	10	6	11	13	9	9	4.5	9	12	12	2'-8	3'-8	2'-5	2'-8	3'-7	2'-5	.813	.970	.467	2.250	295.97
17-19	10	6	12.5	14.5	9	9	4.5	9	12	12	2'-9	3'-8	2'-6	2'-8	3'-8	2'-5	.916	1.075	.467	2.458	299.68
20-22	10	6	13.5	15.5	9	9	4.5	9	12	12	2'-8	3'-9	2'-7	2'-7	3'-8	2'-6	.985	1.145	.467	2.597	300.00
23-25	10	6	15	17	9	9	4.5	9	12	12	2'-7	3'-10	2'-8	2'-6	3'-10	2'-7	1.088	1.251	.467	2.806	309.34

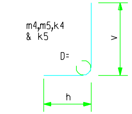
* THESE DIMENSIONS ARE CORRECT FOR 38' LONG STANDARD SECTIONS ONLY. DIMENSIONS MUST BE RECALCULATED FOR ALL OTHER SECTION LENGTHS.

NOTES:

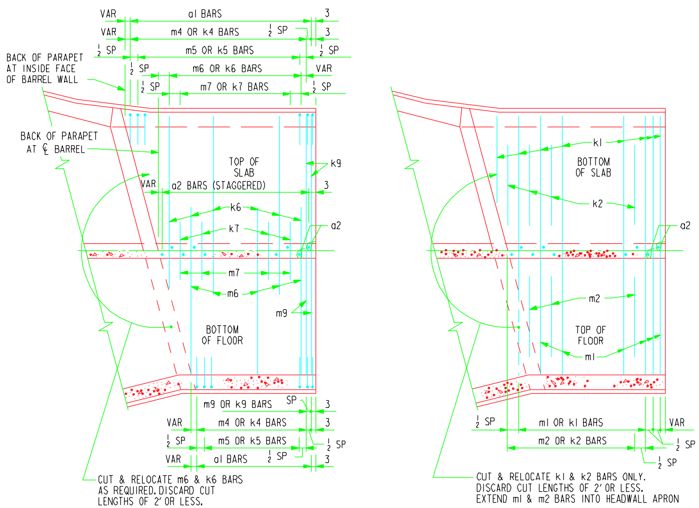
1. SEE DRAWING TWRCB-GI-87 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.

BENT BAR DETAIL

BARS	D
4	3
5	3¾
6	4½
7	5¼



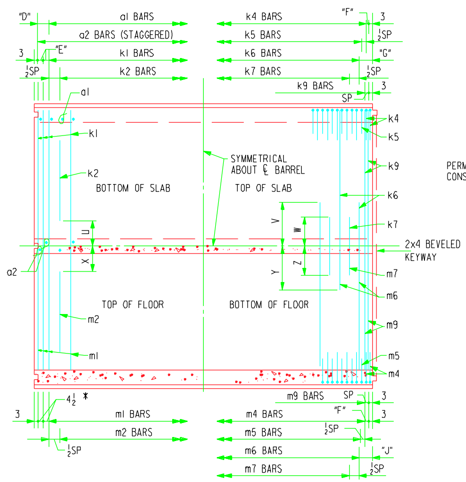
NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.



END SECTION - PLAN VIEW (KEYWAY NOT SHOWN)

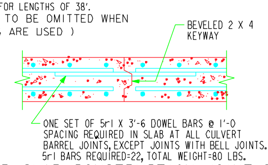
NOTE: END SECTION DETAILS SHOWN ARE FOR A 15° SKEW BARREL. USE FOR SKEWS OF 30° & 45° BY INCREASING THE NUMBER OF TRANSVERSE REINFORCING BARS REQUIRED TO BE CUT & RELOCATED.

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

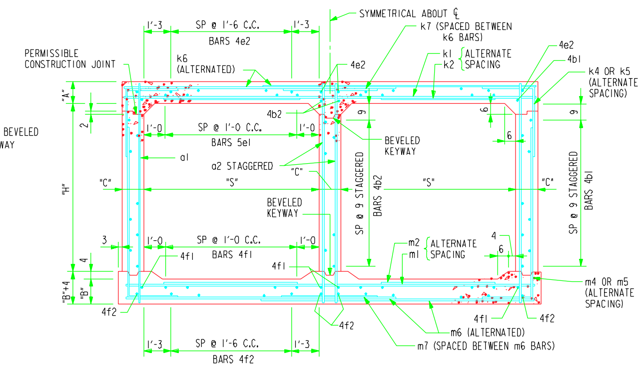


STANDARD SECTION PLAN VIEW

NOTE: TYPICAL FOR LENGTHS OF 38'.
(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)



TOP SLAB CONSTRUCTION JOINT DETAIL



BARREL SECTION

LATEST REVISION DATE : 12-5-96

APPROVED BY :

STANDARD DESIGN

CULVERT BARREL DETAILS

FOR

TWIN REINFORCED CONCRETE BOX CULVERTS

HIGHWAY DIVISION
IOWA DEPARTMENT OF TRANSPORTATION

JULY , 1987

TWRCB 10-6-87

REVISED: 8/89; KEYWAY NOTE & DETAIL ADDED, LONGITUDINAL BARREL STEEL NOTE ADDED.
REVISED: 12/96 ; KEYWAY NOTATION CHANGED, DOWEL BAR LENGTH CHANGED.
TWB106.SDI

XXXXXXXXXXSYSTEMTIME XXXXXXXUSERNAME XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXDGNSPEC