TABLE OF FLUME CONCRETE (CU. YDS.)

CULV. SIZE S x H	3:1 SLOPE FLUME						4:1 SLOPE FLUME					
	L3 TOTAL		L2 PER FOOT		STUB CURTAIN	BASIN CURTAIN	L3 TOTAL		L2 PER FOOT		STUB CURTAIN	BASIN CURTAIN
	WALLS	FOOTING	WALLS	FOOTING			WALLS	FOOTING	WALLS	FOOTING		
3'x3'	3.1	4.0	0.112	0.221	0.161	0.115	4.2	5.5	0.110	0.216	0.160	0.113
4'x4'	4.3	5.0	0.156	0.257	0.323	0.249	5.8	6.8	0.153	0.251	0.318	0.244
5'x3'	3.1	5.3	0.112	0.293	0.226	0.161	4.2	7.2	0.110	0.286	0.224	0.159
5'x4'	4.3	5.6	0.156	0.293	0.377	0.290	5.8	7.8	0.153	0.286	0.371	0.285
5'x5'	5.6	6.0	0.200	0.293	0.442	0.355	7.6	8.3	0.196	0.286	0.436	0.350
5'x6'	7.0	6.4	0.244	0.293	0.647	0.539	9.6	8.9	0.239	0.286	0.636	0.528
6'x3'	3.1	5.9	0.112	0.329	0.258	0.184	4.2	8.1	0.110	0.321	0.255	0.181
6'x4'	4.3	6.3	0.156	0.329	0.431	0.332	5.8	8.7	0.153	0.321	0.424	0.325
6'x5'	5.6	6.8	0.200	0.329	0.505	0.406	7.6	9.4	0.196	0.321	0.498	0.399
6'x6'	7.0	7.2	0.244	0.329	0.739	0.616	9.6	10.0	0.239	0.321	0.727	0.604
6'x8'	11.3	8.2	0.369	0.337	0.849	0.723	15.7	11.5	0.361	0.329	0.837	0.711
8'x4'	4.3	7.7	0.156	0.401	0.538	0.415	5.8	10.6	0.153	0.391	0.530	0.407
8'x5'	5.6	8.2	0.200	0.401	0.631	0.507	7.6	11.4	0.196	0.391	0.623	0.499
8'x6'	7.0	8.7	0.244	0.401	0.924	0.770	9.6	12.1	0.239	0.391	0.909	0.755
8'x8'	11.3	10.0	0.369	0.409	1.057	0.900	15.7	13.9	0.361	0.399	1.042	0.885
8'x10'	15.5	11.0	0.466	0.409	1.293	1.136	21.5	15.4	0.456	0.399	1.277	1.120
10'x4'	4.3	10.6	0.156	0.551	0.568	0.419	5.8	14.6	0.153	0.537	0.560	0.412
10'x5'	5.6	11.3	0.200	0.551	0.679	0.531	7.6	15.7	0.196	0.537	0.671	0.523
10'x6'	7.0	12.0	0.244	0.551	1.011	0.826	9.6	16.7	0.239	0.537	0.995	0.810
10'x8'	11.3	13.6	0.369	0.560	1.166	0.978	15.7	19.0	0.361	0.546	1.150	0.962
10'x10'	15.5	15.0	0.466	0.560	1.448	1.260	21.5	21.1	0.456	0.546	1.432	1.244
10'x12'	24.2	17.0	0.677	0.579	1.777	1.584	33.8	24.0	0.662	0.564	1.760	1.567
12'x6'	7.0	14.9	0.244	0.682	1.122	0.906	9.6	20.6	0.239	0.665	1.105	0.889
12'x8'	11.3	16.8	0.369	0.691	1.300	1.081	15.7	23.5	0.361	0.674	1.282	1.064
12'x10'	15.5	18.6	0.466	0.691	1.627	1.409	21.5	26.1	0.456	0.674	1.610	1.392
12'x12'	24.2	21.0	0.677	0.711	2.001	1.778	33.8	29.5	0.662	0.693	1.984	1.760

NOTE: L3 CONCRETE QUANTITIES ASSUME A 1°00' ANGLE 'C'.

S = CULVERT SPAN
H = CULVERT HEIGHT

FLUME NOTES:

REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:
EDGE CLEARANCES: 2" EXCEPT
TOP OF FLOOR 2¼" TO NEAR TRANSV. REINF. BAR
BOTTOM OF FLOOR 3½" TO NEAR TRANSV. REINF. BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3½"
TRANSVERSE 2"

FLOOR OF FLUME IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

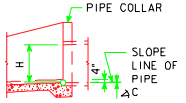
BAR SIZE NUMBER	4	5	6	7	8
MINIMUM SPLICE LENGTH	21"	26"	31"	43"	55"

THIS SPLICE, IF USED WILL BE AT THE CONTRACTOR'S EXPENSE.

BEVELED 2x4 KEYWAYS ARE TO BE USED FOR 9" WALLS AND 2x6 KEYWAYS ARE USED FOR 10" AND GREATER WALL THICKNESS.

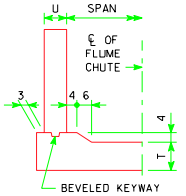
GENERAL CONSIDERATIONS:

THE FLUME STANDARDS, WHEN USED IN COMBINATION WITH A PROPERLY COMPLETED SITUATION PLAN AND THE APPROPRIATE STANDARD SHEET 1070 SERIES WILL PROVIDE STRUCTURAL PLANS AND THE FLUME "ESTIMATED PROJECT QUANTITIES".

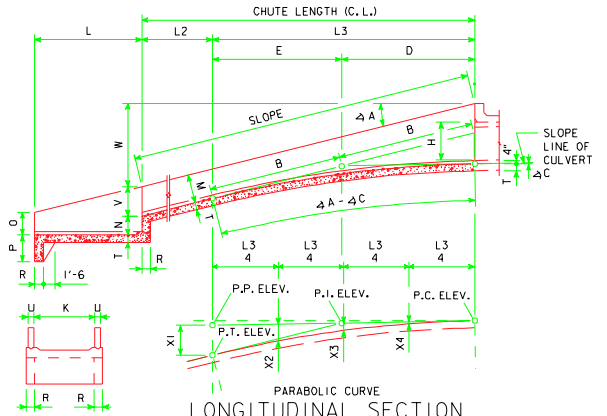


LONGITUDINAL SECTION WITH PIPE CULVERT

KEYWAY DETAIL



FLUME CHUTE DETAILS
(NORMAL TO FLOWLINE)



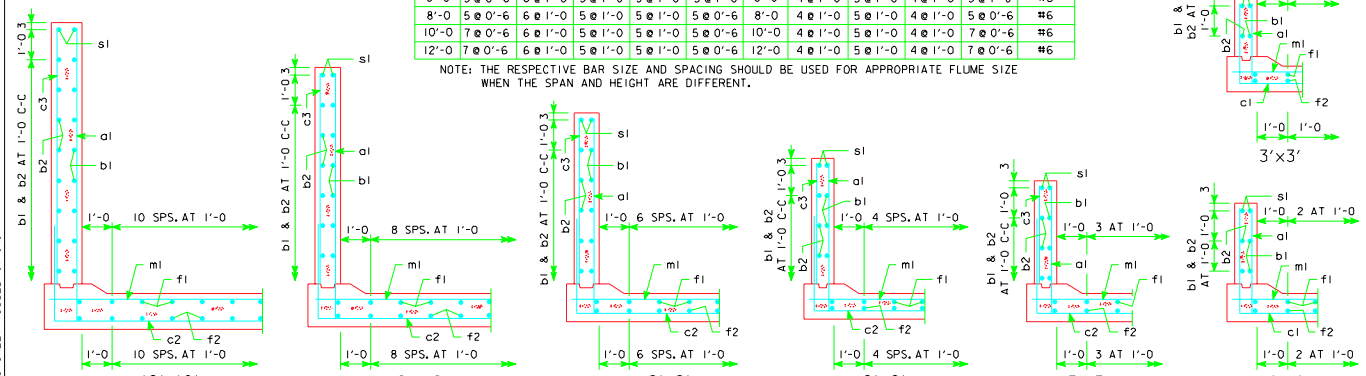
END VIEW
SEE BASIN STANDARDS FOR ADDITIONAL DETAILS NOT SHOWN.

LONGITUDINAL SECTION WITH BOX CULVERT

TABLE OF FLUME REINFORCING

S \ BAR	FLUME SPAN c1, c2	f1	f2	h1	m1	H \ BAR	FLUME HEIGHT a1	b1	b2	c3	s1
3'-0	5 @ 1'-0	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 1'-0	3'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	——	#5
4'-0	5 @ 1'-0	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 1'-0	4'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	——	#5
5'-0	5 @ 1'-0	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	5 @ 1'-0	#5
6'-0	5 @ 0'-6	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 1'-0	6'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	5 @ 1'-0	#6
8'-0	5 @ 0'-6	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 0'-6	8'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	5 @ 0'-6	#6
10'-0	7 @ 0'-6	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 0'-6	10'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	7 @ 0'-6	#6
12'-0	7 @ 0'-6	6 @ 1'-0	5 @ 1'-0	5 @ 1'-0	5 @ 0'-6	12'-0	4 @ 1'-0	5 @ 1'-0	4 @ 1'-0	7 @ 0'-6	#6

NOTE: THE RESPECTIVE BAR SIZE AND SPACING SHOULD BE USED FOR APPROPRIATE FLUME SIZE WHEN THE SPAN AND HEIGHT ARE DIFFERENT.



HALF SECTIONS OF SAME SIZE SPAN AND HEIGHT FLUMES (NORMAL TO FLOWLINE)

NOTE: MIX AND MATCH DETAILED FLOORS AND DETAILED WALLS FOR APPROPRIATE FLUME SIZE.

TABLE OF FLUME DIMENSIONS

S x H	K	M	V (3:1)	V (4:1)	L	N	O	P	R	T	U
3'x3'	9'-6	2'-3	2'-4½	2'-3⅞	13'-0	2'-0	1'-2	3'-0	9"	11"	9"
4'x4'	11'-0	3'-0	3'-2	3'-1⅛	14'-0	2'-3	1'-11	3'-3	1'-0	11"	9"
5'x3'	11'-6	2'-3	2'-4½	2'-3⅞	13'-0	2'-0	1'-2	3'-0	9"	11"	9"
5'x4'	12'-0	3'-0	3'-2	3'-1⅛	14'-0	2'-3	1'-11	3'-3	1'-0	11"	9"
5'x5'	12'-6	3'-9	3'-11½	3'-10⅜	15'-0	2'-6	2'-9	3'-6	1'-0	11"	9"
5'x6'	13'-0	4'-6	4'-8⅞	4'-7⅝	16'-0	2'-9	3'-6	4'-0	1'-3	11"	9"
6'x3'	12'-6	2'-3	2'-4½	2'-3⅞	13'-0	2'-0	1'-2	3'-0	9"	11"	9"
6'x4'	13'-0	3'-0	3'-2	3'-1⅛	14'-0	2'-3	1'-11	3'-3	1'-0	11"	9"
6'x5'	13'-6	3'-9	3'-11½	3'-10⅜	15'-0	2'-6	2'-9	3'-6	1'-0	11"	9"
6'x6'	14'-0	4'-6	4'-8⅞	4'-7⅝	16'-0	2'-9	3'-6	4'-0	1'-3	11"	9"
6'x8'	15'-0	6'-0	6'-3⅞	6'-2¼	18'-0	3'-0	4'-10	4'-3	1'-3	11"	10"
8'x4'	15'-0	3'-0	3'-2	3'-1⅛	14'-0	2'-3	1'-11	3'-3	1'-0	11"	9"
8'x5'	15'-6	3'-9	3'-11½	3'-10⅜	15'-0	2'-6	2'-9	3'-6	1'-0	11"	9"
8'x6'	16'-0	4'-6	4'-8⅞	4'-7⅝	16'-0	2'-9	3'-6	4'-0	1'-3	11"	9"
8'x8'	17'-0	6'-0	6'-3⅞	6'-2¼	18'-0	3'-0	4'-10	4'-3	1'-3	11"	10"
8'x10'	18'-0	7'-6	7'-10⅞	7'-8¾	20'-0	3'-6	6'-5	4'-6	1'-3	11"	10"
10'x4'	17'-0	3'-0	3'-2	3'-1⅛	14'-0	2'-3	1'-11	3'-3	1'-0	1'-1	9"
10'x5'	17'-6	3'-9	3'-11½	3'-10⅜	15'-0	2'-6	2'-9	3'-6	1'-0	1'-1	9"
10'x6'	18'-0	4'-6	4'-8⅞	4'-7⅝	16'-0	2'-9	3'-6	4'-0	1'-3	1'-1	9"
10'x8'	19'-0	6'-0	6'-3⅞	6'-2¼	18'-0	3'-0	4'-10	4'-3	1'-3	1'-1	10"
10'x10'	20'-0	7'-6	7'-10⅞	7'-8¾	20'-0	3'-6	6'-5	4'-6	1'-3	1'-1	10"
10'x12'	21'-0	9'-0	9'-5⅞	9'-3⅜	22'-0	4'-0	8'-0	4'-9	1'-3	1'-1	1'-0
12'x6'	20'-0	4'-6	4'-8⅞	4'-7⅝	16'-0	2'-9	3'-6	4'-0	1'-3	1'-2	9"
12'x8'	21'-0	6'-0	6'-3⅞	6'-2¼	18'-0	3'-0	4'-10	4'-3	1'-3	1'-2	10"
12'x10'	22'-0	7'-6	7'-10⅞	7'-8¾	20'-0	3'-6	6'-5	4'-6	1'-3	1'-2	10"
12'x12'	23'-0	9'-0	9'-5⅞	9'-3⅜	22'-0	4'-0	8'-0	4'-9	1'-3	1'-2	1'-0

LATEST REVISION DATE :

APPROVED BY :

STANDARD DESIGN

REINFORCED CONCRETE FLUMES

FOR
REINFORCED CONCRETE BOX CULVERTS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
JANUARY, 2004

RCF-01-04

RCF-01-04 - THIS SHEET ISSUED 01-04.

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