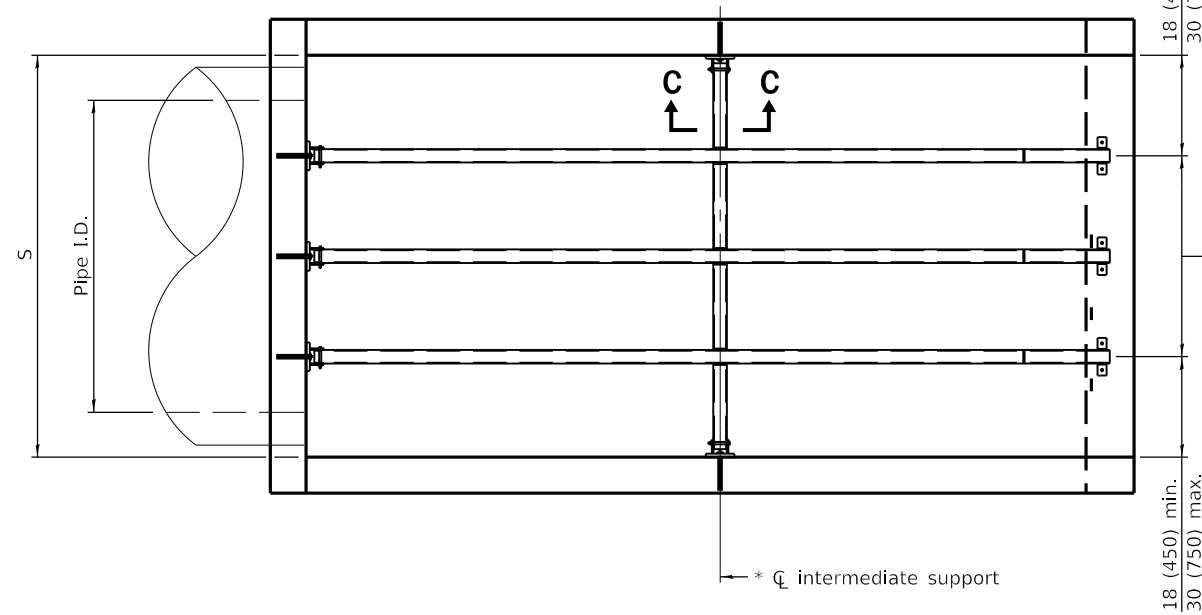


* Provide intermediate support for grate pipe lengths > 20'-0" (6.00 m).

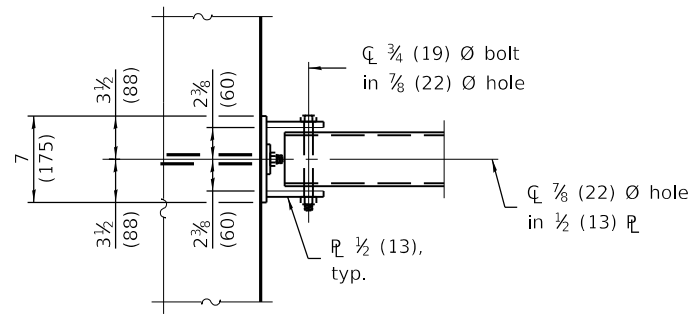
LONGITUDINAL SECTION



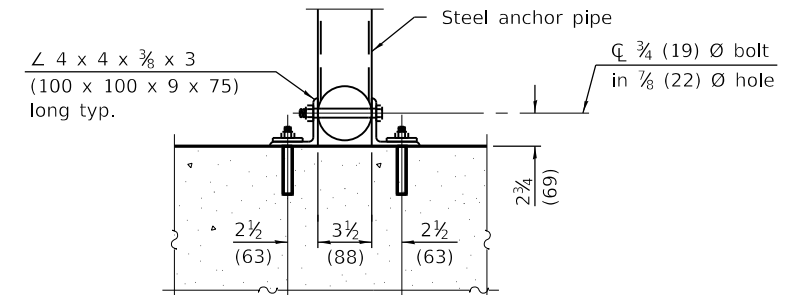
PLAN VIEW

Steel pipes at 18 (450) cts. min. 30 (750) cts. max.

6 1/2 (165) for 1:3 slope **
7 (178) for 1:4 slope **
7 3/8 for 1:6 slope **

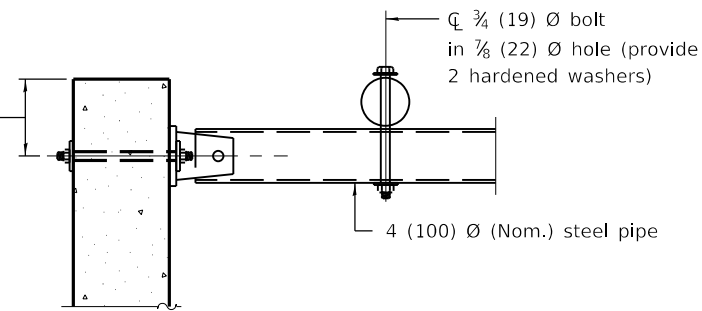


VIEW A-A



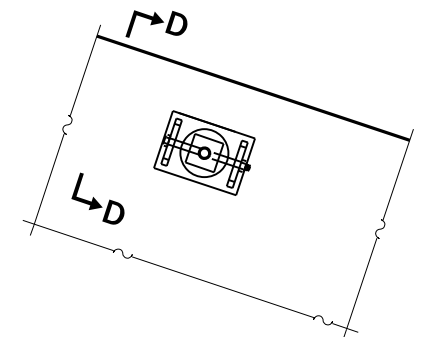
C 3/4 (19) Ø hole in L for 5/8 (16) Ø anchor rods w/ 2 1/2 x 2 1/2 x 3/16 (63 x 63 x 8) R washer

SECTION B-B



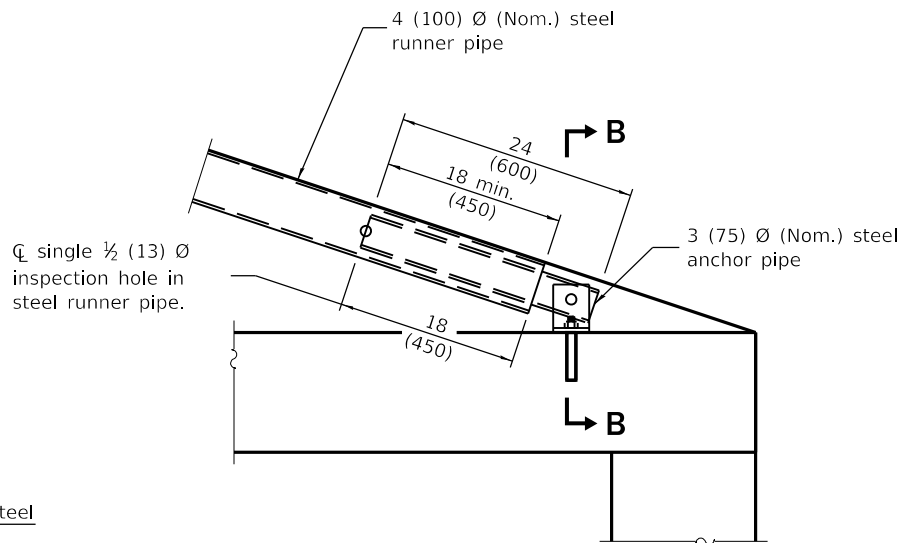
SECTION D-D

** Measured perpendicular to top of culvert wall. In addition, formed hole shall be located a minimum of 6 (150) measured horizontally from any vertical joints necessary for construction of the culvert end section.

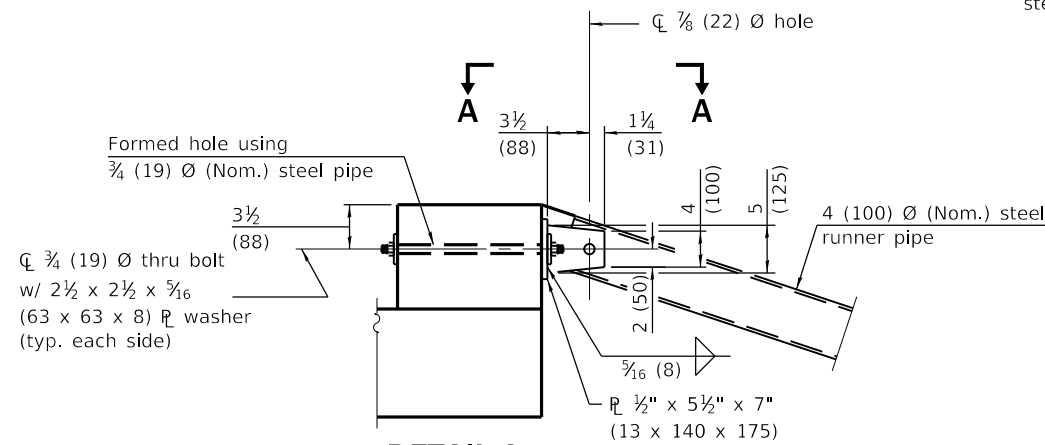


VIEW C-C

(See Detail A for dimensions and details not shown.)



DETAIL B



DETAIL A

GENERAL NOTES

This standard shall only be used on concrete end sections not skewed more than ± 15 degrees with roadway.

The minimum distance from the center of a hole to the free edge of a structural shape or plate shall be 1 1/2 (38) unless noted otherwise.

All dimensions are in inches (millimeters) unless otherwise shown.

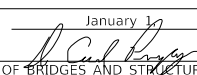
DATE	REVISIONS
1-1-18	Corrected value in elliptical pipe table. Renamed standard.
4-1-16	Corrected typo.

TRAVERSABLE PIPE GRATE FOR CONCRETE END SECTIONS

(Sheet 1 of 2)

STANDARD 542311-07

Illinois Department of Transportation

APPROVED January 1, 2018

 ENGINEER OF BRIDGES AND STRUCTURES

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ISSUED 1-1-97

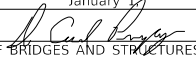
PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

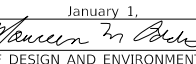
Pipe I.D.	Slope of End Section								
	1:3			1:4			1:6		
	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe
27 (675)	1 @ 9'-8" 1 @ (2.95 m)	N/A	9'-8" (2.95 m)	1 @ 12'-11" 1 @ (3.94 m)	N/A	12'-11" (3.94 m)	1 @ 19'-7" 1 @ (5.97 m)	N/A	19'-7" (5.97 m)
30 (750)	1 @ 11'-4" 1 @ (3.43 m)	N/A	11'-4" (3.43 m)	1 @ 14'-10" 1 @ (4.52 m)	N/A	14'-10" (4.52 m)	1 @ 21'-10" 1 @ (6.65 m)	1 @ 3'-6" 1 @ 1.07 m)	25'-4" (7.72 m)
33 (825)	1 @ 12'-1" 1 @ (3.68 m)	N/A	12'-1" (3.68 m)	1 @ 15'-10" 1 @ (4.83 m)	N/A	15'-10" (4.83 m)	1 @ 23'-5" 1 @ (7.14 m)	1 @ 3'-7" 1 @ (1.09 m)	27'-0" (8.23 m)
36 (900)	1 @ 12'-10" 1 @ (3.91 m)	N/A	12'-10" (3.91 m)	1 @ 16'-10" 1 @ (5.13 m)	N/A	16'-10" (5.13 m)	1 @ 24'-11" 1 @ (7.59 m)	2 @ 3'-11" 2 @ (1.19 m)	32'-9" (9.97 m)
42 (1050)	2 @ 14'-9" 2 @ (4.50 m)	N/A	29'-6" (9.00 m)	2 @ 19'-3" 2 @ (5.87 m)	N/A	38'-6" (11.74 m)	2 @ 28'-6" 2 @ (8.69 m)	2 @ 4'-7" 2 @ (1.40 m)	66'-2" (20.18 m)
48 (1200)	2 @ 16'-4" 2 @ (4.98 m)	N/A	32'-8" (9.96 m)	2 @ 21'-4" 2 @ (6.50 m)	1 @ 5'-1" 1 @ (1.55 m)	47'-9" (14.55 m)	2 @ 31'-6" 2 @ (9.60 m)	2 @ 5'-1" 2 @ (1.55 m)	73'-2" (22.30 m)
54 (1350)	2 @ 18'-2" 2 @ (5.54 m)	N/A	36'-4" (11.08 m)	2 @ 23'-9" 2 @ (7.24 m)	2 @ 5'-9" 2 @ (1.75 m)	59'-0" (16.23 m)	2 @ 35'-1" 2 @ (10.69 m)	4 @ 5'-9" 4 @ (1.75 m)	93'-2" (28.38 m)
60 (1500)	2 @ 19'-9" 2 @ (6.02 m)	N/A	39'-6" (12.04 m)	2 @ 25'-10" 2 @ (7.87 m)	3 @ 6'-3" 3 @ (1.91 m)	70'-5" (21.47 m)	2 @ 38'-1" 2 @ (11.61 m)	4 @ 6'-3" 4 @ (1.91 m)	101'-2" (30.86 m)
66 (1650)	2 @ 21'-7" 2 @ (6.58 m)	2 @ 6'-11" 2 @ (2.11 m)	57'-0" (17.38 m)	2 @ 28'-2" 2 @ (8.59 m)	3 @ 6'-11" 3 @ (2.11 m)	77'-1" (23.51 m)	2 @ 41'-11" 2 @ (12.78 m)	5 @ 6'-11" 5 @ (2.11 m)	127'-5" (36.11 m)
72 (1800)	3 @ 23'-2" 3 @ (7.06 m)	2 @ 7'-5" 2 @ (2.26 m)	84'-4" (25.70 m)	3 @ 30'-3" 3 @ (9.22 m)	3 @ 7'-5" 3 @ (2.26 m)	113'-0" (34.44 m)	3 @ 44'-8" 3 @ (13.61 m)	5 @ 7'-5" 5 @ (2.26 m)	171'-1" (52.13 m)
78 (1950)	3 @ 25'-0" 3 @ (7.62 m)	3 @ 8'-1" 3 @ (2.46 m)	99'-3" (30.24 m)	3 @ 32'-8" 3 @ (9.96 m)	4 @ 8'-1" 4 @ (2.46 m)	130'-4" (39.72 m)	3 @ 48'-3" 3 @ (14.71 m)	6 @ 8'-1" 6 @ (2.46 m)	193'-3" (58.89 m)
84 (2100)	3 @ 26'-7" 3 @ (8.10 m)	3 @ 8'-7" 3 @ (2.62 m)	105'-6" (32.16 m)	3 @ 34'-9" 3 @ (10.59 m)	4 @ 8'-7" 4 @ (2.62 m)	138'-7" (42.25 m)	3 @ 51'-3" 3 @ (15.62 m)	6 @ 8'-7" 6 @ (2.62 m)	206'-3" (62.58 m)

PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

Pipe I.D. (Equiv. Round)	Slope of End Section								
	1:3			1:4			1:6		
	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe
21 (525)	1 @ 8'-2" 1 @ (2.49 m)	N/A	8'-2" (2.49 m)	1 @ 11'-2" 1 @ (3.40 m)	N/A	11'-2" (3.40 m)	1 @ 17'-5" 1 @ (5.31 m)	N/A	17'-5" (5.31 m)
24 (600)	1 @ 8'-2" 1 @ (2.49 m)	N/A	8'-2" (2.49 m)	1 @ 11'-2" 1 @ (3.40 m)	N/A	11'-2" (3.40 m)	1 @ 17'-5" 1 @ (5.31 m)	N/A	17'-5" (5.31 m)
27 (675)	1 @ 8'-11" 1 @ (2.72 m)	N/A	8'-11" (2.72 m)	1 @ 12'-2" 1 @ (3.71 m)	N/A	12'-2" (3.71 m)	1 @ 18'-11" 1 @ (5.77 m)	N/A	18'-11" (5.77 m)
30 (750)	1 @ 9'-5" 1 @ (2.87 m)	N/A	9'-5" (2.87 m)	1 @ 12'-11" 1 @ (3.94 m)	N/A	12'-11" (3.94 m)	1 @ 19'-11" 1 @ (6.07 m)	N/A	19'-11" (6.07 m)
36 (900)	2 @ 11'-0" 2 @ (3.35 m)	N/A	22'-0" (6.70 m)	2 @ 14'-11" 2 @ (4.55 m)	N/A	29'-10" (9.10 m)	2 @ 22'-11" 2 @ (6.99 m)	1 @ 4'-7" 1 @ (1.40 m)	50'-5" (15.38 m)
42 (1050)	2 @ 12'-4" 2 @ (3.76 m)	N/A	24'-8" (7.52 m)	2 @ 16'-8" 2 @ (5.08 m)	N/A	33'-4" (10.16 m)	2 @ 25'-6" 2 @ (7.77 m)	2 @ 5'-5" 2 @ (1.65 m)	61'-10" (18.84 m)
48 (1200)	2 @ 13'-8" 2 @ (4.17 m)	N/A	27'-4" (8.34 m)	2 @ 18'-5" 2 @ (5.61 m)	N/A	36'-10" (11.22 m)	2 @ 28'-0" 2 @ (8.53 m)	3 @ 6'-1" 3 @ (1.85 m)	74'-3" (22.61 m)
54 (1350)	2 @ 15'-0" 2 @ (4.75 m)	N/A	30'-0" (9.50 m)	2 @ 20'-1" 2 @ (6.12 m)	2 @ 6'-9" 2 @ (2.06 m)	53'-8" (16.36 m)	2 @ 30'-7" 2 @ (9.32 m)	3 @ 6'-9" 3 @ (2.06 m)	81'-5" (24.82 m)
60 (1500)	3 @ 16'-7" 3 @ (5.05 m)	N/A	49'-9" (15.15 m)	3 @ 22'-2" 3 @ (6.76 m)	2 @ 7'-7" 2 @ (2.31 m)	81'-8" (24.90 m)	3 @ 33'-7" 3 @ (10.24 m)	4 @ 7'-7" 4 @ (2.31 m)	131'-1" (39.96 m)
66 (1650)	3 @ 17'-11" 3 @ (5.46 m)	N/A	53'-9" (16.38 m)	3 @ 23'-11" 3 @ (7.29 m)	2 @ 8'-3" 2 @ (2.51 m)	88'-3" (26.89 m)	3 @ 36'-2" 3 @ (11.02 m)	4 @ 8'-3" 4 @ (2.51 m)	141'-6" (43.10 m)
72 (1800)	3 @ 19'-6" 3 @ (5.94 m)	N/A	58'-6" (17.82 m)	3 @ 25'-11" 3 @ (7.90 m)	3 @ 8'-11" 3 @ (2.72 m)	104'-6" (31.86 m)	3 @ 39'-2" 3 @ (11.94 m)	4 @ 8'-11" 4 @ (2.72 m)	153'-2" (46.70 m)

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**TRAVERSABLE PIPE GRATE
FOR CONCRETE END
SECTIONS** (Sheet 2 of 2)

STANDARD 542311-07