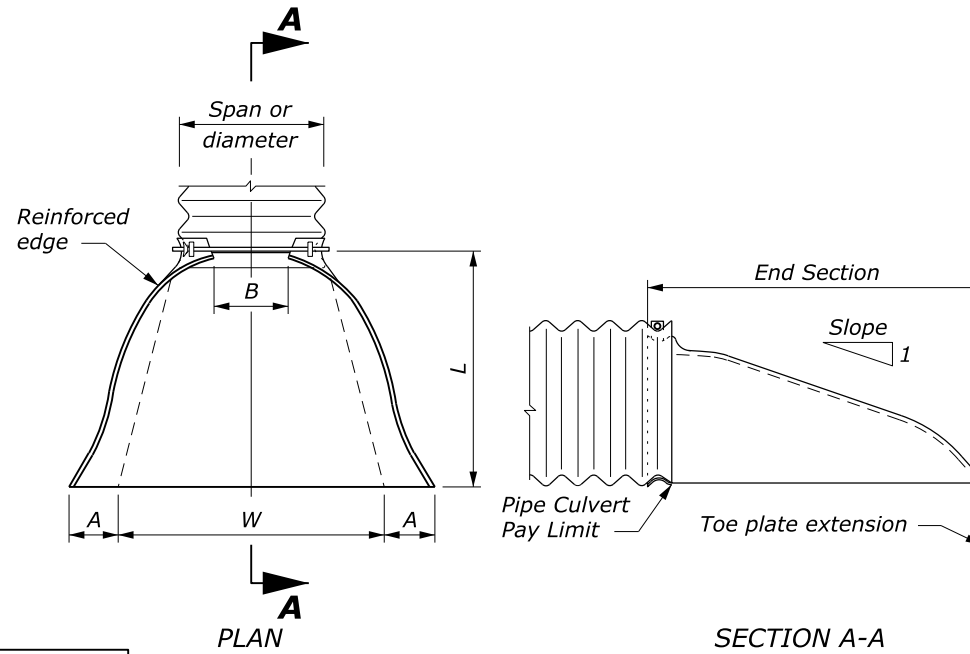


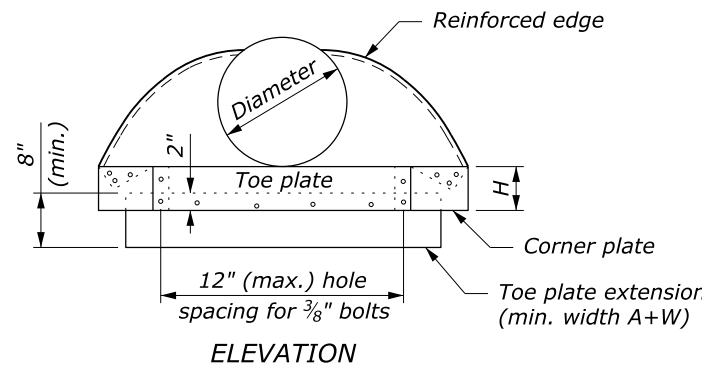
END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER INCHES	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx.
	STEEL		ALUMINUM		A (min)	B (max)	H (min)	L (±2")	W (max)	
	INCHES	GAGE	INCHES	GAGE						
12	0.064	16	0.060	16	5	7	6	21	44	2¼
15	0.064	16	0.060	16	6	8	6	26	52	2¼
18	0.064	16	0.060	16	7	10	6	31	58	2⅛
21	0.064	16	0.060	16	8	12	6	36	66	2⅛
24	0.064	16	0.060	16	9	13	6	41	72	2⅛
30	0.079	14	0.075	14	11	16	8	51	88	2⅛
36	0.079	14	0.075	14	13	19	9	60	105	2
42	0.109	12	0.105	12	15	25	10	69	122	2⅛
48	0.109	12	0.105	12	17	29	12	78	131	2
54	0.109	12	0.105	12	17	33	12	84	143	2
60	0.109	12	0.105	12	17	36	12	87	157	1⅞
66	0.109	12	0.105	12	17	39	12	87	162	1⅞
72	0.109	12	0.105	12	17	44	12	87	169	1½
78	0.109	12	0.105	12	17	48	12	87	178	1⅜
84	0.109	12	0.105	12	17	52	12	87	184	1⅓
90	0.109	12	0.105	12	17	58	12	87	188	1¼
96	0.109	12	0.105	12	17	58	12	87	197	1⅛

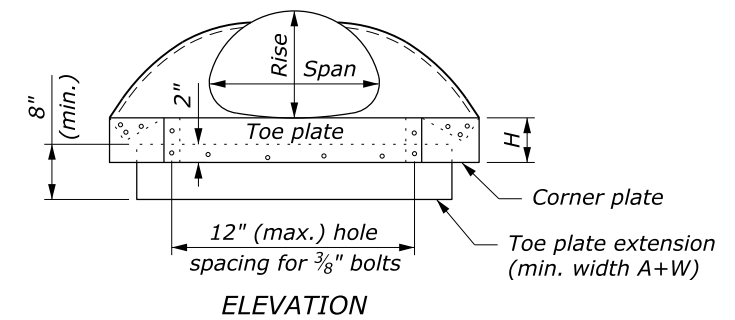


ROUND OR PIPE ARCH CULVERT

PIPE SIZE SPAN × RISE INCHES	EQUI-VALENT DIAM. (INCHES)	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx.
		STEEL		ALUMINUM		A (min)	B (max)	H (min)	L (±2")	W (max)	
		INCHES	GAGE	INCHES	GAGE						
17 × 13	15	0.064	16	0.060	16	7	9	6	19	30	2½
21 × 15	18	0.064	16	0.060	16	7	10	6	23	36	2½
24 × 18	21	0.064	16	0.060	16	8	12	6	28	42	2½
28 × 20	24	0.064	16	0.060	16	9	14	6	32	48	2½
35 × 24	30	0.079	14	0.075	14	10	16	8	39	60	2½
42 × 29	36	0.079	14	0.075	14	12	18	9	46	75	2½
49 × 33	42	0.109	12	0.105	12	13	21	12	53	85	2½
57 × 38	48	0.109	12	0.105	12	18	26	12	63	90	2½
60 × 46	54	0.109	12	0.105	12	18	34	12	70	102	2
64 × 43	54	0.109	12	0.105	12	18	30	12	70	102	2
66 × 51	60	0.109	12	0.105	12	18	33	12	77	116	1½
71 × 47	60	0.109	12	0.105	12	18	33	12	77	114	1½
73 × 55	66	0.109	12	0.105	12	18	36	12	77	126	1½
77 × 52	66	0.109	12	0.105	12	18	36	12	77	126	1½
81 × 59	72	0.109	12	0.105	12	18	39	12	77	138	1½
83 × 57	72	0.109	12	0.105	12	18	39	12	77	138	1½
87 × 63	78	0.109	12	0.105	12	20	38	12	77	148	1½
95 × 67	84	0.109	12	0.105	12	20	34	12	87	162	1½
103 × 71	90	0.109	12	0.105	12	20	38	12	87	174	1½
112 × 75	96	0.109	12	0.105	12	20	40	12	87	174	1½



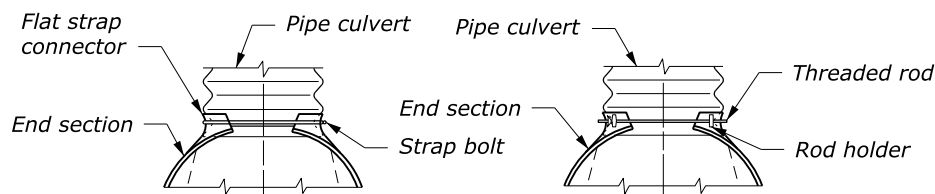
ROUND PIPE CULVERT



PIPE ARCH CULVERT

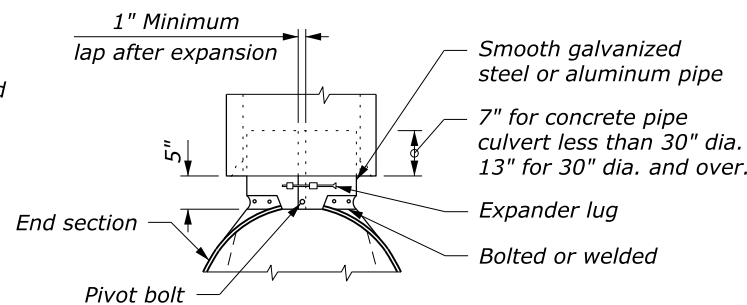
NOTE:

- Variations in design and dimensions are permitted to allow for manufacturer's standards.
- Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
- Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.
- Fabricate multiple piece bodies with lap seams tightly joined by 3/8" rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and equivalent pipe arch from 0.138 inch steel or 0.135 inch aluminum.
- On end section center panels for 66" and larger equivalent pipe arch provide 2½" × 2½" × ¼" angle reinforcement bolted or riveted under the center panel seam.
- Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 66" and larger equivalent pipe arch with 2½" × 2½" × ¼" stiffener angles attached with bolts or rivets.
- Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.
- Warp embankment slopes to match the slope of the flared end sections.

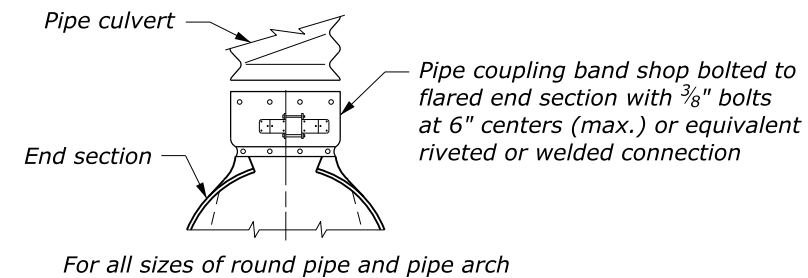


For 12" thru 24" round pipe and 17" × 13" thru 28" × 20" pipe arch For 30" thru 60" round pipe and 35" × 24" thru 66" × 51" pipe arch

**DESIGN A
CONNECTION TO ANNULAR
CORRUGATED METAL PIPE**



**DESIGN B
CONNECTION TO CONCRETE
PIPE INLET END**



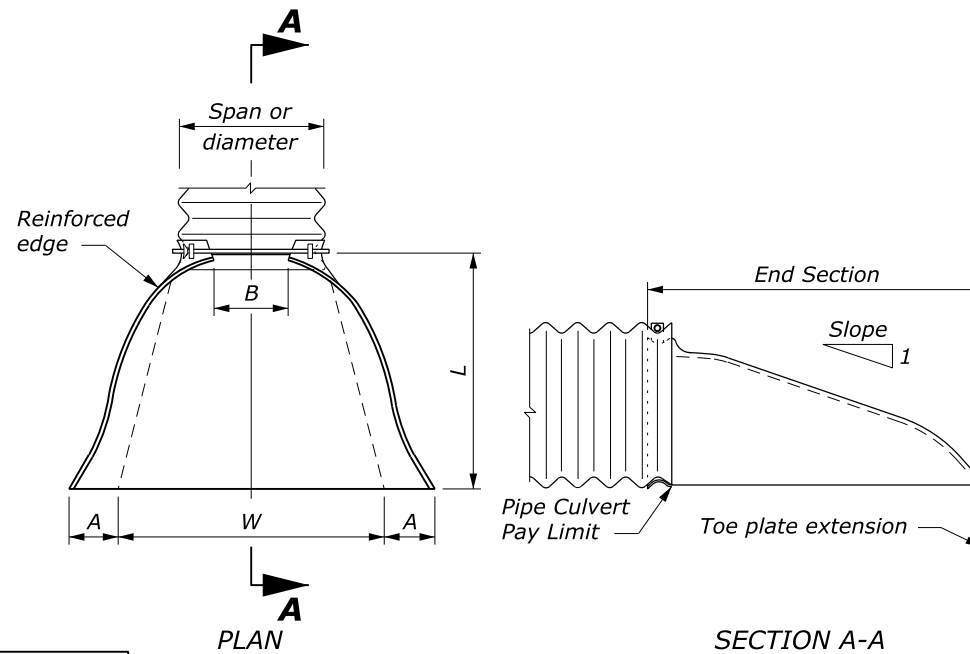
**DESIGN C
CONNECTION TO
METAL PIPE OR
OUTLET END OF
CONCRETE PIPE**

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	FLH STANDARD 602-4
METAL END SECTIONS	SPECIFICATION FP-24, FP-14 APPROVED FOR USE 1/2024

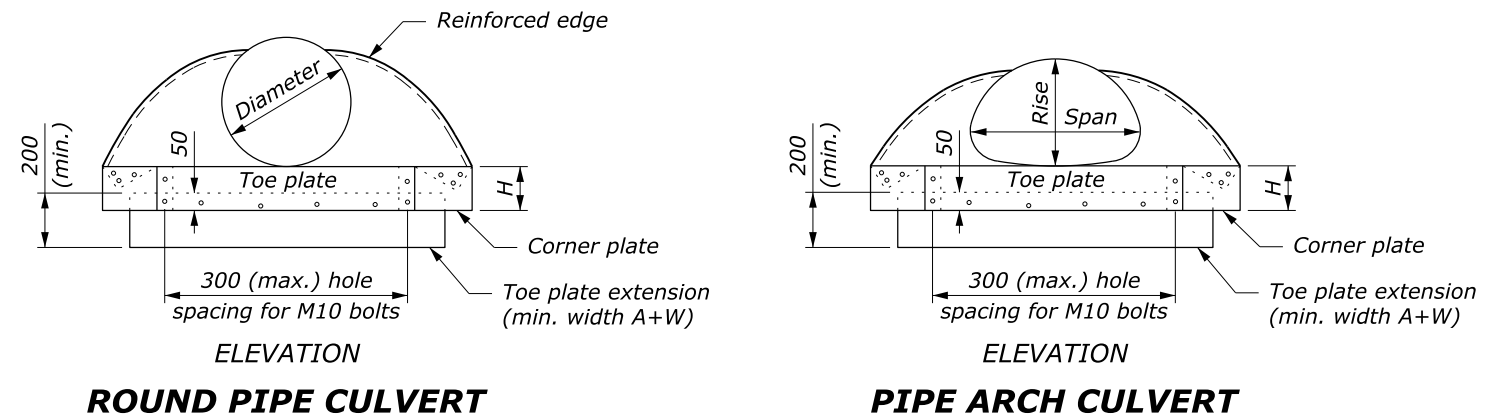
END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER	METAL THICKNESS		DIMENSIONS					SLOPE Approx.
	STEEL	ALUMINUM	A (min)	B (max)	H (min)	L (±50)	W (max)	
300	1.63	1.52	125	175	150	525	1100	2¼
375	1.63	1.52	150	200	150	650	1300	2¼
450	1.63	1.52	175	250	150	775	1450	2⅝
525	1.63	1.52	200	300	150	900	1650	2⅝
600	1.63	1.52	225	325	150	1025	1800	2⅝
750	2.01	1.91	275	400	200	1275	2200	2⅝
900	2.01	1.91	325	475	225	1500	2625	2
1050	2.77	2.67	375	625	250	1725	3050	2⅝
1200	2.77	2.67	425	725	300	1950	3275	2
1350	2.77	2.67	425	825	300	2100	3575	2
1500	2.77	2.67	425	900	300	2175	3925	1⅞
1650	2.77	2.67	425	975	300	2175	4050	1⅝
1800	2.77	2.67	425	1100	300	2175	4225	1½
1950	2.77	2.67	425	1200	300	2175	4450	1⅓
2100	2.77	2.67	425	1300	300	2175	4600	1⅓
2250	2.77	2.67	425	1450	300	2175	4700	1¼
2400	2.77	2.67	425	1450	300	2175	4925	1⅞



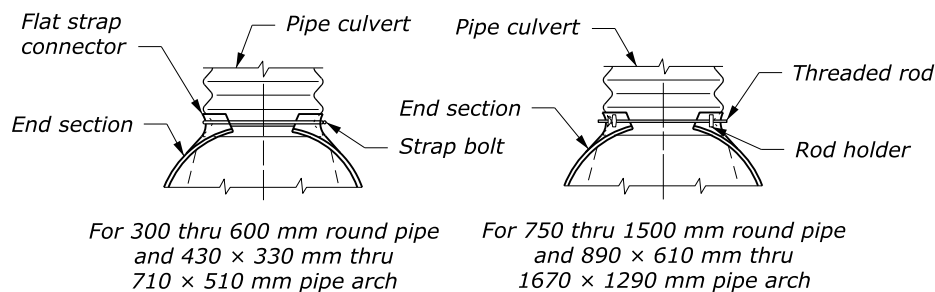
ROUND OR PIPE ARCH CULVERT

PIPE SIZE SPAN × RISE	EQUI-VALENT DIAM.	METAL THICKNESS		DIMENSIONS					SLOPE Approx.
		STEEL	ALUMINUM	A (min)	B (max)	H (min)	L (±50)	W (max)	
430 × 330	375	1.63	1.52	175	225	150	475	750	2½
530 × 380	450	1.63	1.52	175	250	150	575	900	2½
610 × 460	525	1.63	1.52	200	300	150	700	1050	2½
710 × 510	600	1.63	1.52	225	350	150	800	1200	2½
890 × 610	750	2.01	1.91	250	400	200	975	1500	2½
1070 × 740	900	2.01	1.91	300	450	225	1150	1875	2½
1240 × 840	1050	2.77	2.67	325	525	300	1325	2125	2½
1450 × 970	1200	2.77	2.67	450	650	300	1575	2250	2½
1520 × 1170	1350	2.77	2.67	450	850	300	1750	2550	2
1630 × 1090	1350	2.77	2.67	450	750	300	1750	2550	2
1680 × 1300	1500	2.77	2.67	450	825	300	1925	2900	1½
1800 × 1190	1500	2.77	2.67	450	825	300	1925	2850	1½
1850 × 1400	1650	2.77	2.67	450	900	300	1925	3150	1½
1960 × 1320	1650	2.77	2.67	450	900	300	1925	3150	1½
2060 × 1500	1800	2.77	2.67	450	975	300	1925	3450	1½
2110 × 1450	1800	2.77	2.67	450	975	300	1925	3450	1½
2210 × 1600	1950	2.77	2.67	500	950	300	1925	3700	1½
2410 × 1700	2100	2.77	2.67	500	850	300	2175	4050	1½
2620 × 1800	2250	2.77	2.67	500	950	300	2175	4350	1½
2840 × 1910	2400	2.77	2.67	500	1000	300	2175	4350	1½

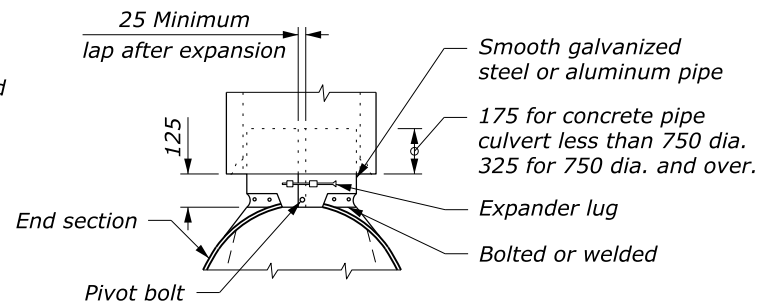


ROUND PIPE CULVERT

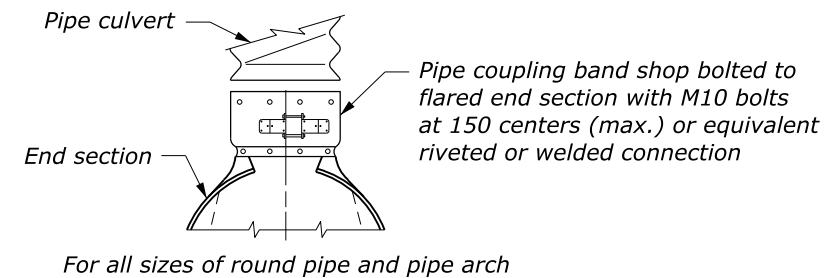
PIPE ARCH CULVERT



DESIGN A CONNECTION TO ANNULAR CORRUGATED METAL PIPE



DESIGN B CONNECTION TO CONCRETE PIPE INLET END



DESIGN C CONNECTION TO METAL PIPE OR OUTLET END OF CONCRETE PIPE

NO SCALE

NOTE:

- Variations in design and dimensions are permitted to allow for manufacturer's standards.
- Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
- Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.
- Fabricate multiple piece bodies with lap seams tightly joined by M10 rivets or bolts. Fabricate end section center panels for 1500 mm and larger diameter pipe and equivalent pipe arch from 3.51 mm steel or 3.43 mm aluminum.
- On end section center panels for 1650 mm and larger equivalent pipe arch provide 64 × 64 × 6.4 angle reinforcement bolted or riveted under the center panel seam.
- Supplement the reinforced edges of end sections for 1500 mm and larger diameter pipe and 1650 mm and larger equivalent pipe arch with 51 × 51 × 6.4 stiffener angles attached with bolts or rivets.
- Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.
- Warp embankment slopes to match the slope of the flared end sections.

This drawing contains **Metric** units of measure. Dimensions without units are millimeters.

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	FLH STANDARD M602-4
METAL END SECTIONS	
SPECIFICATION FP-24, FP-14	
APPROVED FOR USE 1/2024	