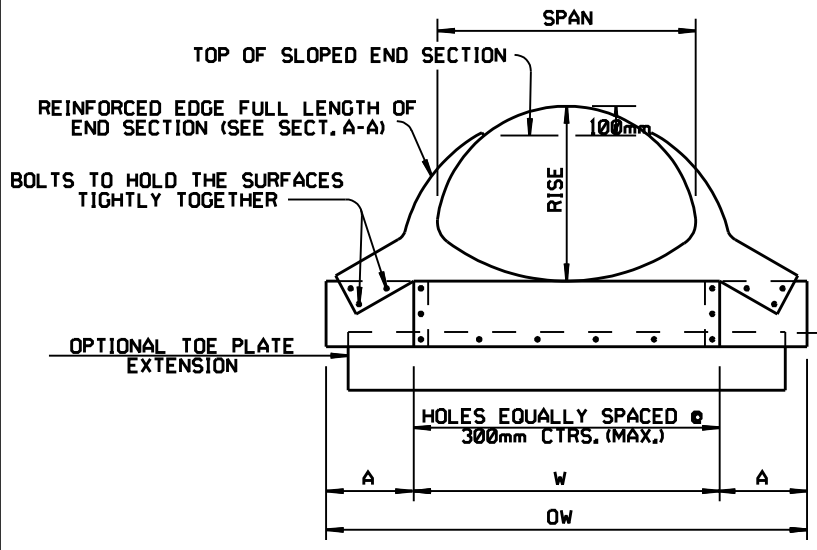
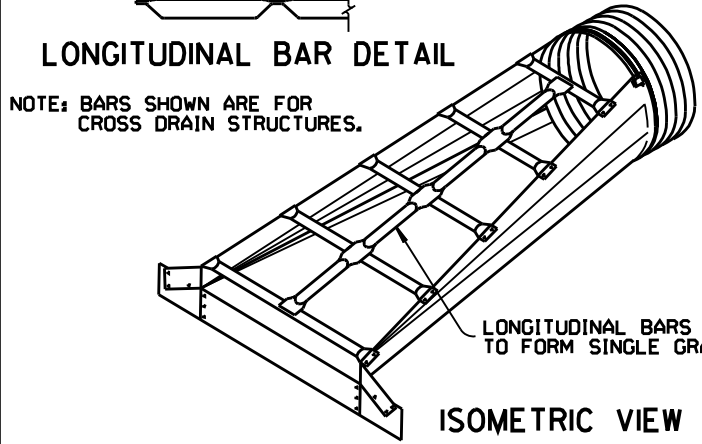


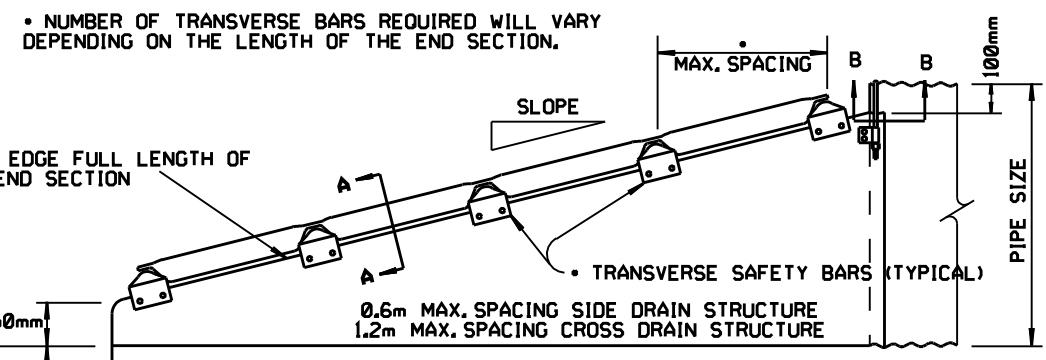
FRONT VIEW CIRCULAR PIPE



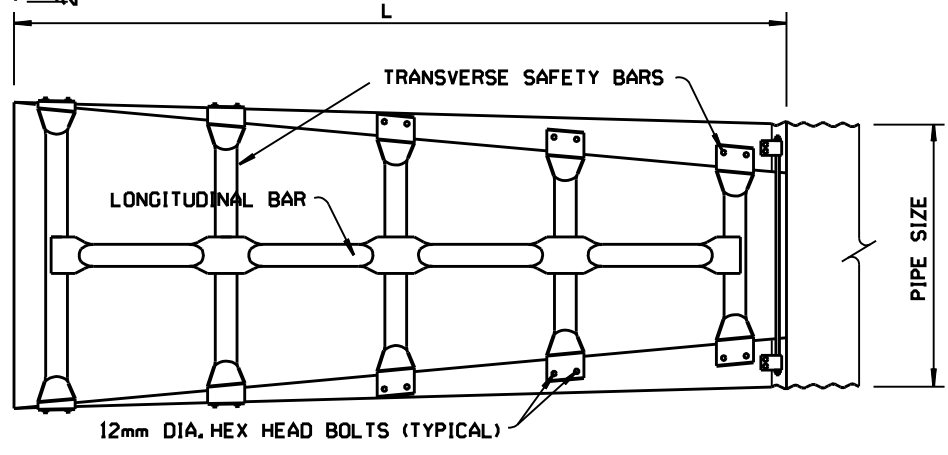
FRONT VIEW ARCH PIPE



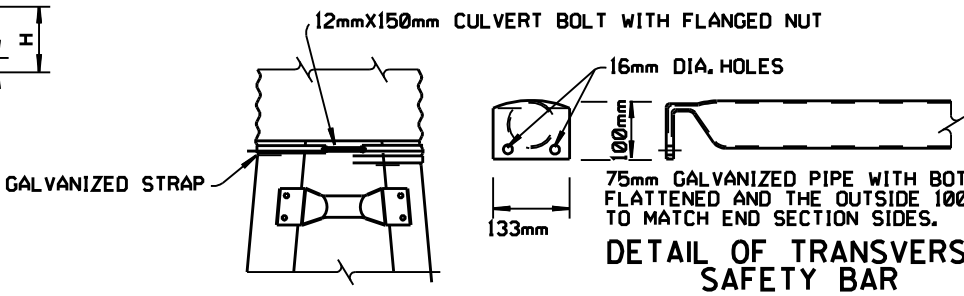
ISOMETRIC VIEW



SIDE ELEVATION CIRCULAR OR ARCH SECTION



TOP VIEW CIRCULAR OR ARCH SECTION

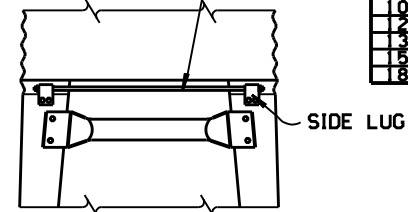


DETAIL OF TRANSVERSE SAFETY BAR

TYPE #1 CONNECTOR DETAIL

FOR 375mm THRU 600mm PIPE

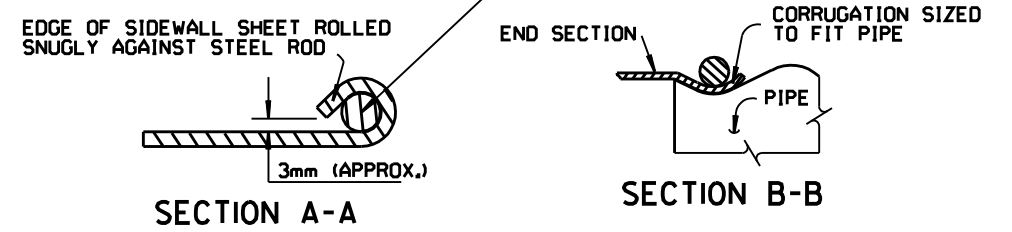
12mm THREADED ROD WITH FLANGED NUTS, FORM OVER TOP OF END SECTION, SIDE LUGS TO BE BOLTED TO END SECTION.



TYPE #2 CONNECTOR DETAIL

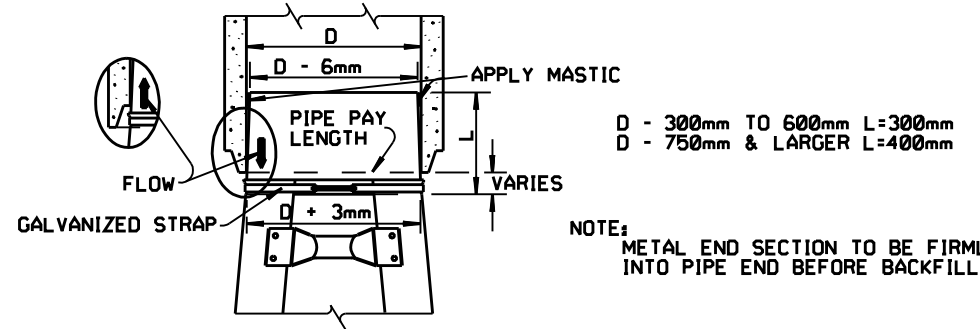
FOR 750mm AND LARGER ROUND PIPES & 525X375mm THRU 1600X1075mm ARCH PIPES

MINIMUM 11mm DIA. GALVANIZED STEEL ROD OR NO. 13 GALVANIZED REINFORCING BAR



SECTION A-A

SECTION B-B



STEEL END SECTION FOR CONCRETE PIPE (Alternate for Concrete End Section)

GENERAL NOTES

END SECTIONS SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SUBSECTION 606.02 (CX) OF THE STANDARD SPECIFICATIONS. WHEN SPECIFIED OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED AND BOLTED TO THE END SECTION APRON LIP WITH 8mm DIAMETER GALVANIZED BOLTS. STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 150mm BY 200mm HIGH. ATTACHMENT TO CIRCULAR PIPES 375mm THROUGH 600mm DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 RODS AND LUGS. SAFETY BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ALL WORK AND MATERIALS REQUIRED FOR CONSTRUCTION AND INSTALLATION OF SAFETY END SECTION SHALL BE INCLUDED IN THE PRICE BID EACH FOR SAFETY END SECTIONS FOR PIPE CULVERTS. LONGITUDINAL AND TRANSVERSE BARS WILL BE REQUIRED FOR CROSS DRAIN STRUCTURES WHEN SPAN IS GREATER THAN 750mm. NO SAFETY BARS WILL BE REQUIRED FOR 750mm SPAN OR LESS WHEN USED ON CROSS DRAIN STRUCTURES. TRANSVERSE BARS WILL BE REQUIRED FOR ALL SIZES OF SIDE DRAIN STRUCTURES. CLASS 1 SAFETY END SECTIONS SHALL BE END SECTIONS WITH A 1:4 SLOPE. CLASS 2 SAFETY END SECTIONS SHALL BE END SECTIONS WITH A 1:6 SLOPE.

EQUIV. DIA.	NOM. W.W. AREA sq m	PIPE ARCH				MIN. GAUGE END SECTION	DIMENSIONS IN mm				SLOPE	L (mm)	SLOPE	L (mm)	PIPE DIA.	MIN. GAUGE ENDS	DIMENSIONS IN mm				SLOPE	L (mm)	SLOPE	L (mm)		
		SPAN (mm)	RISE (mm)	A	H		W	OW	A	H							W	OW	A	H					W	OW
450	1.44	525	375	200	150	675	1075	1.4	500	1.6	750	375	6	200	150	525	925	1.4	500	1.6	750					
525	1.98	600	450	200	150	750	1150	1.4	800	1.6	1200	450	6	200	150	600	1000	1.4	800	1.6	1200					
600	2.26	700	500	200	150	850	1250	1.4	1000	1.6	1500	525	6	200	150	700	1075	1.4	1100	1.6	1350					
750	4.05	875	600	300	225	1050	1550	1.4	1400	1.6	2100	600	6	200	150	800	1150	1.4	1400	1.6	1700					
900	5.85	1050	700	300	225	1250	1850	1.4	1700	1.6	2400	700	6	200	150	900	1250	1.4	1700	1.6	2100					
1050	8.01	1225	800	400	300	1400	2100	1.4	2000	1.6	2700	800	6	200	150	1050	1350	1.4	2000	1.6	2400					
1200	10.47	1400	900	400	300	1600	2400	1.4	2300	1.6	3000	900	6	200	150	1200	1500	1.4	2300	1.6	2700					
1350	12.73	1575	1000	400	300	1700	2500	1.4	2500	1.6	3200	1000	6	200	150	1350	1650	1.4	2500	1.6	2900					
1500	15.28	1750	1100	400	300	1800	2600	1.4	2700	1.6	3400	1100	6	200	150	1500	1800	1.4	2700	1.6	3100					
1650	18.03	1925	1200	400	300	1900	2700	1.4	2900	1.6	3600	1200	6	200	150	1650	1950	1.4	2900	1.6	3300					
1800	21.00	2100	1300	400	300	2000	2800	1.4	3100	1.6	3800	1300	6	200	150	1800	2100	1.4	3100	1.6	3500					
2000	25.13	2375	1400	400	300	2100	2900	1.4	3300	1.6	4000	1400	6	200	150	2000	2250	1.4	3300	1.6	3700					
2250	30.08	2625	1500	400	300	2200	3000	1.4	3500	1.6	4200	1500	6	200	150	2250	2400	1.4	3500	1.6	3900					
2500	35.34	2875	1600	400	300	2300	3100	1.4	3700	1.6	4400	1600	6	200	150	2500	2550	1.4	3700	1.6	4100					
3000	47.25	3625	1800	400	300	2500	3300	1.4	4000	1.6	4700	1800	6	200	150	3000	2800	1.4	4000	1.6	4400					

ARKANSAS STATE HIGHWAY COMMISSION

SAFETY END SECTION FOR CIRCULAR AND ARCH PIPES

STANDARD DRAWING SES-1(M)

2-19-97	REVISION	REVISION
2-19-97	REVISION	REVISION
2-19-97	REVISION	REVISION
2-19-97	REVISION	REVISION

