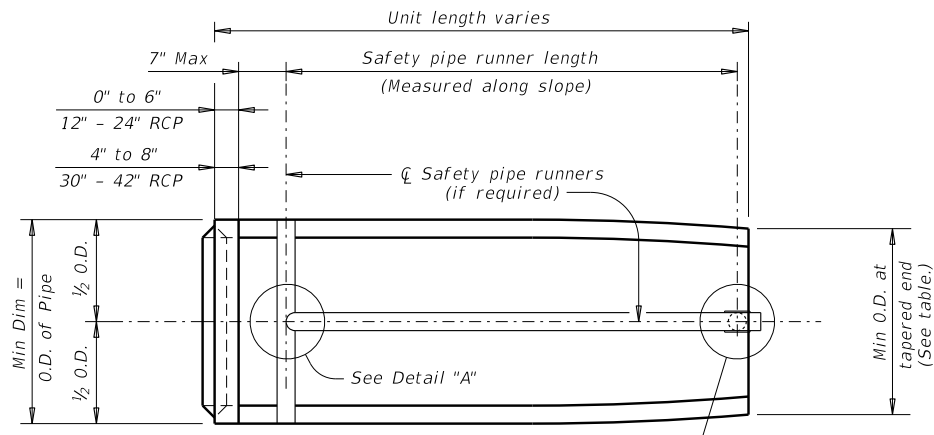


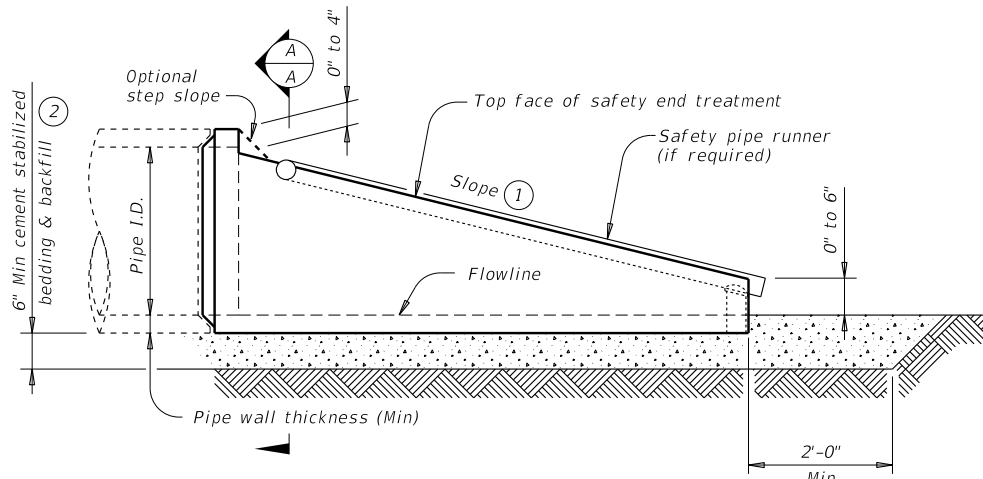
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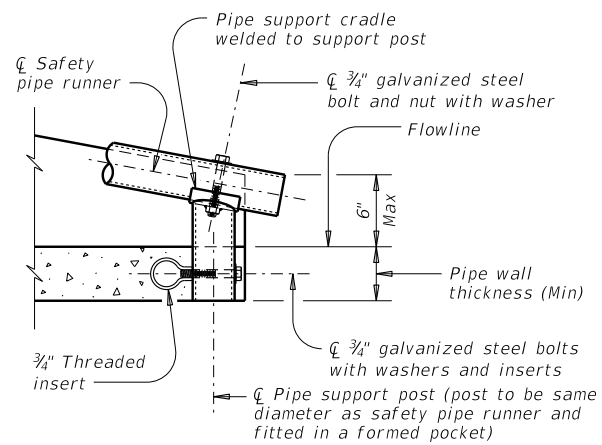
**PLAN VIEW**

(Showing spigot end connection.)



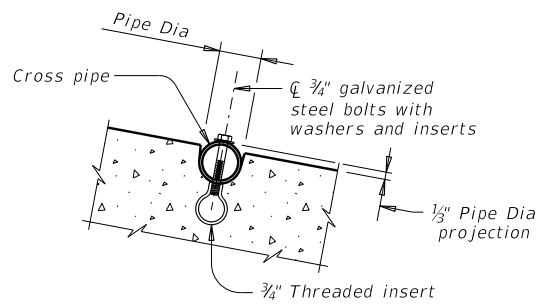
**LONGITUDINAL ELEVATION**

(Showing spigot end connection.)



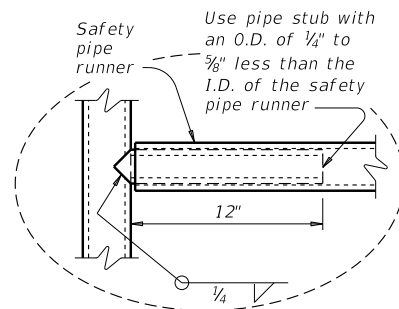
**END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS**

(If required)



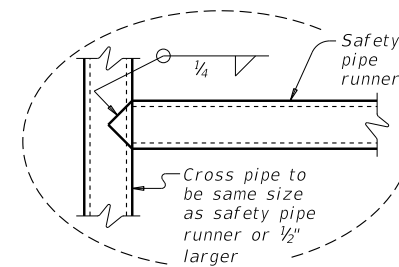
**INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS**

(If required)

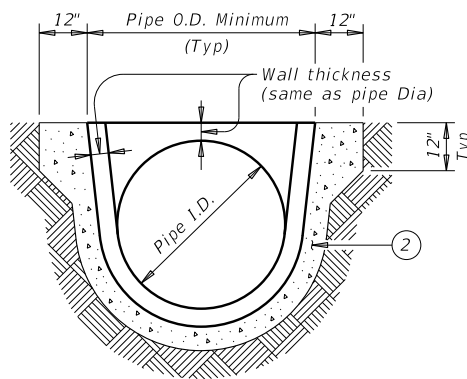


**OPTION A**

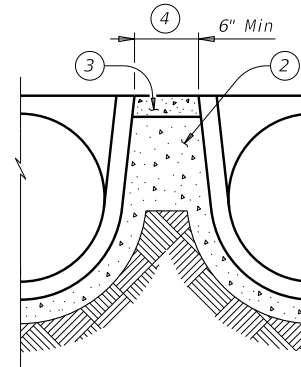
**DETAIL A**



**OPTION B**



**SECTION A-A**



**MULTIPLE PIPE INSTALLATION**

**MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES**

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 1/2" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

**REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS**

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. / ft. of pipe)	Slope	Minimum Length of Unit	Single Pipe		Multiple Pipe	
							Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	16"	16"	0.07 Circ.	3:1	2'-0"	≤ 45°	No	≤ 45°	No
					4:1	2'-8"				
					6:1	4'-0"				
15"	2 1/4"	19 1/2"	19"	0.07 Circ.	3:1	2'-10"	≤ 45°	No	≤ 45°	No
					4:1	3'-9"				
					6:1	5'-8"				
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	3:1	3'-8"	≤ 45°	No	≤ 45°	No
					4:1	4'-10"				
					6:1	7'-3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5'-3"	≤ 45°	No	≤ 30°	No
					4:1	7'-0"			> 30°	Yes
					6:1	10'-6"				
30"	3 1/2"	37"	31"	0.18 Circ.	3:1	6'-3"	≤ 15°	No	≤ 15°	No
					4:1	8'-2"			> 15°	Yes
					6:1	12'-1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7'-10"	= 0°	No	≥ 0°	Yes
					4:1	10'-4"			> 0°	Yes
					6:1	15'-4"				
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	3:1	9'-6"	≥ 0°	Yes	≥ 0°	Yes
					4:1	12'-6"				
					6:1	18'-7"				

**MATERIAL NOTES:**

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.  
Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.  
Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

**GENERAL NOTES:**

Precast safety end treatment for reinforced concrete pipe (CRP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".  
When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.  
Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.  
Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.  
Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.  
Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

**Texas Department of Transportation** Bridge Division Standard

**PRECAST SAFETY END TREATMENT TYPE II ~ CROSS DRAINAGE**

**PSET-RC**

FILE: psetrcss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
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