



## SECTION 732

### FLARED END SECTIONS

**732.1 Description.** This work shall consist of furnishing and installing precast concrete or metal flared end sections of the size and shape shown on the plans.

**732.1.1** Precast concrete flared end sections shall be used with concrete or vitrified clay culvert pipe.

**732.1.2** Metal flared end sections shall be used with metal culvert pipe.

**732.1.3** End sections for HDPE and PVC pipe may be either precast concrete or metal flared end sections of the pipe group type specified for that application.

**732.1.4** Safety slope end sections may be used with concrete, HDPE, PVC or metal culvert pipe.

#### **732.2 Material.**

**732.2.1** All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

<b>Item</b>	<b>Section/Specification</b>
Metal Flared End Sections	1020
Precast Concrete Flared End Sections	1032
Plastic Joint Compound for Vitrified Clay and Concrete Pipe	1057
Tubular Joint Seal	1057
Mortar for Pipe Joints	1066
Safety Bars and Longitudinal Bars	ASTM A 53, Schedule 40
Bar Grate	ASTM A 575, Grade 1020

**732.2.2** Cast-in-place toe walls for precast concrete flared end sections shall be constructed of Class B or B-1 concrete, or concrete of a commercial mixture in accordance with [Sec 501](#). Material, proportioning, air entraining, mixing, slump and transporting of Portland cement concrete shall be in accordance with [Sec 501](#). Air-entrained concrete will not be required. Concrete shall be placed and cured in accordance with [Sec 703](#). Precast toe walls shall be constructed of any of the above specified concrete mixtures or these walls may be constructed of the same mixture used to fabricate the precast concrete flared end sections. Precast toe walls may be cured in accordance with [Sec 703](#) or in the same manner as the flared end sections.

#### **732.3 Construction Requirements.**

**732.3.1** Flared end sections shall be joined to pipes or pipe-arches as shown on the plans and shall be placed to the line and grade of the structure on a uniformly firm soil foundation shaped to fit the lower part of the end section.

**732.3.1.1 Precast Concrete Flared End Sections.** The joint material between the end section and the adjoining pipe shall be the same as that used for the pipe joints, and shall be installed in the same manner. Toe walls shall be of the size and shape shown on the plans and may be precast or cast-in-place. Forming of cast-in-place toe walls will not be required.

**732.3.1.2 Metal Flared End Sections.** The end section shall be joined to the pipe or pipe-arch as shown on the plans. The toe plate, if specified, shall be set in a trench or driven to the proper elevation. Care shall be taken to avoid damage to the metal.

**732.3.2 Safety Slope End Section.** The safety slope end section shall consist of a metal-flared end section, a safety bar system or a bar grate system, toe plate extension, if required in the contract, and any fasteners required for attachment to the culvert pipe.

**732.3.2.1 Construction Requirements.** Safety slope end sections shall be attached as shown on the plans and shall be placed to the line and grade of the structure on a uniformly firm soil foundation shaped to fit the lower part of the end section.

**732.3.2.2 Toe Plate Extension.** The toe plate extension, if required, shall be attached to the end section as shown on the plans.

**732.3.2.3 Safety Bar System.** Safety bars will be required on end sections of culvert pipes 24 inches (600 mm) in diameter or greater. The number, size and spacing of safety bars shall be as shown on the plans.

**732.3.2.4 Bar Grate System.** In lieu of the safety bar system, the bar grate system may be used. If used, the bar grate system shall be fabricated and installed as shown on the plans.

**732.4 Method of Measurement.** Measurement of precast concrete, plastic or metal flared end sections and safety slope end sections will be made per each.

**732.5 Basis of Payment.** The accepted quantity of flared end sections and safety slope end sections, complete in place, will be paid for at the contract unit price for each of the items included in the contract. When two different diameters of pipe are shown on the plans for a given location for Group B or Group C pipe, the contract unit price for the flared end section or safety slope end section that would be required for the larger diameter pipe will be used for payment purposes. No direct payment will be made for any excavation or bedding required for placement of an end section, toe walls or toe plates. Any damaged sections required to be replaced due to the contractor's actions shall be at the contractor's expense.