

SECTION 108  
STORM DRAINAGE SYSTEM

## 108.1 GENERAL

All materials and workmanship in this section shall be installed per the current VDOT Road and Bridge Standards and Specifications and in accordance with Title 13 of Staunton's City Code and the current Virginia Stormwater Management Handbook unless otherwise specified.

## 108.1.1 Related requirements specified in other Sections of the Specifications:

- A. Chapter 8 - General Construction Standards
- B. Section 103 - Site Clearing
- C. Section 104 - Trenching & Backfilling
- D. Section 106 – Seeding
- E. Section 107 - Sanitary System (for pipe installation)

## 108.1.2 Reference Specifications are referred to by abbreviation as follows:

- A. American National Standards Institute – ANSI
- B. American Society for Testing and Materials – ASTM
- C. American Water Works Association – AWWA
- D. American Railway Engineering Association - AREA

## 108.2 PRODUCTS

108.2.1 Submit shop drawings on all products as required by City.

108.2.2 Provide certified test results of pipe testing.

108.2.3 Pipe material shall only be Class III reinforced concrete or corrugated, smooth interior, high density polyethylene (ADS N12 or equal) with bell and spigot joints.

108.2.4 Reinforced concrete pipe is required for the following applications:

- A. Over 10' or less than 3' of cover.
- B. Subject to velocities over 10 fps.
- C. Non-residential streets.
- D. Pipe diameter greater than 30".
- E. Areas subject to chemical/gasoline leaks.

108.2.5 Manholes

- A. Precast reinforced concrete manholes shall be constructed in accordance with Standard Drawings for the type and size of manhole indicated on the Drawings.
- B. Provide tongue and groove joints in manhole sections with a preformed groove in the tongue for placement of an O-ring type round, rubber gasket.

- (1) Gasket shall comply with requirements of ASTM C443.
  - (2) Gasket shall provide the sole element in sealing the joint from either internal or external hydrostatic pressure.
- C. Manhole steps shall be corrosion-resistant and shall be one-inch square cast iron, rubber-covered steel or aluminum. The steps shall conform to the dimensions shown in Standard Drawings.
- D. Manhole frames and covers shall be molded of gray cast iron conforming to ASTM A48, Class 30 and shall be labeled “storm”. Castings shall be coated with a coal tar pitch varnish, to which sufficient oil has been added to make a smooth coating, tough and tenacious when cold, but not tacky or brittle. Seating surfaces between frame and cover shall be machined. The dimensions and weights shall conform to the requirements shown in Standard Drawings. Frames and covers to be set in the street shall be set flush with the finished road surface.
- E. Flow Lines - All structures shall have flow lines. The minimum depth of flow channel shall be equal to 3/4 the diameter of the largest sewer in the manhole to which it connects. The channel shall be graded to give a smooth, uninterrupted flow through the manhole. Bench walls shall be pitched a minimum of 1 inch per foot from the inside periphery of the manhole to the edge of the flow channel.
- 108.2.6 Drainage Structures shall be specified on the plans in accordance with VDOT Standards.
- 108.2.7 Stormwater Management facilities shall be specified on the plans in accordance with Title 13 of Staunton’s City Code and the current Virginia Stormwater Management Handbook

### 108.3 EXECUTION

- 108.3.1 All pipe shall be installed per the manufacturer’s recommendations or as shown on the plans.
- 108.3.2 Lay gravity storm drains so as to maintain a true alignment and grade as indicated on Drawings. After completion, the pipe shall exhibit a full circle of light when lighted at one manhole and viewed from the next.
- A. Commence laying gravity storm drains at the lowest point on a section of line and lay pipe with the bell ends uphill.
  - B. Pipe Joint. Preparatory to making pipe joints on gravity storm drain lines, clean and dry all surfaces of joint pipe and jointing material.

Use lubricants, primers, adhesives and similar materials as recommended by the manufacturer. Place, fit, join and adjust the jointing materials or factory fabricated joints as recommended by the manufacturer to obtain the degree of water tightness required. As soon as possible after the joint is made, place sufficient backfill material, as specified under Section 104 - Trenching and Backfilling, along each side of the pipe to resist forces that might tend to move the pipe off line and grade.

- C. Complete backfilling as specified under Section 104 - Trenching & Backfilling. Place backfill over the pipe immediately after the pipe has been laid.

#### 108.4 TESTING

- 108.4.1 All lines shall have a television inspection performed in accordance with section 114 of the City of Staunton Design and Construction Standards, and any applicable NASSCO standards.

#### 108.5 MEASUREMENT AND PAYMENT

- 108.5.1 Storm Drain Pipe - Measurement shall be parallel to the pipe including the lengths occupied by appurtenances. The bid price is to include all excavation bedding and backfill. Payment shall be per linear foot for the size and type specified.
- 108.5.2 Tees and Bends - Measurement and Payment shall be per each for the size specified.
- 108.5.3 Manholes - Measurement and Payment shall be per each. The bid price is to include the manhole, steps, invert, flexible boot and any excavation and backfill required for complete installation. There is no separate payment for frame and cover.
- 108.5.4 Drainage Structure - Measurement and Payment shall be per each. The bid price is to include the structure, steps, invert, flexible boot, all excavation, bedding, backfill and other incidental materials and workmanship. There is no separate payment for frame and cover.

END OF STORM DRAIN SYSTEM