

### **Conditions of Use/ Responsibility of Data**

These “guideline” specifications are to be used by the A/E as a base document in the development of project/site-specific Division 2 – SITE WORK specifications for Montgomery County Public Schools Construction Projects. They may or may not be complete, correct and/or appropriate for use for any given project. It is the responsibility of the A/E to review these “guideline” specifications and to edit and/or supplement them as required to ensure that they represent the full, complete, correct and code-compliant specifications required for all construction of the project to which they apply. The use of these “guideline” specifications, and/or any information herein, in no way releases the A/E from their Contractual responsibility to prepare and provide the full, complete and correct code-compliant Contract documents, plans and/or specifications required for construction.

Review and editing of these “guideline” specifications shall be performed by appropriately licensed Maryland professional engineer. Specifications are to be prepared in Microsoft Word, edited using the “Track Changes” feature of that software and submitted to MCPS electronically on a compact Disk for review.

## **SECTION 02230 – STORM DRAINAGE SYSTEM**

### **PART 1 - GENERAL:**

#### **1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1, Specifications Section, apply to work in this section.

#### **1.2 DESCRIPTION OF WORK:**

- A. Section specifies materials and work required to construct storm drainage system.

#### **1.3 RELATED SECTIONS:**

- A. Refer to Section 02000 "Clearing", Section 02100 "Earthwork and Grading", Section 02200 "Utility Standards"; and Division 15 "Mechanical".

#### **1.4 STANDARDS:**

- A. Washington Suburban Sanitary Commission (WSSC) current "General Conditions and Standard Specifications" and "Standard Details".
- B. Montgomery County Department of Transportation current "Design Standards".
- C. Maryland Department of Transportation State Highway Administration current "Standard Specifications for Construction and Materials".
- D. Maryland Standards and Specifications for Soil Erosion and Sediment Control, current edition.
- E. American Concrete Pipe Association (ACPA).

F. Cast Iron Soil Pipe Institute (CISPI).

1.5 SUBMITTALS:

A. Products:

1. Submit certificate signed by manufacturer and Contractor stating that pipe and pipe joint materials comply with this specification.
2. Submit shop drawings of pre-cast reinforced structures and cast in place reinforced concrete structures indicating location, size and placement of concrete reinforcement.
3. Submit manufacturer's descriptive literature of cleanouts.
4. Submit location of product manufacture.
5. Special shop drawing and submittal reviews are those requiring third-party (governing agency) review and approval in addition to normal reviews by Owner, Architect and/or Engineer of Record. In instances where shop drawings and Contractors submittals must also be reviewed and approved by municipal agencies or other entities, Contractor shall allow extended time as required to accommodate these reviews and approvals at no additional cost or delay to Owner, Architect and/or Engineer of Record. Contractor shall schedule and/or adjust work schedules accordingly.
6. Contractor shall bear surveying, engineering and permitting costs for re-design and/or re-engineering required for substitutions and/or to expedite construction and/or accommodate changes in Contractor's construction methods and means.

1.6 PROJECT CONDITIONS:

- A. Refer to Section 02100 "Earthwork and Grading" and as noted.
- B. Existing Storm Drainage System: Provide, install, operate and maintain pumps and related equipment required to divert storm water during system construction.
- C. Traffic: Maintain pedestrian and vehicular traffic during system construction.
- D. As-Built Documents:
  1. Refer to Section 02200 "Utility Standards"

1.7 CONSTRUCTION SURVEYS:

- A. Provide survey equipment and qualified personnel for construction surveys. Provide combined horizontal and vertical alignment stakes for system construction. Horizontal stake interval to be 25 feet maximum and at structures. Provide construction cut sheet preparation as required.

**PART 2 - PRODUCTS:**

2.1 MATERIALS:

- A. General: Provide products manufactured within a 500-mile radius of Project Site
- B. Polyvinyl Chloride (PVC) Pipe: ASTM D 3034, SDR 35 PVC gravity sewer pipe, size as indicated, standard manufacture laying length.
  1. Pipe Joints: ASTM D 3212, bell and spigot type, with flexible elastomeric gasket



approved equal.

1. Quality: Free of defects of flaws, which affect strength or filtering properties.
- L. Sand: ASTM C33 Fine Aggregate.
- M. Concrete: Refer to Section 02200 "Utility Standards".
- N. Reinforcing Steel and Hardware: Refer to Section 02200 "Utility Standards", and as noted:
  1. Size and type of steel and hardware shall be as indicated.
  2. Exposed reinforcing steel shall be hot dip galvanized, ASTM A 767, Coating Class I.
  3. Hardware shall be hot dip galvanized, ASTM A 153.
- O. Miscellaneous Products:
  1. Underground Identification Tape: Manufactured by Allen Systems, Houston, Texas.
    - a) Type: "Markline".
    - b) Color: Precaution Blue.
    - c) Legend: Caution sewer line buried below.
    - d) Tape Width: Three inches.

### **PART 3 - EXECUTION:**

#### **3.1 DEWATERING, EXCAVATION, OVER-EXCAVATION AND UNSUITABLE EARTH:**

- A. Refer to Section 02200 "Utility Standards".

#### **3.2 CONNECTIONS TO EXISTING SYSTEM:**

- A. For structure construction over existing pipe, excavate and expose existing pipe at structure location indicated. Adjust structure location as directed by Owner's Representative in event existing pipe joint interferes with structure walls, at no increase to Contract Sum. Manually excavate below existing pipe prior to structure base placement. Place concrete base and construct structure as specified. Neatly cut and remove upper half of existing pipe and construct invert flow channel.
- B. For pipe connections to existing structures, excavate and expose existing structure. Cut and remove portion of existing structure wall required for pipe connection. Install pipe, through existing structure wall, flush with interior wall surface. Remove portion of existing invert flow channel required for connection and reconstruct as specified. Fill joint between pipe and existing structure wall with cement mortar.

#### **3.3 PIPE:**

- A. General: Install in accordance with manufacturer's installation instructions and as noted. Inspect each pipe laying length and pipe joint materials for defects. Remove defective products from project site. Install pipe to horizontal and vertical alignment indicated. Begin installation at lowest system elevation and proceed up-grade. Field cut pipe only where required to complete structure-to-structure closures, install fittings or as specified. Cut pipe to smooth square end.
- B. Cast Iron Pipe: Install with spigot end of pipe pointing in direction of flow. Install fittings where indicated or required. Clean and lubricate joints, immediately prior to joining pipe, in accordance with manufacturer's recommendation. Position each laying length in previously installed pipe and push joint tightly together.

- C. Concrete Pipe: Install with tongue end of pipe pointing in direction of flow. Clean and thoroughly wet joints immediately prior to joining pipe. Apply thick liberal coat of mastic to groove and tongue. Position each laying length in previously installed pipe and pull joint tightly together with mechanical device designed for pipe jointing.
  - 1. Clean interior of each joint removing excess cement mortar and finish flush with surface. Fill exterior upper half of pipe joint with cement mortar.
- D. Polyvinyl Chloride (PVC) Pipe: Install pipe in accordance with ASTM D 2321, manufacturer's installation instructions, and as noted.
  - 1. Install with pipe spigot end pointing in flow direction. Begin installation of pipe, with vertical gradient exceeding 10 percent, at lowest elevation and proceed up-grade. Clean bell and spigot interior and exterior surfaces, removing oil, grit and foreign matter. Lubricate pipe ends and gasket in accordance with manufacturer's instructions. Position each laying length of previously installed pipe and manually push joint tightly together.
  - 2. Field Pipe Cutting: Shape spigot end of cut pipe to resemble manufactured spigot end, with a pipe-beveling tool designed for PVC pipe. Copy full insertion mark provided on manufactured spigot end onto prepared field cut end.
- E. Corrugated Steel Pipe: Install in accordance with manufacturer's recommendations and instructions, and ASTM A 798.
- F. High Density Polyethylene Pipe: Install in accordance with manufacturer's recommendations.

#### 3.4 CLEANOUTS:

- A. Refer to Section 02200 "Utility Standards" and as noted.
- B. Install cleanouts and construct concrete pads of Class "A" concrete as indicated.
- C. Cleanout in paved walk area shall be installed without a concrete pad. Top shall be cast into and set flush with finished walk surface.

#### 3.5 STRUCTURES:

- A. Refer to Section 02200 "Utility Standards" and as noted. Neatly cut pipes flush with interior structure walls. Construct invert flow channels smooth and semicircular in shape. Shape channels with horizontal circular curves, with radii as large as structure will permit or as indicated. Neatly form channels in structure base with bricks and cement mortar. Provide steps in structures exceeding 3.0 feet in depth. Vertical step spacing per standards specified.

#### 3.6 BACKFILL:

- A. Refer to Section 02200 "Utility Standards", and as noted.
- B. Polyvinyl Chloride (PVC) Pipe: Conduct backfill operations when pipe temperature is below 60 degrees Fahrenheit or during early morning hours to prevent excessive Contraction.
- C. Underground Identification Tape: Install during backfill operations. Tape shall be centered over pipe, located 12 inches above pipe.

#### 3.7 WASTE MANAGEMENT:

- A. Recycle waste piping materials in accordance with Division 1 "Construction Waste

Management" requirements.

### 3.8 STORMWATER MANAGEMENT

- A. Contractor shall be responsible for efforts necessary to submit and obtain County approval of As-Built plans and to deliver a County-approved stormwater management system within 60 days of final site stabilization.
- B. Contractor shall keep all as-built information current on a record set of drawings as stormwater management system is being constructed.
- C. Contractor shall hire Civil Engineer of record to produce a set of certified as-built drawings. Once prepared, Contractor shall obtain County approval of documents.
- D. Contractor shall be responsible for pumping down and cleaning of system as required for final inspection and acceptance by MCDPS.
- E. Final County approval and close out of stormwater management and sediment control permits are required before Contract completion is achieved for stormwater management work.

**END OF SECTION**