

SECTION 334100 – STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. City of Baltimore Department of Public Works Specifications Materials, Highways, Bridges, Utilities, and Incidental Structures, 2006.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Nonpressure transition couplings.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.
- B. HDPE: High Density Polyethylene Pipe

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating: At least equal to system test pressure. Pipe joints shall be water tight.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Certificates: For each type of pipe and fitting, from manufacturer.
- C. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic pipe and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Architect and Owner no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

- A. PVC Water-Service Piping:
 - 1. Pipe: ASTM D 1785, Schedule 40 PVC, with plain ends for solvent-cemented joints.
 - 2. Fittings: ASTM D 2466, Schedule 40 PVC, socket type.

2.2 NONPRESSURE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 - 1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

2.3 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

- A. HDPE Pipe and Fittings, NPS 6 and Larger: Corrugated and smooth lined pipe and fittings manufactured in accordance with requirements of ASTM F 2306, latest edition. Pipe shall be type S with a full circular cross section, with an outer corrugated pipe wall and a smooth inner wall. Fittings shall be water-tight.
- B. HDPE corrugated and smooth lined pipe shall be manufactured from virgin PE compounds which conform with the requirements of cell classification 335444C as defined and described in ASTM D 3350.
- C. Minimum pipe stiffness at five percent deflection shall be as described in ASTM F 2306, Section 6.3 when tested in accordance with ASTM D 2412.
- D. HDPE pipe and fittings shall be supplied by the same Manufacturer. Pipe and fittings from different Manufacturers shall not be interchanged.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in City of Baltimore Department of Public Works Specifications Materials, Highways, Bridges, Utilities, and Incidental Structures, 2006.

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install gravity-flow, non-pressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction as required by manufacturer's requirements for non-pressure drainage piping. Use manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
 - 3. Install piping with 24-inch minimum cover, unless noted otherwise on the plans.
 - 4. Install PVC piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join PVC cellular-core piping according to ASTM D 2321 and ASTM F 891 for solvent-cemented joints.
 - 2. Join HDPE piping with water tight joints per manufacture's requirements.

3.4 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.5 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains.
- B. Make connections to existing piping and underground manholes and structures.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3500 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3500 psi.
 - 3. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- C. Pipe couplings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

3.6 IDENTIFICATION

- A. Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
 - 1. Use detectable warning tape over nonferrous piping.

3.7 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.

- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of the City of Baltimore.
 - 3. Schedule tests and inspections by the Owner with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of the City of Baltimore, UNI-B-6, and the following:
 - a. Test plastic piping according to ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.8 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 334100