

SECTION 02600 – SEWERS AND DRAINS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK: Provide sanitary sewer system and storm sewer system as shown on the Drawings. This includes:

1. Sanitary sewer pipe
2. Sanitary sewer service pipe
3. Repairs to existing pipe
4. Storm sewer pipe
5. Connection to existing systems
6. Underdrain

1.02 RELATED WORK specified elsewhere includes:

1. Existing Subsurface Conditions Section 02010
2. Handling Contaminated Soils: Section 02110
3. Earthwork: Section 02300
4. Erosion and Sedimentation Control: Section 02370
5. Stormwater Treatment System: Section 02631.

1.03 SUBMITTALS:

- A. Manufacturer's product data and installation instructions for all materials prior to the start of construction.
- B. Certified copies of tests on pipe and manhole units.
- C. Construction Records: Record depth and location of the following:
 1. Sanitary sewer pipe and service locations, cleanouts, bends in services, connection points to sewer main, and elevations.
 2. Repairs to existing pipes.
 3. Storm sewer pipe locations, and elevations.
 4. Underdrain pipe locations and connection points to storm drainage system, and elevations.

Record neatly in a permanently bound notebook and submit at Substantial Completion. Provide access to records for ENGINEER at all times. Submit copies to ENGINEER on a weekly basis.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

- A. General: Provide fittings of same type and class of materials as pipe. Provide commercially manufactured wyes or tee/wyes for service connections. Fitting must have single piece gasket.

- B. PVC Non-Pressure Pipe and Services (Sewer and Storm Drain): 4- through 15-inch Diameter: ASTM D3034 or ASTM D3033, 18- through 27-inch Diameter: ASTM F-679, strength requirement SDR 35; push-on joints, ASTM D3212; gaskets, ASTM F477.
- C. Underdrain Transport Pipe: Solid-wall, corrugated exterior, polyethylene pipe with smooth wall interior, highway grade, AASHTO M252, ASTM F405, by American Drainage Systems, or approved equal.
- D. Reinforced Concrete Pipe: ASTM C76; Class IV, O-ring gasket joints with rubber gaskets, meeting MDOT specifications.
- E. Ductile Iron Pipe: AWWA C151; thickness Class 52 AWWA C150; double cement lined, AWWA C104; push-on joints or mechanical joints with rubber gaskets, AWWA C111; fittings, AWWA C110.
- F. Underdrain: Materials shall conform to the Drawings and MDOT SECTION 605 – UNDERDRAINS with the following modifications:
 - 1. Fittings: Provide fittings of same type and class of materials as pipe. Provide commercially manufactured wyes or tee/yses. Fitting must have single piece gasket.
 - 2. Pipe: Underdrain pipe shall be SDR-35 PVC meeting ASTM F789, corrugated polyethylene pipe meeting MDOT 706.06, or equivalent. Coiled pipe shall not be permitted

2.02 MISCELLANEOUS:

- A. Flexible Couplings: Use and location shall be approved by ENGINEER.
 - 1. Type A: Dresser Style 253 as manufactured by Dresser, or approved equal.
 - 2. Type B: Neoprene sleeve with stainless steel bands by Fernco, or approved equal.
- B. Geotextile Fabric: Propex 4508 by Amoco Fabrics Co., or approved equal.
- C. Marking Tape: Lineguard III by Tri-Sales, Inc., 2-inch wide, green; detectable with magnetic locators, or approved equal.
- D. Rigid Insulation: Extruded closed-cell rigid foamed polystyrene, 2-inch thickness, width of trench, Styrofoam HI-60, by Dow Chemical, or approved equal.
- E. Pipe Supports: Saddle type, steel, painted, adjustable, by ITT Grinnell, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF GRAVITY PIPE AND FITTINGS:

- A. Methods: Install in accordance with manufacturer's recommendations. Use a laser beam for line and grade unless otherwise permitted by the ENGINEER. Secure each length of pipe with bedding before placing next length. Plug open ends when work is suspended. Bed pipe as shown on Drawings. A 30-inch minimum cover over the top of PVC pipe and DI pipe should be provided before the trench is wheel-loaded.

- B. Grade and Line:
 - 1. Lay pipe to line and grade shown on the Drawings. If grade is not shown, determine elevations of start and finish points for each run of pipe. Lay pipe to a uniform grade between these points.
 - 2. Line and grade may be adjusted by the ENGINEER as required by field conditions.
 - C. Conditions: Lay pipe in the dry. Do not use installed pipe to remove water from work area.
 - D. Flush and clean all pipe and remove all debris and materials. Flushing and cleaning methods approved by ENGINEER. Gravity flushing is not acceptable.
 - E. Connections to Manholes and Catchbasins: Provide short length of pipe so that joints are located within 3 feet of inside surface of manholes and catch basins for all pipe.
 - F. Sanitary Sewer Service Fittings and Leads:
 - 1. Size of service leads 6-inch unless otherwise indicated.
 - 2. Depth and location of service to be determined by ENGINEER in field.
 - 3. Provide tee/wye or wye fittings on main line pipe.
 - 4. Provide clean outs as shown and detailed on Drawings.
 - 5. Plug, or cap, and stake ends of new service. Provide stake which extends from plug or cap to 1-foot above ground surface. Assist ENGINEER in measurement of pipe installed and in obtaining swing ties to ends of leads.
 - G. Underdrain:
 - 1. All work shall conform to the Drawings and MDOT SECTION 605 – UNDERDRAINS
- 3.02 PIPE UTILITIES TO BE ABANDONED: Close open ends of abandoned underground utilities which are not indicated to be removed. Provide sufficiently strong closures, such as caps or brick and mortar, acceptable to ENGINEER to withstand hydrostatic or earth pressure which may result after ends of abandoned utilities have been closed. CONTRACTOR may remove abandoned utilities with written permission of ENGINEER.
- 3.03 INSULATION:
- A. Install as shown on Drawings.
 - B. Provide 2-inch minimum thickness compacted sand layers for sanitary and storm sewer, directly above and below insulation.
- 3.04 TESTING OF SANITARY SEWERS:
- A. General: Test all sanitary sewer pipes after backfilling. Install service leads on main line before testing. Perform tests in presence of ENGINEER. A maximum of 1000 feet of pipe may be installed but not tested at any time.

B. Gravity Sewer Leakage Tests: Use low pressure air test as follows:

1. Plug ends of section to be tested.
2. Supply air slowly to the pipe to be tested until the air pressure inside the pipe is 4.0 psi greater than the average back pressure of any groundwater submerging the pipe.
3. Disconnect air supply and allow a minimum of two minutes for stabilization of pressure.
4. Following stabilization period measure drop in pressure over the test period within the following times:

Nominal Pipe Size (in.)	Test Period (min.)
4	4
6	4
8	6
10	6
12	7
15	8
18	9
21	11
24	13

5. Acceptable drop: No more than 1.0 psi.
- C. Deflection Test for PVC Gravity Sewer Pipe: Test 100% of pipe with "GO-NO-GO" gauge allowing maximum deflection per ASTM D3034, Appendix X1, Table X1.1.
- D. TV Inspection: All sewers and drains may be inspected by the OWNER using TV pipe inspection. Defects in materials and/or workmanship found during the inspection shall be corrected by the CONTRACTOR.
- E. Repair all pipes not passing tests, using materials and methods approved by the ENGINEER, and retest.

End of Section