

SECTION 33 31 00

SANITARY SEWER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Description of Work: Provide labor, materials, equipment, and services necessary for proper and complete installation of the sanitary sewer system as indicated on the drawings and as herein specified including the following items:
 - 1. The entire sanitary sewer system from outside within 8' of the proposed building to the connection with the existing sewer system, including sanitary manholes, gravity sewer lines, and services to proposed buildings.
 - 2. Sanitary sewage pipe.
 - 3. Underground pipe markers.
 - 4. Manholes.
 - 5. Bedding and cover materials.
- B. The Contractor shall pay all fees associated with connection to the existing utilities and inspections by the Town of Islesboro and the local sewer district.
- C. Related Sections:
 - 1. Section 31 02 00 - Development Permits
 - 2. Section 31 02 10 - Subsurface Investigations
 - 3. Section 31 10 00 - Site Preparation
 - 4. Section 31 20 00 - Earthworks
 - 5. Section 31 25 00 - Erosion Control

1.2 REFERENCES

- A. The "Standard Specifications" referred to herein is the book entitled "Standard Specifications" published by the State of Maine Department of Transportation dated December 2002, as supplemented.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data indicating pipe material used, pipe accessories, and appurtenances.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- E. Shop Drawings: Submit Product Specification Literature and/or Shop Drawings for:
 - 1. Precast concrete structures (manholes).
 - 2. Cast iron frames and covers for structures.

1.4 CLOSEOUT SUBMITTALS

- A. Comply with Section 01 73 00 - Execution Requirements: Requirements for submittals.
- B. Project Record Documents:
 1. Accurately record actual locations of pipe runs, connections, manholes, cleanouts, stubs, and invert elevations.
 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Comply with the requirements of Section 01 40 00 – Quality Requirements.
- B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.
- C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- D. All Work shall comply with the requirements of the Maine Department of Environmental Protection standards, the Cumberland County Soil & Conservation District Standards, U.S. Environmental Protection Agency NPDES, and City of Portland, Maine Permit requirements, to minimize adverse environmental impacts. Reference is made to the Erosion and Sedimentation Control Report and Plan included in the Plan set for this project. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts
- E. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.
- F. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damages to property outside the limits of Work.

1.6 PRE-INSTALLATION MEETINGS

- A. Comply with Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements and elevations are as indicated.

1.8 COORDINATION

- A. Comply with Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.

- B. Coordinate the Work with termination of sanitary sewer connections outside building, trenching and new connection to existing subsurface wastewater system.

PART 2 - PRODUCTS

2.1 SANITARY SEWER PIPE

- A. Pipe shall conform to ASTM D 3034 for sizes 4" - 15". PVC resin compound shall conform to ASTM D 1784 and rubber gaskets shall conform to ASTM D 3212 and F 477. Standard laying lengths shall be 13 ft. The pipe shall be colored green.
- B. Pipe shall be joined with the bell-and-spigot joint meeting AASHTO M252, AASHTO M294-97 OR MP7-97. The joint shall be watertight. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104° Fahrenheit. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
- C. PVC gravity sewer fitting shall meet all requirements and intent of the National Standards ASTM D - 3034 for materials and ASTM D-3212 for joints.
- D. Plastic Pipe: ASTM D3034 or ASTMD3033, strength requirement SDR35, Type PSM, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of inches, bell and spigot style rubber ring sealed gasket joint.
 - 1. Fittings: PVC.
 - 2. Joints: ASTMD3212 push-on joints, ASTM F477, elastometric gaskets.
- E. Fittings:
 - 1. ANSI A21.10, 250 psi rated.
 - 2. Furnish fittings of same type and class of materials as pipe.
- F. Joints:
 - 1. Push-on with single rubber gasket, ANSI, A21.11, pressure rating equal to that of the pipe.

2.2 UNDERGROUND PIPE MARKERS

- A. Warning Tape: 3' Wide detectable tape with foil aluminum core. Tape shall be bright and have a warning message including the words "SANITARY SEWER BELOW".

2.3 MISCELLANEOUS

- A. Flexible Adaptors:
 - 1. Neoprene sleeve with stainless steel bands equal to those manufactured by Fernco, Calder Couplings.
- B. Manhole Seals:
 - 1. Segmented neoprene seal with stainless steel bolts equal to "Link-Seal" as manufactured by Thunderline Corp.

- C. Insulation: Equal to Styrofoam SM by Dow Chemical Co., sheet size 2' by 4' by 2" thick.

2.4 SANITARY MANHOLES

- A. Precast Concrete Structures: ASTM C478, MDOT Section 712.06. Structures and top pieces shall provide H-20 load bearing capacity. Two (2) Butyl rubber gaskets shall be installed at all joints between manhole sections.
- B. Structure walls: 5 in. thick for precast up to 10 ft. depth; 8 in. thick for precast below that depth.
- C. Cast Iron Frames, Grates, and Covers: ASTMA48, Class 35, MDOT Section 712.07. Covers shall have the word "Sewer" cast thereon.
 - 1. Sanitary Manholes: Standard Solid Cover - 24 in. round opening; M248S, (heavy-duty) manufactured by Ethridge Foundry Co., Portland, ME or approved equivalent.
- D. Waterproofing: All sewer manholes shall be waterproofed with two coats of bituminous sealer applied to the exterior of the manhole by the manufacturer. Waterproofing shall comply with ASTM D449, Type A.
- E. Manhole Steps: Steps shall be Polypropylene Plastic with steel reinforcement or aluminum conforming to ASTM B221, alloy 6061-T6, a minimum of 14" wide and cast into the sections.
- F. Brick: ASTM C32-69, Grade MS, except Grade SS for drainage manhole inverts; MDOT Section 704.01.
- G. Concrete Block: ASTM C-139; MDOT Section 704.03.
- H. Mortar: One part Portland Cement, Type IIA, two parts mortar sand, and clean water as required: MDOT Section 705.02.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Comply with Section 01 73 00 - Execution: Verification of existing conditions before starting work.
- B. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on the drawings.

3.2 PREPARATION

- A. Notify "Dig-Safe" (1-888-334-7233) at least 3 days prior to beginning any excavation work, in accordance with Maine State Law.
- B. Contact local utility companies, before beginning work.

- C. Check for conflict with underground utilities or structures. Notify the Architect/Engineer immediately of any and all discrepancies before proceeding with the work.
- D. Fully coordinate with utility companies to insure timely work by others to avoid construction delays.
- E. Hand trim excavations to required elevations. Correct over excavation with Structural Fill as specified in Section 31 20 00.
- F. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 20 00 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.
- D. Bedding Material: as specified in Section 31 20 00.
- E. Soil Backfill from Above Pipe to Finish Grade: as specified in Section 31 20 00.

3.4 INSTALLATION - PIPE

- A. Excavate in locations and to depths indicated on the drawings to install drain lines.
- B. Install pipe, fittings, and accessories in accordance with the manufacturer's recommendations.
- C. Place pipe on minimum 6 inch deep bed of bedding material as specified.
- D. Lay pipe to inverts noted on drawings in straight lines and constant slopes.
- E. Install aggregate at sides and over top of pipe.
 1. Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.
 2. The remainder of the trench shall be backfilled as specified in Section 31 20 00.
- F. Refer to Section 31 20 00 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.
- G. Connect to existing subsurface wastewater system system.

3.5 INSTALLATION - SANITARY SEWER MANHOLES

- A. Form bottom of excavation clean and smooth to correct elevation.

- B. Place 12-inch layer of $\frac{3}{4}$ -inch crushed stone and compact to 95 percent.
- C. Set base section establishing elevations and pipe inverts for inlets and outlets as indicated on Drawings.
- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.6 FIELD QUALITY CONTROL

- A. Comply with Section 01 40 00 - Quality Requirements, 01 70 00 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

3.7 PIPE TESTING

- A. General: Test all pipes after backfilling. Install all service leads on main line before testing. Perform tests in presence of Engineer or authorized representative of the Sewer District or Public Works Department.
- 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 a 6-minute test period.
 5. Acceptable Drop: No more than 1.0 psi.
 6. Repair and retest: Repair all pipes not passing tests using materials and methods approved by the Engineer, and retest.

3.8 SANITARY MANHOLE TESTING

- A. General: Use either exfiltration test for all manholes. Perform tests before constructing invert.
- B. No allowance will be made for absorption during the 8-hour test period. No allowance will be made for leakage at test plug.
- C. Retest unacceptable manholes following repairs until acceptable leakage rate is attained.
- D. Instant Exfiltration Test:
 1. Prior to backfilling excavation, plug pipes into and out of manholes and liftholes and fill with water.
 2. Inspect manhole surface, pipe joints, and lift holes. If there are no visible leaks, manholes may be considered watertight.
- E. 8-Hour Exfiltration Test:
 1. Plug pipes into and out of manhole and secure plugs.
 2. Lower groundwater table (GWT) to below manhole. Maintain GWT at this level throughout test.

3. Provide means of determining GWT level at any time throughout test.
4. Fill manhole with water to top of cone.
5. Allow a period of time for absorption (determined by Contractor).
6. Refill to top of cone.
7. Determine volume of leakage in a 9-hour minimum test period and calculate rate.
8. Acceptable Leakage Rate: Not more than 1 gallon per vertical foot per 24 hours.

F. MANHOLE REPAIRS

1. Determine causes of all leaks and repair them. Perform earthwork required if manhole has been backfilled.
2. Perform repairs using methods and material approved by the Engineer. Remove and replace or reconstruct manhole if necessary. Remove and replace defective sections if required by Engineer.

3.9 PROTECTION OF FINISHED WORK

- A. Comply with Section 01 70 00 - Execution Requirements: Protecting finished Work.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
 1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.
 2. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION