SECTION 02530 – SANITARY SEWERS

All work and materials shall conform to MDOT SECTION 603 – PIPE CULVERTS AND STORM DRAINS, SECTION 604 – MANHOLES, INLETS, AND CATCH BASINS, SECTION 653 –POLYSTYRENE PLASTIC INSULATION and DIVISION 200 – EARTHWORK with the following modifications:

MODIFICATIONS:

Section 603.01 This work shall consist of the construction of sanitary sewers and manholes, and all associated work as shown on the plans, details, and specified herein.

Contractor shall install locating/warning tape over the centerline of all storm drain pipe, including mains and catch basin laterals. Both a green warning tape and a number 10 or 12 single strand coated wire shall be installed at a maximum of 24 inches below finish surface grade for the entire length of pipe. Magnetic warning tape may be used in place of separate warning tap and wire.

Section 604.01 Description Add the following: Provide sanitary sewer system as shown on the Drawings. This includes:

A. Sanitary sewer pipe
B. Sanitary sewer service pipe and wyes
C. Repairs to existing pipe, as needed
D. T.V. Inspection and cleaning of existing sewer pipe
E. Installation and repairs to sanitary manholes as indicated on the Drawings.

Section 653.02 – Add the following: Polystyrene plastic insulation shall have a minimum thickness of 2 inches.

ADDITIONS:

All work shall be performed in accordance with City of Portland, Maine Technical and Design Standards and Guidelines (latest revision).

Furnishing and installing polystyrene plastic insulation shall be considered incidental to the cost of the sanitary sewer system.

SUBMITTALS:
The CONTRACTOR shall submit to the RESIDENT:

A. Manufacturer's product data and installation instructions for all materials prior to start of construction.

B. Construction Records: Record depth and location of the following:
   1. Pipe and service locations, cleanouts, bends in services, and connection points.
   2. Storm drainage and potable water pipe locations, when encountered.

C. Antifloatation Slab: Contractor shall complete calculations, performed by a professional engineer registered in the State of Maine, to determine if antifloatation slabs are necessary for all sanitary manholes. If necessary, CONTRACTOR shall calculate size of and design of antifloatation slabs for sanitary manholes. Calculations for all manholes shall be submitted to RESIDENT prior to construction.

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

TESTING:

Gravity sewers shall be tested by one of the following methods:

A. Low pressure air
B. Infiltration
C. Exfiltration

Approval of method will be made by the RESIDENT with due consideration for subsurface conditions and size and type of pipe.

The CONTRACTOR shall have the proper labor, plugs, weirs, and other equipment to perform all required tests. Testing of each sewer installed shall include the portions of service laterals installed under this contract.

A. Low Pressure Air:
When low pressure air test is used, it shall be conducted in compliance with the following:

After completing backfill of the sewer line, the CONTRACTOR shall, at no additional cost to the DEPARTMENT, conduct a line acceptance test using low pressure air. The test shall be performed according to stated procedures and in the presence of the RESIDENT.

Procedures: All pneumatic plugs shall be seal tested before being used in the actual test installation. One (1) length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs at 25 psig. The sealed pipe shall be pressured at 5 psig. The plugs shall hold against this pressure without bracing and without movement of the plugs or pipes.

After a manhole to manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig or greater than the average back pressure off any ground water that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize.

After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed “acceptable” if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than average back pressure of any ground water that may be over the pipe shall not be less than the time shown for the given diameters in the following table:

Pipe Diameter (in inches)	Minutes
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5
21	10.0
24	11.5

In areas where groundwater is known to exist, the CONTRACTOR shall install a one-half inch diameter capped pipe nipple, approximately 10" long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the groundwater shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all the readings. (For example, if the height of the water is 11-1/2 feet, then the added pressure will be 5psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound and the timing shall remain the same.)

If the installation fails the air test, the CONTRACTOR shall, at no additional cost to the DEPARTMENT, determine the source of the leakage. CONTRACTOR shall then repair of replace all defective materials and/or workmanship.

B. Infiltration:
An infiltration test requires groundwater levels to be a minimum of one foot above the crown of the pipe of the height end of the section being tested. Infiltration test procedures are:

1. RESIDENT to determine length of sewer main and the connecting lines to be tested.
2. With all connecting pipe plugged (other than those included in test section) install a V-notch weir in downstream end of pipe. V-notch weir must be constructed accurately and installed to maintain a watertight seal between weir and pipe.
3. Allow time for water to build up behind weir until steady, uniform flow passed through V notch.
4. Reading shall be taken and recorded.

C. Exfiltration: Test procedures are:

1. RESIDENT to determine length of sewer to be tested.
2. Properly cap or plug and block service lateral, stubs and fittings into sewer lines being tested.
3. Plug upstream and downstream ends of test section providing a water supply connection downstream and standpipe in manhole upstream.
4. Fill test section and upstream standpipe and allow time for water absorption in manholes.
5. Measure drop in upstream standpipe over 4 – 15 minute periods and compute leakage.

Note: The upstream manhole may be used as the standpipe. Test sections shall be kept short enough to maintain a reasonably low head to prevent excess pressures.

Leakage in gravity sewers shall not exceed 300 gallons per inch diameter, per day, per mile of pipe when tested by either internal pressures or external pressure means. Should the pipe as laid fail to meet these requirements, the CONTRACTOR shall perform the necessary work, at no additional cost to the City, to meet these requirements.

*** END OF SECTION ***