

SANITARY SEWER MANHOLES

****Rutland City-Proctor STP 2728(1) Rutland City NH 2716(1) Rutland City STP 019-3(57)**

XX. DESCRIPTION. This work shall consist of the construction of sanitary sewer manholes including outside drops as required; and the furnishing and placing of precast concrete covers and cast iron covers with frames.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 604 of the Standard Specifications.

XX. MATERIALS. Materials shall meet the requirements of the following Subsections:

| | |
|---------------------------------|--------|
| Crushed Gravel for Subbase..... | 704.05 |
| PVC Plastic Pipe..... | 710.06 |

Crushed gravel used for bedding material beneath structures shall meet the gradation requirements of Table 704.05A - Fine.

All PVC Sewer Pipe shall be SDR 35.

XX. SUBMITTALS. The Contractor shall submit Fabrication Drawings in accordance with Section 105.

XX. GENERAL CONSTRUCTION REQUIREMENTS. Precast concrete grade rings may be used in lieu of bricks.

Sanitary sewer manholes shall be placed on a level, uniformly compacted base of Crushed Gravel Bedding to the extent shown on the Plans or as ordered by the Engineer.

Unless otherwise specified in the Contract, all precast sections shall be rated for H-20 loading in accordance with the current AASHTO *Standard Specifications for Highway Bridges*.

Outside sewer manhole drops consisting of a concrete encased SDR 35 PVC drop pipe shall be required at all new sewer manholes where the sewer pipe invert entering a manhole is at an elevation of 600 mm (24 inches) or more above the manhole's outlet pipe invert.

Leakage testing shall be performed in accordance with CONSTRUCTION OF SANITARY SEWER MANHOLES of this Section and Subsection 628.08.

XX. CONSTRUCTION OF SANITARY SEWER MANHOLES.

(a) Leakage Tests. Leakage tests shall be performed by the Contractor and observed by the Engineer on each sanitary sewer manhole. The leakage test shall be a vacuum test or water test performed as described herein.

(1) Vacuum Test. The vacuum test shall be performed on manholes, completely constructed, with inlet and outlet pipes in place. Testing shall be conducted before any

backfilling begins. Any material around the base section shall be removed to expose the entire side of the manhole. Plug pinholes and horizontal seams with a non-shrinking concrete grout.

Brace the inlet and outlet pipes/plugs to prevent movement during the test. Use air inflated plugs in good condition.

The vacuum test shall be performed using equipment acceptable to the Engineer. The equipment shall be in good operating condition. All gauges shall not have any broken glass or other visible abnormalities. The test shall be performed by trained personnel familiar with the equipment and the test.

The test shall have a minimum duration of two minutes. The vacuum shall be pumped down to 250 mm (10 inches) of mercury on an acceptable gauge, and held. At the time the removal of air is stopped, the test time shall begin.

Any manhole that has a vacuum drop to 225 mm (nine inches) of mercury or less, within the following time intervals, shall have failed the test.

0 - 10 ft. deep: less than 2 minutes.
10 - 15 ft. deep: less than 2-1/2 minutes.
15 - 20 ft. deep: less than 3 minutes.
over 20 ft. deep: less than T.

Calculations for manholes deeper than 20 feet:

$$T = 0.085 [DK/Q] \text{ where}$$

T = Time of pressure drop in seconds.
K = 0.000419 DL; but not less than 1.0.
Q = 0.0015 ft³/min/ft² of area.
D = Nominal manhole diameter in inches.
L = Depth of manhole in feet.

- (2) Water Test. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blowout.

The manhole shall then be filled with water to the top of the cone section. With the approval of the Engineer, a period of time may be permitted to allow for absorption. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and the measuring time of at least four hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be converted to liters per vertical meter of depth per 24-hour day (gallons per vertical foot of depth per 24-hour day). The leakage for each manhole shall not exceed 10 L/m/day (1 gallon/foot/day). If leakage exceeds the allowable rate, repairs shall be made as approved by the Engineer and the manhole retested.

(b) Outside Drop for Sewer Manhole. Outside Drops for Sewer Manholes shall be cast-in-place Class B concrete of the type shown on the Plans. PVC sewer pipe and fittings shall be cast into the concrete and shall be SDR 35. Outside concrete drop shall be attached to sewer manholes with dowels and threaded bent bars and anchors as shown on the Plans in order to prevent unequal settlement. Incoming sewer piping shall be connected to the outside drop piping with an exterior transition coupling in the case of dissimilar materials. Exterior transition coupling shall consist of a flexible rubber boot or, in the case of an HDPE pipe to PVC pipe transition, the exterior transition coupling shall consist of an HDPE/PVC spigot end transition adapter fitting.

XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Outside Drop for Sewer Manhole) to be measured for payment will be the number of units constructed in the complete and accepted work.

The quantity of Special Provision (Sanitary Sewer Manhole) of the size specified to be measured for payment will be the number of units used in the complete and accepted work.

XX. BASIS OF PAYMENT. The accepted quantity of Special Provision (Outside Drop for Sewer Manhole) will be paid at the Contract unit price per each. Payment will be full compensation for furnishing, transporting, handling, testing, and placing the materials specified, including crushed gravel bedding, backfill, concrete, bent bars and dowels, reinforcing steel, PVC pipe and fittings, transition couplings, rubber boots, bitumastic or other watertight sealant, and coatings, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Excavation for outside drops for sewer manholes will not be paid for separately, but will be considered incidental to Special Provision (Outside Drop for Sewer Manhole).

The accepted quantity of Special Provision (Sanitary Sewer Manhole) of the size specified will be paid at the Contract unit price per each. Payment will be full compensation for furnishing, transporting, handling, testing, and placing the materials specified, including crushed gravel bedding, backfill, concrete, concrete risers, top sections, reinforcing steel, steps, pipe, mortar, brick, bitumastic or other watertight sealant, cast iron cover with frame, coatings, pipe stubs, curb board, and bituminous fillets, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Excavation for new sewer manholes will not be paid for separately, but will be considered incidental to Special Provision (Sanitary Sewer Manhole).

Payment will be made under:

| <u>Pay Item</u> | <u>Pay Unit</u> |
|---|-----------------|
| 900.620 Special Provision (Outside Drop for Sewer Manhole) | Each |
| 900.620 Special Provision (Sanitary Sewer Manhole)(X' I.D.) | Each |