

GRAVITY SEWER LINES SPECIFICATIONS
For
The Town of Lake Placid

1.00 Materials: Pipes and Fittings: All main line pipe, fittings, and specials shall be of one of the following materials:

1.01 Polyvinylchloride Pipe: Plastic gravity sewer pipe and fittings shall be smooth wall polyvinylchloride (PVC) conforming to or exceeding the performance requirements of ASTM Designation D2241, SDR 26, 160 PSI @73°F; ASTM F-789 for sizes 4 inches to 18 inches; PS-46; or ASTM F-679 for sizes 18 inches to 27 inches diameter. For sizes 21 inches through 48 inches diameter sewer main profile wall PVC with smooth interior and exterior in accordance with ASTM F-794 is acceptable.

1.02 Ductile Iron Pipe:

a) Ductile iron pipe shall conform to the requirements of ANSI Standard A21.51. The pipe wall thickness shall be not less than that required by a working pressure of 150 psi with Type 2 laying condition and 5 feet cover in conformance with ASTM Standard A746-76, Latest Revision.

b) Joints for cast iron pipe shall be mechanical or push-on joints conforming to ANSI Standard A21.11. Pipe interior shall have a bituminous seal coat over a cement mortar lining conforming to ANSI Standard A21.4. Exterior of pipe shall have a bituminous coating.

c) Other pipe materials and manufacturer including vitrified clay pipe, exterior corrugated, asbestos concrete, and concrete, will not generally be acceptable for use in wastewater collection systems.

d) All above ground pipe and fittings shall be ductile iron.

1.03 Manholes, Pre-cast Concrete: Pre-cast manholes shall meet the general requirements as Specified herein.

a) Details and shop drawings of each manhole, proposed to be furnished shall be submitted to and approved by the Project Engineer prior to the manufacture of the units. Manholes which are not manufactured in compliance with the approved shop drawings and these specifications may be rejected.

b) The design and manufacture of the manholes, and special pipes construction at manholes, shall conform to these specifications.

c) In addition to the general requirements, pre-cast manholes shall conform to the requirements of ASTM Designation C478-75 and the following modifications thereto:

- 1) the minimum shell thickness shall be 5 inches;
- 2) cement to be used in pre-cast manholes shall be Type II, 4000 psi acid resistant cement used for sanitary construction;
- 3) joints whose positions in the complete construction are below the water table shall be compression type, neoprene gasket joint of a design approved by the Engineer;
- 4) lifting holes through the structures are permitted, however, all holes shall be completely sealed with hydraulic cement;
- 5) the design of the structure shall include a pre-cast base of not less than 8 inches in thickness, and poured monolithically with the bottom section of the manhole walls;
- 6) all grout used for sealing around the pipe openings shall be of type acceptable to the Project Engineer designed for use in water; all openings and joints shall be sealed watertight;
- 7) pre-cast manhole tops, if used, shall terminate at such elevations as will permit laying up to a minimum of 12 inches of clay brick under the manhole frame to make allowance for future street grade adjustment;
- 8) drop connections, where required on pre-cast manholes, shall be manufactured with the manhole elements at the casting yard; the manufacturer shall submit for approval the method of drop manhole construction; and
- 9) all interior surfaces of pre-cast manholes shall be coated with two coats of Koppers 300M, or equal; the exterior surfaces shall receive two coats of Koppers Bitumastic Black or equal.
- 10) all manholes that receive low-pressure or step-system sewage shall be lined with HDPE as specified on the plans or approved by the Project Engineer.

d) Manhole Casting: Casting for manhole frames, covers, steps, and other items shall conform to ANSI Designation A 48-74, Class 30. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the service intended. The seating surfaces between frames and covers shall be

machined to fit true. No plugging or filling will be allowed. Lifting or "pick" holes shall be provided, but shall not penetrate the cover. Casting patterns shall conform to those shown or indicated on the drawings. The words SANITARY SEWER shall be cast in all manhole covers. All manhole frames and covers shall be traffic bearing. Manhole castings shall be of U.S. manufacture.

e) Cement Mortar: Cement mortar for manhole construction shall be 1 part cement and 3 parts clean sharp sand to which hydrated lime may be added in the amount not to exceed 10% of the amount of cement by volume. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than 1 hour shall be used.

2.00 Construction:

2.01 Excavating the Trench:

a) As a general rule, do not open the trench to far ahead of the pipe laying so as to avoid possibly flooding the trench, reduce or eliminate pumping or sheeting, reduce caving caused by ground water, reduce potential workmen and traffic hazards.

b) The trench width at the ground surface may vary with and depend upon the depth, type of soils and position of surface structures. The minimum clear width of the trench in the pipe zone should be one foot greater than the outside diameter of the pipe. The maximum clear width of the trench at the top of the pipe should not exceed a width equal to the pipe diameter plus two feet. If the above defined trench widths must be exceeded or if the pipe is installed in a compacted embankment, pipe embedment should be compacted to a point of at least 2.5 pipe diameters on both sides of the pipe or to the trench walls, whichever is less.

c) Minimum cover for the top of the pipe is 36 inches below the finished grade.

d) The trench bottom should be smooth and free from large stones, rocks or large dirt clods. Excavation of bells should be provided so that the pipe is uniformly supported along its length. Usually, loose material left by the excavator on the trench bottom will be adequate for bedding the pipe barrel and providing full support. When rock or other non-cushioning material is encountered, excavation shall be extended to 6 inches below the outside bottom of the pipe and a bedding cushion of sand or other selected backfill used as the pipe bed.

2.02 Pipe Handling

a) The interior of all pipe shall be thoroughly cleaned of all foreign material before being lowered in the trench and shall be kept clean during the laying operations by means of plug or other approved methods.

b) Pipe laying shall proceed up grade with spigot ends pointing in the direction of flow. Before pipe is joined, gaskets shall be cleaned of all dirt and stones and other foreign material. The spigot ends of the pipe shall be lubricated lightly with a lubricant specified by the pipe manufacturer and approved by the Project Engineer. Sufficient pressure shall be applied to the pipe so as to properly seat the socket in the bell of the pipe. All pipe shall be laid straight, true to the lines and grades shown on the plans, in each manhole section.

c) Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or the weather is unsuitable for such work, except by permission of the Project Engineer. At all times when work is not in progress, the exposed ends of all pipes shall be fully protected by a board or other approved stopper to prevent earth or other substances from entering the pipe.

d) Any pipe which is disturbed or found to be defective after laying shall be taken up and re-laid or replaced.

e) Transportation: Care shall be taken during transportation of the pipe that it is not cut, kinked or otherwise damaged.

f) Handling Pipe Lengths: Ropes, fabric, or rubber protected slings and straps shall be used when handling pipes.

g) Storage:

1) Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects which could damage the pipe.

2) Stacking of the polyvinylchloride pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under the anticipated temperatures and condition.

3) When necessary, due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of pipe at the point of contact with the sleeper or between supports.

4) The handling of the jointed pipe line shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Sections of the pipes with deep cuts and gouges shall be removed.

5) Care shall be exercised when lowering pipe into the trench to prevent damage to or twisting of the pipe.

6) Polyvinylchloride pipe connected to heavy fittings, manholes, and rigid structures shall be supported in such a manner that no subsequent relative

movement between the pipe and the joint with the rigid structures is possible.

2.03 Additional Work

a) Concrete Inverts: All manhole interior bottoms shall be shaped with true inverts. Inverts shall be of concrete mortar construction, as specified herein.

b) Additional items of construction, such as cleanouts, terminal lampholes, special manholes, and other items necessary for the complete installation of the system shall conform to specific details on the drawings and shall be constructed of first-class materials conforming to the applicable portions of the specifications.

c) Connections to existing manholes and pipe stubs shall be made without permanent damage to the existing structure. The invert channels shall be reshaped or removed, if necessary, and reconstructed to provide for smooth flow. Pipe opening in the existing manhole walls shall be made watertight with an approved grout.

3.00 Quality Testing/Inspections:

3.01 It is imperative that all sewers and appurtenances be built practically watertight and that the Contractor adheres rigidly to the specifications for materials and workmanship. Sewage may need to be pumped for disposal and special care and attention must be paid to securing watertight construction. Upon completion, the sewer, or section thereof, will be tested and gauged and if leakage is above the allowable limits specified, the sewer will be rejected.

3.02 On completion of each block or section of sewer, or such other times as the Project Engineer may direct, the block or section of sewer is to be cleaned, tested, and inspected. *EACH SECTION OF THE SEWER IS TO SHOW, EXAMINATION FROM EITHER END, A FULL CIRCLE OF LIGHT BETWEEN MANHOLES.*

3.02 Each manhole, or other appurtenances to the system also shall be of the specified size and form, be watertight, neatly and substantially constructed, with the top set permanently to exact position and grade.

3.03 All repairs shown necessary by the inspection are to be made; broken or cracked pipe replaced, all deposits removed and the sewer left true to line and grade, entirely clean and ready to use.

3.04 All wastewater collection systems shall be tested by infiltration/exfiltration as described below:

a) The allowable limits of infiltration, exfiltration, or leakage for the entire system or any portion thereof, including house service lines, shall not exceed a rate of 0.1 gallons per foot of pipe per 24 hours for all sizes of pipe throughout the system. The allowable limits of infiltration or exfiltration of manholes shall not exceed a rate of 2 gallons per manhole per 24 hours.

b) Infiltration, if taken between any two adjacent manholes, shall not exceed 0.1 gallon per 24 hours per foot of sewer for all sizes and all locations. This testing of lines between adjacent manholes will not be required except to localize the position of a leak in a portion of the system that exceeds the allowable leakage limit or as directed by the Project Engineer.

c) Any part or all of the system may be tested for infiltration or exfiltration, as directed by the Project Engineer. Prior to testing for infiltration, the system shall be pumped out so that normal infiltration or exfiltration shall be determined by pumping into or out of calibrated drums, or by other approved methods.

d) The exfiltration test will be conducted by filling the portion of the system being tested with water to a level which will provide: a minimum head on a service lateral connected to the test portion of 2 feet; or in the event there are no service laterals in the test portion, a minimum difference in elevation between the crown of the highest portion of the sewer and the test water level of 5 feet.

e) Tests shall be conducted on portions of the system not exceeding 3 manhole runs or more than 1000 feet of main sewer, or as otherwise directed by the Project Engineer. Tests shall be run continuously for 3 hours. Where infiltration or exfiltration exceeds the allowable limits also specified herein, the defective pipe, joints, or other faulty construction shall be located and repaired. If the defective portions cannot be located, as much of the work as is necessary will be removed and reconstructed in order to conform to the specified allowable limits. Testing shall be performed as the job progresses and shall be started after no more than 2000 feet of pipe is laid.

f) The Contractor shall provide all labor, equipment and materials, and conduct all testing required, under the direction of the Project Engineer.

3.05 The Contractor shall provide a video log of the completed gravity sewer system to both the engineer and the Town of Lake Placid Utility Department. The video log shall show the station location of all laterals.

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