

- (23) The migration of fines from surrounding backfill or native soils shall be restricted by gradation of embedment materials or by use of suitable filter fabric.
- (24) The remaining portion of the trench above the pipe embedment shall be backfilled in twelve-inch lifts which shall be firmly compacted. Compaction near/under roadways, driveways, sidewalks and other structures shall be to 95% of the maximum moisture-density relationship, as determined by ASTM Specification D 698, Method D. Ice, snow or frozen material shall not be used for backfill.

§ 94-32. Manholes and manhole installation.

- A. Design of all manholes shall be submitted to the Superintendent and shall receive approval prior to placement.
- B. Manholes shall be placed where there is a change in slope or alignment and at intervals not exceeding 400 linear feet.
- C. Manhole bases shall be constructed or placed on a minimum of 12 inches of crusher-run maximum one-half-inch stone free of organic materials.
- D. Manhole bases shall be constructed of 4,000 PSI (twenty-eight-day) concrete eight inches thick or shall be precast bases properly bedded in the excavation. Field constructed bases shall be monolithic, properly reinforced and extend at least six inches beyond the outside walls of lower manhole sections. Precast manhole bases shall extend at least six inches beyond the outside walls of lower manhole sections.
- E. Manhole sections.
 - (1) Manholes shall be constructed using precast minimum four-foot-diameter concrete manhole barrel sections and an eccentric top section, conforming to ASTM Specification C-478, with the following exceptions on wall thickness:

Manhole Diameter (feet)	Wall Thickness (inches)
4	5
5	6
6	7
6 1/2	7 1/2
7	8
8	9

- (2) All sections shall be cast solid, without through lifting holes. Flat top slabs shall be a minimum of eight inches thick and shall be capable of supporting a H20 loading.

- F. All joints between sections shall be sealed with an O-ring rubber gasket, meeting the same specifications as pipe joint gaskets, or butyl joint sealant completely filling the joint.
- G. All joints shall be sealed against infiltration. All metal parts shall be thickly coated with bitumastic or elastomeric compound to prevent corrosion.
- H. Steps or ladder rungs shall be installed in the inside manhole walls at all times.
- I. No holes shall be cut into the manhole sections closer than six inches from joint surfaces.
- J. Manholes which extend above grade shall not have an eccentric top section. The top plate shall be large enough to accommodate the cover lifting device and the cover.
- K. The elevation of the top section shall be such that the cover frame top elevation is five-tenths-foot above the one-hundred-year flood elevation (in a field), 0.5 foot above a lawn elevation or at finished road or sidewalk grade.
- L. When located in a traveled area (road or sidewalk), the manhole frame and cover shall be heavy-duty cast iron. When located in a lawn or in a field, the manhole frame and cover may be light-duty cast iron. The cover shall be 36 inches in diameter. The minimum combined weight of the heavy-duty frame and the cover shall be 735, plus or minus 5%, pounds. The minimum combined weight of the light-duty frame and the cover shall be 420, plus or minus 5% pounds. The mating surfaces shall be machined and painted with tar pitch varnish. The cover shall not rock in the frame. Infiltration between the cover and frame shall be prevented by proper design and painting. Covers shall have "Sanitary Sewer" cast into them. Covers shall have lifting holes suitable for any lifting/jacking device. The lifting holes shall be designed so that infiltration is prevented.
- M. A drop of at least 0.1 foot shall be provided between incoming and outgoing sewers on all junction manholes and on manholes with bends greater than 45°.
- N. Inverts and shelves/benches shall be placed after testing the manholes and sewers.
- O. Benches shall be level and slope to the flow channel at about one inch per foot.
- P. The minimum depth of the flow channel shall be the nominal diameter of the smaller pipe. The channel shall have a steel trowel finish. The flow channel shall have a smooth curvature from inlet to outlet.
- Q. Manhole frames, installed at grade, shall be set in a full bed of mortar with no less than two nor more than four courses of brick underneath to allow for later elevation adjustment. In lieu of brick, grade rings may be used for elevation adjustment. Grade rings shall not exceed six inches in depth. The total number of grade rings shall not exceed 12 inches in height; however, in no event shall more than three grade rings be used.
- R. Manholes which extend above grade shall have the frames cast into the manhole top plate. The top plate shall be securely anchored to the manhole barrel, by a minimum of six-and-one-half-inch corrosion-resistant anchor bolts, to prevent overturning when the

cover is removed. The anchor bolts shall be electrically isolated from the manhole frame and cover.

- S. Internal drop pipes and fittings shall be PVC plastic sewer pipe in compliance with ASTM D2241. Corrosion-resistant anchors shall be used to attach the drop pipe to the inside surface of the manhole barrel.

§ 94-33. Infiltration/exfiltration testing; deflection testing; air testing; vacuum testing.

A. Infiltration/exfiltration testing.

- (1) All sanitary sewers or extensions to sanitary sewers, including manholes, shall satisfy requirements of a final infiltration test before they will be approved and wastewater flow permitted by the Village of Champlain. The infiltration rate shall not exceed 25 gallons per 24 hours per mile per nominal diameter in inches. An exfiltration test may be substituted for the infiltration test; the same rate shall not be exceeded. The exfiltration test shall be performed by the applicant, under the supervision of the Superintendent, who shall have the responsibility for making proper and accurate measurements required. The exfiltration test consists of filling the pipe with water to provide a head of at least five feet above the top of the pipe or five feet above groundwater, whichever is higher, at the highest point under test, and then measuring the loss of water, from the pipe section under test, by the amount of water which must be added to maintain the original level. However, under no circumstances shall the head at the downstream manhole exceed 10 feet or fill to within six inches of the top of the downstream manhole. Should this condition prevail, the testing methods in § 94-33C and/or § 94-33D shall be utilized. In this test, the test section must remain filled with water for at least 24 hours prior to taking any measurements. Exfiltration shall be measured by the drop of water level in a standpipe with a closed bottom end or in one of the sewer manholes serving the test section. When a standpipe and plug arrangement is used in the upper manhole in the test section, there shall be some positive method for releasing entrapped air prior to taking any measurements.
- (2) Test section. The test section shall be as ordered or as approved, but in no event longer than 1,000 feet. In the case of sewers laid on steep grades, the test length may be limited by the maximum allowable internal pressure on the pipe and joints at the lower end of the test section. For purposes of determining the leakage rate of the test section, manholes shall be considered as sections of forty-eight-inch diameter pipe, five feet long. The maximum allowable leakage rate for such a section is 1.1 gallons per 24 hours. If leakage exceeds the allowable rate, then necessary repairs or replacements shall be made and the section retested.
- (3) Test period. The test period, during which the test measurements are taken, shall not be less than two hours.
- (4) Pipe lamping. Prior to testing, the section shall be lamped. Any length of pipe out of straight alignment shall be realigned.

- B. Deflection testing. Also prior to testing, all plastic pipe, in the test section, shall be tested for deflection. Deflection testing shall involve the pulling of a rigid ball or

mandrel, whose diameter is 95% of the pipe inside diameter, through the pipe. Any length of pipe with a deflection greater than 5% shall be replaced. The test section shall be flushed just prior to deflection testing. The test shall not be performed with a mechanical pulling device.

- C. Low-pressure air testing alternative. In lieu of hydrostatic testing (exfiltration or infiltration), low-pressure air testing may be employed. Low-pressure air tests shall conform to ASTM Specification C 828. All sections to be tested shall be cleaned and flushed and shall have been backfilled prior to testing. Air shall be added until the internal pressure of the test section is raised to approximately four pounds per square inch gauge (PSIG). The air pressure test shall be based on the time, measured in seconds, for the air pressure to drop from 3.5 PSIG to 2.5 PSIG. Acceptance is based on limits tabulated in the Specification Time Required for a 1.0 PSIG Pressure Drop in the UniBell PVC Pipe Association Recommended Practice For Low Pressure Air Testing of Installed Sewer Pipe. Before pressure is applied to the line, all connections shall be firmly plugged. Before the test period starts, the air shall be given sufficient time to cool to ambient temperature in the test section. If the test section is below groundwater, the test pressure shall be increased an amount sufficient to compensate for groundwater hydrostatic pressure; however, the test pressure shall not exceed 10 PSI. The pressure test gauge shall have been recently calibrated, and a copy of the calibration results shall be made available to the Superintendent prior to testing.

D. Vacuum testing alternatives.

- (1) In lieu of hydrostatic testing (exfiltration or infiltration), vacuum testing may be employed for testing of sewer lines and manholes. Sewer lines and manholes shall be tested separately. All sewer lines to be tested shall be cleaned and flushed and shall have been backfilled prior to testing. The vacuum test shall be based on the time, measured in seconds, for the vacuum to decrease from 10 inches of mercury to nine inches of mercury for manholes and from seven inches of mercury to six inches of mercury for sewers.
- (2) Acceptance of manholes is based on the following:

Manhole Depth (feet)	Manhole Diameter (feet)	Time to Drop 1 Inch of Mercury (10 Inches to 9 Inches) (seconds)
10 or less	4	120
10 to 15	4	150
15 to 25	4	180

NOTES:

¹ For five-foot diameter manholes, add 30 seconds to the times above.

² For six-foot diameter manholes, add 60 seconds to the times above.

- (3) If the test on the manhole fails (the time is less than that tabulated above), necessary repairs shall be made and the vacuum test repeated until the manhole passes the test.
- (4) Acceptance of sewers [seven inches of mercury to six inches of mercury] is based on the time tabulated in the Specification Time Required for a 0.5 PSIG Pressure Drop in the UniBell PVC Pipe Association Recommended Practice For Low Pressure Air Testing of Installed Sewer Pipe.
- (5) The vacuum test gauge shall have been recently calibrated, and a copy of the calibration results shall be made available to the Superintendent prior to testing.

§ 94-34. Force mains.

- A. Force mains serving sewage lifting devices, such as grinder pumps and pump stations, shall be designed in accordance with § 94-28. Additional design requirements are:
 - (1) Force main pipe material shall be:
 - (a) Ductile iron pipe. Pipe shall conform to ANSI A21.51. The minimum wall thickness shall be Class 52 (ANSI A21.50). The pipe shall be clearly marked with either "D" or "DUCTILE." Fittings shall conform to ANSI A21.10. Pipe and fittings shall be furnished with push-on joints conforming to ANSI A21.11. Pipe and fittings shall be cement mortar lined and have an internal and external bituminous seal coating.
 - (b) Polyvinyl chloride (PVC) plastic pipe. Pipe shall conform to ASTM D2241. Materials used in the manufacture of PVC pipe shall meet ASTM C 1784. The minimum wall thickness shall be SDR21. Fittings shall conform to ASTM D2241. Joints and gaskets shall conform to ASTM D2241, D1869 mid F477.
 - (c) Other pipe and materials. Other pipe materials require prior written approval of the Superintendent before being installed.
 - (2) Trenching, bedding and backfilling shall be in accordance with § 94-31C.
 - (3) Joint preparation and assembly shall be in accordance with the manufacturer's written instructions.
 - (4) Anchorages, concrete blocking and/or mechanical restraint shall be provided when there is a change of direction of 7 1/2° or greater.
 - (5) Drain valves shall be placed at low points.
 - (6) Automatic air relief valves shall be placed at high points and at four-hundred-foot intervals, on level force main runs.
 - (7) Air relief and drain valves shall be suitably protected from freezing.
 - (8) When the daily average design detention time, in the force main, exceeds 20 minutes, the manhole and sewer line receiving the force main discharge or the sewage shall be treated so that corrosion of the manhole and the exiting line are

prevented. The corrosion is caused by sulfuric acid biochemically produced from hydrogen sulfide anaerobically produced in the force main.

- (9) The force main shall terminate, in the receiving manhole, at a PVC plastic sewer pipe T. The vertical arms of the T shall be twice the diameter of the force main. The upper arm shall be at least four feet long; the lower arm shall terminate in a PVC plastic sewer pipe 90° elbow in a flow channel directed to the manhole exit pipe. The T and its arms shall be securely fastened to the inside surface of the manhole wall using corrosion-resistant anchors.

- B. Force main testing. All force mains shall be subjected to hydrostatic pressure of 150% of the normal operating pressure. The duration of the test, at pressure, shall be at least two hours. Before conducting the test, the pipe shall be filled with water and all air shall be expelled. During the test, water shall be added, as needed, to maintain the test pressure. The amount of water added shall be recorded so as to calculate leakage. Leakage shall not exceed 25 gallons per day per mile per inch nominal pipe diameter. During the test, the owner and the Superintendent shall walk the route of the force main and examine the exposed pipe and the ground covering any backfilled pipe to discover leaks. Leakage in excess of that specified above shall be collected with new material at the owner's expense and the test repeated. Any observed leaks shall be repaired at the owner's expense.

§ 94-35. Final acceptance by village; guaranty of materials and workmanship.

All sanitary sewers and extensions to sanitary sewers constructed at the applicant's expense, after final approval and acceptance by the Superintendent and concurrence by the Village of Champlain Board, shall become the property of the Village of Champlain and shall thereafter be operated and maintained by the Village of Champlain. No sanitary sewer shall be accepted by the Village of Champlain until four copies of as-built drawings have been so filed with the Superintendent and the Superintendent has approved the submitted drawings. Said sewers, after their acceptance by the Village of Champlain, shall be guaranteed against defects in materials or workmanship for one year by the applicant. The guaranty shall be in such form and contain such provision as deemed necessary by the Village of Champlain Board, secured by a surety bond or such other security as the Village of Champlain Board may approve.

§ 94-36. Liability insurance coverage during construction period.

- A. All contractors engaged in connecting house laterals with sanitary sewers, who perform any work within the right-of-way of any highway, shall file a bond in the amount of \$5,000 with the Village of Champlain Clerk to indemnify the Village of Champlain against loss, cost, damage or expense sustained or recovered on account of any negligence, omission or act of the applicant for such a permit, or any of his or their agents arising or resulting directly or indirectly by reason of such permit or consent or of any act, construction or excavation done, made or permitted under authority of such permit or consent. All bonds shall contain a clause that permits given by the Village of Champlain may be revoked at any time for just cause.
- B. Before commencing work, the above contractor shall file insurance certificates with the Village of Champlain Clerk for the following:

- (1) Workman's compensation and employer's liability insurance as required by the laws of the state covering the contractor.
 - (2) Personal injury liability having limits of not less than \$500,000 each occurrence and \$500,000 aggregate (completed operations/products, personal injury).
 - (3) Property damage liability having limits of not less than \$500,000 for all damages arising during the life of the contract and shall include, but not be limited to, the following designated hazards:
 - (a) Premises and operations.
 - (b) Independent contractors.
 - (c) Completed operations and products.
 - (d) Property damage.
 - (e) Explosions, collapse and underground.
 - (4) Comprehensive automobile liability (including nonowned and hired automobiles) having limits of not less than:
 - (a) Bodily injury:
 - [1] Each person: \$300,000.
 - [2] Each occurrence: \$500,000.
 - (b) Property damage, each occurrence: \$500,000.
 - (5) Business excess liability insurance in the amount of \$2,000,000.
 - (6) All insurance policies must provide for five business days' notice to the Village of Champlain before cancellation and must cover all liabilities of the Village of Champlain and be in a form approved by the Village of Champlain Board of Trustees and be in a satisfactory form approved by the Village Board of Trustees.
 - (7) The minimum insurance limits stated above shall be subject to periodic review by the Village of Champlain Board of Trustees and adjustments made, by resolution, as appropriate.
- C. Where it is necessary to enter upon or excavate any highway or cut any pavement, sidewalk or curbing, permission must be obtained from the Superintendent if a Village of Champlain highway is involved, from the County Department of Public Works if a county highway is involved and/or the New York State Department of Transportation if a state highway is involved.

ARTICLE VI

Building Laterals, Street Laterals Connections and Fees**§ 94-37. Permit required for sewer connections.**

No unauthorized person shall uncover, make any connection with or opening into, use, alter or disturb any public sewer or appurtenance thereof without first obtaining a written permit from the Superintendent.

§ 94-38. Prohibited discharges.

No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, subsurface drainage, cooling water or unpolluted industrial waters to any sanitary sewer. Swimming pool drains shall not be connected to any sanitary sewer.

§ 94-39. Sewer lateral permits.

- A. There shall be two classes of sewer lateral permits:
 - (1) For residential, commercial and institutional service.
 - (2) For service to establishments producing industrial wastes.
- B. In either case, a permit application shall be submitted to the Superintendent. The permit application shall be supplemented by any plans, specifications or other information considered pertinent, in the judgment of the Superintendent. A fee, established by § 94-122, shall accompany the application.

§ 94-40. Each building to have separate building laterals; laterals under buildings.

- A. A separate and independent building lateral shall be provided for every building requiring sanitary facilities. When, however, there is a building behind a front building, the second building may use the front building's building lateral, if there is no other way to provide sanitary service to the back building.
- B. New street laterals and/or building laterals shall not go under building basements. In like fashion, a building shall not be constructed over an existing lateral; the lateral shall be relocated after the Superintendent has approved plans showing the relocation. If relocation is not physically possible then the lateral shall be:
 - (1) Exposed and totally encapsulated in not less than three inches of concrete; or
 - (2) Exposed and walled and the building rooms above positively ventilated outdoors.
- C. All existing manholes in or under the basement shall be sealed airtight in a manner acceptable to the Superintendent. No new manholes shall be constructed on the portion of the lateral under the building.

§ 94-41. Laterals serving several buildings.

When building laterals are to serve multiple-dwelling structures, the building lateral shall be sized in accordance with the metered water use and with sound professional engineering judgment.

§ 94-42. Laterals serving complexes.

Where a lateral sewer is to serve a complex of industrial, commercial, institutional or dwelling structures, special design of the building lateral system shall be required. Such lateral sewer shall be connected to the public sewer through a manhole. The Superintendent shall determine if and where this connection to the public sewer is required. If required, a new manhole shall be installed in the public sewer pursuant to §§ 94-32 and 94-87 and the lateral connection made and tested as directed by the Superintendent. Plans and specifications shall be prepared and submitted for approval pursuant to this chapter.

§ 94-43. Dry sewers.

Dry sewers shall be designed and installed in accordance with this chapter.

§ 94-44. Use of existing building laterals.

Existing building laterals may be used in connection with new buildings only when they are found, on examination by the Superintendent, to meet all requirements of this chapter.

§ 94-45. Lateral pipe materials.

Building and street lateral pipe materials shall be one of the following:

- A. Tar-coated, service grade, cast-iron soil pipe conforming to ASTM Specification A-74, Cast Iron Pipe and Fittings. All dimensions, weight and markings of the pipe shall conform to the requirements of ANSI, Designation A112.5.1, except spigot ends shall be plain end if gasket joints are used.
- B. Polyvinyl chloride (PVC) pipe and fittings conforming to ASTM Specification D-3034-73, SDR-35 Polyvinyl Chloride (PVC) Sewer Pipe and Fittings. All pipe shall be suitable for gravity sewer service. Provisions shall be made for contraction and expansion at each joint with a rubber ring. The bell shall consist of an integral wall section stiffened with two PVC retainer rings which securely lock the solid cross section ring into position. Minimum pipe stiffness (F/Y) at 5% deflection shall be 46 PSI when tested in accordance with ASTM Specification D-2412.
- C. Ductile iron pipe. Pipe, fillings and specials shall be manufactured in accordance with ASTM Specification A-746. Pipe shall have a minimum thickness of Class 50. Fittings shall conform to ANSI Specification A-21.11 and have a minimum pressure class rating of 150 PSI. All pipe and fittings shall be cement mortar lined in accordance with ANSI Specifications A-21.4 at twice the specified thickness and have an internal and external bituminous seal coating. Closure pieces shall be jointed by means of a mechanical coupling of the cast sleeve type. Any part of the building or street lateral that is located

within five feet of a water main or water service shall be constructed of cast-iron soil pipe. Cast-iron soil pipe may be required by the Superintendent where the building or street lateral is likely to be damaged by tree roots. If installed on fill or unstable ground, the building or street lateral shall be of ductile iron pipe, although other pipe material may be permitted if such pipe is uniformly supported on a poured concrete cradle approved by the Superintendent. The distance between consecutive joints, as measured along the center line of the installed pipe, shall not be less than 10 feet, except under abnormal circumstances, in which case this dimension may be diminished, if approved by the Superintendent. The size and slope of building and street laterals shall be subject to approval by the Superintendent, but in no event shall the internal pipe diameter be less than four inches nor shall the pipe slope be less than 1/4 inch per foot.

§ 94-46. Connection of street lateral to main sewer.

At the point of connection of a street lateral to a main sewer, a standard y-fitting and sufficient one-eighth- (forty-five-degree) bend fittings shall be used. The y-fittings shall be installed so that flow in the arm shall transition smoothly into the flow in the public sewer. No lateral connection shall be made to the public sewer which permits the flow into the public sewer from the lateral to enter at right angles.

§ 94-47. Laterals for future use; as-built drawings.

The street lateral, including the y- and one-eighth bend fittings, shall be connected to the main sewer at the time of constructing the main sewer, for each proposed lot for either immediate or future development. Laterals installed for future development shall be fitted a standard plug approved for use by the Superintendent. All sewer connections shall be via a properly installed saddle on the main sewer pipe. No portion of the lateral pipe shall protrude into the main sewer pipe. The location of all lateral connections shall be field marked with a two-by-six-inch corrosion- and rot-resistant board. The marker board shall extend from the depth of the lateral to a minimum of two feet above grade. The location of all lateral connections shall be indicated on a drawing and four copies of this drawing, showing the as-built location of these connections, shall be furnished to the Superintendent. A refundable deposit shall be placed with the Village of Champlain to assure receipt of these as-builts. The deposit shall be placed when application is made; the amount of the deposit shall be \$100 per sheet of plans showing locations of lateral connections. No sanitary sewer shall be accepted by Village of Champlain until four copies of this record drawing have been so filed with the Superintendent and the Superintendent has approved the submitted drawings.

§ 94-48. Special manhole requirements.

When any street lateral is to serve a school, hospital or similar institution or public housing or is to serve a complex of industrial or commercial buildings or which, in the opinion of the Superintendent, will receive wastewater or industrial wastes of such volume or character that frequent maintenance of said building or street lateral is anticipated, then such street lateral shall be connected to the public sewer through a manhole. The Superintendent shall determine if and where this type of connection to the public sewer is required. Connections to existing manholes shall be made as directed by the Superintendent. If required, a new

manhole shall be installed in the public sewer pursuant to §§ 94-32 and 94-87 and the lateral connection made thereto as directed by the Superintendent.

§ 94-49. Laterals at or near buildings.

Whenever possible, the building lateral shall be brought to the building at an elevation below the basement floor. Building laterals laid parallel to a bearing wall shall not be installed closer than three feet to such wall. The building lateral shall be laid at uniform grade and in straight alignment insofar as possible. Changes in direction shall be made only with properly curved pipe and fittings. Changes of direction of 90° or greater shall be made with a cleanout which extends to grade, terminating in a terminal box set in concrete. The ends of all building or street laterals, which are not connected to the interior plumbing of the building, for any reason, shall be sealed against infiltration by a suitable stopper, plug or by other approved means.

§ 94-50. Lifting of wastewater.

In all buildings in which any building drain is too low to permit gravity flow to the public sewer, wastewater carried by such drain shall be lifted by mechanical means and discharged to the building lateral, on approval of the Superintendent.

§ 94-51. Lateral pipe installation.

All excavations required for the installation of a building or street lateral shall be open trench work unless otherwise approved by the Superintendent. Pipe laying and backfilling, regardless of pipe material used, shall be performed in general accordance with Paragraphs 3 through 6 of ASTM Specification C-12, except that trench width, measured at the top of the installed pipe, shall not exceed the outside pipe diameter plus 14 inches, and except that no backfill shall be placed until the work has been inspected. The depth of cover over the pipe shall be sufficient to afford protection from frost.

§ 94-52. Joints.

- A. Watertight joints. All joints and connections shall be made watertight.
- B. Cast-iron push joints. Premolded gaskets may be used for hub and plain end cast-iron pipe joints and joints with fittings, if approved by the Superintendent. The gasket shall be a neoprene compression-type unit which provides a positive seal in the assembled joint. The gasket shall be a premolded, one-piece unit, designed for joining the cast-iron hub and plain end soil pipe and fittings. The assembled joint shall be sealed by compression of the gasket between the exterior surface of the spigot and the interior surface of the hub. The joint shall be assembled following the manufacturer's recommendations using acceptable lubricant and special pipe-coupling tools designed for that purpose. The plain spigot end shall be forced into the hub end of the pipe for the full depth of the hub itself. Lubricant shall be a bland, flax-base, nontoxic material and shall not chemically attack the gasket material.