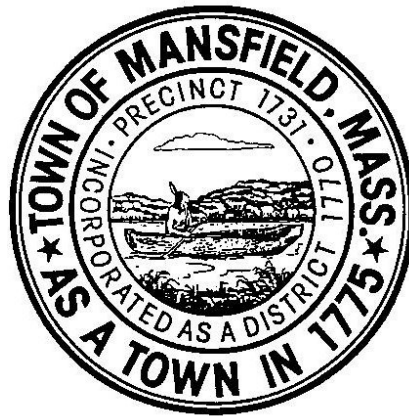


**TOWN OF MANSFIELD  
DRAINLAYER'S LICENSE AND  
SEWER DESIGN AND CONSTRUCTION  
REGULATIONS  
2005**



Adopted March 2, 2005  
Amended July 6, 2011  
Mansfield Board of Selectmen

<b>DEFINITIONS:</b> .....	<b>5</b>
<b>1.0 PURPOSE</b> .....	<b>8</b>
<b>2.0 APPLICABILITY</b> .....	<b>8</b>
<b>3.0 DRAINLAYER'S LICENSE</b> .....	<b>8</b>
3.1 Issuance of Drainlayer Licenses.....	8
3.2 Application.....	9
3.2.1 Insurance.....	9
3.2.2 <b>License Term</b> .....	9
3.2.3 <b>License Fees</b> .....	9
3.2.4 Performance Bond.....	9
3.2.5 References.....	10
3.3 Notice of Violation.....	10
3.4 Fines.....	10
3.5 Terminations and Suspension of License.....	11
3.6 License Application/Renewal Forms.....	11
3.7 <b>Contractors working on behalf of the Town</b> .....	11
<b>4.0 SEWER PERMITS</b> .....	<b>11</b>
4.0.1 Permit Required.....	11
4.0.2 State Permits.....	12
4.0.3 Permit Types.....	12
4.0.4 Additional Requirements.....	12
4.0.5 Cost of Sewer.....	12
4.0.6 Unauthorized Work.....	12
4.0.7 Licensed Contractors (Drainlayer's).....	13
4.0.8 Sewer Permit Process.....	13
4.0.9 Permit Fee.....	13
4.0.10 Street Opening Permit.....	14
4.0.11 DIGSAFE and Mansfield Water Department.....	14
4.0.12 Application for Local Permit.....	14
4.0.13 Eligibility.....	15
4.0.14 Expiration of Permit.....	15
4.0.15 Mandatory Inspection of Sewer Work.....	15
4.0.16 Video Camera Inspection.....	16
4.0.17 Right of Entry.....	16
<b>4.1 SEWER CONNECTION PERMIT</b> .....	<b>16</b>
4.1.1 <b>Minimum Size, Fittings and Clean-outs</b> .....	16
4.1.2 Wye Saddles.....	18
4.1.3 Minimum Elevations for Gravity Connection.....	18
4.1.4 <b>Grease Traps</b> .....	18
4.1.5 Industrial Connections.....	19
4.1.6 Inspection.....	19
4.1.7 Grinder Pumps and Sewage Ejectors.....	20
4.1.8 Testing of Service Connections.....	20
<b>4.2 SEWER EXTENSION PERMIT</b> .....	<b>20</b>

4.2.1	Design.....	20
4.2.2	Paper Streets.....	20
4.2.3	Master Plan.....	20
4.2.4	Future Connections.....	20
4.2.5	Minimum Size.....	21
4.2.6	<b>Depth</b> .....	21
4.2.7	Slope.....	21
4.2.8	Minimize Solids Deposition.....	21
4.2.9	Slope Between Manholes.....	22
4.2.10	High Velocity Protection.....	22
4.2.11	Steep Slope Protection.....	22
4.2.12	Impervious Dams.....	22
4.2.13	Alignment.....	22
4.2.14	Changes in Pipe Size.....	22
4.2.15	Manhole Locations.....	22
<b>4.3</b>	<b>SEWER REPAIR PERMIT.....</b>	<b>22</b>
<b>4.4</b>	<b>SEWER DISCONNECTION PERMIT.....</b>	<b>23</b>
4.4.1	<b>Credit for Existing Flow.....</b>	<b>23</b>
<b>5.0</b>	<b>TECHNICAL REQUIREMENTS.....</b>	<b>23</b>
5.1	Trench Excavation and Backfill.....	23
5.1.1	Traffic Control & Safety.....	23
5.1.2	<b>Materials</b> .....	24
5.2	General Construction.....	25
5.2.1	Clearing the Right of Way.....	25
5.2.2	Pavement Removal and Replacement.....	25
5.2.3	Blasting.....	25
5.2.4	Trench Width.....	25
5.2.5	Grade.....	26
5.2.6	Shoring, Sheet piling, and Boxing of Trenches.....	26
5.2.7	Location of Excavated Materials.....	26
5.2.8	Debris.....	26
5.2.9	Safety.....	26
5.2.10	Removal of Water.....	26
5.2.11	Trench Backfill Compaction.....	27
5.2.12	Excess Excavated Material.....	27
5.2.13	Rock Excavation.....	27
5.2.14	Controlled Density Fill.....	27
5.3	Sewer Pipe Installation.....	28
5.3.1	<b>Scope</b> .....	28
5.3.2	Materials.....	28
5.3.3	Joints.....	28
5.3.4	Preparation of Trench.....	29
5.3.5	Preparation of Sewer Pipe.....	29
5.3.6	Laying and Jointing Pipe and Fittings.....	29
5.3.7	<b>Sewer Installation</b> .....	29
5.3.8	Testing of Sewer Pipe & Appurtenances.....	31
5.4	Manhole and Clean-out Construction.....	32
5.4.1	Concrete.....	32

TOWN OF MANSFIELD  
DRAINLAYER'S LICENSE AND  
SEWER DESIGN AND CONSTRUCTION REGULATIONS

5.4.2	Precast Manhole Sections.....	32
5.4.3	Special Fittings.....	32
5.4.4	Drop Manholes.....	32
5.4.5	Manhole Frames and Covers.....	32
5.4.6	Watertightness.....	33
5.4.7	Coating.....	33
5.4.8	Manhole Steps.....	33
5.4.9	Manhole Stubs.....	33
5.4.10	Manhole Bench (Table).....	33
5.4.11	Manhole Inverts (Flow Channel).....	33
5.4.12	Buoyancy.....	34
5.5	Grinder Pumps and Sewage Ejectors.....	34
5.6	Pressure Sewer Systems.....	35
5.6.1	Layout.....	35
5.6.2	Pipe Size.....	35
5.6.3	Pipe Material.....	35
5.6.4	Valves.....	35
5.6.5	Air Release Valves.....	36
5.6.6	Cleanout Connections.....	36
5.7	Wastewater Pumping Stations and Force Mains.....	36
5.8	Trenchless Technology.....	36
5.8.1	Existing Utilities.....	36
5.8.2	Pipe Jacking.....	36
5.8.3	Horizontal Directional Drilling.....	36
5.8.4	Boring Path Report.....	37
5.8.5	As-Built Trenchless Sewers.....	37
<b>6.0</b>	<b>SEWER TESTING.....</b>	<b>37</b>
6.1	Low Pressure Air Testing.....	37
6.2	Vacuum Test (Negative Air Pressure).....	38
6.3	Exfiltration Testing.....	40
6.4	Force Main Testing.....	41
6.5	Deflection Testing.....	42
<b>7.0</b>	<b>SEWER EASEMENTS.....</b>	<b>42</b>
7.1	Public Sewers.....	42
7.2	Private Sewers.....	42
7.3	Rules Regarding Sewer Easements.....	43
<b>8.0</b>	<b>PROTECTION OF WATER SUPPLY.....</b>	<b>43</b>
8.1	Cross Connections.....	43
8.2	Relation to Water Main.....	43
8.2.1	Horizontal Separation.....	43
8.2.2	Vertical Separation.....	44
8.2.3	Concrete Encasement.....	44
8.3	Well Areas-Zone II.....	44
8.4	Location of Sewers in Streams.....	44
8.4.1	Cover Depth.....	44
8.4.2	Alignment.....	44
<b>9.0</b>	<b>VALIDITY.....</b>	<b>44</b>

**APPENDIX A – Sewer Construction Details**

**APPENDIX B – Drainlayers License Application and Bond Form**

**APPENDIX C - Water & Sewer Connection Fee Schedule**

**DEFINITIONS:**

Appurtenance shall mean any piece associated with the physical operation of the Mansfield Sewerage System.

ASTM shall mean the material standard of the American Society for Testing and Materials.

Board shall mean the Board of Selectmen, acting as Sewer Commissioners, or their authorized agent.

Building Sewer shall mean the extension from the interior plumbing to the public sewer or other place of disposal. The building sewer extends from the foundation at the building to the property line.

CDF shall mean controlled density fill or flowable fill.

Concentric shall mean the relationship between two different circular, cylindrical sewer pipes, when one is exactly centered within the other.

DEP shall mean the Massachusetts Department of Environmental Protection.

Director shall mean the Director of Public Works of the Town of Mansfield, or his authorized agent or representative.

Drain - Any system of pipes, catch basins, ditches, leaching facilities, or similar installations, which collect and carry storm water or rain water and is:

- a. Located in a subdivision approved under the subdivision control Law after the adoption of these regulations.
- b. On land subject to site plan approval under Mansfield Zoning By-Law.
- c. Connected directly or indirectly to the Town's drainage facilities.

Drainlayer shall mean a person or entity fully licensed, bonded, and insured to install sewers or drains in the Town of Mansfield.

Drainlayer License - A license required by the Sewer Commissioners for any person or entity installing a public or building sewer or drain in the Town of Mansfield.

Engineer shall mean any person who is licensed by the Commonwealth of Massachusetts to perform professional engineering services.

EPA shall mean the United States Environmental Protection Agency.

Garage shall mean any structure or property where one or more motor vehicles are kept, stored, or serviced, including a public or private garage, carport, motor vehicle repair shop, paint shop, service station, lubritorium, car wash, gasoline station with grease pits or wash racks or areas, or any building used for similar purposes.

Gallons Per Day (GPD) shall mean the estimated flow of sewerage based on DEP regulations 314 CMR 7.15.

Industrial Discharge Permit shall mean the permit required or issued by a Municipality for the discharge of industrial waste.

Infiltration shall mean the water entering a Sewerage System from the ground or a water body, including through such means as, defective building drains and sewers, pipes, pipe joints, connections, or manhole walls.

Inflow shall mean the discharge into a Sewerage System, including service connections, from such sources including, but not limited to: roof leaders, cellars, yards, and area drains, foundation drains, sump pumps, Cooling Water discharges, drains from springs, and swampy areas, manhole covers, cross connections from Storm Sewers and Combined Sewers, catch basins, storm water, surface runoff, or street wash water.

Licensed Drainlayer shall mean a drainlayer who has a valid and current drainlayer license issued by the Town of Mansfield.

Lot shall mean an area of land in one ownership, with definite boundaries used, or available for use, as the site of one or more buildings.

May is permissive; shall is mandatory.

M.G.L. shall mean Massachusetts General Law.

Owner shall mean the person(s) holding fee simple title to a parcel, tract or lot of land, as shown by the record in the appropriate Land Registration Office, Registry of Deeds or Registry of Probate.

Paper Street shall mean any road, street or way not legally accepted as a public way by the Town of Mansfield.

Person shall mean an individual or two or more individuals, or trust, or a group or association of individuals, having a common or undivided interest in a tract of land including a partnership or corporation.

Plans shall mean approved contract drawings, Town standards, working drawings, Detail sheets or exact reproductions thereof, which show the location, character, dimensions and details of the work to be done.

Private Sewer System shall mean any portion of sewer, which is located on private property, within a private easement, on a private way, or in an unaccepted way prior to Town acceptance and is privately owned and maintained.

Public Sewer System shall mean any portion of the Mansfield Sewer System which is located in a public way, on Town owned land, in a Town sewer easement, or any sewer which has been formally accepted by the Town of Mansfield and is controlled by the Board of Selectmen acting as Sewer Commissioners, and maintained by the Director of Public Works.

Recorded shall mean recorded in the Registry of Deeds of Bristol County, except that, as affecting registered land, it shall mean filed with the Recorder of The Land Court. (Section 81-L of Chapter 41, M.G.L.).

Right-of-Way shall mean the area that has been laid out for travel purposes.

Sanitary Sewer shall mean a Sewer that carries Sanitary Sewage and/or Industrial Wastes.

Sewage shall mean the spent water of a community, which may be a combination of liquid and water-carried Wastes from residences, commercial buildings, industrial facilities, and institutions, together with any groundwater, surface water, and/or storm water that may be present.

Sewer shall mean a pipe or conduit that carries Sewage.

Sewer System shall mean pipelines or conduits, pumping stations, force mains, and all other structures, devices, appurtenances, and facilities used for collecting and conveying wastes to a site or works for treatment or disposal.

Sewer Connection shall mean the sewer pipes and appurtenant works necessary to connect a building or estate to a sewer system.

Sewer Extension shall mean the addition to a sewer system of a sewer pipe, together with appurtenant works, which when connected to the sewer system becomes the property of, and is operated and maintained by, the person owning the sewer system.

Shall is mandatory; may is permissive.

Slope shall mean the inclination of a trench bottom or a trench sidewall, expressed as a ratio of vertical distance to the horizontal distance. For example, a 3:1 slope shall rise or fall 3 vertical feet in a distance of 1 horizontal foot.

Solid Waste shall mean any unwanted or discarded solid material, consisting of putrescible or nonputrescible solid waste material, including garbage and rubbish.

Storm Drain or Storm Sewer shall mean a pipe or conduit for conveying ground, storm, or surface waters, roof and surface runoff, uncontaminated Cooling Water, and non-contact industrial process waters.

Subgrade shall mean the plane at the bottom of the subbase.

Surveyor shall mean a person who is registered by the Commonwealth of Massachusetts to perform professional land surveying services.

Town Engineer shall mean the Town Engineer of the Town of Mansfield, or his duly authorized agent or representative.

Wastewater shall mean sewage, industrial waste, other wastes or any combination of the three.

## **1.0 Purpose**

These regulations are intended to protect the public health, safety and welfare and the environment and to ensure proper and safe operation of the Mansfield Municipal Sewer System by regulating the direct and indirect discharge of wastewater and pollutants to the Sewerage System in accordance with 360 CMR 10.000 and the Town of Mansfield Sewer Use Regulations adopted by the Board of Selectmen on February 21, 1996.

In the absence of code provisions or in amplification thereof, the materials and procedures as set forth in appropriate specifications shall apply:

- ❑ American Society of Testing Material (ASTM), and the Water Pollution Control Federation (WPCF) Manual of Practice No.7, "Operation and Maintenance of Wastewater Collection Systems".
- ❑ American Society of Civil Engineers (ASCE), Manuals and Reports in Engineering Practice No.60, "Gravity Sanitary Sewer Design and Construction".
- ❑ New England Interstate Water Pollution Control Commission Technical Report #16 (TR-16), "Guides for the Design of Wastewater Treatment Works".
- ❑ **Current Town of Mansfield, Department of Public Works, "Design and Construction Regulations"**

The Town Engineer shall, in the case of any discrepancies or questions, direct the Contractor accordingly.

## **2.0 Applicability**

- 2.1** The Town of Mansfield Board of Sewer Commissioners requires all contractors in the business of installing sewer and drains to be licensed with the Town. The Sewer Commissioners have designated the Town Engineer to administer the licensing program as described by these regulations.
- 2.2** No unauthorized person shall uncover, make any connections with or opening into, use, alter, or disturb any public or private sewer appurtenance thereof without first obtaining approval of a Sewer Permit for the connection, extension, or repair of a sewer as appropriate from the Town Engineer.
- 2.3** Every person who directly or indirectly discharges Wastewater to the Town of Mansfield Sewerage System shall ensure that such discharge complies with 360 CMR 10.000. The requirements of 360 CMR 10.000 apply to direct discharges to the Mansfield Sewerage System and to discharges to the Mansfield Sewerage System through a municipal sewer.

## **3.0 Drainlayer's License**

### **3.1 Issuance of Drainlayer Licenses**



Any drainlayer working on land in the Town of Mansfield shall be licensed pursuant to these regulations. Licenses shall be obtained from the Sewer Commissioners through the Town Engineer or his designee at the Mansfield Town Hall, Six Park Row, Mansfield, Massachusetts, 02048, telephone number (508) 261-7377. The license shall be in the name of the entity or an individual. A drainlayer license application is attached in Appendix B.

### 3.2 Application

A license application shall not be considered complete unless a valid State of Massachusetts Heavy Equipment Operators License, Certificate(s) of Insurance, Performance Bond, references, and the appropriate fee accompany it. The entity or individual shall complete the license application and submit it to the Town Engineer, who will present the completed application to the Sewer Commissioners for approval within twenty-one (21) days. The Town shall maintain an up-to-date list of Licensed Drainlayers, which shall be provided to residents and others requesting the same.

#### 3.2.1 Insurance

The licensed drainlayer shall file an insurance certificate(s) listing the Town as the additionally insured and stating that the Town shall be notified thirty (30) days prior to cancellation annually with the Town of Mansfield for the appropriate insurance coverage shown below:

- a. Worker's Compensation Insurance for the protection of all employees in accordance with applicable state law.
- b. Contractor's Liability with limits of \$1,000,000.00.
- c. Automotive liability on and off public highways, owned vehicles, hired vehicles, and non-ownership liability with a limit of \$1,000,000.00.

Liability insurance shall cover property damage insurance, blasting and explosion, underground damage to utilities, and collapse, and be issued by an insurance agency licensed to do business in Massachusetts.

#### 3.2.2 License Term

**The license term for a drainlayer shall be January 1<sup>st</sup> to December 31<sup>st</sup>.**

#### 3.2.3 License Fees

**Licensed Drainlayers shall pay an annual license fee of \$250.00 to the Town of Mansfield at the time of application or renewal. All licenses regardless of the date of application date shall expire on December 31<sup>st</sup> of that year.**

#### 3.2.4 Performance Bond

A performance bond in the sum of \$5,000 that shall remain in full effect for a period of three years from the effective date of the license and shall be required

each year of licensure. The performance bond shall be prepared on the attached form included in Appendix B of these regulations.

Upon renewal of a license or in subsequent years application the drainlayer shall either submit a new bond which shall remain in full force for a period of three years from the date of application or renewal, or extend the length of the current bond on file, by means of a certificate of rider so that the expiration date of the current bond will be changed to be in full effect for a period of three years from the date of application or renewal.

### 3.2.5 References

The drainlayer shall submit a list of at least three references that are familiar with the past work and experience of the drainlayer. The list shall include the name, organization, contact number(s), and brief description of the type of work performed for each reference. Other municipal references are preferred.

### 3.3 Notice of Violation

The Town will issue a "Notice of Violation" whenever it determines that:

1. A contractor is performing work without proper licensure.
2. A contractor is in non-compliance with the Rules and Regulations set forth by the Department of Public Safety.
3. Construction is proceeding in a manner that jeopardizes public safety.
4. Construction is occurring in violation of these Standards and/or any other applicable approved specification or details.
5. Sewer construction is proceeding without a valid permit.
6. There is a connection of any source of clear water (inflow and/or infiltration) to the Building Sewer.
7. There is, or has been, a discharge, into the Town of Mansfield Sewerage System, of any prohibited water or wastes as defined in 360 CMR 10.000.
8. Work is taking place in the right-of-way without proper permits and/or notifications.
9. There is damage to the roadway, public property, or utilities resulting from the work.
10. There are Debris and/or soils in the roadway resulting from the work.
11. Work is not completed, including necessary testing and as-built documentation.

Any person found to be violating any provision of these Regulations shall be served by the Town with written notice stating the nature of the violation and provided with a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease and correct all violations.

The Board of Selectmen have designated the Town Engineer to enforce these regulations.

### 3.4 Fines

The Town Engineer may impose a **\$250.00** fine per day against any drainlayer who violates the requirements contained herein until the violation is rectified and accepted by the Town Engineer. The licensed drainlayer may appeal the fine to the Board of Sewer

Commissioners. The appeal must be made in writing within 10 business days of issuance.

The Board of Selectmen acting as Sewer Commissioners may also assess a civil penalty of up to **\$5,000.00** per day against the owner for each violation, including but not limited to hiring an unlicensed contractor to perform work on any sewer or drain, as described in Section 7 of the Town of Mansfield Sewer Use Regulations.

Any person violating any of the provisions of these Regulations shall become liable to the Town for any expense, loss or damage incurred by the Town by reason of such violations.

### 3.5 Terminations and Suspension of License

The Sewer Commissioners may terminate or suspend any drainlayer license upon due notice and after a public hearing for violating any of the specifications contained herein including the expiration of bonds and/or insurance. There shall not be any rebate on the annual fee upon termination. Termination will be for just cause including shoddy workmanship, performing work without a permit, excessive groundwater infiltration to sewers, deliberate groundwater infiltration, incomplete work, any violation of this regulation, not completing proper as-built plans, gravel or stones or soil entering the sewer, septage in flow, and other just causes. The contractor may apply for reinstatement, but the Town retains the right to not reissue the license or only reissue it in the future at its discretion.

### 3.6 License Application/Renewal Forms

The Application for Drainlayer's License can be found in Appendix B of these regulations. The Town Engineer may issue a negative recommendation to the Sewer Commissioners based on previous violations, negative references, or lack of relevant experience. Also, the Town of Mansfield may withhold approval of any licenses and/or permits for outstanding taxes or fees.

### 3.7 Contractors working on behalf of the Town

**Any contractor performing construction or repair of sewers and drains as part of a contract with the Town of Mansfield who is working on behalf of the Engineering Division or the Department of Public works shall be exempt from the requirements of this section, provided that the contractor maintains insurance and bonding requirement equal to or greater than the requirements of these regulations. Contractors under contract with the Town must be licensed if they wish to perform other work not associated with a town Contract.**

## 4.0 Sewer Permits

### 4.0.1 Permit Required

No person shall connect to a Municipal Sewer System, or construct, effect, modify, or maintain a Sewer extension, connection or repair, without a sewer permit issued by the

Town Engineer, and when required a DEP extension/connection permit pursuant to M.G.L. c.21§ 43 and 314 CMR 7.00, 360 CMR 10.000.

Permit requirements are published by the DEP, and referenced by the application categories in the following table:

<b>DEP Permit Application Categories: 310 CMR 4.00</b>
BRP WP 13 Major Sewer Extension
BRP WP 14 Minor Sewer Extension; Connect w/Pump Station
BRP WP 17 Major Sewer Connection ( $\geq 50,000$ gpd)
BRP WP 18 Minor Sewer Connection (15,000 to 50,000 gpd)
BRP WP 55 Industrial Wastewater

#### 4.0.2 State Permits

All sewer extensions and sewer connections requiring a DEP Permit shall have a plan and necessary calculations prepared by a Registered Professional Engineer in the Commonwealth of Massachusetts. The Department of Environmental Protection (DEP) must approve the Sewer Extension or Connection before the Town will issue any Sewer Connection, Extension, or Street Opening Permits.

#### 4.0.3 Permit Types

The Town of Mansfield Engineering Department must issue a Sewer Permit for all repairs, modifications, connections, or extensions to the Mansfield Sewer System. In addition, Sewer Permits are required for the expansion of any existing building connected to the system that requires alteration or retrofit of the existing sewer or any of its direct appurtenances.

#### 4.0.4 Additional Requirements

Installation of Sewers and Drains shall be in accordance with these regulations and standards as well as any requirements of the Town Engineer. The Town of Mansfield reserves the right to waive any specification or to impose other regulations as required based on field conditions. Details of various Sewer components are attached in Appendix A and made a part of these regulations and standards.

#### 4.0.5 Cost of Sewer

All costs and expense(s) incident to the installation and connection of the building sewer shall be borne by the owner. The owner shall indemnify the Town from any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer.

#### 4.0.6 Unauthorized Work

No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment that is a part of the sewerage works. Any person violating this provision shall be subject to immediate arrest under the charge of disorderly conduct.

#### 4.0.7 Licensed Contractors (Drainlayer 's)

Only contractors licensed by the Town of Mansfield will be permitted to construct or repair Sewers. Any Sewer installed by contractors not licensed by the Town will be rejected. A list of Licensed Drainlayers may be obtained at the Mansfield Engineering Department. **Licensed Drainlayers shall not sub-contract Sewer installation work to anyone other than a Town licensed drainlayer.** If the Licensed Drainlayer of record does not perform the work the permit is null and void unless transferred to another licensed drainlayer per section 4.0.14. Failure to comply with this provision shall lead to a Notice of Violation for the Licensed Drainlayer and may result in loss of such License.

#### 4.0.8 Sewer Permit Process

Prior to beginning any work on any sewer in the Town of Mansfield, a licensed drainlayer shall obtain the appropriate permits as listed below:

- ❑ Sewer connections with sewer flows estimated to be less than 2,000 gallons per day require a Mansfield Sewer Connection Permit to be issued by the Town Engineer.
- ❑ Sewer connections with sewer flows estimated to be greater than 15,000 gallons per day, sewer connections with a pump station, and industrial sewer connections require both:

An appropriate Massachusetts DEP Permit; and

A Mansfield Sewer Connection Permit issued by the Town Engineer

- ❑ All sewer main extensions (including sewers to be installed on private roads) require both:

An appropriate Massachusetts DEP Permit; and

A Mansfield Sewer Extension Permit issued by the Town Engineer.

- ❑ Sewer repairs require a Mansfield Sewer Repair Permit issued by the Town Engineer.
- ❑ Sewer Disconnections (cut and cap) require a Sewer Disconnection Permit issued by the Town Engineer.

In addition, any industrial user or domestic source with flows 2,000 gallons per day or greater shall apply to the Water Pollution Control Facility (WPCF – (508) 285-5746) for an Industrial Discharge Permit. The Town Engineer will not issue a Sewer Connection Permit until either a copy of the Industrial Discharge Permit or determination that permit is not required is received from the WPCF.

#### 4.0.9 Permit Fee

A permit fee of \$100.00 plus \$1.00 per linear foot of sewer to be installed in excess of 100 feet shall be charged for each Permit. Additional inspections, if required, due to defective workmanship or incomplete construction may be assessed a re-inspection fee of an equal amount.

#### 4.0.10 Street Opening Permit

A drainlayer shall obtain a Street Opening Permit from the Department of Public Works, and obtain a police detail when necessary as determined by the Chief of Police, if construction of the sewer requires construction in a traveled way of a street or work within the Right of Way.

#### 4.0.11 DIGSAFE and Mansfield Water Department

Prior to beginning any excavation of a sewer or drain, the licensed drainlayer shall contact DIGSAFE at telephone number 1-888-DIG-SAFE to have all underground utilities located. The assigned DIGSAFE number shall be listed on the sewer permit application. The licensed drainlayer shall also notify the Mansfield Water Department (508) 261-7330 at least three (3) business days before construction is to begin so that the Water Department can mark the water lines at the site. The Water Department may waive the Water Department notification for sites located on unaccepted streets. The drainlayer must request waiver of this notification from the Water Department.

#### 4.0.12 Application for Local Permit

A Permit application must be made on the form prescribed by the Town of Mansfield Engineering Department. The application will require at a minimum, the following information:

- a. Location/Address of the work site;
- b. Name of the Owner;
- c. Name, license number, and telephone number of the drainlayer;
- d. Length, size and material of all sewer to be installed;
- e. Estimated residential, commercial and industrial sewer flow;
- f. Dig-Safe Number;

And where appropriate, the following items:

- A sketch of the proposed sewer connection showing all bends and clean-outs (required for existing residential buildings and repairs)
- A plot plan of the proposed building showing the proposed sewer connection, manholes, bends, and clean-outs (required for new construction and connection with pump station)
- Design drawings and calculation performed by a Massachusetts Professional Engineer (required for all sewer extensions and low pressure sewers)
- Copy of DEP Permit (required for connections over 15,000 GPD, industrial connections, and sewer extensions)
- Proof of Mansfield Industrial Discharge Permit (required for all connections over 2,000 GPD and all industrial users)

#### **4.0.13 Eligibility**

The Town of Mansfield shall issue permits to contractors licensed to perform excavation in the Town of Mansfield.

NOTE: The Town of Mansfield may deny permits to any applicant who has previously violated, or is currently in violation of, these Standards or any other Mansfield rules, regulations, standards, specifications or details described herein. In addition the Town of Mansfield may deny permits to any drainlayer who has not satisfactorily completed or furnished required testing reports or as-builts for previous permits.

#### **4.0.14 Expiration of Permit**

- A. The Permit will expire if the work is not initiated within one year (365 days) from the date of issuance. Upon Permit expiration, a new Permit, including payment of the Permit fee, will be required for the future connection and inspection(s).
- B. A sewer permit will become void if request to cancel the permit is received by either the owner or drainlayer who originally applied for the permit. No refunds will be issued for canceled or duplicate permits. No permit shall be transferred to a different drainlayer unless permission to transfer is granted in writing by the original drainlayer on a permit.
- C. The Town of Mansfield may extend the duration of the Permit for a reasonable period. Requests for extension of the Permit period must be submitted in writing to the Mansfield Engineering Department in advance of the expiration and must state the reason for request.

#### **4.0.15 Mandatory Inspection of Sewer Work**

- A. The Contractor shall notify the Engineering Department prior to beginning any work and again (if necessary) when that sewer work is available for inspection. Notification is to be provided at least twenty-four (24) hours before the inspection is desired. The Engineering Department will perform inspections on Sewers during normal Town Hall business hours, or as agreed to in advance with the Engineering Department. No holiday or weekend work shall be allowed except by permission of the Engineering Department.
- B. It is the responsibility of the Contractor to ensure that the sewer is inspected, in its entirety, and that all work is exposed for inspection and constructed in accordance with these standards. Under no circumstance shall the Sewer work be backfilled without an inspection by the Town Engineer or his authorized representative.
- C. The Town Engineer may require re-excavation of a buried sewer utility if an inspection was not performed at the time of installation.

#### 4.0.16 Video Camera Inspection

The Town Engineer or Public Works Department may, at their discretion, require the connection to be inspected using closed circuit television equipment. Video camera inspections shall be performed to inspect for, but not limited to, the following:

- a. Joint separation.
- b. Pipe sags.
- c. Construction debris in sewer line.
- d. Properly installed joints.
- e. Deformed pipes.
- f. Cracks in pipes.
- g. Infiltration.
- h. Number of fittings and distance between manholes.
- i. Illegal discharge of clear water.

#### 4.0.17 Right of Entry

An authorized representative of the Town of Mansfield shall have the right of entry to, upon or through the Owner's Premises for purposes of inspecting Building Sewers or to determine if any sources of clear water are connected to the Building Sewer.

### 4.1 Sewer Connection Permit

A Mansfield Sewer Connection Permit must be issued before the installation of any service connection. For connections to existing buildings, a completed sketch of a service connection shall be included with the sewer connection permit application. This sketch shall show the general alignment of the sewer including any bends, clean-outs, or manholes. The sketch shall also show the proximity of the sewer line to any significant features such as buildings, structures, paved areas, and water lines. In cases of distant or complex pipe configurations, the Town Engineer may require a plan and profile of a sewer connection to be completed by a Massachusetts Registered Professional Engineer. For connections to new buildings, a plot plan shall be included with the sewer connection permit application, which shows the proposed sewer including all bends, clean-outs, and manholes, along with the proposed building and all other utilities.

#### 4.1.1 Minimum Size, Fittings and Clean-outs

- A. Building Sewers must be a minimum of six (6) inches in diameter and sized based on the anticipated flows. Building Sewers must have a **tee-wye** clean-out located no more than (10) feet from the buildings exterior wall.
- B. If an existing sewer lateral servicing a property is five (5) inches or less in inside diameter the Drainlayer may use four (4) inch PVC SDR35 instead of six (6) inch with prior approval from the Town Engineer.
- C. Sewer Service is to begin a maximum of ten (10) feet off the inside wall of building foundation.
- D. Six (6) inch pipe must be used to within ten (10) feet of the building, at which point the plumbing regulations will be adhered to. If a four (4) inch pipe extends



from the building, a four (4) to six (6) inch Fernco Flexible Coupling (or approved equal) will be used in joining the six (6) inch to the four (4) inch pipe. A licensed plumber must perform all work within ten (10) feet of the building.

- E. All changes in direction are to be made with either twenty-two and a half (22½) or forty-five (45) degree bends with at least three (3) feet of horizontal pipe between fittings. At a minimum, where two bends are used to form a ninety (90) degree turn, a wye clean-out shall be provided. A clean-out shall be provided every one hundred (100) feet. Where conditions warrant, as determined by the Town Engineer, a sewer manhole shall be provided in lieu of a clean-out.
- F. All clean-outs must be the same diameter as the horizontal Building Sewer into which the clean-out is connected; minimum of six (6) inches.
- G. All clean-outs must be extended to within six (6) inches of finished grade and be provided with a screw on cap.
- H. **If a tee wye cleanout is installed under a paved or traveled area, an appropriate size frame and cover shall be provided and brought to grade. Refer to typical In Line Cleanout Detail Located in Pavement or Traveled Way, see Appendix A. The frame and cover shall be installed as to prevent any load from being transferred onto the PVC riser or screw plug.**
- I. Crushed stone shall be placed a minimum of six (6) inches above and below and all around the Sewer pipe at full width of the trench and around any cleanouts.
- J. Slope requirements within the building must conform to the latest edition of the State of Massachusetts Plumbing Code, local codes, and to these standards, whichever is more stringent.
- K. Building Sewers must be installed at a minimum slope of 2.00% (1/4" per foot) and a maximum slope of 7.00%. The Town, depending on site conditions, may modify the slope requirements.
- L. Sewers must not connect directly into any manhole without the prior written approval of the Town Engineer. Inside drop connections to manholes are not permitted, unless prior approval of the Town Engineer is granted.
- M. Building Sewers must maintain a minimum cover (from finished grade to top of pipe) of three (3) feet. The Town will not accept Sewers installed with less than three (3) feet of cover in a right-of-way or easement, unless prior permission has been obtained from the Town Engineer.
- N. A separate and independent building sewer shall be provided for every building. However, where one building stands at the rear of another on an interior lot, both buildings are located in Mansfield, and no private sewer is available or can be constructed to the rear of the building through an adjoining alley, court, yard, or driveway, the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer. If in the case of a residential accessory structure, an existing separate lateral or tee is to be used if

available. If no available lateral or tee exists, the accessory structure may be connected by a tee wye into the existing house service provided that the entire service is upgraded to PVC.

- O. **All commercial, industrial, residential apartments and condominium buildings with four (4) or more units shall use a sewer manhole, in place of clean-outs, outside of the building foundation and for changes in direction.**

#### 4.1.2 Wye Saddles

- A. Where a lateral or tee does not service a property, a wye saddle may be used on the sewer main with approval of the Town Engineer.
- B. A Fernco-type wye saddle may be used under the following conditions. A hole shall be carefully drilled at the 10-12 o'clock position on the pipe, making sure not to damage the sewer main in any way. The saddle is then strapped securely around the main with steel strapping and concrete is poured completely around the saddle.
- C. **No saddle connections to the sewer will be allowed in new subdivision construction. Only rigid slip couplings shall be allowed on PVC sewer mains.**

#### 4.1.3 Minimum Elevations for Gravity Connection

- A. Upon exiting the building, the Sewer must maintain a minimum cover (from finished grade to top of pipe) of three (3) feet. Where an existing sewer pipe exits an existing building with less than three (3) feet of cover, the contractor shall install the connection so as to meet minimum cover requirements as soon as is practical.
- B. In cases where the building sewer crosses a water main or service with less than eighteen (18) inches of vertical separation between the pipes, the Contractor shall completely encase the joints of the sewer pipe with six (6) inches of 3,000 PSI concrete using a form (not free flow). Any joint in the sewer pipe which falls within ten (10) feet measured horizontally from the centerline of the water main or service shall be encased. This encasement must be inspected by the Engineering Department prior to backfill. Based on existing or anticipated field conditions, the Engineering Department may require additional concrete encasement.

#### 4.1.4 Grease Traps

- A. All restaurant and food service establishments, as defined in 105 CMR 590.001 or any successor regulation, shall be equipped with a grease trap which complies with the construction and maintenance specifications set forth in Title V of the State Environmental Code 310 CMR 15.05 and 360 CMR 10.000.
- B. All grease traps shall be installed on the exterior of the building and shall be located as to be readily and easily accessible for cleaning and inspection. Grease

traps shall not be installed unless tested, rated and bear the seal acceptance from the state Plumbing Board or approved by the Town Engineer.

- C. Installation of a grease trap shall require the installation of an inspection manhole, immediately downstream of the grease trap. This inspection manhole shall be used to confirm the serviceability of the grease trap.
- D. Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his own expense and reported to the Mansfield Sewer **Division** on an annual basis.
- E. **Grease traps shall be equipped with devices to control the rate of water flow through the traps so that the flow rate does not exceed the rated design flow of the grease trap.**
- F. **The waste from the food and waste grinders shall not discharge to the sewer system through a grease trap.**
- G. **In the maintaining of these grease traps, the owner(s) shall be responsible for proper removal and disposal by appropriate means of the captured material and shall maintain records of dates and means of disposal that are subject to review by the Town Engineer and the Board of Health. Licensed waste disposal firms must perform any removal and handling of the collected material.**
- H. **Failure to properly maintain a grease trap shall be a violation of these regulations.**

#### 4.1.5 Industrial Connections

When required, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters, and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of wastes. Such manhole, when required, shall be accessible and safely located and shall be maintained by the owner so as to be safe and accessible at all times.

#### 4.1.6 Inspection

- A. At the time of inspection, the sewer shall be connected to the building plumbing. The Town shall inspect all work and the final connection before any portion of sewer is backfilled. All pipe installed shall be inspected by the Town engineer or his designee prior to approval. The pipe shall be bedded and backfilled to the spring line of the pipe with the specified 3/4-inch crushed stone. Once the pipe has been inspected, the **Licensed** Drainlayer may then complete the stone and gravel backfill as specified above. No stones or other materials greater than 6 inches shall be allowed within the backfilled trench. The **Licensed** Drainlayer shall contact the Engineering Department a minimum of 24 hours prior to the inspection request, and notify the department when they are to begin work.

- B. At the time of inspection, the Drainlayer shall have prepared an As-Built sketch of the service connection. The as-built shall include three measurements to a fixed location for the connection at the property line, cleanouts, bends, and Fernco.

#### **4.1.7 Grinder Pumps and Sewage Ejectors**

In cases where the existing sewer will not drain by gravity to the sewerage system, a pump system shall be designed and installed in accordance with Section 5.5.

#### **4.1.8 Testing of Service Connections**

Vacuum Testing will be required for all manholes (See Section 6). Air pressure tests may be required in some circumstances (See Section 6).

### **4.2 Sewer Extension Permit**

#### **4.2.1 Design**

All sewer extensions shall be designed by a Massachusetts Registered Professional Engineer in accordance with TR-16 and The Town of Mansfield **Sewer Design and Construction** Regulations. All sizes, slopes and materials are to adhere to TR-16. A plan and profile along with associated details of the sewer extension shall be submitted to the Town Engineer with the permit application for review.

#### **4.2.2 Paper Streets**

All sewer design and construction work proposed or performed in paper streets, shall comply with the Town of Mansfield Subdivision Regulations.

#### **4.2.3 Master Plan**

All sewer extensions shall be designed to conform to the current Town of Mansfield Sewer Master Plan. In no case shall a sewer extension be approved or installed unless the proposed sewer provides the proper sewer pipe material, size, depth, and alignment to achieve the current and future goals or intent of the Master Plan.

In the absence of a Master Plan, or as an interpretation or clarification thereto, the Town Engineer may reasonably require a particular material, size, depth and alignment of a proposed sewer extension be modified to allow for future sewer service.

#### **4.2.4 Future Connections**

Where the sewer main passes in front of a property, provision for future connection of that property shall be provided by the Contractor and recorded with the Mansfield Engineering **Division**.

Building Sewers installed for future connections must be terminated at the limit of the right-of-way or easement and plugged to ensure water tightness. A standard 2"x4" with

the top four feet painted green must be installed at the end of the plugged line and recorded with the Mansfield Engineering **Division**.

#### 4.2.5 Minimum Size

No public gravity sewer shall be less than eight inches (20 cm) in diameter.

#### 4.2.6 Depth

In general, sewers should be designed deep enough to drain basement fixtures and to prevent freezing. **Insulation shall be provided for sewers that cannot be placed at a minimum depth of three (3) feet. This minimum depth shall be taken as the distance from the existing ground to top of pipe, with the approval of the Town Engineer or his designee.**

#### 4.2.7 Slope

All sewers should be so designed and constructed to give a velocity when flowing full of not less than 2.0 feet per second (0.61 m/s) based on Manning's formula using an "n" value of 0.013. Use of other "n" values may be permitted by the reviewing agency if deemed justifiable on the basis of research or field data presented. The following minimum slopes may be used only if absolutely necessary because of grade restrictions; however slopes greater than these are desirable.

Sewer Size	Minimum Slope in Feet Per Feet (m/m)
8 inch (203mm)	0.004
10 inch (254mm)	0.0028
12 inch (305mm)	0.0022
14 inch (356mm)	0.0017
15 inch (381mm)	0.0015
16 inch (406mm)	0.0014
18 inch (457mm)	0.0012
21 inch (533mm)	0.0010
24 inch (610mm)	0.0008
27 inch (686mm)	0.00067
30 inch (762mm)	0.00058
36 inch (914mm)	0.00046

#### 4.2.8 Minimize Solids Deposition

The pipe diameter and slope shall be selected to obtain the greatest practical velocities to minimize settling problems. Oversizing of sewers in order to justify using flatter slopes is discouraged. If the proposed slope is less than the minimum slope of the smallest pipe which can accommodate the design peak hourly flow, the actual depths and velocities at minimum, average and maximum day and peak hourly flow for each design section of the sewer shall be calculated by the design engineer and submitted to the reviewing authority.

#### **4.2.9 Slope Between Manholes**

Sewers shall be laid with uniform slope between manholes.

#### **4.2.10 High Velocity Protection**

Velocities greater than 12 feet per second (3.7 m/s) will not be permitted under any flow conditions, unless adequate special provision is made to protect against displacement by erosion and impact.

#### **4.2.11 Steep Slope Protection**

Sewers on 15 percent slopes or greater shall be anchored securely to prevent displacement.

#### **4.2.12 Impervious Dams**

Impervious dams should be provided every 300 feet to control the flow of groundwater within the pipe bedding material.

#### **4.2.13 Alignment**

In general, sewers 30 inches or less in diameter should be laid out in a straight line and alignment should be checked with a laser beam.

#### **4.2.14 Changes in Pipe Size**

When a smaller sewer joins one of a larger diameter, the invert of the smaller sewer should be raised sufficiently to maintain the same energy gradient. An approximate method for securing these results is to match crowns.

#### **4.2.15 Manhole Locations**

Manholes shall be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and distances not greater than 400 feet for sewers 15 inches or less in diameter, and 500 feet for sewers 18 to 42 inches in diameter. Greater spacing may be permitted in larger sewers and on those carrying a settled effluent, with prior approval of the reviewing agency.

### **4.3 Sewer Repair Permit**

- 4.3.1** If any private sewer service connection or main becomes obstructed or otherwise fails to work properly, notice must be given to the Town Engineer or his duly authorized agent. If maintenance or repair work is necessary on private property the owner shall pay the cost of such work. Repair work or maintenance of the sewer system on Town Property will be performed and paid for by the Town of Mansfield. The property owner(s) affected shall be responsible to determine that the obstruction is not on his property. In no way will the Town pay for or reimburse any owner or drainlayer who performs work on private property as a result of a blockage or maintenance issue on Town property.

- 4.3.2** A Mansfield Sewer Repair Permit must be issued before the repair of any sewer service, main, manhole or other appurtenance. A completed sketch of the proposed repair shall be included with the Sewer Repair Permit application. This sketch shall show the general alignment of the sewer including any bends, clean-outs, or manholes. The sketch shall also show the proximity of the sewer line to any significant features such as buildings, structures, paved areas, and water lines.
- 4.3.3** At the time of inspection, the Drainlayer shall have prepared an as-built sketch of the repair. The as-built shall include three measurements to a fixed location for the connection to existing pipes, cleanouts, and bends.
- 4.3.4** **The Town Engineer may require that a clean-out be installed as part of any physical repair performed, regardless of the scope of the repair, if a clean-out does not exist.**

#### **4.4 Sewer Disconnection Permit**

Prior to the demolition of any building or structure that is connected to the sewer system, the sewer service for that building or structure must be permanently capped at the property line or at another location with the approval of the Town Engineer. A **licensed** drainlayer shall obtain a Sewer Disconnection Permit for the work, and the work shall be inspected and as-built plan submitted in the same manner as described in Section 4.1.

##### **4.4.1 Credit for Existing Flow**

**For Buildings being demolished for the purpose of constructing a new building or buildings on the same lot, the estimated average daily flow per 314 CMR 7.15 of the existing structure will be credited towards the proposed average daily flow of the proposed structure(s) in the fee calculation as provided in Appendix C under the following circumstances:**

- The existing building(s) was in existence and connected to Town sewer within two (2) years of the new building Sewer Connection Permit application;**
- The existing building(s) are located on the same lot;**
- A valid Disconnection Permit was issued prior to demolition.**

#### **5.0 Technical Requirements**

##### **5.1 Trench Excavation and Backfill**

###### **5.1.1 Traffic Control & Safety**

- A. All excavations for sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the Town.

- B. If work is being performed in a traveled way, it shall be at the discretion of the Chief of Police to require an assigned Police Detail to any and all work performed in the travel way.
- C. Any work within a State Highway shall be coordinated with the Massachusetts Highway Department.

### 5.1.2 Materials

#### A. Trench Backfill

Placement of backfill material shall include the working of material to achieve suitable moisture content and compaction to the specified density in accordance with Massachusetts Highway Dept. Standard Specifications (Spec.150.60, backfilling for structures and pipes). Imported material must be approved by the Mansfield Engineering Department prior to placement. Material shall be granular fill, gravel, rock, or combinations thereof, free of humus, organic matter, vegetative matter, frozen material, clods, sticks, and debris and containing no stones having a dimension greater than six (6) inches. Sand or pea stone will not be an approved backfill material. No backfill shall be placed on or against structures, pipes, or any other masonry until the Mansfield Engineering Department or its authorized agent has performed a visual inspection. Unacceptable material shall be removed at the direction of the Town Engineer.

#### B. Crushed Stone

Material for pipe bedding shall be 3/4 inch minus crushed stone, having reasonably even gradation from coarse to fine, in accordance with the Massachusetts Highway Department Standard Specifications for Highways and Bridges specification for Aggregates and related materials M2.010 (Sect. 230.61).

#### C. Gravel for Trench Backfill

Gravel for trench backfill shall be clean pit run gravel, crushed rock or gravel having a reasonable even gradation from coarse to fine. The maximum size shall be six (6) inches.

#### D. Bituminous Concrete

Asphaltic concrete shall be hot plant mix, type I-1 material conforming to the requirements of MA Highway Section 420, entitled, "Class I Bituminous Concrete Base Course" of the Standard Specifications of the Massachusetts Highway Dept. Contractor shall replace bituminous concrete in two lifts, binder and wearing course in thickness' as specified by the Department of Public Works Street Opening Regulations, but in no case less than 3" binder and 2" wearing course. **If the Asphalt**



Concrete is greater than the required minimum of 3" binder and 2" wearing the contractor must match the existing thickness.

## 5.2 General Construction

### 5.2.1 Clearing the Right of Way

Where clearing of the right of way is necessary, it shall be completed prior to the start of the trenching. Trees and brush shall be cut as near to the surface of the ground as practicable and piled for disposal. Contractor shall remove all organic material, grub stumps and strip loam & subsoil to granular mineral material. The Contractor shall observe all state laws relating to fire permits and local regulations relating to burning such materials. Under no conditions shall excavated materials be permitted to cover brush or trees prior to clearing and disposal. In accordance with Massachusetts Highway Dept. Standard Specifications (Sect 101).

### 5.2.2 Pavement Removal and Replacement

All bituminous and concrete pavements, regardless of the thickness, shall be saw-cut where required prior to excavation of trenches. Width of the pavement cut shall be at least six (6) inches greater than the required width of the trench at ground surface on each side. Pavement removed during excavation shall be piled separately from the earth spoil and removed from the site and shall not be used in backfilling the trench. After the trench has been backfilled and compacted according to the design specifications, the Contractor shall bring the trench to a smooth even grade at the proper depth below the existing surface to provide for the required depth of pavement. The Contractor shall saw-cut the existing pavement to a straight line and remove any pavement that has been damaged during work as required by the Director of Public Works and or the Town Engineer. The entire existing paved surface shall be cleaned and the sawn edges prepared with tack before resurfacing is begun. The trench shall be repaired per the specifications set forth in the Street Opening Permit issued by the Mansfield Department of Public Works.

### 5.2.3 Blasting

Blasting for excavation will be permitted only after securing approval of the Mansfield Fire Department and only when proper precautions are taken for the protection of persons and property. The Contractor at his own expense shall repair any damages caused by the blasting. The Contractor's methods of procedure and blasting shall conform to all applicable State laws and municipal ordinances.

### 5.2.4 Trench Width

In all cases, trench width shall be confined to dedicated right-of-way for public thoroughfares or within areas for which construction easements have been obtained, unless special arrangements have been made with the affected property owners beforehand and approved by the Engineering Department.

### **5.2.5 Grade**

The bottom of the trench shall be carried to the lines and grades shown on the Plans or as established by the design Engineer, with proper allowance for pipe thickness and for proper bedding.

### **5.2.6 Shoring, Sheeting, and Boxing of Trenches**

Whenever necessary to prevent caving during excavation in gravel, sandy soil, or other unstable material, the trench shall be adequately sheeted and braced. Failure to comply with proper applicable OSHA standards with regard to; sheeting, shoring, or bracing shall be cause for a Notice of Violation. All sheeting, shoring and bracing of trenches shall conform to those standard requirements.

### **5.2.7 Location of Excavated Materials**

During trench excavation, the Contractor shall locate the excavated material so it will not obstruct a traveled roadway or street; and, unless otherwise approved by the Public Works Superintendent, all streets and roadways shall be kept open to at least one-way traffic, or as directed by the Mansfield Police Department.

### **5.2.8 Debris**

No groundwater, septic water, gravel, stones, etc. shall enter the Sewer during construction. The Registered Drainlayer shall be responsible to protect the Sewers from these occurrences.

### **5.2.9 Safety**

The Registered Drainlayer shall be responsible for the proper excavation and safety measures during construction. All work shall be in accordance with OSHA standards. The Town of Mansfield is not responsible for proper safety standards employed by the Registered Drainlayer and accepts no responsibility for accidents.

### **5.2.10 Removal of Water**

- A. The Contractor shall provide and maintain ample means and devices with which to promptly remove and properly dispose of all water, including flow from existing sewer lines, entering the trench excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and inspection, until the backfill above the pipe has been completed accordingly.
- B. The Contractor shall be responsible for dewatering the trench. If the Contractor wishes to dewater into the Towns drainage system, the Mansfield Engineering Department must approve any and all means for the transfer, treatment and disposal thereof before any discharge occurs.

- C. The Contractor shall dispose of the water and or sewage in accordance with state and local regulations. Precautions against sedimentation control must be maintained at all times.

#### **5.2.11 Trench Backfill Compaction**

After the Contractor has backfilled the pipe zone of the trench as required, he shall then backfill the balance of the trench, mechanically compacting each layer to 95% of maximum density in roadways and 90% in all other areas. Where fill is required, use bank-run gravel per M1.03.0 (a six-inch maximum diameter stone size).

#### **5.2.12 Excess Excavated Material**

All excess excavated materials shall be hauled and properly disposed of by the Contractor. The Contractor shall make his own arrangements for the disposal of the excavated material.

#### **5.2.13 Rock Excavation**

Before proceeding with rock excavation, the Contractor shall have completed the common excavation to such depths that only rock excavation remains. At this time the trench shall be made available to the design Engineer and measurements will be taken to determine the amount of rock excavation remaining. Any redirection of a sewer connection to avoid ledge outcrops must be approved by the Engineering Department.

#### **5.2.14 Controlled Density Fill**

Controlled Density Fill (CDF) where required, shall be a mixture of Portland cement, fly ash, aggregates, water and admixtures proportioned to provide a non-segregating, self consolidating, free-flowing and excavatable material that will result in a hardened, dense, non-settling fill. CDF is approved as an alternative to "Gravel for Trench Backfill."

The use of CDF is required for backfill material associated with any construction in paved roadways, or at the discretion of the Mansfield Department of Public Works.

- A. Placement  
CDF is a heavy material and during placement will exert a high fluid pressure against any pipe, manhole, or other material it contacts. The resultant pressure will tend to cause pipe and manholes to float or shift. CDF shall be placed in such a manner as to prevent flotation or shifting of pipe and manholes. CDF shall not be placed on frozen ground or during a time when the air temperature is 38 °F or less and falling.
- B. No CDF shall be placed under water.

- C. Curing  
Contractor shall provide steel plates k-36 steel (k-56 recommended) to span trenches or otherwise prevent traffic or construction equipment coming in contact with CDF until the CDF has hardened sufficiently to prevent rutting. Contractor shall provide cold patch on all edges of steel plates used for vehicular transition in any affected area.

### 5.3 Sewer Pipe Installation

#### 5.3.1 Scope

This item shall include the work necessary for the installation of sewer pipe and fittings of the sizes and classes indicated, including but not limited to furnishing materials, placing crushed gravel pipe base, providing bell holes in the trench bottom; laying and jointing the pipe; installing sewer tees, wyes and laterals; furnishing pipe necessary for physical test; and testing of the line. Ductile iron pipe shall be used when the sewer line is less than three (3) feet below finished grade **at the discretion of the Town Engineer.**

#### 5.3.2 Materials

All materials used in new sewer construction must have a useful design life of 50 to 100 years. The use of pipe, couplings, or any other material that does not meet the design life requirement is prohibited.

- A. PVC Sewer Pipe

Pipe used for sewers shall be PVC. The pipe shall be of the size and type indicated on the plans and shall conform to the appropriate specifications detailed below. Pipe and fittings used in Building Sewer construction shall be smooth wall inside and out, and must be either: Polyvinyl Chloride ("PVC") and must conform to ASTM D-3034 (SDR 35; or ASTM D-1785-99 (Schedules 40 or 80)). All pipe must have a minimum tensile strength of 34.50 Mpa as defined by ASTM D-1784. SDR rating is the ratio of the outside diameter to the pipe wall thickness.

- B. Ductile Iron Pipe

Ductile iron (DI) pipe must meet ASTM A-746-99 (pressure class 350) or AWWA C-151 (pressure class 350) with exterior asphaltic coating per AWWA C-151 and interior asphaltic coating meeting AWWA C-151 or polyethylene lining complying with ASTM D-1248 of nominal 40-mil thickness.

#### 5.3.3 Joints

All pipe joints shall be push-on types with proper gaskets for sealing the Sewer. Where push-on joints are not feasible, rigid slip couplings or mechanical joint couplings shall be used. Except for joining the building plumbing to the lateral sewer, Fernco type joints will only be allowed with prior approval of the Town

Engineer. When Fernco joints are used they shall be provided with stainless steel shear bands or encased in concrete to prevent joint settlement and separation.

#### **5.3.4 Preparation of Trench**

Crushed gravel base for pipe shall be placed in the trench to a minimum depth of six (6) inches below the invert of the pipe. The base shall be placed and leveled to approximate flow line grade in advance of the pipe laying. Immediately following the placement of each pipe, the crushed gravel pipe base shall be placed to the centerline of the pipe and properly chinked.

#### **5.3.5 Preparation of Sewer Pipe**

All pipes and fittings shall be carefully inspected before being laid and no cracked, broken or defective pipe or fittings shall be used in the work. The ends of the pipe shall be cleaned with a brush, washed and thoroughly scrubbed where necessary to remove dirt or other foreign material.

Extreme care shall be exercised to insure that the inside surfaces of the bell are smooth and free from any projections which would interfere with the assembly or water tightness of the joint.

#### **5.3.6 Laying and Jointing Pipe and Fittings**

- A. Sewer pipe shall be laid in full lengths as manufactured and shall be laid on a constant grade and in a straight alignment from manhole to manhole or clean-out. Wherever possible, pipe shall not be installed with elbows or bends. A manhole shall be located at every change in grade or horizontal alignment, but no more than three hundred (300) feet apart.
- B. The Contractor shall layout his own work and be responsible for the execution of the work to such lines and grades to comply with the specifications stated herein.
- C. PVC pipe is flexible in nature and may be out of grade and alignment through the middle of a pipe length even though each end is on grade and in alignment as evidenced by a laser beam or grade boards. To prevent the above situation from occurring, the contractor shall check the elevation of the top of each length of PVC pipe laid at each end and at the midpoint. The midpoint elevation shall be within 0.01 foot of the average elevation of the two ends.

#### **5.3.7 Sewer Installation**

- A. PVC Sewer Pipe shall be installed in accordance with the manufacturers recommended installation procedures.
- B. PVC Sewer Pipe shall be connected to concrete manholes by means of an approved coupling with an elastomeric gasket, an approved waterstop or flexible sleeve. Use of Portland Cement grout for connecting PVC Sewer

Pipe to manholes will not be permitted, unless previously authorized by the Town Engineer. Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe pointing in the direction of flow (uphill). Each piece shall be laid true to line and grade and in such a manner as to form a closed concentric joint with the adjoining pipe in order to prevent any sudden offsets in the flowline.

- C. Main Sewers  
All Sewer mains shall be installed using a laser or other approved means to insure correct pitch and angle. The Registered Drainlayer is responsible for the line and grade of the pipe.
- D. The installation of sewer pipe shall commence at the lowest point along the sewer and shall proceed so that the spigot end of the section being laid is placed into the bell end of the pipe already laid. Every precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. The Engineering Department shall inspect any and all piping before backfilling occurs. No de-watering of the trench shall take place into the sewer pipe or any appurtenance.
- E. Sewer pipe shall be bedded in  $\frac{3}{4}$  inch crushed stone six inches above and below the pipe and at full width of the trench. The drainlayer shall backfill the sewer line with suitable material, which is free of stones larger than six inches or 50 pounds.
- F. Service Connections  
The Contractor shall place service lateral Wye branches at the locations indicated on the plans or specified by the Engineering Department. Sewer laterals shall be provided for every home or buildable lot. Final service lateral locations may be determined in the field after consultation with the property owner. The 6-inch side outlet shall be installed at an angle of approximately 45 degrees above the horizontal. After the Wye is in position, special pipe bedding material and select backfill shall be hand-placed and chinked around the Wye to prevent any movement of the next pipe.
- G. If installed on private property, the Wye outlet shall be plugged with a 6-inch plug and marked with a standard 2"x4" painted green. Whenever the main sewer is installed in the street right-of-way, the Contractor shall extend the service connection from the Wye branch to the property line of the property to be served, or to the point designated on the approved plan or the Town Engineer. Laterals shall be no deeper than seven feet below grade, unless approved by the Town Engineer. Each lateral shall be marked with a standard 2"x4" painted green, which extends to 1 foot below grade. The lateral shall be bedded in  $\frac{3}{4}$  inch crushed stone. In no case will the Contractor be required to extend the service connection on to private property without first obtaining consent by the property owner. Unless otherwise specified on the plans or directed by the design

Engineer, each service connection shall be laid in a separate private trench on a straight line and gradient from the Wye to the end of the service connection at the property line. No service connection shall be laid on a grade of less than two percent, unless otherwise authorized or shown on the approved plans.

- H. Upon completion of the sewer, a Registered Professional Engineer shall complete an as built plan and profile drawing. The plan shall show, at a minimum, the location of all sewer lines, manholes, laterals, ties to each lateral, depth of each lateral, and map and lot numbers. The Drainlayer shall be responsible for recording lateral information. If information is not available at the time of the as built the Drainlayer shall excavate and uncover laterals as necessary.
- I. **General**  
**No gravity sewer, lateral connection, or sewer manhole shall allow the introduction of rainwater, surface drainage, groundwater or any other source of inflow to the sewer system.**
- J. **No transition of the pipe diameter or material is allowed between manhole sections, unless approved by the Town Engineer.**
- K. **If, due to topography, the sewer is more than approximately three (3) feet deeper than is required for the service connection depth, then a chimney is to be used to reduce the depth and the associated cost of the lateral service connection.**
- L. **All new sewer mains shall be cleaned and camera inspected prior to acceptance by the Town.**

### 5.3.8 Testing of Sewer Pipe & Appurtenances

After completion of the sewer main and all laterals, the Drainlayer shall hire an approved independent testing service to conduct low-pressure air leakage tests on all sections of new sewer and negative air pressure tests on all new manholes using ASTM and Town of Mansfield Standards outlined in Section 6 of this document.

Prior to final operation of a sewer main extension or building sewer, the Town Engineer may also require the following additional testing to identify defects and/or sources of infiltration/inflow (I/I):

- i. Video camera inspection of all lines in the presence of the Engineering **Division**.
- ii. Smoke testing of all lines in the presence of the Engineering **Division**.
- iii. Deflection testing of all lines in the presence of the Engineering **Division**.
- iv. Site inspection of the Owner's Premises, including the interior of the building

## **5.4 Manhole and Clean-out Construction**

### **5.4.1 Concrete**

Manholes shall be pre-cast concrete with O-ring or bituminous-based gasketed joints or poured-in place concrete type. Other types are allowable subject to the approval of the reviewing agency. Concrete used in the construction of the manhole shall be so proportioned and mixed as to meet a 3,000-psi compression test after 28 days.

### **5.4.2 Precast Manhole Sections**

Precast concrete sections for manholes shall be minimum of 48 inches in interior diameter. Cones shall be eccentric with a wall thickness of a minimum of five (5) inches and reinforcement similar to that of manhole sections. The tops and bottoms of the cones shall be parallel. Any manhole having a depth greater than nine (9) feet shall have an extended base.

### **5.4.3 Special Fittings**

The wyes, tees, and bends used in the construction of the drop manholes assembly and the clean-outs shall be either PVC or ductile iron. The pipe and fittings shall conform to the specifications as set forth in these Specifications. Drop manhole assemblies shall be encased in concrete or as required by the Public Works Superintendent.

### **5.4.4 Drop Manholes**

A drop pipe should be provided for a sewer, with an invert entering a manhole at an elevation of 24 inches (61 cm) or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches (61 cm), the invert shall be filleted to prevent solids deposition. Drop manholes should be constructed with an outside drop connection where appropriate. Outside drop connections shall be encased in concrete. Inside drop connections, where necessary, shall be secured to the interior wall of the manhole and provide access for cleaning. Inside drop manholes will only be allowed if the manhole diameter is 60 inches or greater.

### **5.4.5 Manhole Frames and Covers**

All manhole frames and grates shall be either LeBaron Foundry model LK110 or LC type with a minimum clear opening of 24 inches, or an approved equal meeting the following minimum standards:

All manhole frames and covers shall be of a size and shape detailed on the plans or approved equal. The castings shall be tough, close-grained, gray iron, free from blowholes, shrinkage and cold shuts. They shall conform to ASTM A 48 - Class 30 and shall be sound, smooth, clean and free from blisters and all defects. All castings shall be planed and ground



where necessary to ensure perfectly flat and true surfaces. Covers shall be true and shall seat within the ring at all points. Manhole covers shall have a maximum of two (2) holes.

All Manholes shall have the word "SEWER", cast upon the cover and be American made.

#### **5.4.6 Watertightness**

Solid manhole covers shall be used and watertight manhole covers are to be used in areas subject to flooding. Manhole lift holes and grade adjustment rings shall be sealed with a non-shrinking mortar or other material approved by the reviewing agency. Inlet and outlet pipes shall be joined to the manhole with a gasketed flexible watertight connection or other watertight connection arrangement that allows differential settlement of the pipe and the manhole to take place.

#### **5.4.7 Coating**

The exterior surfaces of all manholes shall be given two (2) heavy coats of bituminous waterproofing material.

#### **5.4.8 Manhole Steps**

Steps for precast manholes shall be of steel reinforced polypropylene plastic, or approved equal. All steps shall be in conformance with ASTM C-478 and shall be aligned vertically. All steps within a manhole shall be of the same design, type and size. Mixing of unmatched steps within the same manhole is not permitted.

Steps shall be placed where there are no incoming or outgoing lines. Loose steps shall be cause for rejection of that manhole cone or section.

#### **5.4.9 Manhole Stubs**

Provide plugged manhole stubs for sewer extensions as shown on the plan or as required by the Engineering Department. The intent of the plugged stub is to provide a means by which future sewer lines can be connected to the manhole with a minimum of inconvenience. Construct invert channels to the manhole wall at the plugged stub in accordance with the invert elevation directed by the design Engineer.

#### **5.4.10 Manhole Bench (Table)**

A bench shall be provided on each side of any manhole channel wherever practical. The bench should be sloped no less than ½ inch (13 mm) per foot (305 mm) (4 percent) or greater than 1.0 inch per foot. No lateral sewer, service connection, or drop manhole pipe shall discharge onto the surface of the bench.

#### **5.4.11 Manhole Inverts (Flow Channel)**

The manhole inverts shall provide a smooth flow-through characteristic. No sharp edges or rough sections that will tend to obstruct the flow of sewerage will be permitted. All cement mortar used in the construction of the inverts shall be troweled smooth. The flow channel through the manholes shall be made to conform in shape and slope to that of the sewers entering and leaving the manholes. The top of the flow channel shall be constructed so that under the peak design conditions the flow will remain in the channel. The channel walls should be formed or shaped to the full height of the crown of the outlet sewer in such a manner to not obstruct maintenance, inspection or flow in the sewers. When curved flow channels are required in manholes, including branch inlets, minimum slopes should be increased to maintain acceptable velocities. A minimum 0.1' drop shall be provided through the manhole.

Inverts shall be constructed of brick and mortar. The brick shall be sound, hard and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Town Engineer. Designation M32-73, AASHO M91-42, red sewer brick only Grade S.A. Brick shall comply with the ASTM Standard Specification of sewer and manhole brick (made from clay or shale). The mortar shall be composed of Portland cement, hydrated lime and sand in which the volume of sand shall not exceed three (3) times the sum of the volume of cement and lime. The proportions of cement and lime shall be 1:1/4.

#### **5.4.12 Buoyancy**

Buoyancy of manholes shall be considered and floatation shall be prevented with appropriate construction where high groundwater conditions are anticipated.

### **5.5 Grinder Pumps and Sewage Ejectors**

- 5.5.1** In cases where the existing sewer will not drain by gravity to the sewerage system, a pump system shall be employed. A pump system shall consist of a precast pump chamber, with a minimum storage capacity of 24 hours of the design flow. A 0.5 horsepower grinder style pump and a piped connection rated for pressure in excess of 150 PSI shall be utilized.
- 5.5.2** All low-pressure sewers are to be designed by a Massachusetts Registered Professional Engineer in accordance with TR-16.
- 5.5.3** The low-pressure sewer line shall be bedded in clean sand.
- 5.5.4** For systems connecting to a low-pressure sewer main, a curb box type shut off valve shall be provided at the property line.
- 5.5.5** Force main connections to the Mansfield Sewer System shall be allowed only as approved by the Town Engineer. At no time shall a Sewer Force Main tie directly into any gravity Mansfield Sewer Main. The force main shall connect to a sewer manhole on private property, and then the connection shall flow by gravity to the existing sewer main.

- 5.5.6** Pumps must be external to the building and situated in a 1,000-gallon pre-cast tank (minimum). Any backup into the building will be the sole responsibility of the Property Owner. The Town of Mansfield is not liable or responsible in any way for damages due to sewage backups served by grinder/ejector pumps, or the force main line itself. The operations, maintenance, repair and replacement of the pump and appurtenances shall be the sole responsibility of the Homeowner. This also includes the force main and/or gravity Sewer from the building to its connection into the Mansfield Sewer main or service lateral.
- 5.5.7** Wiring and electrical connections should be NEMA rated for the environment in which they are to be placed.
- 5.5.8** Level sensing devices should be used to detect wastewater levels for initiating pump operation and to detect high water levels. Level sensing devices are recommended over mercury float-type switches. These devices should not be located near flows entering the well.
- 5.5.9** Inspection of pump system shall be performed by the Engineering Department. Contractor shall provide water and shall run the pump through several cycles. Connection shall be inspected for workmanship and materials, and either be passed or failed at the time of inspection. The Town of Mansfield Building Department shall inspect all wiring.

## **5.6 Pressure Sewer Systems**

Wastewater can be conveyed to the pressure sewer using various approaches, such as septic tank effluent pumping (STEP) or grinder pumps. A pressure main is common to both systems. In addition, components such as isolation valves, air release valves, and cleanouts make up a pressure sewer system.

### **5.6.1 Layout**

The branched configuration of a pressure sewer is similar to that of a conventional gravity sewer system. Looped piping is not permitted. Pipe routing should include long radius sweeps no less than those recommended by the pipe manufacturer. Pressure pipes should be deep enough to prevent freezing.

### **5.6.2 Pipe Size**

Size the diameter of the pressure sewer so that it provides a cleansing velocity based on the average daily flow of the system.

### **5.6.3 Pipe Material**

Use the equivalent of Class 200, SDR 21 PVC piping or greater in pressure sewers to provide the necessary working pressure rating for the system, and to provide durability during installation.

### **5.6.4 Valves**

Curb box shut off valves shall be provided at the property line on each service line. In addition, isolation valves should be considered where system expansion is projected, and at key locations on very long runs.

#### **5.6.5 Air Release Valves**

To release air trapped in the pressure lines, site air release valves at high points in the system. Air release valves should be located in a manhole or structure to allow access for repair and maintenance. Consider automatic air release valves to reduce the system's operating and maintenance costs.

Also, place air release manholes at least 14 pipe diameters downstream of the locations where hydraulic jumps occur. Hydraulic "jumps" form in sections where the pipeline intersects with the hydraulic grade line. Air bubbles formed by hydraulic jump conditions are carried downstream with the wastewater flow.

#### **5.6.6 Cleanout Connections**

Provide a means for cleaning out the pressure mains at sags and other locations where debris can accumulate and clog the lines. Provide proper valving to conduct required maintenance.

### **5.7 Wastewater Pumping Stations and Force Mains**

All wastewater pumping stations and force mains shall be designed by a professional engineer in accordance with TR-16.

### **5.8 Trenchless Technology**

All sewers installed using trenchless methods must be designed by a Massachusetts Professional Engineer, and must conform to slope, grade, and alignment as specified in these regulations. Any alternate materials used in trenchless technologies must meet the minimum requirements as specified in these regulations for conventional materials. The Town Engineer will review any proposed trenchless technology on a case-by-case basis.

#### **5.8.1 Existing Utilities**

In preparation of pipe jacking or directional drilling activities, an as-built showing any and all existing utilities in the area of work must be verified by test pits or by vacuum hole methods. These field locations must be submitted in lieu of any proposed sewer work.

#### **5.8.2 Pipe Jacking**

A specialized tunneling method for installing underground pipelines with minimal surface disruption. Primarily used for new sewer construction, it is also used for sewer replacement and relining.

#### **5.8.3 Horizontal Directional Drilling**

Horizontal Directional Drilling (HDD) is a trenchless method for installing any number of utilities. It is a multi-stage process consisting of site preparation, and restoration, equipment setup, and drilling a pilot bore along a predetermined path and then pulling the product back through the drilled space. Alignment of the bore is accomplished by a hydraulic jack as the drill bit head is pushed into the ground. The orientation and tracking of the head is determined by an above ground radio detection device, which picks up radio signals generated from a transmitter on the drill itself.

Contractor is responsible for selecting or designing drilling fluids for the site-specific soil and groundwater conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pull-back or drilling. This can be accomplished by creating sump areas or vacuum operations to prevent damage or hazardous conditions in surrounding areas.

#### **5.8.4 Boring Path Report**

Furnish a Bore Path Report to the Engineering Department within seven (7) days of the completion of each bore path. Include the following in the report:

1. Location of project including the Permit Number and when assigned.
2. Name of person collecting the data, including title, position and company name.
3. Investigation site location.
4. Identification of the detection method used.
5. Elevations and offset dimensions as required.

#### **5.8.5 As-Built Trenchless Sewers**

Any sewers installed by trenchless methods must meet the required minimum slopes, alignment, and grade as proposed in the original design plans. Any sewers that do not meet the minimum requirements shall be rejected.

### **6.0 Sewer Testing**

#### **6.1 Low Pressure Air Testing**

- 6.1.1** All new sewer mains, and services where required, must successfully pass an air leakage test as described in this section.
- 6.1.2** At the time of the test, the Registered Drainlayer shall determine the groundwater elevation from observation wells, excavations or other means, all subject to review by the Town Engineer.
- 6.1.3** For making the low-pressure air test, the testing service shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. The equipment shall be provided with an air regulatory valve or air safety so set that the internal air pressure in the pipeline cannot exceed 8 psig.

- 6.1.4** The leakage test using low-pressure air shall be made on each manhole-to-manhole section of pipeline and any stubs and stoppers after placement of the backfill.
- 6.1.5** The mainline pipe shall be tested only after laterals have been extended to the property line but before any connections are made to the building sewer(s). If any connections are made to the building sewers it shall be the responsibility of the Drainlayer to temporarily disconnect or plug the connections.
- 6.1.6** Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
- 6.1.7** All air used shall pass through a single control panel.
- 6.1.8** Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig.
- 6.1.9** At least two (2) minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 4 to 3 psig shall not be less than that shown in the following table.

<b>Pipe Diameter in Inches</b>	<b>Minutes</b>
6	5:40
8	7:36
10	9:26
12	11:20
15	14:10
18	17:00
21	19:50
24	22:40
27	25:30

- 6.1.10** Should the sections under test fail to meet the requirements, the Registered Drainlayer shall do all work of locating and repairing leaks and retesting as the Town Engineer may require.

**6.2 Vacuum Test (Negative Air Pressure)**

- 6.2.1** All manholes, wet wells, valve pits, grease traps, or any other structure or appurtenance other than sewer mains, laterals, and clean-outs, which are connected to the sanitary sewer system must be tested by means of either vacuum or exfiltration testing. Exfiltration testing will only be allowed when in the

opinion of the Town Engineer it is not feasible to conduct vacuum testing due to size and configuration of openings or extreme shallow depth of a structure.

- 6.2.2** All lift holes and pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified period of time is used to determine the acceptability of the manhole (ASTM-C1244-93).
- 6.2.3** All manholes shall be made as tight as possible to prevent infiltration and inflow and to ensure no leaks are present.
- 6.2.4** The Town Engineer or his designee prior to testing shall inspect all manholes.
- 6.2.5** Manholes shall be tested using approved testing techniques and equipment described by the American Society for Testing Materials after all connections to the manhole have been made. Backfill is not required for manhole testing.
- 6.2.6** All manholes shall pass a Negative Air Pressure (Vacuum) Test as detailed below prior to approval by the Town Engineer or his designee.
- 6.2.7** All lift holes are to be permanently plugged and joints in sections and around entering pipes sealed.
- 6.2.8** All pipes entering the manhole are to be temporarily plugged taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.
- 6.2.9** All manholes are to be individually tested, and the values obtained are applicable only to the manhole being tested at the time and conditions of testing.
- 6.2.10** The test head shall be placed on top of the manhole or inside the opening in accordance with the manufacturer's recommendation.
- 6.2.11** It is the responsibility of the drainlayer to ensure the manhole has a flat surface and testing head is able to make a tight seal.
- 6.2.12** If manhole cannot be tested due to leakage around testing head, necessary repairs shall be made and the manhole retested. In cases of retesting, the Town Engineer or his designee reserves the right to reschedule or delay the test to conform with his/her schedule.
- 6.2.13** A vacuum of ten (10) inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop from ten (10) inches of mercury to nine (9) inches.
- 6.2.14** The manhole shall pass if the time for the vacuum to drop from ten (10) inches to nine (9) inches of mercury meets or exceeds the value indicated in the following table.

<b>Depth of manhole</b>	<b>Time (min)</b>
-------------------------	-------------------

Less than 10 feet	1
10 to 15 feet	1.5
Greater than 15 feet	2

- 6.2.15** Depth of a manhole is to be measured from the lowest inside elevation of the manhole to the surface on which the vacuum head is to be placed.
- 6.2.16** If the manhole fails the initial test, necessary repairs shall be made and the manhole retested. In cases of retesting, the Town Engineer or his designee reserves the right to reschedule or delay the test to conform with his/her schedule.
- 6.2.17** The Town Engineer or his designee may deem a manhole failed after successful completion of a vacuum test if water is observed in the manhole after completing the test or the level of standing water in a manhole rises after completing the test.

### 6.3 Exfiltration Testing

- 6.3.1** Maximum allowable exfiltration for new sanitary sewer sections or manholes is 200 gallons per inch of diameter per mile of pipe per day.
- 6.3.2** Do not test by this method if temperature of components is below 33 degrees Fahrenheit.
- 6.3.3** Plug all inlets and outlets.
- 6.3.4** The manhole or structure shall be completely filled with water to the top, or at a level as specified by the Town Engineer, but not less than 2 feet above ground water level.
- 6.3.5** The water level shall be clearly marked or measured from a reference point.
- 6.3.6** Allow water to stand in manhole for one hour, then refill to original water level and begin test.
- 6.3.7** After one hour, measure the drop in water level. For 48-inch diameter manhole, use measured water level drop to determine equivalent gallons lost per 24 hours from table in Section 6.3.8 (i.e. 2" drop = 376 gal; 2 1/4" drop = 423 gal.). For other manhole sizes, calculate the 24-hour equivalent loss using the formula stated therein.
- 6.3.8** Exfiltration Rate: The following table may be used to determine exfiltration in gallons per 24 hours by measuring loss that occurs in 1 hour. The table is applicable only for 48-inch diameter manholes.

Loss in Gallons Per 24 Hours for Drop in Water Level Per Hour in 48" Dia. Manhole										
DROP	0"	1"	2"	3"	4"	5"	6"	7"	8"	9"
	188	376	564	752	940	1128	1316	1504	1692	
1/4"	47	235	423	611	799	987	1175	1363	1551	1739



1/2"	94	282	470	658	846	1034	1222	1410	1598	1786
3/4"	141	329	517	705	893	1081	1269	1457	1645	1833

For manholes larger than 48" diameter use the following formula.

$$G = 0.0816(H)(D^2)$$

Where:

G = gallons drop in 24 hours in inches.

D = diameter of manhole in inches.

H = drop in manhole in inches.

**6.3.9** The maximum allowable exfiltration (leakage) per 24 hours is 200 Gallons per inch per mile per day, or 0.003 gallons per foot of diameter per foot of depth.

**6.3.10** Allowable exfiltration per day (Gallons) = 0.003 x Diameter (FT) x Depth (FT)

**6.3.11** Test failure is indicated by water loss greater than maximum allowable exfiltration.

#### 6.4 Force Main Testing

**6.4.1** As a minimum, all sewer force mains shall be tested in accordance with the Hydrostatic Testing Requirements of AWWA C600.

**6.4.2** All force mains shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 psi, whichever is greater. Loss of water pressure during test shall not exceed 5 psi in a 2-hour period.

**6.4.3** Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 1500 feet.

**6.4.4** The pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe. Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the drainlayer shall install corporation cocks at such points so the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied.

**6.4.5** Duration of test shall not be less than two hours.

**6.4.6** The test pressure shall not exceed the rated pressure of the valves in the pipeline.

**6.4.7** Where leaks are visible at exposed joints and/or evident on the surface where joints are covered, the drainlayer shall repair the joints, retighten the bolts, relay the pipe, or replace the pipe until the leak is eliminated--regardless of total leakage as shown by the hydrostatic test.

**6.4.8** All pipe, fittings and other materials found to be defective under test shall be removed and replaced by the Drainlayer.

- 6.4.9** Lines that fail to meet test requirements shall be repaired and retested as necessary until test requirements are complied with.
- 6.4.10** No pipe installation will be accepted if the leakage is greater than that determined by the formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

in which L is the allowable leakage, in gallons per hour; S is the length of pipeline tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

## **6.5 Deflection Testing**

### **6.5.1 Allowable Deflection Test**

Pipe deflection measured not less than ninety days (90) after the backfill has been completed as specified shall not exceed five (5.0) percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

- 6.5.2** Deflection shall be measured with a rigid mandrel (Go/No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Engineer for each diameter of pipe to be tested. The mandrel shall be hand pulled by the drainlayer through all sewer lines.

- 6.5.3.** Any section of sewer not passing the mandrel shall be uncovered at the Drainlayer's expense and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

## **7.0 Sewer Easements**

### **7.1 Public Sewers**

Public Sewers shall be constructed within existing public rights of way when applicable to the extent physically and legally possible. If a public sewer must be constructed within a private way or across private property, a permanent easement of no less than twenty (20) feet in width, for the construction, maintenance and operation of said public sewer shall be conveyed to the Town by appropriate persons possessing an interest in such private way or property, and accepted at a Town Meeting.

### **7.2 Private Sewers**

- 7.2.1** If an individual service connection must cross someone else's property, the owner of the property being served by the sewer must obtain a construction and maintenance easement from the owner of the property that is being crossed. A permit will not be issued until the easement has been gained.

**7.2.2** No more than one (1) building or residence will be permitted to connect into an existing private sewer easement unless the prior written approval of the Town Engineer has been obtained.

**7.2.3** All costs for initial installation, subsequent repair, relocation, change or replacement of Building Sewers shall be at the Owner's expense.

### **7.3 Rules Regarding Sewer Easements**

**7.3.1** The Owner shall not place or permit to be placed any trees or other deep-rooted landscaping within the easement or directly over or within ten (10) feet horizontally of the Sewer line. Any trees or landscaping placed within the easements or rights-of-ways are at risk of being damaged or removed by the Town without the obligation of replacement.

**7.3.2** Owner shall not place or permit to be placed any permanent or temporary structures, mounding, lighting, fencing, signs, retaining/landscaping/entrance walls, irrigation lines, etc. within the easement or directly over or ten (10) feet horizontally of Building Sewers or any other sewer facility. Any of the above listed items placed within easements or rights-of-ways are at risk of being damaged or removed by the Town without the obligation of replacement.

**7.3.3** It shall also be the responsibility of the Owner to insure that all manhole and clean-out top of castings extend to finish grade and are not buried, sodded over, placed in concrete, or obstructed in any way.

**7.3.4** The Town may periodically perform field inspections to verify compliance with the abovementioned requirements. If a violation exists then the Owner must immediately remedy the situation.

**7.3.5** Bolted and gasketed sewer manhole covers will be required at all off road locations or anywhere deemed necessary by the Town Engineer.

## **8.0 Protection of Water Supply**

### **8.1 Cross Connections**

There shall be no physical connections between a public or private potable water supply system and a sewer or any sewer appurtenance that would permit the passage of wastewater or polluted water into the potable supply. No water pipe should pass through or come into contact with any part of a sewer manhole.

### **8.2 Relation to Water Main**

#### **8.2.1 Horizontal Separation**

Whenever possible, sewers shall be installed at least ten (10) feet from any existing or proposed water main. If local conditions prevent a lateral separation of ten (10) feet, the Town Engineer may make an exception on a case-by-case

basis when supported by data from the design engineer. Such an exception may allow the sewer to be installed closer than ten (10) feet to a water main, provided that it is laid out in a separate trench with top (crown) of the sewer at least 18 inches below the bottom (invert) of the water main.

### 8.2.2 Vertical Separation

Whenever sewers must cross water mains, the sewer shall be laid so that the top of the sewer is at least 18 inches below the bottom of the water main. The sewer joints should be equidistant to and located as far away as possible from the water main.

### 8.2.3 Concrete Encasement

When it is impossible to maintain the required separation the sewer shall be concrete encased ten (10) feet horizontally on either side of the crossing, or continuously where there is less than ten (10) feet of separation. As an alternate, the sewer and water lines may also be constructed of mechanical joint cement lined ductile iron pipe, which shall be tested to 150 psi to assure watertightness.

## 8.3 Well Areas-Zone II

Any Sewers within one thousand (1,000) feet of a Public Water Supply or fifty (50) feet of a domestic well shall be of watertight construction. At a minimum, schedule 40 PVC pipe with solvent weld joints is to be used.

For all parts of new sewer connections within a designated Zone II, only hard connections will be allowed. No ferenco or flexible rubber connections shall be permissible, unless approved by the Mansfield Engineering **Division**.

## 8.4 Location of Sewers in Streams

### 8.4.1 Cover Depth

The top of all sewers entering or crossing streams should be sufficiently below the natural bottom of the streambed to protect the sewer line. In general, the following minimum cover requirements must be met:

- ❑ One (1) foot of cover where sewer is located in rock.
- ❑ Three (3) feet of cover in other material.
- ❑ One (1) foot of cover in paved stream channels.

### 8.4.2 Alignment

Sewers should only cross streams perpendicular to the flow without a change in grade. Sewer systems shall be designed to minimize the number of stream crossings.

## 9.0 Validity

All regulations or parts of regulations in conflict herewith are hereby repealed.

The invalidity of any section, clause, sentence or provision of these regulations shall not affect the validity of any other part of these Regulations, which can be given effect without such invalid part or parts.

These Sewer Regulations shall not contravene, nor render ineffective any of the lawfully established rules and regulations of the Massachusetts Department of Environmental Protection.

TOWN OF MANSFIELD  
DRAINLAYER'S LICENSE AND  
SEWER DESIGN AND CONSTRUCTION REGULATIONS



**APPLICATION FOR DRAINLAYER'S LICENSE  
TOWN OF MANSFIELD  
MANSFIELD, MASSACHUSETTS 02048**

OFFICE USE ONLY:	
LICENSE NUMBER:	_____
APPLICATION RECEIVED:	_____
ENGINEERING APPROVAL:	_____
BY:	_____
SELECTMEN APPROVAL:	_____

Application Type:     New License     License Renewal    If Renewal, list previous License # \_\_\_\_\_

Name of Corporation: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Street Address: \_\_\_\_\_

Phone: \_\_\_\_\_

FAX: \_\_\_\_\_

24-Hour Phone: \_\_\_\_\_

The Following items must be attached:

- A copy of Valid Heavy Equipment Operators License
- Insurance Certificate (Town must be listed as additionally insured)
- Performance Bond (USE ATTACHED FORM)
- Three (3) references who are familiar with your work with telephone numbers (NOT REQUIRED FOR RENEWALS)
- License fee of \$250.00

**THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT AND UNDERSTANDING OF THE DRAINLAYER'S REGULATIONS, AND THAT HE/SHE HAS READ THE ENTIRE DOCUMENT.**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Bond Number: \_\_\_\_\_

**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS:

That we, \_\_\_\_\_ (an individual, partnership, corporation or company) duly organized under the Laws of the State of Massachusetts, and having a usual place of business at:

\_\_\_\_\_ as Principal, and

\_\_\_\_\_ a corporation duly organized under the Laws of

the State of \_\_\_\_\_ and duly authorized to do business in the Commonwealth of

Massachusetts, and having a usual place of business at \_\_\_\_\_ as Surety, are holden and stand firmly bond and obligated unto the Town of Mansfield, Massachusetts, as obligee, in the sum of **Five Thousand Dollars and no/cents (\$5,000.00)** lawful money of the United States of America, to and for the true payments whereof we bind ourselves and, each of us, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal, by means of a written AGREEMENT (Drainlayer's License and Sewer Design and Construction Regulations, adopted, 3/2/2005) shall install drains and sewers in the Town of Mansfield in accordance with the regulations.

Whenever the Company shall be, and declared by the Town to be in default under the Sewer Design and Construction Regulations or Drainlayer's License Regulations shall promptly remedy the default or complete the drain and sewer work.

No right of action shall accrue on the Bond to or for the use of any persons other than the Town named herein or the heirs, executors, administrators, successors and assigns of the Town.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this day \_\_\_\_\_ of \_\_\_\_\_.

Principal: \_\_\_\_\_

Surety: \_\_\_\_\_

(SEAL)

By: \_\_\_\_\_

By: \_\_\_\_\_

(SEAL)

Title: \_\_\_\_\_

Title: \_\_\_\_\_

**IMPORTANT**

*Surety Companies executing BONDS must appear on the U.S. Treasury Department's most current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts and be authorized to transact business in the State of Massachusetts.*

*The attention of the Surety Companies and Company executing this Performance Bond is directed to the fact that said Bond shall remain in full effect for a period of three (3) years from the effective date of the issuance of a Drainlayer's License.*

**APPENDIX A**

**INDEX OF DETAILS:**

TYPICAL MANHOLE DETAIL	02730 001A
TYPICAL MANHOLE DETAIL	02730 001B
PRECAST CHIMNEY DETAIL	02730 002
SEWER PIPE CONNECTION DETAIL	02730 003
SEWER CHIMNEY DETAIL	02730 004
TYPICAL TRENCH DETAIL	02730 005
INSIDE DROP CONNECTION DETAIL	02730 006A
INSIDE DROP CONNECTION DETAIL	02730 006B
TYPICAL OUTSIDE DROP MANHOLE DETAIL	02730 007
FORCE MAIN CLEANOUT DETAIL	02730 008
BUILDING CONNECTION DETAIL	02730 009
SEWER SERVICE CONNECTION DETAIL	02730 011
CHIMNEY DETAIL	02730 012
PIPE TRENCH DAM DETAIL	02730 013
WYE SADDLE DETAIL	02730 014
PVC WYE BRANCH DETAIL	02730 015
CONCRETE ENCASEMENT DETAIL	02730 016
CONCRETE ARCH DETAIL	02730 017
TYPICAL IN-LINE CLEANOUT DETAIL	02730 018
TYPICAL IN-LINE CLEANOUT DETAIL	02730 019