APPENDIX D
HOUSE LATERAL DESIGN STANDARDS

*T*his appendix contains generic house lateral design standards. These generic standards can be adapted to fit specific community needs. They are not presented as inclusive of all situations or circumstances.

TOWN OF XXXXXX
STANDARDS FOR
DESIGN AND CONSTRUCTION OF BUILDING SEWERS

Includes all amendments through _____
Be it so voted and enacted by the Board of Selectmen, Acting as Sewer Commissioners of the Town of XXXXXX, Commonwealth of Massachusetts
as follows:

True Copy Attest:_____
Town Clerk

DEFINITIONS:

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

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

Authority shall mean the Massachusetts Water Resources Authority.

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.

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.

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.

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.

MWRA shall mean the Massachusetts Water Resources Authority.

MWRA Service Area shall mean the area consisting of the following political subdivisions: Arlington, Ashland, Bedford, Belmont, Boston, Braintree, Brookline, Burlington, Cambridge, Canton, Chelsea, Dedham, Everett, Framingham, the north sewer district of Hingham, Holbrook, Lexington, Malden, Medford, Melrose, Milton, Natick, Needham, Newton, Norwood, Quincy, Randolph, Reading, Revere, Somerville, Stoneham, Stoughton, Wakefield, Walpole, Waltham, Watertown, Wellesley, Westwood, Weymouth, Wilmington, Winchester, Winthrop, and Woburn.

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 XXXXXX.

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.

Public Sewer shall mean a sewer in which all owners of abutting properties have equal rights and is controlled by the Board of Selectmen acting as Sewer Commissioners, and maintained by the Public Works Superintendent.

Recorded shall mean recorded in the Registry of Deeds of Norfolk 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 Use Discharge Permit shall mean the permit required or issued jointly by the Authority and a Municipality for the discharge of industrial waste.

Sewerage System shall mean any device, equipment or works used in the transportation, pumping, storage, treatment, recycling, and reclamation of Wastewater and Industrial Wastes.

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 putrecible 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.

Superintendent shall mean the Superintendent of Public Works of the Town of XXXXXX, or his authorized deputy, agent or representative.

Surveyor shall mean any 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 XXXXXX, or his duly authorized deputy, agent or representative.

1.0 Purpose

These specifications are intended to protect the public health, safety and welfare and the environment and to ensure proper and safe operation of the XXXXXX 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, the XXXXXX Code Sewer Use and the Rules & Regulations relating to Private Sewers adopted by the Board of Selectmen on _____.

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".

The XXXXXX Public Works Superintendent shall, in the case of any discrepancies or questions, direct the Contractor accordingly.

2.0 Applicability

Every person who directly or indirectly discharges Wastewater to the Authority 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 Authority Sewerage System and to discharges to the Authority Sewerage System through a municipal sewer.

3.0 DEP Extension/Connection Permit

No person shall connect to a Municipal Sewer System or an Authority Sewer, or construct, effect, modify, or maintain a Sewer extension or connection, without a sewer system connection permit issued by the Board of Selectmen acting as Sewer Commissioners, or extension/connection permit if required by DEP pursuant to M.G.L. c.21§ 43 and 314 CMR 7.00, 360 CMR 10.000 in where such a permit is required.

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

DEP Permit Application Categories: 310 CMR 4.00

BRP WP 13	Major Sewer Extension
BRP WP 14	Minor Sewer Extension; Connect w/Pump Station
BRP WP 17	Major Sewer Connection (≥ 50,000 gpd)
BRP WP 55	Industrial Wastewater

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

3.10 Paper Streets

Paper Street Sewers and appurtenances shall comply with the Street and Sewer-Commissioners. All sewer design and construction work proposed or performed in paper streets, shall comply with the Town of XXXXXX Land Subdivision Regulations.

4.0 Building Sewer Connection Permit

4.10 Connection Permits

A Sewer Connection Permit shall be issued by the Town of XXXXXX Engineering Department for all repairs, modifications or connections to the XXXXXX Sewer System. In addition, Sewer Connection Permits are required for the expansion of any existing building connected to the system which requires alteration or retrofit of the existing sewer or any of its direct appurtenances.

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.

No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the sewerage works. Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct. Please note DIGSAFE-1-888-344-7233.

4.20 Permit Fee

A fee of $50.00 per residential dwelling unit and a fee of $75.00 per non-residential unit shall be charged for each Permit. This permit includes up to three (3) inspections. Additional inspections, if required, due to defective workmanship or incomplete construction will be assessed a re-inspection fee of an equal amount.

4.30 Entrance Fee

An entrance fee of $300.00, shall be charged for any new single connection to the Sewer System. The fee shall be deposited in the Sewer Enterprise Fund.

4.35 Street Opening Permit

Contractor shall obtain a Street Opening Permit from the Department of Public Works. If construction of the building sewer requires construction in a traveled way of a street or work within the Right of Way. The contractor shall post a bond in an amount determined by the Public Works Superintendent; said bond to be released only on final approval from the Superintendent of Public Works. The Contractor shall restore the street trench with a temporary patch of bituminous concrete within twenty-four (24) hours. If flowable fill was placed in a trench, subsequent trench repair is to be placed within thirty (30) days of the temporary patch.

4.40 Application for Local Permit

1. A Permit application for any sewer extension must be made on the form prescribed by the Town of XXXXXX Engineering Department. Once a signed permit from the XXXXXX Engineering Department has been issued to the contractor, the entrance fee shall be paid to the P.W.D. where applicable. A Street Opening Permit must be obtained from the Public Works Department wherever a street is to be opened, or pursuant to the following:

   a. Any easements required for construction of the connection must be approved by the Engineering Department prior to issuance of the Permit.

   b. Any Sewer Extension in a right-of-way, easement or paper street, must be designed by a Registered Professional Engineer in the State of Massachusetts. Plans shall be to scale, and approved by the Engineering Department prior to issuance of the Permit. This permit shall not supercede any DEP requirements for an extension permit.

   c. Once DEP has issued an Extension Permit.

2. The application will require at a minimum, the following information:

   a. Name and address of the Owner;

   b. Name, address and telephone number of the Contractor;

   c. Address of work site;

   d. If required, a legal description of the Owner's property for which the Permit is being requested;

   e. Dig-Safe Number;

   f. Number of bedrooms in the house to be serviced by the Sewer Connection;

   g. If required by the Town Engineer or Public Works Superintendent, plans shall be submitted by a Professional Engineer to the Engineering Department for review for the Building Sewer and connection, which at a minimum must consist of the following:

      1. Plot plan according to XXXXXX Board of Health standards.

      2. Connection details including location of connection and routing of the building sewer, profile of connection, and the material(s) of construction for the building sewer.

      3. Elevation of the first floor and lowest point of gravity service.

4.50 Eligibility

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

NOTE: The Town of XXXXXX may deny Permits to any applicant who has previously violated, or is currently in violation of, these Standards or any other XXXXXX rules, regulations, standards, specifications or details described herein.

4.60 Expiration of Permit

a. The Permit will expire if the work is not initiated within one hundred eighty (180) 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. The Town of XXXXXX, 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 XXXXXX Engineering Department in advance of the expiration and must state the reason for request. Requests for extension must be forwarded to:

Town Engineer
Town of XXXXXX

Attn: Sewer Connection Permit

4.70 Notice of Violation

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

1. Contractor is performing work without proper licensure.
2. Contractor is in non-compliance with the Rules and Regulations set forth by the Department of Public Safety.
3. If 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 specifications or details. Sewer construction is proceeding without a valid permit.
5. Connection of any source of clear water to the Building Sewer.
6. A discharge, into the Town of XXXXXX Sewerage System, of any prohibited water or wastes as defined in 360 CMR 10.000.
7. Work taking place in a right-of-way without a proper police detail, subject to the Town of XXXXXX Police Chief's approval.
8. Damage, debris, and or soils in the roadway resulting from the work.

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.

These regulations shall be enforced by employees of the XXXXXX Sewer Department or XXXXXX Engineering Department, by means of a non-criminal disposition pursuant to M.G.L. Chapter 40, Section 21D.

Any person who shall continue any violation beyond the time limit provided for in Section 4.70, shall be subject to a penalty of $50.00. Each day in which any such violation shall continue shall be deemed a separate offense. (amended October 18, 1994)

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

4.80 Mandatory Inspection of Building Connections

1. Notification

The Contractor shall notify the Engineering Department that the sewer work is available for inspection. Notification to be provided at least twenty-four (24) hours before inspection is desired. The Engineering Department will perform inspections on Sewers from 8:30 a.m. to 4:30 p.m., Monday through Wednesday, Thursdays from 8:30 a.m. to 5:30 p.m., and on Friday from 8:30 a.m. to 12:00 p.m. Or as agreed to in advance with the Engineering Department.

It is the responsibility of the Contractor to ensure that the connection is inspected, in its entirety, from the foundation to the connection with the public sewer or existing lateral, work must be exposed for inspection and be constructed in accordance with these standards. Under no circumstance shall the Sewer work be backfilled without an inspection by the Engineering Department or its authorized representative.

The Public Works Department or the Engineering Department may require re-excavation of a buried sewer utility if an inspection was not performed at the time of installation.

2. Video Camera Inspection

The Engineering Department or Public Works Department may, at their discretion, require the connection to be inspected using closed circuit television equipment. The XXXXXX Public Works Department shall perform the video camera inspection and inspect for, but not limited to, the following:

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

4.90 Right of Entry

An authorized representative of the Town of XXXXXX 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.

5.0 Trench Excavation and Backfill

5.05 Traffic Control & Safety

1. All excavations for building 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.
2. 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.
3. Any work within a State Highway shall be coordinated with the Massachusetts Highway Department.
4. 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.

5.10 Scope

This item covers the work necessary for the trench excavation and backfill, complete, including but not limited to: clearing of right of way; protection of private property during construction; disposal of cleared materials; excavation of trench for the pipe and appurtenances; foundation stabilization; backfilling the pipe; trench backfilling above the pipe; removal, replacement, and rehabilitation of all fences, drainage ditches, waterways, culverts, concrete curbs and sidewalks, or other features moved or damaged during construction; removal of all obstructions; removal of existing pavement; locating and protecting existing utilities; repair of damage to utilities; the maintenance of access to public thoroughfares and to private property; the maintenance of adequate barricades, lights, and warning signs for the protection of the public on public right-of-ways, streets and private drives; shoring, cribbing, bracing, sheeting, and dewatering as may be required; hauling and disposal of waste excavation, including temporary hauling and disposal of soil which cannot be accommodated within the designated right of way; repair of public and private property damaged during construction; final cleanup of the construction area; restoration of the landscape in public rights of way including replacement of lawns, grasses, trees, shrubs and mulches; and all miscellaneous items of work required to complete the construction specified hereunder, in accordance with 360 CMR 10.000, Massachusetts Highway Standard Specifications 120.60, and the Town of XXXXXX Land Subdivision Regulations.

5.20 Materials

5.21 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 XXXXXX 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 four (4) 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 a visual inspection has been performed by the XXXXXX Engineering Department or its authorized agent.

Unacceptable material shall be removed at the direction of the Town Engineer.

5.22 Crushed Stone

Material for pipe base 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).

5.23 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 four (4) inches.

5.24 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' equal to the existing binder but in no case less than 2.5" binder and 1.5" wearing course.

5.25 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" and as an alternative to "Crushed Gravel" and may be used at any location on the project at the option of the contractor for stabilization material, pipe base material, pipe zone material, trench backfill material and pavement base material. The use of CDF is required for backfill material associated with outside drop manholes, and any construction in paved roadways having been paved or surfaced within five (5) years, or at the discretion of the XXXXXX Public Works Superintendent.

6.0 General Construction

6.11 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).

6.12 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 Superintendent of Public Works and or the Engineering Department.

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 XXXXXX Public Works Department.

6.13 Blasting

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

6.14 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.

6.15 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.

6.16 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.

6.17 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 XXXXXX Police Department.

6.18 Removal of Water

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.

The Contractor shall be responsible for dewatering the trench. If the Contractor wishes to de-water into the Towns drainage system, the XXXXXX Engineering Department must approve any and all means for the transfer, treatment and disposal thereof before any discharge occurs.

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.

6.19 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 85% to 90% in all other areas. Where fill is required, use bank-run gravel per M1.03.0 (a six-inch maximum diameter stone size).

A cash bond to be determined by the Public Works Superintendent is to be posted for trenches that do not require flowable fill (CDF). After a period of one year, or at the discretion of the Superintendent of Public Works, the Contractor must replace the pavement. After such a time the Public Works will inspect the work and determine if the bond shall be released.

Any subsequent settlement of the trench or ditch during the above referenced time frame shall be considered to be the result of improper compaction and shall be corrected at no expense to the Town by the contractor.

6.20 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.

6.21 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 the sewer connection to avoid ledge outcrops must be approved by the Engineering Department.

6.22 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.

The use of CDF is required for backfill material associated with outside drop manholes, and any construction in paved roadways having been paved or surfaced within five (5) years, or at the discretion of the XXXXXX Public Works Superintendent.

1. 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 ºF or less and falling.

   No CDF shall be placed under water.

2. 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.

7.0 Sewer Pipe Installation

7.10 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 existing finished grade.

7.20 Materials

1. 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.

2. 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.

8.0 Installation Requirements

8.10 Permit

A Permit must be issued by the Town of XXXXXX Engineering and Public Works Departments prior to the installation or repair of a Sewer.

8.20 Licensed Contractors

Only contractors licensed by the Town of XXXXXX 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 contractors may be obtained at the XXXXXX Engineering Department. **Licensed Contractors shall not sub-contract Sewer installation work to anyone other than a Town licensed contractor.** Failure to comply with this provision shall lead to a Notice of Violation for the Licensed Contractor and may result in loss of such License.

8.30 Minimum Size, Fittings and Clean-outs

Building Sewers must be a minimum of six (6) inches in diameter and sized based on the anticipated flows. Building Sewers must have a wye clean-out located ten (10) feet from the buildings exterior wall.

One clean-out will be allowed in order to change direction of the Building connection. Any subsequent change in direction will require a precast manhole with rubber boots. No change in direction more than 45 degrees shall be allowed. Ninety-degree turns require installation of a precast manhole. Two forty-five (45) degree bends may be utilized with an approval from the Town Engineer. These bends will not be allowed to achieve a change in direction that results in any future loss of subsequent manhole placement, either before or after the changes in alignment.

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.

All clean-outs must be extended to within six (6) inches of finished grade and capped.

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.

Building Sewers must be installed at a minimum of 1.00% and where possible, not to exceed 7.00%. The Town, depending on site conditions, may modify the slope requirements.

No saddle connections to the sewer will be allowed in new subdivision construction.

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.

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 by the Town Engineer.

8.40 Minimum Elevations for Gravity Connection

1. 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.
2. 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 three (3) 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 watermain 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.

8.50 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 XXXXXX Engineering Department.

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 XXXXXX Engineering Department.

8.60 Grease Traps

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.

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.

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 XXXXXX Sewer Department on an annual basis.

9.0 Workmanship

9.10 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 a minimum of four (4) inches for service laterals. 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.

9.20 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.

9.30 Laying and Jointing Pipe and Fittings

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 cleanout. 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.

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.

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.

For a main sewer extension in a right of way, paper street, or easement, Contractor shall use the laser beam method of maintaining grade and alignment of the pipeline unless another method is approved by the Engineering Department.

9.35 Sewer Installation

1. PVC Sewer Pipe shall be installed in accordance with the manufacturers recommended installation procedures.
2. 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.

   a. Main Sewers
   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.

b. Service Connections
The Contractor shall place service lateral Wye branches at the locations indicated on the plans or specified by the Engineering Department. 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. The Contractor shall mark the Wye with a 2"x4".

c. 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. 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.

d. Testing of Sewer Pipe & Appurtenances
Prior to final operation of a sewer main extension or building sewer, the Town may require the following testing to identify sources of infiltration/inflow (I/I):

- Low pressure air test (for sewers without building sewers).
- Video camera inspection and/or smoke testing of all lines in the presence of the Engineering Department. Site inspection of the Owner's Premises, including the interior of the building
- Manhole Vacuum Test (Adapted from ASTM C 1244 - 93 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

10.0 Vacuum Test (Negative Air Pressure)

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).

10.10 Preparation of the Manhole

All lift holes shall be plugged with an approved non-shrink grout.

All pipes entering the manhole shall be plugged, taking care to securely brace the pipes and plugs from being drawn into the manhole. The manhole shall be set to finish grade and all paving (if applicable) completed.

A failed Vacuum Test warrants the Contractor to supply the Town with an approved method of repair. This method shall be approved by the Public Works Superintendent and Town Engineer before such repair takes place.

10.20 Procedure

a. The test head shall be placed at the inside of the top of the frame and the seal inflated in accordance with the manufacturer's recommendations.

b. A vacuum of ten (10) inches of mercury shall be drawn, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine (9) inches.

c. The manhole shall pass if the time for the vacuum reading to drop from ten (10) inches of mercury to nine (9) inches meets or exceeds the values indicated by the Massachusetts Water Resource Authority.

11.0 Manhole and Cleanout Construction

11.10 Scope

This item includes the work necessary for the construction of precast manholes and cleanouts, including: concrete; furnishing and placing of the concrete precast sections; eccentric cones, pipe and fittings; cast iron frames and covers; and all appurtenances, in direct relation to the residential sewerage connection.

11.20 Materials

11.21 Concrete

Concrete used in the construction of the manhole base and other structures specified shall be so proportioned and mixed as to meet a 3,000 psi compression test after 28 days.

11.22 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.

11.23 Precast Concrete Bases

Precast base sections or manhole bases shall be approved and inspected by the Engineering Department prior to installation.

11.24 Special Fittings

The wyes, tees, and bends used in the construction of the drop manholes assembly and the cleanouts 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 CDF or as required by the Public Works Superintendent.

11.25 Manhole Frames and Covers

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. With the word "SEWER", cast upon the cover and be American made.

11.26 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.

11.27 Manhole Blockouts / Plugged Boot

Provide manhole blockouts and or plugged boots for sewer extensions as shown on the plan or as required by the Engineering Department. The intent of the blockout is to provide a means by which future sewer lines can be connected to the manhole with a minimum of inconvenience. The method of construction shall provide a watertight blockout and shall be approved by the Town Engineer. Construct invert channels to the manhole wall at the blockout in accordance with the invert elevation directed by the design Engineer.

11.28 Manhole Tables

a. All tables in manholes within right-of-ways, paper streets, and easements shall be made of red brick.

b. Manholes on private property, at the discretion of the contractor may choose to have a piped invert. This shall utilize two 45-degree bends and a straight section no less than 24 inches in length. A concrete table shall be poured and shaped so as to provide positive drainage to the manhole invert, and a cut-out provided in the center section PVC.

11.29 Manhole Inverts

The inverts of the manholes shall be constructed in conformance with the details shown on the Plans. The manhole inverts shall provide a smooth flow-through characteristic. No sharp edges or rough sections which will tend to obstruct the flow of sewerage will be permitted. All cement mortar used in the construction of the inverts shall be trowelled smooth. The contractor may, at his option, use precast bases with prepoured and formed inverts (channels).

11.30 Drop Manholes

Outside Drop manholes shall be constructed as required or at the location shown and as detailed on the approved plans [See detail 18.20 Appendix A]. The outside drop in its entirety shall be encased in flowable fill.

12.0 Grinder Pumps and Sewage Ejectors

a. 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 1,000 gallons. A 0.5 horsepower grinder style pump and a piped connection rated for pressure in excess of 150 PSI shall be utilized.

b. 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 XXXXXX 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 XXXXXX Sewer main or service lateral. Said owner shall be responsible for including such sewage works in the property deed.

c. Force main connections to the XXXXXX Sewer System shall be allowed only as approved by the XXXXXX Public Works Superintendent.

12.10 Force Main Connections

At no time shall a single family Sewer Force Main tie directly into any XXXXXX Sewer Main.

The force main shall connect to a sewer manhole on private property, then the connection shall flow by gravity to the existing sewer main.

If minimum cover cannot be achieved, Schedule 80 PVC, or Ductile Iron pipe shall be used. All force mains on private property shall be a minimum of 2" schedule 40 PVC, or as approved by the Town Engineer.

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.

13.0 Sewer Easements

Public Sewers

Public Sewers shall be constructed within existing public rights of way when applicable to the extent physically and legally possible. If, upon determination by the Sewer Commissioners, a public sewer must be constructed within a private way or across private property, a permanent easement of no less than twenty-five (25) 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. Variances from or waivers of the provisions of this Section may be granted in the discretion of the Sewer Commissioners only upon establishment of public necessity for such variance or waiver based upon the following and in conjunction with:

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 (see Standard Sewer Easement Agreement, Section-19). A permit will not be issued until the easement has been gained. At no point will a building sewer be permitted to tie into a manhole within an easement.

2. No more than one (1) building or residence will be permitted to connect into an existing Sewer Easement unless the prior written approval of the Public Works Superintendent has been obtained.

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

4. Owner shall not place or permit to be placed any trees or other deep-rooted landscaping directly over or within twelve and one-half (12.5) foot horizontal distance 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.

5. 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. directly over or within twelve and one-half (12.5) foot horizontal distance 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.

6. 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. The Town may periodically perform field inspections to verify compliance with the above-mentioned requirements. If a violation exists then the Owner must immediately remedy the situation.

8. Bolted and gasketted sewer manhole covers will be required at all off road locations or anywhere deemed necessary by the Public Works Superintendent.

14.0 Protection of Water Supply

1. There shall be no physical connections between a Building Sewer and the Water Supply System or appurtenances thereto which would permit the passage of any polluted water into the water supply system. Sewers shall be laid at least ten (10) feet horizontally from any existing or proposed water line. The distance shall be measured centerline to centerline. In cases where it is not practical or allowable to maintain a ten (10) foot horizontal separation, the Town may consider the installation of the sewer closer to the water line, provided that:

   a. The water line is in a separate trench or on an undisturbed earth shelf located to one side of the sewer.

   b. At an elevation so the bottom of the water line is at least eighteen (18) inches above the top of the sewer line.

   c. Building Sewers crossing water mains shall be laid to provide a minimum vertical separation distance of eighteen (18) inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water line joints. Where a water line crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water line. When it is impossible to obtain proper horizontal and vertical separation as stated above, the building sewer shall be designed and constructed equal to the specifications required for water pipe, and shall be pressure tested to assure water tightness prior to backfilling.

14.10 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 fernco or flexible rubber connections shall be permissible, unless approved by the XXXXXX Engineering Department.

15.0 Pipe Jacking & Directional Drilling

15.10 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.

15.20 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.

Any proposed pipe-jacking or directional drilling must be submitted by a registered Professional Engineer in the Commonwealth of Massachusetts, and be approved by the XXXXXX Engineering Department.

15.25 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.

15.30 Vacuum Holes

In preparation of pipe-jacking activities, an as-built showing any and all existing utilities in

the area of work must be verified by the vacuum hole method. These field locations must be submitted in lieu of any proposed sewer work.

16.0 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 Water Resources Authority.