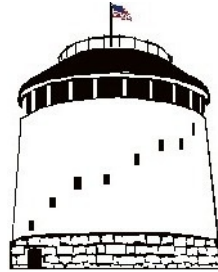


BANGOR WATER DISTRICT

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Water Construction Specifications and Procedures

Revised: January 8, 2013

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SECTION I: GENERAL INFORMATION

1.1 PLANS AND SPECIFICATIONS

1.1.1 Submittals

An Applicant proposing to construct a public or private water main or service shall submit a Project Application (see Section V) and one set of plans and specifications to Engineering Department at 614 State Street, Bangor ME 04401. The plans shall show plan and profile of the proposed water main or private line, right-of-way boundaries, other utilities, limits of paving, ledge profile or test borings, and any other physical or topographical features relevant to the installation and maintenance of the water system. Where available, control shall be based on the Maine State Plane Coordinate System NAD 1983 East.

All drawings, specifications and Engineer's reports submitted for approval shall be prepared and stamped by a registered Professional Engineer legally qualified to practice in the State of Maine. A cover letter shall be submitted with each set of plans and specifications giving a description of proposed work. Submittals will not be returned to the Applicant.

1.1.2 Project Review

The District's goal is to review plans within 30 days after receipt. A Capacity to Serve letter will be issued to the Applicant within this period. Comments will be returned to the Applicant. If the Applicant does not respond to the District's comments within 60 days, the plans shall be considered inactive. In such cases, a new submission shall be required. All plans will be date stamped upon receipt and reviewed in order of receipt.

1.1.3 Approval

BWD shall issue a letter of approval following project review. Approvals are valid for a period of two years from the date of issue. If construction is not in progress at the end of that period, District approval is void. Plans and specifications may have to be submitted as a new project, if deemed necessary by the District, and must conform to the District's most current standards and specifications.

1.1.4 Final Plans for Construction

Prior to construction, the Applicant shall submit two paper sets of plans and specifications depicting approved water system configuration and an electronic version of the final Planning Board signed plans. No water construction shall begin or inspector assigned until these plans are received by the District.

1.1.5 Service Line

Service lines 1-inch in diameter or less do not require the engineering review necessary for main extensions and private lines. However, for large diameter and long service extensions the District reserves the right to request the information outlined above. The District will size all domestic services and meters. Service lines must be designed, installed, inspected, and approved in accordance with

District standards and specifications before water service is provided. At a minimum, the following information for new or replacement service lines must be submitted with the Project Application:

- Plan showing building and distance to street
- Location of Curb Stop
- Fixture count
- Sprinkler requirements
- Map & Lot Number
- Name, address and phone number of contractor installing the service

1.1.6 Agreements

An agreement between the owner and the District is required depending on the type of proposed water construction. Types of agreements include:

- Main Extension Agreement
- Private Line Agreement
- Fire Service Agreement

Appropriate agreement forms will be furnished by the District to the Applicant. Agreements must be in place and fees paid before water construction begins. The Applicant is also required to file an Application for Service with the District before water service is turned on to individual services.

1.2 PROJECT ACCEPTANCE

1.2.1 Water Main Extension for Public Use

A public water main is defined by Chapter 650 of the Maine Public Utility Commission rule as:

“...a water line in a public way owned by the utility to serve one or more customer, multi-unit dwelling complex, or commercial or industrial development; or a water line owned by the utility on private property to serve more than one customer, multi-unit dwelling complex, or commercial or industrial development or to serve a single customer, multi-unit dwelling complex or commercial or industrial development if another person or entity has an easement or other right of access for water line purposes.”

All new water main extensions for public use require the completion of a Project Application prior to project review.

Water service will not be activated for the new public water main until all of the following conditions have been met:

1. Final inspection is complete and the new water main and its appurtenances meet the District’s standards and specifications.
2. The District has issued a project acceptance letter.
3. The District has received one paper set of 24-inch by 36-inch as-built drawings with an electronic version.
4. The Project Application and all appropriate agreements have been signed and submitted to the District: Main Extension Agreement, Fire Service Agreement, and all Easements. (See Section V)

The Applicant will be responsible for any repairs as a result of construction or defects for a period of one year from date of activation. Any charges incurred during that year shall be paid by the Applicant. A District inspector shall be present for all repair work.

1.2.2 Private Line

Private lines are defined by Chapter 650 of the Maine Public Utility Commission (PUC) rule as:

“A water line constructed after May 7, 1986 across private property to serve a single customer, a single multi-unit dwelling complex or a single commercial or industrial development upon which no other person has an easement or other right of access for water line purposes.”

Generally, the District considers a water line servicing a property to be a private line if:

- a) The water line is under a single ownership that will not be divided in the future; and where
- b) The water line will not be extended through the subject property to serve additional customers in the future.

This definition may apply to a residential, commercial, or industrial development that has more than one tenant. Examples include mini-malls, office complexes, or multi-unit residential complexes that are sufficiently far from a main located in a public right-of-way that individual services are not practical.

All new private lines require the completion of a Project Application prior to project review.

Water service will not be activated for the private line until all of the following conditions have been met:

1. Final inspection is complete and the new private line and its appurtenances meet the District's standards and specifications.
2. The District has issued a project acceptance letter.
3. The District has received one paper set of 24-inch by 36-inch as-built drawings with an electronic version.
4. The Project Application and all appropriate agreements have been signed and submitted to the District: Private Line Agreement, Fire Service Agreement (if applicable), and all Easements. (See Section V)

The District will not accept ownership of private lines. Individual curb stops shall be installed within the R.O.W., or have easements furnished to the District. The Applicant will be responsible for the continued maintenance of the private line, with the exception of individual unit curb stop shutoffs which will be maintained by the District.

1.2.3 Service Line

A service line is defined by Chapter 650 of the Maine Public Utility Commission (PUC) rule as:

"A water line installed at the customer's expense extending from a main to serve a single customer, a single multi-unit dwelling building or complex of a single commercial or industrial development. The service drop portion of the service line shall be owned by the utility and shall extend from the main to the curb stop (shut-off valve). The curb stop shall ordinarily be at the edge of the right of way."

All new service lines and service line renewals require a Project Application prior to construction.

Service renewals include replacing the service box and rod as instructed by the District. The District will supply the service box on service renewals. Service boxes and curb stops shall not be placed in driveways. Water service will not be activated for the service line until all of the following conditions have been met:

1. Final inspection is complete and the new service line meets the District's standards and specifications.
2. The District has issued a project acceptance letter.
3. The District has received as-built information. The Project Application has been signed and submitted to the District with all easements (if applicable). (See Section V)

All services, domestic and fire protection, must have separate shut-off valves within the right-of-way..

1.3 EASEMENTS

Easements shall be required for all water mains and appurtenances intended for public use except where installed within the public way of the State or the Municipality. Such easements shall not be less than 20-feet wide. The District reserves the right to require additional easement width as construction and maintenance activities may require. All easements shall include the right of ingress and egress as well as the right to install and maintain water lines and appurtenances. If necessary, easements shall extend to adjacent properties for orderly extensions of service.

All appurtenances (blow-offs, curb stop shut-offs, hydrants, etc.), if not within the water main easement limits, or if part of a private line, shall be provided with an easement to the District 10-feet long by 20-feet wide, and centered around the appurtenance. The extent of all easements shall be at least 5-feet from any structure, where possible.

No buildings or permanent structures shall be constructed within the easement, except if the easement includes a roadway. In a roadway easement, pavement and other utilities will be allowed. Any utility crossings shall be generally perpendicular and shall maintain a 1-foot vertical separation except as noted in Section 1.4: Separation Distances.

No trees, shrubs, structures, fences or obstacles shall be placed within an easement that would render the easement inaccessible by equipment. Any person who places an obstruction within the utility easement shall be liable for the cost of removal and replacement and any damage to the utility.

1.4 SEPARATION DISTANCES

There shall be no physical connection between a water supply line and a sewer or appurtenance. Water lines shall be laid at least 10 feet horizontally from a sewer or sewer manhole, and in accordance to the Maine State Plumbing Code. When local conditions prevent a horizontal separation of 10 feet, the water line may be laid closer to a sewer or sewer manhole provided that:

- a) The bottom (invert) of the water main shall be 18 inches above the top of the sewer and the edge-to-edge distance shall be no less than 5 feet.
- b) Where this vertical/horizontal separation cannot be obtained, the sewer shall be constructed of District-approved ductile iron water pipe, and be pressure tested without leakage prior to backfilling.

Water lines crossing sewers shall be laid to provide a vertical separation of at least 18 inches between the bottom of the water line and the top of the sewer. When local conditions prevent this vertical separation, the following construction shall be used:

- a) Sewers passing over or under water lines shall be constructed of District approved ductile iron water pipe.
- b) Water lines passing under sewers shall, in addition, be protected by the following:
 - i. A vertical separation of at least 12 inches between the bottom of the sewer and the top of the water line.
 - ii. Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line.
 - iii. One full length of waterline be centered at the point of the crossing so that the joints shall be equidistant and as far as possible from the sewer.

Minimum Separation from Water Mains

The following minimum separations from water mains shall be observed at all times unless otherwise directed by BWD personnel:

Horizontal Separation

- a) Sanitary Sewers – refer to requirements in this section noted above
- b) Storm drains – 3 feet, face to face for mains, catch basins and drain manholes
- c) Gas mains – 6 feet, face to face
- d) Underground electric and telephone – 6 feet, face to face
- e) Utility Poles – 6 feet, face to face

Vertical Separation

- a) 18 inches for sewer
- b) 12 inches minimum, all crossings

Minimum Separation from Water Services

The following minimum separations from water services shall be observed at all times unless otherwise directed by BWD personnel:

Horizontal Separation

- a) Storm drains – 3 feet, face to face for mains, catch basins and drain manholes
- b) Gas mains – 6 feet, face to face
- c) Underground electric and telephone – 6 feet, face to face
- d) Property lines – 10 feet,
- e) Sanitary sewer – 5 feet; if sanitary sewer service is laid 18 inches below water service, then an 18-inch horizontal separation is allowable
- f) Curb stops for multiple services – 18 inches
- g) Utility Poles – 6 feet

Minimum Separation from Hydrants

The following minimum separations from hydrants shall be observed at all times unless otherwise directed by BWD personnel:

Horizontal Separation

- a) Gas mains – 3 feet behind hydrant (not allowed over hydrant branch)
- b) Underground electric and telephone – 3 feet behind hydrant (not allowed over hydrant branch)

SECTION II: WATER MAIN CONSTRUCTION

2.1 General

2.1.1 Agreements and Fees

After final plans depicting the approved water main configuration and right of way and or easements have been received, the District and the Applicant shall enter into a main extension agreement, private line agreement, fire service agreement, and project application. At this time, the Applicant will deposit the following estimated fees:

- a) Fire Protection Capacity Charge (not applicable for private lines)
- b) Inspection Fees
\$45/hour (hours estimated at the beginning of the project and reconciled at the end of the project based on actual time that BWD spent inspecting the project)
- c) Service Application Fees
- d) Municipal or MDOT Street Opening Permit Fees (if applicable). MDOT opening permit must be obtained by BWD
- e) District jobbing fees (tapping the water main, pressure test, chlorination, etc.)

After the project is completed, the District will reconcile all costs associated with the project and will either provide a refund if total costs are less than the deposited amount or request payment for costs in excess of the deposited amount.

2.1.2 Location Permits

The Applicant shall submit a copy of the location permit (state or municipal) to the District.

2.1.3 Inspection

An inspector from the District, or a consultant working for the District, will be assigned to each project to ensure that all work is completed and materials are installed in compliance with these specifications. All work must be inspected prior to backfilling. During the course of the work the inspector will report to the District Engineer on the progress of the work. Any deviation from the approved plans or specifications must be approved by the District before incorporation into the work.

The Applicant/Contractor shall schedule with the District for inspection services a minimum of two business days prior to beginning construction. The District reserves the right to have material removed in order to inspect the main, service, or backfill material.

2.2 DESIGN CRITERIA

2.2.1 Pipe Size/Type

All distribution mains 4-inches and larger shall be ductile iron per material specifications except under special site conditions where the District may specify a different pipe type.

All main distribution pipe lines shall be of a size to adequately serve the needs of the proposed development and any potential extensions thereof. The minimum size of the pipe where public fire protection is to be provided or required shall be 8-inches in diameter. Dead-ends shall be minimized by looping all mains where practical.

Where dead-ends are necessary they shall be terminated with a fire hydrant, or 2-inch minimum blow-off assembly.

The District will determine the size of all water mains and services. The District may request that the size of the main be increased beyond the required size for the project. This is sometimes necessary to facilitate the future expansion of the system beyond the scope of the Applicant's project. In this case the District will pay to the developer the difference in cost of the material between the two pipe sizes.

2.2.2 Depth of Cover

Water pipe shall be laid with a minimum cover of 5-feet and a maximum cover of 7-feet, measured from final finished grade to the top of the pipe. The contractor shall establish adequate elevation control to ensure that upon final grading appropriate cover over water lines has been maintained. It shall be the Contractor's responsibility and expense to verify the cover at any location questioned by the District. Any potential changes in alignment or grade of roadways shall be considered in the original utility design.

2.2.3 Gate Valve Locations

Gate valves shall be installed at all pipe junctions and street intersections in such a manner as to control flows in all areas of the system. A minimum of two valves are required at all tees, except at hydrant arms and service or as otherwise approved by the District. A valve may be required beyond the last service if the main can be extended in the future. In all other areas gate valves will be required every 1000 feet, except as otherwise approved by the District. Additional gate valves may be required under certain situations, such as looped systems, where it is necessary to isolate certain sections of the system. All valves shall be installed plumb.

2.2.4 Pressure and Flow Requirements

All distribution systems shall be capable of providing a minimum working pressure of 20 p.s.i. under maximum day demand conditions, plus the required fire flow as determined by the Insurance Services Office (ISO) or the local fire department. The Applicant will provide the estimated peak demand for the project and the District will determine whether the project meets pressure and flow requirements.

In the event that the 20 p.s.i. minimum pressure cannot be met, the developer or owner can request, in writing, limited service for each service connection in question. The District will determine whether adequate conditions exist to grant limited service.

2.3 CONSTRUCTION

2.3.1 Description

This section addresses: excavation and backfill of the trench; furnishing, and installing cement-lined ductile iron pipe, valves, fittings, hydrants, and accessories of the types and classes described herein and shown on the plans; making connections to the existing public water supply system; pressure testing and disinfecting the completed installation; and incidental work as described herein.

Please refer to Section IV: Bangor Water District Standard Details for detailed drawings of the following items:

- Typical Trench Detail
- Typical Trench Detail in Ledge
- Residential Meters and Backflows
- Commercial Meters and Backflows
- Thrust Block Specifications
- Hanging Thrust Blocks
- Restraining C-900 Valves
- Typical Tie-in (Old main to new main when service interruption is not desired)
- Typical Domestic / Fire Service
- Wall crossing sections
- Typical Domestic Service Connection
- Standard Hydrant Set-up
- Offsets
- Permanent Style 2-inch Blow offs
- Meter pit installation

2.3.2 Excavation

All work performed and materials used for excavation will be considered as incidental to other items of these specifications.

Excavation shall be kept free of water and special precautions shall be taken to prevent entry of water, mud, or other foreign substances into the line. Temporary water-tight caps or plugs shall be installed over all openings at the end of each day, when the work is suspended for periods of 30 minutes or more (including lunch hours), between each length of pipe that is being installed, or whenever necessary to protect the work in progress.

All damage resulting from inadequate bracing or shoring will be the responsibility of the Contractor. The Contractor shall make all necessary repairs and do reconstructions at his own expense. The Contractor will bear all other expenses resulting from any such damage due to lack of adequate shoring. All excavated areas shall be compliant with all OSHA standards and regulations.

The Contractor will take special precautions on projects that are near road curbs. Every effort shall be made to avoid disturbing any roadside curbing. Should it become necessary to disturb or remove curbing during water main installation, the Contractor shall, at own expense, replace such curbing in accordance with construction practices in the latest edition of the Maine Department of Transportation Highway Specifications or local town specifications.

2.3.3 Excavation Near Underground Utilities

The Contractor shall note that underground sewer mains and services, storm drains, telephone or communications cables, gas lines, and other below-ground utilities may exist in close proximity to the work. Excavation around other utilities, pipes, culverts, and similar installations shall be done with extreme care. It shall be the Contractor's responsibility to contact each utility to be encountered and obtain information relative to location and depth before excavating in the area. It shall be the contractor's responsibility to comply with the State of Maine "Dig Safe" law. The Contractor shall promptly notify the Utility concerned in the event of damage occurring during construction, whether caused by his action or others.

In the event that underground utilities conflict with the location of the work, the Contractor shall promptly notify the District and shall not disturb the conflicting utility until given specific instruction specifying the action to be taken.

Private utilities (building drains, etc.) encountered during the work shall be brought to the attention of the District and be handled in such manner as directed by the District. All damaged utilities, public or private, shall be immediately repaired at the Contractor's expense.

The Contractor shall use extra caution to avoid disturbing any water service connections along the proposed water main routes. Any disruption of water service or any damage to such service lines shall be immediately reported to the District and the property owner. It shall be the Contractor's responsibility to immediately repair any damage done to water services during installation of new water mains. Any damage due to the crimping of water services will be repaired at the Contractor's expense. No water service shall be crimped without the advanced written approval of the Bangor Water District. Crimping shall only be used as a last resort.

In the event of damage to facilities, a representative from the District will be on site while repairs are being made.

2.3.4 Excavated Material

All excavated material shall be placed in a manner that will not endanger the work and will avoid obstructing sidewalks and driveways. Gutters and other means for providing surface drainage shall be kept clear where possible.

2.3.5 Backfilling Materials and Procedures

Suitable excavated material or borrow (i.e. free of stones larger than 6-inches and capable of being properly compacted) shall be placed and tamped under and around the pipe, taking care to maintain equal depth on both sides and to prevent movement of the pipe from its proper alignment. Unsuitable material including wet clay, frozen soil, boulders, rubble, wood, debris, etc. shall not be replaced in the trench. Where directed by the District, due to soft or otherwise unsuitable trench bottom conditions, crushed stone or 6-inch minus granular pipe bedding shall be placed in accordance with the requirements of BWD standard details.

Suitable material from excavation shall be used to the maximum extent possible in grading over, and adjacent to, the pipe and in filling adjacent low land as directed by the District. Materials that cannot be so placed shall be removed as directed by the District.

Suitable material is defined as material that is free of rocks larger than 6-inches, and frozen earth and has moisture content suitable for proper compaction. Please refer to the Bangor Water District's material specifications regarding suitable soils.

2.3.6 Test Pit Excavation

At such locations as may be determined by the District, the Contractor shall perform test pit excavation to locate various utilities. The limits and depth of such excavations shall be determined by the District. The contractor shall perform all work as directed by the District. In addition, the Contractor shall carefully backfill the test pit, using 12-inch compacted layers, and restore the surface to a condition equal to or better than it was before.

2.3.7 Extra-Earth Excavation

The Contractor shall perform additional excavation, where the District so directs, when necessary during construction. The following conditions may result in the Contractor performing additional excavation:

- a) Necessity of installing water mains below other subsurface utilities
- b) Discovery of unsuitable material in the trench bottom
- c) Necessity of widening the trench beyond specified limits in order to remove or relocate structures encountered during construction

2.3.8 Blasting

The District has adopted the blasting requirements used by the City of Bangor. The Contractor must obtain a blasting permit from the City, which includes a pre-blast survey per City specifications.

The Contractor shall employ an experienced blaster and shall comply with all local and state laws, ordinances, and applicable safety codes and regulations relative to the handling, storage, and use of explosives and protection of life and property. The Contractor shall be fully responsible for all damage thereto caused by his blasting operations. Signals, warning of danger, shall be given before every blast. Suitable weighted timer mats, wire rope mats, or other approved covering shall be provided to confine all materials lifted by blasting within the limits of the trench or excavation.

The excavated ledge material may be used in approved areas for backfilling the mid portion of the trench except that stone fragments exceeding the size of 6-inches shall not be used in the backfill.

2.3.9 Preparation of Water Line Trench Bottom

Pipe shall be laid directly on the undisturbed trench bottom. Where the water main extension crosses a sewer line or house lateral, the water main joints shall be spaced such that no water main joint is closer than 10 feet to the sewer centerline. The water line shall be installed such that it passes 18 inches over the sewer.

2.3.10 Pipe Installation

Pipes shall be carefully lowered into the excavation, be guided into proper position, and joined to the preceding length or fitting. Pipes shall be installed using a temporary cap or plug to keep out water, animals, and debris.

All pipes shall be installed with a minimum 5-foot depth of cover over the top of the pipe not to exceed 7-feet without prior approval from the Bangor Water District. Where existing or proposed pipes, conduits, culverts, cables, wires, etc. interfere with laying at this depth, the water pipe shall be laid to provide a minimum vertical separation distance of 18-inches.

2.3.11 Cutting Pipe

When a field cut end of a water main is to be used for insertion into a "Bell-Tite" or "Tyton" joint, it shall be beveled on the outside of the cut about 1/8-inch, at an angle of about 30 degrees with the pipe center. This shall be done with a portable grinder.

2.3.12 Connection to Existing Water Main

The Contractor shall locate and confirm sizes and materials of existing mains, excavate, furnish and install tapping sleeves and valves, and backfill the excavation. All materials, including mechanical joint accessories, valve boxes, and other items necessary to make all joints watertight and provide complete and effective connections to existing water mains shall be provided by the Contractor. All tapping sleeves shall be pressure tested prior to BWD tapping the main. Tapping valves shall be installed plumb.

Contractors are not authorized to operate any valve connected to an existing water main including, but not limited to, all domestic and fire services.

All size-on-size taps shall be done with full body ductile iron MJ tapping sleeves meeting BWD material specifications.

2.3.13 Thrust Blocking, Anchorage, and Joint Restraint Water Line Fittings

Thrust blocking and anchorage is required wherever the pipe:

- a) changes direction as at tees, bends, crosses, and tapping sleeves;
- b) changes sizes, as at reducers; or
- c) stops, as at dead ends and hydrants.

Concrete shall be used for thrust blocks, and they shall be poured in place or pre-cast in accordance with BWD standard details. Poured-in-place thrust blocks shall be constructed by pouring concrete between the fitting and the undisturbed wall of the trench. A low slump mixture shall be used so that the concrete may be easily shaped into the desired form, a wedge with the wide end against the solid wall. Poured-in-place thrust blocks shall be poured using forms. Care shall be exercised to ensure that the concrete is clear of joint accessories, bolts, nuts, and flanges. A layer of 8-mil poly sheeting shall be placed between the main and the concrete thrust block.

The Contractor shall furnish and install all materials and equipment, and perform all labor for the manufacture, transporting, placing, curing, and testing concrete for thrust blocks. Concrete shall be

composed of Portland cement, water, fine and coarse aggregate, and an air-entraining mixture. Cement shall be Type II conforming to ASTM C150 or ASTM C175.

Aggregates shall conform to ASTM C33. For thrust blocks, all aggregates shall be able to pass through a screen with 2-inch square openings.

Preferably, water used in mixing and curing concrete shall be potable. Non-potable water shall be fresh, clean and free from injurious amounts of sewage, oil, acid, alkali, salt, and organic matter.

Air entraining admixtures shall conform to the Specifications for Air Entraining Admixtures for Concrete (ASTM C260).

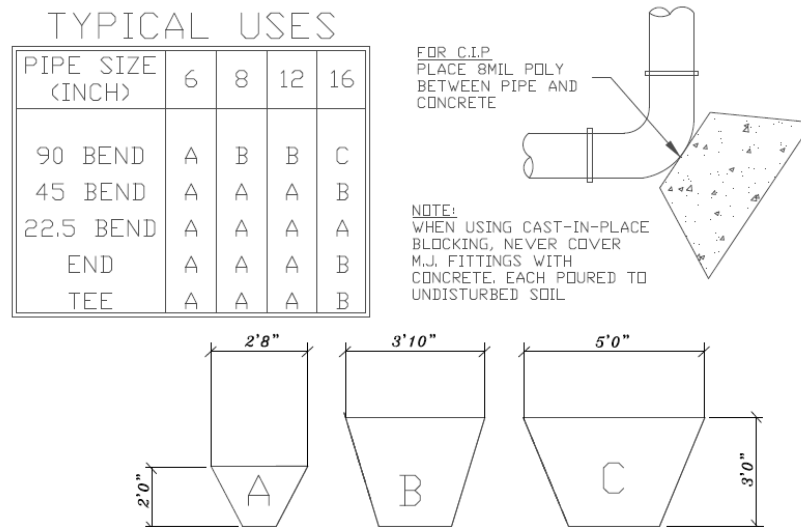
Unless otherwise shown on drawings, concrete used for thrust blocks shall have a 28-day compressive strength of 2,500 psi. When no preliminary strength tests of the concrete to be used are made, the water-cement ratio shall not exceed the following values.

| Specified Compressive Strength at 28 days (psi) | Maximum permissible water-cement ratio, lb. of water per lb. of cement |
|---|--|
| 2,000 | 0.70 |
| 2,500 | 0.55 |
| 3,000 | 0.46 |
| 3,500 | 0.40 |
| 4,000 | 0.35 |

Water-to-cement ratios other than the above may be used when the strengths of the concrete are to be established by tests. The District shall determine if concrete testing is necessary and shall also determine the method of any concrete testing which is performed. The slump of concrete for thrust blocks shall be the minimum that is practicable such that the concrete may be easily shaped into the desired form, a wedge with the wide end against the solid undisturbed wall. Segregation of materials in the mixture shall not be permitted. Forming and placing of concrete for thrust blocks shall be done under the direction of the District.

Curing and form removal for concrete thrust blocks, and requirements due to air temperature and weather conditions shall follow proper construction practices and shall be subject to approval by the District.

Minimum thrust block area against the undisturbed trench wall shall be as follows:



THRUST BLOCK SPECIFICATIONS

A=SMALL PRECAST (.22 YDS.) HT. = 24"
 B=LARGE PRECAST (.97 YDS.) HT. = 36"
 C=CAST-IN-PLACE (1.74 YDS.) HT. = 50"

In addition to the above requirements for thrust blocking, water mains shall be protected from movement by thrust forces in the following manner:

1. All fittings, valves, hydrants, and caps shall have ductile iron standard or wedge restraint glands, unless otherwise directed by the District.
2. All push-on joints in hydrant lateral shall be secured by rods as shown on the standard details or as directed by the District.

All valves are required to be rodded to the tee. Foster adapters are allowed.

Bolts on all ductile standard glands shall be systematically tightened with a torque wrench according to the manufacturer's requirements. When all bolts have been tightened in this manner, each bolt shall be retightened according to manufacturer's requirements in the event that some may have loosened during the initial tightening process.

When a fitting is used to make a vertical bend, anchor the fitting to a thrust block braced against undisturbed soil. The thrust block should have enough resistance to withstand upward and outward thrusts at the fitting.

2.3.14 Traffic Control

On portions of the project which are within the confines of an existing roadway, the Contractor shall provide for at least one-way traffic whenever possible with special regard for the safety of the traveling

public. Traffic control shall be accomplished in accordance with M.D.O.T. specifications and shall be coordinated with the local Town Public Safety office. A traffic control plan shall be prepared, submitted and approved by the governing authority prior to commencing work.

Property owners whose driveways will be blocked for a short period of time will be notified by the Contractor at least 24-hours in advance of the excavation so that vehicles can be removed when necessary. Driveways shall not be blocked over night without the expressed consent of the property owner.

2.4 WATER LINE CHLORINATION AND PRESSURE TESTING

All water line testing shall be done in accordance with AWWA specifications.

1. When pressure testing and chlorination is conducted by someone other than the Bangor Water District, the District requires a representative on site to witness the test and operate any valves connecting to the existing main. The line testing must conform to the District's procedure in accordance with ANSI/AWWA C651-92 and ANSI/AWWA C600-93.
2. Chlorination shall be done in accordance with ANSI/AWWA C651-92, the AWWA standard for Disinfecting Water Mains Section 5.2, Continuous-Feed Method.
3. Integrity of the installed pipeline shall be confirmed using ANSI/AWWA C600-93, the AWWA standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.
4. All bacteriological sampling will be collected and tested by the Bangor Water District.
5. When one and a half (1 ½) times the working pressure is less than 100PSI. The main will be pressure tested to a minimum of 100 PSI.

2.5 COMMON BORROW, ROADWAY GRAVEL AND PIPE BEDDING

2.5.1 Description

Furnish and place common borrow where trench material is unsuitable, gravel for drives, and parking areas, and granular pipe bedding as directed by the District at locations where the existing soil conditions are unsuitable.

2.5.2 Common Borrow

Borrow material shall contain no rocks or fragments with dimensions in excess of the layer thickness being placed, and shall be free of frozen earth, ice, snow, rubbish, peat and other unsuitable material. Common borrow shall meet MDOT specification 703.18. Borrow shall not be used in the work when suitable materials from the excavation are available.

Common borrow shall be placed in 12-inch layers and be thoroughly compacted before the next layer is placed.

2.5.3 Roadway Gravel

Furnish and place gravel to a depth of 15-inches for access drives and parking areas, and to a depth equal to the depth of existing gravel base or eighteen 18-inches, whichever is greater in excavations made in existing roadways. Roadway gravel to be furnished under this item shall be composed of screened or crushed gravel of hard durable particles meeting MDOT Type C specification 703.06 free from vegetable matter, lumps or balls of clay and other deleterious substances.

Gravel shall be placed in 12-inch layers and be thoroughly compacted before the next layer is placed.

2.5.4 Pipe Bedding

Special pipe bedding is normally not required for ductile iron pipe. Pipe bedding is required for excavations in ledge and may be required if unsuitable materials are encountered in the trench. If bedding is required, it shall be as per BWD Standard Details. **No pipe shall be laid directly on ledge, under any circumstances.**

2.5.5 Trench Backfill

Shall be as per BWD Standard Details.

Where flowable fill is required per the Maine Dept. of Transportation or local town standards, placement of sand or stone around pipe to a depth of 1-foot above top of pipe must occur prior to placement of flowable fill.

2.6 HOT BITUMINOUS AND CONCRETE PAVING

2.6.1 Description

Paving shall be done in accordance with local and DOT paving specifications.

2.6.2 Paving Time Limits

The Contractor shall be responsible for all conditions set forth under the local or MDOT Street Opening Permit. Under conditions of this permit, no paving shall be allowed after winter shutdown (approximately Dec. 1), and all roads must be satisfactorily paved before winter shutdown. The Contractor shall be responsible for maintaining any paving done through project duration, especially during winter shutdown. All paving outside the urban compact line will be under the Maine Department of Transportation's jurisdiction.

2.6.3 Paving Other

There are times when the Bangor Water District will have to obtain permits that may include an escrow account to be set up. All deposits and fees needed for the permit and escrow will be the responsibility of the developer.

2.7 LOAM, SEEDING AND SODDING

2.7.1 Description

This item shall consist of furnishing and placing loam, seed, and sod as needed to restore areas disturbed by construction.

2.7.2 Materials

Loam:

Two inches of loam shall be placed in accordance with BWD standard details. The loam shall be of approved quality topsoil. It shall be free from gravel, roots, clods, stones, and other material, which would tend to form air pockets in the soil. The use of sour loam or mulch will not be permitted. Prior to stripping the loam, the Contractor will remove grass, briar, stumps or roots by mowing, grubbing, or other satisfactory means.

Fertilizer:

Commercial fertilizer for seeding shall be 10-10-10 grade containing at least ten (10) percent available nitrogen, 10-percent readily available phosphoric acid and ten (10) percent total available potash. The fertilizer shall be supplied in unopened bags with the weight, contents, and guaranteed analysis shown thereon or on a securely attached bag.

Seed:

All seed shall be certified as to mixture germination and purity, as being in conformity with the following requirements. All seeds shall be from the previous year's crop. Each type of seed shall have a percentage of germination not less than eighty-five (85) and shall have not more than 1-percent weed content.

The seed mixture shall consist of seeds proportioned by weight as follows:

- Kentucky Blue Grass 50%
- Red Top 25%
- Canada Blue Grass 10%
- Dwarf White Clover 10%
- English Rye Grass 5%

Sod:

Sod shall, in general, be obtained from sources having soils of the same type as the base soil over which it is to be placed, except that sod from light sandy soils will not be acceptable. The sod to be placed upon sandy soils shall be of such character and moisture content that the sod will not break up or crumble during the operations of cutting, transporting, or laying. All sod shall be approved in its original location before cutting. The sod shall consist of a dense, well-rooted growth of perennial and desirable grasses, indigenous to the general locality where it is used and shall be free of noxious weeds.

2.7.3 Construction Methods

2.7.3.1 Loam

All slopes and other areas where loam is required shall be trimmed and shaped to the required sub-grade of the area. Before placing the loam, the prepared areas shall be scarified or loosened to a depth of at least 2-inches by harrows, pulverizes, or other means.

Loam shall be spread on the prepared areas to the uniform depth shown on the plans or as directed. After spreading, all existing lumps or clods shall be broken up and all rocks over 2-inches in diameter, and roots, litter or foreign matter shall be raked up and disposed of. When the loamed area is to be seeded and is also adjacent to an existing lawn, all rocks over 1-inch in size shall be removed by raking or by other approved methods, and the material shall be compacted by rolling with a suitable lawn roller. All compacted loamed surfaces shall conform to the required grades and cross sections.

When loam is spread, upon which the sod is to be placed, the material shall be spread to the required depth. Rocks exceeding 2-inches shall be raked up, together with undesirable roots and debris, and disposed of. The loam need be only roughly shaped since in placing the sod, the material shall be adjusted to give the desired finished elevation and cross section of the sod surface. Any excess of loam remaining in stock piles, after completion of loaming all required areas, shall be trimmed or leveled to present a neat appearance as directed.

2.7.3.2 Fertilizing

After the areas to be seeded have been loamed and brought to grade, the soil shall be brought to a friable condition by harrowing or otherwise loosening and mixing it to a depth of at least 4-inches before fertilizing. The commercial fertilizer shall be applied to the soil by means of a mechanical spreader or other approved method which is capable of maintaining a uniform rate of application. The fertilizer (10-10-10) shall be applied at the rate of 25-pounds over 1,000-square feet. When other commercial fertilizers are used as authorized above, the application shall provide a minimum amount of the basic ingredients as specified for the 10-10-10 fertilizer. Fertilizer shall be thoroughly harrowed, raked, or otherwise mixed satisfactorily with the soil to a depth of not less than 1-inch. Fertilizing shall be done when the soil is in a moist condition and at last 24-hours before sowing the seed.

2.7.3.3 Seeding

Grass seeds of the required mixture and quality shall be sown by a mechanical seeder or other method, which will show a uniform quantity as required over the whole area to be seeded. The mechanical seeder shall be capable of being operated to avoid the growth of grass in rows. The application of the seed shall be in the amount of three pounds per 1000-square feet. Seeding shall be done when the air is calm, and between the dates of April 15 - October 1.

After seeding all areas shall be lightly raked by hand to mix the seed and loam, and to smooth the surface. Lawn areas shall then be rolled with a light lawn roller.

When dry periods occur during the allowable dates for seeding, the Contractor shall apply sufficient water to the area to satisfactorily maintain the moisture content of the soil to allow proper germination of the seed and growth of the grass.

2.7.3.4 Sodding

The sod bed or area from which the sod is to be cut shall be mowed at least twice before the sod cutting begins. Mowing shall be by means of lawn mowers or other approved equipment at intervals of one week between mowings. Cutting of sod shall not be started until at least one week after the second mowing. The sod shall be cut in strips having a minimum width of 12-inches and length of not less than 18-inches. The sod shall be cut to uniform thickness of not less than 2-inches.

The sod shall be freshly cut by means of an acceptable sod cutter and transported to the area to be sodded in an unbroken condition. Storage of sod will not be permitted and it shall be placed in final position immediately after cutting. Sod shall be loaded and unloaded by hand.

The sod shall be moist and shall be laid on a moist bed of loose loam. The sod shall be carefully placed by hand in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward.

The bottom edges of sodded areas shall extend at least two inches into the ground or ditch bottom. All other edges of sodded areas shall be turned into the ground and covered with a layer of top-soil at least 2-inches in depth, which shall be thoroughly compacted to conduct the surface water over the edge of the sod.

The transverse joints of sod strips shall be broken and the sod carefully lain to produce tight joints. Any spaces left between sod strips shall be filled with loam. Where the sod may be displaced during sodding operation, the workmen shall work from ladders or treaded planks. The sod shall be firmly compacted by tamping with an approved tamper immediately after a workable area has been placed.

After tamping, the sod surface shall present a smooth, even surface free from bumps and depressions, and true-to-line grade and cross section. On slopes steeper than three horizontal to one vertical, the sod shall be pegged with wooden pegs. The pegs shall be spaced not more than 2-feet apart in any direction, and shall be driven flush with the surface of the sod.

During July and August, and during periods of drought, the Contractor may place sod only if he will satisfactorily water the sod and ensure continued growth of the grasses. Sod placed during such time and not surviving shall be removed and replaced by the Contractor at his expense.

Frozen sod shall not be used, nor shall sod be placed upon frozen ground.

2.8 PERMITS

A Highway Opening Permit must be obtained from the City of Bangor or other municipality having jurisdiction and/or the Maine Dept. of Transportation before any excavation is made within the right-of-way of state, state-aid and City/town roads. The Contractor must obtain this permit, and the permit fees must be paid at the time of application, which will occur prior to the actual start of the work.

The developer/contractor is responsible for signing for service from BWD and paying all applicable fees and/or deposits prior to commencing work, including fire service agreements and main extension agreements.

There are times when the District will be required to obtain permits for a new main installation. The District is required to obtain DOT permits. In some cases there will be a deposit required as part of the permit. The District will require the developer/contractor to pay this deposit into an escrow for one year. After MDOT releases the escrow the money will be refunded back to the developer/contractor minus a 5% administration fee accessed by MDOT. If the MDOT refuses to refund any part or all of the escrow money, the developer/contractor will not be refunded the portion that is retained by the MDOT.

2.9 EROSION CONTROL

The District is very concerned that the contractor use proper erosion control procedures. The contractor shall explicitly follow any direction from the District as well as state, local and federal regulations as to the placement of erosion control structures.

Cleanup, grading, seeding, planting, and restoration of the work area shall be carried out as early as practical as the construction proceeds. All non-pavement areas disturbed during construction shall be loamed and seeded to reestablish vegetation within 30 days of disturbance. Temporary pollution control provisions and permanent erosion control features such as hay bale check dams, sediment basins, silt fence, and seeding and mulching shall be used as necessary to assure economical, effective, and continuous erosion control. Temporary erosion control shall be installed in accordance with Maine Erosion and Sediment Control BMPs, latest edition, as published by the Maine Department of Environmental Protection (DEP).

All temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. All permanent erosion control features shall be incorporated into the project at the earliest practicable time. Temporary erosion control measures shall be used to correct conditions that develop during construction that require attention prior to installation of permanent erosion control features, or that are needed temporarily to control erosion that develops during normal construction practices.

Provisions shall be made to retard the rate of runoff from the construction site and control disposal of runoff, including pump discharges resulting from trench dewatering operations.

The contractor shall be solely liable for any violations of state, local or federal erosion control laws caused by the contractor or any subcontractors during construction.

SECTION III. WATER MAIN MATERIALS SPECIFICATIONS

3.1 GENERAL

The Bangor Water District reserves the right to accept or reject materials when in the best interests of the District. Any reference to a particular standard shall mean the latest revision.

3.1.1 Brass fittings

These notes apply to all brass fittings purchased for use within the Bangor Water District's Distribution System. All brass fittings will conform to the following standards:

All fittings will be made of No Lead Brass. (.25% lead or less brass), such as Enviro Brass or approved equal.

3.2 MATERIALS

3.2.1 Blank Flanges

250 lbs. Class 125 bolt hole (C115/A21.15)

3.2.2 Brass fittings for type “K” copper tubing and HDPE (CTS)

3/4-inch through 2-inch brass fittings shall have a lead content meeting standards noted above for the fitting in question. The vendor shall supply the District with the lead content of the fittings. Fittings shall conform to ANSI/AWWA C800 standards for Type “K” soft copper and shall be compression type on the copper end. CTS (Copper Tubing Size) HDPE shall have stainless steel insert stiffeners.

Brass Goods (Miscellaneous)

Shall be 125 lbs., brass shall have a lead content meeting standards noted above for the fitting in question. The vendor shall supply the District with the lead content of the fittings, with iron pipe size (IPS) threads shall be used for connecting water services. Items included are bushings, couplings, elbows, nipples, plugs, and tees. Manufactured by Lee, Wheeler, Nibco, Hayes, Ford, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

Corporation Stops

3/4-inch and 1-inch corporations shall have a lead content meeting standards noted above. The vendor shall supply the District with the lead content of the fittings Corporations shall have a ball valve type construction with inlet CC thread and compression pack joint on the outlet, heavy patterns, and shall conform to AWWA/ANSI C800.

1 1/4-inch to 2-inch shall, have a lead content meeting standards noted above. The vendor shall supply the District with the lead content of the fittings, with inlet iron pipe thread and compression pack joint on the outlet, heavy patterns, and conforming to AWWA/ANSI C800. Manufactured by Ford, Hayes, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

Curb Stops

Curb stops shall have a lead content meeting standards noted above. The vendor shall supply the District with the lead content of the fittings. Curb stops shall have a ball valve type construction or approved equal with compression pack joints on each end. Curb stops shall open left withno drain, have heavy patterns, and shall conform to AWWA/ANSI C800. Curb stops shall be manufactured by Ford, Hayes, McDonald EB2, Mueller, Cambridge Brass, or approved equal.

3.2.3 Copper Tubing

Copper tubing shall be type “K” soft copper (ASTM B88).

3.2.4 Copper Tube Size (CTS) High-Density Polyethylene (HDPE)

High Density Polyethylene (HDPE) pipe may be used on the owner’s side of the service line after the curb stop outside the right of way. The HDPE must be copper tubing size (CTS) and conform to AWWA standard C901-02 (PE 3608 Pressure Class 200) and be clearly marked. Stainless steel inserts and compression fittings must be used at all joints.

Tubing shall be approved for potable water service by the National Sanitation Foundation and bear the NSF seal. The product shall be rated for a minimum 200 working PSI and standard ratio (SDR) shall not exceed 9 for tubing size. Fittings shall be equipped with compression-type connections with insert stiffeners.

Shall comply with AWWA C-901, ASTM-D-1248 and D-2737, PE 3608

3.2.5 Copper Meter Setters

Meter setters for 5/8 x 3/4 -inch and 3/4-inch meters shall have compression pack joint connections on the inlet and outlet ends suitable for 3/4-inch copper tubing. Meter setters for one-inch meters shall have female iron pipe thread connections on the inlet and outlet ends. Two meter gaskets shall be supplied with each horn. Manufactured by McDonald EB2, Cambridge Brass, or approved equal.

3.2.6 Duc Lugs and Tie Bolts

Duc lug bolts shall be Star Supply Corp. or approved equal.

Tie bolts with hexagonal nuts shall be Star Supply Corp. or approved equal.

3.2.7 Flanged adapters

Flanged adapter couplings shall have either a ductile iron ASTM A536 or gray iron ASTM A126 body. Bolt circle, bolt size, and spacing shall conform to ANSI 150 lbs. flange drilling. Grade 30 gasket with either a malleable iron ASTM A47 or ductile iron ASTM A536 follower. Anchor studs shall be installed for a minimum working pressure of 125 psi. Bolts and nuts shall be ductile iron ASTM A536, Rockwell 912, or approved equal.

3.2.8 Hydrants

Shall be compression type conforming to AWWA/ANSI C502. Hydrants approved are Eddy F2640, Mueller Super Centurion 200, or US Pipe Metropolitan 250, US model 250, AVK Series 2780 meeting the following requirements:

1. Break flange construction
2. 5 1/4-inch main valve
3. Non self-draining - drain hole plugged
4. Two 2 1/2 inch hose nozzles (National Standard Thread)
5. One 4 1/2 inch pumper nozzle (National Standard Thread)
6. Inlet connection - mechanical joint
7. Inlet connection size - six inch
8. Direction of opening - right
9. Operating nut - 1 1/2 inch pentagon pattern (National Standard)
10. Trench depth - as specified in BWD's Construction Specifications
11. Hydrant color – yellow with silver bonnet and nozzles
12. Packing - "O" ring
13. Nozzle cap chains
14. Stainless steel nuts and bolts

15. Supplied with mechanical joint accessories, high strength low alloy steel bolts and heavy hexagon nuts conforming to ANSI/AWWA C111/A 21.11.

Hydrants shall be given a primer coat of paint and an enamel finish coat, both of a type specified for metal finishes. Hydrants shall be yellow with silver nozzle caps and cover:

- Silver Paint: California oil based paint, number 211-10 or approved equal.
- Yellow Paint: California oil based paint, number 211-63 or approved equal.

3.2.9 Pipe

Pipe shall be either ductile iron or approved plastic (PVC and HDPE mains requires BWD approval prior to use).

Ductile iron:

(4-inch diameter and larger). Pipe shall be ductile iron centrifugally cast with push-on joints conforming to AWWA/ANSI C151/A21.51. Pipe shall be Class 52, double cement lined and bituminous coated conforming to AWWA/ANSI C104/A21.4. Ten percent of the pipe shall be suitable for field cutting and marked as such.

Polyethylene encasement meeting the requirements of AWWA C105 shall be utilized on all ductile iron pipe installed in corrosive soils.

Plastic:

(AWWA) (4-inch to 12-inch diameter). Requires District approval before using. Pipe shall be polyvinyl chloride (PVC) AWWA pressure pipe with push-on joints conforming to ANSI/AWWA C900. Pipe shall be Class 150 meeting the requirements of SDR 18. Standard laying lengths shall be 20 feet for all sizes. At least 80 percent of the total footage of pipe of any size shall be furnished in standard lengths. The remaining 15 percent can be random lengths at least 15 feet long. All pipe shall be clearly marked with one-inch letter "WATER" at 12-inch intervals two sides 180 degrees apart the entire length.

Tracer wire shall be 12-gauge UF wire with joint seal, tested for continuity, and placed over all plastic pipe. "Caution" tape should be placed two feet above the new line, and should be three inches in widths.

3.2.10 Pipe Couplings

Sleeves shall be epoxy coated ductile iron ASTM A536, and shall have smooth inside taper for uniform gasket seating. Gasket shall be grade 30. Follower flanges shall be ductile cast iron ASTM A536. Bolts shall be 304 stainless steel with heavy 304 stainless steel hexagon nuts to ANSI/AWWA C111/A21.11 standards. OD range shall be approved by the Bangor Water District. Ford coupling or approved equal.

3.2.11 Pipe Fittings

Pipe fittings shall have mechanical joint ends conforming to ANSI/AWWA C1/A21.11, double cement lining and bituminous coating conforming to ANSI/AWWA C104.A21.4.

Fittings shall be supplied with mechanical joint accessories unless specified others, with high strength low alloy steel bolts and heavy hexagon nuts conforming to ANSI/AWWA C111.A21.11.

Long body fittings shall be Class 350 ductile iron conforming to ANSI/AWWA C110/A21.10.
Compact body fittings shall be Class 350 ductile iron conforming to ANSI/AWWA C153/A21.53.

3.2.12 Repair Sleeves

Shall have single band of 304 stainless steel with malleable iron ASTM A47 grade 32510 lugs, grade 30 gasket and high strength low alloy steel bolts with heavy semi-finished hexagon nuts conforming to AWWA/ANSI C111.A.21.11 or 3904 stainless steel bolts and nuts as manufactured by Rockwell or approved equal.

3.2.13 Retainer Glands

Mechanical joint retainer glands shall be heavy duty ductile iron body, UL or FM approved, and shall have a minimum working pressure rating as follows:

- 4-inch 350 psi
- 6-inch 350 psi
- 8-inch and larger 250 psi

Set screws shall be either “Cor-Ten” steel, ductile iron, or approved equal. The number of set screws shall be equal to or greater than the number of the nominal diameter of the gland (i.e. four-inch, four sets of screws; six-inch, six set of screws). Locking rings and megalugs are acceptable replacements for retainer glands, but are not a replacement for thrust blocks.

3.2.14 Service Boxes, Covers, and Rods

Service boxes shall be Erie style with arch pattern, one-inch in diameter, constructed from SC #40 Black Steel, adjustable in length from five feet to six feet, and have 1/2-inch diameter stainless steel rod 36-inches in length with brass cotter pins. One-inch caps shall be extra heavy with brass pentagon plug and coarse “rope” thread to fit a one-inch Erie style box. Two-inch caps shall be a #3 cover, cast iron with brass bushing and brass pentagon plug to fit a two-inch Erie style box. All caps shall have the word “WATER” clearly cast in top and be constructed of a magnetic material.

3.2.15 Service Box Foot Adapter

Service box foot pieces shall be cast iron and fit all standard one-inch Erie style service boxes and fit over curb stops larger than one inch.

3.2.16 Service Saddles

Shall be constructed of ductile iron with epoxy coating and with two stainless steel bands, nuts, and washers. Body casting shall be wrap-around design of high tensile ductile iron conforming to ASTM A536. Gasket shall be of 3 1/2-inch diameter and constructed of Buna-N, and grooved to conform to the pipe surface, bonded in place for easy installation. Finish shall be epoxy coated. Ford FC202 or approved equal.

3.2.17 Tapping Sleeves

Mechanical joint tapping sleeve:

Shall be ductile iron and have ductile iron mechanical joint end seals conforming to AWWA C111, with outlet flange conforming to AWWA C207, class D with ANSI 150 lb. drilling recessed for tapping valve. Tapping sleeve shall fit AWWA standard of 1908, Class AB-CD cast iron pipe. Manufactured by Clow, Mueller, or approved equal. Acceptable for cast iron and ductile iron pipe.

Stainless steel tapping sleeve:

Shall be entirely 304 stainless steel or 304 stainless steel body with ductile iron outlet flange conforming to AWWA C207 Class D, ANSI 150 lb. drilling recessed for tapping valve. Bolts shall be high strength 18-8 stainless steel with heavy hexagon nuts conforming to ANSI/AWWA C111 / A21.11.

Gasket material shall be grade 30 or approved equal, and shall have a smooth inside taper for uniform seating. Acceptable for ductile iron pipe.

All size on size taps require full body Ductile Iron MJ tapping sleeves.

3.2.18 Tapping Valves

Tapping valves shall be epoxy coated with 200 psi working pressure, non-rising stem, "O" ring, open left, flanged end conforming to AWWA C207, Class D, ANSI 150 lb. drilling, mechanical joint end conforming to AWWA C111, two-inch ductile iron operating nut with 304 stainless steel bolt, resilient seated gate valve conforming to ANSI/AWWA C509, manufactured by Waterous Series 500, American Darling CRS 80, Mueller A2360, AVK series 25, or approved equal.

Tapping valves shall be supplied with standard mechanical joint accessories, high strength low alloy steel bolts, and heavy hexagon nuts conforming to ANSI/AWWA C111/A21.11.

Tapping valve seal plates and bonnets shall have either all silicone bronze or 304 stainless steel bolts and nuts.

3.2.19 Valves

Valves shall be epoxy coated inside and out and supplied with standard mechanical joint accessories, high strength low alloy steel bolts and heavy hexagon nuts conforming to ANSI/AWWA C111.A21.11.

Valve seal plate and bonnet shall have either all-silicone bronze or 304 stainless steel bolts and nuts.

Butterfly Valves (16 inch diameter and larger).

Shall be a non-directional ductile iron valve with a steady state working pressure of 150 psig, and a maximum steady-state differential pressure of 150 psi, bubble-tight in both directions at rated psi, open left, mechanical joint ends, non-rising stem, two-inch ductile iron operating nut with stainless steel bolt, conforming to AWWA/ANSI C504. Manufactured by Clow, Dresser, Mueller, or Pratt.

Gate Valves (12-inch diameter or less):

Shall be 200 psi working pressure, non-rising stem, "O" ring, stem seal, open left, mechanical joint, two-inch ductile iron operating nut with stainless steel bolt, resilient seated gate valve conforming to

ANSI/AWWA C509, manufactured by Waterous Series 500, American-Darling CRS 80, Mueller A 2360, AVK series 25, or approved equal.

3.2.20 Valve Boxes

Shall be cast iron, or ductile iron free from defects, manufactured in the USA or Canada, two piece, sliding type with a non-flange top section, no inside stops, and an outside shaft diameter of six inches. Bottom section shall be belled base. Length of top section shall be a minimum of 24 inches. Middle and bottom section length as needed. Boxes shall have the word "WATER" clearly cast into the cover.

3.2.21 Valve Box Top-Extension and Cover

Shall be cast iron, manufactured in the USA or Canada. Boxes will have "WATER" cast in cover.

Pioneer-style box shall be 4.5-inch or 5.25-inch straight body.

SECTION IV. STANDARD DETAILS

(2 Plans Sheets in Pocket)

SECTION V. DOCUMENTS

Contents

1. Application for Service Instructions
2. Application for Service Form
3. Project Application
4. Main Extension Agreement
5. Private Line Agreement
6. Fire Service Application & Agreement (Customer Installed)
7. Fire Service Application & Agreement (District Installed)
8. Fire Service Application & Agreement (Existing)
9. Sample Easement

5.1 APPLICATION FOR SERVICE - INSTRUCTIONS

5.1.1 Application Required

In accordance with Maine Public Utilities Commission regulations, and in keeping with the District's terms and conditions for service, applicants wishing to receive water service from the District must:

1. Make written application for service, fire service, main extension or private line either in person, by mail, by fax, or by e-mail. The application shall be on a form provided by the District.
2. Pay the established fees.
3. For new services (domestic & fire), service replacement, main extensions or new private lines, submit additional information as detailed in the Bangor Water District "Water Construction Specifications and Procedures" manual.
4. Pay or sign a payment agreement for any outstanding balances (if applicable).

All steps must be accomplished for the application to be considered complete, and must be completed each time a different party becomes responsible for payment. Completed applications will be processed as directed by MPUC regulations.

The party responsible for payment of the bill must sign the application; multiple names on an account require signatures from all parties listed.

The District's "Rights and Responsibilities" handout will be made available for the customer; currently it is available for pick-up, e-mail, and mailing, as well as on the website (bangorwater.org).

5.1.2 Re-Connection of Service

A new application is not required for customers whose service is temporarily terminated at their request (such as a winter break) and who seek to re-connect service, provided a current application is on file. This is considered a re-connection of service, and the established reconnection fee will be charged. All outstanding balances must be paid to re-connect service.

5.1.3 Transfer of Accounts With Active Water

Approximately five to seven days after an old account is final billed, the District will attempt to contact the new customer to complete the application process. In most cases, this will involve a three-day notice delivered to the service premises. In cases where the applicant's name is known, the District may attempt to contact them by mail or phone.

For applications remaining incomplete, service will be terminated in accordance with approved MPUC disconnection regulations.

5.1.4 Transfer of Accounts With Inactive Water

After receipt of a completed application, water may be turned on for a customer. An appointment is required and the applicant or their agent must be on the premises for water to be turned on.

Application for Service

Bangor Water District
PO Box 1129
Bangor ME 04402-1129

tel (207) 947-4516
fax (207) 947-5707
billing@bangorwater.org

Existing
New

Complete all information. Incomplete or unreadable applications will result in denial of service.

Names (s) _____

Mailing Address: _____

TRANSFER Water on [] Turn-on required []
NEW Requires New Project Application Form and fees
[] Engineering [] Construction
Service begins:
Office use: testable BF [] no [] yes notice goes to _____
[] Residential [] Non-residential
[] single family [] Mix of residential and non-residential
[] multi-unit # of units _____
[] home occupation on site
_____ % of building used for non-residential purposes
[information required by Maine Revenue Services (207) 624-9693]
[] If your business is sales tax exempt, check here and attach copy of exemption certificate.

Account number:
Service Location :

Owner [] Tenant [] Landlord _____

Employer/source of income _____

Daytime phone(s) _____

Previous service with Bangor Water: No [] Yes [] If yes, give address: _____

Do you have unpaid bills at this utility or for any other kind of utility service Yes [] No []

Have you declared bankruptcy within the past six years Yes [] No []

Does anyone at this location have a medical condition that requires life support equipment or emergency restoration of water if service is interrupted No [] Yes [] doctor certification required

I hereby contract with BWD for water service (domestic and/or fire protection), and agree to abide by BWD's terms of service and related requirements until I give proper notice to terminate service. I understand that my account information may be used for debt collection by BWD. I understand that the information I provide is subject to verification, and provision of incomplete or false information is grounds for termination of service and possible law enforcement.

Signature _____

Print: _____

Date: _____

Signature required for each person on account

Establishment Fee Paid: Date: _____
[] by cash [] check # _____
[] Official Payments transaction confirmation number _____

Project Application

Block A: Information

Owner

Date _____ Owner _____

Owner's Mailing Address _____

Owner's Phone _____ Contact Name _____

Project

Project Description _____

Project Location (Street Address) _____

Map _____ Lot _____

Contractor _____ Contact Name _____

Contractor Phone _____ Address _____

Block B1: Residential

Single Family _____ Rental _____ Apartment _____ Condo _____ Duplex _____ Other _____

Will there be a Pressure Tank/Booster Pump installed? _____

Will there be a Sprinkler System? _____ Pool? _____ Underground Irrigation? _____ Pressure Washer? _____

Block B2: Commercial/Industrial/Residential

Business Name _____

Development Type _____

Peak Domestic Demand (gpm) _____ Average Daily Demand (gpd) _____

Peak Fire Flow/Sprinkler Demand) _____ Minimum Pressure Required _____

Will there be a pool? _____ Underground irrigation? _____ Pressure Washer? _____

Will there be a Pressure Tank/Booster Pump Installed? _____

Block C: BWD Use Only

Project Number _____

Basic Data

Closest Hydrant _____ Static Pressure(psi) _____ Size Of Existing Main _____ Type: _____

Main Extension _____ Private/Public _____ Private Hydrant _____

Estimated Fees

Inspection _____ Jobbing _____ Fire Protection _____

NOTE: A fee of will be assessed upon completion of each Application for Service.

I have received a copy of the Terms and Conditions of Service. I authorize the Bangor Water District to enter the premises and access the property to inspect the main/service installation, normal maintenance and reading of the water meter, evaluate, require and test backflow prevention devices, and evaluate potential usage. I further understand the estimated cost is to be paid in advance and any adjustments will be made upon completion of the work.

Owner/Applicant _____ Date _____



BANGOR WATER DISTRICT

P.O. BOX 1129 · BANGOR, ME 04402-1129
TEL: (207) 947-4516 · FAX: (207) 947-5707
www.bangorwater.org

Kathy Moriarty
General Manager

Main Extension Agreement

This agreement entered into this _____ day of _____, 20__ by and between _____ of _____, _____, _____ (hereinafter called the "applicant") and the Bangor Water District, a water utility duly established under the laws of the State of Maine with its principal place of business at Bangor, Maine (hereinafter called the "utility").

WHEREAS, the utility is engaged in the business of supplying water service to the public in the City of Bangor and several other cities and towns in Maine, and

WHEREAS, the applicant has requested that the utility's water main be extended to service property owned by the applicant on _____ in _____, a distance of approximately _____ feet of _____-inch main from the existing water main on _____,

NOW THEREFORE, it is agreed between the applicant and the utility as follows:

1. The applicant agrees to pay the utility \$_____ for fire protection charges as required by the Maine Public Utilities Commission regulations. The applicant also agrees to pay the utility the following fees:

- engineering review fees _____
- inspection fees _____
- utility jobbing fees _____

The applicant agrees that this full amount will be paid by _____.

Within 60 days following determination of the final utility costs incurred for the extension, including engineering review fees, inspection fees, fire protection charge and utility jobbing fees, the amount advanced shall be adjusted to the actual cost less the investment amount (if applicable), either by the utility's return to the applicant of any excess amount, or by an additional payment by the applicant to the utility to cover any deficiency.

2. The utility agrees to provide service to the new main described above after satisfactory installation of water main and appurtenances in accordance with the Utility's Material Specifications, Water Construction Specifications and Procedures, Terms & Conditions and other applicable utility policies and receipt of the amount required in paragraph 1.

3. A contractor hired by the applicant will install this main and appurtenances, which is intended to be conveyed to the District as a main extension. The applicant agrees to install the main and appurtenances in strict accordance with the utility's specifications and understands that failure to do so may result in delay in providing water service until deficiencies are satisfactorily corrected.

4. Where these facilities are being installed on private property, the applicant agrees to furnish the utility a permanent easement, in accordance with the District's policy thereon, free of encumbrances, entitling the utility to construct, own, maintain, and replace the above described facilities.

5. Each time a customer is connected to the water main until 10 years after connection of the first consumer, the utility will make an investment in the main extension in an amount as per the attached Main Extension Investment Sheet calculated for _____. The utility will pay the investment amount to the developer. In no event shall the aggregate amount of investment by the utility pursuant to paragraph 5 exceed 50 percent of the total cost of the main extension.

6. Upon acceptance by the utility, the water main extension and utility portion of all service lines shall become the property of the utility. The utility will have a continuing obligation to maintain it.

7. The utility shall have the right to extend its main further beyond the extension and to serve other mains, or to tap and take off from the extension laterally. Further or lateral extensions shall not be considered as part of the main extension agreed to herein for purposes of investments by the utility or customer contributions.

8. This contract is subject to the rules of the State of Maine Public Utilities Commission governing water main extensions (65-407 CMR 65), which are hereby incorporated by reference into this contract. In the event of a conflict between this contract and the Commission's water main extension rules, the rule shall govern. The parties understand that the provisions of this contract are subject to alteration by a decision or rule of the Maine Public Utilities Commission.

9. Disputes arising under this contract or under the Public Utilities Commission water main extension rule may be referred pursuant to the rules to the Commission for resolution.

10. This agreement shall bind and inure to the benefit of the heirs, executors, administrators, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, said parties hereto have caused this agreement to be executed by their duly authorized officers on the date first written above.

WITNESSES

BANGOR WATER DISTRICT

Kathy Moriarty
General Manager

Applicant

- Require right of way
- Accepted street or road
- In process of acceptance
- Established grade (accepted)
- Require easement on private property

Customer contributions:

Fire protection charges \$ _____

BWD-estimated cost of project: \$ _____



BANGOR WATER DISTRICT

P.O. BOX 1129 · BANGOR, ME 04402-1129
TEL: (207) 947-4516 · FAX: (207) 947-5707
www.bangorwater.org

Kathy Moriarty
General Manager

Private Line Agreement

This agreement entered into this _____ day of _____, 20__ by and between _____ of _____, _____, _____ (hereinafter called the "applicant") and the Bangor Water District, a water utility duly established under the laws of the State of Maine with its principal place of business at Bangor, Maine (hereinafter called the "utility").

WHEREAS, the utility is engaged in the business of supplying water service to the public in the City of Bangor and several other cities and towns in Maine, and

WHEREAS, the applicant has requested that the utility provide water service to property owned by the applicant on _____ in _____.

NOW THEREFORE, it is agreed between the applicant and the utility as follows:

1. The applicant agrees to pay the utility the following fees:

- engineering review fees _____
- inspection fees _____
- utility jobbing fees _____

The applicant agrees that this full amount will be paid by _____.

Within 60 days following determination of the final utility costs incurred for the extension, including inspection fees and utility jobbing fees, the amount advanced shall be adjusted to the actual cost less the investment amount (if applicable), either by the utility's return to the applicant of any excess amount, or by an additional payment by the applicant to the utility to cover any deficiency.

2. The utility agrees to provide service to the new line described above after satisfactory installation of water main and appurtenances in accordance with the utility's Material Specifications, Construction Specifications, Terms & Conditions and other applicable utility policies and receipt of the fee amounts referenced in paragraph 1.

3. A contractor hired by the applicant will install this water line and appurtenances, which is intended to remain as a private line serving leased tenants on the subject property. The applicant agrees to install the water line and appurtenances in strict accordance with the utility's specifications and understands that failure to do so may result in delay in providing water service until deficiencies are satisfactorily corrected.

4. Whereas the subject property is to be developed as a multi-building mixed retail space to be leased from a single owner (the applicant) and the Applicant agrees that the water main will never be extended beyond the subject property and it is unlikely that the property will be further divided, this

installation will be considered a private line. The applicant will have a continuing obligation to maintain the water line and appurtenances. Except as provided below, the utility will have no obligation to maintain the private main on private property.

5. Whereas these facilities are being installed on private property, the applicant agrees to furnish the utility a permanent easement, in accordance with the District's policy thereon, free of encumbrances, entitling the utility to construct, own, maintain, and replace individual curb stop shutoffs to each leased or rented premise on the subject property.

6. This contract is subject to the rules of the State of Maine Public Utilities Commission governing water main extensions (65-407 CMR 65), which are hereby incorporated by reference into this contract. In the event of a conflict between this contract and the Commission's water main extension rules, the rule shall govern. The parties understand that the provisions of this contract are subject to alteration by a decision or rule of the Maine Public Utilities Commission.

7. Disputes arising under this contract or under the Public Utilities Commission water main extension rule may be referred pursuant to the rules to the Commission for resolution.

8. This agreement shall bind and inure to the benefit of the heirs, executors, administrators, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, said parties hereto have caused this agreement to be executed by their duly authorized officers on the date first written above.

WITNESSES

BANGOR WATER DISTRICT

Kathy Moriarty
General Manager

Applicant



BANGOR WATER DISTRICT

P.O. BOX 1129 · BANGOR, ME 04402-1129
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www.bangorwater.org

Kathy Moriarty
General Manager

Fire Service Agreement (Customer Installed)

MEMORANDUM OF AGREEMENT made _____ by and between the Bangor Water District, Bangor ME, hereinafter called the "District," and _____, hereinafter called the "Customer."

WHEREAS the Customer

- owns/operates certain real estate at _____, and desires service to a _____-inch fire service (based on size of tap at water main), and
- agrees to all rules, regulations, standards, and policies of the District, and to its rates as approved by the Maine Public Utilities Commission, and
- has hired a contractor to install the fire service line,

NOW THEREFORE, the Customer agrees that

- the portion of the fire service pipe prior to the curb stop closest to the main shall be the property of the District and shall be maintained, repaired, and replaced by the District without reimbursement, and
- the remainder of the fire service pipe shall be the property of the Customer and shall be maintained, repaired, and replaced as required by the District at the expense of the Customer,

THEN this application – subject to acceptance by the District - shall be binding on the heirs, executors, administrators, successors, and assigns of the Customer on the date first written above.

Signature

Print name

Company (if applicable)

Date: _____



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Kathy Moriarty
General Manager

Fire Service Agreement (Existing)

MEMORANDUM OF AGREEMENT made _____ by and between the Bangor Water District, Bangor ME, hereinafter called the "District, and _____, hereinafter called the "Applicant."

WHEREAS the Applicant owns/operates certain real estate at _____ (_____) and said Applicant desires service to a ____-inch fire service, and agrees to all Rules and Regulations of the Bangor Water District as approved by its Trustees and to its rates as approved by the Maine Public Utilities Commission,

NOW THEREFORE, the Applicant agrees that that portion of the domestic/fire service pipe beyond the curb stop closest to the main (measured from the main) shall be the property of the District and shall be maintained, repaired, and replaced by the District without reimbursement, and

WHEREAS the Applicant agrees that the remainder of the fire service pipe shall be the property of the Applicant and shall be maintained, repaired, and replaced as required by the District at the expense of the Applicant,

THEN this agreement shall be binding on the heirs, executors, administrators, successors, and assigns of the contracting parties on the date first written above.

Signature

Print name

Company (if applicable)

Date: _____

Bangor Water District Easement (Sample)

KNOW ALL MEN BY THESE PRESENT, that (Name of land owner) of (Town) in the County of Penobscot and State of Maine, in consideration of One Dollar (\$1.00) and other valuable consideration paid by the Bangor Water District, a quasi-municipal corporation duly organized and existing under the laws of the State of Maine and located in Bangor, County of Penobscot, State of Maine--the receipt of which is hereby acknowledged--do hereby give, grant, bargain, sell and convey unto Bangor Water District, its successors and assigns, the right to perpetually enter at any and all times upon a strip of land ___ feet wide being situated on the _____ of property owned by _____ as recorded in the Penobscot County Registry of Deeds B _____, P _____, hence Description of easement land

AND to construct and perpetually maintain through, under and across said strip, conduits or pipe lines, with all necessary fixtures and appurtenances, for conveying water, and to lay, relay, repair, maintain and remove water pipe(s) upon or under said strip, with all necessary fixtures and appurtenances, together with the right at all times to trim, cut down, and remove bushes to such extent as necessary in the judgment of the Grantee

AND reserving to the Grantor, his heirs and assigns, the use and enjoyment of said strip for such purposes only as will in no way interfere with the perpetual use thereof by the Grantee, its successors and assigns, for the purposes above mentioned, provided that no building or any kind of permanent structure shall be erected on said strip by grantor, his heirs or assigns, and that the Grantor, his heirs or assigns, shall not remove earth from said strip or place fill thereon without the written permission of the Grantee, its successors and assigns.

TO HAVE and to hold the aforementioned and bargained premises with all privileges and appurtenances thereof to said Bangor Water District its successors and assigns to its and their use and benefit forever. And he does hereby covenant with the said Grantee, its successors and assigns, that he is lawfully seized in fee of the premises that they are free of all encumbrances; that he has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that he and his heirs and assigns shall and will warrant and defend the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS THEREOF, the said (Name of land owner) as Grantor, and relinquishing and conveying rights by descent and all other rights in the above-described premises, have hereunto set his hand and seal this ___th day of _____, 20__.

Signed, Sealed and Delivered
In said Presence of:

Witness

By _____

State of Maine,

(Date)_____

County of Penobscot, ss.

Then personally appeared the above named (Name of land owner) and acknowledged the foregoing instrument to be his (or their) free act and deed.

Before me,

Notary Public