

# Boothbay Region Water District Policies & Procedures

Revision III

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**BOOTHBAY REGION WATER DISTRICT**  
**POLICIES & PROCEDURES**  
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## SECTION 1

### CUSTOMER SERVICES AND MAIN EXTENSION

#### I. GENERAL

The Boothbay Region Water District is the prime supplier of fluoridated water to Boothbay, Boothbay Harbor and Southport. All new water services and main extensions shall be constructed and located in a manner to provide for the orderly growth and expansion of the water system. The following rules are a general basis for the proper development of the system. Exceptions based on extenuating circumstances (health hazards, economic hardship, etc.) shall be individually reviewed and acted upon by the Trustees.

#### II. SERVICE PIPE

1. Location. Service pipe connections shall be made only from a main located in the public street, or within a legal water utility right-of-way, which is the legal address of the premises served. The curb stop will be located at the perimeter of the right-of-way. Any property being served not directly adjacent to the main must obtain utility easements over third party property prior to connection.
2. Construction of New Services. With the approval of the District, the applicant shall be responsible for the installation of the service pipe in the public way. At the District's option, work in the public way may be performed with its own staff or be completed by a contractor. The applicant shall be responsible for the installation of the service pipe and appurtenances on the property of the applicant. All materials and workmanship performed on the District owned portion shall be in accordance with *Section 2, Water Main and Service Specifications* of these policies. The new service pipe shall be left exposed until the pipe and all joints are inspected by the District staff. The District is responsible for obtaining road opening permits. Dig Safe notification is the responsibility of the applicant or its agent.
3. Maintenance of Service. The service pipe between the main and the curb stop or shut off in public ways shall be maintained and repaired by the District without cost to the Applicant. The remainder of the service pipe between the curb stop or shutoff and the meter shall be repaired and maintained by the Applicant at the Applicant's expense.
4. Single Service. No more than one Applicant may be served from a service pipe under the control of a single curb stop or shutoff.

The District, through an act of the board of trustees may grant an exception to this requirement in the case of multi-unit establishments provided a separate meter and shutoff are used for each unit, these accessible to the District and located in a common utility room with separate outside entrance acceptable to the District. The common service pipe utility room must be owned by a single entity. An access easement must be granted to the District and an agreement outlining the conditions of service (shutoff in case of service pipe repair) shall be executed and filed at the Lincoln County Registry of Deeds.

When an existing multi-unit establishment or structure, currently served through a single service and meter is reconstructed or renovated or when a single unit is converted to a multi-unit establishment or structure, the District shall require that the piping be arranged so that a separate shutoff and meter must be installed for each unit, place of business or abode. The District may require a new separated service pipe from the main to the establishment for each unit.

5. Permanent Lawn and Shrub Irrigation Systems. All seasonal and year-round in ground lawn and shrub irrigation systems constructed after January 22, 2002 must be served from a separate and single service line from the main. These shall be separately metered and have proper cross-connection control as specified by district staff.
6. Applicant Shutoff. Every service must be provided with a ball valve shutoff, located before the meter, easily accessible and located inside the building near the service entrance. All piping shall be below frost level (5 feet below finished grade) or otherwise protected from freezing and shall be arranged to permit draining wherever necessary and approved by the District.
7. Backflow Devices. All services shall be equipped with an approved backflow device as outlined in the Boothbay Region Water District Cross-Connection Control Program, (latest revision) which provides guidance on them.
8. Joint Use of Service Pipe Trench. . Water and sewer services may be allowed in the same trench provided the sewer is gravity flow and at least two-feet of separation are maintained. Underground electrical service must maintain 10 foot separation from all water service lines. Installation requirements for a service pipe are located in *Section 2, Water Main and Service Specifications.*
9. Abandonment of Service. If an Applicant voluntarily discontinues service for more than 24 continuous months, the service shall be considered abandoned. Any Subsequent application for service shall be considered a new application of service as annotated in the *Boothbay Region Water District Terms and Conditions of Service, Section 2, Part 2.* The District reserves the right to reuse or deny use of any existing abandoned appurtenances.

### III. **METERS**

1. Malfunctioning Meters. If a meter is found malfunctioning, a water bill will be computed using the average water consumption for the corresponding period during the previous two years. For new customers, with less than 1-year consumption, a minimum quarterly bill will be assessed.
2. Aboveground Heated Meter Vaults. If it is infeasible to furnish a suitable location for a meter inside a building, or the District deems it is necessary to locate the meter outside the building, the water meter must be moved to an aboveground heated meter vault constructed in such a way as to not create a confined space as defined by the Maine Department of Labor. All costs for perpetual care and operation of the aboveground heated meter vault will be borne by the Applicant. The District on a case-by-case basis will provide specifications for a vault to the Applicant.
3. Sub-metering. Sub-metering shall be at the Applicants expense and shall comply with the most recent Maine Public Utility Commission regulations. The District will not become a party to submetering of any account for any reason.
4. Testing. Meter testing is completed by the District for meters used for billing purposes. The District has the capability to test meters up to 1" service capacity in the Adams Pond Treatment Facility, Meter Testing Lab. The District tests under contract all other meters with a third party.

- a. Portable test equipment may be used to test large meters in the field. Test equipment shall be recalibrated to insure accuracy in accordance with the test equipments manufacturer specifications. The equipment shall include a device to regulate flow through a meter during the test.
- b. Meters shall be tested by the manufacturer, with proper certification of such testing furnished to the District, or by the District, prior to installation. Thereafter, meters shall be tested periodically in accordance with American Water Works Association (AWWA) specifications or more frequently if requested by the Applicant. Tests made at the request of a Applicant shall be made in the presence of the Applicant or a designated representative if the Applicant desires. Following this test, the Applicant will be provided a complete report, in writing, showing the test results.
- c. All tests shall be at the expense of the District unless the Applicant requests tests more frequently than once in eighteen (18) months. In this case the utility will require the Applicant to make a deposit in per the Boothbay Region Water District Terms & Conditions of Service (latest revision) to cover the cost of the meter test. If a meter test fails to meet the AWWA standards, the Applicant's deposit will be refunded. If the meter conforms to the standards, the District may retain the Applicant's deposit, and the meter will be continued in use at the same location.

#### IV. WATER MAIN EXTENSIONS

The Boothbay Region Water District does not participate in main extensions. As specified by the Maine PUC, all costs for main extensions must be borne by the individual Applicant , or municipality requesting the extension. All main extensions must be in compliance with the Boothbay Region Water District Policies and Procedures and Maine Public Utilities (PUC) Rule located in Chapter 650 and be pre-approved by the Board of Trustees. The Applicant must submit three (3) copies of system design calculations and construction drawings and specification prepared by a Registered Professional Engineer in the State of Maine or upon approval by the district manager in order to be considered by the Board of Trustees. The District will have full access to inspect all construction work performed by the Applicant with any costs of the inspection paid in full by the Applicant. The Applicant shall furnish evidence to the District that the project, for which the main extension is proposed, has been approved by local and State regulatory agencies, as applicable. No water main construction shall begin without District and Public Utilities Commission (Dig-Safe) approval.

1. General - In accordance with Maine Public Utilities (PUC) Rule, Chapter 650, Section 2 (a) which states "*The actual construction (water main) shall be done by the utility or by an agency acceptable to it under the utilities supervision*". Criteria for being considered an acceptable agency for construction purposes will be determined by the district manager. Criteria for acceptance include, but are not limited to; past experience, previous job performance, direct work observation and bonding capability.
  - a. All materials used for a new water main extension will be in compliance with this document and preapproved by the District.



- b. Main extensions shall normally be located in public ways. These may be located on private property with an easement developed by the District at the expense of the applicant and recorded in the Lincoln County Registry of Deeds.
  - c. All work shall conform to the District's specifications as hereinafter presented.
  - d. If the demand for water expected from the Applicants to be served by the extension requires existing mains leading to the extension to be replaced or supplemented by parallel mains, or requires booster pumps or other appurtenances in order to satisfy the demand or to maintain adequate pressure along the extension, the Applicant requesting the extension shall, in accordance with Maine PUC rules, Chapter 650 (G), participate in a reasonable portion of the cost of the improvements.
  - e. In arriving at the length of the water main extension necessary to render service at any point, the distance from such point to the nearest existing water main shall be traced along the line which, according to established trade standards and utility practices, mark the proper construction of the extension in the street, road or right-of-way on which the building or lot fronts. The point at which the extension ends and the service line commences shall normally be at the intersection of this line and another line, perpendicular thereto, which passes through the center of the building to be served.
  - f. The District shall insure that any and all facilities, installed or accepted under an agreement, comply with the District's standards for materials and installation are adequate and safe for the purpose of the utility. The District will not be required to accept a main extension, pipeline, or related appurtenances until after they have been inspected and tested and meet District standards. Any inspections or tests shall be at the expense of the Applicant. The Applicant will provide the District a one (1) year guarantee on all equipment installed and be responsible for any failure due to defect or workmanship.
2. Water Main Extensions for Individuals. Main extensions must be approved by the Board of Trustees and constructed in compliance with standards as set forth in this policy.
3. Water Main Extensions for Development or Subdivisions. Any main extension for the purposes serving real estate development, industrial development or subdivision will be fully funded by the Applicant. The Board of Trustees must approve any extension of this type prior to construction, monitored by the District during construction, and constructed consistent with the regulations presented in this document. Service to any main extension will not commence before an application for service is approved by the Board of Trustees and the requirements of Section 1, IV, (4) are met.
4. Acceptance of Water Main. The acceptance of water mains requires a majority vote of the District Board of Trustees. In order to meet the criteria to be considered for acceptance, the Applicant must comply with the following requirements:
- a. During the construction phase District personnel must have had free and unfettered access to all construction activities reserving the right to stop work and order re-work in the case substandard workmanship or materials are discovered.
  - b. A copy of a system drawing depicting the water mains and appurtenances as the only utility shown shall be provided to the Board of Trustees.

- c. The District must be provided a copy of easements for water mains not within any established town right-of-way being a minimum of 20feet. Wide with a recordable plan stamped by a State of Maine registered surveyor and recorded in the Lincoln County Registry of Deeds, and a recorded Quitclaim Deed so granting the Boothbay Region Water District access for maintenance purposes.
  - d. The District must be provided a set of “as-built” drawings, stamped by a State of Maine registered professional engineer providing detailed tie measurements to every valve (curb stops, gate valves, etc.) throughout the project as well as an accurate depiction of the main and service line locations.
5. Private Water Main Extensions. The District will not allow private water main extensions fed, attached or in any other way associated with district infrastructure.

## V SERVICE LINE OWNERSHIP AND SPRINKLER SYSTEMS

1. Service Connections from Year Round Water Mains – The District will maintain ownership and assume maintenance responsibilities from the water main under the public way to the curb stop at or near the Applicants property line or outside the public right-of-way, whichever is closest to the water main. The Applicant shall own and properly maintain the service line from the curb stop to the premises being served. The service line shall be constructed of one (1”) inch minimum of K-copper, 160 psi iron pipe size (IPS) plastic pipe, or 200 psi copper tube size (CTS) plastic pipe and must be fully inspected by the district prior to initiation of water service. If IPS or CTS plastic is used, all fittings must be brass and all clamps stainless steel. The service line will be set at a minimum depth of 4 feet. The meter for year round service (see Section 1 III) shall be placed within the premises in a well heated area for year round installation or installed either inside or outside the premises for seasonal installation. The meter for seasonal service shall be located in an area easily accessible for District personnel
2. Service Connections from Seasonal Water Mains
  - a. *Public Road* – If a seasonal water main is on the opposite side of the road to where the Applicants residence is located, the District shall own and maintain the service line from the water main to the edge of the opposite right-of-way. If the seasonal main is on the Applicants’ side of the road, the Applicant shall own and maintain the service line after the valve connection at the water main. All meters will be installed on the Applicant’s side of the public right-of-way. Cost for installation is at the Applicants expense.
  - b. *Private Road* – If a seasonal water main is installed on a private road, the Applicant shall own and maintain the service line after the valve/connection at the water main regardless of which side of the road the main is located in relationship to the Applicant’s property. All water meters will be installed at the water main.
3. Commercial and Multi Unit Fire Sprinkler Systems – The Applicant shall own and maintain the sprinkler main from the valve connection at the water main to the premises being served.
4. Seasonal Meter off Year Round Main with Outside Meter - Any Applicant who receives seasonal service off a year round main with an aboveground, exposed meter will have the meter installed when seasonal service begins, Seasonal meters will be installed by district staff no later that 1 May each year, with service terminated on the third Thursday of October.

5. Seasonal Meter off Year Round Main with Freeze Protected Meter – Any Applicant with a freeze protected meter, as determined by the Distribution Foreman, or in his/her absence, Assistant Distribution Foreman, off of a year round main can request service extension until December 1 during a calendar year subject to all applicable fees as specified in the Boothbay Region Water District Terms & Conditions of Service. . In no case will an Applicant remain in service into the following calendar year. If so, the Applicant will be re-classified as a year-round Applicant and billed on a quarterly basis.

## SECTION 2

### WATER MAIN AND SERVICE SPECIFICATIONS

#### I. GENERAL

The following section describes the criteria used in determining the design, type, kind, size and class of water main, services and appurtenances to be installed as part of the Boothbay Region Water District. The pipe and appurtenances shall be laid on a firm foundation with tight joints and properly protected in a trench excavated and backfilled in accordance with these specifications.

#### II. DESIGN CRITERIA

1. Service Pressure. Water system improvements shall be designed to provide a normal working pressure of not less than 20 psi.
2. Main Size. The minimum size of all new year-round water mains, providing fire protection and serving fire hydrants, shall be 8-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow or peak demand while maintaining a minimum residual pressure. In certain situations, the Board of Trustees can waive the minimum main diameter to no less than 6-inch in diameter. This can only be done on an individual case-by-case basis. The minimum size of all hydrant branch mains shall be 6-inch diameter.
3. Hydrants. Unless otherwise required by the municipality's fire chief or public safety officer, the maximum spacing for fire hydrants intended to supply a fire flow shall be 1000 feet. Closer spacing may be required in order to locate hydrant at street intersections or other points convenient for the fire departments, or as required by the District for proper system operation and maintenance.
4. Gate Valves. Gate valves shall be required at all main intersections and along the main at intervals of 1000 feet. A gate or shut off is required on each hydrant branch and on all service lines. The District shall decide on the final number and location of all valves. All gate valves installed will be "open left"
5. Dead Ends. Dead Ends shall be minimized by looping all new mains whenever practical as determined by the District
6. Air Relief Valves. Air relief valves shall be installed at all high points of the new main as determined by the District. The District shall determine the size of the valve and piping.
7. Blow-offs. Blow offs shall be installed at the ends of all dead end mains and at low points as determined by the District. The District shall determine the size and design of the blow-off valve and piping. Typically blow offs are not necessary when a fully functional fire hydrant is installed at the terminus of a new water main.

8. Separation of Water Mains and Sewers:

a. *Parallel Installation.*

- i. Normal Conditions – All water mains to be installed in proximity of sanitary sewer mains shall be installed in accordance with the *Maine Department of Human Services, Requirements for the Separation of Water Mains and Sewers* (latest revision). Under normal conditions mains shall be laid at least 10 feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible; the distance shall be measured edge-to-edge.
- ii. Unusual Conditions – When local conditions (such as ledge, bridges, etc.) prevent a horizontal separation of 10 feet, a water main may be laid closer to a storm or sanitary sewer provided the following conditions:
  - A. The bottom of the water main is at least 18 inches above the sewer and a minimum of 5 feet edge to edge horizontally is provided;
  - B. Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling; and
  - C. The Maine Department of Human Services agrees that local conditions can warrant less than 10 feet separation and approves the plans and specifications.

b. *Crossings.*

- i. Normal Conditions – Water mains crossing sewer services, storm sewers or public sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer.
- ii. Unusual Conditions – When local conditions prevent a vertical separation as described in Section 2, II (8) a., (ii). the following construction shall be used:
  - A. Sewers passing over or under water mains should be constructed of the materials described with joints that are equivalent to the water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling; or
  - B. Water mains passing under sewer shall, in addition, be protected by providing a vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main; adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking the water mains; and that on full length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer. Pressure sewer mains shall be encased with no less than five (5) feet on

either side of the water main and encased using a structural joint. Gravity sewer mains shall be encased in PVC pipe with no less than five (5) feet on either side of the water main and encased using a structural joint.

9. Backflow Devices. All water services shall be equipped with an approved backflow device in accordance with the Boothbay Region Water District Cross-Connection Control Plan, latest revision, as required by Maine law. The device shall be installed just down stream of the meter unless otherwise approved by the District.
10. Commercial Fire Services. A separate service shall be provided to serve a building sprinkler system and/or private fire protection system.
11. Residential Fire Suppression Systems (RFSS) - For the purposes of this section a RFSS is intended for a single family unit dwelling only. The following rules apply for the installation of such systems.

The service water main can be used for a RFSS provided that the existing service main is in compliance with this document.

District staff will complete an evaluation of the residence to determine the proper size of meter necessary to meet all domestic water needs without taking the fire suppression system into account.

A licensed fire protection professional will determine the flow requirements for proper operation of the RFSS and a magnetic meter will be selected to meet the fire flow requirements.

The RFSS will be the first branch of internal plumbing downstream of the water meter assembly sized for residential fire flow.

The Applicant will be charged in accordance with the Boothbay Region Water District Terms & Conditions of Service (latest revision) based on the findings of 11(b.).

The Applicant will install and maintain a proper cross connection control device for the RFSS in accordance with the Boothbay Region Water District Cross-Connection Control Plan (latest revision) with all ongoing maintenance or compliance costs being borne by the Applicant.

### III. MATERIALS

1. Polyvinyl Chloride (PVC) Water Main - PVC water main is strictly forbidden from use within the district's distribution system as water main. PVC pipe may be used for water main or water service sleeving only.
2. Ductile Iron Pipe. Where applicable the district may require the Applicant to install ductile iron pipe that shall meet the requirements for the thickness design as specified in the American Water Works Association (AWWA) C-15 (latest revision) *American National Standard for Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids* and be double cement lined. The cement lining shall conform to AWWA C-104/A21.4 (latest revision) *American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water*. Pipe shall be pressure class 350 and double cement lined 1/8<sup>th</sup> inch thick. . Type and thickness used shall require prior approval by the District  
  
3 inch to 6 inch pipe shall be supplied in 18 foot nominal lengths and 8 inch and larger shall be supplied in 20 foot nominal lengths. Each length shall include a matching Tyton® rubber gasket, and a minimum of 2 (two) serrated silicon bronze conductivity wedges. Pipe shall be bituminous coated for corrosion protection, including a seal coating over the cement lining.
3. High Density Polyethylene (HDPE). Where applicable the district may require the Applicant, or provide the Applicant the option, to install HDPE water main that shall meet the requirements for the thickness design as specified in AWWA C-906 (latest revision) *Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In. for Water Distribution and Transmission*. All HDPE installed will be iron pipe size (IPS). Type and thickness used shall require prior approval by the District.
4. Bolted Pipe Couplings- Couplings for connecting pipe of same or different diameters shall be constructed of ductile iron including both the center sleeve and the end rings. The end ring and center sleeve shall be cast from ductile (nodular) iron, meeting or exceeding ASTM A-536-80, Grade 65-45-12. End rings and gaskets shall cover an extended range of outside diameters from IPS to A/C pipe in one coupling. Gaskets shall be made of virgin styrene butadiene rubber (SBR) compounded for water or sewer service in accordance with ASTM D-2000 MBA-18. All gaskets shall be marked for a range of pipe diameters. Bolts and heavy hex nuts shall be 5/8" high strength, low alloy steel track-head bolts. Hardware to have national coarse rolled thread and heavy hex nuts. Steel shall meet AWWA C-111 composition specifications. All surfaces of cast parts shall have shop applied paint shop coat paint for corrosion protection. Couplings, when properly installed shall be rated at a minimum working pressure of 250 psi. Higher working pressures may be required as specified.
5. Copper Tubing - Copper tubing shall be Type "K" conforming to ASTM B-75, B-68, and B-88 as they apply in standard sizes 1 inch through 2 inch. 1 inch through 1-1/2 inch shall be supplied in 60, or 100 foot coils, unless otherwise specified. 2 inch shall be supplied in 40 foot coils or 20 foot lengths as specified.
6. Mechanical Joint Fittings - Mechanical joint compact body fittings shall be ductile iron class 350 and shall be produced in strict accordance with AWWA C-153/ ANSI A-21.53 and AWWA C-111/ ANSI A-21.11 for joints and AWWA C-104/ ANSI A-21.4 for cement lining for sizes 3" through 12". 14" through 24" shall be manufacturer's standard and produced to the intent of AWWA C-153/ ANSI A-21.53. Mechanical joint fittings shall be UL listed and rated at 350 psi.

Mechanical joint nuts and tee-head bolts will be Corten or ductile iron and shall meet or exceed the requirements of AWWA C-111, 11-7.5 and ANSI A-21.22 for high strength low alloy steel having the following composition: a maximum of **0.20%** carbon, 1.25% manganese, 0.50% sulfur, 0.25% nickel, 0.20% copper with a minimum combined of 1.25% of nickel, copper and chromium. The mechanical joint nuts and tee-head bolts shall have minimum yield strength of 45,000 psi and an elongation in 2 inch increments of 20%.

Mechanical joint gaskets shall meet or exceed the minimum requirements of AWWA C-111/ ANSI A-21.11 specifications latest revision for SBR {styrene-butadiene (synthetic) Rubber} gaskets. Standard mechanical joint glands shall be ductile iron per ASTM A-536, Grade 65-45-12

7. HDPE Joint Fittings. All required fittings shall be engineered to be used on HDPE water main and comply with AWWA C-906 (latest revision) *Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In. for Water Distribution and Transmission*.
8. Mechanical Joint Restraint Devices. Mechanical joint retainer glands shall be incorporated in the design of the follower gland and shall include a restraining ring that, when actuated by a wedging action of the gland, imparts a restraining force against the pipe that increases as the pressure increases. The restraining ring shall grip the full pipe circumference. Restraining devices that restrain by a method of "Point-Loading" the pipe will not be allowed. Glands and restraining rings shall be manufactured of Ductile Iron meeting ASTM A536-80, Grade 65-45-12. Restraining rings shall also be heat treated to a minimum hardness of Rockwell 40 using a proprietary process. A21.10, AWWA C-111/ ANSI A-21.11, and AWWA C-153/ ANSI A-21.53 specifications latest revision. The restraint ring shall be actuated solely by the tee-head bolts.

The mechanical joint restraint device shall have a working pressure of at least 350 psi with a minimum safety factor of 2:1. Mechanical joint restraint shall be listed by Underwriters Laboratories, Inc., as meeting their standard UL 6M46, latest revision. Mechanical joint restraints shall also comply with Factory Mutual Research Corporation's approvals. Mechanical Joint Restraints shall "Grip Rings" manufactured by Romac Industries, Inc.

9. Valves.
  - a. *Gate Valves*—Gate valves shall have a 2-inch nut for wrench operation and the operating nut shall have an arrow cast in the metal indicating the direction of the opening. Valves shall have maker's initial, pressure rating and a year of manufacture cast on the body.

Valves 3 inch through 16 inch shall be resilient wedge type with a non rising stem meeting or exceeding the minimum requirements of AWWA C-515-99 Standard for "Reduced-Wall, Resilient Seated Gate Vales for Water Supply Service." Minimum valve wall thickness shall meet or exceed the requirements of AWWA C-153 specifications latest revision.

Valve stem shall turn counter-clockwise to open (open left). Valve body, bonnet, and wedge shall be constructed of Ductile Iron per ASTM A-536, Grade 65-45-12, providing strength and a pressure rating that exceeds the requirements of AWWA C-509 by at least 25%; Grey Iron materials will not be allowed. Valves shall feature smooth, full diameter, unobstructed bore when open and a 100% water tight seal when closed with a working pressure rating of 250 psi.



The ductile iron wedge shall be of one piece solid construction. The wedge shall be symmetrical and seal equally well with flow in either direction. There will not be any exposed metal seams, edges or screws within the waterway. The exterior of the ductile iron wedge shall be fully encapsulated with Nitrile Rubber per AWWA C-515. Wedge rubber shall be molded in place and bonded to the ductile iron portion. It will not be mechanically attached with screws, rivets or similar fasteners. All seating surfaces in body shall be inclined to the vertical at a minimum angle of 32° (when stem is in a vertical position) to eliminate abrasive wear of rubber sealing surfaces.

The valve stem & stem nut shall be bronze in full compliance with Section 4.4 of AWWA C-515. Wrench nut shall be ductile iron. Wrench nut shall have four (4) flats at stem connection to assure even distribution of operating input torque to the stem. All body-to-bonnet and bonnet-to-cover seals shall be O-rings constructed of Nitrile Rubber. Flat gaskets will not be allowed. Stem shall be sealed by at least three (3) O-rings. The top two (2) O-rings shall be replaceable with valve fully open and while subjected to full rated working pressure per AWWA C-515. O-rings set in a cartridge will not be allowed. Valves shall have thrust washers located above and below thrust collar to assure easy operation of the valve.

All internal and external ferrous surfaces of the valve body and bonnet shall have a fusion bonded epoxy coating, complying with AWWA C-550, applied electrostatically prior to assembly. All exterior nuts and bolts shall be 18-8 Type 304 stainless steel.

Resilient wedge gate valves shall be furnished in configurations that are listed by Underwriter Laboratories, Inc. and approved by Factory Mutual Research Corporation. Gate Valves shall come with a full ten (10) year money back warranty. Valves shall be American Flow Control Series 2500.

10. Valve Boxes. Valve boxes shall be heavy pattern cast or ductile iron, cast in two or three telescoping section of sliding construction and of such lengths as will provide, without full extension, the required cover. The lower section shall be 5-1/4 inch minimum inside diameter shall be bellied or domed at the bottom and fit over the valve nut. The upper section shall fit over the lower section. Covers shall be at least 6 inches in diameter, shall fit flush with the top, shall have the word "WATER" cast thereon in raised letters, and shall be slotted for easy removal. Valve boxes shall be of good quality cast or ductile iron, free from all defects in material and workmanship, and shall be coated with coal-tar pitch enamel or other approved coating. Valve boxes shall be suitable for the size valve on which they are used.
11. Curb Boxes. The curb box shall be "Erie" Style, 1 inch diameter iron pipe of telescoping design, adjustable 1 foot within its height range. Standard service box depths of bury shall be 5 foot to 6 foot. The service box base shall be reinforced at the arch and pipe ring area and the arch shall accommodate up to (and including) 1 inch curb stops. A 1/2 inch diameter type 304 stainless steel extension shall be included with each box. The rod shall be offset for centering in the pipe and shall have a heavy stainless steel yoke end, with a stainless steel cotter pin. The stainless steel rod shall be welded into the stainless steel yoke for strength. Each box shall include a "Plug" type cover with a deep slot for the release of surface water and removal of debris. The cover shall contain a brass plug that features a coarse "rope" thread to enable quick and easy removal.

Curb boxes for 1 ¼ inch through 2 inch (inclusive) curb stops shall include a heavy foot piece to be centered over the curb stop with the service box installed over the neck of the foot piece. The neck of the foot piece shall fit snugly into the arch of the service box providing a stable and tight fitting installation. The foot piece shall fit all standard 1" Erie Style service boxes. The stainless steel rod shall be 5/8-inch wide by 24-inches in length.

All surfaces shall be thoroughly coated for rust prevention. Curb boxes shall be manufactured in accordance with, and meet all applicable terms and provisions of ASTM A-438 and ASTM 48.

12. Water Service Pipe. From a year-round water main to a year-round curb stop, water service pipe shall be Type K, annealed seamless copper water tube meeting their requirements of ASTM B88. Joints shall be packed or compression type as required by the corporation stops and curb stop. Minimum allowable size for service pipe shall be 1 inch in the case of year-round services. Seasonal customers with the meter set outside may use ¾" water main downstream of the meter assembly consistent with instruction. Where service pipes larger than 2 inches are required, ductile iron pipe shall be used. The minimum allowable size of ductile iron pipe service shall be 4-inch diameter.

13. Corporation Stops 1 inch through 2 inch. Ball corporation stops shall have all metal parts cast from Red Brass and be classified "lead free brass". The brass ball shall be Teflon™ coated red brass, and supported by two Nitrile (Buna-N) seals, 80 Durometer, sealed in place with epoxy adhesive. The operating stem shall have a square head with a flanged stem design to prevent failure due to blowouts. The flow direction shall be plainly cast into the top of the stem. The stem shall have a single Nitrile (Buna-N) O-Ring seal, 70 Durometer, to assure against external leakage. The cap or stem shall rotate 90 degrees for on-off position, with the direction of rotation clearly marked on the Cap or Stem.

All ball corporation stops shall have a working pressure of 300 psi. The throughway dimension shall be no smaller than the nominal size of the valve. All Ball Corporation Stops will be designed so they can be installed under pressure with standard tapping machines, and insertion tools. All threads shall conform to the current AWWA C-800 standard. Inlet threads shall be either AWWA (CC) or Iron Pipe (IP, ANSI B2.1), style. Outlet shall be a compression pack joint sized for copper. The compression nut/body design shall feature a positive, external and visual stop for indication of proper tightening. The compression seal shall be factory lubricated Buna-N. A conductor spring shall be imbedded into the Buna-N gasket to provide metal to metal contact for electrical conductivity. The Buna-N Gasket shall also incorporate a stainless steel gripper ring to provide mechanical restraint. All materials shall meet or exceed AWWA C-800, latest revision.

Ball corporation stops can be directly tapped into the ductile iron water main provided that the water main engages 2 full threads of the ball corporation stop.

14. Curb Stops. All curb stops will be "open left". Ball curb stops shall have all metal parts cast from red brass; and classified "lead free brass". The brass ball shall be Teflon™ coated red brass, and be supported by molded Nitrile (Buna-N) seals, 80 Durometer, sealed in place with epoxy adhesive. The valves shall be non directional, with a throughway dimensions no smaller than the nominal size of the valve when open, and water tight to its working pressure when closed

All ball curb stops shall have a rated working pressure of 300 psi. All threads shall conform to the AWWA C-800 standard, latest revision. Outlet compression sealed shall be factory lubricated Nitrile (Buna-N). A conductor spring shall be imbedded into the Buna-N gasket to provide metal to metal contact for electrical conductivity. The Buna-N gasket shall also incorporate a stainless steel beveled gripper to provide mechanical restraint.

The operating cap or stem shall be held in place with a brass internal retaining nut threaded into the stem and epoxied. The stem shall have a double Nitrile (Buna-N) O-ring seal, 70 Durometer, to ensure against external leakage. The cap shall have a flat head in the use of opening and closing the valve, and shall be designed to accept an extension rod. The check lugs shall be enclosed and positioned to line up the ball with the waterway through the valve and to effectively block the waterway in the closed position.

All valves shall fully open or close against the check lugs with a 90 degree rotation of the cap. All materials shall meet or exceed AWWA C-800 and ASTM B-62 specifications latest revision.

15. Service Saddles for Ductile Iron Water Main. –

These clamps are made to the same design and construction specifications as the repair clamps featured previously. The tapped outlet is 304 Stainless, permanently “fused” by GTAW welding, and fully passivated. Stainless Steel Tapped Repair Clamps are made in all sizes and available with tapped outlets ranging in size from .3/4” to 3” in both NPT (female iron pipe) and AWWA(CC) Taper thread

The Service Saddle shall be constructed of 304 (18-8) stainless steel with Teflon coated, rolled UNC thread bolts. Nuts, bolts and sidebars shall be 304 (18-8) stainless steel. Lifter bars will be a heavy gauge 304 (18-8) stainless steel and will have a lip curve to hold the bolts in place while tightening the clamp. A self-lubricating washer will be used between the hex nut and lifter bar assembly. Gaskets will meet ASTM D2000 MAA 610 and have grids in a square pattern and tapered ends, made of Virgin SBR rubber compounded for water service

16. Service Saddles for HDPE Water Main. Service saddles for HDPE water pipe shall be the same as in Service Saddles for Ductile Iron Water Main installed with spring washers approved by the District.

17. Tapping Sleeves. Tapping sleeve shall be either ductile iron or stainless steel, with a flanged end compatible with a tapping valve. Cast iron or fabricated steel plate sleeves will not be allowed. Sleeves shall have a minimum working pressure of 200 psi.

Ductile iron tapping sleeves shall be mechanical joint type with “yield strength” of 45,000 psi, and a tensile strength of 65,000 psi; at an Elongation 12.0%. Tapping sleeves shall be manufactured from ductile iron to meet or exceed ASTM A-536. Side flange seals shall be the O-ring type of either round, oval or rectangular cross-sectional shape. The rubber gaskets shall be capable of a water tight seal to the working pressure. The sleeve shall be furnished with a test plug to provide for pressure testing before tapping. Mechanical joint tapping sleeves are to be used in conjunction with a mating tapping valve from the same manufacturer.

18. Hydrants. Fire Hydrants shall meet or exceed AWWA C-502, *Hydrants*, latest revision. Rated water working pressure shall be 250 psi, with a hydrostatic test pressure of 500 psi.

The nozzle section, upper and lower hydrant barrels, and hydrant base shall be constructed of ductile iron per ASTM A-536. The hydrant upper barrel shall have a 16 inch top section in lieu of the manufacturer's 10 inch standard. The main valve closure shall be of the compression type, opening against the pressure and closing with the pressure. The nozzle section is to be designed for easy 360 degree rotation by the loosening of no more than four (4) bolts without any disassembly of the hydrant. Each hydrant shall be furnished with two, 2½ inch steamer nozzles, and 1 each of 4½ inch pumper nozzle. Both the 2½ inch steamer nozzles and 4½ inch pumper nozzle shall be National Standard Thread (NST). There shall be a pentagon nut on each nozzle cap. Hydrant shall be operated with a 1½ inch pentagon nut (#5 Pent Nut) and shall turn counter- clockwise to open (open left). The operating nut shall be bronze construction with a weather shield. Depth of bury shall be a minimum of 5 foot 6 inch. Inlet shall be 6 inch diameter with mechanical joint connection per AWWA C-111/ ANSI 21.11.

Hydrants shall be shop painted as per AWWA C502 standards and field painted after installation with two coats of alkyd enamel paint as per the color requirements of the district (See Table 1). The seat diameter shall be 5¼ inches, and have a bronze cross arm. Hydrant must be designed so that removal of all working parts can be accomplished without excavating. The bronze seat shall be threaded into mating threads of bronze for easy field repair. The lower valve washer and hydrant shoe shall have a fusion bonded epoxy coating, complying with AWWA C-550, applied electro-statically prior to assembly. All exterior nuts and bolts connecting the hydrant shoe to the lower barrel shall be 18-8 Type 304 stainless steel.

The hydrant must have an internal stop nut located in the top housing hydrant. The hydrant operating threads to be factory sealed from water, moisture, and foreign matter. Hydrant must have a traffic flange design allowing for a quick and economical repair of damage resulting from a vehicle's impact. Hydrant break flange must have no more than four (4) bolts to attach it to the lower barrel, and must be replaceable without the use of a hoisting device to lift the upper barrel.

The hydrant shall be Waterous Pacer #41788 1, and manufactured by American Flow Control, Inc.

Alpha style hydrant connectors are permitted for use.

Fire hydrants shall be color coded to NFPA Standard 291, *Recommended Practice for Fire Flow Testing and Marking of Hydrants*, Latest Edition. Color-coded fire hydrants provide an immediate visual indication of available hydrant flow. Without color-coding, firefighters cannot know the flow potential of a hydrant, especially if the firefighters are responding to a mutual aid call.

The hydrant barrel shall be yellow, the top (bonnet) and nozzle caps (discharges) appropriate colors to indicate hydrant capacity (NFPA 291 § 5.2.1.2).

Fire hydrant caps shall be coded as illustrated in Table 1 and per (NFPA 291 § 5.2.1.2) This requirement will be in effect on 31 December 2019:

<b>Table 1</b> <b>Boothbay Region Water District</b> <b>Fire Hydrant Color Code</b>	
<b>COLOR</b>	<b>AVAILABLE FLOW @ 20 psi residual</b>
<b>BLUE</b>	<b>≥ 1,500 GPM</b>
<b>GREEN</b>	<b>1,000 - 1,499 GPM</b>
<b>ORANGE</b>	<b>500 - 999 GPM</b>
<b>RED</b>	<b>&lt; 500 GPM</b>

19. Couplings and Connectors. For joining new pipe to new or old pipe, couplings shall be solid sleeve type, cast or ductile iron with mechanical joints conforming to AWWA C110 (latest revision) *Ductile Iron and Gray Iron Fittings 3 in. through 48 in. for Water* or AWWA C-906 (latest revision) *Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In. for Water Distribution and Transmission*.
20. Thrust Blocks. Thrust blocks shall be pre cast concrete with a minimum compressive strength of 3000 psi. Retainer glands, friction clamps, and rods may also be required and shall be determined by the District. Thrust blocking is required on hydrants and any bend 45° or greater.
21. Miscellaneous Metal Work. Bends, hydrants, valves and appurtenances shall be strapped and clamped where required and/or as directed. Steel bars, rods and plates shall be provided as directed and as approved. After installation, all parts of the strapping and clamping devices shall be given two heavy coats of approved bituminous protective coating.
22. Backfill.
  - a. *Common Fill* - Common fill will not contain material which cannot be properly compacted. Common fill shall contain no stones larger than 4 inches in diameter. Common fills have properties such that it can be spread and compacted. Snow, ice and frozen material shall not be permitted.
  - b. *Screened Gravel or Crushed Stone* – Screened gravel shall be well graded in size from 1/4 inch to 3/4 inch and shall consist of clean, hard and durable particles or fragments. It shall be free from dirt, vegetable, or other objectionable matter, excess of soft, thin elongated, laminated or disintegrated pieces. The grading shall conform to the requirements outlined in Table 2:

<b>Table 2</b> <b>Screened Gravel or Crushed Stone Sieve Requirements</b>	
<b>Sieve Designation</b>	<b>% Passing by Weigh Square Opening</b>
1"	100
3/4"	96-100
3/8"	20-55
No. 4	5-20
No. 8	0-5

- c. *Granular Fill* – Granular fill shall consist of hard, durable stone and coarse sand, free from frost, frozen lumps, loam and clay, well graded and containing no stone having any dimension greater than  $\frac{3}{4}$  inches. The grading of sizes and material shall be such that the gravel may be thoroughly consolidated. The grading shall conform to the requirements as illustrated in Table 3.

Table 3 Granular Fill Sieve Requirements	
Sieve Designation	% Passing by Weight Square Opening
$\frac{3}{4}$ "	95-100
No. 4	50-95
No. 40	5-50
No. 200	0-10

23. Pavement. Provide all materials in accordance with the applicable sections of the Standard Specifications of Highways and Bridges of the Maine Department of Transportation (D.O.T.)
- a. *Aggregate Subbase and Base* – Division 700 – Materials Details, Section 703 – Aggregates, Subsection 703.06 – Type A and Type B for Aggregate Base.
  - b. *Bituminous Tack Coat* – Provide AE-90 Asphalt Emulsion Material, Division 700 – Material Details, Section 702 Bituminous Material, Subsection 702.04 – Emulsified Asphalts.
  - c. *Bituminous Concrete Binder and Surface Courses* – Division 700 – Materials Details, Section 702 – Bituminous Material and Section 703 – Aggregates Subsection 703.09, Grading C for roadways; Grading C and D for sidewalks, islands, and drives.
  - d. *Sidewalks* – (When Applicable): Division 700 – Material Details and (When Applicable) Section 608 – Sidewalks
  - e. *Pavement Markings* – Section 708.03 – pavement Marking Paint.

#### IV. CONSTRUCTION METHODS

1. General. In unloading, storing, stacking and handling pipe, fittings, valves, or appurtenances, the contractor shall take special care to insure that his methods are consistent with methods employed by the manufacturer in the manufacture and shipping of the product. Insofar as possible, all heavy materials shall be carefully handled by the use of hoists or skidways to avoid shock or damage. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground. It shall be the contractor's responsibility to inspect all shipments, and to replace or repair at his own expense any materials, which have been damaged through his own negligence. Whenever possible, pipe shall be strung along the routes with the bell ends facing in the direction in which the work is to proceed.

2. Trench Excavation. The contractor shall excavate the trench to the lines and grades as shown on the plans and as required by the District. Special care shall be taken to protect existing underground utilities and support the sides or the trench to prevent movement, to include the use of sheeting, shoring and bracing. The contractor shall also be required to do all dewatering of the trench, which may be necessary to insure that the trench bottom is firm and dry. If, in the opinion of the District, unsatisfactory soil conditions exist at the required trench grade, the contractor may be required to excavate below normal trench grade until suitable foundation material is encountered. At no time will water main be installed on frozen material. The excavation shall then be backfilled with screened gravel in six-inch layers. Each layer shall be properly tamped and compacted until normal trench grade is obtained. The contractor shall make such additional excavations as may be necessary to provide for proper placement of concrete trust blocks, valves, hydrants, services and other appurtenances as shown on the plans or as required by the District. All water main trenches shall be such that a minimum cover of 5 feet is provided over the pipe, except at gate valves where minimum of 3 feet of cover shall be provided at the top of the bonnet. The maximum depth of cover shall be 7 feet unless approved otherwise by the District.
3. Bedding of Pipe and Fittings. All pipe and fittings shall be placed on a layer of bedding material consisting of compacted-screened gravel or granular fill. The depth of the bedding shall be 6 inches minimum or equal to one-half the diameter of the pipe which ever is greater. Any voids under the pipe shall be filled by chinking and thoroughly tamped. The bedding material shall be brought up to the spring line of the pipe.
4. Laying of Pipe and Fittings. The pipe shall be placed in the trench in accordance with the manufacturer's recommendations or by an approved method in such a manner as to insure that the pipe is not damaged. All pipes shall be thoroughly sound, dry and clean, before laying and the utmost of care shall be taken to insure that its condition is not altered when it is placed on the bed. A watertight plug shall be installed once the pipe is in place to keep out groundwater and dirt. All work associated with laying the pipe shall conform to AWWA Standards Specification C-600 (latest revision) *Installation of Ductile Iron Water Mains and Their Appurtenances* for C-600 wherever applicable and not in conflict with the provisions contained in these specifications. When the pipe is in place, screened gravel or granular fill, whichever is applicable, shall be placed in the trench and thoroughly compacted in six inch lifts to 12 - inches above the top of the pipe.
5. Installation of Valves, Hydrants and Sprinkler Systems.
  - a. *Valves* – The contractor shall install all valves and tapping sleeves and valves together with valve boxes, at the locations shown on the plans or as directed by the District. In general, valves shall be installed as close as possible to plumb and in accordance with the manufactures recommendations. Valve boxes shall be installed at every valve location and shall be adjusted to the proper finish grade and set plumb and centered over the operating nut of the valve. The contractor shall exercise special care that the valve box is free of dirt and other obstructions and that the base does not rest on the valve bonnet. An earth cushion shall be provided between the bonnet and the base. After installation is completed all valves shall be operated and then left in the closed position.

- b. *Tapping Sleeves and Valves* – Tapping sleeves and valves shall be installed with the outlet flange set vertically and the sleeve squarely centered on the main. Concrete or granite blocking shall be placed beneath the sleeve and valve to provide support. Concrete thrust blocking shall be placed behind and under the sleeve and valve after the top is completed. The valves shall be flushed after completing the taps to ensure the valve seat is clean. Bituminous coating shall be applied to the bolts and nuts holding the sleeve together.
  - c. *Hydrants* – Hydrants shall be set plumb and at the proper elevation with respect to final finished grade. The hydrant valve base shall be set on firm material. The hydrant branch valve and hydrant tee shall be adequately anchored together by mechanical means (retainer glands, anchor tee, and/or tie rods) and by concrete thrust blocks. Hydrant locations shall be such that no part of the hydrant is within one foot of the curb line and no less than twenty feet from an intersecting street. Prior to any hydrant being tested under pressure, all hydrant laterals and mains shall be flushed to remove dirt, rocks and foreign matter. Each nozzle and pumper outlet shall be at least eighteen (18”) inches above grade on the installed hydrant. Any hydrant not located before a sidewalk or within twenty (20) feet of the centerline of the road must have two, six-inch diameter; ductile iron bollards installed either side of the hydrant.
  - d. *Fire Sprinkler Systems*. The Applicant shall install sprinkler systems in accordance with National Fire Protection Association (NFPA) guidelines as applicable. The size of the fire suppression system will be determined in accordance with Boothbay Region Water District Terms and Conditions of Service and be based on the fire protection service size, as it enters the premises before the first branch. All private fire protection supply systems shall be on dedicated connection to the systems mains for no other purpose then that of the private fire protection system.
6. Concrete Thrust Blocks. Concrete thrust blocks shall be installed at all bends 45° or greater, dead ends and hydrants as shown on the plans or as directed by the Water District. The bearing area of the thrust blocks shall be determined for each installation based on soil type and system design pressure. The thrust block shall be constructed of preformed, steel reinforced concrete or as directed by the District. In the event that other utilities or local conditions prohibit the use of thrust blocks, the contractor shall furnish and install mechanical thrust resisting devices, upon the approval of such devices by the Water District. Mechanical thrust resisting devices may be substituted for concrete thrust blocks and incorporated into the work if it is deemed to be more expeditious to do so; provided however, the device shall be at least equal in resistance to the thrust block and of a satisfactory design and receive prior approval from the District for its use.
7. Service Connection.
- a. *Corporation Stops* – All corporation stops shall be installed at the locations as shown on the plans or as directed by the Water District. A tapping machine shall be used which permit tapping of water mains under pressure. The tapping machine shall be rigidly fastened to the pipe and the tap shall be made in the upper one-half of the pipe. The length of travel of the tap shall be so established that when the stop is inserted and tighten with a fourteen-inch wrench, not more than one to three threads will be exposed on the outside. When a wet tap is made, the corporation shall be inserted with the machine still in place.



- b. *Copper Tubing* – Copper tubing shall be installed as directed by the District. Excavation for services shall be to a minimum depth of 6 feet and the installer shall exercise special care to insure that the bottom is free from sharp rocks or ledge outcroppings. In placing the service in the trench, the installer should be careful that the copper tubing has no kinks or sharp bends and that the screened gravel (or granular fill) placed to a depth of six inches over and around the service is free from large or sharp stones which may come in contact with the service.
  - c. *Curb Stops and Boxes* – Curb stops and boxes shall be furnished and installed by where noted on the plans or as directed by the District. The installer shall place compacted gravel around and below the curb cock. The curb box shall be set flush with the finish grade and at or near the property line.
8. Pressure and Leakage Testing. The contractor shall furnish the necessary equipment and labor for carrying out a pressure test and leakage test, as specified in AWWA C-600 (latest revision) *Installation of Ductile Iron Water Mains and Their Appurtenances* for C-600, the completed pipes. The pressure and leakage shall be conducted concurrently. The hydrostatic pressure shall be maintained for at least 2 hours.

The amount of leakage permitted shall be in accordance with AWWA C600, current edition. If any leaks occur they shall be repaired. Prior to testing any taps and furnish all necessary caps, plugs, etc., are required to be installed in conjunction with testing the pipe. The installer shall also furnish a test pump, gages, any other equipment required in conjunction with carrying out the hydrostatic test.

Prior to conducting the test, the mains shall be flushed to remove all materials that may have entered the mains during construction. Flushing velocities shall be equal to or greater than 2-1/2 feet per second.

9. Chlorination of Pipelines. Before being placed in service, all new water lines shall be chlorinated in accordance with AWWA C-651 (latest revision) *Disinfecting of Water Mains* for AWWA 601.

Before any disinfecting procedures are initiated, the Water District shall be advised of the intended disinfection methods and no work shall be done until the District approves such methods. The installer shall provide all necessary tools, materials, and labor for disinfecting the mains. The tablet method of chlorination shall not be employed.

The location of the chlorination and sampling points shall be determined by the District in the field. The contractor shall install taps for chlorination and sampling. The contractor shall uncover and backfill the taps as required.

The general procedure for chlorination shall include a primary flush cycle to remove all dirty or discolored water from the lines, and then to introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for 24 hours and the chlorine residual after 24 hours shall be at least 50 mg/l. The slug method of chlorination is permitted only with the consent of the District.

Following the chlorination period, all treated water shall first be flushed from the lines at their extremities, and replaced with water from the distribution system. A Maine State certified laboratory shall conduct bacteriological sampling and analysis of the replacement water. The District shall determine the number of samples and the test location. The installer shall be required to rechlorinate, if necessary, and the line shall not be placed in service until satisfactorily disinfected.

Special disinfecting procedures shall be used in connection to existing mains, and where the methods outlined above are not practical.

10. Backfilling the Trench. Upon installation of pipe, the trench shall be backfilled and final restoration of the surface made. Screened gravel or granular fill shall be placed to a point twelve inches over the top of the pipe, shall be placed in six-inch layers and thoroughly compacted. Special care shall be taken to insure that backfill around the pipe shall be common fill or granular fill and shall be placed in twelve-inch layers and thoroughly compacted. Compaction for that portion of the trench twelve inches above the top of the pipe shall be 95% of maximum density, as determined in accordance with Method D of ASTM specification D1557. The use of jetting or flooding to obtain a necessary compaction for bedding of the pipe will not be permitted.

Whenever a loam or gravel surface exists prior to cross-country excavations, it shall be removed, conserved, and replaced to the full original depth. In some areas, it may be necessary to remove excess material during the cleanup process, so that the ground may be restored to its original level and condition. If the contractor prefers not to store loam or topsoil, he shall replace it with loam or topsoil of equal quality and in equal quantity. In freezing weather, a layer fill shall not be left in an uncompacted state at the close of the day's operations. Fill shall not be placed on snow, ice, or frozen uncompacted soil, nor shall ice or frozen soil be incorporated in any fill. At the close of each day's operations, the surface of the compacted fill shall be rolled or otherwise smoothed to eliminate any ridges or mounds. All earthwork associated with this activity shall comply with the Maine Department of Environmental Protection (DEP) Rules, Chapter 500 and 502, *Sedimentation and Erosion Control*.

11. Compaction Control. Compaction tests shall be completed as directed by the District in accordance with ASTM D1556 as the work progresses to determine the degree of compaction being attained. Corrections for oversize stones larger than  $\frac{3}{4}$  inch in size shall be made in accordance with ASTM "Procedure for Testing Soil", suggested method for correcting maximum density and optimum moisture content of compacted soils for oversize particles.

Any corrective work required as a result of such tests, such as additional compaction or a decrease in the thickness of layers, shall be performed by the installer.

Compaction control tests will be made at no expense to the District, and by a testing laboratory approved by the District.

12. Restoring Trench Surface. Where the trench occurs adjacent to paved streets, in shoulders, sidewalks or in cross-country areas, the installer shall thoroughly consolidate the backfill and maintain the surface as the work progresses. If settlement takes place, the installer shall immediately deposit additional fill to restore the level of the ground. In and adjacent to street and highways, if the top 24-inch layer is unsuitable for use as sub-grade or shoulder material, the contractor shall remove this layer and provide granular fill for the sub-grade.

The surface of any driveway or any other area which is disturbed by the trench excavation and which is not a part of the paved highway shall be restored by the installer to a condition at least equal to that was existing before work began.

In the section where the water main passes through grassed areas, the installer shall, at his own expense, remove and replace the soil, or shall satisfactorily loam and seed the surface. The depth of the loam replaced shall be at least equal to that removed by the installer in his trenching operations, in no event shall it be placed less than 6" depth.

13. Pavement Replacement. The installer shall furnish all labor, material, equipment and incidentals necessary to replace all paved areas damaged by his operation.

The installer shall, after pipe laying and backfilling operations are completed, and after a 12-inch gravel sub-base is shaped and compacted, place the pavement.

The installer shall be required to clean all road surfaces after backfilling and before any surfacing.

The installer shall maintain pavement during the guarantee period of one year and shall promptly refill and repave areas that have settled or are otherwise unsatisfactory for traffic.

The installer shall furnish and spread calcium chloride on disturbed surfaces to allay dust conditions. Calcium chloride shall conform to AASho M-144.

No permanent pavement shall be placed within 90 days after completion of backfilling, unless permitted to do so in writing by the authority having jurisdiction. Repaving may be delayed for a longer time if the said authority so directs.

Temporary pavement shall be 1-1/2 inch thick bituminous concrete. Temporary pavement shall be maintained until replaced by permanent pavement.

If points of settlement or holes appear in the temporary pavement, the contractor shall repair the same within 30 day of notification by the District or authority having jurisdiction.

Permanent pavement to be placed over the width of the trench shall be 4 inches of bituminous concrete, laid in two courses, a 2-1/2 inch binder course, and 1-1/2 inch wearing course. Temporary pavement shall be removed and the sub-base shall be prepared by thoroughly compacting and shaping the sub-base to the required grade and cross section, and the edge of the old pavement shall be trimmed to a smooth straight-line tack coated.

Immediately prior to laying the binder course, the trimmed edges shall be stable and unyielding, free of loose or broken pieced, and all edges shall be thoroughly broomed and coated with an approved asphalt tack coat. Prior to placing wearing course, the binder course shall broomed and tack coated.

If directed by the authority having jurisdiction, permanent pavement of a thickness greater than 4 inches shall be placed. Material and placement shall conform to the above specifications, and thickness shall be as specified by the authority.

Prior to construction the contractor shall obtain the necessary road opening permits from authority having jurisdiction. Depending on the conditions of the permit the contractor may be required to place only temporary pavement, the authority having jurisdiction may be responsible for placing permanent pavement.

V. **MISCELLANEOUS**

1. Notification. The installer or Applicant shall notify the District at least two working days prior to commencement of work on a new service or main extension.
2. Cross Connections. No cross connection shall be installed by a water Applicant until after an application for a cross connection permit and a permit to install such cross connections has been approved for issuance by the Maine Department of Human Service.
3. Road Opening Permits. The Boothbay Region Water District shall take all road opening permits for State of Maine owned roads. Each Applicant must sign a written agreement with the district to ensure proper rehabilitation of roads in repaving operations. All costs associated with these permits are at the cost of the Applicant.
4. DigSafe Notification – All underground utility work shall be properly marked and identified via the DigSafe® System. The District will not participate in any water projects not having proper DigSafe notification and markings. DigSafe notification is the responsibility of the Applicant or his/her agent.