

# SUGARLOAF WATER ASSOCIATION

## STANDARDS AND SPECIFICATIONS GUIDE

### Quality On Tap!

*OUR COMMITMENT - OUR PROFESSION*



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# 1 NEW SERVICE CONNECTION

This policy deals with the criteria involved in the consideration of an application for service of water, from the Sugarloaf Water Association. Each service application will be judged on the following points, as to whether the service is rendered via a simple service connection or a main extension. All main extensions shall be a minimum of 8-inch diameter pipe or same 6-inch minimum to facilitate future fire protection and main extensions.

**Please evaluate the following points before completing an application for a new service connection:**

## 1.1 PROPERTY LOCATION

Does the property have frontage on existing association distribution mains? Main frontage is defined as: such that the applicants' lot or property borders an active association main for at least a minimum of ten feet. Any lot or property with said frontage and also meeting the other criteria points outlined will be eligible for service via a simple service connection. Lots or property without said frontage or not meeting the other criteria points outlined will be required to extend association distribution mains to this point of intersection from the center line of the building extending perpendicular to the road, street or right of way from which the building has frontage. In the case of a property being bordered by more than one main, the frontage will be judged to be the side that the building is orientated to face, and in no way exempts an owner from contributing to the extension of an existing main, if the property was best served by the new extension.

## 1.2 FIRE PROTECTION

Is the applicant's property within the accepted associations and towns standards for distance from an existing fire hydrant (no new dwellings on public water should be more than 500 feet from the nearest hydrant, as measured along the roadway,) and if so, does the existing fire protection provide the flow necessary to protect the proposed structures or any other conceivable structures the project could be expected to have built?

If the property is within the accepted distance standards and will be adequately served by the existing fire flows provided, the property is eligible for service via a simple service connection. If the property is not within the accepted distance standards or the existing fire flows are not adequate for the proposed structures; the applicant will be required to extend and / or upgrade mains that will provide the needed fire protection.

## 1.3 SERVICE DEMANDS

Do the service demand requirements fall within the capabilities of the existing system capabilities? If the proposed application demands are within the capabilities of the existing system, and also meet the other criteria points, the application is eligible for service via a simple service connection. If the applicants demands are in excess of the existing systems safe capabilities, as determined by Industry Standards, the applicant would be required to upgrade the existing system to the proper size necessary to serve this application; unless the existing system should be resized for reasons other than increased demand. If the

main needs to be resized due to factors other than increased demand by an applicant, the association and applicant will work together in accordance with MPUC Chapter 65 to determine cost allocation of main resizing.

## 1.4 SYSTEM INTEREST

The following questions also need to be asked when considering a service application

- Is the property a large parcel, which could conceivably be subdivided in the future?
- Is the property one that the system demands could conceivably change in the future?
- Is the property adjacent to other developable properties, such that these properties would be best served either directly or indirectly by a main extension also serving the applicants property?
- Does the applicant's property fall within a limited service zone?
- Is the property part of an approved subdivision or development?
- Is the application in any other way detrimental to the proper development of the water system?
- Is the application for an establishment that could be termed temporary?

If these issues can be addressed by a no answer then the application may be served via a simple service connection. If any of these issues are answered by a yes, service must be rendered by a main extension of proper size, complete with all appurtenances and features necessary for proper and adequate service as deemed necessary by the association operations staff in accordance with Industry Standards and Practices.

### 1.4.1 OTHER CONSIDERATIONS

Is public health at immediate risk due to a lack of public water supply to the applicant's property? If so a deviation from these policies and standards may be arranged on a case-by-case basis, by the associations' operations staff.

## 1.5 WATER UTILITY TAMPERING

Did you know that tampering with water utilities property is now a Federal Crime? No water service valve, system valve, water line, pump, motor, water meter, backflow device, fire hydrant, or any other system appurtenance etc. that is the property of the water dept. will be opened or closed or otherwise operated, by any other than persons authorized by the utility company. Any person, who is not an employee of the Water Dept. or does not have the expressed authorization of the water dept, and who is caught tampering with any water service valve, system valve, water line, pump, motor, water meter, backflow device, fire hydrant, or any other system appurtenance etc. will be subject to Federal Terrorist Laws, State Of Maine governing illegal use of, or tampering with a public water system, along with the water dept. first offence fine of \$1000.00.

## 2 INSTALLATION STANDARDS

### 2.1 MAINS

All mains installed shall meet the specification of the S.W.A., and installed under the supervision of the S.W.A. inspectors. Materials stored at a job site will be stored in a safe, sanitary manner throughout the job. Mains are to be installed within the public right of way or easement conveyed to the S.W.A. for the purpose of water transmission and / or distribution. Mains are to be installed at a depth of 5 1/2 - 6 feet, in a location such that it does not lie under a paved roadway, if at all possible. SWA mains are to be laid with a 10-foot separation from underground utilities, if at all possible. At no time will the S.W.A. inspector be considered a safety officer. Open or soft trenches must be properly marked using flares, signs and or wooden barriers and the contractor will be responsible for public safety at all times. The contractor will also provide flagmen if requested by the S.W.A.. Valves, fittings and hydrants shall be blocked with concrete thrust blocks, per the direction of the S.W.A. inspector. All gate boxes shall be properly installed and raised to grade at the completion of paving operations. The contractor will be responsible for maintenance of the particular line that he is installing for a period of one year from the time the main is accepted by the S.W.A.. The S.W.A. may add, delete or make changes in the scope of this work as deemed necessary.

### 2.2 SERVICES

All services shall be installed using materials meeting the specifications of the S.W.A.. Services will be installed in such a location as to minimize conflict with items that may cause increased maintenance for the S.W.A.. Services will be installed at 5 1/2 to 6 foot of bury, with the location of the services box at the intersection of the property line and the public right of way. Service installations will utilize stainless steel control rods, and the minimum service size will be one inch. The customer owned portion of the service shall be composed of S.W.A. approved materials. Couplings used underground shall be AWWA standard of brass and or stainless steel construction. Services shall be located in its own trench separate from other utilities (MPUC Chapter 62), with a minimum of 10 feet separation between the water and sewer trenches, as per State Law. Services may be subject to a pressure test if this action is deemed necessary by the S.W.A. operations staff.

### 2.3 HYDRANTS

Hydrants shall be installed under the supervision of the S.W.A.. Hydrants shall be installed using a hydrant tee and gate valve for the hydrant. Hydrants shall be installed such that the branch line is level and of minimum length. Hydrants shall be installed out of paved areas, and where ever possible such that the installed hydrant lies between the sidewalk and the boundary between the public R.O.W. and private property. Hydrants shall be thrust blocked for horizontal and vertical movement, in accordance with AWWA standards.

### 2.4 METERS

Sensus Meters shall be installed by the S.W.A. or by an approved agent. All meters shall be installed in a warm, dry, accessible location to facilitate maintenance, sanitary conditions and prevent freezing. All meters will be installed with a remote reader. Remote readers shall be located such that they are easily read in any weather condition. Meters will be installed utilizing an approved backflow device, and Pressure reducing valve for appropriate hazard class of the installation.



### 3 MATERIAL SPECIFICATIONS

Material specifications for Mains, Services, Meters and Hydrants.

This policy deals with the specification regarding materials used in the installation and maintenance of the system infrastructure. It shall be the policy of the association to specify materials based on the following criteria, the Sugarloaf Water Association operation staff shall do specification of materials.

Evaluation points

- AWWA standards
- Engineering standards
- State and Federal Law
- Proven record of material and /or supplier, as per Sugarloaf Water Association experience.
- 200 PSI rated

#### 3.1 MATERIAL SPECIFICATION FOR SUGARLOAF WATER ASSOCIATION

##### 3.1.1 WATER MAINS

Water pipe shall be Ductile Iron Class 52 utilizing push on joints, meeting AWWA c151 and c111. The pipe will have double cement lining, seal coating inside and bituminous coating outside in compliance with AWWA c104. Pipe shall be supplied in 20 foot lengths, with 2 bronze wedges per piece. Acceptable manufacturer: Griffin Pipe Products. Installation shall be by S.W.A. guidelines, under S.W.A. Inspection and supervision, at no time shall the inspector serve as a safety officer. In the event that the soil conditions are deemed potential corrosive by the association the association may specify poly wrap for the ductile installation, meeting ANSI /AWWA c105/A21.5 standards.

No water main installation will commence or continue beyond November 1<sup>st</sup>, or commence prior to May 1<sup>st</sup>.

##### 3.1.2 VALVES

AFC 2500 Series Resilient Seated Valves size 3 thru 12 inch shall conform to AWWA c509 standards. The valve body and bonnet shall have fusion-bonded epoxy inside and out and shall have 18-8 stainless steel bolts, type 304 installed by the manufacturer. The bronze stem shall be sealed by two O-rings, which must be replaceable under pressure. All valves must open left and be mechanical joint style, supplied with grip ring style retainer by Romac. Valves over 12 inches shall be rubber-seated tight closing butterfly type, conforming to AWWA c-504 latest revision. The resilient seat shall be Buna-N rubber designed to provide tight shut-off at specified pressures. Valve shafts shall be made of 18-8 stainless steel, type 304 materials and shall be securely attached to the disc with 18-8 stainless steel hardware. Acceptable manufacturer:

Henry Pratt Company.

### *3.1.3 VALVE BOXES*

Valve boxes shall be two piece, cast iron, sliding type with a top flange and a minimum inside diameter of 5 and 1/4 inches. Covers shall have the word "Water" cast into the top, unless specified differently. Dimensions will be tops 26 inches and bottoms 36 inches. Acceptable manufacturer: Bibby - St. Croix.

### *3.1.4 FITTINGS*

Fittings shall be Mechanical Joint Ductile Iron compact fittings class 350 in compliance with AWWA c153 and cement lined in compliance with AWWA c104, made in the United States. Acceptable manufacturer: Tyler Pipe. Mechanical joint accessories will be the restrained joint type known commonly as GripRing Type by Romac.

### *3.1.5 SERVICES*

1" Copper tubing or Endot EndoPure PE 3408-200 PSI shall be used from the main to the curb stop and be in compliance with ASTM b88. Service brass must conform to AWWA c800, latest revision, with pack joint end connections and be of the ball variety. Service brass shall be constructed of 85% copper, 5% tin, 5% lead, and 5% zinc. Standard corporation tread shall be a cc type tread. Acceptable manufacturer: A.Y. McDonald.

Saddles shall be used in installations larger than 1 inch, saddles will be double stainless steel band, with epoxy coated ductile saddle portion tapped with cc tread. Acceptable manufacturer: Romac.

Curb boxes shall be Curb box shall be adjustable sliding variety with length adjusting from 5 1/2 to 6 feet. Curb box covers will have the word "Water" cast into the top and be equipped with ROPS style plug. Acceptable manufacturer: Laroche Fonderie.

### *3.1.6 TAPPING SLEEVES*

Tapping sleeves shall be manufactured of 18-8 stainless steel, nuts and bolts will be 5/8 inch diameter 18-8 stainless steel. Face flanges must conform to AWWA c207 class d-ANSI 150 lb. Drilling a 3/4 inch 18-8 stainless steel test plug shall be provided for testing purposes. Gaskets will provide 360 degree coverage and meet the requirements of ASTM d2000-80M 4AA 607. Mechanical type tapping sleeves shall be used for installations where the main to be tapped is a transmission main or else otherwise deemed critical by SWA operations staff. Mechanical type tapping sleeves shall conform to AWWA c-110 standards and also be equipped with test plug for testing purposes. Acceptable manufacturer: Romac.

### *3.1.7 WATER METERS*

Water meters shall be Sensus ECR meters, reading in gallons. Each meter will be supplied with a touch pad. All meters must comply with AWWA standard c700 as most recently revised. All meters will be installed by S.W.A. Personnel or by a designated agent under the direction of the Association; using a meterhorn style setting and including an Association approved backflow preventer for the application. Acceptable items

include either McDonald or Ford meterhorn assemblies.

### 3.1.8 HYDRANTS

Hydrants shall be designed, manufactured and tested in compliance with the latest edition of AWWA c502 “Standard for Dry- Barrel Fire Hydrants” as published by AWWA. Hydrants shall be traffic design with a replaceable breakable unit 3” above the ground. Hydrants will be dry barrel type with drains plugged to comply with State and Federal Laws. Main valve opening shall have a diameter of at least 5 1/4 inches. The hydrant shall operate with an open left operating nut, which will be pentagonal in shape, measuring 1 1/4” Point to Point. Hydrant shall have two 2 1/2 inch nozzles and one 4 1/2 inch pumper nozzle, all with NST treads. Standard bury length for the Association shall be 5 1/2 feet. Acceptable hydrant manufacturer are the Waterous Model WB67.

### 3.1.9 THRUST BACKING, ANCHORAGE, AND JOINT RESTRAINT WATER LINE FITTINGS

Thrust backing 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 dry 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. Care shall be exercised to ensure that the concrete is clear of joint accessories, bolts, nuts, and flanges.

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 airentaining mixture. Cement shall be Type II confirming 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 two (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, or 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.

<b>Specified Compressive Strength at 28 days (psi)</b>	<b>Maximum permissible water-cement ratio, lb. of water per lb. of cement</b>
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 Association 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 Association.

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 Association.

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

Pipe Size	Fitting or Pipe Change	Min. thrust block area against undisturbed earth (square feet)
6"	90 degrees	5.5
6"	11/4 degrees	1.5
6"	Dead end	6.5
8"	90 degree bend	6.5
8"	45 degree bend	5.0
12"	90 degree bend	20.0
12"	11 1/4 degree bend	4.5
12"	Dead end	22.0
8"	90 degree bend	6.5
8"	45 degree bend	5.0
12"	90 degree bend	20.0
12"	11 1/4 degree bend	4.5

12"	Dead end	22.0
16"	22 1/2 degree bend	9.5
16"	90 degree bend	23.5
20"	Dead end	41.0
12 X 12	Tapping sleeve	14.0
8 X 8	Tapping sleeve	9.5
6 X 6	Tapping sleeve	8.5
Hydrants		5.5
16 X 16 X 16		8.5
16 X 16 X 8		9.5
16 X 16 X 12		14.0
20 X 20 X 6		8.5
20 X 20 X 16		6.5
12 X 12 X 6		8.5

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

- All fittings, valves, hydrants, and caps shall have ductile iron standard glands, unless otherwise directed by the Association.
- All push-on joints in hydrant lateral shall be secured by rods as shown on the contract drawings or as directed by the Association.
- All valves are required to be rodded to the tee.

Bolts on all ductile standard glands shall be systematically tightened with a torquewrench 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.

All services, domestic and fire protection, must have separate shut-off valves.

## 3.2 MATERIALS SUPPLIER GUIDELINES

### 3.2.1 MATERIALS SUPPLIER ELIGIBILITY

Proposals will only be accepted from authorized Supplier actively engaged in the manufacture and/or sale of the items called for in this particular project or RFP. In order to best serve the project, the selected Supplier shall be headquartered in Maine. Material supplier shall include listing of locations.

### 3.2.2 MATERIALS SUPPLIER LIABILITY INSURANCE

The selected supplier shall maintain Worker's Compensation and Employee's liability, Commercial Automobile liability and such other insurance as may be appropriate for the project. The Supplier's Liability Insurance shall provide protection from claims, which may arise out of, or result from the Supplier's performance and furnishing of product, materials and services on the project.

## 3.3 TECHNICAL REQUIREMENTS

### 3.3.1 SPECIFICATIONS

Proposals shall be submitted in compliance with the attached material specifications and material supplier requirements. If an item is described by using a trade name or catalog number of a manufacturer or supplier, the term "or approved equal" if not stated therein, shall be implied. The term "or approved equal" is defined as any other product which, in The Supplier Water Association's opinion, is fully equal in quality and performance, and will serve its intended purpose. However, for the purpose of continuing the Sugarloaf Water Association's standardization, several items have "no or equal" i.e. Hydrants, Gate Valves, and Water Meters.

### 3.3.2 NO QUOTE TERMS

If a Supplier cannot provide a specific item as described in the specifications, he shall indicate "No Quote". All exceptions to the specifications shall be listed with or attached to the proposal form provided and not in separate correspondence. Any price submitted in the proposal for a specific item, which does not meet specifications and is not listed as an exception shall be deemed unacceptable.

### 3.3.3 SAMPLES

Product samples, if required, must be furnished free of charge prior to the opening of proposals. Do not enclose samples with proposal. Samples will be returned upon request at the Proposer's expense.

## 3.4 MATERIALS SUPPLIER REQUIREMENTS

### 3.4.1 SUPPLIER SERVICE DEPARTMENT

Supplier shall have and maintain a company owned Service Department to ensure Contractor's

workmanship by performing pressure and disinfection testing for this project. Supplier shall provide three references from Customers for whom they do service work on a regular basis, at time proposal is due.

#### *3.4.2 TRAINING CERTIFICATES*

Supplier shall furnish appropriate Training Certificates for H.D.P.E. fusion work and confined space criteria for Service Technicians at the time proposal is due.

#### *3.4.3 PRESSURE TESTING*

Supplier shall have a company employed service technician perform appropriate pressure tests to ensure workmanship of contractor. The Contractor shall be responsible for repairing or replacing any deficient work at no additional cost to the Association. Retesting, upon completion of repairs/replacement, to attain passing test shall also be at no additional cost. All additional testing costs will be paid for by the Contractor. Supplier shall furnish names of 4 or more service technicians employed by supplier at time of proposal that potentially could be on jobsite performing service work.

#### *3.4.4 DISINFECTION*

Disinfection of newly installed water mains will be completed by an employee of the Supplier. The Contractor shall be responsible for coordination with the selected supplier. Additional disinfection, if necessary, shall be paid for by the Contractor at no additional cost to the Association. Supplier shall furnish names of 4 or more employees that can accomplish this work.

#### *3.4.5 24 HOUR EMERGENCY SERVICE*

Supplier shall provide 24 HR Emergency Service to the Sugarloaf Water Association. Supplier shall have a formal system in place to respond to emergencies. Procedures must be presented with proposal.

#### *3.4.6 2 HOUR EMERGENCY SERVICE*

Supplier shall provide Emergency Service to the Sugarloaf Water Association within a two hour limit from the time of call on any items listed in the RFP. Supplier shall provide twenty contact names, which include office, home, and cell phone numbers (as applicable). A Minimum of three Service Technicians capable of doing taps, chlorination and fusion work with access to company owned service trucks and appropriate equipment must be provided on the list. List must include Officers of Company such as CEO, President, Controller, etc. List must be included with proposal. Supplier shall incur all costs (both his and the Association) associated with not meeting the two hour time limit for emergencies.

#### *3.4.7 SAFETY TRAINING*

Supplier must have capability of presenting a 10 Hour OSHA Safety course to all parties involved with the particular Sugarloaf Water Association Project. All costs for this training shall be Supplier's responsibility. Supplier will coordinate with all parties involved to meet this requirement prior to start of the particular project. Supplier shall provide name and appropriate qualifications of person conducting the Safety

Training at the time of the proposal.

#### *3.4.8 SUPPLIER SITE VISITS*

A Supplier representative shall visit the particular project once a week to provide timely recommendations and solutions for parties involved.

#### *3.4.9 LEAK DETECTION*

In event of a perceived leak Supplier shall provide a minimum of 3 days Leak Detection services utilizing a combination of leak correlater and ground listening devices at no charge to the Sugarloaf Water Association. Unused days at the end of the project will enable the Sugarloaf Water Association to use this service to complete a leak survey on their existing system at no charge. If more than 3 days are required to due to deficient work, costs shall be Contractor responsibility. Supplier shall provide 3 references from Customers for whom they have been successful in finding leaks.

#### *3.4.10 UNLOADING AND STRINGING OF PIPE*

Supplier shall provide all manpower necessary to unload and string ductile iron pipe. The Sugarloaf Water Association will not participate in any manner with unloading of ductile iron pipe. Contractor will be responsible for traffic control. Truck mounted cranes are required for unloading to limit disruption of traffic flow. Supplier to provide 5 customer references for unloading and stringing of Ductile Iron Pipe.

### **3.5 AWARD OF PROPOSAL**

#### *3.5.1 TIMING*

The award will be made within 30 days of RFP opening to the supplier whose proposal is most advantageous to the Sugarloaf Water Association. Such factors as price, delivery time, quality, service, compliance with specifications and requirements and past performance of the Vendor will all receive due consideration.

#### *3.5.2 WAIVER RIGHTS*

The Sugarloaf Water Association reserves the right to waive any formality in the RFP, reject any or all proposals submitted and make an award solely in the best interests of the Sugarloaf Water Association.

#### *3.5.3 GUARANTEE*

Supplier will guarantee that items offered for sale fully comply with the items specified in this RFP. Furthermore, the Supplier shall warrant that it can meet all the requirements of this RFP. All expenses covering return or replacement of defective or rejected merchandise will be born by the Supplier.

#### *3.5.4 UNIT PRICES*

Supplier shall submit a separate unit price for each item unless otherwise specified. The proposal award



will only be made on a complete package.

### *3.5.5 PAYMENT TERMS*

Supplier shall receive payment for product when that particular product has been installed and successfully passed pressure testing or is otherwise deemed acceptable by the Sugarloaf Water Association and their Engineer.

### *3.5.6 DELIVERY DATES*

Specified delivery dates shall be stated in the proposal. If delivery dates for any items will vary, this must be indicated. Demonstrated ability to meet delivery dates will be a factor in awarding this proposal. Note: All material in this RFP is subject to a maximum two hour emergency delivery time frame in an emergency situation.

### *3.5.7 DEFAULT*

If after the RFP is awarded to the selected Supplier, they are unable to furnish the materials, supplies, and/or services required, the Sugarloaf Water Association reserves the right to procure materials or supplies from other sources and back charge any additional costs to such Supplier. However, the Supplier shall not be liable for such additional cost if failure to deliver is due to any cause beyond its control such as an act of God, war, fire, flood, strike by other than its own employees, or sabotage.

## 4 CONSTRUCTION SPECIFICATIONS

### 4.1 GENERAL

#### 4.1.1 SPECIAL INSTRUCTIONS

- Take adequate measures to minimize adverse environmental impacts during construction, e.g. Erosion control, dust control, noise control. Furnish and spread calcium chloride or apply water for dust control during construction as directed by the Owner's representative. Noise-generating heavy equipment shall not commence work before 7:00 A.M. Or continue past 7:00 P.M.
- Contractors should visit the site and acquaint themselves with existing conditions prior to beginning any construction activities.
- The Contractor shall secure all required utility and municipal permits for work operations shown on the plans.
- No burning will be allowed on site.
- The Contractor shall be responsible for verification of existing conditions (topography, utilities, existing improvements) as shown on the plans prior to the start of construction. All discrepancies, variations and /or deviations shall be noted and submitted to the Owner in writing prior to the start of construction. Failure to verify the conditions shall nullify the Contractor's ability to seek change orders at a later date which relate to discrepancies in existing surface conditions found after the start of construction.
- "Limit of Work" lines indicated are an approximate indication of area requiring work under contract, and are not absolute limits of scope of work required under contract. Refer to the specifications for full scope of work and associated work limit lines.
- Contractor shall comply with all aspects of P.L. 437, the Maine "Dig Safe" Law, which requires location, and protection of all utility companies who have underground utility lines in the vicinity of any proposed excavation work.

#### 4.1.2 EXISTING UTILITIES

- Locate and clearly mark all existing above ground and underground utilities prior to any excavations, in all areas of work. By law, contractor must contact "dig-Safe" (1-800-225-4977) prior to any excavation work.
- All presently known existing utilities are located on the Existing Conditions Plan, locations are approximate only, and are based on plans provided by Sugarloaf Mountain Corporation. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, notify and consult with owner's representative immediately for directions. Repair any utilities damaged

during project operations to the satisfaction of the appropriate utility.

#### *4.1.3 AS BUILT DRAWINGS*

- The Sugarloaf Water Association requires as-built plans for all utility construction. Contractor shall keep careful record plans of all below ground and above ground utilities and drainage systems as outlined in each section of these specifications, by neatly marking up a set of site plans showing any and all deviations from design conditions, in locations and elevations.

#### *4.1.4 PARKING AND WORK AREA PROTECTION*

- The Contractor shall be responsible for providing a designated employee parking area within the limits of work shown on plans. Parking and materials deliveries shall not block areas and egress to the existing facilities.
- The Contractor shall take all necessary precautions to enclose the work areas and prevent pedestrian entry in work zones. Install fencing, signs, and banners as required to protect the work areas from unauthorized use.

### **4.2 WATERLINE EXCAVATION AND BACKFILL**

#### *4.2.1 GENERAL PROVISIONS*

- Coordinate work with that of other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of the work.
- The “Standard Specifications” referred to herein is the book entitled “Standard Specifications, Highways and Bridges” published by the State of Maine Department of Transportation dated October 1990, as supplemented, excluding the following portions thereof.
- Contractor shall work in close cooperation with the Sugarloaf Water Association, other affected utility companies and the Sugarloaf Mountain Corporation.

#### *4.2.2 DESCRIPTION OF WORK*

Provide all labor, materials, equipment and services necessary for proper and complete installation of the following:

- Perform excavation and trenching as required for the complete installation of all water lines and individual lot services.
- Provide all necessary sheeting, shoring and bracing to protect the work and assure the safety of workers, adjacent property and the public in accordance with OSHA standards.
- Maintain all excavations free from water.

### 4.2.3 MATERIALS

#### 4.2.3.1 Granular Backfill

Granular backfill is material to be placed as fill material above the 12" sand layer at all waterlines. Backfill shall be clean, free draining sand and gravel meeting the following gradation:

Sieve Size	Percent by Weight Passes
3/8"	85-100%
No. 200	0-5%

### 4.2.4 TRENCH EXCAVATION

- Trench excavation includes excavation for pipes and fittings as shown on the plans. Make trench walls as near vertical as practical, consistent with OSHA requirements and safe working practices. Shore and brace as necessary. Keep excavations free from water in order to carry on work properly.
- Do not excavate to full depth in freezing temperature unless structures can be installed immediately. Protect excavation bottom from freezing.
- Do not disturb sub grade below required grades.
- Excavation shall be made to such a point as to allow a minimum of six inches (6") of sand fill bedding material to be placed beneath the bottom of pipes in soil areas. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material for the pipe. Safety shall be the controlling factor in determining minimum trench widths.
- Before installation of any pipe, the Contractor shall first place and consolidate a six-inch (6") layer of sand bedding. After the pipe has been placed an additional twelve inches (12") shall be placed and consolidated to the top of the pipe. The trench shall be carefully backfilled, deposited in eight inch (8") layers and thoroughly consolidated by hand or mechanical tampers.

### 4.2.5 COMPACTION

All fill and backfill shall be placed in maximum 8- inch lifts and compacted in accordance with the following:

- Under Drives, Roads or Pavement      98%
- Lawn or Woods                                      95%

### 4.2.6 DEWATERING

- Control surface and sub-surface runoff so as not to allow water to accumulate in excavations or areas to be filled. Remove water from excavations to prevent softening of trench bottoms, and soil

changes detrimental to the stability of sub grades, existing excavations and undisturbed bearing surfaces. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering systems components necessary to convey water away from the site. Discharge water in safe, legal manner into existing waterways or drainage systems, as required. Do not allow water carrying excessive soil particles to be discharged directly to existing waterways or systems.

- Install sedimentation basins or other sedimentation controls as required to prevent sediment damage downstream. Correct any erosion problems as directed at no additional cost to the Owner. Conform to all regulations of the State Department of Environmental Protection.

#### *4.2.7 UNSUITABLE SOILS*

- Unsuitable material such as peat, muck, soils with high organic content, or junk fill which underlies the subgrade or the bottom of excavations, outside the normal limits of excavation as shown on the Drawings, shall be removed and replaced with suitable material when directed by the Owner's representative.
- Unsuitable material that lies within the limits of required excavation will be removed as part of the work without change in the "Contract Price".
- Soil rendered unsuitable for bearing by the Contractor's operations shall be removed at the Contractor's expense and replaced with compacted gravel, crushed stone or concrete when so directed by the Owner's representative, and at no expense to the Owner.
- Unsuitable soils shall be legally disposed of.

#### *4.2.8 FILL AND BACKFILL*

- Backfilling is the placement of structural fill materials in trenches, pits, against pipes or other previously excavated, or as shown on the plans.
- Place fill and backfill in 6" to 8" layers (loose Measure) and compact each layer to required density (see "compaction"). Areas to be filled and backfilled must be free of standing water. Do not backfill until lines or structures are inspected, tested or approved.
- On slopes of 4:1 or steeper, excavate horizontal benches 6' wide every 2' vertically to eliminate shear planes before placing any fill.
- Filling and backfilling shall not commence until all lines have been installed, and the locations of all pipe, fittings, and underground structures have been measured and recorded. Fill and /or backfill shall be carefully placed by hand around the pipe.
- The contractor shall assume responsibility for site surface and subsurface drainage and shall maintain such drainage during the life of the contract, and shall at all times protect adjacent property.

#### 4.2.9 FROST

- No fill materials shall be placed when the subgrade, the fill material, or the previous lift on which fill is to be placed is frozen. In the event that the subgrade or any fill which already has been placed becomes frozen, it shall be thawed, scarified and then recompacted, or else removed, to the satisfaction of the Owner's representative before the next lift is placed. Any soft spots resulting from frost shall be removed or recompacted to the satisfaction of the Owner's representative before new fill material is placed.

#### 4.2.10 MAINTENANCE AND RESTORATION

##### 4.2.10.1 Protection of Graded Areas

- Protect newly graded areas from traffic and erosion, and keep free of trash and debris.
- Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances, until final project acceptance.

##### 4.2.10.2 Reconditioning Compacted Areas

- Where completed compacted areas disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and recompact to required density before proceeding with other work.
- Restore areas affected by settlement, due to the work of the Contract, to original lines, grades or levels. Correct conditions contributing in any way to such settlement in a manner approved by the Owner's representative. Remove and replace any improperly placed or compacted fill material at no additional cost to the owner.

#### 4.2.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

- Transport waste material or soils, including unsuitable subsurface materials, to the approved on-site disposal area in accordance with DEP Site Location Order and local regulations.
- Transport waste material, including trash, plastics, rubber and similar debris to an approved off-site disposal area in a safe and legal manner.

### 4.3 PLANS AND CONSTRUCTION SPECIFICATIONS

#### 4.3.1 SUBMITTALS

An applicant proposing to construct a water system for public use and dedication to the Sugarloaf Water Association shall submit 1 set of plans and specifications to Sugarloaf Water Association, Management and Planning Department, 5005 Iron Brook Road, Carrabassett Valley ME.04947. The plans shall show plan and profile of the proposed water main, or pump station plan and details, right of way boundaries, other utilities, limits of paving, ledge profile or test borings and any other physical or topographical feature relevant to the installation and maintenance of the main or pump station.

All drawings, specifications and engineer's reports submitted for approval shall be prepared by or under the supervision of a registered professional engineer or others 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 work.

#### *4.3.2 REVIEW*

The Association's goal is to review plans within thirty (30) days after receipt. An ability to serve letter will be issued to the applicant within this period. Comments will be returned to the consultant. If the applicant does not respond within sixty (60) days, the plans shall be considered inactive and returned. In such cases a new submission shall be made. All plans will be stamped upon receipt and reviewed in order of receipt.

#### *4.3.3 APPROVAL*

Following review and approval, plans shall be stamped "approved" and returned to the applicant with a letter of approval. Approvals are valid for a period of eighteen (18) months from date of issue. If construction is not in progress at the end of that period, Association approval is void. Plans and specifications may have to be submitted as a new project, if deemed necessary by the Association to conform to the most current specifications.

#### *4.3.4 FINAL PLANS FOR CONSTRUCTION*

Prior to construction submit two paper sets depicting approved water and or pump station configuration of the final signed plans. No construction shall begin until these plans are received by Sugarloaf Water Association.

### **4.4 PROJECT ACCEPTANCE**

Upon completion the utilities must be dedicated to the Sugarloaf Water Association. A Certificate of Title and Project Completion form must be submitted. Upon final inspection and approval of the facilities and satisfaction of all Association requirements, the Association will accept the facilities in writing. 1 set of 24" x 36" as-built reproducible Mylar's shall be provided prior to acceptance. The developer will be responsible for any maintenance as a result of construction or defects for a period of one (1) year from date of acceptance. Any charges incurred during that year shall be billed to the Contractor.

### **4.5 EASEMENTS**

Easements shall be required for all water mains and appurtenances except where installed within the public way of the State or the Municipality. Such easements shall not be less than thirty (30) feet in width. Combined water and sewer easements shall be not less than fifty (50) feet in width with both pipes ten (10) feet from the edges of the easement. The Association reserves the right to require additional easement width if construction and maintenance activities require it. All easements shall include the right of ingress and egress as well as the right to install and maintain water lines. If necessary, easements shall extend to adjacent properties for orderly extensions of service.

All appurtenances (blow-offs, hydrants, etc.), if not within the pipeline easement limits, shall be provided

with an easement ten (10) feet by ten (10) feet centered around the appurtenance.

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. Other utilities will be located no closer than five (5) feet from the Association facilities. Any utility crossings shall be generally perpendicular and shall maintain a vertical separation of one (1) foot.

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

#### 4.6 SEPARATION OF WATER AND SEWER LINES

- There shall be no physical connection between a drinking water supply line and a sewer or appurtenance.
- Water lines shall be laid at least ten (10) feet horizontally from a sewer or sewer manhole whenever possible; the distance measured from edge to edge. When local conditions prevent a horizontal separation of ten (10) feet, the water line may be laid closer to a sewer or sewer manhole provided that:
  - The bottom (invert) of the water main shall be eighteen (18) inches above the top of the sewer and the edge to edge distance shall be no less than five (5) feet.
  - Where this vertical/horizontal separation cannot be obtained, the sewer shall be constructed of AWWA approved Ductile Iron water pipe, pressure tested without leakage prior to backfilling.
- Water lines crossing sewers shall be laid to provide a separation of at least eighteen (18) inches between the bottom of the water line and the top of the sewer, whenever possible. When local conditions prevent this vertical separation, the following construction shall be used:
  - Sewers passing over or under water lines shall be constructed of AWWA approved Ductile Iron water pipe.
  - Water lines passing under sewers shall, in addition, be protected by the following:
    - A vertical separation of at least (18) eighteen inches between the bottom of the sewer and the top of the water line.
    - Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water line.
    - 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.



## 4.7 MAIN EXTENSION AGREEMENT

After final plans depicting the approved water main configuration and right of way and or easements have been received, the Association and the developer/contractor shall enter into a main extension agreement at this time, the developer will deposit the following estimated fees:

- Public Fire Protection Fee: \$2.50/ft this fee applies when a main can be extended in the future beyond the end of the main extension. The footage is the distance from the last hydrant installed to the end of the main. This allows the prorated share of the cost of a future hydrant to be escrowed and applied to the installation cost when installed.
- Inspection Fee: \$300/day (estimated) @ \$30.00/Hr.
- Service Initiation or Termination Fee: \$35/service
- Non Payment Termination Fee: \$115/service
- Capitol Assessment Fee: \$3,000/service

After the project is completed, the Association will reconcile all costs associated with the project and either refund total actual costs under the deposited amount or request payment for costs in excess of the deposited amount.

### 4.7.1 INSPECTION

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

The Contractor shall schedule with the Association for inspection services a minimum of 3 working days prior to construction. The Association cannot guarantee an inspector for the project without this notice.

## 4.8 DESIGN CRITERIA

### 4.8.1 PIPE SIZE

All main distribution pipe lines shall be of a size to adequately serve the needs of the proposed development and any potential extensions thereof, but in any event shall not be less than eight (8) inches in diameter except as may otherwise be permitted herein:

The minimum size of the pipe where fire protection is to be provided or required shall be eight (8) inches in diameter. Dead-ends shall be minimized by looping all mains where practical. Where dead-ends are necessary they shall be provided with a fire hydrant, or blow-off assembly. The nominal pipe diameter of

water mains without fire protection shall not be less than four (4) inches.

The Association 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 developer's project. In this case the Association will pay to the developer the difference in cost between the two sizes.

#### *4.8.2 DEPTH OF COVER*

Water pipe shall be laid with a cover of five and one-half (5 ½') feet measured from established finished grade to the top of the pipe. The contractor shall establish adequate elevation control to ensure that upon final grading (grade stakes at 50' increments minimum) 5 ½' of 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 Association. Any potential changes in alignment or grade of roadways shall be considered in the original utility design. Loss of adequate cover will necessitate relocation or lowering of the waterline.

#### *4.8.3 GATE VALVE LOCATION*

Gate valves shall be installed at all pipe junctions and street intersections in such a manner as to control and cut off flows in all segments of the system. A minimum of two (2) valves are required at tees and a valve is 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 may be approved by the Association. Additional gate valves may be required under certain situations, such as looped systems, where it is necessary to isolate certain sections of the system.

#### *4.8.4 PRESSURE / FLOW REQUIREMENTS*

All distribution systems shall be capable of providing a minimum working pressure of 30 p.s.i. at each service connection under maximum day demand conditions, plus the required fire flow as determined by the Insurance Services Office (ISO) or the local fire department. The consultant will provide the estimated peak demand for the project and will determine whether the project meets the Association pressure/flow requirements.

In the event that the 30 p.s.i. minimum pressure cannot be met, the developer/owner can request limited service for each service connection in question. The Association will determine whether adequate conditions exist to grant a limited service. If adequate conditions exist, the Association and the developer/owner can enter into a limited service agreement.

### **4.9 WATER LINE CONSTRUCTION**

#### *4.9.1 DUTIES OF THE CONTRACTOR*

Install the water mains so as to supply the Association, upon completion, with a satisfactory, watertight pipeline, laid to proper line and grade, and in accordance with these specifications and approved plans to the satisfaction of the Association, and will leave the site in condition which is suitable, not only to the

Association, but to those abutting the right-of-way, right-of-way grantors, and any municipal or state authorities having jurisdiction over the areas involved.

Obtain all street opening permits from cities or towns covering any pipelines to be laid in the public way and shall be responsible for fees levied by any regulatory agencies which are applicable to the work covered by this specification.

Establish line and grade for the pipeline and right-of-way boundaries where the pipeline is to be laid in right-of-way outside of a public way.

Familiarize himself with all obstructions which he can foresee, such as existing pipes, services, conduits, ducts, sewers or any other such obstructions which might interfere with the construction, and he agrees to make arrangements with the owners of such facilities so as to save the Association harmless from any damages thereto caused by his operations and to make whatever arrangements might be necessary to move or remove and replace these facilities so as to permit the construction of this pipeline, all at his own expense.

Purchase all pipe, fittings, valves, gaskets and piping accessories, including but not limited to services, air valves and hydrants, in accordance with Sugarloaf Water Association specifications.

Make any changes which may be required, such as the removing or restoring of the property of others in the land through which this line will cross in right-of-way or otherwise. The Contractor will place all pipe, fittings, valves and all the attendant facilities in place in the proper trench, to proper line and to proper grade, as called for in the plans and specifications and to the satisfaction of the Association's Inspector.

Make all connections to the Sugarloaf Water Association system in accordance with standard Association practice and under Association inspection.

Provide trench and excavation for the purpose of testing, chlorinating, and connecting the new main into existing pipe and promptly backfill such trench and patch and restore the surface as necessary. Provide and maintain trench barricades, warning signs, warning lights, traffic control, as required by applicable safety regulations and organizations with jurisdiction over traffic control.

Shall perform leakage tests and disinfect the completed main and provide proof of satisfactory disinfection.

Upon completion of the work to the Association's satisfaction, transfer to the Association, free and clear of liens, damage claims or law suits all right, title and interest to all piping and appurtenances.

The following specifications for the performance of the work are part applicable, but do not necessarily constitute the full and complete specifications for the work. Such reasonable additional requirements as the Superintendent may specify must be followed.

No valve, hydrant or other facility of the Sugarloaf Water Association shall be operated by the Contractor or his agents. Sugarloaf Water Association will, upon a 48-hour notice of the Contractor, furnish men and equipment for such activity.

#### 4.9.2 EXCAVATION

The Contractor will make application for all necessary street opening permits necessary for the pursuit of the work. No street opening shall be made by the Contractor until the appropriate permit has been received and is in hand, and when such opening shall be made, it shall be done in strict accordance with the terms of the permit.

When any pavement, regardless of type, must be cut, it shall be done in a neat and symmetrical manner by use of a saw, chisel, or other suitable method. In no case shall pavement be torn up with a backhoe bucket except between and inside of cuts previously made as above. Should any further pavement be broken, outside of the cuts, as by blasting, such damaged pavement shall be cut out in a neat and orderly fashion.

The trench shall be dug so that the pipe can be laid to the alignment and depth required and shall be excavated in advance only to the extent necessary for the proper pursuit of the work; the amount excavated ahead may be controlled by the Inspector or Superintendent. The trench shall be kept dewatered, such that no drainage water shall enter the pipe, and the end of the pipe shall be temporarily plugged off at night or over weekends, or whenever the work is suspended, or in cases where unstable material could cause a cave-in to enter into the exposed end of the pipe. The trench width shall be the minimum necessary to properly lay and joint the pipe, permitting whatever bracing or sheathing may be necessary in unstable material. The bottom of the trench shall be smooth and even and should be as nearly undisturbed as possible so that the barrel of the pipe may be laid in a flat bottom trench on good solid material. Shallow holes should be dug at the joints so that the barrel of the pipe shall be in contact as much as possible with the solid floor of the trench. In ledge installation or in boulders or other large stones, there shall be at least 6" clearance between the barrel of the pipe and any ledge, stone or other object. These clearances are the minimum to be permitted between any part of the pipe or appurtenance being laid and any part or projection or point of a rock, boulder, stone, culvert, pipe, duct, or similar object or material. The bottom of the trench may for a short distance, near the center of the pipe length, be left slightly low to permit the withdrawal of the slings with which the pipe is placed in the trench. This material shall be replaced and compacted mechanically when the pipe is in place. Likewise, if for any reason the bottom of the trench should be excavated below the desired grade, suitable material may be replaced to bring the bottom of the trench up to the proper grade before pipe is put in place. This material is to be mechanically compacted so as to give it a smooth, solid base for the pipe, subject to the approval of the Inspector or Superintendent. When the bottom of the trench at sub grade is found to be unstable or to include cinders or other types of refuse, or vegetable or other organic material, or large pieces or fragments of inorganic material or stone or rock, any such undesirable material shall be removed and replaced with suitable material before the pipe is placed. Such material as is used to replace unsuitable material in a trench bottom shall be compacted in layers of no more than 8" by mechanical means before the pipe is placed on it. In the case of unstable material, the Association inspector may, at his discretion; orders crushed stone or gravel to be used to stabilize the pipe bed before pipe is placed in the trench.

All structural excavations and trenches shall be sheeted or braced as required for the safe pursuit of the work, the protection of structures, the protection of other utilities, and as required by any Federal, state or municipal laws, ordinances or regulations.

The Contractor shall be responsible for the design, adequacy and maintenance of all sheeting, sheet piling,

bracing or other temporary structures or supports required.

When the sheeting or shoring cannot be removed without endangering the new work, other structures or the security of the banks, it shall be left in place.

### *4.9.3 PIPE LAYING*

#### **4.9.3.1 Handling of Materials into Trench**

Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient handling of all materials. Pipe fittings and accessories shall be carefully lowered into the trench, piece by piece, by means of derrick, crane, slings and other suitable tools and equipment, in a manner such as to prevent damage to the material or to its protective coating and linings. No chain or slings shall be passed through the inside bore of any pipe or valve or fitting. Under no circumstances shall piping materials be dropped or dumped into the trench.

#### **4.9.3.2 Cleaning of Materials**

All lumps, blisters, excess coating material or other foreign matter shall be removed or cleaned from the pipe, with particular attention being given to the spigot end, which enters into the bell of the next adjacent pipe. Also, the inside of the bell shall be cleaned and wiped dry and clean before any joint material is applied to it. All foreign matter shall be removed from the inside of pipe, fittings, valves, and the interior cleaned and kept clean. Particular attention shall be given to the cleaning of surfaces to which gaskets are to be applied, and especially to the inside grooving of the push-on pipe bells.

#### **4.9.3.3 Laying Pipe**

Every possible precaution shall be taken to prevent foreign material from entering into the pipe as it is being placed in the trench. Likewise, no foreign matter shall be allowed to enter into the joint area between pipes. If there is any question as to foreign material having gotten into the joint, the joint shall be taken apart and checked and made up again in the proper manner. The inside of every pipe, as it is lowered into the trench, shall be checked for any dirt or stone or other debris, or any material whatsoever which may be inside the pipe, and such extraneous material shall be cleared out and the pipe made completely clean before it is jointed into the next pipe in the trench. Precautions shall be taken such that no backfill material shall enter the open end of the pipe already laid in the trench, and every effort shall be made to prevent trench water from entering the pipe. Whenever pipe laying is not in progress, a watertight plug or other effective means shall be used for keeping any extraneous material from entering into the pipe. Any water in the trench shall be kept down by pumps, such that it will be below the invert of the pipe already laid. Sump holes may be dug in the bottom of the trench, off center of the pipe, for the purpose of keeping the pump suction below the gradient of the bottom of the pipe. No pipe shall be laid in water or when, in the opinion of the Inspector or Superintendent, conditions are not suitable for laying.

#### **4.9.3.4 Cutting Pipe**

Any pipe, which must necessarily be cut on the job in order to put fittings, valves or other accessories in the proper place, shall be done in a workmanlike manner satisfactory to the Association. In case of "push-on" joint pipe, proper chamfering must be done on the ends of any cut pipe before an attempt is made to enter it into a bell. In the case of mechanical joints, a smooth, square, neat cut must be made and it must be painted with approved material before making up the joint. On Ductile iron pipe a saw or abrasive wheel

type of equipment shall be used. On cast iron pipe smaller than 12", wheel cutters or other approved method may be used, but in no case shall any cement lining of iron pipe be harmed in the cutting, and the raw edge of the cement lining, as well as the iron pipe itself, shall be sealed by proper coating. No so-called "cold cutters" will be allowed on the job. All cuts shall be square and even, with no ragged, rough ends. Any unevenness shall be ground smooth.

#### **4.9.3.5 Bell Ends To Face Direction Of Laying**

The pipe shall be laid with the bell ends facing the direction of the laying, unless otherwise permitted by the Association.

#### **4.9.3.6 Blocking**

Permanent blocking necessary to support the pipe in the trench shall be done only with specific authorization and approval of the Association. Temporary blocking under valves and fittings for support prior to the building of permanent supports or anchors is allowed.

#### **4.9.3.7 Jointing Of Pipe**

All joint areas on the pipe shall be cleaned and free from irregularities before an attempt is made to make up any joints. Joints, when made, shall be done in the manner prescribed by the manufacturer of the pipe. In the case of rubber gasket joints, these joints shall be made up in accordance with the American Standard specifications for the jointing of cast iron pressure pipe and fittings. ASA #A21.11 (AWWA #C111).

On "Mechanical Joints", on 16" and larger pipe, all bolts shall be retightened with a proper torque wrench no sooner than 24 hours after the original tightening.

In the case of flanged joints, flange faces shall be thoroughly cleaned before making up such joints, so that no paint globs or any other projections or rust or other foreign matter remain on the faces of the flanges and that they are smooth, clean iron. Bolts and nuts shall be tightened evenly, being tightened in pairs on opposite sides of the pipe, until all are equally torqued. When completely tightened, the bolts should be long enough so that all nuts are "full". All bare metal shall be coated with suitable bituminous paint, and before backfilling, this material shall be dry and hard.

#### **4.9.3.8 Permissible Deflection of Joints**

Whenever it may be necessary to deflect pipe from a straight line, either vertically, horizontally, or other direction to change the direction of laying, in all sizes 12" and smaller, the allowable deflection shall be 3 degrees per joint, or 16 inches per 20' length; in larger sizes, 1 1/2 degrees, or 6 inches per 20' length. Every possible precaution shall be taken to be sure that each joint is properly made up and that the pipe is "home".

#### **4.9.3.9 Setting Valves & Fittings**

All valves, fittings, plugs and/or caps shall be set and jointed into the pipe, and blocked and anchored as shown on the plans. The location of these features along the line shall be in accordance with the general plans for the pipeline. Any unconnected outlets shall be valved and securely plugged with adequate and appropriate pipe plugs or blind flanges, as called for on the plans. 'Mechanical Joint' bends; plugs, and caps shall be restrained with AWWA approved restrainer.

#### **4.9.3.10 Valve Boxes**

All valves 12" and smaller shall be fitted with a standard valve box set at the proper elevation on the valve and concentric with the operating nut, straight, square and plumb. The top shall be set to the proper surface grade and, after backfilling and settlement have taken place, these valve box top sections shall be straightened, reset or adjusted as necessary. All valves shall be supplied with proper boxes and/or chambers, as called for in the plans and these specifications. At least two permanent location measurements to the valve must be obtained. Backfill around valve boxes shall be mechanically tamped within a five-foot radius of the valve box. Backfill at valve chambers shall be mechanically tamped for a distance of 30 feet along the trench, both upstream and downstream from the ends of the chamber.

#### **4.9.3.11 Hydrants**

Hydrants shall be installed with the frangible coupling set 3" above finish grade in accordance with the Association's standard. Hydrants will be set straight, square and plumb. Hydrant tee and the hydrant boot shall be appropriately braced. Trenching for hydrant and branch shall be done in accordance with Section 2 herein. All appurtenant piping and jointing shall be done in accordance with Section 3 herein.

#### **4.9.3.12 Services**

Services shall be tapped on the side of the main at ten or two O'clock in accordance with the Association standard. Service piping shall be a minimum one-inch Virgin Polyethylene Endot EndoPure PE 3408-200 PSI or K Copper tubing and conform to the Maine State Plumbing Code for buried cold water service lines. Standard corporations shall be cc type. Enough slack shall be placed in the material to prevent stretching or pulling from main. A service shut off (curb stop) with rod shall be placed in a service box on the sideline of the right-of-way. Any service box located in a paved area shall be installed inside a full sized gate box top section. At least two permanent location measurements to the service shut off must be obtained. Services shall have 5-1/2 feet of cover. Services shall be installed at the center of the lot to be served. The only exception will be when a foundation is already on the lot. In that case, the service can be installed anywhere along the foundation frontage to the road. One and a half and two-inch corporations shall be threaded into an approved tapping saddle. Trenching and backfilling shall be done in accordance with Sections 2 and 4 herein. All domestic services 2" and larger shall require chlorination/dechlorination. Service lines starting from the water main to the first curb stop or to the first property line of the customer closes to the main, are the property and responsibility of the Sugarloaf Water Association. The customer is responsible to maintain its portion of the service line free of leakage and obstruction from the footprint of the building out to the furthest curb stop, or to the customer property line. Sugarloaf Water Association is not responsible for private water line or private water systems.

#### **4.9.3.13 Protective Wrapping**

Where shown on the plans, special plastic sleeves or envelopes shall be slipped over the pipe and sealed together with plastic adhesive tape. Care shall be exercised such that these sleeves shall be intact and sealed together when backfill is placed, and during the backfill operation, likewise, care shall be taken not to puncture the material.

#### **4.9.3.14 Pipe Endings**

ALL dead-end sections of pipe shall end with a hydrant where possible; otherwise a blow off. This shall

include all stubs (including fire services 4" and larger) as well as the main runs.

#### **4.9.3.15 Abandoning Pipe**

All abandoned water mains shall be terminated with a mechanical joint cap or push-on plug. No brick and mortar will be allowed.

### *4.9.4 BACKFILLING*

#### **4.9.4.1 Material**

All backfill material shall be free from cinders, ashes, refuse, organic matter, boulders, rocks, stones or other material which, in the opinion of the Association, is unsuitable for the purpose. However, from two foot above the top of the pipe to the top of the trench, material-containing stones up to 6" in their greatest dimension may be used unless otherwise directed by the Association. When the type of backfill material is not otherwise specified on the drawings, the material excavated from the trench may be used as backfill upon its approval by the Association, provided that unsuitable stone, etc., as above, are sorted out. Where any specific type of backfill material is indicated on the plans, such notation shall be followed and native material will be hauled away and disposed of to make way for the specified material. Pipe in ledge trench is to be backfilled with select material.

#### **4.9.4.2 Backfill In Right-Of-Way (Untraveled)**

From a point one foot above the pipe to the surface, backfill material may be placed by machine, but shall be worked over in such a manner as to minimize future settlement of this material. The backfill material shall be mounded up to an excess depth of 3" to 6" over the trench to allow for future settlement, and before the Contractor finishes and the job is accepted, this situation shall be reviewed and any necessary fill added so that there is no depression left due to settlement of the trench at any point. The above is the minimum requirement, and when street requirements are more stringent, such requirements shall be met.

#### **4.9.4.3 Backfill Within Public Streets, and Traveled Areas**

Where the trench crosses or follows streets or other areas such as driveways, parking areas, etc., or wherever there will be vehicular traffic with or without a pavement over the trench the backfill from a point one foot above the pipe shall be placed in 8" layers and each layer compacted to the satisfaction of the Association. Compaction of granular material shall be by means of a mechanical vibratory compactor. Other material shall be compacted by pneumatic or other mechanical compaction methods. In all cases a gravel or stone base shall be placed to a depth at least equal to the existing road base, but in no case less than one foot of depth.

#### **4.9.4.4 Backfill In Ledge Trenches**

Backfill in ledge trench shall be either sand or fine gravel, but in cases where corrosive conditions may prevail due to the type of ledge or other material which has been excavated, clay may be specified on the plans or by the inspector or superintendent. In cases where granular material is used, a complete clay dam shall be put in the backfill at least every 100' along the trench where the surface gradient is other than horizontal.

#### **4.9.4.5 Backfilling – Structures**

The excavation for thrust blocks and other structures shall be refilled with such of the excavated materials



and in such order as may from time to time be directed by the Association inspector. Whenever the excavated materials are unsuitable, the Contractor shall furnish suitable backfill materials. This material shall be a uniformly graded bankrun gravel having no stones larger than 6 inches.

The backfill around structures must be carefully placed in layers not to exceed 8" and tamped and brought up evenly around all sides of the structure. The material shall be thoroughly tamped with mechanical or vibratory compactors and water added, if necessary, to obtain 90 percent laboratory density as determined by the Standard Method of Test for Compaction and Density of Soils AASHTO Designation T-99.

Backfilling around pipes outside the structures shall be in accordance with the pipe laying specifications.

#### **4.9.4.6 Operation In Freezing Weather**

In freezing weather, no backfill material which is frozen shall be placed in the trench, but if backfilling must be done, new unfrozen material must be brought to the site and the frozen material disposed of elsewhere.

Should the excavation take place in sustained periods of freezing weather, the sides and bottom of the trench shall be protected to prevent freezing of the material to the satisfaction of the Association.

#### **4.9.4.7 Open Trench**

Backfilling shall follow pipe laying as closely as reasonable, so that a minimum of trench shall be open at any time. Over night, and especially over weekends and holidays, the amount of open trench shall be kept at an absolute minimum. Any caved-in trench, especially after heavy rain and flooding, shall be cleaned out and the bottom consolidated before any additional pipe shall be laid.

### **4.9.5 FILLING AND TESTING**

- Upon completion of backfilling, the Contractor shall fill the pipeline with water from the Sugarloaf Water Association's system and conduct a pressure and leakage test in accordance with Section 4 of AWWA Standard C600-82 and the following procedures.
- The Contractor shall not operate any existing Association valves for filling, flushing or testing the new main. Sugarloaf Water Association will, upon a 48hour notice of the Contractor, furnish men and equipment for such activity.
- Under the inspection of the Association, the Contractor shall slowly fill the new main and ensure that all air has been expelled from the main, hydrants, air valves and service leads. Once all air is expelled, the Contractor shall flush the new main at a minimum velocity of 2.5 feet per second to remove any particulate matter. In the event a fire hydrant is used for flushing the complete valve assembly will be removed before flushing begins. The Contractor shall be responsible for all dechlorination and disposal of all flushing water and providing any necessary hoses or equipment for flushing and prevent unnecessary erosion.
- The Contractor shall excavate and provide a tap for pressure and leak testing and chlorination. The chlorine tap shall be installed within ten feet of the source if practical. Otherwise, install the tap immediately outside of existing pavement. The Contractor is responsible for all work associated

with the excavation, including proper trench protection, barricades, traffic control and proper backfilling and compaction upon successful completion of the test.

- The Contractor shall conduct the pressure and leak test and provide the required testing equipment after the new main has been properly filled and flushed, unless otherwise arranged with the Association.

The pressure and leak test shall be conducted as follows:

- Purge all air from the line.
- Decrease pressure in the main to be tested approximately 20 p.s.i. Observe test gauge to ensure the pressure doesn't rise due an existing valve or tapping valve leaking by. This is done to ensure that no undisinfected water from the installed main enters the existing main while performing the actual test.
- A pressure test pump will be connected to the new main at the testing point. The pressure will be slowly increased to 150 psi and allowed to stabilize (+/- 2.5 psi) for a minimum of 15 minutes.
- A reservoir of potable water shall be connected to the test pump and the initial level of water recorded.
- The pump pressure shall be maintained at 150 psi for one hour with all makeup water withdrawn from the reservoir.
- After one hour, the water level in the reservoir will be measured and the volume of water drawn from the reservoir calculated and compared with the following allowable leakage:
  - Allowable leakage in Gallons Per Hour =  $(\text{Pipe Length}^{\text{Feet}} \times \text{Nominal Diameter}^{\text{Inch}}) / 10,900$
- If any test discloses leakage greater than that specified above, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance. No repair clamps of any kind will be allowed. Repair shall consist of removing leaking section and replacing with couplings and pipe.

#### 4.9.6 DISINFECTION

##### 4.9.6.1 Scope

This specification becomes a standard part of the contract documents and covers the disinfecting and flushing of water mains within the Sugarloaf Water Association distribution system. Unless specified otherwise, all procedures apply to new mains, cleaned mains, cleaned and relined mains, repaired mains, and mains which have been out of service for a long period of time.

In certain circumstances, the Superintendent or designee may waive or alter the requirements in this specification where it is determined that no reasonable threat of contamination constituting a health hazard or aesthetic deterioration exists in the water main in question.

#### 4.9.6.2 Keeping the Pipe Clean and Dry

Precautions shall be taken by the Contractor to protect the interiors of pipes, fittings, and valves against contamination:

- Pipe delivered for construction shall be strung and protected so as to prevent entrance of any foreign material.
- Pipe shall not be laid in water, or when trench conditions or weather conditions are unsuitable for such work.
- All openings in the pipeline shall be closed with watertight plugs while pipe laying and at the close of the day's work or for other reasons.
- Joints of all pipes in the trench shall be completed before work is stopped.
- The surface of the joint rings shall be thoroughly cleaned with an approved soap solution and all foreign matter removed from the pipe and fittings before the pipe is lowered in the trench.
- If dirt enters the pipe, it shall be removed and the interior of all affected pipe and fittings shall be swabbed with a 5% Hypochlorite solution or other commercially available household bleach immediately before they are installed.
- Pipes and services in the ground shall be closed off when not under construction.

#### 4.9.6.3 Pre-Flushing

The Association shall flush the source water, as near the shut off as possible prior to tying-in to ensure that contaminants or debris are not introduced into the new pipe.

#### 4.9.6.4 Flushing

The main shall be flushed through a hydrant at the end of the main at a velocity not less than 2.5 ft./sec. If no hydrant is installed at the end of the main, the Contractor shall provide a tap large enough to develop a velocity in the main of at least 2.5 ft./sec. The gallons per minute to achieve 2.5 ft./sec velocities for different diameter pipes are provided in Table 1.

Main Size (in.)	Gallons per minute
6	200
8	400
12	900
16	16000

*Table 1 Gallons per minute required to obtain 2.5 feet per second flushing velocity*

Association water at no cost to the Contractor will be available to the work site for use in disinfecting and

flushing mains. The Contractor shall furnish all necessary pipe and hose connections. The Contractor shall exercise care in the use of the water to prevent contamination of the existing water supply. Measures shall be taken prior to flushing to provide adequate drainage during flushing. Drainage shall be away from the main, and flooding of the trench shall be prevented. The volume of water flushed shall be measured or calculated and reported to the Association Inspector.

Wherever the conditions allow, the new water main shall be kept isolated from the active distribution system until satisfactory bacteriological testing has been completed and the disinfectant water flushed out.

#### **4.9.6.5 Methods of Disinfection**

The Contractor shall disinfect all portions of the water main that was worked on as well as any portion(s) of the network that was taken out-of-service to allow completion of the contract. The chlorine solution to be used may be made from Calcium or Sodium Hypochlorite.

The Contractor must completely fill out a request for the sanitary release of the pipeline on the appropriate Sugarloaf Water Association form. On the reverse side of the request form a sketch shall clearly illustrate:

- The section, size, and location of the pipeline for which the request for sanitary release is made
- The existing main where the new main was connected
- The point of application of the chlorine-water solution
- The location, type, and size of the sampling points
- Which valves connected to the new location of pipeline is to be open and/or closed during the sampling.

**NOTE** – The Contractor shall obtain a signature of approval from the Superintendent for final sanitary release.

##### *4.9.6.5.1 Continuous Feed Method*

The continuous feed method consists of completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and filling the main with chlorinated potable water so that after a 24±4-hour holding period in the main there will be a free chlorine residual of not less than 10 mg/L at all locations of the main.

Prior to being chlorinated, the main shall be filled to eliminate air pockets and shall be flushed to remove particulates. The flushing velocity in the main shall be not less than 2.5 ft/sec unless the Superintendent or designee determines that conditions do not permit the required flow to be discharged to waste.

**NOTE** – Flushing is no substitute for preventive measures during construction.

At a point not more than 10 ft. downstream from the beginning of a new main, water entering the new main shall receive a dose of chlorine pumped at a constant rate such that the water at any location will have not less than 25 mg/L of chlorine. To assure that this concentration is provided, the Association representative

shall measure the chlorine concentration at regular intervals at available blow-offs or hydrants in accordance with procedures described in the current editions of “Standard Methods for the Examination of Water and Wastewater” or using an appropriate chlorine test kit.

Table 2 gives the amount of chlorine required for each 100 ft. of pipe of various diameters. Solutions of 1% chlorine may be prepared with Sodium Hypochlorite or Calcium Hypochlorite. During the application of chlorine, valves shall be closed so that the strong chlorine solution in the main being treated will not flow into water mains in active service. Chlorine application shall not cease until the entire main is filled with heavily chlorinated water. The chlorinated water shall be retained in the main for at least 24±4 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24±4-hour period, the treated water in all the portions of the main shall have a residual of not less than 10 mg/L of free chlorine.

<b>Pipe size (in.)</b>	<b>Volume Gallons in 100 feet of Pipe</b>	<b>15% Chlorine solution Gallons in 100 feet of Pipe</b>	<b>1% Chlorine solution Gallons in 100 feet of Pipe</b>
4	65	2 oz.	0.2 (1 ½ pts)
6	150	3 oz.	0.4 (2 ½ qts)
8	260	5 oz.	0.6(1 ½ qts)
10	410	1 cup	1.0 Gal
12	590	1 pint	1.4
16	920	1 quart	2.3
24	2350	1 ½ Quarts	5.8
30	3680	2 ½ Quarts	9.1
36	5290	0.9	13.0
42	7200	1.2	18.0
48	9400	1.5	23.0
54	11900	2.0	30.0
60	14690	2.5	36.0

*Table 2 Chlorine Required to Produce 25 mg/L Concentration in 100 feet of Pipe by diameter*

**NOTE:** To make 1% chlorine solution using HTH granular Calcium Hypochlorite add 1 pound of Calcium Hypochlorite to 8 gallons of water. Using Sodium Hypochlorite, dilute the hypochlorite according to the percent available chlorine on the container. For example, if you have 5% household bleach, place 1 gallon

in 4 gallons of water. You then have 5 gallons of 1% solution.

#### **4.9.6.5.2 Slug Method (Emergency Use Only)**

At a point not more than 10 ft. downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 100 mg/L of free chlorine. To assure that this concentration is provided, the Association representative shall measure the chlorine concentration at regular intervals along the main where taps and/or hydrants have been provided. The chlorine shall be applied continuously and for sufficient period to develop a solid column or 'slug' of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L for at least 3 hours.

The free chlorine residual shall be measured in the slug as it moves through the main. If at any time it drops below 50 mg/L, the Contractor shall stop the flow, chlorination equipment shall be relocated at the head of the slug, and as flow is resumed, chlorine shall be applied to restore the free chlorine in the slug to not less than 100 mg/L.

As the chlorinated water flows past fittings and valves, related valves and hydrants shall be operated so as to disinfect appurtenances and pipe branches.

#### **4.9.6.6 Flushing After Disinfection**

After the applicable retention period, the heavily chlorinated water shall be flushed from the main into the sewer until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system. Where domestic sewers are not available, the heavily chlorinate shall be dechlorinated. The replacement water shall be allowed to remain in the pipeline for 24 hrs.(+/- 4 hrs.) prior to sampling for physical, bacteriological, and chemical testing.

#### **4.9.6.7 Analytical Tests**

After the appropriate retention time (24±4 hours or 3 hours for the slug method), after flushing and before the water main is placed into service, a sample or samples shall be collected for sanitary analysis by the Contractor with an Association representative present. Suitable sample piping shall be furnished by the Contractor to allow sample collection. The sampling point or points shall provide samples, which are representative of the water in all sections of the main for which sanitary approval is requested. All samples shall be collected in a manner as to avoid contamination from the environment surrounding the main. Rubber or synthetic hose shall not be connected to the main to collect a representative sample. The area around the sampling point of the main shall not be filled with water. At least one sample shall be taken from each main, and in the case where a main is greater than 1000 feet, one sample from each 500 feet of line. The samples shall be submitted to the Approved Laboratory for bacteriological, chemical, and physical analysis. The following analyses shall be completed and reported on submitting the original laboratory form. Total chlorine residual, Total Coliform (Membrane Filtration method), pH, and turbidity.

#### **4.9.6.8 Final Flushing**

Disinfected water mains shall be flushed within 4 hours of being placed into service. Flushing shall be designed to restore water quality to that of the source water, immediately prior to being placed into service. The length of time of flushing shall depend on the size and length of the water main, however at least three volumes of water should flow through the entire length of the main. Pipe volumes can be

calculated by using Table 2 and adjusting for the full length of the main.

#### **4.9.6.9 Redisinfection**

If the initial disinfection and flushing fail to produce satisfactory analytical results, the main may be reflashed and shall be resampled. If check samples show the presence of coliform organisms, then the main shall be rechlorinated by the Contractor, using the continuous feed method of chlorination, until satisfactory results are obtained.

#### **4.9.6.10 Dechlorination**

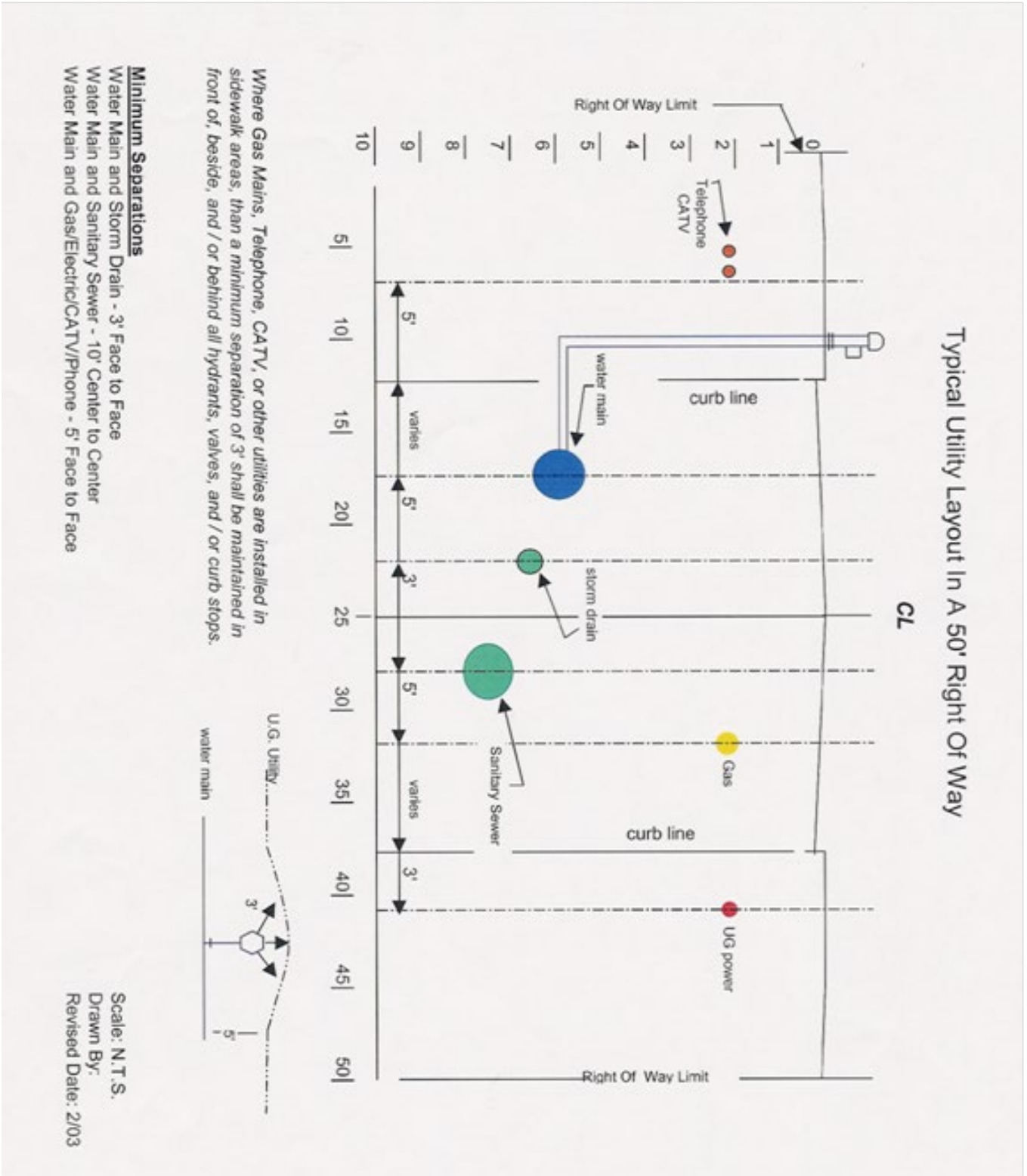
Contact the local sewer authority before discharging the highly chlorinated water to the sewer. The discharge of water to the environment with chlorine concentrations greater than the ambient distribution system chlorine residual is prohibited. The highly chlorinated water must be dechlorinated before being discharged to the environment. The method of dechlorination is at the discretion of the contractor as long as the procedure does not cause harm to the environment.

## 5 TAMPERING WITH WATER UTILITIES

Did you know that tampering with water utilities property is now a Federal Crime? No water service valve, system valve, water line, pump, motor, water meter, backflow device, fire hydrant, or any other system appurtenance etc. that is the property of the water dept. will be opened or closed or otherwise operated, by any other than persons authorized by the utility company. Any person, who is not an employee of the Water Dept. or does not have the expressed authorization of the water dept, and who is caught tampering with any water service valve, system valve, water line, pump, motor, water meter, backflow device, fire hydrant, or any other system appurtenance etc. will be subject to Federal Terrorist Laws, State Of Maine governing illegal use of, or tampering with a public water system, along with the water dept. first offence fine of \$1000.00.



# 6 TYPICAL UTILITY LAYOUT IN A 50' RIGHT OF WAY



# 7 NEW SERVICE APPLICATION

Date \_\_\_/\_\_\_/\_\_\_ Telephone # (\_\_\_) \_\_\_-\_\_\_-\_\_\_  
Name \_\_\_\_\_ Building Permit # \_\_\_\_\_  
Address \_\_\_\_\_ Permitted Bedrooms \_\_\_\_\_  
State \_\_\_\_\_ Service size Request \_\_\_\_\_  
Lot # \_\_\_\_\_ Location \_\_\_\_\_

### Property Location

Does the property have frontage on existing association distribution mains? Yes No

### Fire Protection

Is the applicant's property within the accepted associations and towns standards for distance (500') from an existing fire hydrant? Yes No

Does the existing fire protection provide the flow necessary to protect the proposed structures or any other conceivable structures the project could be expected to have built? Yes No

### Service Demands

Do the service demand requirements fall within the capabilities of the existing system capabilities? Yes No

### System Interest

Is the property a large parcel, which could conceivably be subdivided in the future? Yes No

Is the property one that the system demands could conceivably change in the future? Yes No

Is the property adjacent to other developable properties, such that these properties would be best served either directly or indirectly by a main extension also serving the applicants property? Yes No

Does the applicant's property fall within a limited service zone? Yes No

Is the property part of an approved subdivision or development? Yes No

Is the application in any other way detrimental to the proper development of the water system? Yes No

Is the application for an establishment that could be termed temporary? Yes No

If these issues can be addressed by a no answer then the application may be served via a simple service connection.

If any of these issues are answered by a yes, service must be rendered by a main extension of proper size, complete with all appurtenances and features necessary for proper and adequate service as deemed necessary by the association operations staff in accordance with Industry Standards and Practices.

# 8 SEPARATION OF WATER MAIN AND SEWERS

