

RICHMOND UTILITIES DISTRICT

WATER MAIN GENERAL SPECIFICATIONS

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Approved – October 15, 2003

1st Revision – September 20, 2006

2nd Revision – May 13, 2021

RICHMOND UTILITIES DISTRICT

WATER MAIN GENERAL SPECIFICATIONS

I. GENERAL

All water main work shall be completed in accordance with Richmond Utilities District (RUD) specifications and as shown on the approved plans and outlined herein.

II. LOCATION

1. Pipe shall be installed so that top of pipe will be at least 5 feet below finished grade.
2. The pipe shall be located within the right-of-way or as otherwise directed by RUD. Case by case determinations will be made by the RUD for other conditions.
3. The water main shall not be installed within 10 feet horizontally of any other underground utility line, including but not limited to sewer, power, telephone, and cable TV. Lateral utility crossings will be allowed on case by case basis and will be installed as specified by the RUD.
4. Lateral phone and cable TV crossings will be encased in Schedule 40 PVC conduit within 10 feet of the water main in all directions.
5. Any electric utility lines within 10 feet of the water main, whether or not a lateral crossing, will be encased in conduit; schedule 40 PVC for low voltage service lines and steel conduit for all others.

III. PRE- CONSTRUCTION

1. Stakes, pins, or other suitable markers shall be placed on the right-of-way line at sufficient points to ensure proper alignment of the water main. Said vertical and horizontal field information will be inspected and approved by RUD prior to start-up.
2. A listing of all material suppliers will be submitted to the RUD for approval Prior to any construction
3. The contractor shall inspect all materials before installation and shall notify the RUD prior to any construction.
4. Pre-blast survey conducted and approved.
5. A pre-construction conference shall be held between RUD and the contractor/owner prior to start-up.
6. The Contractor is required by law to contact Dig-Safe at least 3 business days prior to beginning any excavation work.
7. Project drawings showing existing structures and utilities, drawn to scale, must be submitted to RUD for review at least 1 month before construction is scheduled to commence.

IV. MATERIAL SPECIFICATIONS

Bolts and Nuts

Cor-Ten Steel T bolts for hot soil areas M/J fittings; #316 stainless steel for flange fittings; Grade 5 bolts A307B heavy head bolt/heavy duty nuts.

Valve Boxes

North American made Tyler, Bibby or equal; standard Style 3 basic component; cover marked WATER.

5-foot bury, 5-1/4 slide type top section; belled base section 36 inches long.

Service Boxes/Foot Pieces

North American made Tyler, Bibby or equal; 1 inch, 5-1/2 foot bury slide type riser, cover with solid brass plug, pentagon head with rope thread Erie style.

Foot pieces: North American made Tyler, Bibby or equal, for 1-1/4 inch to 2-inch valves.

Rods

5/8 inch #316 stainless steel for 1-1/2 inch and larger ball valves;

1/2 inch #316 stainless steel for 3/4 inch and 1 inch ball valves.

Stainless Steel cotter pins

Copper Tubing

Copper Tubing shall be Type K as manufactured by Revere or Bridgeport Brass, or approved equal. Tubing shall conform to ASTM B-88 and AWWA C-800. Individual house services shall be 3/4" in diameter, unless specified differently by RUD.

P.E. Tubing

Polyethylene tubing shall be copper tube size polyethylene pipe. Tubing shall have a working pressure rating of 200 p.s.i. Insert stiffeners shall be stainless steel and shall be used at all compression connections.

Corporation Stops

Ford, Mueller or equal AWWA taper thread (CC) inlet by Pack-Joint outlet for copper/CTS plastic.

Service Saddles

Nylon/epoxy coated D.I. body with 2 stainless steel straps; ¾ inch to 2 inch with AWWA taper thread (CC) outlet thread. Manufactures: Ford, Romac, Rockwell, Mueller, Smith-Blair.

Service Brass/Miscellaneous Brass

½ inch to 2-inch Ford, Mueller or equal, All pack joint (no flare).

Fittings: Bends, Tees, Solid Sleeves*

Ductile iron - U.S. made M/J compact Class 350 cement-lined C-153.

Cast iron- U.S. made M/J Class 250, C110.

*Note: solid sleeves shall be long-body only.

Cut-in Sleeves - M/J Clow #349 or Mueller #840.

Valves - M/J

Cut-in valves:

Clow Resilient Wedge #F-6111 open left w/stainless steel nuts/bolts

Mueller Resilient Wedge #C-2360-44 open left w/stainless steel nuts/bolts

Tapping valves:

Clow Resilient Wedge #F-6114 open left w/stainless steel nuts/bolts

Mueller Resilient Wedge #T-2360-16 open left w/stainless steel nuts/bolts

Gate Valves:

Clow Resilient Wedge #F-6100 open left w/stainless steel nuts/bolts

Mueller Resilient Wedge #T-2360-20 open left w/stainless steel nuts/bolts

Tapping Sleeves

M/J : Clow # F-5205 or Mueller H-842 for sizes 4 inch through 12 inch

JCM all-stainless steel #432 for 16 inch through 20 inch

Fire Hydrants

Waterous, American Darling, Eddy, or approved equal - 2 hose nozzles and pumper nozzle.

Plugged drain hole. Open right. Minimum 5 ¼" valve opening

Mechanical Joint Restraints

EBBA IRON "Megalug", Uniflange Series 1400 or approved equal.

D.I. Pipe

2 inch through 12 inch, Class 52 double-cement-lined. Push-on joint.

16 inch through 20 inch, Class 51 double-cement-lined . Push-on joint.

Manufacturers: Atlantic States, U.S. Pipe, Griffin.

Couplings

Couplings shall be used in new piping connections and to make repairs to existing utilities.

Couplings may be straight, transition, reducing or repair type couplings.

1. Cast Couplings

Cast couplings shall have ductile iron sleeves and follower flanges per ASTM A-536. Sleeve ends shall have a smooth inside taper for uniform gasket sealing. Follower flanges shall be designed for a high strength/weight ratio. Bolts shall be high strength low alloy steel bolts per ASTM A-325 with heavy, semi-finished hexagon nuts per ASTM A-5563 and AWWA C111. When specified on the drawings, nuts and bolts shall be 316 Stainless Steel. Gaskets shall be virgin SBR compounded for water service. Gaskets shall meet ASTM D2000 3 BA715.

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Sleeves and follower flanges shall be painted with shopcoat enamel. When specified on the drawings, epoxy coated sleeves and flanges shall be provided.

Cast coupling center sleeves lengths shall be as shown in the following table.

Pipe	4"		6" & 8"		10" & 12"		over 12"
Minimum Center Sleeve Length	5"		7"		10"		12"

Acceptable manufacturers of cast couplings shall be Viking Johnson (Maxifit), Smith-Blair, Rockwell, Dresser, Romac or approved equal.

2. Solid Sleeves

Solid sleeves shall be ductile iron Class 350 mechanical joint fillings per 02701.02B.

Solid Sleeves shall be "long" type (12" minimum length).

V. INSTALLATION

1. Pipe, fittings, valves, hydrants, and associated appurtenances shall be installed in accordance with the latest American Water Works Association Standards.
2. Fittings and hydrants shall be blocked for horizontal and/or vertical movement in accordance with American Water Works Association Standards.
3. All gate boxes shall be properly installed and raised to grade at the completion of paving operations.
4. If the water main should be laid across an area where there is or will be a culvert, the trench dimensions will be such that the water main will have at least one foot clearance over the culvert and 5 feet of cover; or 2 feet clearance between the top of the water main and bottom of the culvert, with sufficient insulation equal to 5 feet of cover
5. The trench will be kept dewatered during pipe laying.

VI. BEDDING

1. Enough bedding is needed to place 6 inches under pipe and to fill both sides of trench to a compacted elevation of 6 inches above top of pipe. All bedding material to be compacted.
2. Bedding material shall be granular sand meeting the following requirements:
 - 100 percent passing a 2-inch sieve
 - 0 to 5 percent passing a No. 200 mesh sieve

VII. QUALITY CONTROL

1. GENERAL

The Contractor shall at all times be responsible for maintaining all disturbed areas of the job site. This is to include periods of work suspended due to cold weather. When RUD recognizes defective conditions the Contractor shall be notified. The Contractor will be given a reasonable amount of time, depending on the degree of the problem, to correct the condition. Examples of defective conditions shall include, but not necessarily be limited to, trench settlement, erosion, pot holes, washouts, etc.

2. CONSTRUCTION MATERIALS

It is the Contractor's sole responsibility to provide and use only new material, new products and new equipment that meet the requirements of RUD and will result in a completed project that is durable and of high quality in all respects. RUD may request samples of any material that the Contractor proposes to use. Such samples shall be of sufficient size and quantity to allow appropriate testing of the sample. RUD shall bear all cost of obtaining and providing such sample. RUD shall bear all cost of testing the sample. However, if testing shows that a sample does not meet the requirements of the plans and specifications, The Contractor shall reimburse RUD for all costs incurred by RUD as a result of testing the sample.

The Contractor shall provide equipment and parts from a single manufacturer to the greatest extent possible. This is to facilitate ease of service, maintenance and parts replacement. RUD reserves the right to reject proposed equipment from various manufacturers if suitable materials are available from fewer manufacturers, and to require that source of materials be unified to the maximum extent possible.

3. CONSTRUCTION REVIEW

RUD or it's representative will provide whatever Construction Review that he or she feels is necessary. Such Construction Review in no way reduces the Contractor's responsibility for supervision or quality control. The Contractor shall cooperate fully in RUD's Construction Review efforts. The Contractor shall keep RUD informed of work in progress as well as the schedule of work to be done . The Contractor shall allow complete access to the project by the RUD, and any representatives of any regulatory or funding agencies.

4. TESTING

The Contractor shall perform all testing specified in the contract documents unless the test is specifically noted to be done by RUD. The Contractor shall notify RUD at least 48 hours in advance for the proposed testing time. Testing and disinfection times must be coordinated so that samples can be delivered to labs and tested properly. In general, Fridays and weekends are not acceptable times for testing and sampling. RUD shall collect all bacteriological samples and deliver them to the lab.

VIII. TEMPORARY SERVICES AND CONNECTIONS

1. GENERAL

Furnish all labor, materials and equipment required to provide temporary connections, temporary relocations and temporary service required for completion of the project.

2. TEMPORARY WATER SERVICES

The Contractor shall be responsible for maintaining water service to customers at all times. If temporary water service is needed, they shall be installed at the Contractor's expense.

Temporary water service methods, materials and connections must be approved by the local water utility. In general, temporary water services shall consist of a temporary polyethylene main and service installed above ground between fire hydrants or temporary taps. The temporary main shall be of adequate size to service the customers. All street and driveway crossings shall be protected from traffic.

All temporary piping shall be disinfected by the Contractor and approved by the local water utility prior to being put into service.

All temporary piping and taps shall be removed once the temporary services are no longer needed.

3. TEMPORARY CONNECTIONS

The Contractor shall make all temporary connections necessary for the proper completion of the project. The temporary connections shall be maintained by the Contractor until no longer needed and then they shall be removed with fittings properly capped and holes properly plugged and grouted.

IX. DUST CONTROL

1. GENERAL

Furnish all labor, materials and equipment necessary to control dust caused by work related to this project. Dust control (water and calcium chloride) shall proceed concurrently with pipe installation.

When notified by RUD that dust is causing problems, the Contractor shall immediately implement approved dust control procedures.

2. MATERIALS

Water for sprinkling shall be clean, free of salt, oil or other injurious matter.

Calcium chloride shall conform to the requirements of AASHO M144 (ASTM D 98).

3. CONSTRUCTION METHODS

All paved areas in the vicinity of trenches shall be swept at the end of each working day. Excavated material shall not be placed directly on gravel or paved surfaces.

Apply by approved methods and with equipment including a tank with gauge equipped pressure pump and spray bar, dispersing water through nozzles at 20 psi or more.

Apply calcium chloride at a rate sufficient to maintain a damp surface, but low enough to assure non-contamination of water courses. **Calcium chloride shall not be applied to paved surfaces.**

X. BACKFILLING

1. Backfilling shall be defined as replacement and compaction of soil in excavation for the purposes of protecting underground construction, maintaining grades, or providing stable foundation material for above ground construction
2. Generally the excavated soil shall be suitable as backfill and shall be replaced in the excavation. Exceptions include frozen fill, fill containing large stones, stumps or other rubble, and any material deemed unsuitable by the Engineer.

Replacement material for ledge shall be considered incidental to the ledge removal cost.

3. Backfilling shall proceed as soon as possible after underground construction has been completed. Backfill shall be extended to the grade indicated on the plans, compacted and graded.

Fill material shall be placed in layers not to exceed 12" and compacted to a density equal to at least 95% of the optimum density determined by the modified proctor test. Compacting may be done by vibrating compactor or roller.

The Contractor shall take care not to damage or disturb any structure, including his own, during backfilling and compaction. The Contractor shall be held liable for any such damage.

Excavations in paved areas shall be paved according to specifications as soon as possible. Other areas shall be loamed and seeded or otherwise restored to a condition equal to or better than that of adjacent areas as soon as possible.

The Contractor shall not withdraw any sheeting without the approval of the Engineer. All voids created by such removal shall be filled and compacted. Any backfilling which does not conform

to these specifications, or which settles differentially, shall be excavated to a depth sufficient to correct the problem and refilled as required. Any pavement or structure which is damaged due to settlement of backfill shall be repaired by the Contractor at his expense.

XI. CLEANUP

Maintain all work areas and all haul routes in a neat and orderly condition. Cleanup is incidental to the appropriate items of the contract.

Remove all debris and surplus material resulting from the work, and maintain all property, both public and private, in a condition acceptable to the party having jurisdiction.

Cleanup includes: removal of all debris and surplus material' replacement and repair of all removed or damaged structures, properties and vegetation to their pre-construction condition; restoration of areas to final grade and contour.

Cleanup of trench areas shall be done concurrently with pipe installation (on a daily basis). When notified by RUD that cleanup is not acceptable, pipe installation shall cease and all efforts shall center on cleanup. No compensation shall be paid the Contractor because of the stopping of the pipe installation for cleanup.

XII. TRENCH INSULATION

1. Materials

Trench insulation shall be extruded polystyrene plastic foam insulation board equal to STYROFOAM brand as manufactured by the Dow Chemical Company and as meeting ASTM C-578 Type IV. Insulation shall be Dow STYROFOAM T&G, or Owens Corning Foamular 250 T&G, or equal. Insulation shall be 3" thick and have a minimum compression strength of 25 psi (ASTM D-1621).

2. Installation

The insulation shall be a minimum of 2 feet wide and shall extend a minimum of 6" beyond the outside edge of the pipe. The insulation thickness shall be 2 inch unless otherwise specified on the drawings or required by the Engineer. In general it shall be used where the top of the pipe is less than 5 feet below finish grade.

The insulation shall be installed on top of a smooth, flat surface of compacted select backfill or bedding. The insulation shall be 6 inches above the top of the pipe. Joints shall be butted tightly for maximum protection. Backfilling over the insulation shall be done by hand for the first 8 inches and compacted before remaining backfill is applied.

Installation for each type of insulation shall be according to the manufactures' recommendations. In general, backfill shall be clean, dry, and be free of any material which can dissolve or harm the plastic such as petroleum products.,

XIII. EROSION CONTROL

1. Furnish all labor, equipment and materials necessary to prevent erosion and sedimentation from occurring on areas disturbed by construction and any other areas designated on the plans. The Contractor shall be responsible for providing interim protection on disturbed areas until a sufficient vegetative cover has been established. Erosion control shall be considered incidental to appropriate items of the Contract.
2. Hay bales shall have minimum dimensions of 18" x 18" x 3'6" and shall weigh at least 40 lbs. Erosion control fence shall be Envirofence by Mirafi, Inc., Charlotte, NC, or approved equal. The fencing shall have the following properties: grab strength of 120 lbs., grab elongation of 30% (max.), water flow rate of 40 gal/min/S.F., and ultraviolet stability of 90%. The fabric width shall be 3' and post length shall be 4.5'. The post spacing shall be 7.7'. The fence fabric shall be securely stapled to the stakes.

Stone for stone check dams shall be as specified by Maine Department of Transportation for trench drain construction.

All materials on the project shall be new. RUD may accept erosion control fence that has been used on previous projects if it meets this specification and the fence is in good and serviceable condition.

3. Install straw erosion control blankets where shown on the plans. Install the blankets according to the manufacturer's latest recommendations.

Install erosion control hay bales in drainage swales at 100 foot spacings, or as shown on plans.

Hay mulch shall be applied at the rate of 40 to 50 lbs (1 bale) to 400 square feet of area. In areas of steep slopes mulch shall be secured. If erosion control hay bales or mulch does not adequately prevent erosion then jute mesh shall be installed.

Install erosion control fencing where shown on the drawings and along banks of streams, water bodies and wetlands when adjacent areas are to be disturbed. Installation shall be as shown on the drawings and according to the manufacturer's latest recommendations. Use coupler when joining sections.

Stone check dams for erosion control shall be located and constructed as shown on the plans.

4. Maintain and re-install erosion control measures until vegetative cover has been established. Carefully remove materials that are not intended to be permanent (such as erosion control fence) when they are no longer needed.

XIV. TRAFFIC CONTROL

1. General

Supply all labor, materials and equipment necessary to control traffic for the safety of workmen, pedestrians, vehicular traffic and the general public.

2. Requirements and Compliance

Establish traffic control procedures to comply with all authorities having jurisdiction. All traffic control procedures and signing shall comply with MDOT and the Manual of Uniform Traffic Control Devices (MUTCD).

The Contractor shall keep local police and fire officials informed at all times regarding the work location and the effect it will have on traffic patterns.

3. Control Methods

Provide project signing at the project limits as required by MDOT. Provide signing and barricades on either end of the actual construction location. Speed limit signs shall be posted with a 25 MPH speed limit. All barricades, signs and signing layouts shall meet MDOT & MUTCD specifications.

At least one traffic control person shall be located at each of the construction locations or work areas. A minimum of two traffic control personnel shall be provided at each construction location or work area where only one lane of traffic will be maintained. The traffic control personnel shall be in radio communication with each other at all times and shall wear fluorescent vests and direct traffic with standard reflective stop/slow flagger signs.

Work will be allowed only during daylight hours. MDOT and MUTCD approved flashing lights and barricades shall be used for proper safety at night.

4. Street Closings

No streets shall be closed without specific written permission of the local authorities having jurisdiction. If street closings are allowed, then "street closed" signs shall be placed at all intersections adjacent to the work area to prevent traffic from entering. The contractor shall be responsible for maintaining access to all businesses and residences at all times. One lane shall be maintained for local traffic on all closed streets at all times. At the end of each workday complete street access shall be restored on all streets.

XV. REPAIRS TO EXISTING UTILITIES

The methods and equipment to complete repairs must be approved by RUD. In general, the following methods of connecting and repairing pipes shall apply:

Gravity Sewer and Storm Drain Mains:

Straight and transition couplings for mains shall be non-shear sewer couplings Style CNSS as manufactured by Cascade Waterworks Mfg. Co., Style LSS2 or LSS3 as manufactured by Romac Industries, Inc., or approved equal.

Gravity Sewer and Storm Drain Services:

Flexible rubber compression couplings (Fernco, Calder, etc.); cast couplings; fittings made specifically for the pipe materials used.

Water Mains and Sewer Force Mains:

Cast couplings, MJ solid sleeves' fittings made specifically for the pipe materials used.

Water Services:

Brass compression couplings; cast couplings; fittings made specifically for the pipe materials used. Connections to PE tubing shall utilize SS inserts and brass compression couplings.

Culverts:

Approved connecting bands; flexible rubber compression couplings' fittings made specifically for the pipe materials used.

XVI. AS-BUILT RECORDS

1. Maintain accurate as-built records throughout the construction project. A complete bound copy of these as-built records shall be delivered to RUD before the line will be accepted. Contractor shall complete the drawings and records.
2. The Contractor shall maintain a set of the construction drawings on the site at all times for the purpose of recording the actual configuration of the final work. The drawings shall show in a neat and legible fashion the final configuration of the constructed project, existing utilities, ledge, etc.
3. The Contractor shall maintain a neat and accurate bound utility location book on the site at all times for the purpose of recording the location and arrangement of all manholes, catch basins,

valves, tees, bends, fittings, service corporations, curb stops, couplings, sewer service tees, ends of sewer services, repairs, etc. The type of pipe and depth shall be noted.

XVII. MISCELLANEOUS

1. When pipe laying operations stop for the day or for a prolonged period of time, a watertight plug will be inserted into the open end of the end pipe or fitting in the trench.
2. All excess material and debris resulting from the trenching will be removed from the job site and the surface of road or right-of-way will be left at the elevation and in the same condition existing prior to construction.
3. Properly mark through the use of flares, signs and wooden horses any open or soft trench. The contractor shall be responsible for the public's safety at all times by using accepted safety precautions and aids during the course of the work.
4. The trench is to be widened if the RUD foreman or inspector desires it in the interest of safety.
5. It is understood that RUD personnel working on this project may be called away for emergency Work and that the contractor will not be paid extra for any down time for labor or equipment. When the contractor has a section of trench open and ready to have a service installed or a water main inspected, he will give a minimum of 24 hours notice to the RUD for making arrangements to install the service or to have an inspector present during all pipe installation.
6. The Contractor installing the pipe and fitting will be responsible for the maintenance of the particular line which he is installing for a period of one year from the first time when the line in question goes into service. This responsibility will also include assuming proper final adjustment for all gate boxes prior to and after any paving or grading operations occurring during this period.
7. The contractor shall be familiar with and shall accept full responsibility for compliance with all

Federal, state and local safety regulations.

8. The RUD will, at the Owner's responsibility and cost, fill, test and disinfect the new water lines.
9. The contractor shall not operate any water related appurtenances, including but not limited to valves, hydrants and service lines, without a representative of RUD present.
10. The contractor shall supply to RUD copies of all field notes, ties, as-built details or other information relating to the installation of the extension.