TOWN OF PITTSBORO
STANDARD SPECIFICATION

SECTION 6
RECLAIMED WATER DISTRIBUTION SYSTEM

JURISDICTIONAL AGENCY APPROVAL
All reclaimed water lines shall be designed, and constructed in accordance with the State of North Carolina Administrative Code (NCAC) Title 15A 02U, and as referenced in 02T, North Carolina Department of Environmental Quality (DEQ), and Division of Water Quality (DWQ). The engineering requirements set forth herein are intended to supplement rather than supersede other applicable local, county, state, and federal requirements. In the case of conflict, the more stringent requirements shall apply.

DESIGN CRITERIA FOR DISTRIBUTION LINES

The requirements in this specification apply to all new, and retrofitted distribution lines.

Location
Reclaimed water lines shall be extended along the roadway to the adjacent property line. A dedicated street right of way, or Town of Pittsboro utility, and pipe line easement shall be utilized. The dedicated easement shall be twenty (20') feet wide, and recorded as "Town of Pittsboro Utility Easement." The dedicated easement shall contain Town utilities unless otherwise approved by the Town Manager, Town Engineer, or Public Utilities Director through an approved encroachment agreement. Where the twenty (20') feet wide easement is undersized too due depth/ or diameter requirements for construction, operations, and maintenance the Town Engineering Department may approve an increase in dedicated easement to accommodate the new utility.

Unless approved in a written waiver by the Town Engineer, or Public Utilities Director no permanent structures, equipment, retaining walls, embankments, impounds, or other elements that would inhibit maintenance operations shall be constructed. The written request waiver shall include the following: description of all special condition (s), including appropriate protection measures of potable water, reclaimed water, and sanitary sewer mains, and access for maintenance purposes.

Fences may cross over easements provided that appropriate access gates have been installed to allow maintenance operations.

At the discretion, and approval by the Town, fill or cut slopes are not allowed to extend into reclaimed water main easements except by specific approval.

All relocations of existing or permitted reclaimed water infrastructure including service piping and meter boxes shall be permitted and inspected in conformance with Town policies and procedures.

Any reclaimed water that leaves the reclaimed water distribution system other than by means of a properly permitted use must be disposed of into the Town of Pittsboro sanitary sewer system, unless otherwise approved by the Town of Pittsboro with special provisions for discharge and disposal. This includes any reclaimed water from blow offs, testing, line flushing, and/or line breaks. In no case shall reclaimed water from blow offs, testing, flushing, line breaks or other unpermitted uses be discharged onto the ground surface or drainage systems, storm water ponds, streams or other non-treated systems. Any unpermitted discharge of reclaimed water shall be reported to the Town of Pittsboro immediately and treated as a wastewater spill in accordance with established policies by the Town of Pittsboro and NCDEQ.

In all cases where potable water is used to supplement a reclaimed water system, there shall be an approved RPZ or Air Gap between the potable water system and the reclaimed water system. Units shall be tested per the requirements set forth in the T.O.P Chapter 25, Utilities Ordinance, Article VI Cross Connections between a Private Supply and The Town of Pittsboro Water System.

In all cases where potable water is used to supply reclaimed water distribution mains on an interim basis until such time when reclaimed water is available, there shall be an approved reduced pressure principle backflow preventer, (RPZ), constructed in accordance with the Cross Connection Ordinance. The RPZ backflow preventer shall be provided on the branch supply line feeding the reclaimed water system and shall be located within 25-ft of the branch connection with the main potable water trunk line. A reduced pressure principle backflow preventer located on the branch feed to the reclaimed water system will preclude the need for individual backflow preventers on each service connection and allow all reclaimed water services to be constructed as described herein under typical reclaimed service standards and specifications.

Cross-Connection Control

There shall be no direct cross connections between the reclaimed water and potable water systems. In all cases where reclaimed and municipal potable water are supplied to the same structure and/or other same facility, a reduced pressure principle backflow preventer shall be provided on the municipal potable water service. The privately owned and maintained reclaimed water service piping and other appurtenances shall be identified in conformance with the North Carolina Plumbing Code. When reclaimed water distribution mains are unavailable, but planned for future construction in accordance with the Reclaimed Water System Master Plan; any service lines to secondary water use facilities, shall be constructed in accordance with reclaimed water standards as described herein including all requirements for requisite color and text identification.

Lateral Separation of Reclaimed, Sewers and Water Mains

Reclaimed water distribution lines shall be located 10 feet horizontally from and 18 inches below any water line where practicable.

(A) Water mains shall be laid at least 10 feet laterally from existing or proposed reclaimed/sewers, unless local conditions or barriers prevent a 10-foot lateral separation, in which case: The water main is laid in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the reclaim/sewer; or The water main is laid in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the reclaim/sewer.

(B) Crossing a water main over a sewer. Whenever it is necessary for a water main to cross over a reclaimed/sewer, the water main shall be laid at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer, unless local conditions or barriers prevent an 18 inch vertical separation--in which case both the water main and sewer shall be constructed of ductile iron materials and with joints equivalent to water main standards (restrained) for a distance of 10 feet on each side of the point of crossing.

(C) Crossing a Water Main under a Reclaimed Water, or Sanitary Sewer. Whenever it is necessary for a water main to cross under a sewer, both the water main and the sewer shall be constructed ductile iron and with restrained joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing. Where ductile iron pipe cannot be used (existing piping) the water, reclaim/sewer shall be encased with quick set, non-excavate flowing fill extending three (3') feet on both sides of the crossing. Reclaimed water distribution lines shall meet the separation distances to sewer lines in accordance with 15A NCAC 02T .0305. All piping shall be restrained MJ sleeves, or other approved couplings, and wrapped with purple polyethylene wrap as specified.

(D) Reclaimed water distribution lines shall not be less than 50 feet from a public well unless the piping and integrity testing procedures meet water main standards approved by the Town Engineer, or Utility Director, but in no case shall they be less than 25 feet from a private well.

(E) All privately owned, and maintained reclaimed water service piping, and appurtenances shall be identified in conformance with North Carolina Plumbing Code.

Sizing

Reclaimed water distribution system piping shall be sized in accordance with the good design procedures, and master plan for reclaim water. The minimum pipe size for reclaim water shall be four (4") inches. The design shall provide adequate pressure throughout the system, or as directed by the Town of Pittsboro.

Installation

All utility extension permits must be obtained prior to construction. All reclaimed water mains shall have a minimum cover of three (3') feet measured from the top of the pipe

to the finished grade. When reclaimed water mains are installed along a roadway, which does not have curb and gutter, the reclaimed water main shall be installed at sufficient depth to prevent conflict with future road improvements or vertical alignment changes.

Vertical Realignments of all Piping Material: All piping material shall be restrained, blocked, and anchored per the Town of Pittsboro approved detail, or per plan detail. Anchoring, and trust blocks shall be formed, and poured to the provided dimensions.

DISTRUBTION PIPING, VALVING, OUTLETS, AND OTHER APPURTENANCES

All new distribution piping in the reclaimed water system, including service lines, valves and other appurtenances shall either be colored purple, and embossed, or be integrally stamped/marked with the words "CAUTION: RECLAIMED WATER – DO NOT DRINK," or be installed with a purple identification tape, tracer wire and a purple polyethylene vinyl wrap. All PVC pipe shall be colored purple, and text identified as described above, no exceptions. The warning shall be stamped on opposite sides of the pipe and repeated every 3-feet or less.

Existing potable or non-potable water lines that are being converted to reclaimed water use should first be accurately located and tested in accordance with regulatory requirements. If required, the necessary actions to bring the line and appurtenances into compliance with regulatory standards should be taken. If the existing lines meet approval of the reclaimed water supplier and NCDEQ, the lines can be approved for reclaimed water distribution. If verification of the existing lines is not possible, the lines should be uncovered, inspected, and identified prior to use.

- **Polyethylene wrap, locator tape, and tracer wire:** Refer to Section 2 General Provisions for Utility Construction of the Town Pittsboro Standard Specifications

- **Marker balls** approved by the Town of Pittsboro shall be installed along reclaimed water lines at a maximum spacing of 100-ft and depth not to exceed 2-ft. Generally, these can be the non-programmable type balls. Additionally, the programmable style marker balls shall be provided at all bends, fittings and reducers. These 'smart balls' shall be loaded with the following information: depth to pipe (from the ball), diameter of the pipe, type of fitting or feature, pipe material. All electronic marker balls shall be provided in purple color for reclaimed water and shall be designed to reflect a specific signal back to the electronic locator. The electronic marker balls shall be installed during pipe laying and provisions shall be made to assure they are not damaged during backfill operations. Electronic marker balls shall be tested by the utility contractor at the completion of backfill operations to assure they are all working properly. Any defective units shall be replaced. All marker ball locations shall be provided on the as-built drawings and the coordinates of these markers shall be provided as append points file, GIS shape file or equivalent.

- Where approved by the Town of Pittsboro the use of tracer wire maybe used instead of the marking balls. The tracer wire shall be purple in color, and 18-gauge wire

All PVC piping shall be C900, or C905. Pantone 522 purple or equivalent. Cut sheet of material manufacture shall be submitted for approval by the Town, or Town representative. **The use of C901 rolled tube/pipe is <u>not allowable.</u>**

Pipe size 4 to 12 inch shall be designed, and manufacture in compliance with AWWA C900. Minimum pressure rate of 200 psi, and standard pipe lengths of twenty (20') feet.

C-900 PVC PIPE SIZES

Nominal Pipe Diameter	Pressure Rating	Diameter Ratio	Wall Thickness (inches)	Outside Diameter
4 – inch	200	18	.267	4.8
6 - inch	200	18	.383	6.9
8 - inch	200	18	.503	9.05
10 - inch	200	18	0.617	11.10
12- inch	200	18	0.733	13.20

Pipe size 16 to 24 inch shall be designed, and manufacture in compliance with AWWA C905. Minimum pressure rate of 200 psi, and standard pipe lengths of twenty (20') feet.

C-905 PVC PIPE SIZES

Nominal Pipe Size	Pressure Rating	Diameter Ratio	Wall Thickness (inches)	Outside Diameter
16 – inch	200	21	.829	17.4
18 – inch	200	21	.929	19.5
20 – inch	200	21	1.029	21.6
24 – inch	200	21	1.229	25.8

PVC Pipe shall not be exposed to direct ultraviolet radiation (sunlight) for more than 30 days, whether the time is continuous or cumulative. PVC pipe shall be protected from direct ultraviolet radiation for any time of exposure exceeding 30 days. PVC pipe that has been discolored by exposure to ultraviolet radiation is unacceptable.

Installation and execution: The Owner or Contractor shall provide all materials, labor, tools, equipment and incidentals required for excavation, installation, backfilling and testing of water mains and associated appurtenances shown on approved plans.

1. Pipe Installation: Reclaimed water main piping shall be installed in accordance with AWWA C600. Pipe shall be installed on reasonably consistent grade and straight alignments, and all joints shall be properly fitted. All pipe and appurtenances shall be placed in trenches with suitable equipment to prevent damage to materials. Pipe and appurtenances shall not be dropped into the trench. Damaged or defective materials shall be permanently marked and removed from the project.

   All foreign matter or dirt shall be removed from pipe and fittings. Pipe interior shall be clean. Pipe that cannot be swabbed clean shall not be used. Materials with evidence of oil, tar or grease shall be permanently marked and removed from the project. Chlorine powder or tablets shall not be placed in pipe during installation.

   Pipe jointing shall be accomplished according to manufacturer requirements. Bell and spigot shall be cleaned and lubricated before jointing. Pipe installation shall progress with bell ends facing the laying direction. Manufacturer's maximum allowable joint deflection shall not be exceeded.

   Pipe cutting for inserting valves, fittings or closure pieces shall be square, neat and properly chamfered according to manufacturer requirements.

   During installation, electrical continuity shall be maintained of the tracer wire between valves. If a wire is cut or otherwise requires splicing, the ends of the wire shall be bared, twisted together and connected with an electrical "twist cap".

   While backfilling the reclaim water main trench, locator tape shall be placed 24 inches above pipe. Locator tape shall bear the words: "Warning – Reclaimed Water Main Below".

2. PVC pipe shall be installed in accordance with AWWA C605. In the Town of Pittsboro, the contractor shall bed pipe in a #78A four (4") inches below and one (1') foot above pipe. The bedding material type shall from Luck Stone quarry or equivalent as approved by the Town. At a minimum, all PVC pipe shall be installed at a Type 4 laying condition as specified by AWWA C605 for depth of installation from three (3') feet to ten (10") feet measured from the top of the pipe. The Type 4 laying condition requires the pipe to be bedded on a minimum of 4-inches of select granular material that will conform to the bottom of the pipe. Select granular material shall consist of Class 1 or Class 2, well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain no more than 10 percent by weight of

material passing a 0.075 mm (No. 200) mesh sieve and no less than 95 percent by weight passing the 25 mm (1 inch) sieve as defined by ASTM D2321. Pipe laying on a flat bottom trench is unacceptable**.**

Class 1 or Class 2 embedment material shall be compacted to the top of the pipe at 95% or greater Proctor density. Careful attention shall be placed on compacting embedment under the haunches of the pipe to prevent any potential voids. When using mechanical compactors, avoid contact with the pipe. When compacting over the pipe crown, a minimum cover of at least 8-inches or more in conformance with the manufacturer's requirements shall be maintained over the top of the pipe prior to compacting. The maximum embedment sizing shall be limited to materials passing a 3/4-inch sieve for angular materials or 1-1/2-inches for rounded rock. Embedment materials consisting of select material or native soils shall be well drained, granular, free of rocks and other foreign materials and shall be selected and placed to prevent gouges, crimping, or puncture of pipe, joints or appurtenances.

3. For all other pipe material, the trench bottom shall be prepared with minimum 4-inch thickness of #78M bedding stone and bell holes shall be prepared in the bedding. The #78M shall be placed to spring line (encompassing the hauches), and to a foot above pipe. The bedding material type shall be from Luck Stone quarry or equivalent as approved by the Town

4. **Reaction Blocking:** All water main fittings shall be installed with thrust restraint. Reaction blocking shall be transit-mixed concrete of minimum 2500 psi 28-day compressive strength placed in adequate quantities for the size and shape of fitting being installed. Reaction blocking shall be formed and poured such that mechanical joint bolts remain accessible. The blocking shall be backed by firm solid earth. Where manufactured joint restraint is used, concrete blocking shall be used only as recommended by the joint restraint manufacturer. All blocking shall be formed, and poured per the provided dimensions **NOT** over formed, and poured. The concrete shall be given twenty-four (24) to cure prior to backfill and compaction.

Valves and Appurtenances

Valves shall be installed on all branches from feeder-reclaimed water mains according to the following schedule: 4 valves cross, and 3 valves at tees.

Setting Valves and Valve Boxes: Valves shall be set at locations shown in approved plans. Valve to pipe connections shall be mechanical joint. A cast iron valve box shall be installed, accurately centered over the valve operating nut. Valve boxes shall be installed to the project finished grade. When not in pavement, the valve box shall be protected with a precast concrete donut. The donut shall be dug into the ground approximately two inches so the donut is level, fully flush with the ground and even with the top of the valve box. Valve boxes in paved sections shall be finished flush with final grade and shall be supported at the top with a poured concrete collar at least 2-1/2 feet in diameter.

Testing standards when connecting to an existing system may require that 4 valves ultimately be located at crosses, three (3) valves at tees, etc. beyond the minimum standard to assure adequate testing can be achieved. In such cases, the valves shall be shown on the plan drawings and included in the testing plan submitted by the Engineer of record.
Where no reclaimed water line intersections exist, a main line valve shall be installed at every distance of 500 feet between valves, or as approved by Town Engineer, Public Utilities Director, or their authorized representative.

All valves for reclaimed water applications, 12-inches in diameter and smaller shall be resilient seated wedge gate valves in conformance with the requirements of AWWA C509, (grey or ductile iron body) or AWWA C515, (reduced wall ductile iron body) and provided with a full circumferential pipe opening. All gate valves shall be designed for a working pressure of 250-psi with a minimum ULFM rating of 200-psi. Gate valves shall be fusion-bonded epoxy, (FBE) coated both interior and exterior at a minimum of 10mils and the FBE coating shall be provided in conformance with AWWA C550. All gate valves shall be assembled with stainless steel bolts.

All gate valves 12-inches in diameter and smaller shall be installed in the vertical position and shall be provided with mechanical joint fittings. Gate valves shall be restrained by wedge action retainer glands or other approved manufacturer provided restraining systems. In all cases, the valve and piping shall be restrained on both sides to sufficiently allow the valve to function as a dead end.

All gate valves shall open left with a non-rising stem and be provided with a 2-inch square operating nut. All gate valves shall be constructed with triple O-ring seals in which 2 O-rings are located above the thrust collar and 1 O-ring is located below the thrust collar. The two upper O-rings shall be replaceable with the valve fully open and subjected to full rated working pressure.

The gate valve wedge shall be fully encapsulated in molder rubber and fully retractable. All valves shall be rated for bi-directional flow. All sealing gaskets shall be made of EPDM rubber materials.

Gate valves 16-inches through 24-inches shall comply with all specifications outlined for gate valves 12-inches and smaller in the previous section including the 250-psi pressure rating. Gate valves 16-inches through 24-inches shall be fabricated exclusively with ductile iron construction in conformance with AWWA C515.

As additional requirement, gate valves 16-inches through 24-inches if installed vertically shall be provided with a minimum of 2-ft of overhead clearance between the top of the operator nut and the finished subgrade. Gate valves 16 through 24 inches in diameter shall be provided with a 4:1 spur gear reducer.

Gate valves, sixteen (16) inches and larger, installed in a horizontal position, shall only be provided, as permitted by the Public Utilities Director for special circumstances where vertical alignment is not possible. All horizontal gate valves shall meet or exceed the specifications outlined herein for vertical gate valves including the 250-psi pressure rating. All horizontal gate valves shall be equipped with bevel gears resulting in 4:1 or 6:1 turn ratios through 24-inches in diameter.

All gate valves for reclaimed water applications shall be painted purple, Pantone 522 with approved field application paint by the contractor prior to installation or otherwise wrapped in purple polyethylene wrap for required identification as a reclaimed water valve.

Valves shall be properly located, operable and at the correct elevation. All valves and reducers shall be rodded to the tee or cross if one is located within 10 feet as shown in the Details. If reducers cannot be rodded, concrete blocking or other restraining methods will be required. The maximum depth of the valve nut shall be 5 feet. When valve extension kits are used, they must be manufactured by the same company, which manufactured the valve.

Combination Air Values

Combination air valves shall be provided to purge air from the system at startup, vent small pockets of air while the system is being pressurized and running, and prevent critical vacuum conditions during draining. Combination air valves approved for use in reclaimed water installations shall be installed at all high points of reclaimed water lines 8 inches in diameter or larger and at other locations, such as major changes in slope, as directed by the Town. A high point shall be determined as any high location where the difference between the high elevation and adjacent low elevation exceeds 10-ft unless otherwise determined by the Public Utilities Director based on special circumstances. The combination air valve shall automatically exhaust large volumes of air from the system when it is being filled and allow air to re-enter the pipe when the system is being drained. The reclaimed water main shall be installed at a grade, which will allow the air to migrate to a high point where the air can be released through an air valve. A minimum pipe slope of 1 foot in 500 feet should be maintained. The valve shall have a minimum two (2) inch NPT inlet and 200-PSI working pressure. Combination air valves shall be sized by the Engineer and approved by the Town.

Combination air valves shall be of the single housing style with Type 304 or 316 stainless steel body that combines the operation of both an air/vacuum and air release valve. The valve must meet the requirements of AWWA C512 and be installed in accordance with the Details.

The valve shall have a minimum two (2) inch NPT inlet and the inlet body shall be rated for minimum 250-PSI working pressure. Combination air valves sized from 2-inches to 4-inches shall be provided with NPT inlets and outlets unless otherwise submitted for approval with flanged connections. The combination air valve shall be provided with

cylindrical shaped floats and anti-shock orifice made of high-density polyethylene. Combination air valves with spherical floats shall not be accepted. All combination air valves shall be installed in accordance with the Details.

The combination air valve shall be installed in standard eccentric manhole as shown in the Town approved detail drawings. The manhole frame and cover shall be stamped "Reclaim Water" with the Town of Pittsboro, and town log. The combination air valve shall be provided with a controlled diameter saddle tap in the same sizing as the combination air valve assembly and isolated with a gate valve of the same size. The isolation gate valve shall be provided with NPT threads and connected with "no lead" brass or bronze ball valves may be used in lieu of gate valves for installations' 2-inches or smaller. The isolation valve shall be rated for 200-psi service or **greater**.

The contractor shall paint the inside of all manholes housing ARV's with Pantone 522 purple paint and stencil the words "CAUTION: RECLAIMED WATER – DO NOT DRINK" on the outside of the manhole in at least 2 locations on both sides of the ASRV. The lettering shall be at least 3-inches in height and be painted in black visible paint that can be easily noticed from ground level.

Valve Boxes

Valve boxes shall be cast iron, screw or telescopic type, with a 5-inch opening. Valve box ring adjustments will not be allowed.

Valve box covers shall be square in shape (NOT round) and shall be designed for AASHTO H-20 truck loadings. All valve box covers shall be of non-interchangeable shape with potable water covers, and cast on the top surface with a recognizable inscription indicating "RECLAIMED WATER". All valve box covers shall be painted, Pantone 522.

The valve box shall be centered over the operating nut and seated on compacted backfill without touching the valve assembly. All valve boxes shall be encased in a trowel finished 2' x 2' x 6" pad of 3000-psi concrete beneath the asphalt with the cover flush with the top of the pavement or flush with the finished grade. Precast concrete valve box encasements may not be used for valve box encasement outside of paved areas. The maximum depth of the valve nut shall be 5 feet. When valve extension kits are used, they must be manufactured by the same company that manufactured the valve.

For valve box and manhole adjustment procedures refer to Section 2, Infrastructure and Utility Construction. No valve box, meter box, manhole or clean-out shall fall in sidewalks, ramps, or curb/gutter.

Appurtenances

Pipe fittings shall conform to AWWA C153 for compact fittings. Fittings shall be mechanical joint in accordance with AWWA C111. Fittings shall be ductile iron with a

minimum working pressure rating of 250 psi.
Fittings shall be cement mortar lined and seal coated in accordance with AWWA C104. Fittings shall have an outside coating of bituminous material that is maintained through storage, handling and installation. Fittings shall not be installed without a complete and thorough bituminous coat.

All fittings shall be restrained to C900 or C905 pipe with an approved wedge action retainer gland or other approved restraining method. All DIP fittings for reclaimed water use shall be identified by painting or wrapping with polyethylene wrap in Pantone 522 purple. At the discretion of the Town of Pittsboro, Meg-a-lug retainer glands may be accepted in certain instances when joint restraint is required.

Blow offs installed on reclaimed water mains at the end of cul-de-sacs shall be a minimum of 2 inches. Where there is not sufficient pressure to thoroughly flush the system, a larger blow off will be required.

Blow off assembly sizing for distribution mains, 4-inches through 8-inches in diameter, shall be the typical 2-inch assembly as shown in the Town approved details. The 2-inch valves shall be gate type provided with threaded connections with a non-rising stem and a 2- inch operating nut, O-ring seals and screwed ends. A full size valve is required on mains that are planned to be extended. Typical 2-inch blow off assemblies shall be provided with SDR 21 purple PVC pipe rated at 200-psi and labeled for use with reclaimed water systems. The SDR 21 PVC pipe shall be joined with bell and spigot joints restrained by solvent weld. The PVC pipe shall be joined to the threaded connections of the 2-inch gate valve with PVC transition couplings with metal threads. The metal inserts of the transition couplings shall be made of stainless steel, “no lead” brass or bronze. The transition couplings shall be connected to the gate valve with threaded “no lead” brass nipples. Threaded PVC pipe and joints with connections threaded in PVC shall not be allowed. All threaded connections shall be provided with metal threads to maintain the pressure rating of the blow off assembly.

For blow off assemblies on main lines larger than 8-inches in diameter, a blow off assembly design including calculations for sizing shall be provided by the design engineer of record and approved by the Engineering Department.

a) All blow offs shall drain to the nearest sanitary sewer manhole when there is a sewer manhole within 200-ft. In cases where a sewer manhole is not within 200-ft, the blow off assembly may be omitted at the discretion of the Town Engineer, and or Public Utilities Director in cases where another blow off assembly is in close proximity.
b) Everything blow off assemblies for reclaimed water installations in which the system will be initially charged with potable water, shall be required to maintain an air gap separation from the blow off discharge pipe to the sanitary sewer manhole.
c) A typical potable water blow off assembly may be utilized in lieu of a standard reclaimed water blow off assembly, in cases where a dead end reclaimed water

main

An approved Pantone 522 purple is required to meet color identification requirements and referenced herein as the color code identification for reclaimed water piping, valves and other appurtenances. Field application of Pantone 522 purple to valves, fittings, manholes and other appurtenances shall be implemented in conformance with manufacturer specifications including surface preparation. In all cases a minimum film thickness of 18-mils shall be applied. For applications open to daylight, the paint shall have UV protection. The paint shall consist of a two coat system consisting of a part high solids cured epoxy as the primer with a polyurethane top coat. For applications not exposed to sunlight, the paint shall be a two coat application of a high solids cured epoxy.

All fittings, valves, blow offs and appurtenances other than pipeline joints shall be restrained with approved wedge action retainer glands. All wedge action retainer glands shall be manufactured as a one-piece retainer gland for use with typical DIP mechanical joint fittings, gate valves and PVC C900 or C905 pipe. The wedge action retainer glands shall be rated to provide restraint up to a 200-psi pressure rating for sizes through 24-inches with a safety factor of 3:1. Approved wedge action retainer glands shall be made of ductile iron, coated with a manufacturer applied epoxy coating or polyester powder coating, including stainless steel bolts and nuts.

Reclaimed water service taps

Individual reclaimed water services and multiple branch services shall be provided from the reclaimed water main to each reclaimed water meter in accordance with the Town approved details. Multiple branch services for reclaimed water shall not exceed one (1) branch lines unless otherwise approved by the Public Utilities Director. Service connections shall be made perpendicular to the reclaimed water main and shall run straight to the reclaimed water meter. The use of C901 rolled/tubed material is not allowed, only ridge pipe shall be used.

All reclaimed water meter boxes and vaults shall be located at the right of way or easement of private property. Reclaimed water meter boxes shall not be placed in streets, sidewalks, parking areas or obstructed by fencing or buildings. Exceptions to these conditions will be at the discretion of the Public Utilities Director.

Provisions for backflow prevention shall be in accordance with the NC Plumbing Code for plumbing. Normally no backflow provisions will be necessary on reclaimed water systems. Approved backflow prevention devices shall be required on the potable water system for all customers with reclaimed water service. Units shall be tested per the requirements set forth in the T.O.P Chapter 25, Utilities Ordinance, Article VI Cross Connections between a Private Supply and The Town of Pittsboro Water System.

The reclaimed water meter shall be sized based on applicant water budget calculations using the approved method. The minimum size of reclaimed water meters and services

shall be 1-inch diameter. Multiple branch service sizing shall be determined by the designer.

Service taps to existing reclaimed water mains shall be made by a licensed utility Contractor of the Developer.

Materials
Direct taps shall not be allowed with C900 or C905 PVC, or Ductile Iron pipe for reclaimed water mains. The maximum size for saddle taps is 2-inches in diameter. All taps larger than 2-inches shall be installed by inline fittings or tapping sleeves. All tapping of C900 or C905 PVC reclaimed water mains shall be implemented with shell type cutting tools classified for use with PVC pipe that retains the coupon cut while penetrating the pipe wall. Twist drill bits and auger bits shall be prohibited.

Service Saddles
All service saddles shall be fabricated with an 85-5-5-5 waterworks brass and fabricated in a controlled diameter configuration to prevent over tightening the bolts and distorting or stressing the PVC pipe. Service saddles shall provide full support around the entire circumference of the pipe. All service saddles shall be manufacturer approved for use with C900 PVC pipe in conformance with AWWA C800. Service saddles shall be provided in a 2-piece bolted design for 4-inch through 8-inch pipe diameters and in a 3-piece assembly for 10-inch and 12-inch diameters. All service saddles shall be provided with an EPDM rubber gasket O-ring design in conformance with ASTM D2000. Service saddle outlets shall be provided with AWWA tapered threads.

Tapping Sleeves
MJ tapping sleeves shall be fabricated of cast iron or ductile iron construction in a two-piece assembly with mechanical joint connections to the main line and flanged connection to the tapping valve. All MJ tapping sleeves shall be rated for a working pressure of 200-psi or greater and provided with a 1-inch test plug for testing. All tapping sleeves shall be hydrostatically tested up to 200-psi for thirty (30) minutes before a tap is made. Tapping sleeves shall NOT be air tested.

All mechanical joint tapping sleeves shall be manufacturer fabricated and approved for installation on the specific main line pipe material, whether C900 or C905 PVC pipe. In all MJ tapping sleeve applications, the tapping sleeve and tapping valve shall be provided by the same manufacturer.

Stainless steel tapping sleeves may be used in lieu of mechanical joint tapping sleeves for C900 PVC reclaimed water mains 6- inch through 12-inch in diameter at sizing as shown in the following table. All stainless steel tapping sleeves shall be manufactured in conformance with AWWA C223. All SS tapping sleeves shall be provided in a two-piece assembly with a full circumferential gasket and a ¾ inch teat plug. The back band shall be a minimum 14-gauge stainless steel and the front band (where the outlet is located) shall be a minimum 12-gauge stainless steel. The bolt bars shall be a minimum

7-gauge stainless steel. All SS tapping sleeves shall be manufacturer rated for a working pressure of 200-psi or greater and hydrostatically tested to 150-psi for thirty (30) minutes before a tap is made. Stainless steel tapping sleeves shall NOT be air tested.

STAINLESS STEEL TAPPING SLEEVE SIZES

NOMINAL MAIN SIZE (inches)	NOMINAL BRANCH Size (inches)
6	4
8	4
8	6
10	4
10	6
12	4
12	6
12	8

Tapping saddles shall not be used with PVC pipe.

Corporation Stops shall be ball type, fabricated with “no Lead” brass. The inlet shall have AWWA Standard threads as per AWWA C800. Taps shall be located at 10:00 or 2:00 o'clock on the circumference of the pipe. The outlet connection of the corporation stop shall be sized for IPS, Iron Pipe Size polyethylene piping and provided with a solid stainless steel insert stiffener manufactured by the same manufacturer of the corporation stop ball valve. The outlet connection to the polyethylene service piping shall be by compression connections provided with the corporation stop ball valve.

Service taps shall be staggered alternating from one side of the reclaimed water main to the other and at least 12 inches apart. The taps must be a minimum of 24 inches apart if they are on the same side of the pipe. No tapping shall be made within 3-ft of the end of the reclaimed water main.

Service piping

Polyethylene service piping shall be provided as minimum 1-inch to maximum 2-inch, IPS, (iron pipe size), inside diameter controlled, piping in conformance with ASTM D2239 and rated for 200-psi. All polyethylene service piping shall comply with NSF14, AWWA C901 and meet all requirements of PE 3710 code designation. The piping shall be provided with no breaks or fittings in service installation lengths of 100-ft or less. All polyethylene service piping shall be provided in purple color, Pantone 522, for reclaimed water applications with the words, “CAUTION – RECLAIMED WATER DO NOT DRINK” labeling the piping as reclaimed water service piping. All PE piping shall be provided with tracer wire. Tracer wire shall be a 12 AWG, UL listed solid copper conductor wire with a minimum 30-mil purple polyethylene jacket, rated for buried service and attached in at least 3-ft intervals with non-metallic fasteners. The tracer wire may be attached to

the pipe by the pipe manufacturer or attached in the field. The tracer wire shall be connected visibly inside the meter box for use by Town of Pittsboro utility locating staff. All connections to PE piping shall be provided with stainless steel insert stiffeners provided by the same manufacturer of the corporation stops and/or the meter setters and approved by the manufacturer for use with PE piping.

Coppersetters

The minimum service size for reclaimed water copper setters is 1-inch in diameter. "Coppersetters" shall consist of "no lead" brass components (meeting UNS C89833 as per ASTM B584) and be installed in reclaimed water applications as shown in the details and provided with a lockable, full port "no lead" ball valve on the inlet side of the meter and a second full port "no lead" ball valve on the outlet side of the meter.

"Coppersetters" shall be provided in a 15-inch vertical rise at the shape and configuration shown in the Town approved detail. "Coppersetters" shall be installed in the center of the meter box such that the top of the inlet and outlet piping is visible for inspection. "Coppersetters" shall be provided with "no lead" compression connections sized for polyethylene piping as specified herein for both inlet and outlet connections. Typical saddle nuts shall be provided with reverse or left hand threads for connecting reclaimed water meters with reverse or left hand threads. The top of the ball valve shall be text identified for use with reclaimed water by a manufacturer installed metal tag.

Water Meters

Reclaimed water meters for 1-inch services will be provided by the Town of Pittsboro with reverse or left hand threads. Reclaimed water meters shall be color identified by purple Pantone 522 cover and casing.

Water Meter Box

Meter boxes for 1-inch reclaimed water services shall be made of heavy duty fiberglass reinforced polymer. The box shall be molded as one piece and provided in a circular shape with a diameter of 20-inches and a depth of 24-inches. The box shall be provided with pre-cut entry areas approximately 3-inches wide by 4-inches high for the service pipe entrance and exit. The plastic box shall be provided in purple color dyed into the fiberglass construction. The meter box cover shall be made of light weight polymer concrete dyed purple, Pantone 522 with the words, "CAUTION RECLAIMED WATER-DO NOT DRINK", embossed in the cover. The meter box cover shall be provided as a solid polymer cement cover with no reader door. The meter box cover shall be provided with one (1) stainless steel locking bolt. The stainless steel locking bolt shall be provided in a Penta head configuration. The box and cover shall be load rated for a vertical load of 20,000-lbs. The inside of meter box shall be labeled indicating, "CAUTION RECLAIMED WATER-DO NOT DRINK" in lettering at least 1-1/2 inches in height that is clearly legible when opening the cover. All fittings and connections shall be "no lead" brass conforming to UNS C89833 as ASTM B584.

Meter Boxes for 1-1/2" and 2" services shall be made of fiberglass reinforced polymer and provided with heavy duty rated polymer concrete covers as indicated in the Standard Details. All meter box covers shall be consistently color-coded purple (Pantone 522 C) and marked on the top surface with recognizable inscription indicating "RECLAIMED WATER-DO NOT DRINK" painted with a protective bituminous coating before being shipped from the factory. No valve box, meter box, manhole or clean-out shall fall in sidewalks, ramps, or curb/gutter

TESTING AND INSPECTION

Hydrostatic testing

Reclaimed water lines, including all fittings, water meter services, and connections to the reclaimed water mains shall be tested for water-tightness by subjecting each section to hydrostatic testing in accordance with applicable provisions of AWWA C-600, except as modified below, and shall consist of pressure testing and allowance testing. Town of Pittsboro staff must be present for all pressure testing. **All valves will be turned by Town staff only.** Others who turn Town valves shall be subject to fines of up to $15,000 per indecent.

The test section shall be slowly filled with potable water and all air shall be vented from the line. At least 48-hour notice required before tests are scheduled. The Contractor shall provide all vents, piping, plugs, bulkheads, valves, bracing, blocking, pumps, and measuring devices and all other equipment necessary for making the tests, including pressure gages, and shall pay the Town of Pittsboro for water used in the tests.

Hydrostatic Testing: Pressure testing may be made before or after backfilling, but backfilling must be completed before allowance testing. If the pipe is center-loaded, a visual inspection for leaks may be made along the pipe line while the test section is under test pressure, and all visible leaks repaired. However, if mechanical compaction is to be used in the backfilling operations as spelled out in AWWA C-600, the tests shall not be made until the backfilling is completed and compacted. Backfill and compaction for the full distance encompassed by restrained/welded joints shall be completed prior to testing. All connections, blow offs, hydrants and valves shall be tested with the main as far as is practicable. Hydrostatic testing shall not begin until the pipe has been filled with water for at least 24 hours to allow for air venting.

Pressure Testing: Unless otherwise noted in the contract documents, the minimum prescribed test pressure shall be at least 200 psi for lines smaller than 16 inches and 150 psi for lines 16 inches or larger, not to exceed 5 psi over the minimum prescribed test pressure, as measured at the lowest end of the section under test. The duration of each pressure test shall be at least 2 hours, during which time the test section shall not drop below the minimum prescribed test pressure. If the pressure in the pipe test section has not stabilized by the end of the testing period, a hydrostatic retest will be required. Each section of a new line between sectionalizing valves or between the last sectionalizing valve and the end of the project shall be tested separately as required in

AWWA C-600, and/or as modified in these specifications, except that any such section less than 500 feet in length may be tested with the adjacent section, if both sections of line have the same pipe class rating. No section greater than 1/2 mile in total pipe length shall be tested without special written permission of the Public Utilities Director.

Testing Allowance/Makeup Water: Makeup water volume shall be determined after the pressure test has been satisfactorily completed and all backfilling and compaction has been completed to top of trench. Testing allowance shall be defined as the maximum quantity of makeup water necessary to be supplied into the pipe line section under test to restore the ending test pressure to the beginning test pressure, after the pipe line has been filled with water and all air expelled. The Contractor shall furnish the necessary apparatus and assistance to conduct the test.

The duration of each makeup water test shall be at least 2 hours. To pass the allowance testing, the quantity of makeup water from the pipe line shall not exceed the makeup water quantity allowed by the following formula, from AWWA C-600:

$$M = \frac{SD\sqrt{P}}{148{,}000}$$

M = testing Allowance (makeup water), in gallons per hour.
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches.
P = test pressure of the pipe being tested

Should the test on any section of the pipe line require more makeup water than allowed by the above formula, the Contractor shall locate and repair the defective pipe, fittings, or joint until the makeup water volume is within the specified allowance. All repairs and retests, if required, shall be made at the Contractor's expense. Connections to the existing pipelines or existing valves shall not be made until after that section of new construction has satisfactorily passed the hydrostatic tests.

Ductile iron pipe used in conjunction with ACP will be tested to the ACP standards, unless otherwise directed by the Engineer.

High pressure systems of all ductile iron pipe will be tested in accordance with AWWA C-600, Section 4.1. Pressure tests will not be considered acceptable and will not be approved without a representative of the Town of Pittsboro present. 48-hour notice shall be given to the Town prior to pressure testing.

The Contractor shall pre-test all water mains before requesting pressure test observation from the Town of Pittsboro. No pressure tests will be observed without the Contractor’s first pre-testing the water mains.

Excessive site visits will not be tolerated. In the event that more than two site visits are required for a segment of water main to pass pressure testing, the Town of Pittsboro shall bill the Owner for the additional visits at a rate of $105 per hour.

Disinfecting Reclaimed Water Mains and Other Appurtenances

Disinfection of new potable water supply system components shall be in accordance with the North Carolina Department of Environment Quality, Rules Governing Public Water Systems, NCAC Title 15A, Subchapter 18C Section .1003 and the requirements of AWWA C651. Preventing Reverse Flow: Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used to accomplish this but not required at this time.

Reclaimed Water mains shall not be placed in service until all final submittals are provided and the Town of Pittsboro has approved the project for service. It is the responsibility of the Owner/Contractor to coordinate reclaim water main disinfection with the submittal of close-out materials.

All water mains shall be thoroughly flushed prior to disinfecting. The Town of Pittsboro reserves the right to have contractor employee a “pig” after three (3) failed bacteriological samples.

Disinfection shall be performed by pumping a solution of HTH and water (potable water obtained from the metered connection) into the new reclaimed water mains (and services) so that a chlorine residual concentration of at least 50 milligrams per liter (50 ppm) remains in the lines. The preferred point of application of the chlorinating agent is at the beginning of the pipe line extension or any valve section of it and through a corporation stop inserted in the top of the newly laid pipe. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipe line extension. The chlorine solution shall be pumped in at a constant rate so that a uniform distribution is produced in the lines. Valves and hydrants shall be adequately exercised to aid in uniformly distributing the chlorine solution. The Owner/Contractor **shall** demonstrate to the Town’s Inspector, or Utility Operator that 50 ppm is at the beginning and ending line segments under test at the beginning of the twenty-four (24) hour period. The Owner/Contractor **shall** demonstrate to the Town’s Inspector, or Utility Operator that 10 ppm is at the beginning and ending line segments under test at the ending of the twenty-four (24) /forty-eight (48) hour period. The chlorine solution shall remain in the lines for a minimum of 24 hours and a maximum of 48 hours at which time the residual concentration shall be no less than 10 ppm. Residual chlorine levels shall be demonstrated to be at least 10 pm or the Town shall require the lines to be re-chlorinated before bacteriological testing is conducted.

At the end of the contact period and prior to bacteriological testing, the chlorine solution shall be thoroughly flushed from the water mains to no more than the normal chlorine

residual in the distribution system. Flushing shall occur at hydrants and/or service connections and discharge shall be to a suitable point that will not result in flooding, erosion or flow into the sanitary sewer system

Extreme care shall be taken to ensure that high-concentration chlorine solution does not enter existing water mains. Preventing Reverse Flow: Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used to accomplish this but not required at this time.

Bacteriological Sampling: After Reclaimed water mains have been disinfected and flushed, the Owner/Contractor shall collect samples for turbidity and bacteriological analysis for each section of pipe tested. At least one sample shall be collected for every 1000 feet of water main. Sample collection shall be performed under the supervision of the Town of Pittsboro or a certified laboratory and shall follow proper chain of custody procedures. Samples shall be collected at locations determined by the Town of Pittsboro. Samples shall be analyzed by a certified laboratory meeting the certification requirements of NCDEQ.

CONTRACTOR CERTIFICATION OF INSTALLATION PROCEDURES

When requested in the Special Provisions or by the design engineer prior to installation, the Contractor shall furnish to the Town of Pittsboro an affidavit (certification) from the pipe manufacturer (or his designee) stating that the Contractor is familiar with the manufacturer's suggested installation methods and procedures and the manufacturer's suggested installation methods and, procedures are consistent with The Town's requirements.

When required by the Special Provisions, the pipe manufacturer or his designee will review the Contractor's methods and, procedures for pipe installation in the field. The Contractor will make any adjustments in the installation as recommended by the manufacturer or his representative. If necessary, the Contractor may be required to reinstall or provide corrections to pipe installed prior to the field review at no cost to the Town. Once the manufacturer, or his representative has reviewed the Contractor's installation methods and the Contractor has adjusted his installation methods as recommended by the same, the manufacturer or his representative shall furnish to the Town of Pittsboro an affidavit (certification) that the Contractor's installation methods and procedures, at the time of the review, complied with the manufacturer's installation practices. The affidavit must provide the name of the manufacturer's representative witnessing the pipe installation

For valve box and manhole adjustment procedures refer to Section 2, Infrastructure and Utility Construction