

RECLAIMED WATER RULES AND STANDARDS

UTILITIES COMMISSION,
CITY OF NEW SMYRNA BEACH
200 Canal Street, New Smyrna Beach, Florida 32168
www.ucnsb.org



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James D. White

James D. White, P.E.

Director of Engineering

TABLE OF CONTENTS

[INTRODUCTION](#).....iii

[DEFINITIONS](#)iv

SECTION 1 – GENERAL INFORMATION

1.01 [Customer Accounts](#)1

1.02 [Rates, Charges and Fees](#).....2

1.03 [Right-of-Way and Access](#)3

1.04 [Relocation of the Utilities Commission’s Facilities Due to Customer Action](#) .3

1.05 [Resale of Reclaimed Water Prohibited](#).....3

1.06 [Sub-Serving by Customer Prohibited](#)3

1.07 [Limits of the Utilities Commission’s Liability](#)4

1.08 [The Utilities Commission Does Not Work on Customer’s Facilities](#)4

1.09 [Basic Requirement for Customer’s Facilities](#)4

1.10 [Developer’s Agreement and Addendum](#).....5

1.11 [Major User](#).....5

SECTION 2 – RECLAIMED WATER PIPE, FITTINGS AND VALVES

2.01 [Pipe and Fittings](#).....6

2.02 [Valves](#).....9

2.03 [Appurtenances](#)11

SECTION 3 – RECLAIMED WATER DISTRIBUTION SYSTEM

3.01 [Design Requirements](#)12

3.02 [Reclaimed Water Main Installation](#)13

3.03 [Pressure Test](#)18

SECTION 4 – CONSTRUCTION

4.01 [Maintenance of Traffic](#).....20

4.02 [Excavation](#).....20

4.03 [Trenching](#)22

4.04 [Backfill](#)23

4.05 [Ground Water Control](#)24

4.06 [Removal and Replacement](#)25

4.07 [Clean-Up](#)26

TABLE OF CONTENTS

SECTION 5 – BORING METHODS

5.01 [Jack & Bore](#)29
5.02 [Directional Bore](#)31

SECTION 6 – PERMITS

6.01 [Permits](#)33

SECTION 7 – FINAL ACCEPTANCE

7.01 [Final Acceptance](#)34

SECTION 8 – RECLAIMED WATER DETAILS

8.01 [Reclaimed Water Details](#)36

INTRODUCTION

The Utilities Commission, City of New Smyrna Beach makes every effort to provide high quality, reliable reclaimed water service to all customers. Providing such service requires that these Rules and Standards be established and administered consistently and clearly understood by all concerned. This publication has been prepared with this in mind and should be helpful to customers, architects, engineers and contractors relative to the installation of new wastewater facilities and the upgrade of existing facilities.

In any case not specifically covered, or if questions arise as to application of these Rules and Standards, contact the Engineering Department prior to design and construction.

These Rules and Standards complement those of the Florida Department of Environmental Protection (FDEP), American Water Works Association (AWWA) Trench Safety Act, Federal Safety codes, such as Occupational Safety and Health Administration (OSHA), and all other applicable City, County and State codes.

DEFINITIONS

ALIGNMENT - The alignment of a pipeline or other line refers to its location and direction.

APPURTENANCE – An accessory part of potable water mains and services necessary for operation, excluding pipe, valves or fittings.

BACKFILL - (1) The operation of refilling an excavation, usually after some structure has been placed therein. (2) The material placed in an excavation in the process of backfilling.

BEDDING - The prepared base or bottom of a trench or excavation on which a pipe or other underground structure is supported.

BELL AND SPIGOT JOINT - A form of joint used on pipes which have an enlarged diameter or bell on one end and a spigot at the other which fits into the bell. The joint is then made tight by lead, cement, rubber "O" ring or other jointing compounds or materials.

CASING - Metal pipe used to seal off a well shaft from the earth surrounding it.

COMPACTION - Tamping or rolling of a material to achieve a surface or density that is able to support predicted loads.

DISTRIBUTION MAINS - Those conduits used to supply reclaimed water to service lines from transmission mains.

DRY TAP - A connection made to a main that is empty.

FLOTATION - The stress or forces on a pipeline or manhole structure located below a water table which tends to fill or float the pipeline or manhole structure.

GATE VALVE - A valve installed in a transmission or distribution main to shut off flow in a section of pipe for the purpose of inspection or repair.

HEAD - (1) A measure of the energy possessed by water at a given location in the water system, expressed in feet. (2) A measure of the pressure of force exerted by water, expressed in feet.

RECLAIMED WATER - Wastewater that receives secondary treatment at a wastewater treatment plant and is reused, but remains non-potable water.

SERVICE LINE - The conduit used for reclaimed water from the distribution main to the property line.

STATIC LEVEL - (1) The elevation of the water table or pressure surface when it is not influenced by pumping or other forms of extraction from the ground water body. (2) The level of elevation to which the top of a column of water would rise, if afforded opportunity to do so, from an artesian aquifer or basin, or a conduit under pressure. Also called hydrostatic level.

TAPPING SLEEVES - A split sleeve used in making a wet connection where a single branch line is to be tapped into a water main under pressure.

THRUST BLOCK - A mass of concrete cast in place between a fitting to be anchored against THRUST and the undistributed soil at the side or bottom on the pipe trench.

TRANSMISSION MAINS - Those conduits used to supply reclaimed water from the wastewater treatment plant to the distribution mains. Also referred to as trunk mains.

VALVE BOXES - Concrete set around a valve stem at finished grade to allow access to the stem in opening and closing the valve. A cover is usually provided at the surface to keep out dirt and debris.

WET TAP - A connection made to a main that is full or under pressure.

SECTION 1 - GENERAL INFORMATION

1.01 CUSTOMER ACCOUNTS

A. Application For Reclaimed Service

Customers requesting reclaimed water service from the Utilities Commission will be asked to complete an Application for New Service with the assistance of a Utilities Commission representative. The application may be made in person or by the Customer's authorized agent. Information to be supplied by the Customer includes personal identification, name to whom bills are to be rendered, street name and house number, zip code, and if in rural territory, other information to assist in locating the Customer's premises. The application should be made as far as possible in advance of the time reclaimed water service is desired. The application will be finalized by a Utilities Commission representative when these and all other applicable Rules and Standards, codes and inspections have been complied with. In addition, a monetary deposit may be required. On acceptance by the Utilities Commission, the application constitutes a service contract and becomes effective at the time the Customer's reclaimed water service is connected. The Utilities Commission will not set the reclaimed water service until the Application for New Service has been made and the appropriate fees and deposit paid. Application and payment for reclaimed water service shall be obtained prior to issuance of a building permit.

B. Deposits/Settlements

Before receiving service, the Customer may be required to pay a monetary deposit, the amount of which shall be set by the Utilities Commission, in accordance with the Customer deposit policy. Such amounts may be changed from time to time by the Commission at its discretion. Information as to the applicable charges will be provided to the Customer by the Utilities Commission Customer Service Department when preparing the application for service. This deposit will refund towards the Customer's final statement balance, any unused portion of the deposit(s), including interest thereon, will be refunded. Refund is contingent upon adequate identification. Deposit receipts are not negotiable or transferable and the deposit is refundable to the Customer whose name appears thereon. It is stipulated that the Customer shall be responsible for all charges incurred by said Customer regardless of the location of service or the number of service locations at which the Customer takes service.

C. Withholding Or Discontinuing Service

The Utilities Commission reserves the right to discontinue service without notice for any of the following reasons:

1. For repairs.
2. For want of supplies.
3. For fraudulent representation in relation to consumption.
4. On account of riots, strikes, insurrections, acts of municipal or other authorities, Acts of God, acts of public enemy.
5. Acts or occurrences beyond the control of the Utilities Commission.

The Utilities Commission reserves the right to discontinue service upon reasonable notice for any of the following reasons:

1. Non-payment of bill when due, in accordance with the disconnect policy.
2. For violation of these Rules and Standards.

The Utilities Commission may withhold a new service or discontinue existing service unless all past due indebtedness to the Utilities Commission at any one or more service locations of a person, family, household, organization or business has been settled in full; provided, however, that said past due indebtedness may, at the option of the Utilities Commission, be transferred to any active account of the Customer and upon so being transferred becomes a part thereof.

1.02 RATES, CHARGES AND FEES

Utilities Commission staff will determine the current Utilities Commission's Rate Schedule or Code which is to apply. In cases where more than one Rate Schedule or Code may apply, the Utilities Commission will advise any Customer as to the rate best adapted to existing and/or anticipated service requirements as defined by the Customer, but does not assume responsibility for continuance of the lowest annual cost under the rate selected.

The Utilities Commission reserves the right to change or amend its Rules and Standards, rates, or other charges, at any time for any reason.

1.03 RIGHT-OF-WAY AND ACCESS

Duly authorized agents of the Utilities Commission shall at all times have access to the Utilities Commission's facilities on the Customer's premises for the purpose of installing, maintaining, inspecting and removing the Utilities Commission's property and shall have access to the premises during normal working hours. Failure to provide such access may be grounds for discontinuance of service. The Utilities Commission shall not be liable for trespass during the performance of these activities. The Customer shall grant or cause to be granted to the Utilities Commission, without cost to the Utilities Commission, all rights, easements, permits and privileges which, in the opinion of the Utilities Commission, are necessary for the rendering of service to the Customer.

1.04 RELOCATION OF THE UTILITIES COMMISSION'S FACILITIES DUE TO CUSTOMER ACTION

Where there is a change in the Customer's operation or construction which, in the judgment of the Utilities Commission, makes rearrangement of the Utilities Commission's facilities necessary, or if relocation of the Utilities Commission's facilities is requested by the Customer for his purposes, such relocation or rearrangement may be performed by the Utilities Commission in accordance with industry practice and the Customer will be responsible for advance payment of all costs associated with said relocation.

1.05 RESALE OF RECLAIMED WATER PROHIBITED

The reclaimed water service purchased from the Utilities Commission shall be used by the Customer only for the purpose specified in the application for service, and the Customer shall not resell such service. Reclaimed water service furnished to the Customer shall be rendered directly to the Customer through the Utilities Commission's individual meter, shall be for the Customer's own use, and shall not be re-metered by the Customer for the purpose of selling reclaimed water service to lessees, tenants or others.

1.06 SUB-SERVING BY CUSTOMER PROHIBITED

The Customer will not build or extend his lines across or under a street, an alley, lane, court, avenue or right-of-way in order to furnish service for another property through one meter even though such adjacent property is owned by the Customer, unless written consent is obtained from the Utilities Commission. Consent may be given only when such adjacent properties are operated as one integral unit, under the same name, for carrying on parts of the same business. When and if such consent is given, the Customer must obtain any necessary City, County or State permits, and all construction shall be in accordance with applicable codes, installed by duly licensed professionals, and subjected to

applicable inspection by authority having jurisdiction.

1.07 LIMITS OF THE UTILITIES COMMISSION'S LIABILITY

The Utilities Commission will use reasonable diligence at all times to provide dependable service, but does not GUARANTEE, NOR WILL IT BE LIABLE TO THE CUSTOMER FOR COMPLETE OR PARTIAL FAILURE OR INTERRUPTION OF SERVICE.

The Utilities Commission shall not be liable for any occurrence, act or omission caused directly or indirectly by mechanical failure of equipment and/or facilities, by repairs or adjustments to its system, or for want of supply, or by riots, strikes, civil unrest, insurrections, accident, litigation, interference by Federal, State or Municipal Governments, acts of God, acts of the public enemy or any other cause beyond the Utilities Commission's control.

Until the reclaimed water enters the right-of-way or easement of the Utilities Commission, it remains the property of the Customer and the Utilities Commission is not liable for loss or damage to any person or property whatsoever resulting directly from the use, misuse or presence of said reclaimed water on the Customer's premises.

1.08 THE UTILITIES COMMISSION DOES NOT WORK ON CUSTOMER'S FACILITIES

Except as may be specifically mentioned in these Rules and Standards or in related Utilities Commission Policies and Procedures, the Utilities Commission does not install or repair service lines on Customer's premises. The Utilities Commission cannot be responsible for the reclaimed water system beyond the point of the Customer's property line and/or easement and does not assume any responsibility for or liability arising because of the condition of lateral lines or apparatus on the premises of any Customer beyond this point.

1.09 BASIC REQUIREMENT FOR CUSTOMER'S FACILITY

All service lines of the Customer shall be installed in accord with these Rules and Standards and in compliance with the latest guidelines of local inspection authorities. All installations must be inspected and approved by an authorized inspector as required by law. The Utilities Commission may refuse service to any new or altered installation or disconnect service to any existing installation which, in the opinion of the Utilities Commission, constitutes a hazard to the public, to other Customers, or to its employees. The Customer is cautioned against the purchase and use of equipment that is not approved by competent authority.

1.10 DEVELOPER'S AGREEMENT AND ADDENDUM

Developers of commercial or residential projects are required to enter into a Developer's Agreement and Addendum with the Utilities Commission. Contact the Engineering Department for further details.

1.11 MAJOR USER

Developers of projects which anticipate an average capacity of 100,000 gallons a day of reclaimed water or more are required to enter into a Major User Reclaimed Water Delivery Agreement with the Utilities Commission. Contact the Engineering Department for further details.

SECTION 2 – RECLAIMED WATER PIPE, FITTINGS AND VALVES

2.01 PIPE AND FITTINGS

All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer, the batch number, the location of the plant and strength designation, as applicable. All reclaimed water pipes and aboveground cross connection control devices shall be adequately identified by the color purple AND EXHIBIT IDENTIFIABLE “NON-POTABLE” NOTICES, MARKINGS OR CODINGS TO ENSURE THAT CROSS CONNECTION DOES NOT OCCUR.

Contractor shall follow manufacturer requirements for pipe joint insertion. If the Utilities Commission inspects and sees that a pipe joint is over inserted, the Contractor will be required to remove and re-install.

A. Ductile Iron

Ductile Iron (DI) pipe shall be in accordance with AWWA Standard C150 and C151. DI pipe fittings shall conform to AWWA Standard C110. DI and shall be installed in accordance with AWWA C600.

Ductile iron pipe and fittings for shall be cement-mortar lined as specified in AWWA Standard C104.

Polyethylene encasement is required and shall comply with the applicable provisions of AWWA Standard C105.

B. Polyvinyl Chloride

Polyvinyl Chloride (PVC) pipe shall be manufactured from clean virgin Type I, Grade I rigid un-plasticized polyvinyl chloride resin conforming to ASTM Designation D1784. PVC pipe for reclaimed water use shall have the National Sanitation Foundation (NSF) seal and conform to AWWA Standard C900 for 4 inch through 12 inch mains and AWWA Standard C905 for 14 inch and larger mains. PVC pipe for reclaimed water mains shall have a minimum dimension ratio (DR) 18.

PVC pipe lengths shall be 20 feet with bell and spigot ends or mechanical joint only. Lubrication used for pipe and fitting joints shall be non-toxic. PVC pipe shall be installed in accordance to AWWA C605.

Connections for pipe 2 inches in diameter and larger shall be rubber compression ring type. Pipe shall be extruded with integral thickened bell walls without increase in DR. Rubber ring gaskets shall be removable and consist of synthetic compounds meeting the requirements of ASTM Designation D1869, and suitable for the designated service. Other

connections shall be lubricant slip type joints.

C. Galvanized Steel

Black or Galvanized Steel (GS) pipe shall not be used. PVC, copper, brass, stainless steel and other corrosion resistant materials may be substituted where approved by the Director of Engineering.

D. Polyethylene

Polyethylene (PE) pipe or tubing shall be purple in color and shall conform to AWWA Standard C901 and comply with ASTM Designations D1248 (materials), D2239 (pipe) and D2737 (tubing) and shall have the National Sanitation Foundation (NSF) seal. The product shall be rated for a minimum working pressure of 200 psi. Fittings shall be brass, equipped with compression type connections, Mueller 110, as manufactured by Mueller Co., or approved equal.

E. High Density Polyethylene

High Density Polyethylene (HDPE) pipe shall be SDR 11 DIPS with a purple stripe.

F. Joints

All bends, reducers, dead ends, and valves in buried pipe systems must be properly and adequately restrained against movement due to the resultant thrust at the specified test pressure.

Push on pipe joints and mechanical joints shall be in accordance with AWWA Standard C111.

Restrained joint assemblies for mechanical joint pipe shall be ductile iron mechanical joint retainer glands as manufactured by American Cast Iron Pipe Company, or approved equal.

Restrained joint assemblies for push on pipe shall be EBBA Iron Inc. MEGALUG Series 1100, Ford Uni-Flange Series 1350 or U.S. Pipe Field-Lok gaskets instant joint restraint, or approved equal.

Flexible type joints shall be of the boltless type, with a joint deflection of 15 degrees, and shall be Flex-Lok as manufactured by American Cast Iron Pipe Company, or approved equal.

Flanged connections shall be in accordance with AWWA Standard C115, 125 lb. standard. Full faced type rubber gaskets of an approved quality

equal to Rainbow gaskets 1/8-inch thick, as manufactured by the U.S. Rubber Company, shall be used. Bolts and nuts shall be Grade B conforming to the AWWA Standard C111 for Steel Machine Bolts and Nuts and Tap Bolts. Stainless steel bolts and nuts are required in all corrosive environments conforming to ASTM F593.

Compact fittings shall be from 4 inches through 24 inches cast from ductile iron in accordance with AWWA Standard C153 with mechanical joint bells. Glands, bolts, nuts and gaskets shall be in accordance with the requirements of AWWA Standard C153. Fittings shall be listed by an approved certifying agency as conforming to the requirements of NSF/ANSI Standard 61. The working pressure rating shall be 350 psi. Fittings shall have an asphaltic outside coating in accordance with AWWA Standard C153. Fittings shall be cement lined and seal coated in accordance with AWWA Standard C104.

Pipe expansion joints shall be suitable for the applicable service with a minimum 100 psi working pressure and shall be Style No. 500, as manufactured by Mercer Rubber Co. or approved equal.

Thrust blocks shall be ready-mix concrete poured between the fitting and undisturbed earth. Concrete for thrust blocking shall have a 28 day compressive strength of 2500 psi and shall be carefully placed so that the fitting joints will be clear and accessible for repair. All fittings shall be wrapped with polyethylene prior to pouring the block. All thrust blocks must be neatly formed to the shape and dimensions shown on the approved Construction Drawings or as indicated by the Engineer. No thrust block shall be poured until the Engineering Department Inspector has visually observed the forming for the thrust block.

G. Flanged Coupling Adapters

Units shall be as manufactured by Clow Corporation, or approved equal, and shall be compatible with ANSI Standard B16.1, 125 lb. flanges.

H. Cast Couplings

Units shall be as manufactured by Clow Corporation, or approved equal. Gaskets shall be suitable for the applicable service conditions.

I. Tapping Sleeves

Units shall be fabricated of stainless steel type, mechanical joint type and suitable for either wet or dry installation and shall be as manufactured by Ford Meter Box Company, or approved equal. Tie straps shall be stainless steel and bolts shall be epoxy coated.

J. Service Saddles

Service saddles for ductile iron, asbestos-cement and plastic pipe shall be double strap. Sealing gaskets shall be suitable for the applicable service and straps shall be corrosion resistant alloy steel, or approved equal.

2.02 VALVES

The valve type, size, rating, flow direction arrow, if applicable, and manufacturer shall be clearly marked on each unit. Valves shall open left (counterclockwise), with an arrow cast in the metal of operating hand wheels and nuts indicating the direction of opening.

A. Gate Valves

Gate valves shall be used for reclaimed water mains 12 inches or less and conform to AWWA Standard C509. For underground service, gate valves shall be iron body, non-rising stem type, resilient seat and shall be equipped with 2-inch square cast iron wrench nuts. For aboveground service, gate valves shall be iron body and shall be outside screw and yoke (OS&Y), rising stem type. Valves shall have cast iron hand wheels or chain operators with galvanized steel chain, as required.

B. Butterfly Valves

Butterfly valves shall be used for reclaimed water mains 14 inches or larger and conform to AWWA Standard C504. Valves shall be cast or ductile iron body, alloy cast iron or ductile iron disc, body mounted seat, one-piece stainless steel shaft (short or long body type) and the valve class, shaft size and other special requirements selected in accordance with the specific design. Valve operation shall be by approved gear actuators, with sealed enclosures for buried or submerged service. Position indicators shall be furnished, as required. Units shall be equipped with actuating nuts, cast iron hand-wheels or chain operators, with galvanized steel chains, as appropriate for the installation. Appurtenances shall be furnished by the valve manufacturer.

Tapping Valves

Valves shall conform to the specifications set forth above, for the applicable service conditions. Additionally, units shall be compatible with the connecting sleeve or saddle and specially designed for wet tapping installation operations. All tapping valves will be of a full port type.

Tapping valves 2-inch or smaller shall be cast iron, wedge disc, non-rising stem or resilient seat and 150 psi minimum working pressure, equipped with 2-inch square cast iron wrench nuts.

C. Blow-off Valves

Blow-off valves shall be a 2-inch lock type valve and shall be spaced as directed by the Engineering Department.

D. Air Release Valves

The air release valves for use in water mains shall be installed as shown on the approved Construction Drawings. Valves shall be provided with a vacuum check to prevent air from reentering the line. The fittings shall be threaded. They shall be plastic manufactured by A.R.I. Flow Control Accessories series D-050 or approved equal.

E. Corporation Stops and Curb Stops

Units shall be brass, ball valve type, full port, equipped with connections comparable with the connecting service pipe type, threaded in accordance with AWWA Standard C800, and as manufactured by Mueller Co., Ford Meter Box Company, or approved equal. Units shall be rated for a minimum 150 psi working pressure, equipped with a vacuum ball to prevent air return.

F. Backflow Prevention Devices

Devices to prevent backflow shall be specified, furnished, and installed by the Utilities Commission based on the hazard class of the Customer. Double check valve assemblies shall be used in low hazard services where reclaimed water is served. The double check valves shall be installed in a vault below finished grade.

Reduced pressure zone (RPZ) assemblies shall be used in high hazard properties including but not limited to medical, dental, funeral and chemical services. The RPZ shall be installed above ground.

2.03 APPURTANANCES

A. Actuators

Valves 14 inches and larger shall be equipped with approved gearing actuators, with sealed enclosures for buried or submerged service, and shall be furnished by the valve manufacturer. Position indicators shall be furnished as required.

Valves 14 inches or larger shall be installed horizontally and as follows:

- Installed in vertical pipe with horizontal stem shall be fitted with approved slides, tracks and shoes to assist the travel of the gate assembly.
- Installed in horizontal pipe with horizontal stem and shall be equipped with approved rollers, tracks and scrapers to assist the travel of the gate assembly and to clear the track of obstruction.

B. Meter Boxes

All meter boxes shall be of appropriate size for the meter installed. They shall be fiberglass reinforced polymer concrete with corresponding size traffic lid, and flush with the finished ground or sidewalk surface. The traffic lid shall be imprinted *RECLAIMED WATER*.

All meter boxes or large meter sets shall be located at the Customer's property line or on property with easements, if required. All meter box covers shall be flush with finished property surface to allow easy access.

C. Wall Sleeves

Units shall have integral annular ring water-stops, and also conform to requirements for DI fittings specified in this Section.

SECTION 3 – RECLAIMED WATER DISTRIBUTION SYSTEM

Before performing any work outside the designated limits of the work site, the contractor shall secure any necessary permits and/or authorization from the applicable Owner, or verify that such has been previously obtained. All requirements of any said permits or authorization shall be followed. Prior to construction operations, a minimum of 48 hours notice shall be provided to the Engineering Department.

All materials shall be delivered and distributed at the site by the Contractor. All pipe, fittings, valves and accessories shall be loaded and unloaded by hoists or skidding so as to prevent shock or damage to the material or protective coatings. Materials handled on skid ways shall be skidded or rolled against material already on the ground. Under no circumstances shall material be dropped.

Pipe shall be so handled that the lining will not be damaged. If, however, any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense in a manner satisfactory to the Engineering Department.

In distributing the material at the job site, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. The Contractor shall not block walks or private driveways with such material.

Occasionally, obstructions may be encountered during the progress of the work which were not indicated on the approved Construction Drawings. If such obstructions interfere to such an extent that revisions to the Drawings are required, the Engineer will make such changes or arrange with the owners of the structure for their removal, relocation or reconstruction.

The maximum permissible deflection of pipes and fittings shall not exceed the manufacturer's recommendations.

3.01 DESIGN REQUIREMENTS

Design and installation of the reclaimed water distribution system shall follow the requirements of the Florida Department of Environmental Protection (FDEP), American Water Works Association (AWWA), Trench Safety Act, Federal Safety codes, such as Occupational Safety and Health Administration (OSHA), and all other applicable City, County and State codes.

Reclaimed water distribution system shall be independent of all other systems. Any physical connection or arrangement which could allow the movement of fluids between the reclaimed water distribution system and any other piping system shall be prohibited.

<u>Pipe and Fittings</u>	<u>Size Range</u>
Ductile Iron Pipe & Fittings and Cement Mortar Lines	No Limit
Polyvinyl Chloride Pipe and Cast Iron Fittings	24" or Less
Polyethylene Pipe and Brass Fittings	Service Connections Only

<u>Valves</u>	<u>Size Range</u>
Gate Valves (Resilient Seat)	12" or Less
Butterfly Valve	14" or Larger
Corporation Stops and Curb Stops	Service Connections Only

3.02 RECLAIMED WATER MAIN INSTALLATION

A. Installation

All pipe, fittings and valves shall be installed at alignment and depths shown on the approved Construction Drawings. The minimum depth of cover for buried pipe is 30 inches from finished grade to top of pipe.

All pipe sections, joints and fittings shall be checked for damage or defects such as cracks, blisters, coating/lining separation, gouges, etc. before it is placed in the trench. Any damaged or defective materials found shall not be installed, but shall be marked REJECTED and immediately removed from the work site.

Proper implements, tools, and facilities satisfactory to the Engineering Department shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, valves and hydrants shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped in the trench.

All debris, sediment accumulation, sand and other foreign matter shall be removed from the interior of all pipe and fittings before installation. Likewise, joint surfaces such as gaskets, gasket grooves, spigots and bells shall be thoroughly cleaned of sand and grit before joining. Care shall be taken to prevent sand and grit from contaminating gasket lubricants. As work progresses, the installed pipe system shall be kept free of dirt, trench water and other foreign matter. All open ends of the pipe line shall be sealed with watertight caps or plugs whenever work is not in progress.

The pipe spigot shall be aligned with and centered to its mating bell before it is inserted. It shall be placed evenly into the bell in a straight line to the seating depth. Care must be taken not to over bell the joint. Required deflections shall not be made until the joint is seated.

Jointing shall be by an approved method and shall not require undue force to accomplish full satisfactory seating and assembly. If possible, joining should be done by hand or push-bar with a cushion block. If mechanical methods are required to join the pipe, care shall be taken not to deform, gouge, chip or otherwise damage the pipe or significantly disturb the bedding. Popping-on or swinging the spigot into the bell shall not be allowed under any circumstances. Fittings and appurtenances must not bear on the pipe when they are installed. They must be fully and independently supported on the bedding or on a permanent foundation.

No pipe or structures shall be installed in a wet trench. All bedding material must be dry and firm. The free water surface shall be lowered to at least 12 inches below the bedding surface before placing pipe or structures and maintained at this depth throughout bedding, hunching, and backfilling. Afterwards the water level shall be maintained sufficiently below the working surface to allow compaction of the remaining backfill to the required density and until all density tests have been performed.

It is the Contractor's responsibility to prevent installed, empty pipe from flotation. Flotation of pipe may be prevented by the timely placement of backfill or approved anchoring devices. If a pipe floats for any reason, the Contractor shall reinstall pipe to the proper alignment and depth at his expense.

Reclaimed water mains shall be laid with a magnetic purple detection tape, *Caution: Buried Reclaimed Water Line Below*. The tape shall be tied to each valve and fitting and run continuously between valves and fittings with no splices. The tape shall be placed directly above the pipe centerline at a maximum depth of 18 inches below finished grade. Backfill

over the tape must be placed with care to prevent displacement or damage of the tape.

PVC and HDPE pipe shall be laid with a purple covered wire, gauge #14, and shall be buried directly above the centerline of the pipe.

Further, purple 4 foot indicator poles (2 feet above finished grade, 2 feet below finished grade) installed every 1000 feet shall be used in pipe installations greater than 1000 feet.

Connections at structures shall be cut accurately and worked into place without forcing and shall align with the connecting point. Flanged joints shall be made up tight, but with care taken to prevent undue strain upon equipment or other items. Suitable flange filler rings shall be installed where required to provide suitable joints. The installation shall be permanently watertight, with no visible leakage at joints, connections with structures, or other locations, under operational or testing conditions. Material that in jointing does not remain completely seated and/or watertight shall be rejected.

Subaqueous pipe laying may be permitted where conditions make it impractical to lay pipe in the dry conditions, provided the Contractor submits his plans for laying pipe underwater to the Engineering Department, and obtains advance approval thereof.

Where waterways, canals, ditches or other cuts are crossed, protective concrete slabs shall be installed across and to 10 feet each side of the bottom. Additionally, approved utility crossing signs shall be placed on the pipe alignment at each side of the canal, etc. Signs shall be at minimum 12 inches by 18 inches 80 gauge aluminum with bright yellow background and 2 inch black reflective letters, worded *Caution Reclaimed Water Main Below*. Signs shall be mounted on an 8 foot galvanized U channeled post. Subaqueous crossings will require advance approval by the Engineering Department.

Ductile iron pipe and fittings exposed to view in the finished work which are to be painted shall not receive the standard tar or asphalt coat on the outside surfaces but shall be primed on the outside with one coat of a rust inhibitive primer. Should portions of the pipe inadvertently be given the outside bituminous coating instead of the rust inhibitive primer the surfaces shall be sealed with a non-bleeding sealer coat, then painted with two coats enamel. The color shall be selected by the Owner. Exposed pipe which is not to be painted shall receive the standard bituminous coating.

All aboveground or exposed piping shall be properly and adequately supported. Hangers, supports, base elbows and tees, and concrete piers and pads shall be provided as indicated on the approved Construction Drawings. Unless otherwise indicated, supports shall be placed approximately 8 feet on centers and at each fitting.

B. Valves

Valves shall be carefully inspected, opened wide, and then tightly closed, and all the various nuts and bolts thereon shall be tested for tightness. Special care shall be taken to prevent joint materials, stones or other substances from becoming lodged in the valve seat. Valves, unless otherwise required, shall be set with the stems vertically above the center line of the pipe. Any valve that does not operate correctly shall be adjusted to operate properly or removed and replaced.

Buried valves shall be installed vertically where depth of cover permits. Where depth of cover does not permit, the valve shall be mounted horizontally. Extension stems shall be provided on all buried valves when the operating nut is deeper than 3 feet below the finished grade, with sufficient stem extension to place the nut not more than 3 feet below finished grade. Where extension stems are required within valve boxes, approved insert stem guides shall be provided.

All valve boxes shall be constructed of cast iron. The valve box shall not transmit surface loads directly to either the pipe or valve. Valve boxes shall be carefully centered over the operating nuts of underground valves to permit a valve wrench to be easily fitted to the nut. The tops of valve boxes shall be set to the required finished grade. Care shall be taken to prevent earth and other material from entering the valve boxes. A concrete support collar shall be provided for the valve box. Valve box covers shall be imprinted with the word *RECLAIMED*.

C. Connections To Existing Reclaimed Water Mains

Where shown on the approved Construction Drawings or directed by the Engineering Department, the reclaimed water mains constructed shall be connected to the existing mains now in place. No such connection shall be made until all requirements have been met and the plan of the cut-in to the existing main has been approved by the Engineering Department.

All connections to the existing reclaimed water mains shall be made by Utilities Commission personnel, unless a certified underground utility contractor has otherwise specifically been approved by the Engineering Department.

In order to allow ample time for the making of any necessary changes in the connection details, the Contractor shall locate the existing main or mains both vertically and horizontally and verify their exact size in advance of making the connection.

No service connections shall be made without prior consent of the Engineering Department.

Any reclaimed water pipe that is out of service shall (not necessarily abandoned) be capped, plugged or repaired with proper size pipe fittings to prevent migration of surrounding soils, except if pipe is abandoned and grout filled.

D. Reclaimed Water Service Connections

All house services shall include the following: lock type curb stops, unions as required, corporation stops and goosenecks.

Service connections to reclaimed water mains (other than DI) of 6 inches or larger shall be made by the drilling of the appropriate size hole and the installation of service clamps. A corporation stop shall be placed at the saddle or fitting with the service line extended to the property line, perpendicular to said line, and terminating with a plugged curb stop, pending meter installation. Exact location for each installed service shall be marked. All corporation stops shall be installed under pressure using an approved tapping machine. All corporation stops in PVC pipe shall be installed in saddles.

All reclaimed water service line hook-ups of the following sizes shall be connected in a meter box:

<u>Meter Size</u>	<u>AWWA Rated Capacity</u>
¾"	House Service
1"	House Service
2"	80 gpm

All reclaimed water service hook-ups listed below shall be connected in a large meter set aboveground:

<u>Meter Size</u>	<u>AWWA Rated Capacity</u>
3"	150 gpm
4"	250 gpm
6"	500 gpm
8"	800 gpm

Where pipes are to extend into or through structures, flexible joints shall be provided at the wall face.

All services under roads shall be installed in PVC Schedule 40 casings or material as may be approved by the Engineering Department (1 ½ inch for single 1 inch services and 3 inch for double 1 inch services).

It shall be the responsibility of the Contractor to record and report to the Engineering Department each service connection and type installed. Each corporation stop shall be located by a distance along the reclaimed water main to the nearest gate valve. This information shall be presented to the Engineering Department in the as-built drawings.

3.03 PRESSURE TEST

No interconnection between the work and an existing active system shall be made without the approval of the Utilities Commission and until the proper clearance/permits are issued by the various permitting agencies.

Not more than 1000 feet, or as directed by the Engineering Department Inspector, of force main shall be hydrostatically leak tested (pressure tested) in any single operation.

Testing, repair or replacement shall be at the Contractor's expense. All equipment, materials, pumps, gauges, measuring equipment, labor, transportation, etc., required to pressure test the pipe system shall be furnished by the Contractor and subjected to the Engineering Department's approval prior to use. All temporary connections, approved by the Engineering Department, necessary to pressure test shall be installed by the Contractor. Upon completion of this work, the Contractor shall install all appropriate plugging/capping devices or permanent connections where required.

The Contractor shall give the Engineering Department 48 hours advance notice of the time when the force main is ready for a pressure test. Tests shall be run in the presence of the Engineering Department Inspector.

Pipe shall be hydrostatically leak tested for tightness for a minimum duration of two hours under a constant hydrostatic gauge pressure of 100 psi. Unless otherwise specified, the allowable leakage rate shall not exceed that required by AWWA Standard C600 or C605, calculated by the following equation:

$$L = (S \times D \times P^{1/2}) \div 148,000$$

L = Allowable leakage rate in gallon per hour (gph)

S = Length of pipe tested in feet

D = Nominal diameter of the pipe in inches

P = Average test pressure in pounds per square inch (psi)

There shall be no additional leakage allowance made for bends, fittings or valves. No visible leakage will be allowed. If such leakage is noted or if the allowable leakage is exceeded, the Contractor must locate and repair all leaks at his expense to the Engineering Department Inspector's satisfaction and the pressure test repeated in its entirety until the pressure tested section is acceptable. The pressurizing equipment shall be designed and operated so that pressure surges within the pipe are minimized.

Any cracked or defective pipes, fittings or valves discovered in consequence of the pressure test shall be removed and replaced by the Contractor with sound material and the pressure test shall be repeated until approved by the Engineering Department Inspector, prior to final acceptance.

No pipe section containing thrust blocks shall be pressure tested until at least seven days after the concrete was poured. However, if high early strength cement was used, only three days must elapse before testing.

When the pressure test has been successfully completed all valves shall be operated to ensure they are opening and closing fully.

The Contractor shall perform a preliminary pressure test to determine the tightness of the pipe and fittings prior to final pressure test.

SECTION 4 - CONSTRUCTION

Contractor shall follow requirements of the Florida Department of Transportation, 29 CFR Part 1926 Subpart P – Excavations, the Trench Safety Act, and all other applicable City, County, State, Federal safety codes, such as OSHA, at all times when performing work within the Utilities Commission's service area.

Further, the Contractor is required to comply with all provisions of Sunshine State One-Call regarding underground utility locates.

If, in the opinion of the Engineering Department, it is necessary to control dust during the construction period, the Contractor shall furnish and spread water or calcium chloride at points where dust is a nuisance or as directed by the Inspector. This cost will be the Contractor's responsibility.

4.01 MAINTENANCE OF TRAFFIC

The Contractor shall erect and maintain the required barricades and construction signs, provide sufficient number of competent flagmen, provide proper storage of construction materials and take all necessary precautions for the protection and safety of the public. All barricades and obstructions shall be illuminated at night and all light shall be kept burning from sunset until sunrise, and at other times when weather conditions necessitate.

The Contractor shall provide the required warning and directional signs at all road closures, intersections and along the detour routes, directing the traffic around the closed portions of the roadway. A temporary detour route shall be indicated clearly throughout its entire length. A pre-approved detour plan may be required for heavily traveled roadways.

When required, the Contractor shall provide suitable crossings at street intersections and driveways, and supply such aid as may be required for pedestrians and motorists, including delivery vehicles, to safely negotiate the construction area.

4.02 EXCAVATION

The Contractor shall perform all excavations to the alignment and depth that will result in the construction of the pipe alignment and depth of cover shown on the approved Construction Drawings.

Care shall be taken not to excavate below the required depth and if excavation is carried below the required depth, the overcut depth shall be backfilled with Type - B backfill material or bedding material compacted to provide pipe support at least equal to that of the original material, all at no cost to the Utilities Commission.

All excavated material retained for backfill shall be piled in such a manner as not to endanger the work or obstruct sidewalks, driveways, or drainage. Fire hydrants, valve pit covers and boxes, curb stop boxes, fire and police call boxes and other utility controls shall be unobstructed and accessible at all times during construction.

The Contractor shall exercise sound construction practices in excavating the trench and maintaining it so that no damage will occur to any foundation, structure, pole line, pipeline or other facility because of slough of slopes, or from any other cause. If, as a result of the excavation, there is disturbance of the ground such as to endanger other property, the Contractor shall immediately take remedial action at his own expense. No act of the Utilities Commission shall in any way affect the liability of the Contractor for damages, expenses or costs that may result from trench excavation.

All existing underground utilities and facilities, whether or not they are shown on the approved Construction Drawings or their locations are made known to the Contractor prior to excavation, shall be protected from damage and, if damaged, shall be repaired to equal the prior serviceability or replaced in kind at the Contractor's expense. The Utilities Commission does not assume responsibility for the correctness of the locations shown on the Drawings or that all such facilities are shown. Repairs or replacement shall be made at the earliest practicable time and in no case shall the Contractor leave the job at the end of the day without making all such repairs or satisfactory arrangements for subsequent repairs.

Trees, stumps and roots within the limits of the trench excavation shall be removed to a depth of at least 12 inches below the bottom of the trench. Stump and root holes shall be refilled to existing grade and compacted. No stumps, roots, or organic matter of any description shall remain under concrete slabs or footings.

Rock excavation shall be carried to a depth at least 6 inches below the required pipe invert grade except that the compacted bedding under the bell of the pipe shall be at least 4 inches in depth. The bottom of the trench shall be brought up to finished grade by backfilling with Type B backfill or bedding material and compacted. Blasting is prohibited.

4.03 TRENCHING

Trenches for gravity sanitary sewers and force mains shall be a depth which will provide a minimum of 36 inches cover from top of pipe to finished grade, except as otherwise shown or directed. The width of the trench at and below the top of the pipe shall not exceed 6 inches on either side of the pipe. The width of the trench above the top of the pipe shall be as nearly vertical as practicable. Excess excavated material, unsalvageable material, and debris shall be wasted and disposed of by the Contractor.

The trench shall be dry when the bottom is prepared. In addition, bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from, and is uniformly supported by, the bottom of the trench. Preparation of the trench bottom and placement of the pipe shall be such that final position of the pipe is true to the alignment and depth and uniformly supported throughout the barrel of each pipe length.

When pipe is placed in backfill over rock or other over depth, additional backfill of the same material shall be tamped on each side of the barrel to the height of the spring line, thus forming a trough of firm bedding.

Wherever excavation of the trench exposes unsuitable materials such as peat, soft clay, quicksand or other unstable material in the bottom of the trench which, in the opinion of the Engineering Department, is unsuitable foundation upon which to lay or support the pipe, backfill and expected superimposed loads, such unsuitable materials shall be removed to a depth necessary to reach material having adequate bearing capacity and at a width of trench at least equal to the minimum trench width as specified. The space created by removal of this unsuitable material shall be backfilled using bedding material.

Excavation for appurtenances shall be made to a size that will allow at least 12 inches between their surfaces and the embankment or shoring. Over width shall be at the expense of the Contractor.

Where sheet piling, shoring, sheeting, bracing or other supports are required to protect adjacent property or the Work, or are necessary for the safety of the workmen or the Public, they shall be designed, furnished, placed, maintained and removed by the Contractor. Sheet piling and timbers used in trench excavations shall be withdrawn in such a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

The use of horizontal struts below the barrel of pipe or the use of the pipe as support for trench bracing will not be permitted. In pipe line construction the use of the soldier pile and horizontal lagging method of support or the use of a traveling shield shall require the prior written permission of the Engineering Department.

4.04 **BACKFILL**

Type B material is a select granular material free from organic matter and of such size and gradation that the desired compaction can be readily attained. When tested in accordance with ASTM D422, it shall conform to the following requirements:

- Maximum size shall not exceed 3 inches.
- At least 95 percent shall pass the 1 ½-inch sieve and not more than 10 percent shall pass the No. 200 sieve.
- The coefficient of uniformity shall be six or greater.
- The material shall have a sand equivalent of 35 percent or greater.
- The material may be clean natural sand or gravel, imported quarry waste, select excavation or mixture thereof. No Type B material shall be used unless it has been approved by the Engineering Department. Samples of the material shall be submitted a sufficient time in advance of intended use to enable its inspection and testing.

Type D material is an unclassified material obtained from the Contractor's excavations. The material shall be substantially free from wood, roots and other organic matter.

- The maximum size of stone shall not exceed 3 inches.
- Gravel base shall be clean, washed, well-graded rounded gravel or crushed rock of 1 ½-inch maximum size and 3/8-inch minimum size. No gravel base material shall be used unless it has been approved by the Engineering Department.
- Bedding material shall be 3/4-inch nominal size coarse aggregate. When tested in accordance with ASTM D422 it shall conform to the following gradation requirements:

○ Passing 1-inch sieve		100%
○ Passing ¾-inch sieve	90	100%
○ Passing 3/8-inch sieve	20	55%
○ Passing No. 4 sieve	0	10%

- The material shall be free from soft, laminated and thin pieces. Limestone from the Brooksville formation may be permitted at the Contractor's option if the material furnished substantially meets the requirements herein set forth.

DI pipe bedding material shall be clean sand, Type D material. PVC bedding material in areas above the natural ground water table shall be fine sand or shell, or a mixture of both. PVC pipe bedding material shall be crushed stone, Type B material at any point where the trench bottom is below the natural ground water table.

After the pipe has been properly laid and inspected, backfill material shall be placed in layers, each layer being compacted as necessary so that a depression along the trench line will not result due to settlement. Contractor shall achieve the specified maximum dry density/optimum moisture content per the approved Construction Drawings. The Contractor may be required to submit all density tests to the Engineering Department for review.

Backfill consisting of Type D material shall be carefully placed equally around the pipe to a depth of 6 inches and shall be spaded, walked in and compacted with hand tampers to obtain a firm, dense support for the pipe. Backfill material shall not be obtained from the trench walls.

When one such layer is completed on both sides of the pipe a second layer shall be started. The backfill material shall then be placed in 12 inch lifts and compacted, using mechanical compaction equipment, each layer being compacted to the required density prior to placing the next layer. Backfill for structures shall be compacted a minimum distance of 5 feet from the outside wall of the structure.

The Contractor may elect to compact the backfill above the level of the initial backfill by flooding provided he has secured prior written approval from the Engineering Department for each location. When compacted by flooding is to be done, the backfill material shall be coarse grained gravel, gravel-sand or sand, free of clay, having not more than five percent (5%) by weight which passes a No. 100 U.S. Standard sieve and no material which passes a No. 200 U.S. Standard sieve. In addition, the character of the soil through which the trench passes shall be clayey-gravel or gravel-sand-silt mixtures which possess permeability sufficient to result in the flooding water being drained away in a reasonable time not to exceed three days. Any tests required to determine if the backfill material or soil adjacent to the trench is suitable for compaction by flooding shall be the sole responsibility of the Contractor.

4.05 GROUND WATER CONTROL

The Contractor shall furnish, install and operate all necessary machinery, appliances, and equipment to keep excavations reasonably free from water during construction and shall dewater and dispose of the water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. The Contractor shall at all times have on hand sufficient pumping

equipment and machinery in good working condition for all ordinary emergencies, and shall have available at all times competent workmen for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, or holidays or weekends, or during work stoppages without written permission from the Engineering Department.

The control of ground water shall be such that softening of the bottom of the excavations or formation of quick conditions or boils shall be prevented. Dewatering systems shall be designated and operated so as to prevent the removal of the natural soils.

The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils and allow the placement of backfill to the required density. The dewatering system shall be installed and operated so that the ground water level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

The release of ground water to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted fill or backfill, and prevent flotation or movement of all structures and pipelines.

The Engineering Department will not accept pipe that floats due to lack of ground water control and shall require the Contractor to reinstall any pipe that is rejected.

4.06 REMOVAL AND REPLACEMENT

Road surfaces, curb and gutter, driveways, sidewalks, parking locations and any other type of surface materials that require removal for the purpose of installation of underground utilities shall be replaced as soon as practicable after compaction of the backfill and in accordance with City, County or Florida Department of Transportation standards or as indicated on the respective permit. These surface materials shall be separated from other excavated materials and will not be permitted to be included in the backfill but shall be satisfactorily disposed of by the Contractor. Surface material to be removed shall be cut, if necessary, vertically with a power-driven friction saw prior to removal. The surface shall be scored in sufficient depth to provide uniform straight break lines.

Under no condition shall pavement be cut with a trenching machine, power shovel or backhoe. The width of cut of the pavement or sidewalk shall be the width of the trench plus one-half the trench width, or a minimum of 2 feet on either side. In the event that the trench excavation becomes wider than the initial cut, the pavement or sidewalk shall be re-cut to at least 2 feet back from all edges of the actual excavation by the Contractor at his own expense. Utility crossing and installations along state highways shall be made in full compliance with Florida Department of Transportation (FDOT) requirements.

4.07 CLEAN-UP

Clean-up is an essential part of the work. As the work progresses and is completed, the Contractor shall clean the site of all signs of operation to the satisfaction of the Engineering Department. This clean-up shall be done as promptly as practicable and shall not be left until the end of the construction period. No part of the work shall be considered complete until clean-up is completed.

Included in clean-up is protection of road shoulders, ditch banks, and other natural or artificial slopes subject to rapid erosion. Except where soil-cement rip-rap is shown and/or directed, this protection shall be by grassing and mulching. A satisfactory stand of grass shall be obtained by sprigging, sodding or seeding over the entire work site. Seeding with Bahia under the direct supervision of a qualified landscaper may, with specific approval of the Engineering Department, be substituted for sprigging or sodding in areas not specifically shown to be solidly sodded.

A. Sprigging

The Contractor shall apply 4-8-4 fertilizer at the rate of six hundred pounds per acre by means of mechanical spreaders to the area to be sprigged. Live sprigs which match the existing grass, with roots uninjured, shall be immediately planted in rows. The distance between rows and between plants in the rows shall not exceed one foot. After planting, the entire area shall be compacted lightly by means of tractors, or rollers. After sprigging, the Contractor shall water the sprigs as required until the Contract is complete and accepted by the Utilities Commission during Final Inspection.

B. Sodding

Sod shall be placed solidly in the areas shown on the approved Construction Drawings. Immediately before the sod is placed, 4-8-4 fertilizer shall be applied at the rate of six hundred pounds per acre by mechanical spreaders or broadcasting and raking. Sod shall be watered as specified for sprigging.

C. Seeding

The areas disturbed by the Contractor's operations and required to be restored and protected shall be prepared and seeded with Bahia and Winter Rye as directed, applied in sufficient quantity to provide the cover required to protect the area.

D. Mulching

Seeding areas shall be uniformly mulched in a continuous blanket immediately following the seeding and compacting operations, using at least 1-1/2 tons of hay or straw per acre. It is intended that mulch shall allow some sunlight to penetrate and air to circulate, at the same time shading the ground reducing erosion and conserving soil moisture. The thickness of the covering shall be adequate to hold the soil but sufficiently loose and open to favor the development of grass. Immediately following the spreading of the mulch, the material shall be anchored to the soil by means of a seed drill, disk harrow set to cut only slightly, or other suitable equipment which will secure the mulch firmly and prevent loss or bunching by wind or rain, or may be anchored with string lines placed at sufficient intervals. On slopes where machinery cannot be used, mulch may be retained in place by hand spading, string lines, or non-metallic open weave fabric. Unless rain is imminent, the mulched areas shall be watered immediately after placing. Upon completion, the surface of the mulched areas shall be free from clods of earth, bumps, or water holding pockets and to the required finished grades.

SECTION 5 - BORING METHODS

Contractor shall follow requirements of the Florida Department of Transportation as a minimum, Federal Safety codes, such as Occupational Safety and Health Administration (OSHA), and all other applicable City, County and State codes. Further, the Contractor is required to comply with all provisions of Sunshine State One-Call regarding underground utility locates.

The Contractor shall supply all labor, equipment, materials, and incidentals necessary to install all piping and appurtenances as shown on the approved Construction Drawings. The quality of all materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Engineering Department. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. The Contractor shall have a sufficient number of competent workers on the job at all times to insure the completion of the work is made in a timely and satisfactory manner.

The Contractor shall manage and control all drilling practices to prevent damage to existing utilities. The Contractor shall make a diligent effort to locate evidence of any other potential subsurface obstructions, e.g. piles. Subsidence and heave within the construction limits of the project shall be limited to values that avoid damage. The Contractor shall be responsible for all damage and repairs as a result of drilling operations.

Shop drawings shall be submitted to the Engineering Department for approval. The proposed construction shall be discussed with the Engineering Department in advance. The proposed device(s) or system(s) shall be subject to the Engineering Department's approval or rejection on its potential ability to complete the utility placement satisfactory without undue stoppage and to maintain alignment according to the approved Construction Drawings. As-built drawings shall be submitted to the Engineering Department. Bore logs may be requested by the Engineering Department at a minimum of 10 foot segments depending on the length of a project. Testing shall follow the requirements of these Rules and Standards.

Work will not be allowed to begin unless the Contractor provides necessary permits to the Engineering Department. A written notice 48 hours prior to start of the actual work shall be given to the Engineering Department. During construction, any deviations greater than 5 feet in any direction shall immediately be reported to the Engineering Department.

5.01 **JACK & BORE**

A. Casing Pipe

Steel casing shall conform to the requirements of ASTM Designation A139 Grade B and shall be protected inside and outside by a black bituminous coating a minimum of 5 mils thick. The steel sleeve shall be painted inside and outside with two coats of bitumastic paint prior to delivery on the job.

The casing pipes shall have the nominal diameter and wall thickness as shown on the approved Construction Drawings.

Field and shop welds of the casing pipes shall conform with the American Welding Society standard specifications. Field welds shall be complete penetration, single-vee groove or single-bevel groove type joints.

The steel sleeves shall be steel pipe welded together and jacked in one continuous operation at the locations specified. In no event shall jacking be discontinued for sufficient period to cause the partially jacked sleeve to freeze in place. Proper alignment and elevation of the sleeve shall be consistently maintained throughout the jacking operation.

Jacking pits shall be shored with sheeting or such other materials as required. Sheeting shall be driven to a sufficient depth below the invert of the steel sleeve to resist any pressure developed by the soil outside the jacking pit. Sheeting shall terminate not less than 3 feet 6 inches above existing grade.

At the completion of the jacking operations, the Contractor will be required to leave all sheeting in place. However the top of the sheeting shall be cut off 30 inches below finished grade.

The Contractor shall be responsible for preventing the occurrence of voids outside the steel sleeves and if they do occur, he may be directed to fill them with grout in a method approved by the Engineering Department. The Contractor shall constantly exercise care in the removal of the earth from within the sleeve sufficiently close to the forward end to prevent voids.

The Contractor shall be responsible for furnishing and installing, and later removing to the extent required, a thrust block or whatever provision may be required for backing up the jacks employed in driving the sleeve forward.

B. Carrier Pipe

Ductile iron pipe shall be the selected pipe material used for carrier pipe.

The Contractor shall provide all ductile iron pipe. All above ground flange pipe shall be ductile iron pipe unless otherwise noted.

The equipment and materials specified herein are intended to be standard types of ductile iron pipe and cast iron fittings for use in transporting potable water.

Carrier pipes to be installed within the specified casings shall be equipped with restrained joint connectors. Pipe and fittings shall be a minimum of Ductile Iron Pressure Class 350.

Ductile iron pipe shall meet the following requirements:

- Thickness of pipe to be supplied shall be one class greater than that required under Table 50.12 AWWA Standard C150. Type 1 Bedding Conditions shall be used for 24-inch diameter and smaller. Type 2 Bedding Conditions shall be used for 30-inch diameter and larger pipe.
- The pipe shall be supplied in lengths not in excess of 20 feet. Pipe shall be either the rubber-ring type push on joints, standard mechanical joint pipe or restrained joint where required. Ball joint pipe and flange joint pipe shall be used where shown on the approved Construction Drawings. Pipe shall be as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company or Clow Corporation.

All ductile iron pipe fittings for yard piping shall be cast iron or ductile iron with a minimum pressure of 150 psi. Fitting shall meet the requirements of ANSI, NEWWA and AWWA specifications as applicable. Rubber gasket joints shall conform to AWWA Standard C111 for mechanical and push-on joints. Ball joints shall conform to AWWA Standard C151, with a separately cast ductile iron bell conforming to ASTM A536, and a cast steel retainer ring conforming to ASTM A148, Grade 90-60. Flanged fittings shall be furnished faced and drilled to 125 pounds template and conform to ANSI B16.1. All pipe and fittings shall have a cement mortar lining and bituminous seal coat on the outside in accordance with ANSI A21.4.

C. INSTALLATION

The pipe shall be installed within the sleeve and after having been satisfactorily placed and approved by the Engineering Department. The space between the outside of the pipe and the sleeve shall be completely filled with sand or a clean grout, pumped in one continuous uninterrupted operation in a manner to prevent occurrence of any voids between the pipe and the sleeve. The pipe must be braced to the side and the top of the sleeve to prevent flotation or motion during the placing of the grout. The grout shall consist of a mixture of about one part cement to six parts sand which shall be subject to increase or decrease in the amount of cement necessary or permitted, provided good flowing characteristics can be obtained without segregation of the sand and cement. Water shall be the minimum required to produce mortar which will flow satisfactorily.

A masonry bulkhead 8 inches wide shall be placed at the ends of the sleeve. The bulkhead installed shall conform to State of Florida Department of Transportation Specifications as to material and installation.

5.02 DIRECTIONAL BORE

A. PIPE AND FITTINGS

High Density Polyethylene (HDPE) and fusible Polyvinyl-Chloride (PVC) are approved pipe material for directional bores. SDR's shall be not more than:

- HDPE - SDR 11
- PVC - SDR 18

Pipe shall be properly identified with permanent green identification.

Joints between plain pipe and HDPE pipe and/or HDPE pipe fittings shall be made by butt fusion welding when possible. The on-site welder making the joints shall have received specific training and may be required to provide proof of training or certification to the Engineering Department.

Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adaptors and back-up rings) or mechanical couplings.

B. EQUIPMENT

The directional drilling machine shall consist of a power system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable bore head.

The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.

The drill pipe shall be constructed of high quality 4130 seamless tubing, grade D or better.

The guidance system shall be of a proven type, capable of tracking at all depths up to 80 feet and in any soil condition, including rock and shall be operated by personnel trained and experienced with this system.

Drilling fluid pressures and flow rates shall be monitored at all times. Drilling fluids shall be composed of clean water, appropriate additives and shall be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained.

C. INSTALLATION

Prior to drilling, Contractor shall utilize all verified locate information to determine drill pathway in conjunction with the approved Construction Drawings.

The entry and exit point shall be within 5 feet of the location shown on the approved Construction Drawings.

After successfully reaming bore hole to the required diameter, pipe shall be pulled with a swivel and reamer in front of the pipe to compact bore hole walls.

The pullback section of the pipe shall be supported during pullback operations so that it moves freely and does not damage the pipe.

The Contractor shall cease operations if the pipe is damaged and shall remove the pipe from the bore hole and repair the pipe using the manufacturer's recommended procedure or replace the damaged pipe before resuming installation.

SECTION 6 - PERMITS

6.01 PERMITS

A. Florida Department of Environmental Protection (FDEP)

A FDEP Permit is required when 100,000 gallons a day or more (as an annual average) is proposed. This is considered a major user of reclaimed water per the [Florida Administrative Code \(FAC\), Chapter 62-610 "Reuse of Reclaimed Water and Land Application"](#).

[FDEP Form 62-610.300\(4\)\(a\)1](#) shall be approved by FDEP prior to a Major User Reclaimed Water Delivery Agreement with the Utilities Commission is executed.

B. Florida Department of Transportation (FDOT)

A FDOT Permit is required when a sanitary sewer main is installed above, below, or contiguous to an FDOT right-of-way. Four copies of [FDOT Form 710-010-85](#) and four sets of approved Construction Drawings, signed/sealed by a registered professional engineer in the State of Florida, must be submitted to the Engineering Department prior to the Utilities Commission's endorsement/approval. The Engineering Department will then submit completed permit application and drawings to FDOT.

C. Volusia County

A [Volusia County Application for Use Permits](#) must be obtained for any work within the County right-of-way or County owned property.

D. City of New Smyrna Beach

A [Street Opening Permit](#) must be obtained for any open street cuts within the city limits. An archaeological permit may be required.

E. Florida East Coast Railway, L.L.C.

All work within the FEC right-of-way shall require a Utility Crossing Permit.

SECTION 7 – FINAL ACCEPTANCE

7.01 FINAL ACCEPTANCE

A final inspection shall be performed after all required tests have been passed with the Utilities Commission Engineering Department Inspector and Engineer, a representative from the Utilities Commission Wastewater Department, along with the Contractor. Any necessary corrections noted at this time shall be made prior to final acceptance.

All transfers of real property and reclaimed water mains to be taken over by the Utilities Commission must be deeded to the Utilities Commission prior to final acceptance by the following:

1. Bill of Sale.
2. Recorded plat including all easements.
3. Recorded easement(s), or proof thereof.
4. Actual cost breakdown of completed reclaimed water facility.
5. 25% Maintenance Bond.
 - All systems and appurtenances accepted by the Utilities Commission are subjected to one (1) year warranty period against all defects in material and workmanship. This warranty period shall begin upon the date of acceptance as specified by the Utilities Commission.
6. All operation and maintenance manuals, minimum 2 copies.
7. As-built drawings.
 - One (2) signed/sealed set of black line (bond)
 - Adobe PDF digital files on CD
 - AutoCAD digital files on CD (AutoCAD 2000 or later version), including shape files and color-dependent plot style table used in the drawings. If a CAD software other than AutoCAD was used, supply the files on a CD in .DGN or .DXF format.

General As-Built Standards

- North arrow (with scale) will be shown in each viewport.
- Profile shall state both horizontal and vertical scales.
- Street names will be labeled in plan view, including names of any intersecting streets.
- Any layers that are not the main subject of the as-built should be frozen or shown with a very thin black or gray line type, but still be clearly readable. Street names, right-of-way lines, lot lines, and lot numbers shall be shown with a black line having a line weight thinner than that of the sewer main.
- Each sheet shall have a drawing legend.

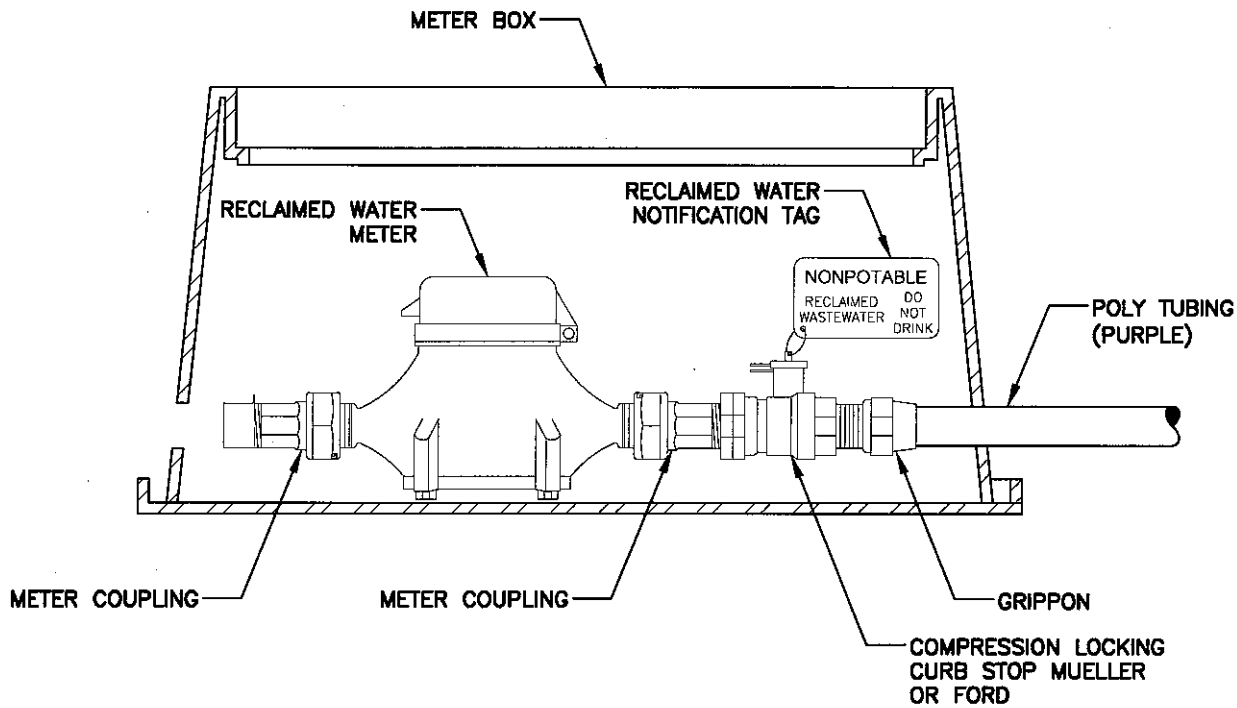
Reclaimed Water

- Fittings (tees, crosses, bends, reducers, and valves) shall be clearly shown, with size noted.
- Tee shall be indicated by calling out the run diameter size first, followed by the branch diameter, e.g. a 12" x 8" tee indicates a 12" run with an 8" branch; a 12" x 12" tee indicates a 12" run with a 12" branch. Crosses shall be noted similarly.
- All installed bends shall be shown and clearly noted. Any bends that were not installed (e.g. because pipe was deflected) shall have the fitting symbol and call out crossed out or removed. Deflection should be clearly indicated.
- All reducers on mains shall be shown, with both diameters noted.
- All valves shall be called out with size and type (gate, butterfly, blow-off, ball etc.), e.g. 8" GV (8" gate valve), 16" BFV (16" butterfly valve), 2" BOV (2" blow-off valve).
- Fitting location must be shown. This may be done by using either tie dimensions from at least two known visible points (storm inlet, manhole, etc.), or by stationing.

SECTION 8 – RECLAIMED WATER DETAILS

8.01 RECLAIMED WATER DETAILS

RW-001	<u>3/4" to 1" Reclaimed Water Service</u>
RW-002	<u>1 1/2" to 2" Reclaimed Water Service</u>
RW-003	<u>2" and Larger Reclaimed Water Service</u>
RW-004	<u>Reclaimed Water Service Connection</u>
RW-005	<u>Reclaimed Water Service Stub Out</u>
RW-006	<u>Reclaimed Water Gate Valve</u>
RW-007	<u>Reclaimed Water Irrigation Pond Outfall Structure</u>
RW-008	<u>Reclaimed Water Advisory Signs</u>
RW-009	<u>Utility Separation</u>

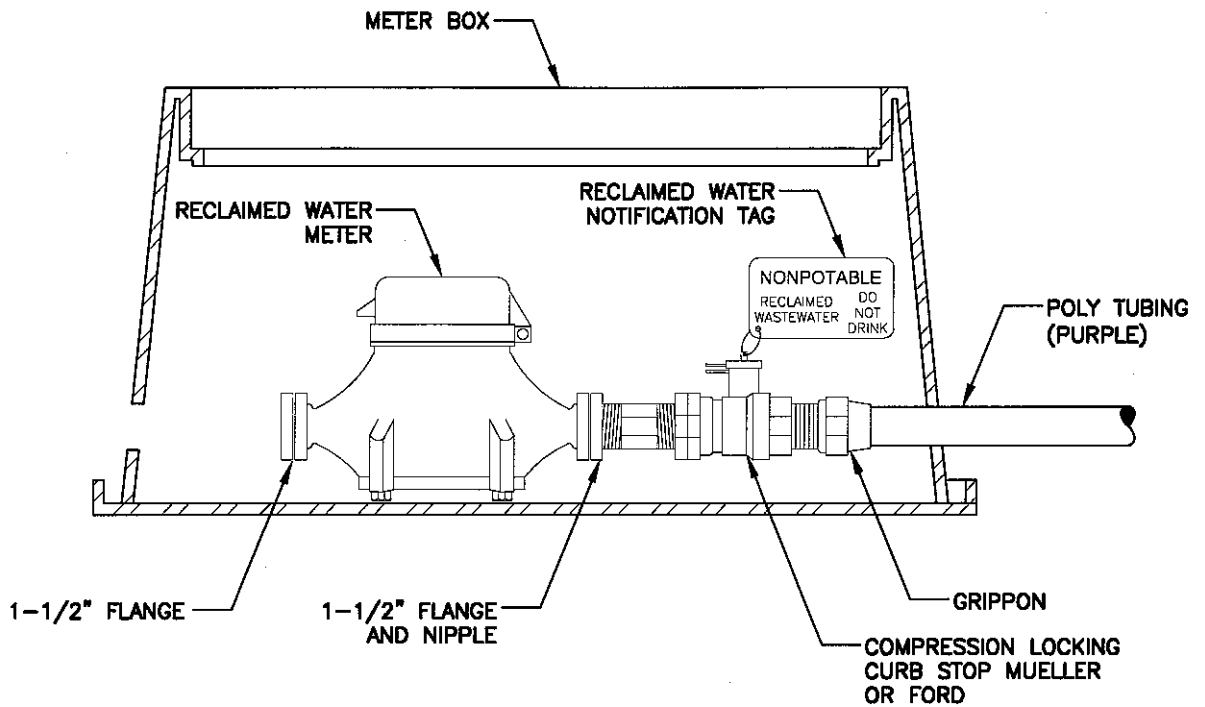


3/4" TO 1" RECLAIMED WATER SERVICE
NTS UCNSB 11/09

NOTE:

- METER BOXES SHALL BE 11" X 18" MADE FROM FIBERGLASS REINFORCED POLYMER CONCRETE, SUPPLIED BY CDR OR GLASMASTERS.

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
3/4" TO 1" RECLAIMED WATER SERVICE			
DWN. J.SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/209	RW-001	
APP. J. WHITE	FILE: RW-001		

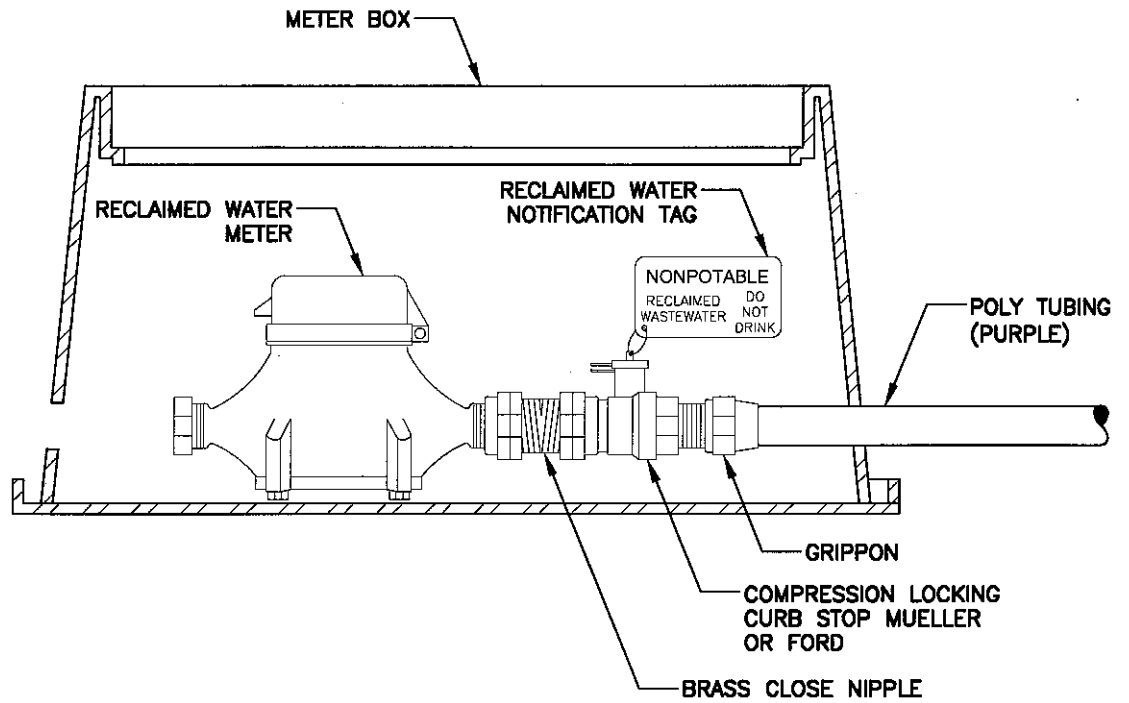


1 1/2" TO 2" RECLAIMED WATER SERVICE
 NTS UCNSB 11/09

NOTE:

- METER BOXES SHALL BE 11" X 18" MADE FROM FIBERGLASS REINFORCED POLYMER CONCRETE, SUPPLIED BY CDR OR GLASMASTERS.

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
1-1/2" TO 2" RECLAIMED WATER SERVICE			
DWN. J. SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-002	
APP. J. WHITE	FILE: RW-002		

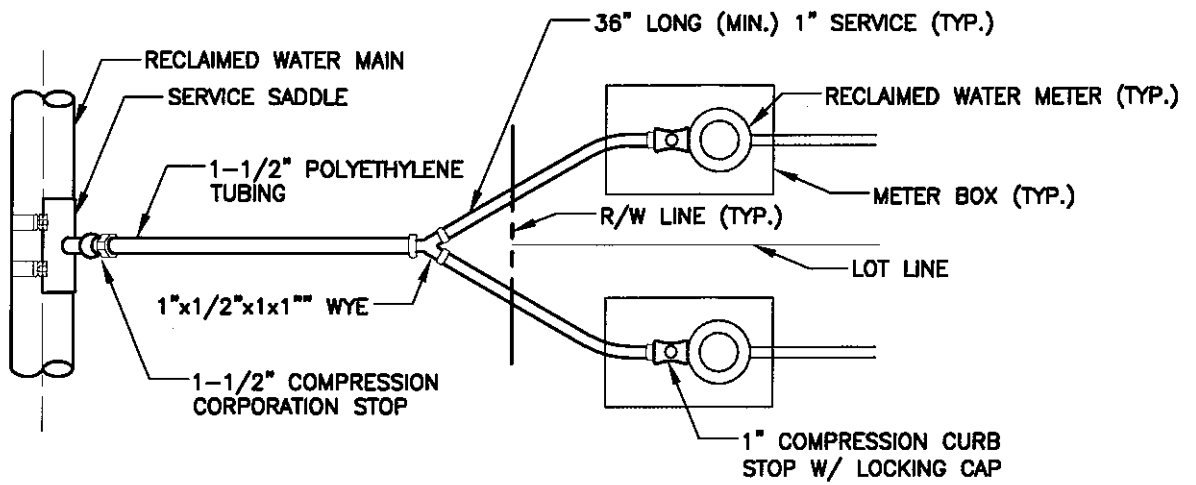


2" AND LARGER RECLAIMED WATER SERVICE
 NTS UCNSB 11/09

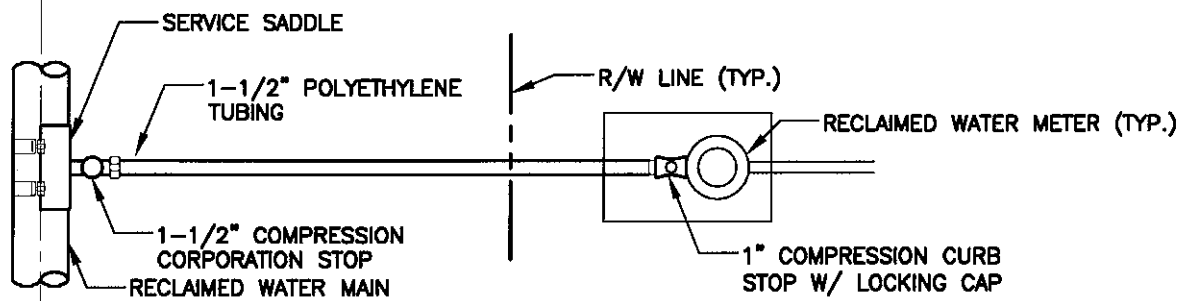
NOTE:

- METER BOXES SHALL BE 11" X 18" MADE FROM FIBERGLASS REINFORCED POLYMER CONCRETE, SUPPLIED BY CDR OR GLASMASTERS.

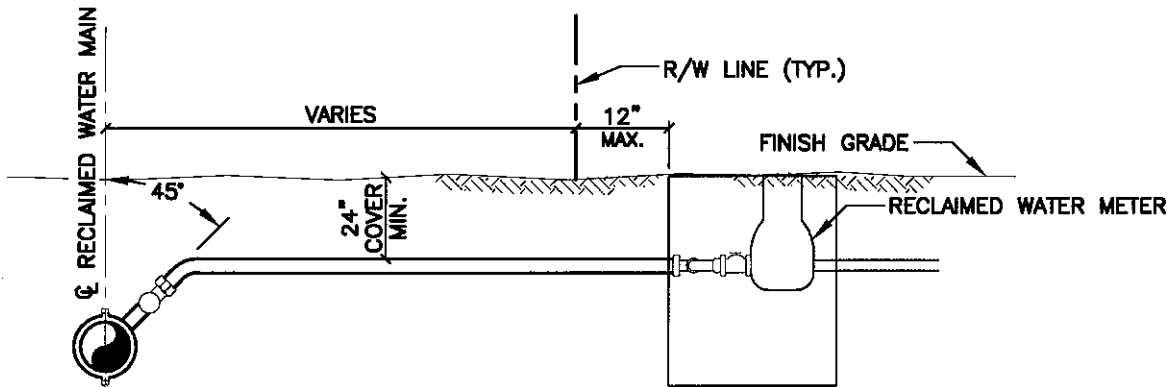
UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
2" AND LARGER RECLAIMED WATER SERVICE			
DWN. J. SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-003	
APP. J. WHITE	FILE: RW-003		



PLAN-DOUBLE SERVICE



PLAN-SINGLE SERVICE



TYPICAL SECTION

RECLAIMED WATER SERVICE CONNECTION

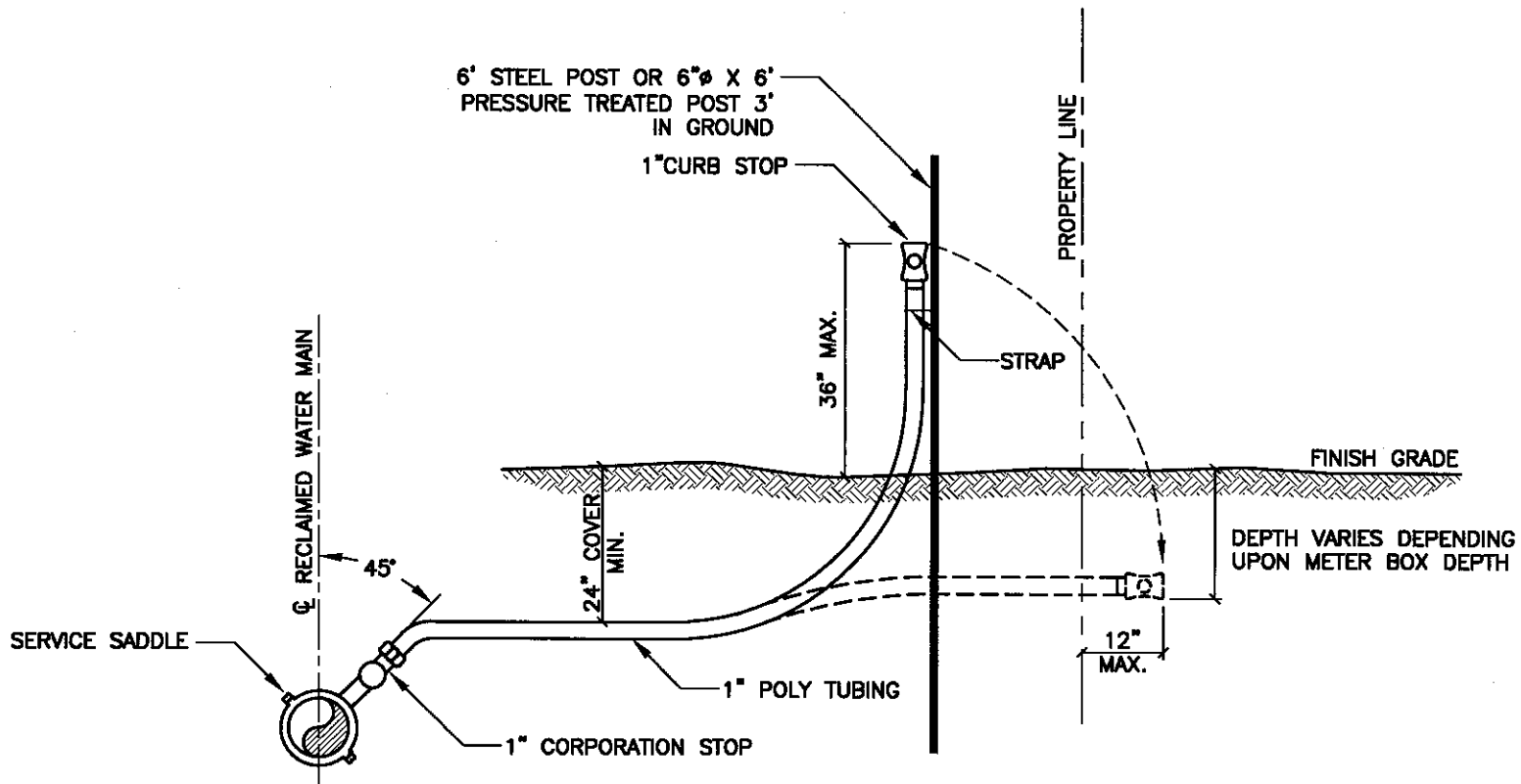
NTS

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NOTE:

1. ALL UNDER ROAD SERVICES IN NEW DEVELOPMENTS SHALL BE IN 4" PVC SCHEDULE 40 CASINGS OR MATERIAL APPROVED BY THE ENGINEERING DEPARTMENT.
2. METER BOXES SHALL BE 11" X 18" MADE FROM FIBERGLASS REINFORCED POLYMER CONCRETE, SUPPLIED BY CDR OR GLASMASTERS.

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
RECLAIMED WATER SERVICE CONNECTION			
DWN. J.SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-004	
APP. J. WHITE	FILE: RW-004		



RECLAIMED WATER SERVICE STUB OUT

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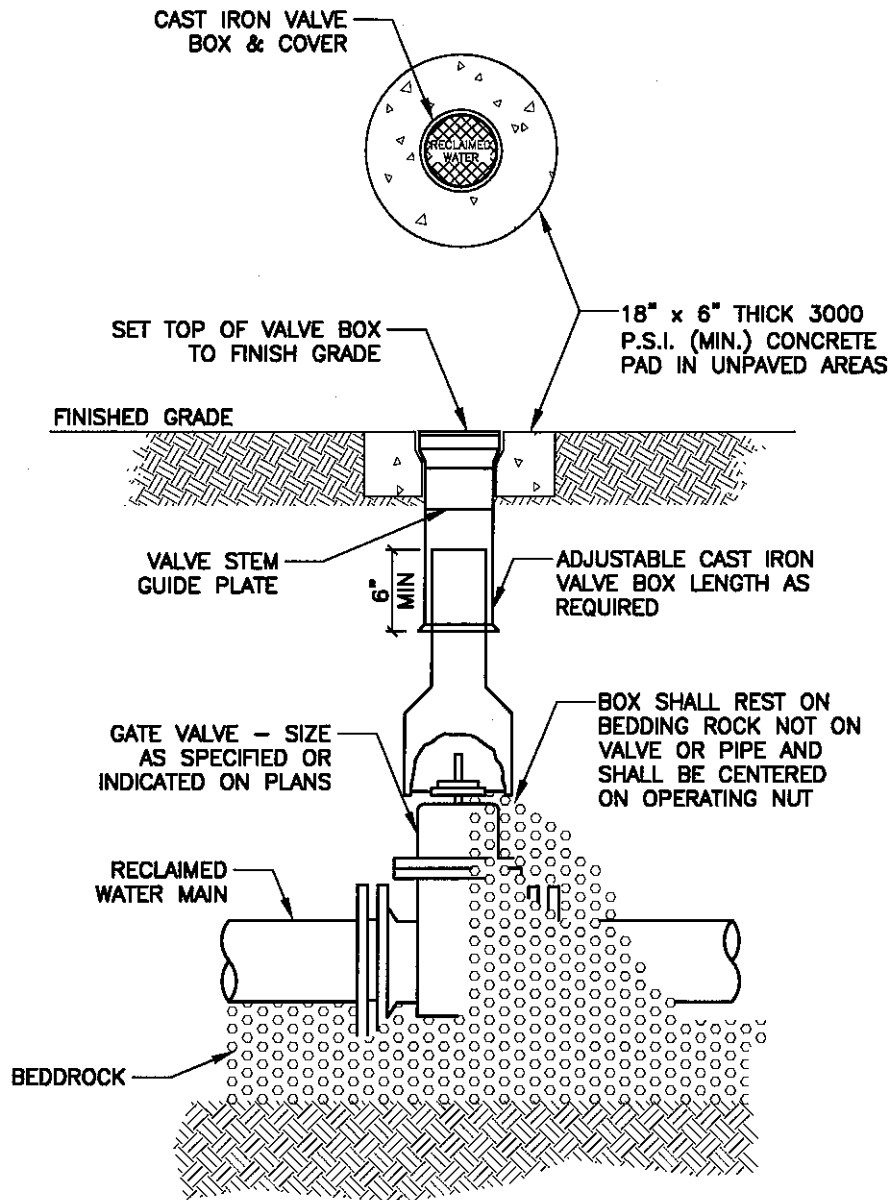
NOTE:

1. ATTACH WATER SERVICE WITH PLASTIC STRAP OR WIRE.
2. ALL UNDER ROAD SERVICES IN NEW DEVELOPMENTS SHALL BE IN 4" PVC SCHEDULE 40 CASINGS OR MATERIAL APPROVED BY THE ENGINEERING DEPARTMENT.

UTILITIES COMMISSION
CITY OF NEW SMYRNA BEACH, FL.

RECLAIMED WATER SERVICE STUB OUT

DWN. J.SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-005	
APP. J. WHITE	FILE: RW-005		



RECLAIMED WATER GATE VALVE

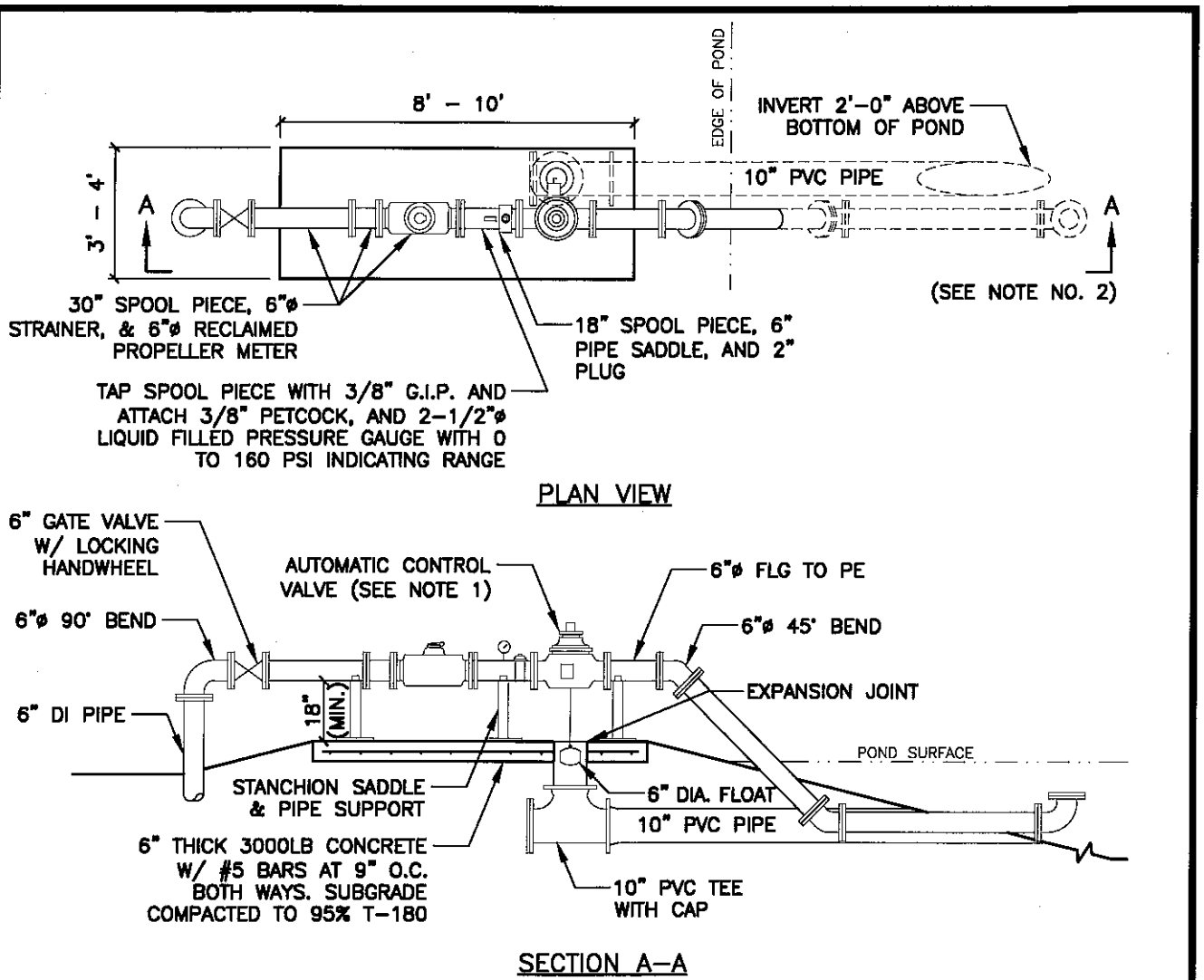
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NOTE:

A 24" VALVE NUT EXTENSION SHALL BE REQUIRED IF OPERATING NUT IS MORE THAN 36" BELOW FINISH GRADE.

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
RECLAIMED WATER GATE VALVE			
DWN. T. HIRN	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-006	
APP. J. WHITE	FILE: RW-006		



RECLAIMED WATER – IRRIGATION POND OUTFALL STRUCTURE

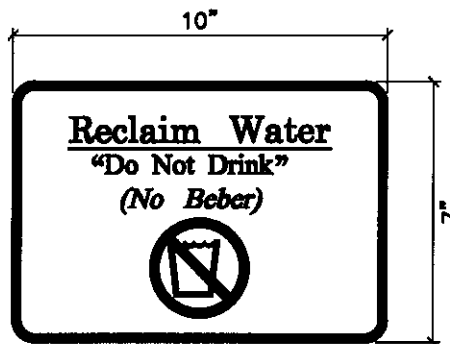
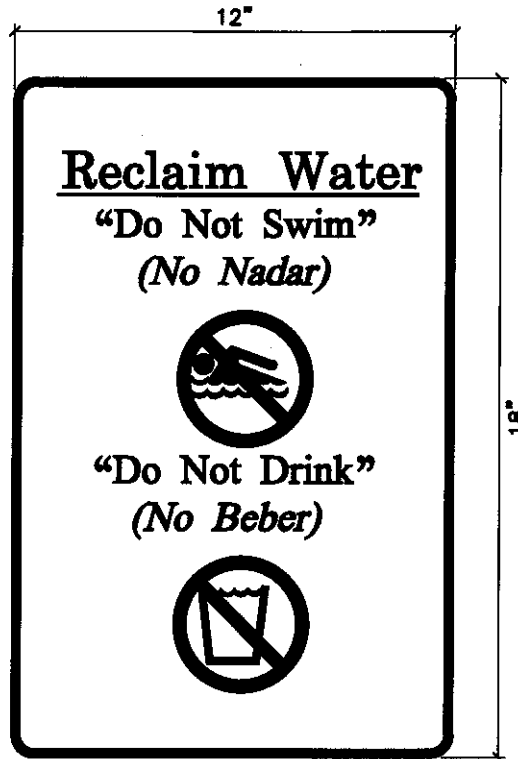
NTS

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NOTE:

1. FILL VALVE – 6" FLOWMATIC BUTTERFLY VALVE MODEL 149SS WITH 4–20mA CONTROLLED ELECTRIC ACTUATOR (120V), LOCAL CONTROL UNIT (NEMA 4), 4–20mA OUTPUT FEEDBACK TRANSMITTER, 4–20mA INPUT PROPORTIONAL CONTROL UNIT, AND RCCL FAILSAFE BATTERY BACKUP SYSTEM.
2. IN STILL WELL – BIRDCAGE LEVEL TRANSMITTER 4–20mA WITH 10–30vdc, 40' CABLE, AND 0–10 PSI.
3. LITTLE GIANT DIAPHRAGM SWITCH – MODEL# RS–5–LL, WITH 2" ON–OFF RESET (SET AT LOW AND HIGH LEVEL).
4. DATA FLOW RTU – WITH ANTENNA TOWER AND RIM006, PSM003, DMM003–2, AMM002, ACM002 MODULES. SEE UCNSB RECLAIMED WATER RULES AND SERVICE STANDARDS (SECTION 8.06 TELEMETRY).
5. FLOW METER – 6" WATER SPECIALTIES MODEL ML–3–06–TR15, FLG X FLG PROP TYPE FLOW METER WITH 4–20mA OUTPUT.
6. PRESSURE – 1/4" TAP ON SPOOL UPSTREAM OF FLOW METER, 1/4" PLUG VALVE FOR ISOLATION, 2–1/2" LIQUID FILLED PRESSURE GAUGE 0–160 PSI, AND WIKA PRESSURE TRANSMITTER MODEL WK8363493 0–200 PSI, 4–20mA.
7. ALL PIPING PRIMED AND PAINTED (RECYCLING PURPLE).

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
RECLAIMED WATER IRRIGATION POND OUTFALL STRUCTURE			
DWN. T. HIRN	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW–007	
APP. J. WHITE	FILE: RW–007		



RECLAIMED WATER – ADVISORY SIGNS

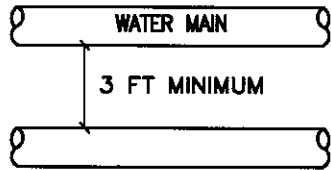
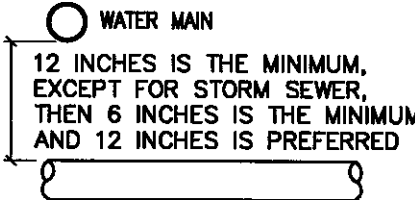
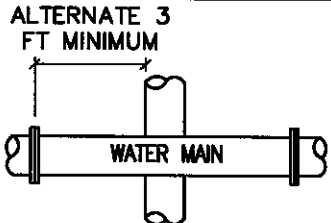
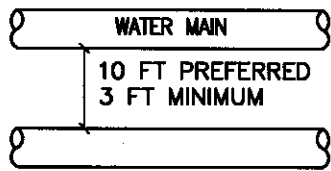
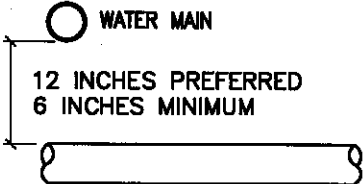
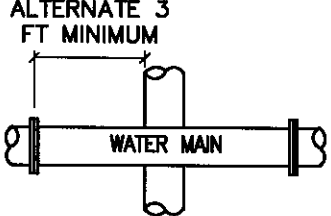
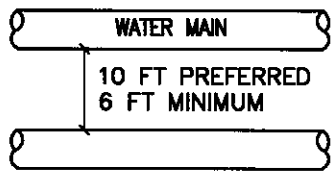
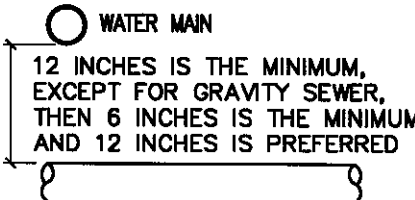
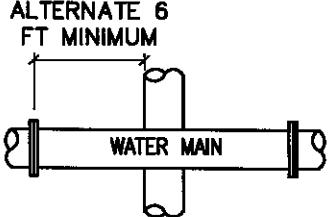


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NOTE:

1. AREAS IRRIGATED BY RECLAIMED WATER, SUCH AS RESIDENTIAL NEIGHBORHOODS AND GOLF COURSES, SHALL HAVE ADVISORY SIGNS POSTED AT THE ENTRANCES ALERTING THE PUBLIC. ADDITIONAL SIGNS SHALL BE POSTED AT THE FIRST AND TENTH TEES OF GOLF COURSES. SIGNS SHALL INCLUDE THE TEXT "DO NOT DRINK" IN BOTH ENGLISH AND SPANISH TOGETHER WITH THE EQUIVALENT STANDARD INTERNATIONAL SYMBOL.
2. ADVISORY SIGNS SHALL BE POSTED ADJACENT TO LAKES OR PONDS USED TO STORE RECLAIMED WATER AND DECORATIVE WATER FEATURES THAT USE RECLAIMED WATER. SIGNS SHALL INCLUDE THE TEXT "DO NOT DRINK" AND "DO NOT SWIM" IN BOTH ENGLISH AND SPANISH TOGETHER WITH THE EQUIVALENT STANDARD INTERNATIONAL SYMBOLS.
3. ALL SIGNAGE SHALL FOLLOW REQUIREMENTS OF FAC 62-610.468

UTILITIES COMMISSION CITY OF NEW SMYRNA BEACH, FL.			
RECLAIMED WATER ADVISORY SIGNS			
DWN. J. SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-008	
APP. J. WHITE	FILE: RW-008		

OTHER PIPE	HORIZONTAL SEPARATION	CROSSING	JOINT SPACING AT CROSSINGS (FULL JOINT CENTERED)
STORM SEWER, STORMWATER FORCE MAIN, RECLAIMED WATER			
VACUUM SANITARY SEWER			
GRAVITY OR PRESSURE SANITARY SEWER, SANITARY SEWER FORCE MAIN, RECLAIMED WATER			
ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM	10 FT MINIMUM		

NOTE:

1. LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314.
2. WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MINIMUM SEPARATION IS 12 INCHES.
3. IN ADDITION TO F.A.C. RULE 62-555.314, THE UC REQUIRES THAT ALL OTHER UTILITY SEPARATIONS SHALL BE 1 FT VERTICALLY ON CROSSINGS AND 3 FT PARALLEL.

UTILITY SEPARATION

NTS UCNSB 11/09

UTILITIES COMMISSION
CITY OF NEW SMYRNA BEACH, FL.

UTILITY SEPARATION

DWN. J.SCHWADRON	SCALE: NONE	REV. 1	SHEET 1 OF 1
CKD. J. WHITE	DATE: 11/2009	RW-009	
APP. J. WHITE	FILE: RW-009		