SECTION 4 - RECLAIMED WATER SYSTEM

4.1 RECLAIMED WATER DESIGN

Design standards for reclaimed water piping shall be as shown herein. There shall be no physical connection between a reclaimed water distribution system and any other utility system including Potable Water, Raw Water, Wastewater or storm sewage system, which would allow unsafe water to enter or backflow into the reclaimed water system by direct pressure, vacuum, gravity or any other means.

The design and sizing of service connection shall correspond to the values of the Water Use Permit issued by South Florida Water Management District (SFWMD). The total amount of reclaimed water used by a customer shall not exceed the limits stated in the Water Use Permit. The Department does not guarantee the availability of reuse water or continuity of service or minimum line pressure in the reclaimed water distribution system. In order to maximize the available capacity of reuse water, the Department reserves the right to regulate the timing and frequency of reclaimed water availability at each service connection. Upon request for reclaimed water for irrigation purposes, the Department shall evaluate the demand and revise water supply. If capacities are available, the Department may concur to provide reclaimed water service connections as follows:

1.) "Direct" reclaimed water service consists of a continuous piping system connection through a meter from the utilities distribution system to the private irrigation system. There shall be no other water supply connected to the "direct" system. The "direct" system may require additional privately owned pumping facility in order to increase and stabilize line pressure. The installation of a pressure control valve, flow rate control and time monitoring devices may be required.

2.) "Lake Discharge" reclaimed water service shall deliver reclaimed water at a predetermined rate of flow and at reduced pressure into a lake system for a future withdrawal for landscape irrigation purposes.

The Department provides reclaimed water for both direct connect and lake discharge uses with specific requirements that pertain to each specific type of use detailed separately in Section 4.2 – RECLAIMED WATER DIRECT CONNECT and Section 4.3 – RECLAIMED WATER LAKE DISCHARGE.

When submitting a reclaimed water project, direct connect or lake discharge, for initial review a Palm Beach County Water Utilities Department Reclaimed Water Project Use Form must be completed and attached to the initial submittal. The form is available on-line at PBCWATER.COM within the Minimum Design and Construction Standards section under Section 4 – Reclaimed Water as follows:

PALM BEACH COUNTY WATER UTILITIES DEPARTMENT
RECLAIMED WATER PROJECT USE FORM

Instructions:

Provide all requested information below in its entirety and submit it to the Palm Beach County Water Utilities Department (WUD) along with reclaimed water design plans per WUD Minimum Design and Construction Standards for review and approval for connection to the WUD reclaimed water system for irrigation purposes.

1. Reclaimed Water Use General Information
   a. Reclaimed Water User Name:

      _____

   b. Property Owner:

      _____

   c. Location Address:

      _____

   d. User Type (I.E. Residential, Non-Residential, Park, Golf Course, etc.):

      _____

   e. Irrigated Acres: _____
   f. Reclaimed Water Capacity (MGD): _____

2. Lake Discharge Reclaimed Users Additional Required Information
   a. Latitude and Longitude of Discharge Point:

      _____

   b. Location of Lake and proximity to nearby surface water bodies (Ex. S of L-20 Canal, N of Le Chalet BLVD., W of Jog RD):

      _____

   c. Type of Discharge Point (Ex. One 1.67’ wide weir with crest at elevation 17.8’ NAVD): _____
   d. Bleeder (include shape detail and elevation) (Ex. One 0.5’ wide x 0.5’ high triangular orifice with invert at elevation 16’ NAVD):

      _____

   e. Control Elevation (NAVD): _____
   f. Operating Elevation (NAVD): _____
   g. Impacted Water (Ex. L-38 Canal): _____
   h. SFWMD ERP Permit Number(s) (Ex. 50-00854-W & 50-04101-P):

      _____

   i. SFWMD Concurrence Date: _____
   j. Monitoring Well Location and Specifications (if required by FDEP):

      _____

Design standards for Reclaimed Water mains (RWM) are as follows:

(a) Minimum Cover:

Design finished grade over RWM shall be 36" minimum (30” is acceptable with DIP except for pipes under proposed/existing pavement in public rights-of-way) and 60” maximum unless otherwise approved by the Department prior to the start of construction. All Reclaimed Water transmission mains within major thoroughfare rights of way shall have full plan and profiles shown. Reclaimed Water main pipes designed to be as level as possible to avoid high points. Proposed top of pipe elevations shown at 100’ intervals on the design plan views prior to Department approval. Reduced minimum cover below 36” requires prior approval by the Department.

(b) Minimum Horizontal Separation (Wall to Wall):

(1) 10’ to buildings, exfiltration trenches, roof overhangs, canopies, walls, fountains, and other similar structures.
(2) 10’ to Wastewater lines (6’ minimum may be allowed in special circumstances and only with prior Department approval).
(3) 10' to drainage pipes (3’ minimum may be allowed in special circumstances and only with prior Department approval).
(4) 10’ to electrical conduits and communication conduits (6’ minimum may be allowed in special circumstances and only with prior Department approval).
(5) 6’ minimum to power poles and light poles (4’ minimum may be allowed in special circumstancess and only with prior Department approval).
(6) 6’ minimum to drainage structures (3’ minimum may be allowed in special circumstancess and only with prior Department approval).
(7) 10’ minimum to potable water lines (6’ minimum may be allowed in special circumstancess and only with prior Department approval).

(c) Vertical Separation:

(1) Maintain 12” minimum separation between all pipes. However, a minimum of 6" vertical separation is acceptable if it is not possible to maintain 12” separation and if the reclaimed water main crosses over or under a storm, wastewater force main or wastewater gravity main with a section of reclaimed water main being ductile iron pipe (DIP) centered on crossing with prior Department approval. In no case shall a reclaimed water main crossover a water main with less than 12” minimum vertical separation. When the reclaimed water main passes under a water main, a minimum of 6" vertical separation is acceptable if it is not possible to maintain 12” separation provided a section of DIP reclaimed water main is centered on the crossing with prior Department approval.

(2) RWM shall cross over gas mains, electrical conduits, and communication conduits unless not feasible. No matter when the RWM crosses over or under gas mains,

electrical conduits, and communication conduits a minimum of 18" vertical separation shall be maintained unless previously approved by the Department.

(d) Layout:

(1) RWM to be placed in road right-of-ways (ROWs) or dedicated common tracts whenever possible. RWM shall be located under sidewalks in residential areas unless not feasible due to project conditions and with prior Department approval. Placement of RWM on or adjacent to interior property lines or between structures is discouraged and approved only when unavoidable. Reclaimed water mains shall not be placed in ditches, landscape buffers, wetlands, or storm water management areas unless special circumstances require RWM to be installed in those area and then only with prior Department approval.

(2) Details of connections to existing facilities are required. A reverse tap due to pre-existing conditions are acceptable only if approved by the Department (detailed to scale plan and profile are required).

(3) When a RWM crosses a fence of any material, a wall of any type (panel, concrete block, etc.) or a berm higher than two (2) feet in height the water main is required to be within a steel casing. The casing is required to extend three (3) feet minimum beyond either side of the berm or ten (10) feet minimum beyond either side of a fence or wall whichever is greater, see Standard Detail 48R.

(4) When a Reclaimed Water main design requires the main to cross under a storm water pipe larger than thirty (30) inches in diameter the Department reserves the right to require the storm water pipe to be redesigned not to exceed thirty (30) inches in diameter. If redesigning the storm water system is not an option then the Potable Water main must be ductile iron pipe (DIP). The Department reserves the right to require the main to be located within a steel casing or relocate the main to avoid the storm water pipe crossing.

(5) When a new or existing RWM is in conflict with a new or existing storm water pipe and the RWM cannot deflect around the storm water pipe due to special circumstances a conflict structure may be required. If a conflict structure must be installed its design must meet both Florida Department of Transportation (FDOT) and WUD Minimum Design and Construction Standards with prior Department and Florida Department of Environmental Protection (FDEP) approval.

(e) Reclaimed Water Main Material:

Pressure Class Rated or Special Thickness Class Rated Cement Lined Ductile Iron Pipe (DIP) or C-900 Class 150 DR 18 PVC pipe (Color: Blue) shall be allowed for WM 12" diameter or smaller. The lining for DIP shall be factory applied in accordance with the manufacturer's specifications and shall be warranted by the pipe manufacturers. Unless specific approval is granted, no water main shall be encased in concrete. Reclaimed

Water mains shall be marked with one continuous strip of 6" wide magnetic purple coded tape imprinted with one and one-half (1 1/2) inch high lettering reading "Caution Reclaimed Water Line Below", and located approximately twelve (12) inches above the crown of the pipe. The wording shall occur every three (3) feet. Buried DIP smaller than 24" shall be painted with a 4" wide continuous purple line parallel to the top axis of the pipe and that is located on top of pipe. Buried DIP 24" and larger shall have a 4" wide continuous blue line applied along each side of pipe as well as along the top of pipe. The coating shall be minimum 8 mils WFT, and minimum 3 mils DFT.
DIP shall be required in the following circumstances:

(1) RWM 16" in diameter or larger.
(2) RWM smaller than 6".
(3) Within 10' of Raw Water/Wastewater/ storm water pipes for parallel installation.
(4) Within 15' of structures, (near side of concrete footing), and top of bank of canals or lakes.
(5) Crossings over Raw Water, Wastewater, and storm pipes with less than 12" separation with no joint within 10' of each other; crossings under any Wastewater, reclaimed water or storm pipe.
(6) Jack and bores (mechanical joints with "Megalugs" or equal).
(7) The Department reserves the right to mandate DIP within public ROWs, any instances of off-site or on-site construction where future damage to the line is possible due to location or circumstances, or in private property away from dedicated ROWs.
(8) Flanged ductile iron pipe is required for exposed (not buried) installation.
(9) Ductile iron pipe shall be polywrapped if buried closer than 10' to other underground Iron and/or steel pipes if no other protection is provided.
(10) RWM with less than 36" cover over pipe with prior Department approval.
(11) Where required for locations with substandard separations to other piping systems.

(f) Reclaimed Water Main Size:

The RWM shall be sized by the developer's engineer as required. The Department's Master Planning may require a greater diameter. An over sizing credit as defined in **Chapter 3** of the Department's Uniform Policies and Procedures Manual (UPAP) may apply. Use the "Friction Coefficient Factor" C=120 for flow calculations and a peak instantaneous flow velocity of 3 feet per second to determine applicable credits.

The minimum size of RWM shall be 4". The engineer may be required to demonstrate the adequacy of such sizing. In cases where the completion of gaps in the Potable Water systems to meet flow requirements of the development is necessary, the developer shall construct the required improvements.

(g) Valves and Appurtenances:

(1) Valves - Valving of all systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the grid system. Generally, the number of

valves at an intersection shall be one less than the number of pipes forming the intersection.

All valves shall have mechanical joint or flanged ends and be of resilient seat design with right hand closed operation; valves 12" or greater shall be butterfly valves unless the Department approves another type of valve in writing prior to installation. Butterfly valves larger than 16” shall have worm gears. Valves shall be certified for buried service if applicable. Valves 24” and smaller rated minimum 150 psi with larger valves being rated a minimum 200 psi.
In-line valves shall be installed for mains 16” and smaller near each side of a canal crossing and/or major road crossing.

In-line valves are required at intervals no greater than 2,500 feet on transmission mains, at intervals of no greater than 1,000 LF on main distribution loops and feeders, and on all primary branches connected to these mains. In high-density areas, valves to be installed as necessary to minimize the number of persons affected by a break. In all instances, effectiveness of placement shall be primary criteria in determining valve location. Valves shall not be located in curbs. When located in traffic areas, valves will be located in the center of traffic lanes. All valves require lids and must be marked "reclaimed water". All proposed valves must be numerically identified on construction drawings. The Department reserves the right to require additional valves at their discretion.

Clearance of 18" or one pipe diameter, whichever is greater, is required between all fittings (bells, valves, saddles, flanges, etc.).

(2) Combination Air Release Valves are required at all canal crossings and at high points, and sized per manufacturer’s recommendations.

(3) All fittings, bends, crosses and caps shall have mechanical joint or flanged ends unless an approved flexible joint restraint system is used.

(h) Thrust Restraint:

(1) All bends, tees, crosses, reducers, valves and dead ends shall be restrained through an approved means of mechanical or approved flexible joint restraint. Thrust blocks consisting of poured-in-place concrete having a minimum compressive strength of 2,500 psi after 28 days cure maybe utilized only with prior approval for connections to existing un-restrained piping. Any line terminated as a construction phase that is a known future extension, shall have a valve with a plug placed at the end, and restrained with approved mechanical or flexible joint restraint. Any PVC/DI pipe transitioning from HDPE pipe to be restrain at a minimum to “in-line valve” condition

(2) An adequate number of pipe lengths shall be restrained using approved mechanical joint restraints (MJ pipe), flexible joint restraints (DIP push-on joint pipe) or pressure pipe bell restraints (PVC or DIP push-on joint pipe) to handle 150 psi working pressure and 250 psi surge pressure. Pipes larger than 24” are restrained and pressure tested to

200 psi. If the restraint pipe length on a design deviates from the standard length listed herein in the restrained pipe lengths, an alternative design by a Registered Engineer based upon the soil conditions and shown on the design drawings and record drawings.

(3) If flexible joint restraints are used, the following requirements apply:

- A Department inspector must witness the installation of flexible joint restraints.
- A copy of the material invoice must be available on the job site for review to confirm the shipment of restraining gaskets, etc.

MIN. LENGTH OF PIPE (FEET) TO BE RESTRAINED

(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

FITTING TYPE		PIPE SIZE								200psi			
		4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
90° HORIZ. BEND		14	20	25	30	35	45	54	62	98	112	124	135
45° HORIZ. BEND		6	8	11	13	15	19	22	26	41	46	51	56
22.5° HORIZ. BEND		3	4	5	6	7	9	11	12	19	22	25	27
11.25° HORIZ. BEND		1	2	3	3	4	4	5	6	10	11	12	13
90° VERT. OFFSET	UPPER BEND	29	41	53	64	74	95	115	134	214	246	276	304
	LOWER BEND	7	10	13	16	19	25	30	35	57	66	74	83
45° VERT. OFFSET	UPPER BEND	12	19	24	29	34	39	48	56	89	102	114	126
	LOWER BEND	3	4	6	7	8	10	12	15	23	27	31	34
22.5° VERT. OFFSET	UPPER BEND	6	9	12	14	17	19	23	27	43	49	55	60
	LOWER BEND	1	2	4	4	4	5	6	7	11	13	15	16
11.25° VERT. OFFSET	UPPER BEND	3	4	6	7	8	9	11	13	21	24	27	30
	LOWER BEND	1	1	1	2	2	2	3	3	6	6	7	8
PLUG (DEAD END)		32	45	59	70	83	107	129	151	214	246	276	304
IN-LINE VALVE		32	45	45	45	45	55	65	80	110	125	140	155
TEE (BRANCH RESTRAINT)	4"X ø	23	–	–	–	–	–	–	–	–	–	–	–
	6"X ø	21	35	–	–	–	–	–	–	–	–	–	–
	8"X ø	18	34	47	–	–	–	–	–	–	–	–	–
	10"X ø	16	32	46	58	–	–	–	–	–	–	–	–
	12"X ø	13	30	44	57	69	–	–	–	–	–	–	–
	16"X ø	7	26	41	55	67	90	–	–	–	–	–	–
	20"X ø	1	21	38	52	65	88	109	–	–	–	–	–
	24"X ø	1	16	34	49	62	86	108	129	–	–	–	–
	30"X ø	1	8	28	44	58	83	106	127	208	–	–	–
	36"X ø	1	1	22	39	54	80	103	124	206	240	–	–
	42"X ø	1	1	15	33	49	77	100	122	205	239	270	–
	48"X ø	1	1	7	27	44	73	97	120	203	238	269	298
REDUCER (LARGER PIPE RESTRAINT)	6"X ø	23	–	–	–	–	–	–	–	–	–	–	–
	8"X ø	38	25	–	–	–	–	–	–	–	–	–	–
	10"X ø	57	43	24	–	–	–	–	–	–	–	–	–
	12"X ø	72	60	44	41	–	–	–	–	–	–	–	–
	16"X ø	99	90	78	75	45	–	–	–	–	–	–	–
	20"X ø	123	116	107	105	81	45	–	–	–	–	–	–
	24"X ø	146	140	132	131	111	82	45	–	–	–	–	–
200psi	30"X ø	209	204	197	188	177	153	116	75	–	–	–	–
	36"X ø	243	236	233	226	217	196	168	135	74	–	–	–
	42"X ø	273	270	265	259	252	234	211	183	133	72	–	–
	48"X ø	301	298	294	289	283	268	249	226	183	131	71	–

NOTES:

1. THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
   SOIL TYPE–SAND TEST PRESSURE–150 PSI/200 PSI DEPTH OF BURY–3'
   TRENCH TYPE–3 SAFETY FACTOR– 1.5 VERTICAL OFFSET–3'
   MINIMUM PIPE LENGTH ALONG TEE RUN–5'
2. THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
3. ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
4. RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.
5. MULTIPLY PIPE LENGTH BY 1.4 FOR POLYETHYLENE ENCASED PIPE.
6. RESTRAINED PIPE LENGTHS EQUAL TO AN "INLINE VALVE" CONDITION ARE REQUIRED AT EACH END OF A TRANSITION FROM HDPE PIPE TO OTHER PIPE MATERIALS.
7. DESIGN ENGINEER IS RESPONSIBLE TO PROPERLY SIZE THE RESTRAINT PIPE LENGTHS FOR THE PROJECTS.

Notes:

- The data in the above table are based upon the following installation conditions:

Soil Type – Sand
Test Pressure – 150 psi up to 24", 200 psi for pipes larger than 24".
Depth of Bury – 3'
Trench Type – 3
Safety Factor – 1.5
Vertical Offset – 3'
Minimum pipe length along tee run – 5'

- The restrained pipe lengths apply to PVC pipe and DIP without polyethylene encasement.
- All joints between upper and lower bends to be restrain.
- Restrained pipe lengths apply to pipe on both sides of valves and fittings.

The above table shall serve as a general design and construction guide only. The Engineer is responsible to justify and document any deviations from the pipe lengths specified in the above table.

On both direct and lake discharged reclaimed water systems, the property owner shall not modify or tamper with the installed facilities without expressed approval by the Department. The property owner shall maintain the irrigation system and keep it in good working order at all times. Any pipe breaks repairs or required sprinkler adjustments must done immediately. If necessary, all or portions of the irrigation system will turned off for service and repairs. If the reclaimed water is not used accordance with rules and regulations the Department reserves the right to temporarily disconnect the reclaimed water service. The property owner shall comply with all reporting requirements to appropriate agencies, including but not limited to pre-connection water sampling, daily lake water elevation data, the data of total water used for irrigation and total reuse water received through meter(s).

The following items shall be included in plan submittal to the Department for both direct connect and lake discharge systems:

- Two sets of reclaimed water distribution system plans (24" x 36" sheets, signed and sealed, max. scale 1" = 40'). The Design shall generally follow the standards for potable water mains. The plans shall list the overall property size, area to be irrigated with reuse water, and the SFWMD/FDEP water use permit data (yearly, monthly withdrawal rates).

- The irrigation system shall be designed to comply with wellfield protection regulations (if applicable). Specifically, no reclaimed water shall be used for irrigation within 75 feet of a utility-owned potable water supply well site. If necessary, potable water may be used to irrigate the landscape areas within the protection zone. No Connection Fees or Guaranteed Revenues shall be charged for this potable water irrigation meter. However, property owner shall pay for the installation of the service, the backflow

preventer and any on-line consumption fees as stated in PBCWUD UPAP. "Water Only" type of service shall apply.

- Permit applications (NPDES, Utility Permit)
- Approvals from applicable Agencies
- Standard Reclaimed Water Development Agreement and a Standard Reclaimed Water Service Agreement (Lake Discharge System and Direct System)
- Copies of resolutions of HOA, MUPD authorizing the reuse water application (if applicable)
- Plan review fee
- Completed Reclaimed Water Project Use form
- The following information shall be included on the design plan sheets:

1. Amount of reclaimed water to be provided (based on Water Use Permit and/or Agreement with WUD)
2. Acreage to be irrigated, total project Acreage
3. Location of Reclaimed Water Discharge Point into Lake and point(s) of withdrawal (lake discharge only)
4. Location of Control Structures and receiving water body (lake discharge only)
5. Control Water Elevation of lake(s) (lake discharge only)
6. Information on control structure(s) (lake discharge only)

    - Weir length
    - Control elevation
    - Crest Elevation

7. Permit or letter of approval from LWDD and/or SFWMD that lakes can function as stormwater system and reclaimed water storage, in accordance with 62-610.830 FAC (lake discharge only).
8. Proposed location of monitor well and easement (if applicable)
9. Groundwater monitoring plan (if applicable)
10. Irrigation water demand through reuse water meter (peak flow water demand for "direct" reuse water service; calculated rate through meter based on a 12 hour per day flow supply for "lake discharge" reuse water service)
11. The required locations of all reclaimed water signage must be on applicable design plans prior to Department approval of project.

(a) Identification for Reclaimed Water System Components:

The reclaimed water system shall be appropriately tagged or labeled to warn the public and employees that the water is not intended for drinking. All new piping, pipelines, valves, and outlets shall be color coded, or otherwise marked, to differentiate reclaimed water system components from potable or other water. All new PVC pipe and fittings are to be infused during manufacture with a permanent purple color. Ductile iron piping, casings and fittings shall be painted prior to installation with two (2) min. 4" wide stripes of purple paint along the full length at approximately 2 and 10 O'clock considering pipe diameter. Department supplied signs are required for landscaped areas irrigated with reclaimed water. For lake discharge systems the property owner shall provide and install "No Swimming" and "Catch and Release" fishing signs. The signs shall be installed at all potential lakes access points. Reclaimed water flushing hydrants shall be identified with tags stating in English and Spanish languages, "Do Not Drink", together with the equivalent international symbol. Flushing hydrants and above ground pipe must be coated with two coats of approved purple paint (minimum 8 mils thickness each coat). Purple meter box lids are required. New and replaced irrigation system valve box lids and sprinkler heads shall be color-coded. The acceptable color is Pantone 522 C or approved equal. Additionally, reclaimed water mains shall be marked with one continuous strip of 6" wide detectable purple tape imprinted with one and one-half (1 1/2) inch high lettering reading "Caution - Reclaimed Water Line Below", and located approximately 12" above the crown of pipe. The wording shall occur once every three (3) feet. Service line valves, meter box lids, valve box lids and vault covers shall be permanently identified (cast-in letters) with "Reclaimed Water" system components.

Meter box lids are permanently identified with "Reclaimed Water -- Do Not Drink". All valves and hydrants require identification tags. A pressure-control valve located on the Customer's side of the meter is required for meters 1-1/2" and larger and for all lake discharge connections. All new installed components of a reclaimed water irrigation system shall be color coded as stated above. The conversion to a reclaimed water irrigation system is the responsibility of the owner, with the irrigation system inspected by the Department prior to Service Activation. Any required corrections by the Department must be completed prior to Service Activation. The property owner is responsible for proper sizing, design and installation of the irrigation system. Special attention required regarding thrust restraint, design and operating pressures, min. cover over pipe and pipe joint design in order to account for possible pressure changes in the reuse water distribution system.

A Remote Telemetry Unit (RTU) is required for all "Lake Discharge" reuse water services, and may be required for "direct" reuse water services, connections to monitor and control (flow rate, availability) through the meter.

4.2 RECLAIMED WATER DIRECT CONNECT

a) Reclaimed Water Service Lines and Taps:

Service pipes shall be Schedule 40 PVC with Schedule 80 PVC fittings. Reclaimed water service taps on the main shall be spaced at a minimum distance of 18" apart. All service lines 2" and smaller shall have corporation stops. Services shall be as short as possible and not exceed 100 feet to meter box. Services under driveways shall be encased in minimum 3" PVC Schedule 40 or HDPE SDR18 purple pipe. Service taps under driveways or roadways shall be avoided whenever possible. Services crossing under parking tracts shall have their meter boxes placed prior to the crossing. In developments where the property line is not clearly defined (condominiums and commercial), the meter box shall be placed within a utility easement in a readily accessible location. Private reclaimed water services shall not cross over any public utility mains unless specifically identified on plans and approved by the Department.

b) Service Installation:

(1) Construction plans shall include a typical meter or meter box installation detail for each service size to be installed. Service line and meter sizes, if applicable must be shown on the plans. The proper sizing of meters, if applicable and service lines is the responsibility of the developer's engineer. Services will be available in the following sizes only: 5/8", 1", 1-1/2", 2", 3", 4" and larger sizes as necessary. Service sizing for "Direct Service" connections shall be based on expected peak demand and correspond to the standard for maximum continuous operating capacity for a meter: 5/8" X 3/4" - 20 GPM, 1" - 50 GPM, 1-1/2" - 120 GPM, 2" - 160 GPM, 3" - 350 GPM, 4" - 1000 GPM, 6" - 2000 GPM. The installation of a pressure control valve on the Customer's side of the meter is required for 1-1/2" and larger meters and is recommended for smaller services.

No direct connect reclaimed water meter shall exceed 1" in size without justification provided by developer that a lake discharged system is not achievable for the property and requires prior Department approval. The Department reserves the right to require telemetry on any direct connect reclaimed water meter system to regulate the use of reclaimed water. Any 3" or larger direct connect reclaimed water meter shall be installed above ground.

All applicable service installation and connection charges must be paid to the Department prior to Service Activation. All meters installed by the Department personnel (see details). All service piping, valves, boxes must be completed in accordance to these standards prior to service initiation. 1-1/2" double strap saddles and corporation stops shall be required for 5/8" X 3/4" and 1" meters. 2" double strap saddles and corporation stops in valve boxes shall be required for 1-1/2" and 2" meters. Threaded area of corporation stops shall be spiral wrapped with two wraps of Teflon tape. The corporation stop shall not be bottomed out (1-3 threads showing). Compression (pack joint) style adapters required for transition

from brass valves and fittings to PVC pipe. No PVC male/female adapters shall be used. Generally, the Department will not install services for meters 3" and larger. Meter boxes cannot be within pedestrian walkways or driveway areas. All meters and meter box locations required to be on the construction drawings prior to approval. Check valves are required for all reclaimed water services. Service lines under driveways and roadways to be encased in minimum 3" PVC Schedule 40 purple pipe. Service taps under driveways and roadways are not permitted unless unavoidable due to existing conditions and then only with prior Department approval. Meter boxes shall be set in grassy area whenever possible. For water meter installations within nonexclusive utility easement paralleling a road right-of-way, the control valve shall be located a maximum of 18" from the right-of-way line and the meter box shall not extend into the easement by more than 48" from the right-of-way line.

(2) Meter boxes and control valve locations shall be designed to be accessible and provide the "minimum unobstructed space" shown on applicable details (i.e., clear of buildings, trees, shrubbery, light poles, walled enclosures, hydrants, cable boxes, garbage compactors, etc.).

(3) Minimum 12" horizontal separation is required between front edge of electrical transformer pad or its projection and back edge of meter box or control valve.

(4) The developer and/or his representative shall be responsible for coordination of service location.

(5) Meter/service will not be installed/activated until:

- Driveway, sidewalk and/or form boards for same are in place.
- Minimum unobstructed space is provided as shown on applicable details. For services 1-1/2" and larger, the minimum 3' unobstructed space shall begin at the ball/gate valve on the discharge side of the meter.
- The required backflow prevention assembly/device is installed on the Reclaimed Water service and passes the initial testing **(if applicable)**.

Note: Service line and meter assembly repairs, relocation and/or adjustments prior to issuance of a Certificate of Occupancy charged at Cost to the Customer.

(6) Double service meter boxes required for dual services installed on a common property line whenever possible.

(7) Meter boxes shall not be located in areas that can be fenced, such as backyards, under any circumstances.

(8) Meter boxes shall not be located in any paved surfaces area (sidewalks, curbs, driveways, roadways, etc.) unless specifically approved by the Department.

(9) In areas where no alternative is available, meter will be allowed in paved area and:

(a) Top of box shall be flush with surface located outside of drainage flow lines (i.e., dry area).

(b) Traffic rated box and lid shall not be located in common traffic areas. Bollards may be required under certain conditions. No Bollards shall be located in public right-of-way "Clear Zones"

(10) In cases where reclaimed water, Potable Water and Wastewater lines have been constructed and a developer replats the development and/or relocates structures, the Department will require that reclaimed water services which cannot be reasonably adjusted, be removed and plugged at the main. When the number of services removed is excessive, the developer is to replace the affected RWM at their expense. A reasonable adjustment is less than three (3) feet laterally. Any adjustments/reconstruction are required to meet all current construction standards and requirements.

(11) Monitoring wells (if required) shall be included in design and construction.

4.3 RECLAIMED WATER LAKE DISCHARGE

The point of discharge into the lake shall be located as far as possible from the:

- Point of withdrawal
- Point of control structure overflow into receiving bodies of water

The lake discharged connection design shall include a lake water level monitoring assembly acting as a shut off valve at a preset lake water elevation. The "Lake Discharge" service shall require the acknowledgement from the appropriate drainage authority and an NPDES permit from DEP. The DEP may require a monitoring well and if required the well must be installed at the property owner expense. The NDPES permit may include further irrigation system operating conditions, including frequent lake water level checking and various reporting requirements.

"Lake Discharge" services, the meter shall be selected using the maximum monthly withdrawal amount from the Water Use Permit, calculate the gallons per minute rate for a 24-hour and 12-hour per day flow. Flow size rate control appurtenances pipe sizes and meter size to function under both discharge time scenarios. The Department reserves the right to install or require the installation of a flow rate control device to regulate peak flow conditions. The installation of a pressure control valve on the Customer's side of the meter is required for 1-1/2" and larger meters, for all lake discharge connections.

4.4 RECLAIMED WATER CONSTRUCTION

(a) Installation:

Installation of reclaimed water pipe and associated fittings shall be in accordance with current AWWA standards for Potable Water, manufacturers' requirements for their particular products, and FDEP regulations. All Non-DIP mains shall have a minimum of 36" clear cover to finished grade unless specifically approved otherwise, subject to pipe material limitations, with pipe being as level as possible. Approved pipe joints restraint shall be required at each fitting involving a change of direction and as specified in plan details. The contractors shall be responsible to ensure that all safety requirements are met with respect to construction.

All pipes shall be laid in trenches having a dry and stable bottom. Backfill shall be free of boulders and debris. Pipe shall be fully supported along its entire length. Sharp or rocky material encountered in the base shall be replaced with proper bedding. Pipe shall be laid on line and grade as designed. Changes in pipe alignment may be accomplished using appropriate fittings or through pipe deflection. Pipe deflection at the joint is allowed with ductile iron pipe and with specially designed PVC pipes (see Approved Materials Lists). The deflection shall not exceed 75% of the Manufacturer's recommended maximum joint deflection. No deflection at the joint is allowed for PVC pipe unless allowed by the pipe manufacturer. If joint deflection is not allowed, PVC pipe curvature shall be accomplished by installing appropriate bends. Flushing hydrants shall be installed plumb with the nozzle minimum 18" above finished grade.
Hydrants shall not be placed in sidewalks or driveways. It will be the responsibility of the Developer to move hydrants placed in sidewalks/driveways and to provide protection from traffic damage if necessary, upon PBCWUD request. Flushing hydrants must be ordered purple in color. Hydrants must be clean and have a glossy purple finish when accepted by the utility.

If painting is required, all oil, grease, dirt, salt and other contaminants must be removed. Two coats of approved paint to be applied by brush per manufacturers' specification for a D.F.T. of at least 4 - 8 mils/coat. One repair kit must be provided with every five (5) hydrants (minimum one per project). A set of tools is required with every ten (10) hydrants (one per project).

All valves shall be placed according to plans unless the Department approves relocation. Asbuilt drawings shall reflect the actual location of all mains, services, and valves. All taps must be at least 18" from a fitting or bell. Reclaimed water mains shall not be laid in fuelcontaminated areas. All valves and hydrants require identification tags.

All road crossings and pavement cuttings shall be in accordance with the requirements of the particular authority governing the area.

(b) Connection to Existing System:

All connections to existing mains shall be made under the direct supervision of the Department. Valves on existing mains shall be operated by Department personnel or under direct supervision of the Department. The contractor shall confirm the compliance of the existing facilities with the Standards (especially in regard to joint restraint), and modify the facilities, if required, at no cost to the Department, prior to connection. Tapping sleeve and valve shall be pressure tested prior to tapping. The contractor shall be ready to proceed with as much material preassembled as possible at the site to minimize the length of service interruption. The Department will postpone a tie-in if the contractor is not ready to proceed on schedule. Wet taps equal to or larger than one half the pipe diameters require a ductile iron mechanical joint tapping sleeve. No sizes on size taps are permitted. A reverse tap due to pre-existing conditions is acceptable only if previously approved (detail drawing is required).

(c) Cleaning and Flushing:

Foreign material shall be kept out of the pipe or cleaned from pipe prior to installation. Upon completion of installation, the reclaimed water mains shall be flushed with Potable Water and the water disposed of without creating a nuisance. The use of reclaimed water for flushing will not be permitted. The ends of pipe installed during one day shall be capped at the end of each day with pipe plugs to prevent contamination.

(d) Testing:

All mains shall be pressure-tested with Potable Water to the required pressure, 150 psi, and 200 psi for pipes larger than 24". Mains located in road rights-of-way shall be pressure tested after the rock and "tack coat" is installed in the road right-of-way. Potable water shall be used for pressure testing. The maximum length of line to be tested as one section will be 2,500 feet. The test shall be performed as determined in the current AWWA specification. The standard test duration is two (2) hours. HDPE pipe pressure test shall be conducted separately from PVC and D.I. pipes. See Section 4.6.3 for pressure test requirements for HDPE pipe. Certifications of Completion and project releases for service from the FDEP (if applicable) for the reclaimed water distribution and irrigations systems are required prior to any Service Activation. As a minimum, a Certification of Completion from the Engineer of Record is required.

(e) Handling, Abandonment and Disposal of Asbestos/Cement (AC) Pipe:

(1) All cutting, removal and disposal of AC pipe must be performed by a Florida licensed Asbestos Abatement Contractor per applicable local, state and federal regulations.. The Department will make every reasonable effort to identify and quantify the location of known AC pipe prior to onset of work. If the Contractor during the course of work observes, uncovers, or otherwise becomes aware of the existence of any asbestos-cement pipe, pieces, or material at the site to which the Contractor or any

subcontractor, supplier, or other person may be exposed, the Contractor shall immediately notify the Project Engineer and the Department.

(2) On projects designed and/or constructed by the Department, the Contractor shall notify the County's Risk Management and Water Utilities Departments. The Risk Management Department shall promptly consult with the Project Engineer concerning such condition and determine the necessity of the County retaining special consultants or qualified experts. The contractor shall not perform any work near or in connection with the suspect material until receipt of special written instructions from the Risk Management Department. The Contractor will ensure that all subcontractors follow these procedures.

(3) Abandonment – Grouting and/or abandonment in place is not permitted otherwise authorized by the County project coordinator/engineer. Written approval is required. AC pipe to be abandoned in place shall be filled with grout. Abandoned A/C pipe is to be shown on the as-built drawings. The grout mix shall be:

Type	**Pounds**	**Cubic Feet**
Cement	340	.73
Sand	2840	17.91
Stone	00	00
Water	374	6.00
Admix/Type b	13 oz.	
Air	170 + 5.0%	1.35

The slump shall be 6" + 1 inch, Admix 1 shall meet ASTM C-494 type BD with alternative mixes requiring prior Department approval.

4.5 HORIZONTAL DIRECTIONAL DRILLING (HDD)

(a) General.

Potable Water design and construction standards (Section 4.6.1, 4.6.2, 4.6.4) shall apply unless noted otherwise. The Department reserves the right to disapprove a horizontal directional drill installation if the conventional open trench or jack and bore type installation is preferred by the Department, because:

- Excessive number of high/low points
- Excessive depth of pipe is of concern
- A casing is required by the Department to protect the utility pipe
- Future service and main connections to the utility pipe will be negatively impacted by a horizontal directional drilling

(b) Pipe sizes, pipe material.

The horizontal directional drilled utility pipe shall be manufacturer approved restraint joint DI pipe PVC pipe AWWA C-900 DR14, 200 psi, NSF 61 (4"-12") or HDPE pipe (SDR 11). If the directional drilled pipe is used as a casing for a small diameter service line (up to 2" diameter) PVC DR18 or HDPE DR17 pipe is acceptable.

Pipe and system components shall be free from voids, cracks, inclusions, and other defects and shall be uniform in color throughout the installation.

(c) Design Requirements.

The Engineer shall inquire with the Department about approval of a horizontal directional drilling procedure for a pipe installation. With the Department's concurrence, the Engineer shall submit a signed and sealed pilot bore plan for review and approval. The plan shall be submitted on a 24" x 36" sheet to a maximum 1" = 20' horizontal and 1" = 2' vertical scale (1" = 10' horizontal, 1" = 10' vertical scale preferred).

The plan must show:

- Finished grade and surface improvements
- Locations of drill set-up
- Length of bore
- Deflection and radiuses of the pilot bore
- Field verified locations of existing utilities and underground structures
- Minimum horizontal and vertical clearances from underground structures, conduits, piping systems (the proposed clearances must exceed the Department's standards plus the guidance system accuracy tolerance)
- Pipe size and specifications (including restraining provisions against "pipe shrinkage")
- Proposed pilot bore pipe defection limits shall not exceed 75% of the maximum deflection allowed by the pipe manufacturer
- The drill radius of the final HDD pipe shall be minimum 30 pipe diameters, not exceeding
  80% of the max. bending radius as recommended by pipe manufacturer
- Limits of directional bore installation
- Limits of pressure testing
- Connection to existing utilities
- Rights-of-way limits, utility easements and temporary construction easements
- Minimum pipe joint restraints at each end of pipe material transition from HDPE pipe
- Trace wires
- Isolation valves and/or transition fittings/adapters

(d) Preconstruction Meeting.

Upon approval of the pilot drill plan by the Department and obtaining all necessary permits for the directional drilling, the Engineer shall schedule a preconstruction meeting with the Department in accordance with Section 5 - Subsection 5.3 Pre-Construction Requirements of this Minimum Design and Construction Standards. If the construction requires any field welding/fusion of HDPE pipe and/or fittings, a Certificate of Completion of a pipe fitting manufacturer approved training program is required. The Engineer and the Contractors performing the utility work shall attend the meeting. The licensed HDD Contractor shall provide references certifying a minimum five (5) years HDD experience.

(e) Pilot Bore.

The Engineer shall schedule the beginning of work with the Department a minimum of 3 days in advance. The drill path shall be accurately surveyed and plotted to create an "as-built" drawing (same scale as the pilot drill plan). A high accuracy MGS (Magnetic Guidance System) shall be capable to provide vertical pipe data with a max. $\pm$ 2% deviation and $\pm$ horizontal pipe location data with max. $\pm$ 2 foot deviation. The data shall be collected at max. 25' intervals.

Deviation of more than $\pm$ 2 feet vertically or horizontally from the approved pilot bore plan shall be reported immediately to the project engineer for evaluation. The Engineer shall evaluate the asbuilt data and confirm the compliance with the design parameters. Deviation beyond approved parameters (depths, deflection radius, separation to other utilities or structures) shall be brought to the attention of the Department. The signed and sealed pilot bore "as-built" drawing shall be submitted to the Department for review and approval if the "as-built" location differs substantially from the design plan.

(f) Pull back of carrier pipe.

Upon approval of the pilot bore location by the Department; the pullback operation of the required carrier pipe shall begin. The Contractor shall select the proper reamer type with the final hole opening to be a maximum of 1.5 times the outside diameter of the largest component system. The open borehole shall be stabilized by means of bentonite drilling slurry. The slurry shall be contained at the entry or the exit side of the bore in pits or holding tanks.

The pipe sections shall be joined together in accordance with the manufacturer's specifications. The ends of the pipe, gaskets and couplings shall be inspected for cleanliness. Chipped, scratched, scraped, cracked or excessive deformed pipe or couplings shall be rejected. Two approved directional drill tracer wires (APWA color coded) shall be pulled alongside of the product pipe. and extended to nearest valve boxes (coil min. 3' wire near the surface inside valve box). The pipe shall be elevated to the approximate angle of entry and supported by roller arms or equivalent. Any field welding/fusion of HDPE pipe and fittings may be performed only by personnel certified through a pipe/fitting manufacturer approved training program.

(g) Testing.

Pipe installed using the HDD method shall be flushed and pressure tested using Potable Water. The pressure within the HDPE Pipe test section shall be raised to approx. 160 psi and then allowed to idle for approx. 3 hours in order to allow to stabilize. Additional make-up water/pressure shall be applied during the 3 hour stabilization period only to maintain a minimum 140 psi pressure.

The final phase of the pressure test shall involve applying make-up water/pressure to achieve a test pressure of 150 psi or higher (as required). The test section is then allowed to idle (no make-up water /pressure is added) for a period of 2 hours. After the 2 hour period, make-up water/pressure is applied and measured to reestablish the test pressure. If the measured and added quantity of water is greater than the allowable amount, the pressure test fails. No leakage is acceptable.

Installed services, tees and stub-outs shall be pressure tested together with the main. Pressure test is not required if the installed pipe is intended to be used as a casing. If the pipe successfully passed the pressure test, a connection to the existing pipe system may be performed.

(h) As-Builts:

Certified as-built drawings must be submitted to the Department for review and approval prior to any final certification in accordance with Section 6 - Subsection 6.1 Record Drawings of this Minimum Design and Construction Standards.

SECTION 4.4 – RECLAIMED WATER SYSTEM STANDARD DETAILS LISTING

1R RECLAIMED WATER DUAL 5/8" X 3/4" METER SERVICE DETAIL
2R RECLAIMED WATER SINGLE 5/8" X 3/4" OR 1" METER SERVICE DETAIL
3R RECLAIMED WATER 1-1/2" and 2" METER SERVICE DETAIL (DIRECT SERVICE)
4R RECLAIMED WATER 3" METER SERVICE DETAIL (DIRECT SERVICE)
5R RECLAIMED WATER 4" METER SERVICE DETAIL (DIRECT SERVICE)
6R RECLAIMED WATER 6" METER SERVICE DETAIL (DIRECT SERVICE)
7R RECLAIMED WATER MAIN TYPICAL FLUSHING HYDRANT INSTALLATION
8R RECLAIMED WATER MAIN TYPICAL GATE VALVE SETTING AND MAIN CUT IN DETAIL
9R RECLAIMED WATER MAIN TYPICAL BUTTERFLY VALVE SETTING
10R RECLAIMED WATER MAIN CROSSING OTHER MAINS AND UTILITES
11R RECLAIMED WATER MAIN CONFLICT DEFLECTION DETAIL
12R TYPICAL THRUST BLOCKS FOR PRESSURE PIPE
13RA RECLAIMED WATER MAIN CASING INSTALLATION DETAILS
13RB RECLAIMED WATER MAIN SPLIT CASING INSTALLATION DETAIL
14R TYPICAL TRENCH DETAIL/ROOT BARRIER INSTALLATION DETAIL
15R RECLAIMED WATER MAIN TYPICAL UTILITIES CANAL CROSSING-SINGLE PIPE (SINGLE PILE)
16R FAN GUARD/PILE CAP DESIGN - SINGLE PIPE (SINGLE PILE)
17R RECLAIMED WATER MAIN UNDERGROUND AIR RELEASE VALVE & VAULT IN NON-TRAFFIC AREAS OUTSIDE OF ROAD RIGHT-OF-WAY
18R RECLAIMED WATER MAIN AIR RELEASE MANHOLE IN PAVED AREA IN ROAD RIGHT-OF-WAY
19R RECLAIMED WATER MAIN PRESSURE TEST CRITERIA
20R RECLAIMED WATER MAIN OFF-SET UNDERGROUND AIR RELEASE VALVE
21R OPEN CUT PIPE INSTALLATION - NON-THOROUGHFARE ROAD
22R OPEN CUT PIPE INSTALLATION - THOROUGHFARE ROAD
23R RECLAIMED WATER IRRIGATION AREA – IDENTIFICATION SIGN
24R MECHANICAL PIPE RESTRAINT – MINIMUM PIPE LENGTHS
25R LAKE DISCHARGE – METER ASSEMBLY (1-1/2” AND 2” METERS)
26R LAKE DISCHARGE – METER ASSEMBLY (3” AND LARGER)
27R LAKE DISCHARGE – OUTFALL DETAIL (PROFILE)
28R LAKE DISCHARGE – OUTFALL DETAIL (FRONT ELEVATION)
29R LAKE DISCHARGE – OUTFALL DETAIL (STILLING WELL)
30R LAKE DISCHARGE – GROUNDWATER MONITORING WELL
31R RUBBLE RIPRAP DETAIL
32R RECLAIMED WATER SYSTEM RTU CONTROL PANEL – BILL OF MATERIALS
33R RECLAIMED WATER SYSTEM RTU CONTROL PANEL
34R RECLAIMED WATER SYSTEM RTU PANEL SPECIFICATIONS (SHEET 1 OF 2)
35R RECLAIMED WATER SYSTEM RTU PANEL SPECIFICATIONS (SHEET 2 OF 2)
36R RECLAIMED WATER SYSTEM RTU SPECIFICATIONS (SHEET 1 OF 4)
37R RECLAIMED WATER SYSTEM RTU SPECIFICATIONS (SHEET 2 OF 4)
38R RECLAIMED WATER SYSTEM RTU SPECIFICATIONS (SHEET 3 OF 4)
39R RECLAIMED WATER SYSTEM RTU SPECIFICATIONS (SHEET 4 OF 4)
40R RECLAIMED WATER SYSTEM RTU CONTROL PANEL POWER WIRING
41R RECLAIMED WATER SYSTEM RTU ANTENNA AND PANEL MOUNTING DETAIL
42R RECLAIMED WATER SYSTEM ELECTRICAL LAYOUT

SECTION 4.4 – RECLAIMED WATER SYSTEM STANDARD DETAIL LISTING (cont'd.)

43R RECLAIMED WATER SYSTEM PLC INPUT/OUTPUT WIRING (SHEET 1 OF 2)
44R RECLAIMED WATER SYSTEM PLC INPUT/OUTPUT WIRING (SHEET 2 OF 2)
45R RTU SHARING BETWEEN LIFT STATION AND RECLAIMED WATER SYSTEM
46R LANDSCAPE NOTES AND ROOT BARRIER DETAIL
47R ABOVE GROUND WATER METER INSTALLATION PIPE SUPPORT
48R RECLAIMED WATER MAIN CROSSING FENCE, WALL OR BERM CASING DETAIL
49R RECLAIMED WATER MAIN CONFLICT STRUCTURE DETAIL

RECLAIMED WATER SYSTEM

STANDARD DETAILS SHEETS 1R – 49R