

WATER CONSERV II

A WORLD-RENOWNED IRRIGATION AND RAPID INFILTRATION BASIN WATER REUSE PROJECT



*Water Conserv II
Distribution Center*

WATER CONSERV II FACTS

Jointly Owned by the City of Orlando and Orange County.

Largest Water Reuse Project of Its Kind in the World.

First Reuse project in Florida Permitted by the Florida Department of Environmental Protection (FDEP) to Irrigate Crops Produced for Human Consumption with Reclaimed Water.

Winner of the 1989 Grand Conceptor Award from the American Consulting Engineers Council for Outstanding Engineering Achievement, Unique Application of Technology and Attention to Environmental and Social Concerns.

Winner of the 2000 U.S. Environmental Protection Agency's Region IV Municipal Water Use Efficiency Award for the Most Innovative and Effective Reclamation and Reuse Program.

Winner of the 2001 Outstanding Project of the Year Award from the WaterReuse Association.

Winner of the 2007 Award of Merit from the WaterReuse Association.

Winner of the 1994, 2001 and 2007 Dr. David W. York Water Reuse Award for the Development and Operation of an Exemplary Water Reuse Program.

Winner of the 2001 Orange County

Environmental Protection Department's Environmental Excellence Award.

Winner of the Florida Water & Pollution Control Operator Association's Class A Reuse Safety Award from 1996 through 2007.

Winner of the 2005 Gold Fleet Safety Award, 2005 Gold Corporate Safety Achievement Award and the 2005 Gold Outstanding Lost-Time Prevention Award from the Florida Safety Council.

Winner of the 2004 Gold Outstanding Achievement Award and 2004 Corporate Safety Award from the Florida Safety Council.

Winner of the 2004 Health & Safety Award and 2004 Community Service Award from Woodard & Curran, Inc.

Winner of the 2003 Maintenance Management Award, 2003 Compliance Award, 2003 Community Service Award and 2003 Management Achievement Award from Woodard & Curran, Inc.

Winner of the 2002 Health & Safety Award, 2002 Maintenance Management Award and 2002 Community Service Award from Woodard & Curran, Inc.

Winner of the 2000 Outstanding Client Service Award from Woodard & Curran, Inc.

Winner of the 1999 Plant of the Year Award from Woodard & Curran, Inc.

Winner of the 1998 O&M Excellence Award from Woodard & Curran, Inc.

Current reclaimed water flows average 25-30 MGD.

Permitted capacity is 80 MG AADF at build-out.

Permitted public access irrigation is 39 MGD and permitted RIB flow is 29.2 MGD.

Transmission Main is capable of handling flows up to 75 MGD.

ENVIRONMENTAL BENEFITS REALIZED BY WATER CONSERV II

Eliminated discharge to surface water.

Turned a liability into an asset for beneficial use.

Proven, beneficial and cost effective year-round reclaimed water reuse.

Reduces the demand on the Floridan aquifer by eliminating the need for well water for irrigation.

Helps to replenish the Floridan aquifer, through the discharge of reclaimed water to the Rapid Infiltration Basins (RIBs).



Typical Water Conserv II RIB Site

Established a preserve within the Rapid Infiltration Basin sites for endangered, threatened and concerned species of plants and animals. Current documented species include the following:

- Scrub Plum
- Clasping Warea
- Sand Spike Moss
- Scrub Morning Glory
- Lewton's Milkwort
- Gopher Tortoise
- Sherman's Fox Squirrel
- Eastern Indigo Snake
- Sand Skink
- Florida Sandhill Crane
- American Alligator
- Roseate Spoonbill
- Northern River Otter
- Great Horned Owl

BENEFITS REALIZED BY THE PARTICIPATING CITRUS GROVE OWNERS

A dependable long term source of irrigation water that is not subject to water restrictions during droughts.

Elimination of installation, operation and maintenance costs for deep well or surface water pumping systems.

Increased crop yields.

Better tree growth.

Enhanced freeze protection capabilities.

Detailed research at the Mid Florida Citrus Foundation.

ORIGINAL CITRUS GROWER AGREEMENT (1986 – 2006)

20 year contract between the citrus grower and the City and County that is binding to the land.

Guarantees a weekly amount of free reclaimed water to be taken by the citrus grower and furnished by the City and County.

Guarantees 40 PSI at the grower turnout under normal operating conditions.

Guarantees the citrus grower highly treated reclaimed water that is free of virus and fecal Coliform, and meets all the requirements of the Citrus Irrigation Reclaimed Water Constituent Concentrations.

City and County shall have the right, upon written notice to the Owner, and when reasonably necessary to enter upon the Owner's property to review and inspect the Owner's operating practices as they relate to this Agreement, and any backflow prevention devices between the Owner's irrigation system and any well which is maintained by the Owner.

Citrus growers can request up to double or refuse their weekly contracted amount 4 weeks per year; no more than 2 weeks consecutively.

Citrus growers have the right to terminate the Agreement if it is determined that the reclaimed water is detrimental to the trees.

If the volume of reclaimed water the citrus grower originally signed up for is found to be detrimental to crop production or quality, the citrus grower has the right to reduce the amount taken to an acceptable volume.

Citrus grower can transfer their allocation to another parcel that is within the project service area.

A buy out clause is provided - \$3,600.00 per acre the first year and decreasing by 5% each year over the life of the contract.

NEW STANDARD WATER CONSERVATION RECLAIMED WATER AGREEMENT (2010 Forward)

Five (5) year agreement between the citrus grower and the City and County that is subject to previously established reclaimed water fees.

City and County are responsible for providing and installing the customer meter, if not currently in place. Existing customers are exempt from meter installation fees. New customers must pay for meter and meter installation.

City and County intend to deliver reclaimed water to the customer at 40 PSI at the grower turnout under normal operating conditions.

The customer is provided highly treated reclaimed water that is free of virus and fecal coliform, and meets all the requirements of the FDEP Public Access treatment parameters.

Customers and the City and County determine the annual flow that each site will

receive based on the size and the use of the reclaimed water. Suppliers, or their designee, shall have the right, upon verbal notice to the Owner, and when reasonably necessary, to enter upon the Owner's property to review and inspect the Owner's operating practices as they relate to this Agreement, and any backflow prevention devices between the Owner's irrigation system and the Suppliers' system and any well which is maintained by the Owner.

The fees for reclaimed water and meter installations for customers are listed in Table 3 on pages 10 and 11.

CUSTOMER SERVICE AGREEMENT

Initially created as an interim agreement until the new standard customer agreement was developed and executed. The agreement between the customer and the City and County is subject to previously established reclaimed water fees.

City and County are responsible for providing and installing the customer meter, if not currently in place. Customer must pay for meter and meter installation.

The customer is provided highly treated reclaimed water that is free of virus and fecal coliform, and meets all the requirements of the FDEP Public Access treatment parameters.



Customer Irrigation With Reclaimed Water Provided By Water Conserv II

Customers and the City and County determine the annual flow that each site will receive based on the size and type of irrigation.

The Suppliers shall have the right, upon written or oral notice to the Owner and when reasonably necessary, to enter upon the Property upon which the Owner's distribution system is located and Reclaimed Water is used, to review and inspect the Owner's operating practices as related to this Agreement, and any backflow prevention devices between the Owner's system and any well and potable water system connection which is maintained by the Owner.

The fees for reclaimed water customers are listed in Tables 3 and 4 on pages 10 thru 12.

RECLAIMED WATER CUSTOMERS

Presently serving 57 agricultural customers, the Mid-Florida Citrus Foundation, 3 golf courses, the City of Ocoee (residential reuse), Orange County Utilities (residential reuse), an equestrian center, a sand mine, Fox Meadow HOA for green space landscape irrigation and 2 landfills (1 includes a soil cement production facility) through 52 turnouts.

The agricultural customers include over 2,737 acres of citrus; 7 indoor, foliage, and landscape nurseries; 2 ferneries; and 4 tree farms.

WATER RECLAMATION FACILITIES

City of Orlando's Water Conserv II Water Reclamation Facility, located at 5420 L.B. McLeod Road, Orlando, Florida.

Orange County's South Water Reclamation Facility, located at 4760 Sand Lake Road, Orlando, Florida.

TRANSMISSION PUMP STATIONS

One station at each water reclamation facility.

Pump/Motor Horsepower

Location	300 HP	800 HP	1000 HP
City of Orlando	3	4 Variable Speed	
Orange County			5 Variable Speed

TRANSMISSION PIPELINE

Transmits reclaimed water from the water reclamation facilities to the Distribution Center Pump Station; RIB Sites 3, 4, 5 and 6; and 3 customer turnouts.

Constructed of pre-stressed concrete cylinder pipe and concrete lined steel pipe with an exterior epoxy coating.

Consists of individual 42-inch diameter pipelines from each water reclamation facility to the point of confluence on the Florida Turnpike with 54-inch diameter pipeline, a distance of 5.5 miles of pipeline. The 54-inch pipeline then runs 15.5 miles to the Distribution Center. Total pipeline length is 21 miles.

Has 2 surge facilities strategically located on the pipeline for surge protection.

DISTRIBUTION CENTER

Components – 100-MGD distribution pump station, four 5-million gallon storage reservoirs, SCADA computer, operations building and maintenance building.

Distribution Pumps (Vertical Turbines)

Quantity	Capacity	Motor	Head
2	8,000 GPM	250 HP	102 Feet
6	10,000 GPM	400 HP	120 Feet

The Distribution Center Pump Station maintains a constant discharge pressure of 60 PSI.

DISTRIBUTION NETWORK

Approximately 70 miles of pipeline ranging in size from 54-inch to 6-inch.

Approximately 50 miles of buried 15kv, 480 volt and instrument cable.

Constructed of pre-stressed concrete cylinder pipe and ductile iron pipe.

Transmits water from the Distribution Center Pump Station to 45 customer turnouts and RIB Sites 2, 5, 7, 8 and 9.

Has 23 surge facilities strategically located on the pipeline for surge protection.

Line pressure throughout the Distribution Network ranges between 60 and 120 PSI.

SUPPLEMENTAL WATER WELLS

25 supplemental water wells strategically located throughout the Distribution Network.

Capacity per well ranges from 1,500 GPM to 3,200 GPM.

Peak supplemental water supply capacity is 56,000 GPM.

Provide water for freeze protection and drought protection when supplies of reclaimed water do not meet customer needs.

TURNOUTS

Point of delivery from the Water Conserv II facility to the private customer systems.



In-Ground Turnout



Above-Ground Turnout

Functions to monitor, record and regulate flow to the customer. Equipped with Bermad pressure regulating/pressure sustaining valve, flow meter, and instrumentation to send information to and receive commands from the Distribution Center.

Turnout is kept locked, accessed only by contract operator. Customers turn on and off according to their water needs and have access to the flow meter for monitoring and record keeping.

RAPID INFILTRATION BASINS AND EXPANSION PROPERTIES

RIBs, agricultural and residential irrigation, and commercial uses are complimentary methods of safe reclaimed water reuse.

RIBs provide capacity for flows in excess of customer needs. Currently, customers use 50% of the reclaimed water, and RIBs recharge the Floridan aquifer with the remaining 50%.

A total of 8 RIB sites. Seven are located in Orange County and 1 is located in Lake County.

A total of 64 RIBs, each RIB having 1 to 5 cells. Total cells = 124.

Total RIB bottom percolation area = 161 acres.

Total current RIB site area = ± 3,725 acres.

Total capacity of RIB system = 29.2 MGD.

Approximately 20 miles of clay and paved roadways provide access to each RIB.

Approximately 24 miles of ductile iron pipeline, ranging in size from 24-inch to 6-inch.

Approximately 20 miles of 480 volt electric cable.

RIB sites were selected based upon percolation ability.

Operation of the Rapid Infiltration Basin system is accomplished through a computerized management system. The system provides the capability to forecast the impact on the regional groundwater system of loading individual or groups of RIBs at prescribed rates and duration.

Approximately 1,725 acres of property for expansion of the project's RIB system.

Approximately 40 miles of fence encloses all RIB sites and expansion properties to minimize trespassing by unauthorized persons and limit liability exposure for the project's owners.

MID FLORIDA CITRUS FOUNDATION

The Mid Florida Citrus Foundation (MFCF) is a nonprofit organization and the research arm of Water Conserv II.

The goals of the Foundation include:

- Providing a safe and clean environment.
- Producing citrus using recommended Best Management Practices.
- Studying the long-term effects of irrigating citrus with reclaimed water.
- Finding solutions to challenges facing citrus growers.
- Evaluating new citrus varieties for production and marketability.
- Developing management practices that will allow growers in the northern citrus area to grow it profitably.
- Studying the effects of golf course irrigation with reclaimed water.
- Promoting urban and rural cooperation.

Research is conducted by scientists from the University of Florida's Institute of Food and Agricultural Sciences and the United States Department of Agriculture.

Research results include:

- The benefits of irrigating with reclaimed water at Water Conserv II have been consistently demonstrated since 1987.
- Citrus on ridge (sandy, well drained) soils responds well to irrigation with reclaimed water and can tolerate up to 100 inches per year in addition to rainfall.
- No negative impacts have resulted from the use of reclaimed water.
- Tree condition and size, crop size, and soil and leaf mineral aspects of citrus trees irrigated with reclaimed water are typically as good as, if not better, than groves irrigated with well water.
- Fruit quality from groves irrigated with reclaimed water is similar to groves irrigated with well water.
- Boron and phosphorous are present in adequate amounts in reclaimed water and can be eliminated from the citrus fertilizer program.
- Reclaimed water maintains soil pH within the recommended range for citrus; therefore, lime no longer needs to be applied.
- Yield and fruit quality vary significantly between different rootstocks.
- High quality deciduous fruits and nuts can be grown on sandy soil with reclaimed water. The unknowns are yield and marketing.
- Golf course grasses respond well to applications of reclaimed water.
- Nitrate levels in the groundwater below the golf course greens and fairways tend to be higher during establishment, then drop to lower levels in established areas.
- Five forage grasses have responded well to irrigation with reclaimed water and have produced good yields of hay.
- Field observations have shown that a number of varieties of vegetables can be grown successfully with reclaimed water.

Research results are published in various scientific journals and presented through meetings, field days and written articles.

ORANGE COUNTY NATIONAL GOLF CENTER

In the early 1990's, growers and residents approached the City and County to find alternative uses for reclaimed water that would be more pleasing to the eye than the RIBs and maintain/improve land values in the area.

Following a joint study by the City and County, an RFP was issued to find a developer to develop a golf course on 971 acres of land that had previously been purchased for expansion of the project's RIB system.

Mr. Phil Ritson, world-renown golf educator, was selected to become the developer of the new Orange County National Golf Center. The original lease agreement included the following:

- The City and County would provide the land free of charge.
- The developer would build the golf center.
- The City and County would receive rent from the golf center based on the number of rounds played.
- All facilities would be irrigated with reclaimed water.
- RIBs would be built and hidden between the fairways to provide the original reclaimed water design capacity for the site.

Construction of the golf center and all related facilities began in October 1996 and was completed in January 1999.



The OCNGC Uses An Average Of 2 MGD Of Reclaimed Water For Irrigation Purposes

SYSTEM OPERATION

Water Conserv II is operated, maintained and managed by a contract operator. The current contract operator is Woodard & Curran, Inc., headquartered in Portland, Maine. Woodard & Curran is an award-winning, dynamic, growing consulting and operations firm serving the public and private sectors.

The contract is a cost-plus fixed-fee type contract that includes the following:

- Five year term.
- Annual budgets negotiated.
- Open book accounting.
- Annual audits performed.



Contact:

Phil Cross

407-656-2332 ex.223

phil.cross@waterconservii.com

www.waterconservii.com

TABLE 1

**WATER CONSERV II
RAPID INFILTRATION BASIN
EFFLUENT QUALITY LIMITS**

Parameters (a)	Maximum Concentrations (b)
Arsenic	0.05
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin	0.004
Lindane	0.004
Methoxychlor	0.01
Toxaphene	0.005
2,4-D	0.10
2,4,5-TP	0.01
Manganese	0.05
Copper	1.00
Barium	1.00
Zinc	5
Phosphorus	10
Coliforms	20
Biological Oxygen Demand	20
Total Suspended Solids	20
Total Nitrogen	30
Chlorides	250
Sodium	250
Sulfate	250
Total Dissolved Solids	500
Ra 226	5pCi/l
Ra 228	5pCi/l
Ph	6.5 - 8.5
Fluoride	1.4 - 2.4

(a) As contained in Board of County Commissioners of Orange County Resolution No. 83-SW-12; August 1, 1983.

(b) All values express as MG/l unless otherwise noted.

TABLE 2**CITRUS IRRIGATION RECLAIMED WATER
CONSTITUENT CONCENTRATIONS**

Constituents	Maximum Average Concentration Limits MG/L	Minimum Sampling Frequency		
		Weekly	Monthly	Quarterly
Arsenic	0.10			X
Beryllium	0.10			X
Bicarbonate (Alkalinity)	200.00		X	
Barium	2.00		X	
Boron	1.00		X	
Cadmium	0.01			X
Chromium	0.01			X
Calcium	200.00		X	
Chloride	100.00	X		
Chlorine	10.00	X		
Cobalt	0.05			X
Copper	0.20		X	
Iron	5.00		X	
Lead	0.10			X
Lithium	0.01			X
Magnesium	25.00			X
Manganese	0.20		X	
Mercury	0.01			X
Nickel	0.20			X
Nitrogen	30.00	X		
Phosphorus	10.00	X		
Potassium	30.00		X	
Selenium	0.02			X
Silver	0.05		X	
Sodium	70.00	X		
Sulfate	100.00		X	
Zinc	1.00		X	
CBOD (Carb Biochemical Oxygen Demand)	30.00		X	
COD (Chemical Oxygen Demand)	120.00		X	
TSS (Total Suspended Solids)	5.00		X	
EC (Conductivity)	1100 umhos	X		
Ph	6.0 – 8.5	X		

- (1) Maximum Average Concentration = Average of last 3 samples tested.
(2) Limits in MG/l unless otherwise noted.

TABLE 3

**ORANGE COUNTY
COMMERCIAL CITRUS GROWER RECLAIMED WATER RATE SCHEDULE**

Effective January 1, 2009 through December 31, 2011	
Commercial Citrus Growers Reclaimed Water Rate	<u>Volume Charge for Usage</u> \$0.15 per 1,000 Gallons
Effective January 1, 2012	
Commercial Citrus Growers Reclaimed Water Rate	<u>Volume Charge for Usage</u> \$0.19 per 1,000 Gallons

AUTOMATIC ANNUAL RATE INCREASE

The Board of County Commissioners adopts annually, effective October 1 each year an automatic increase each year of three percent (3%) to all rates, fees and charges contained in this schedule as they are in effect immediately prior to the effective date of such annual increase.

TABLE 4

**ORANGE COUNTY
RECLAIMED WATER RATE SCHEDULE**

Effective October 1, 2010

Retail Residential Rates

Meter Size	Fixed Monthly Charge	Allowed Monthly Usage (Gallons)	Volume Charge For Usage Above Allowance
5/8 by 3/4 Inch	\$3.33	4,000	\$0.90 per 1,000 Gallons
3/4 Inch	\$3.33	4,000	\$0.90 per 1,000 Gallons
1 Inch	\$8.34	10,000	\$0.90 per 1,000 Gallons
1 – 1/2 Inch	\$16.68	19,000	\$0.90 per 1,000 Gallons
2 Inch	\$26.67	31,000	\$0.90 per 1,000 Gallons
3 Inch	\$50.02	57,000	\$0.90 per 1,000 Gallons

Wholesale Priority Rates

Meter Size	Fixed Monthly Charge	Allowed Monthly Usage (Gallons)	Volume Charge For Usage Above Allowance
4 Inch	\$161.68	218,000	\$0.74 per 1,000 Gallons
6 Inch	\$369.87	499,000	\$0.74 per 1,000 Gallons
8 Inch	\$578.06	780,000	\$0.74 per 1,000 Gallons
10 Inch	\$879.22	1,185,000	\$0.74 per 1,000 Gallons
12 Inch	\$1,341.38	1,808,000	\$0.74 per 1,000 Gallons
16 Inch	\$2,659.86	3,584,000	\$0.74 per 1,000 Gallons

TABLE 4

**ORANGE COUNTY
RECLAIMED WATER RATE SCHEDULE**

Effective October 1, 2010

Wholesale Interruptible Rates With No On-Site Storage

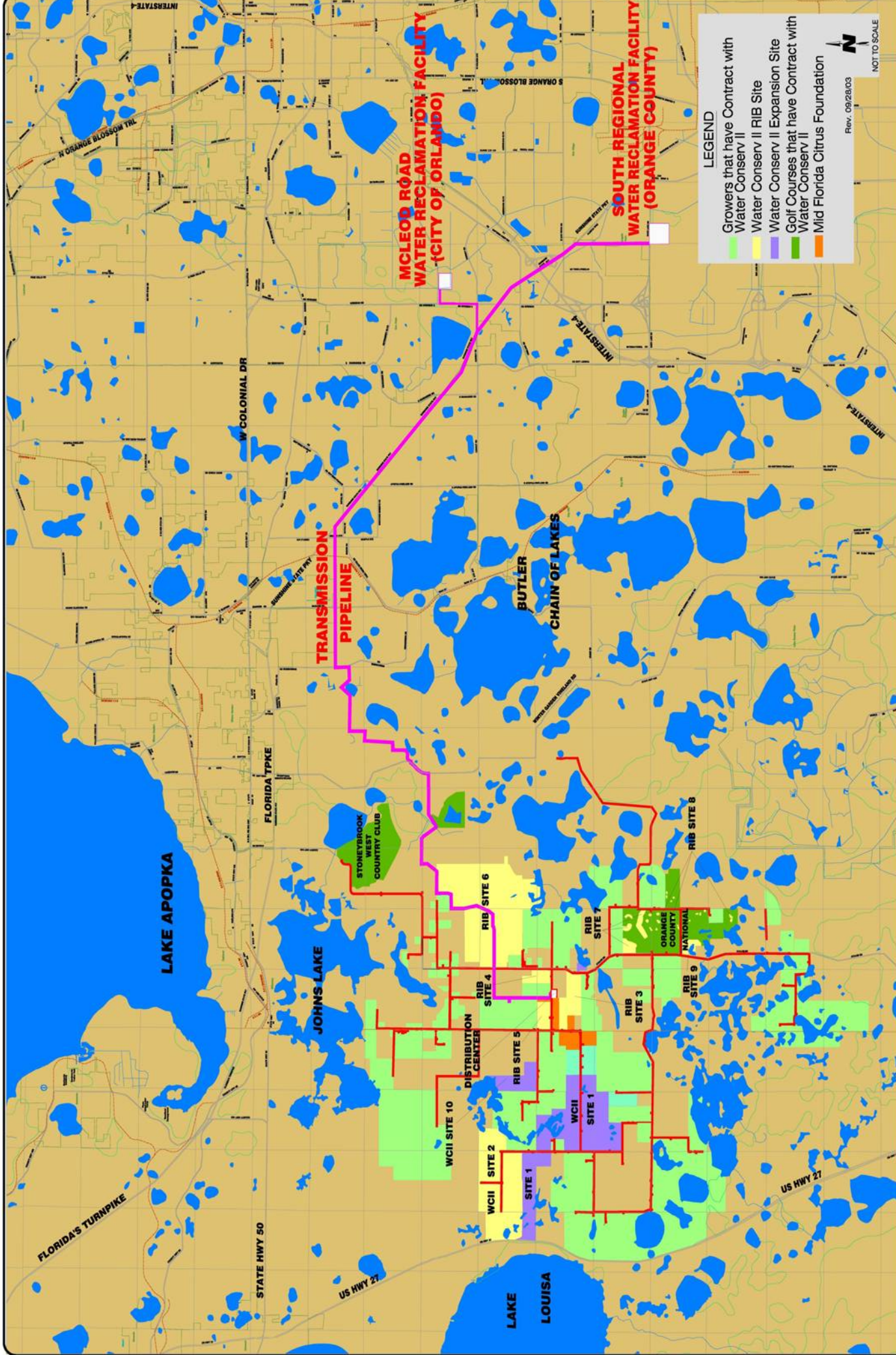
Meter Size	Fixed Monthly Charge	Allowed Monthly Usage (Gallons)	Volume Charge For Usage Above Allowance
4 Inch	\$97.01	218,000	\$0.44 per 1,000 Gallons
6 Inch	\$221.92	499,000	\$0.44 per 1,000 Gallons
8 Inch	\$346.83	780,000	\$0.44 per 1,000 Gallons
10 Inch	\$527.54	1,185,000	\$0.44 per 1,000 Gallons
12 Inch	\$804.83	1,808,000	\$0.44 per 1,000 Gallons
16 Inch	\$1,595.91	3,584,000	\$0.44 per 1,000 Gallons

Wholesale Interruptible Rates With On-Site Storage

Meter Size	Fixed Monthly Charge	Allowed Monthly Usage (Gallons)	Volume Charge For Usage Above Allowance
4 Inch	\$64.67	218,000	\$0.30 per 1,000 Gallons
6 Inch	\$147.95	499,000	\$0.30 per 1,000 Gallons
8 Inch	\$231.22	780,000	\$0.30 per 1,000 Gallons
10 Inch	\$351.69	1,185,000	\$0.30 per 1,000 Gallons
12 Inch	\$536.55	1,808,000	\$0.30 per 1,000 Gallons
16 Inch	\$1,063.95	3,584,000	\$0.30 per 1,000 Gallons

AUTOMATIC ANNUAL RATE INCREASE

The Board of County Commissioners adopts annually, effective October 1 each year an automatic increase each year of three percent (3%) to all rates, fees and charges contained in this schedule as they are in effect immediately prior to the effective date of such annual increase.



LEGEND

- Growers that have Contract with Water Conserv II
- Water Conserv II RIB Site
- Water Conserv II Expansion Site
- Golf Courses that have Contract with Water Conserv II
- Mid Florida Citrus Foundation

Rev. 09/28/03
NOT TO SCALE

WATER CONSERV II PROJECT MAP



PB Water
A Division of
Parsons Brinckerhoff
Guide & Douglas, Inc.

PB
100
Years