Exhibit A

POTABLE WATER

Utilities Sub-Element

Prepared by

The Office of Planning and
Calvin, Giordano and Associates, Inc.
2015 Update by Brown and Caldwell, Inc.

City of Hollywood

Hollywood, Florida

January 2015~~2008~~

POTABLE WATER
(Utilities Sub-Element)

TABLE OF CONTENTS

LIST OF MAPS

LIST OF TABLES

I. PURPOSE

The presence of abundant water is fundamental to the existence of urban communities. Communities must have potable water for drinking purposes as well as for domestic, commercial and industrial uses.

To this end, the City of Hollywood maintains a potable water service system. The following analysis of the existing water treatment and distribution facilities presents a study of capacity, distribution, and quality with respect to future water consumption requirements of the City of Hollywood water service area.

II. BACKGROUND

Water is abundant in South Florida. Before man first tampered with the environment, water flowed south freely from the 700 square mile Lake Okeechobee, dispersing over a wide expanse of land called the Everglades. The largest remaining tract of the original Everglades, over 700,000 acres, is in Western Broward County. Water from Lake Okeechobee continues to filter down through this area on its way to the Florida Bay.

The subtropical climatic characteristics of the Hollywood area result in an average annual rainfall of 60 inches. However, rainfall is unevenly distributed during the year; about 80% occurs from May to November. The hydrologic conditions of the area create a period of dryness from December to May during which salt water intrudes on coastal aquifers and rivers throughout the area, which can be extended by drought. During drought conditions, the Hollywood area is currently just above 50 percent of normal average rainfall.

The need for water is year round, and the waters in the Everglades are essential to filling that need. Adequate water levels must be maintained in the Everglades to prevent salt water intrusion from underground streams deep within the earth.

Rain is the source of fresh water, but most of it either evaporates immediately or runs off to the ocean. Thus, water must be taken from networks of underground aquifers.

Broward County and the City of Hollywood are located within the South Florida Water Management District. The City falls within the SFWMD's Lower East Coast (LEC) Planning Area. In Hollywood, potable water for all purposes is obtained from the shallow Biscayne Aquifer, and supplemented by water from the Floridan Aquifer. The Aquifer underlies all the coastal areas and most of the Everglades in Dade and Broward Counties (See Map PW-1). The Biscayne Aquifer is thickest along the coast where it extends from land surface to a depth of about 200 feet and thins westward to a featheredge near the Collier-Broward County Line where it becomes an open surface aquifer.

It is underlain by marl of low permeability, which extends to a depth of about 900 feet and separates the Biscayne Aquifer from the underlying Floridan Aquifer. The Biscayne Aquifer is a highly permeable sequence of beds of limestone, sandstone, and

sand that ranges in age from late Meocene through Pleistocene period. In the City of Hollywood, the Aquifer is composed of the following marine Pleistocene formations: (from oldest to youngest), Anastasia formation, Miami Oolite, and Pamlico Sand. The Aquifer forms a hydrologic unit of permeable materials that carry groundwater in an unconfined condition in Southeast Florida.

Facilities

The first water treatment plant for the City of Hollywood was a small building near the current Federal Highway between Polk and Taylor Streets. In 1926, the Hollywood Land and Water Company sold the water plant to the City of Hollywood for $219,922.40. This first plant consisted of three wells with raw water pumps, sand filters with a total maximum day capacity of 0.5 million gallons per day (MGD), a one million gallon ground storage tank, and finished water pumps. In the 1930's, the City of Hollywood proceeded to build the water treatment plant located at the intersection of Hollywood Boulevard and North 35th Avenue in order to relocate the municipal water supply away from the area which had become the congested downtown area and to move the water wells away from salt water intrusion areas.

In 1961, an ion-exchange water softening facility with a maximum daily capacity of 8 MGD was installed. The ion-exchange facility was expanded to a maximum daily capacity of 16 MGD in 1964. In 1970, the basic method of treatment at the plant was changed from the ion-exchange water softening process to a catalytic precipitation lime-softening process, and the maximum daily capacity of the plant was increased to 20 MGD. The capacity of the plant was further increased to a maximum daily capacity of 30 MGD in 1974 by a 10 MGD expansion of the catalytic precipitation lime-softening process. (See Map PW-4) In 1992, the addition of a membrane softening and filtration process was added.

The City of Hollywood has eight ~~four~~ wells which draw from the Floridan~~Floridian~~ Aquifer and two~~three~~ Biscayne wellfields plus additional water from the Broward County system. There are 14~~20~~ wells operated by the City of Hollywood, which supply raw water to the plant from the Biscayne Aquifer. Each well will produce from 1000 gpm to 1,300 gpm. The wells range in depth from 75~~60~~ to 155~~150~~ feet and in diameter from 10 to 16 inches. (See Map PW-5) There are also eight~~4~~ wells that can supply water from the Floridan Aquifer. These wells have a depth of about 1,300 feet. Currently, the raw water pumping capacity of the Biscayne wells is 43.0~~49.8~~ MGD and 12.2~~6.05~~ MGD for the Floridan~~Floridian~~. The plant has four~~two~~ reverse osmosis units which can treat a maximum capacity of ~~2~~8 MGD from the Floridan Aquifer. ~~Currently, there are two new proposed withdrawal wells for the Floridian Aquifer that are under construction with a pumping capacity of 2.9 MGD.~~

The City operates the WTP with the following existing treatment processes:

- Lime Softening (LS)
- Membrane Softening (MS)
- Reverse Osmosis (RO)

The raw water quality and treated water requirements determine the method of treatment for each raw water source. Raw water from the Hollywood Biscayne wellfield can supply both the LS and MS treatment systems. ~~During the 12-month period prior to April 2006,~~ The~~the~~ raw water from the Hollywood Biscayne wellfield source is~~was~~ typically split between these two treatment systems with approximately 64 percent supplied to the LS system and the remaining 36 percent supplied to the MS system. Raw water from the Piccolo wellfield can also supply both the LS and MS systems; however, it is generally preferred that this source supplies the MS system to improve its color quality. Raw water from the Floridan Aquifer supplies the RO treatment system exclusively. Figure 2-5 presents a simplified block flow schematic representation of the existing treatment scheme. The upper portion of the figure illustrates the supply connection between the water sources and the water treatment systems.

According to the City's WUP No. 06-00038-W, issued on April 10, 2008, the maximum annual average raw water withdrawal allowed from the Biscayne Aquifer is 11,205 MG (or 30.7 mgd) and from the Floridan Aquifer is 3,168 MG (8.7 mgd). The water use permit also defines allowable maximum-month withdrawals: The maximum month withdrawal from the Biscayne Aquifer is limited to 1,062.20 MG, and the maximum month withdrawal from the Floridan Aquifer is limited to 259.00 MG. The existing allocation was established under the requirements of the Water Availability Rule, which limited the Biscayne Aquifer maximum-day and maximum-month withdrawals to a base condition that was established based on raw water usage from 2002-2006, and required alternative water supplies to be used to meet any additional demands. In the case of Hollywood, the alternative water supply used is the Floridan Aquifer.

~~The City is currently applying for a 20-year water use permit in 2007. According to the most recent Regional System Water Availability Rule proposed by the SFWMD, a base condition water use can be conceded to the applicant, which in no case may exceed the withdrawal permitted to the applicants as of April 1, 2006. In regards to the groundwater sources, the base condition water use may be the maximum quantity of water withdrawn by the applicant from the permitted source during any consecutive twelve month period over the five years preceding April 1, 2006. Consequent to this policy, the City's base condition water use is 24.5 MGD for the Hollywood Biscayne wells and 5.9 MGD for the Piccolo wells. Given this Biscayne water supply allocation, the annual average daily and maximum day finished water production capacities from the Biscayne Aquifer would be limited to approximately 28.4 MGD and 32.7 MGD, respectively.~~

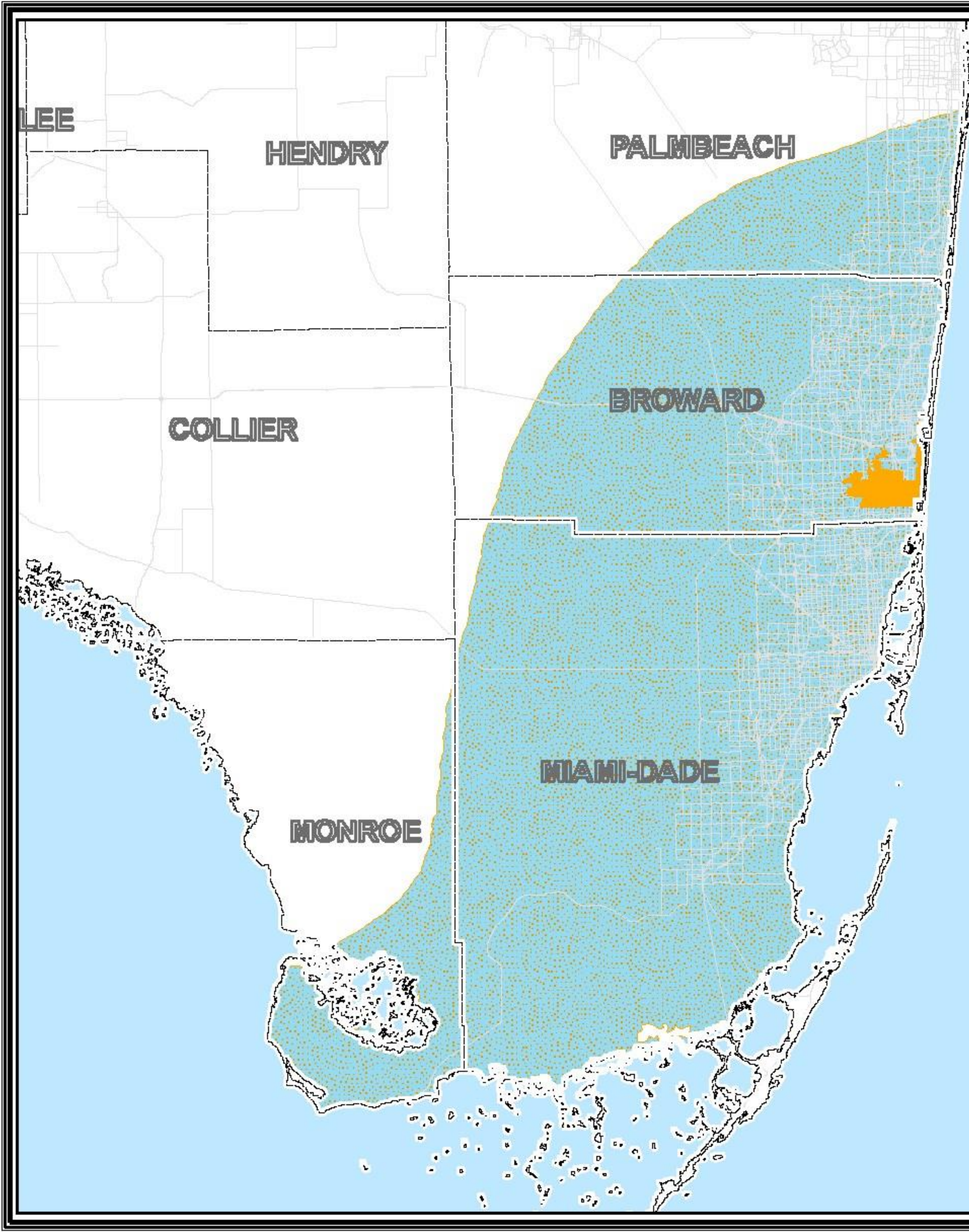
The Water Treatment plant, located at 35th Ave and Hollywood Blvd., provides water service at a pressure range of 55 psi to 65 psi ~~to a single pressure zone 60 (PSI measured at the plant)~~ within the retail service area~~city limits~~. The City's retail service area population is forecasted to be approximately 144,000 in 2015 and 155,000 in 2030 (the planning horizon). ~~About 139,357 permanent residents, 50,000 seasonal residents and various commercial and industrial customers are served on a retail basis~~. (It should be noted that the population rises to 200,000 or more in the City of Hollywood during the winter months, which include the addition of vacationers and seasonal

residents.)

There are areas within the City of Hollywood corporate limits that are served by neighboring utility companies. Port Everglades is serviced by Fort Lauderdale's Peele-Dixie System, and Beverly Park is served by Broward County Water and Wastewater ServicesUtilities (See Map PW-6). In addition to Hollywood residents, water service is currently provided through an agreement with Broward County to: the City of Dania Beach, Areas of Unincorporated Broward County, Town of Pembroke Park, West Park, and portions of the Seminole Hollywood Reservation.

MAP- PW-1

THE SPATIAL EXTENT OF THE BISCAYNE AQUIFER



City of Hollywood Comprehensive Plan

Utilities
The Spatial Extent Of
The Biscayne Aquifer

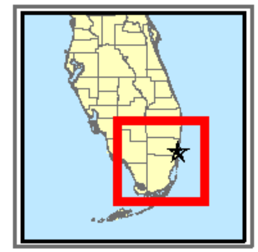
Map PVV-1

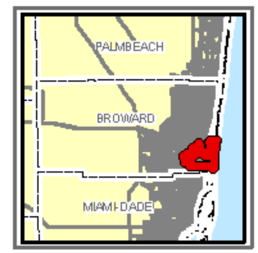
Legend

City Boundary

Roads

M Biscayne Aquifer





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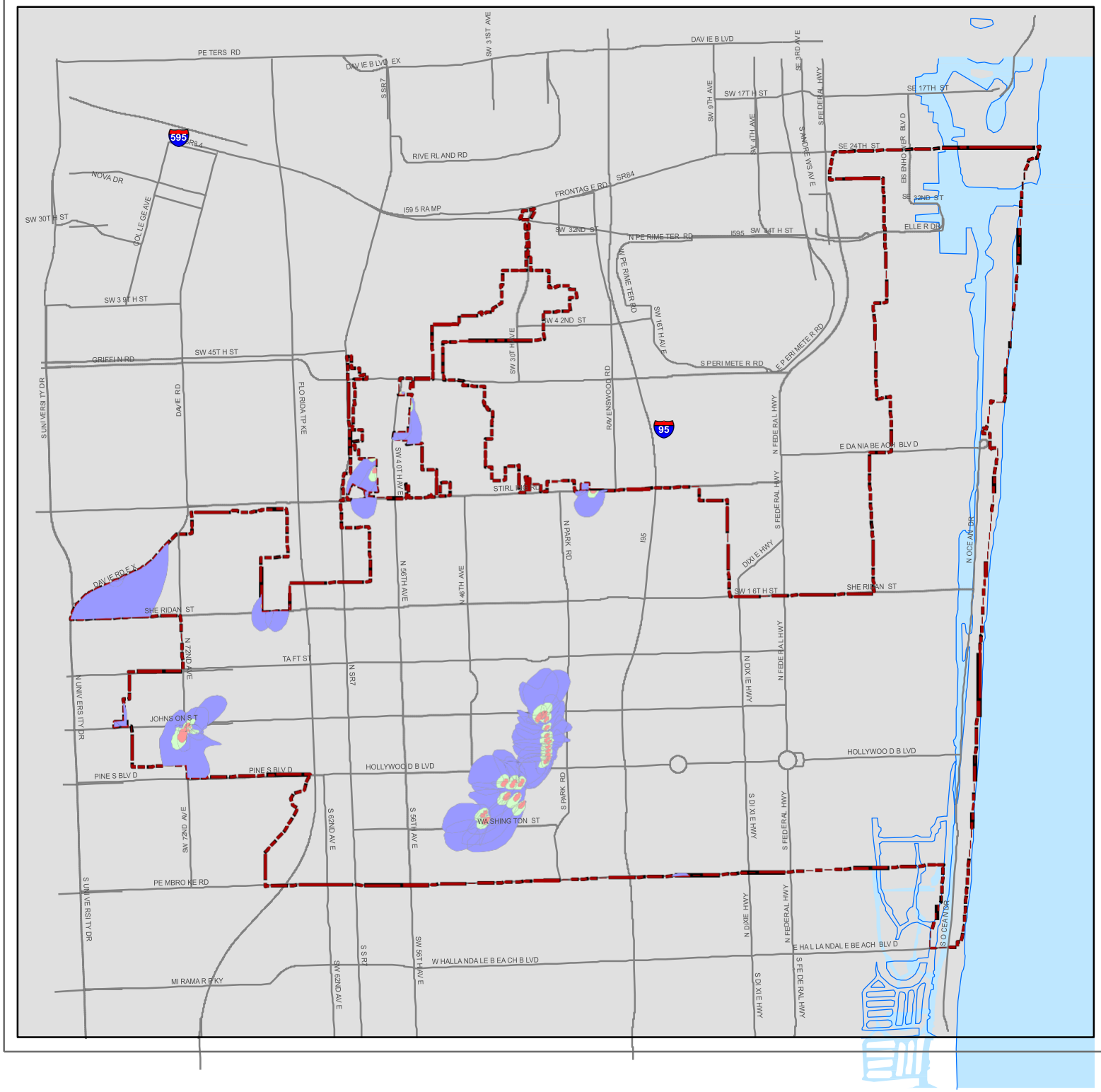
MAP- PW-2

WELLFIELD PROTECTION ZONES



City of Hollywood Comprehensive Plan

Wellfield Protection Zones

Map PW-2

Legend

Hollywood City Boundary

Wellfield protection zones

ZONE

Zone 1: 10-day buffer, no hazardous substances permitted

Zone 2: 30-day buffer, monitoring of wells required

Zone 3: 210-day buffer, secondary containment required for regulated substances

Printed July 17, 2007

Data Source: Broward County Department of Environmental Protection, 2001

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Miles

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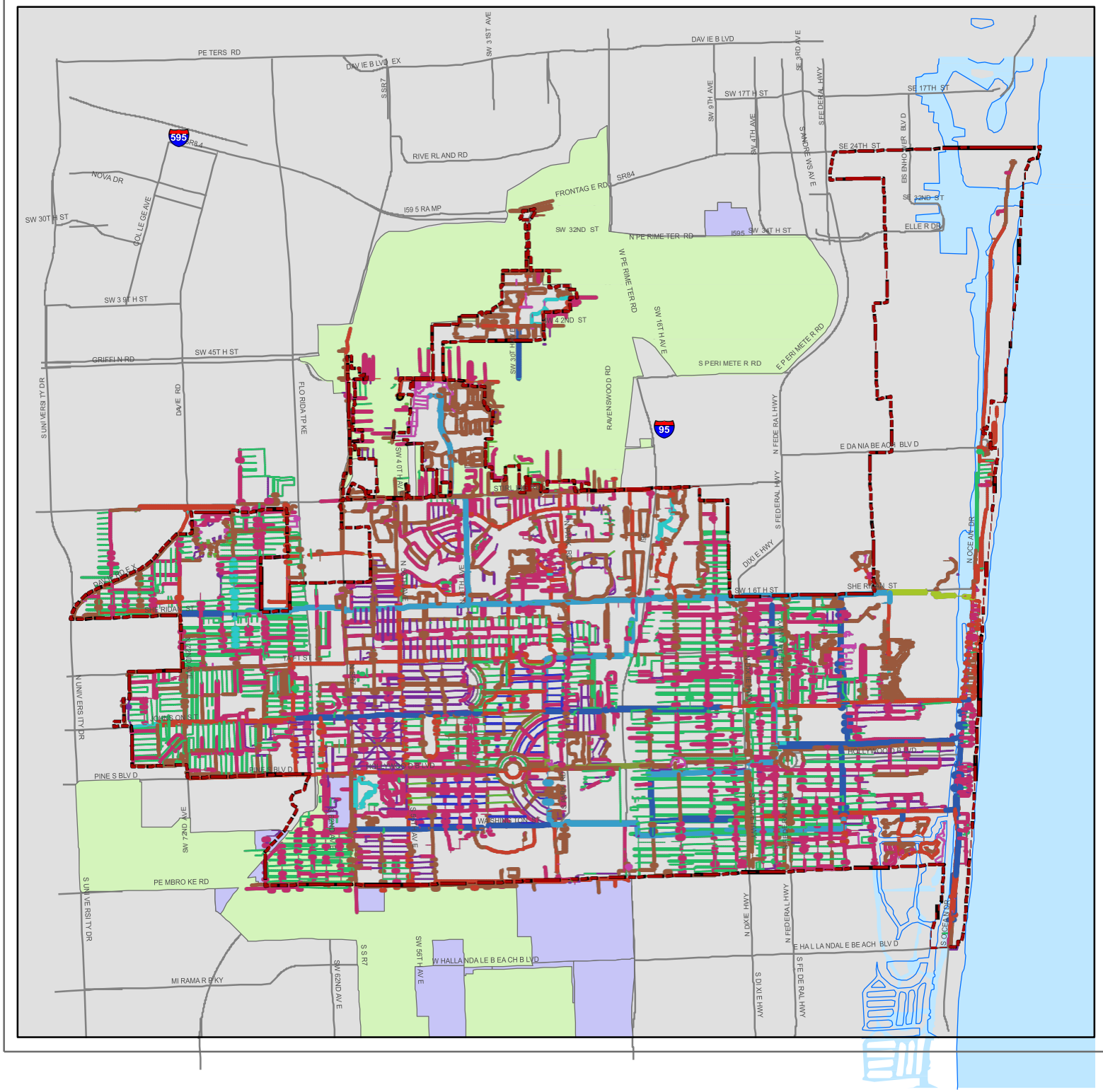
MAP- PW-3

EXISTING WATER SYSTEMS



City of Hollywood Comprehensive Plan

Existing Water Systems

Map PW-3

Legend

City Water Mains
DIAMETER
- < 1
- 1
- 1.5
- 2
- 2.5
- 3
- 4
- 6
- 8
- 10
- 12
- 14
- 16
- 18
- 24
- 30

City Boundary

County Water Mains
DIAMETER
- < 1
- 1
- 1.5
- 2
- 2.5
- 3
- 4
- 6
- 8
- 10
- 12
- 14
- 16
- 18
- 24
- 30

County service area

County shared service Area

Data Source: City of Hollywood Public Works Engineering, 2007

Printed July 26, 2007

N W E S

0 0.5 1 2
Miles

Calvin, Giordano & Associates, Inc.

GIS Produced and maintained by the CGA Geographic Information Systems Services

Existing Demand

Over the past five years (2009-2013~~2001-2006~~), the City of Hollywood department of public Utilities (HLWD-DPU) has produced an average of 21.4~~24.5~~ million gallons per day (MGD) of finished water served to its retail and wholesale customers. HLWD-DPU's water service retail population was estimated to be approximately 144,300~~149,000~~ in 2014~~2006~~. The maximum-day finished water production over the past five years, which occurred in 2009, was 26.6~~35.2~~ MGD. ~~in 2005.~~

HLWD-DPU's water demand (both retail and wholesale) has ~~increased steadily~~ generally decreased over the past ten years. Although the City of Hollywood is built-out, the retail average water demand is anticipated to ~~keep increasing~~ increase over the planning period due to redevelopment and organic population growth. By 2030~~2025~~, it is anticipated that the total average water demand (retail and wholesale combined~~combine~~) will be approximately 24.9~~37.3~~ MGD.

HLWD-DPU's existing ~~(2007)~~ sources of raw water are the Hollywood Biscayne wellfields, the Broward County South Regional Wellfield ~~or the~~ (also known as the Brian Piccolo wellfield), and the Floridan~~Floridian~~ wellfield~~s~~. Raw water from the Brian Piccolo wellfield is purchased by HLWD-DPU from Broward County according to an existing agreement.

HLWD-DPU's existing ~~(2007)~~ total and firm finished water treatment capacities are rated at 46~~42~~ MGD and 40.5~~36.5~~ MGD, respectively~~correspondingly~~. The breakdown is presented in Table 1. ~~However, the finished water treatment capacity is expected to be reduced down to 35.3 MGD due to the Water Availability Rule recently promulgated (February 2007) by the South Florida Water Management District (SFWMD). To accommodate future water demand growth and the reduction of its Biscayne water supply allocation, HLWD-DPU is planning to expand its treatment capacity, promote water conservation, and offset water demand via reclaimed water.~~

Table 1: Existing Firm and Nominal Water Treatment Capacity

Treatment System	Units in Service Assumed For Firm Capacity	Existing Firm and Nominal Finished Water Treatment Capacities (mgd)	Treatment Losses
Lime Softening (LS)	Nine units in service out of twelve total	Firm: 22.5 mgd Nominal: 24 mgd	2 percent
Membrane Softening (MS)	Six trains in service out of seven total	Firm: 12 mgd Nominal: 14 mgd	13 percent
Reverse Osmosis (RO)	Three trains in service out of four total	Firm: 6 mgd Nominal: 8 mgd	20 percent
Total (all three systems)	All described above	Firm: 40.5 mgd Nominal: 46 mgd	N/A

Water Quality

In both chemical and physical terms, the water quality of the Hollywood wellfields is equal or superior to that of most of its neighbors.

In the past, there have been three areas of concern regarding water quality: Disinfection Byproducts (DBPs), management of chloramination, and chlorides. ~~Triholamethane Formation Potential, Ammonia Nitrogen in the current supply, and Chlorides in the current supplies.~~

DBPs, particularly total Trihalomethanes (TTHM), have been a concern for the City in the past. The current treatment process used by the City is effective at managing THMs through enhanced removal of TTHM precursors via the MS process, and limiting the potential for TTHMs and five regulated Haloacetic Acids (HAA5, a similar type of DBP) to form through the use of chloramination.

Chloramine, which the City uses for disinfection, is formed by combining sodium hypochlorite ("free chlorine") with ammonia. Management of this process, particularly the ratio at which free chlorine and ammonia are combined and free ammonia residuals in the system, is important to maintain acceptable water quality. The water treatment plant currently uses online monitoring and automated control systems to maintain target chlorine and ammonia dosage levels, and monitoring is conducted in the system to track the amount of chloramines present. ~~Triholamethane (TTHM) regulations are being met at the present. Ammonia is not considered a health risk, but when mixed with chlorine, chloramines are formed and these compounds may be the subject of future regulation. Since the amount of ammonia nitrogen in the water supply varies from time to time, this is a mixed blessing because ammonia prevents the formation of THMs, but too much allows chloramines to be formed.~~

Chlorides are a concern because of the threat of salt water intrusion into the City's primary water supply source, the Biscayne Aquifer. Chlorides cannot be removed significantly by the treatment processes typically used to treat Biscayne Aquifer water, so significant saltwater intrusion into a Biscayne wellfield can render those wells unusable for potable water supply. ~~, at~~At the present time, the levels of chloride~~s~~ in the City of Hollywood's Biscayne Aquifer wellfield~~s~~ is well below allowable maximums, and the monitoring wells show the levels along the salt water intrusion barrier (See Map PW-7 and PW-7a).

Salt water intrusion can impact water quality, and currently salt water intrusion has "crept" into the Biscayne Aquifer from the Ocean westward into the eastern Biscayne Aquifer, including areas of the City of Hollywood. Currently, the water in the Biscayne Aquifer west of 18th Avenue in Hollywood is still relatively free from salt water intrusion. Unfortunately, years of use from the Biscayne Aquifer by utilities throughout South Florida without the thorough understanding of ~~the causes of~~ how to avoid and manage salt water intrusion has resulted in the water in the Biscayne Aquifer east of 15th Avenue to become too salty for even landscape irrigation. Jointly, as an alternative to the Biscayne Aquifer, the Hollywood wellfields now

utilizeutilizes the Floridan Aquifer that contains brackish water, which necessitates the use of reverse osmosis to remove the concentrate and generate finished water.

Treatment

The City of Hollywood's raw water supply is treated using either lime softening and sand filtration, membrane softening, or reverse osmosis, followed by disinfection, PH adjustment and fluoridation. Softening reduces the hardness to acceptable levels. Filtration requires the use of traditional granular media filter or membranes which remove suspended particles from the water. Fluoride is added to improve dental health of the human public. Disinfection with chloramines (chorine combinedcombine with ammonia) is used to destroy potentially harmful microorganisms and provide residual protection to water in the City's distribution system.

The water is conveyed directly from the wells to the water treatment plant and is piped to the appropriate treatment process: The Biscayne Aquifer water to either the lime softening or membrane softening process, and FloridanFloridian Aquifer water to the RO process. The water treated by lime softening process is first conveyed to the bottom of conical-shaped softening units known as "Spiractors" where it is mixed with a lime slurry and transported upward through the reactor. The Spiractors contain sand particles that serve as "collectors" forwhere the compounds that cause hardness (calcium, magnesium, and other divalent cations carbonate) isare precipitated and deposited (or plated) on the sand particles. Fresh sand is introduced to the top of the Spiractor as the enlarged, plated, spent sand is withdrawn at the bottom and disposed of by either hauling to landfills or sold selling it commercially as well point media. The resulting softened water flows up and out of the Spiractor to gravity filters for additional removal of suspended materials by filtration. The gravity filters contain a filter media consisting of graded gravel, silica sand, and anthracite coal. This filter media removes suspended materials and is regularly flushed (backwashed) to remove accumulated particles. After passing through the filter, the lime softened water combines with the membrane softened water and RO water in a blending tank. The particles that are backwashed from the filter are settled out, thickened and dewatered for disposal at neighboring landfillslandfill sites. The backwashed water is discharged into the backwash basin at the plant site and reused by the wastewater treatment plant and for the sprinklingirrigation system of Eco Grande Golf Course, and other sites both city and privately owned.

The Biscayne Aquifer raw water to be treated by the membrane softening process is dosed with acid and anti-scalant prior to membrane filtration. These chemicals are added to prevent the membranes from clogging fouling or scaling, which can significantly reduce production capacity. The water is then passed through cartridge filters to remove particulate matter larger than 5 microns in size, which could potentially; microns not removed could damage the membrane surface. The pretreated raw water is passed through the membranes at a pressure of 150approximately 120 pounds per square inch (PSI), where ions causing hardness (in particular, calcium and magnesium), dissolved iron, microorganisms, and very small particles are removed. The membrane-softened water is then sent to a degasifier. In the degasifier, the water is allowed to "rain" over a column of plastic media while air is blown upwards through

the media.~~, where~~ This process removes the excess carbon dioxide (CO_2)~~,~~ that is not able to be removed by membrane treatment~~, is removed~~. The membrane-softened water then joins the lime softened and RO treated water in the blending tank. The water ~~which~~ that does not pass through the membranes~~ filters~~, which contains concentrated salts and particles, is transported to the South Regional Wastewater Treatment Plant via a dedicated pipeline and mixed with that plant's effluent.

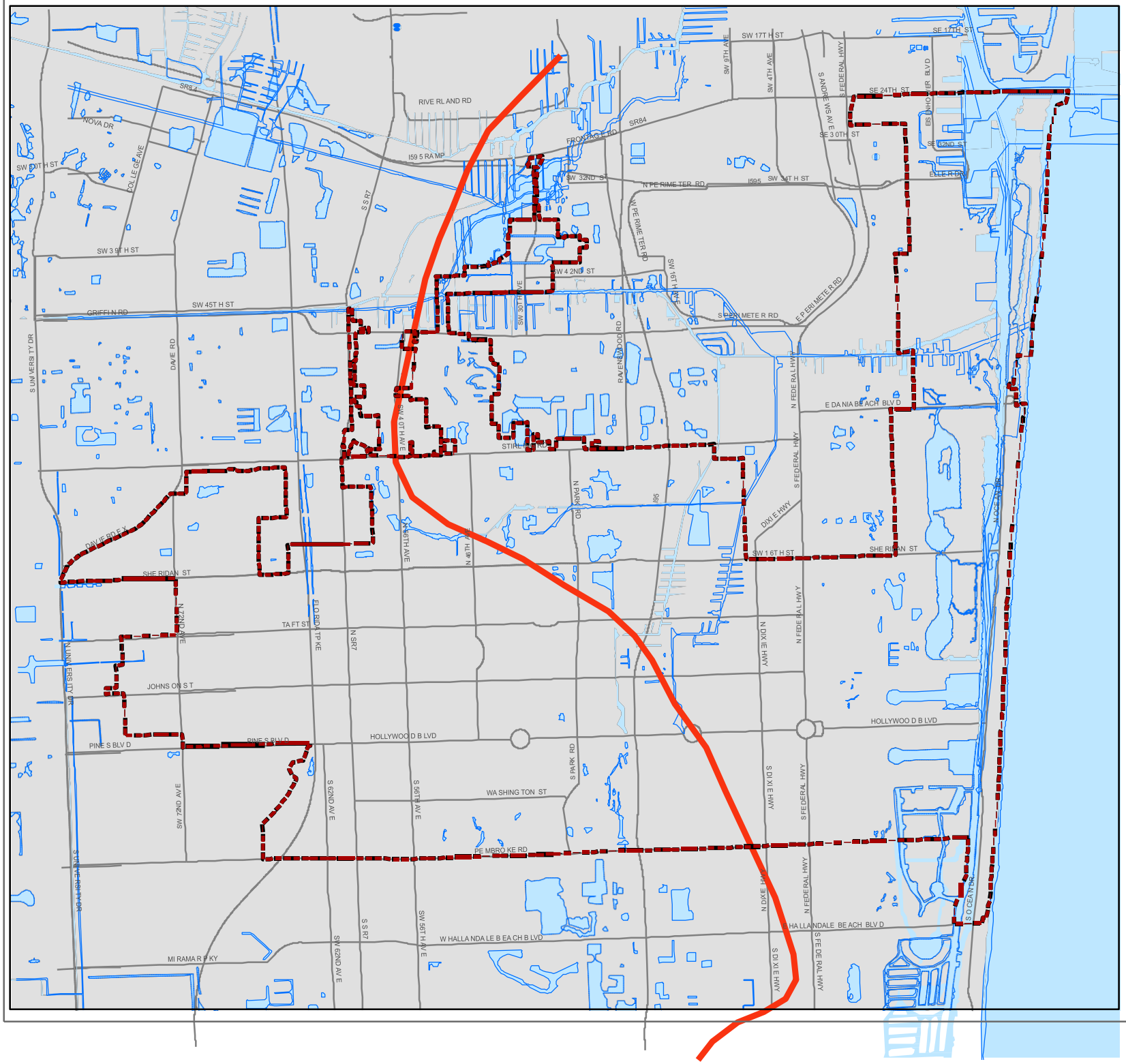
The Floridan~~Floridian~~ Aquifer water to be treated with RO undergoes a process very similar to the membrane softening process. The raw water is dosed with acid and anti-scalant, passes through a cartridge filter, and then is boosted to a pressure of about ~~325~~250 PSI and passed through the RO membrane. The RO membrane removes fine particles, microorganisms, and dissolved salts present in the raw water. The RO membranes can remove more than 99% of the salts dissolved in the Floridan~~Floridian~~ Aquifer water, thereby converting brackish water into fresh water. After membrane treatment, the water is sent to a degasifier similar to the one used to treat the membrane softened water. However, for Floridan~~Floridian~~ Aquifer water, the degasifier is used to remove both excess CO_2 and naturally-present hydrogen sulfide (H_2S). The degasifier remove~~s~~ about 99% of the H_2S from the water, which is then combined with the membrane-softened and lime-softened water in the blending tank. The off-gas from the Floridan~~Floridian~~ degasifier~~degasifiers~~ is further treated in an air scrubber to limit the emission of the H_2S to the atmosphere, thereby preventing any undesirable odors in the area and protecting the environment. The water which does not pass through the membrane filters, which contains concentrated salts and particles, is conveyed to the South Regional Wastewater Treatment Plant and mixed with that~~that's~~ plant's effluent.

In the blending tank, the water from all three treatment processes are combined and treated with caustic soda to increase the pH to a range suitable for maintaining appropriate corrosion control, typically around pH 8.0 or above. The water is then disinfected with chloramines to inactivate potentially pathogenic microorganisms and provide~~provided~~ protection from them throughout the distribution system. Fluoride is then added to the water to protect dental health prior to being distributed to costumers.

The City has an~~a~~ 18~~13~~ MG total storage capacity; 2 MG in elevated storage tanks in the distribution system, ~~and the remaining~~ 11 MG of ground storage on-site at the WTP, and 5 MG of ground storage located at a new (installed 2014) West Hollywood Storage and Pumping Facility located near Sheridan St. and 68th Avenue. ~~A total of five ground storage tanks are available with two 3.5 MG tanks located downstream of the blend tank. These tanks are followed in series by three 1 MG tanks that discharge to a 1 MG high service pumping clearwell. Inclusive of the clearwell, the combined finished water storage inventory (on-site) is 11 MG.~~

MAP- PW-4

APPROXIMATE LIMIT OF SALTWATER INTRUSION



City of Hollywood Comprehensive Plan

Approximate Limit of Saltwater Intrusion

Map PW-4

Hollywood City Boundary

Saltwater Intrusion Line

Printed July 18, 2007

Data Source:City of Hollywood; Broward County

N W E S

0 0.5 Mile

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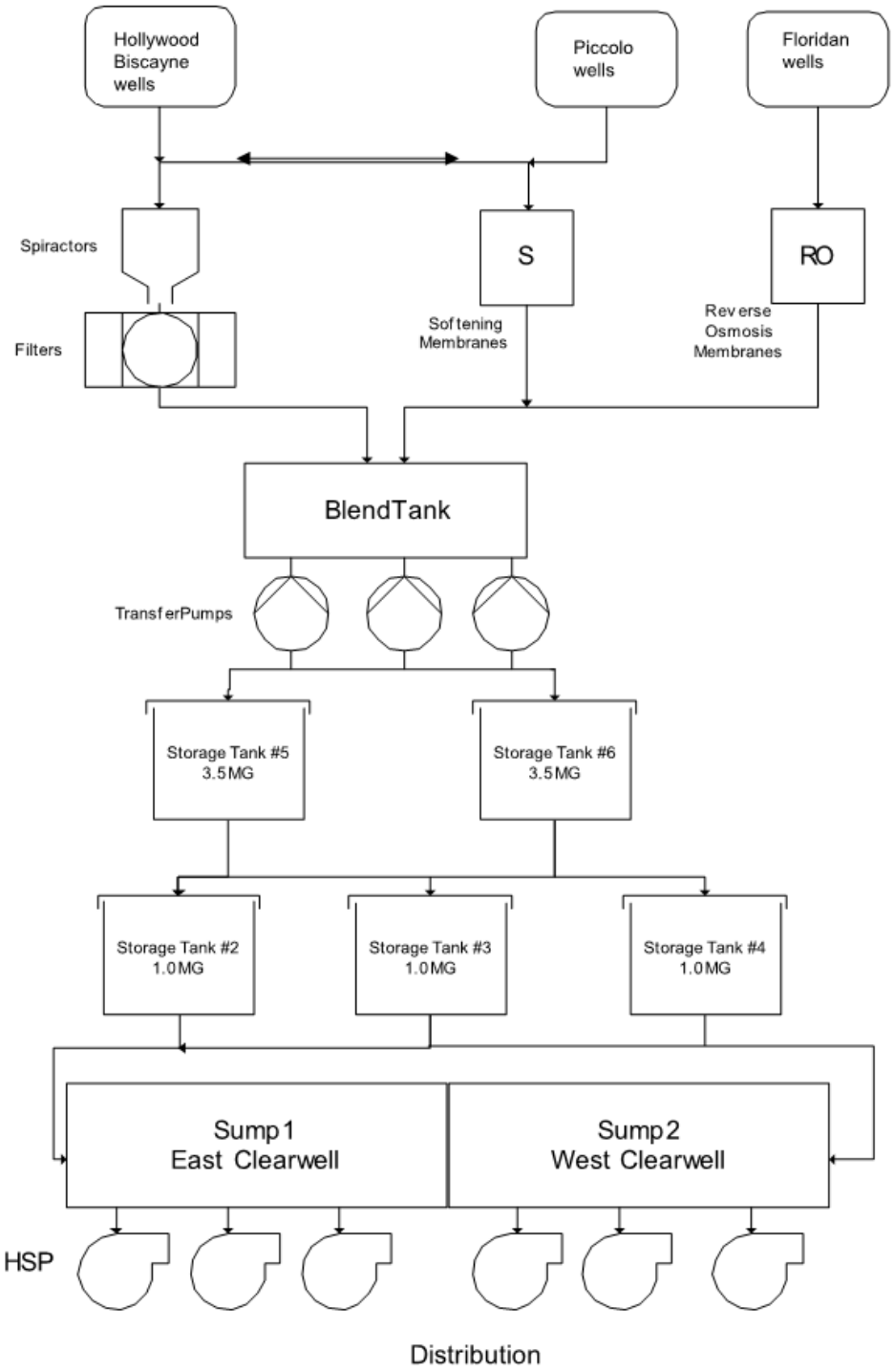
GIS Produced and maintained by the CGA Geographic Information Systems Services

PW-5

EXISTING WATER TREATMENT PLANT PROCESS FLOW DIAGRAM



Intergovernmental Coordination

The provision of water is overseen by three government agencies. The Federal Government is represented by the Environmental Protection Agency. In general, the EPA sets water quality standards to be followed by water suppliers. These standards are embodied in the Safe Drinking Water Act.

The standards are enforced by the Department of Environmental Protection of the State of Florida. The State is additionally represented by the South Florida Water Management District, which is responsible for issuing ~~water draw down permits~~ Water Use Permits (WUPs) in South Florida. These permits are issued for twenty year periods, but must be reviewed every five years~~at the present time and are carefully reviewed~~. In the past, SFWMD has been mostly concerned with the supply side of water and controlling surface water. In more recent years, it has become increasingly involved in regional water quality issues and conservation issues. Over time it is expected that these roles will continue to receive more and more emphasis because of continued growth in the region.

Broward County, by way of the Environmental Protection and Growth Management Department~~Quality Control Board~~, is also involved in water quality and distribution issues. The Board is responsible for the implementation of water quality standards and participates in the review process for ~~drawdown permits~~WUPs.

Planned Capital Improvements

The City's overall FY 2015 – 2019 Capital Improvement Program (CIP) identifies capital improvement projects for the City's DPU that are related to repair and replacement work needed to proactively maintain the level of service for the City's water distribution system. Since the City already has sufficient existing water supply and treatment infrastructure in place, no capital expenditures are required to meet the City's water supply needs over the planning horizon.

~~Table 2:~~
~~Capital Improvements and Proposed Monetary Allocation~~

~~No.~~	~~Project Name~~	~~FY 08~~	~~FY 09~~	~~FY 10~~	~~FY 11~~	~~FY 12~~
	~~WATER~~					

1	Floridan Wells F-6 and F-7 (Well head piping, Pumps and Vaults)	$1,210,000	-	-	-	-
2	Floridan Wells F-10 and F-13 and Transmission Main	$3,569,500	-	-	-	-
3	RO Train D at the WTP		$3,000,000			
4	Floridan Wells F-8 and F-9 and Transmission Main				$4,000,000	
5	RO Train E at the WTP					$3,000,000
	TOTALS	$4,779,500	$3,000,000	$0	$4,000,000	$3,000,000

III. ANALYSIS

The purpose of a comprehensive plan is to determine present problems, anticipate future problems over a fixed period of time, and propose solutions for these needs.

The City of Hollywood has developed a 10-year work plan that identifies sources and facilities needed to meet the projected project needs of Hollywood and the adjacent consumers. The work plan includes an inventory of potable and reuse water service providers and includes the planning, financing, construction and operation of the facilities. Agreements among the providers, distributors, and consumers address the responsibilities. Conservation, reuse practices and regulations are and will continue to be enforced to reduce the per capita consumption of water. To dateFor instance, the City of Hollywood has achievedexpects to implement a conservation water savings of approximately 3.01.0 MGD by 2015. Advertisements, promotions, and rate incentives are a few methods to encourage consumption reduction. Reuse/recharge projects will continueare also expected to be developed by 20302025. In addition, the City of Hollywood is developing an alternative Floridan source of up to 10.7 MGD finished water by 2025.

Table 23:

Projected Water Demands by the City of Hollywood

Year	City's Retail Service Area Population Projections	Average-Day Finished Water Demand Projections for Retail Customers (mgd)	Average-Day Finished Water Demand Projections for Broward County 3A and 3B/3C (mgd)	Total Average-Day Finished Water Demand Projections (mgd)
2015	144,554	16.5	6.6	23.1
2020	149,573	17.1	6.8	23.9
2025	150,720	17.2	6.9	24.1
2030	155,105	17.7	7.2	24.9

~~City's Retail Service Area Population~~ ~~Average Day Finished Water Demand Projections for retail customers~~ ~~Average-Day Finished Water Demand Projections for Broward County 3A~~ ~~Total Average Day Finished Water Demand Projections~~

Year	Projections	(MGD)	and 3BC (MGD)	(MGD)
2005	146,343	18.15	7.50	25.65
2010	159,663	19.80	8.20	28.00
2015	175,461	21.76	9.30	31.06
2020	189,953	23.55	10.60	34.15
2025	204,446	25.35	11.90	37.25
2030	218,938	27.15	12.86	40.01

*** The 2030 average-day projection for Broward County (12.86 MGD) is an extrapolation of the years preceding.**

Source: City of Hollywood 2007 Water Master Plan.

Raw Water Source

The City's Biscayne water supply comes from the previously-described Piccolo and Hollywood Wellfields. The wellfields have a combined nominal pumping capacity of 43.049.8 MGD, and a current firm pumping capacity of 39.746.5 MGD. This nominal capacity is adequate to provide the maximum amount of Biscayne water allowed by the City's current Water Use Permit (WUP), which is 34.932.7 MGD. Because of the limitations on future Biscayne Aquifer withdrawal, this supply system will not need to be expanded unless the City elects to pursue Aquifer recharge as a future water source. Floridan Aquifer water is supplied by eightfour supply wells that have a total nominal capacity of 12.25.8 MGD, and a firm capacity of 10.22.9 MGD assuming onetwo wellwells isare out of service. Currently, only two of the four wells can be used at once due to drawdown issues related to well spacing and design. When treatment losses (assumed to be 80%) are taken into account, the wells can only support a total finished water production of 8.0 MGD. This is less than their current allocation of 3 MGD from the Floridan Aquifer, and additional wells will be needed in the future to provide for additional demand. Also, due to the corrosive nature of the Floridan water the 36-inch raw water piping has experienced significant deterioration and may be at risk of structural failure. Because this water source will be critical to meeting the City's future water needs, it is recommended that these pipelines be inspected, repaired and/or replaced as needed to ensure continuing service. Although it currently has structural issues, the raw water piping is of adequate size to handle future raw water production of up to the maximum-projected 28.75 MGD in 2025. The RO skids themselves have also experienced significant deterioration; this is discussed further below. Currently, the City is in the process of expanding its raw water supply. Two 1,000 gpm (1.44 MGD) Floridan wells are currently under construction, which will increase nominal Floridan production capacity to 8.9 MGD and firm production capacity to 7.2 MGD.

~~Table~~
~~3~~4:
~~Alternative Sources for Raw Water~~

~~Project~~ Year:	~~2010~~	~~2015~~	~~2020~~	~~2025~~
~~Additional Reverse Osmosis Trains (Brackish Water Use)~~	~~2.0~~	~~4.0~~	~~4.0~~	~~2.0~~
~~Raw Water Requirement (Average Daily)~~	~~5.3~~	~~9.6~~	~~14.1~~	~~18.4~~

~~Source: City of Hollywood 2007 Water Master Plan~~
~~Note: Units in MGD~~

Treatment Facilities

The existing water treatment plant, as indicated earlier, has enough capacity to meet the ~~present~~ needs over the planning horizon, therefore there will not be any capacity-related improvements. ~~The population serviced is expected to increase to 175,461, by~~
~~2015, which could bring the maximum water utilization for a day to over 45 million gallons. To provide sufficient capacity for 2020 the water treatment capacities is to undergo an expansion to 46.5 MGD, as discussed in the 2007 Water Master Plan. These expansions involve further development of Reverse Osmosis Treatment, and modifications to the facilities and equipment. A planned addition of Reverse Osmosis Treatment is planned for 2008 and will add an additional capacity of 2 MGD, according to the City of Hollywood Public Utilities Department.~~

~~Reverse Osmosis is currently an on-going project at the Water Treatment Plant. The facilities are capable of handling 2 MGD by the end of 2008, but are not currently producing finished water into the distribution stream. There are plans to increase the capacity of the Reverse Osmosis Trains to a total of 14 MGD by 2020, according to the Public Utilities Department.~~

~~Table 5:~~
~~Current Planned Expansions to Water Treatment Plant~~

~~Year~~	~~Capacity~~	~~Improvements~~
~~2008~~	~~37.3 (MGD)~~	~~2 MGD R/O~~
~~2009~~	~~39.3 (MGD)~~	~~2 MGD R/O~~
~~2010~~	~~43.3 (MGD)~~	~~4 MGD R/O~~
~~2015~~	~~47.3 (MGD)~~	~~4 MGD R/O~~
~~2020~~	~~51.3 (MGD)~~	~~4 MGD R/O~~
~~2025~~	~~55.3 (MGD)~~	~~2 MGD R/O~~ ~~2 MGD mod.~~

~~**Source: 2007 City of Hollywood Water Master Plan.**~~

Distribution

The City's WTP has three discharge mains, a 24-inch water main (South header), a 30-inch water main (West header), and a 20-inch water main (bypass header) that supply water into the distribution system transmission lines. The City's service area water distribution system consists of over 700 miles of pipe with diameters ranging from 2-inch to 36-inch, two elevated 1.0 MG storage tanks, two 2.5 MG ground storage tanks located at a common storage and pumping facility, approximately 40,000 connections, over 2,500 fire hydrants, and over 7,500 valves. The vast majority of these facilities are over 35 years old. There are currently 30 miles of transmission mains of 16 to 30-inches in diameter, approximately 480 miles of distribution mains of 6 to 14-inches in diameter, and approximately 200 miles of distribution pipe of 4-inches and less in diameter. The distribution system piping is constructed of different materials such as cast iron (CI), galvanized iron (GI), polyvinyl chloride (PVC), ductile iron (DI), and asbestos cement (AC).

~~The City's water distribution system consists of over 600 miles of pipe with diameters ranging from 1-inch to 36-inch, 2 elevated 1 MG storage tanks, approximately 40,200 connections, over 2,400 fire hydrants, and over 7,500 valves. The vast majority of these facilities are over 35 years old. The WTP has two discharge mains, a 24-inch water main (South header) and a 30-inch water main (West header) that supply water into the distribution system transmission lines. However, due to metering issues with the 24-inch water main, the WTP only utilizes the single 30-inch main that feeds an average of 24 mgd. Modestly higher pressure losses result from the use of only one discharge main. There are currently 30 miles of transmission mains of 16 to 30-inches in diameter and approximately 480 miles of distribution mains, 6 to 14-inches. Additionally, it is estimated that there are 200 miles (40 percent of total pipe inventory) of distribution pipe 4-inches and less. There are a large number of 2-inch galvanized iron pipes in the older parts of the City,~~

~~previously installed or owned by the City, which are still in use.~~

~~*Outside Sources*~~

~~As indicated earlier, portions of the existing population are serviced by Broward County Utilities. At the present time, the City subsidizes those persons being served down to existing City water rates.~~

Conservation

Despite the fact that the City is blessed with an excellent supply of water and a large treatment facility and distribution system, water conservation practices must continue to be encouraged to guarantee the future of the system.

Conservation of water can be done in several ~~three~~ ways, for example: encouraging the use of water-saving devices in user facilities, encouraging the use of landscaping and planting of native plants to cut down on outside use of water, ~~and having a sound water emergency ordinance in place~~, having an approved conservation rate structure in place, and complying with South Florida Water Management District emergency water use restrictions when applicable. ~~All of these methods can be implemented by the City through amendments to applicable city codes.~~

Other Concerns

Degradation of raw water is a concern that the City of Hollywood has managed to avoid. In the past, major concerns were expressed regarding salt water intrusion into the wellfield. The City has ~~embarked on a program to~~ closed~~close~~ down threatened wells and has replaced these wells with new wells west of the existing water plant at the Chaminade Madonna High School. In addition, the point of salt water intrusion has stabilized, and the balance between salt water and fresh water should be maintained. ~~The imposing salt water intrusion led to a decrease in the consumptive use permit from 36.5 MGD to 35.3 MGD. This current permit expires December 2007. This has resulted in the use of wells drawing from the Floridan Aquifer, and the use of a reverse osmosis process on the brackish water from the Floridan Aquifer.~~

Additionally, concerns have been raised regarding the contamination of raw water by man-made substances. The City maintains a monitoring program that would warn of such contamination and has abandoned wells near potential sources of contamination. Land use plans and zoning amendments as well as developments in the area of active wells must be reviewed carefully to guarantee that new development or redevelopment will not create the potential to contaminate raw water wells.

IV. GOALS, OBJECTIVES, POLICIES

Goal

Provide residents of the City of Hollywood, and large users, a cost-effective and equitable potable water supply system which provides an adequate supply of water meeting all applicable federal, state and local water quality standards and does not compromise the sustainability of the county's water resources to supply water in the future.

Objective 1.0

The City of Hollywood shall identify and, where feasible, correct existing potable water facilities' deficiencies as necessary.

Policy 1.1 In the absence of legal constraints on the use of revenues, the City of Hollywood should maintain funding for systems improvements identified in the Capital Improvements Element to alleviate potable water deficiencies.

Policy 1.2 The City of Hollywood shall develop and maintain an inventory of its potable water facility serving residents, customers, and large users.

Policy 1.3 Maintain public facilities and areas utilizing preventative measures to avoid deterioration of the public infrastructure. (CWMP Policy CW.31)

Objective 2.0

Potable water facilities shall be provided to meet the City's short-term and long-term future needs.

Policy 2.1 The level of service (LOS) standard for potable water facilities shall be the Florida Department of Environmental Protection Permitted Capacity of the facility. The LOS standard for water treatment plants shall be measured by maximum daily flow.

Policy 2.2 The City of Hollywood shall use the information contained to access adequacy of service and concurrency for potential retail customers. For a bulk purchaser of potable water, the City will use the flow information contained in the FDEP permit application to access adequacy of service and concurrency.

Potable Water Demand Rates

Facility Type	Water Use in Gallons per Day
Residential Per capita per day Per single family unit	 114 ~~100~~ 350
Retail per square foot	0.1
Office Space per square foot	0.2
Other non-residential per capita	20

Source: City of Hollywood 2014 Water Supply Facilities Work Plan Update
Broward County Health Department, Florida Department of Health.
In the case where the facility type is not listed, then the most suitable one is to be used.

Policy 2.3 The City shall continue to utilize the development review process of the Broward County Land Development Code to require applicants for development permits to utilize existing potable water facilities if lines are "available" as defined by Chapters 62-550, 62-555, and 62-560, Florida Administrative Code (FAC).

Policy 2.4 Planning for additional capacity and/or a reduction in per capita demand shall be included in the 10-Year Water Supply Facilities Work-plan as required in Chapter 163 of Florida Statutes to increase the coordination of local land use and future water supply planning.

Policy 2.5 An assessment of the impacts of the construction and operation of water treatment plants and support services on adjacent natural resources shall be prepared during site review when considering the siting of new water treatment plants and the expansion of, or increase in capacity of, water treatment plants.

~~Policy 2.6 Within twelve (12) months after the adoption of the Retail Service Water and Wastewater Master Plan Update, the City of Hollywood shall re-examine the feasibility of amending the potable water facilities LOS standard. The LOS standards that may be considered include treatment plant peak daily demand capacity, water storage capacity, and water pressure for distribution facilities.~~

Policy 2.6~~7~~ In order to protect and conserve the Biscayne Aquifer, the City of Hollywood shall continue to investigate the utilization of alternate water sources to supplement and broaden the city's future water supply sources as described in the 10-Year Water Supply Facilities Work plan. These potential sources could include the increased use of reclaimed ~~waste~~water, improved methods of conservation, Aquifer Storage and Recovery (ASR), improved operations to increase stormwater reuse and aquifer recharge by improvements to the secondary canal infrastructure, and other technologies which may be addressed in the Lower East Coast Regional Water Supply Plan of the South Florida Water Management District (SFWMD).

Policy 2.7~~8~~ The City shall encourage maximizing the use of existing potable water facilities and reducing redundant facilities.

Policy 2.8~~9~~ The City shall promote the implementation of an integrated geographic information system in order to make available standardized land use and potable water supply facilities information for local and regional planning.

Policy 2.9~~10~~ The City shall ensure adequate water supplies are available to serve the new development no later than the anticipated date of issuance of a certificate of occupancy or its functional equivalent.

Objective 3.0

Maximize the use of existing potable water facilities and encourage compact urban growth patterns.

Policy 3.1 The City of Hollywood shall continue to coordinate the provision of potable water through agreements with the municipalities serviced by the City of Hollywood.

Policy 3.2 The City of Hollywood shall recommend the denial of future land use map amendments where densities or intensities are increased if:

1. Potable water facilities are not available and a consumptive use permit for the Florida Department of Environmental Protection Permitted capacity from the South Florida Water Management District (SFWMD) has not been issued; and

2. Plans to extend potable water facilities so that they become available are not included within a financially feasible capital improvements program and/or there is not a reasonable expectation that the consumptive use permit will be issued.

Policy 3.3 As an alternative to new potable water facility construction, the City of Hollywood shall identify opportunities to increase the efficiency and optimize the use of existing facilities.

Policy 3.4 The City of Hollywood shall encourage the use of coordinated regulatory and programmatic approaches and financial incentives to promote compact, efficient urban growth patterns.

Objective 4.0

Conserve and protect potable water resources with primary focus on the Biscayne Aquifer by optimizing the utilization of water resources through effective water management practices.

Policy 4.1 The City of Hollywood shall develop a basin-wide water management protocol that optimizes flood protection, water quality, stormwater storage, wetlands sustainability, and groundwater recharge functions while protecting groundwater from saltwater intrusion. By assessing the existing surface water management system, wellfield characteristics, groundwater levels, saltwater intrusion limits, flows and canal stages a model will be developed to better utilize the water resource.

Policy 4.2 The City of Hollywood shall continue to coordinate with the Independent Drainage Districts and the SFWMD to investigate application of the basin-wide protocols throughout the county where appropriate.

Policy 4.3 The City of Hollywood will cooperate with Broward County to develop a plan to maintain the Centralized Wellfield System to protect and maximize the raw water supply while protecting the Biscayne Aquifer from further saltwater intrusion.

Policy 4.4 The City of Hollywood and Broward County shall continue to maintain Chapter 36, "Water Resources and Management," Article II, "Water Emergencies," Section 36-55, "Restrictions on landscape irrigation," Broward County Code of Ordinances, which imposes year-round, county-wide landscape irrigation restrictions.

Policy 4.5 The City shall enforce the landscape regulations, which include Zoning, Functional landscaping and xeriscaping Ordinances. The City will also address the SFWMD's xeriscape guidelines.

The Broward County Board of Rules and Appeals ~~has~~ approved the standards for ultra-low plumbing fixtures at 80 PSI~~, effective September 1, 1992 in Broward County~~:

TABLE PLUMBING
STANDARDS Fixture Flow
Rate

Fixture	Flow Rate
Toilet	1.6 gal/flush
Shower Heads	2.5 gal/minute
Faucets	2.0 gal/minute

Policy 4.6 The City shall continue to implement its conservation-oriented rate structure within its utility systems.

Policy 4.7 The City shall continue to implement a leak detection program to reduce the amount of non-revenue water~~unaccounted-for water loss~~ within its utility systems.

Policy 4.8 The City of Hollywood shall continue to implement a year-round public information and education program promoting water conservation.

Policy 4.9 The City of Hollywood will gather a comprehensive water use profile for service area customers including demographic data, customer class, land use, rate profiles, usage patterns and seasonal variations to increase the effectiveness of conservation efforts by focusing methods on those elements with the greatest water saving potential. Using the data generated, the City of Hollywood will expand and/or implement those programs that promote conservation of water resources. In addition, the City shall expand and continue to implement programs that promote conservation of water resources through efforts such as plumbing retrofit, toilet rebates, water use audits, installation of rain sensors, promotion of xeriscape and landscape Best Management Practices (BMPs), and education as applicable.

Policy 4.10 The City shall reduce potential groundwater pollution sources by continuing to implement the Water and Sewer Connection Ordinances.

Policy 4.11 The City shall continue ~~Continue~~ to eliminate causes of pollution to water supply. (CWMP Policy CW.130)

Policy 4.12 The City of Hollywood shall continue to protect the groundwater supply from potential sources of contamination pursuant “Water and Sewers” along with Water and Septic Tank Ordinance.

Policy 4.13 The City of Hollywood shall protect groundwater quality by continuing to implement Wellfield Protection Ordinance, which regulates the storage, handling, usage, disposal or production of hazardous materials and solid waste within designated zones of influence as identified in the Code.

Objective 5.0

Potable water facilities shall be designed, constructed, maintained and operated in such a manner as to protect the functions of natural groundwater recharge areas and natural drainage features and not exacerbate saltwater intrusion.

Policy 5.1 The design for the construction, operation and maintenance, of new or expanded potable water facilities shall consider the short-term and long-term impacts to natural groundwater recharge areas, wetlands, surface and groundwater levels, and exacerbation of saltwater

intrusion. The design shall also consider whether or not the construction, operation and maintenance will significantly harm the aquifer system. Adverse impacts of construction, operation, and maintenance shall be avoided or at least minimized.

Objective 6.0

Provide the customers and large users of the City of Hollywood cost-effective, equitable and adequate potable water system meeting all applicable federal, state, and local standards.

Policy 6.1 The City of Hollywood shall endeavor to provide service to residents, customers, as well as those municipalities having agreements with the city of Hollywood, when service is not anticipated to be provided by others.

Policy 6.2 The City of Hollywood shall continue to coordinate the provision of potable water services through agreements with municipalities and other service providers in Broward County.

Policy 6.3 In order to protect and conserve the Biscayne Aquifer, the City of Hollywood shall <u>continue to utilize the Floridan aquifer and</u> investigate utilization of alternate potable water sources to supplement and broaden its future water supply sources. These potential sources could include ~~the Floridan Aquifer,~~ ASR, desalinization, capture and storage of excess storm water currently lost to tide and other technologies which may be addressed in the SFWMD's Lower East Coast Regional Water Supply Plan.

Policy 6.4 Consistent with bonding requirements, the City of Hollywood will take no action by which the rights and benefits of its customers might be impaired or diminished.

Objective 7.0

With the treatment capacity serviceable by the Reclaimed Water System, expand the reclaimed water system to replace current systems using potable water for irrigation in the public right of way and other public facilities. Investigate possible expansion of treatment capacity of the reclaimed water system.

Policy 7.1 Design large private projects to include reclaimed water. (CWMP Policy CW.34).

Policy 7.2 Investigate the feasibility of installing reclaimed water for the irrigation system on US 441/SR7 project. (CWMP Policy 1.19)