CDM

Miami Dade County

Water Supply Facilities Work Plan

Support Data

Revised March 2008

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CDM Project No.6430-57901-061

MIAMI-DADE WATER AND SEWER DEPARTMENT

WATER SUPPLY FACILITIES WORK PLAN

March 2008

The following individual was in responsible charge for the preparation of the following sections of the Water Supply Facilities Work Plan, using available data provided by the Miami-Dade Water and Sewer Department and other water suppliers within Miami-Dade County:

Sections 1 through 5

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Contents

Section 5 Water Supply Facilities Work Plan

Tables

Figures

Appendices

Section 1
Introduction

Miami-Dade County (County) is continuing to experience growth, as it has over the last several decades. The Miami-Dade Water and Sewer Department (MDWASD) provides drinking water to approximately two million customers in the County. Because of rapid population growth, complex environmental issues and developing regulatory and statutory requirements, MDWASD is developing a comprehensive 20-year plan for water supply development.

1.1 Background

In response to the finding that traditional water supply sources will not be sufficient to meet demands of the growing population, of industries and of the environment, the Florida Legislature enacted bills in 2002, 2004 and 2005. These bills, Senate Bills 360 and 444, significantly changed Chapters 163 Intergovernmental Programs and 373 Water Resources, Florida Statute (F.S.), to improve the coordination of water supply and land use planning by strengthening the statutory requirements linking regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments.

The current statutory provisions direct local governments to do the following with regard to water supply:

1. Coordinate appropriate aspects of its comprehensive plan with the appropriate water management district's regional water supply plan. [s. 163.3177(4)(a), F.S.]

2. Ensure that its future land use plan is based upon the availability of adequate water supplies and public facilities and services. [s. 163.3177(6)(a), F.S., effective July 1, 2005.] Data and analysis demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany all proposed Future Land Use Map amendments submitted to the Department of Community Affairs (DCA) for review. The submitted package must also include an amendment to the Capital Improvements Element, if necessary, to demonstrate that adequate public facilities will be available to serve the proposed Future Land Use Map modification.

3. Ensure that adequate water supplies and facilities are available to serve new development no later than the date on which the local government anticipates issuing a certificate of occupancy and consult with the applicable water supplier prior to approving a building permit, to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy. [s. 163.3180(2)(a), F.S., effective July 1, 2005.] Local governments should update their comprehensive plans and land development regulations as soon as possible to address this water supply concurrency requirement.

4. Revise the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element (hereafter the "Infrastructure Element"), within 18 months after the water management district approves an updated regional water supply plan, to:

    a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the updated regional water supply plan, or the alternative project proposed by the local government under s. 373.0361(7), F.S. [s. 163.3177(6)(c), F.S.];
    b. Identify the traditional and alternative water supply projects and the conservation and reuse programs necessary to meet current and future water use demands within the local government's jurisdiction [s. 163.3177(6)(c), F.S.]; and
    c. Include a water supply facilities work plan for at least a 10-year planning period for construction of public, private, and regional water supply facilities, which are identified in the element as necessary to serve existing and new development. [s. 163.3177(6)(c), F.S.] Amendments to incorporate the water supply facilities work plan into the comprehensive plan are exempt from the twice-a-year amendment limitation. [s. 163.3177(6)(c), F.S.]

5. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 4 above, revise the Conservation Element to assess projected water needs and sources for at least a 10-year planning period, considering the appropriate regional water supply plan(s) or, in the absence of an approved regional water supply plan, the applicable District Water Management Plan. [s.163.3177(6)(d), F.S.] If the established planning period of a comprehensive plan is greater than ten years, the plan must address the water supply sources necessary to meet and achieve the existing and projected water use demand *for the established planning period*, considering the appropriate regional water supply plan. [s. 163.3167(13), F.S.]

6. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 4 above, revise the Intergovernmental Coordination Element to ensure coordination of the comprehensive plan with applicable regional water supply plans and regional water supply authorities' plans. [s. 163.3177(6)(h)1., F.S.]

7. Address in its Evaluation and Appraisal Report (EAR) the extent to which the local government has implemented the 10-year water supply facilities work plan, including the development of alternative water supplies, and determine whether the identified alternative water supply projects, traditional water supply projects, and conservation and reuse programs are meeting local water use demands. [s.163.3191(2)(l), F.S.]

This Water Supply Facilities Work Plan is meant to satisfy portions of the above statutory requirements (other portions will be satisfied elsewhere by MDWASD) and,

as stated in Item 1 above, to coordinate with the Lower East Coast (LEC) regional water supply plan. The LEC Plan was adopted on February 15, 2007 by the South Florida Water Management District (SFWMD).

1.2 Purpose and Objectives

The purpose of this Water Supply Facilities Work Plan is to present MDWASD's water supply systems and to provide a plan for implementing water supply facilities, including the development of traditional and Alternative Water Supplies necessary to serve existing and new development. These water supplies were developed by first incorporating demand reductions due to conservation. In addition, this plan incorporates information on wholesale customers and other water suppliers that provide water to portions of Miami-Dade County: the City of North Miami, the City of North Miami Beach, and the City of Homestead.

The MDWASD and the SFWMD have scheduled meetings with local governments to assist them in their efforts to prepare a Water Supply Facilities Work Plan (Work Plan). The overall objective of the meetings is to develop an outline for local governments to use in the preparation of their work plans that identify and plan for water supplies facilities needed to serve existing and new development within the local government's jurisdiction. This outline will be developed to specifically address these local governments served by MDWASD since they provide water to most of the municipalities within the County. MDWASD will coordinate and provide information to the local governments in Miami-Dade County to assist them in the preparation of their Work Plans.

The information contained within this Work Plan will be included in an amendment to various elements of the County's Comprehensive Plan. This Work Plan is to be coordinated and updated every five years within 18 months after February 15, 2007, the date LEC regional water supply plan was adopted.

This Water Supply Facilities Work Plan includes the following primary sections:

- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Water Supply Facilities Work Plan

Section 2
Water Service Area

2.1 MDWASD Service Area

The MDWASD water service area contains interconnected systems and thus, for the most part, functions as a single service area. However, for the convenience of discussing existing facilities, the service area may be broken down into three subareas by water treatment facilities: the Hialeah-Preston area serving the northern part of Miami-Dade County, the Alexander Orr, Jr. area serving the central and portions of the southern part of Miami-Dade County and the South Dade area (formerly known as the Rex Utility District) serving the southern part of Miami-Dade County, shown on **Figure 2-1**.

Within the MDWASD service area, there are 14 wholesale customers. Of the 14 wholesale customers, 12 have executed 20-year water use agreements. Agreements with the City of Hialeah and the City of Miami Beach are being developed and must be submitted to the SFWMD within six months of the issuance of the 20-year water use issued on November 15, 2007. The City of North Miami Beach will stop purchasing water from MDWASD in 2008. The City of North Miami Beach will remain a wholesale customer until then.

In addition to MDWASD, there are four other water suppliers within Miami-Dade County that provide water to parts of unincorporated Miami-Dade County and within their respective municipal boundaries. Two municipalities in the South Dade area are Florida City and the City of Homestead. MDWASD does not have an agreement with Florida City. Water is sold to and purchased from the City of Homestead. MDWASD purchases water from the City of Homestead to provide water to serve the Redavo area and pays retail rates. MDWASD has an agreement with the City of Homestead, however, this agreement is not a large user agreement. The agreement also provides for an emergency interconnection at SW 137 Avenue and 288 Street that can be used by either party. In the North Dade area, the City of North Miami and the City of North Miami Beach provide water to portions of unincorporated or incorporated parts of Miami-Dade County.

2.2 Hialeah-Preston Subarea

The Hialeah-Preston (H-P) subarea is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities and high pressure systems. This system delivers water to Hialeah, Miami Springs, the City of Miami and other portions of northeastern Miami-Dade County, shown on **Figure 2-2,** generally north of Flagler street.

2.3 Alexander Orr, Jr. Subarea

The Alexander Orr, Jr. (AO) subarea is comprised of a high pressure system comprised of two major piping loops. This system delivers water to nearly all of Miami-Dade County south of approximately Flagler Street and north of SW 248th

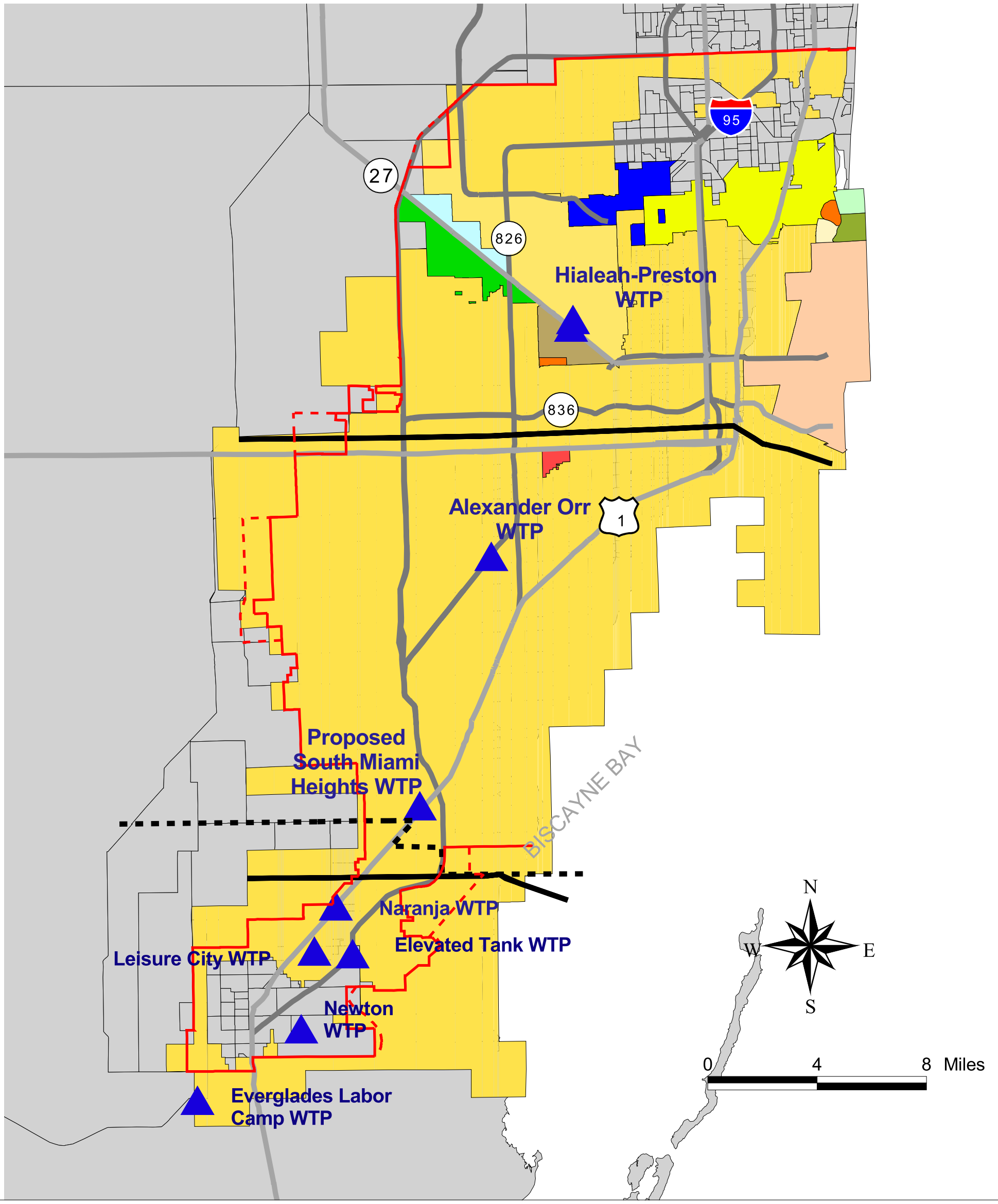

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Figure 2-1: MDWASD Service Area and Wholesale Customers
3/25/2008

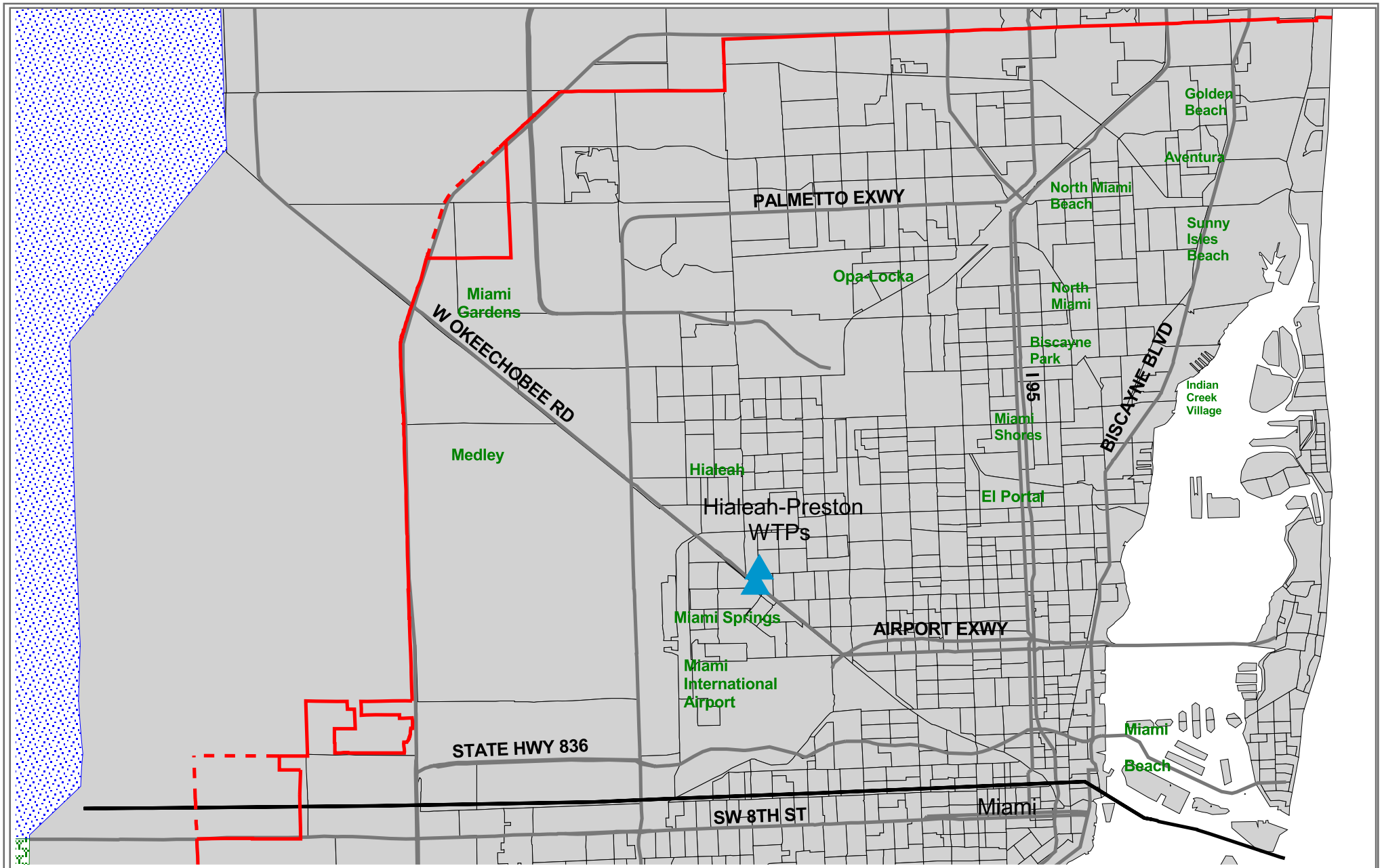


Figure 2-2
Hialeah-Preston Subarea
and Water Treatment Plants
6/28/2007

Street, including Virginia Key, Fisher Island, the Village of Key Biscayne and, upon request, to the City of Homestead, and Florida City, shown on **Figure 2-3.**

2.4 South Dade Subarea

The South Dade subarea consists of small distribution systems and storage tanks that evolved around each individual water treatment plant (WTP) within each WTP's distinct service areas. These systems deliver water to nearly all of Miami-Dade County south of S.W. 248th street and east of S.W. 197th avenue. Homestead and Florida City are within this area. Florida City provides water service within its incorporated boundaries and to a small portion of unincorporated Miami-Dade County. In addition, Florida City purchases water from the City of Homestead to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street. The City of Homestead provides water within its municipal boundary and for a portion of unincoriporated Miami-Dade County including the Redavo development. This development consists of 107 homes and an approximate population o f 310. **Figure 2-4** shows the current South Dade subarea.

MDWASD has plans for the construction and operation of the South Miami Heights (SMH) WTP in the South Dade subarea. The SMHWTP is scheduled to come on line as early as July 2011. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain in service after the SMHWTP begins operations. Everglades and Newton WTPs will continue serving MDWASD customers once the SMHWTP begins operations. The existing distribution and storage systems will be incorporated into the future plans. A general shift will occur in the northern boundary of the South Dade subarea once the proposed South Miami Heights Water Treatment Plant comes into service in 2012. The northern boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. Figure 2-1 and 2-4 illustrate the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Miami-Dade areas, but will not have other effects on the population expected to be served by MDWASD.

2.5 Wholesale Customers

The 14 wholesale water customers within the MDWASD service area have large user agreements. These agreements, with the exception of the City of North Miami and the City of North Miami Beach, are for 20-year periods. **Table 2-1** identifies the 14 wholesale customers and the status of their large user contracts.

As outlined in the Miami-Dade County Code of Ordinances, Chapter 2, Article XXXVII, Section 2-347, if a private or municipal water or sewer utility proposes to expand its assigned service area, the Director or designee shall determine whether or not the Department whether or not the Department shall release the portion of the service area requested.

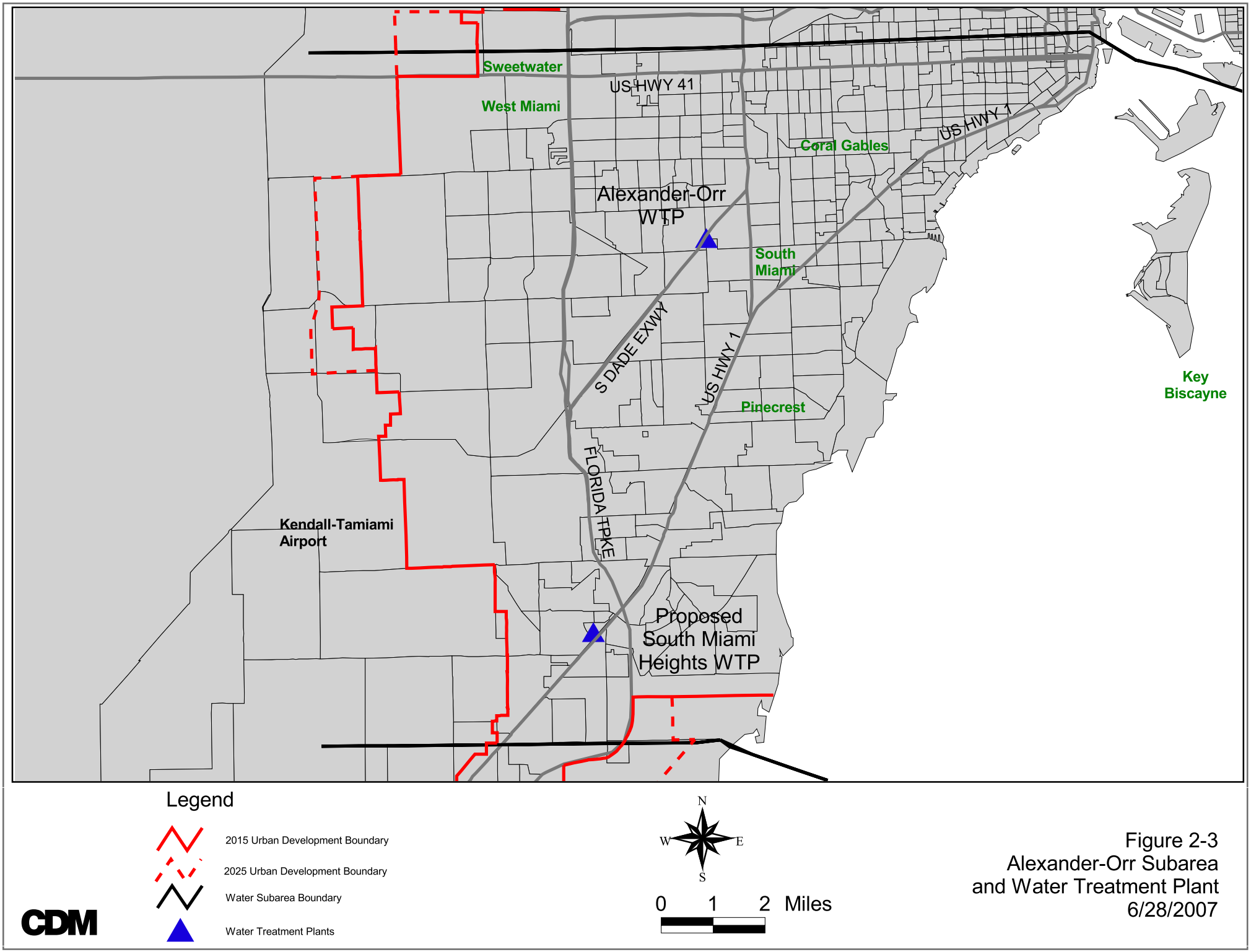
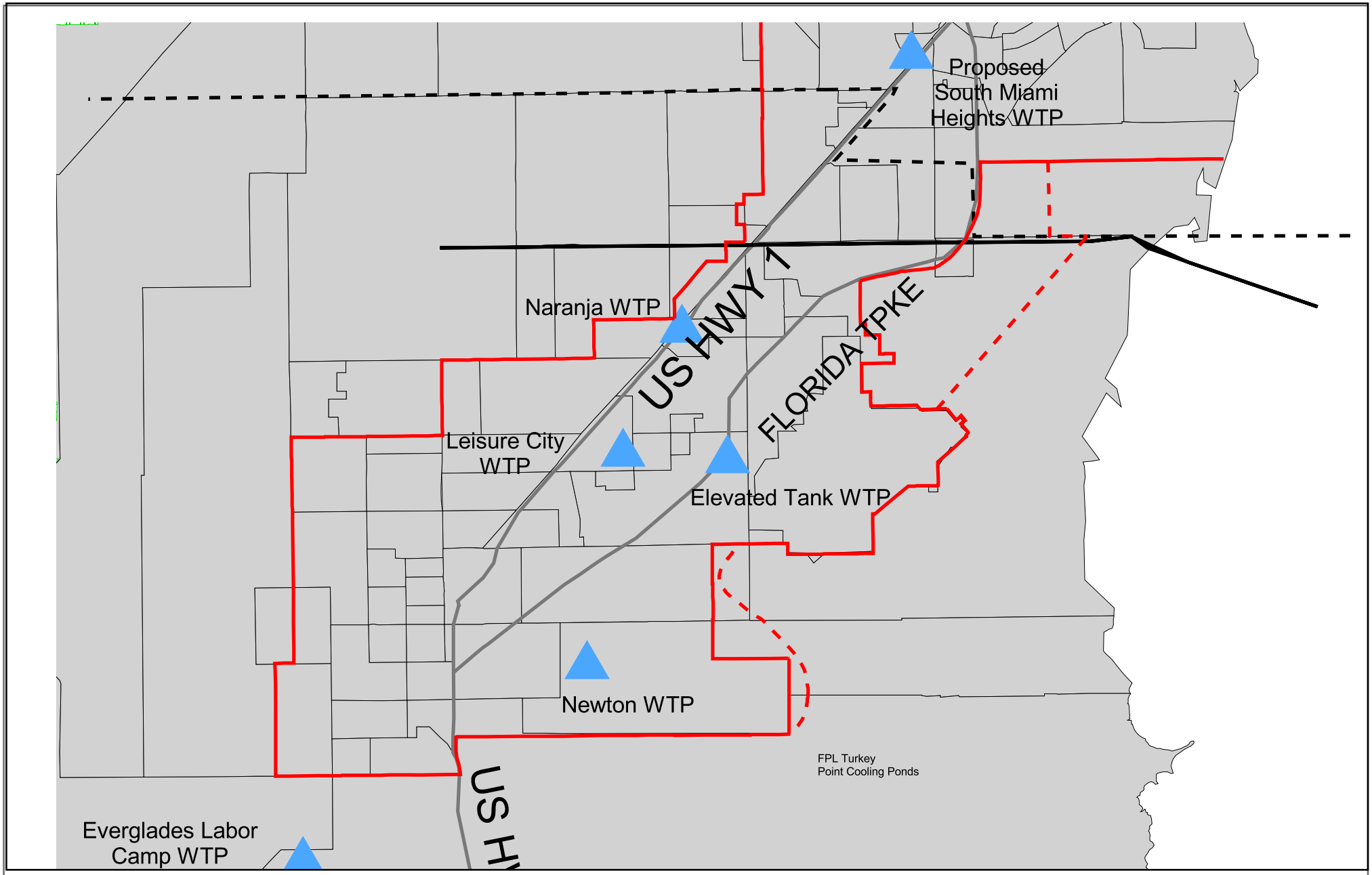


Figure 2-3
Alexander-Orr Subarea
and Water Treatment Plant
6/28/2007



Legend

- 2015 Urban Development Boundary
- 2025 Urban Development Boundary
- Water Subarea Boundary
- Water Service Redistribution Shift
- Water Treatment Plants

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Figure 2-4
South Dade Subarea
and Water Treatment Plant
6/28/2007

Table 2-1 Wholesale Water Agreements for 20 Year Period

Municipality	Status
Bal Harbour Village (BLH)	Signed, executed agreement
Town of Bay Harbour Islands (BHI)	Signed, executed agreement
City of Hialeah (CH)	20 Year agreement may not be necessary if interlocal agreement for RO Plant is approved, agreement must be submitted to the SFWMD within six months of November 15, 2007
City of Hialeah Gardens (HG)	Signed, executed agreement
Indian Creek Village (IC)	Signed, executed agreement
Town of Medley (MED)	Signed, executed agreement
City of Miami Beach (MB)	Agreement must be submitted to the SFWMD within six months of November 15, 2007
City of Miami Springs (MS)	Signed, executed agreement
City of North Bay Village (NB)	Signed, executed agreement
City of North Miami (NM)	Signed, executed agreement
City of Opa-Locka (OPLOC)	Signed, executed agreement
Town of Surfside (SURFS)	Signed, executed agreement
Village of Virginia Gardens (VG)	Signed, executed agreement
City of West Miami (WM)	Signed, executed agreement

Source: MDWASD Water Use Permit No. Re-issue 13-00017-W, November 15, 2007

2.6 Other Water Suppliers (Non-MDWASD)

Other water suppliers located in Miami-Dade County have facilities and provide water to portions of Miami-Dade County. These facilities are located in the extreme northern and extreme southern parts of the County as shown in **Figure 2-5**. Other water suppliers within the County are:

- City of North Miami
- City of North Miami Beach
- Florida City
- City of Homestead

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

2.6.1 City of North Miami

In the northern part of the County, the City of North Miami provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northwestern parts of unincorporated Miami-Dade County.

BISCAYNE BAY

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Municipalboundaries.shp

- FLORIDA CITY
- HOMESTEAD
- NORTH MIAMI
- NORTH MIAMI BEACH

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- FLORIDA CITY
- HOMESTEAD
- NORTH MIAMI
- NORTH MIAMI BEACH

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Figure 2-5: Other Water Suppliers in Miami-Dade Co. 3/25/2008

The City's service area consists of a high pressure distribution system comprised of three main distribution lines, which are interconnected. The service area is generally bounded by NE 163rd Street to the north, Biscayne Bay to the east, NW 105th Street to the south, and NW 27th Avenue to the west. It serves a population of over 70,000 people in a 13 square-mile area, servicing the City of North Miami, the Village of Biscayne Park, and parts of unincorporated Miami Dade County.

2.6.2 City of North Miami Beach

In the northern part of the County, the City of North Miami Beach provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northeastern and northwestern parts of unincorporated Miami-Dade County. The City of North Miami Beach provides service entirely or to portions of the City of Aventura, Town of Golden Beach, City of Miami Garden, and City of Sunny Isles Beach. The City of North Miami Beach has emergency interconnections with Bal Harbor Village, City of Hallandale Beach, and City of North Miami.

The City's distribution system consists of a high pressure system, distributing potable water service to more than 187,000 people in northeast Miami-Dade County, specifically servicing the City of North Miami Beach, City of Miami Gardens, City of Aventura, City of Golden Beach, and City of Sunny Isles Beach and some areas of unincorporated Miami-Dade County. The service area is generally bounded by the Snake Creek Canal and Ives Dairy Road to the north, NW 37th Avenue to the west, NE and NW 135th Street to the south, and Collins Avenue to the east. Only about 25 percent of the City system's service area is within City limits.

2.6.3 City of Homestead

The City of Homestead provides water within most of its municipal boundaries and to a small part of southern Miami-Dade County including a portion of Florida City and parts of unincorporated Miami-Dade County. The City of Homestead sells water to MDWASD to serve a portion of unincorporated Miami-Dade County in a development consisting of 107 homes. This development, named Redavo, has an estimated population of 310. Currently, the City of Homestead and Miami-Dade County have an agreement. However, this agreement is not a wholesale agreement. In addition, MDWASD provides some water service within portions of the municipal boundary of the City of Homestead. In addition, the City of Homestead sells water to Florida City to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street.

The City of Homestead's service area comprises a high pressure water distribution system that services approximately 10,240 acres in southern Miami-Dade County, with an estimated present population of 71,252. The service area is generally bounded by SW 296th Street to the North, SW 137th Avenue to the east, SW 344th Street to the south, and SW 192nd Avenue to the west.

2.6.4 Florida City

In the southern part of the County, Florida City provides water service to parts of southern Miami-Dade County within its municipal boundaries and to a small portion of unincorporated Miami-Dade County. The City's service area is comprised by a high pressure distribution system that services approximately 1,520 acres in southern Miami-Dade County. The service area has a current population of over 15,000, and is generally bounded by SW 328th Street to the north, SW 172nd Avenue to the east, SW 352nd Street to the south, and SW 187th Avenue to the west. In addition, Florida City purchases water from the City of Homestead to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street.

2.6.5 Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) has facilities in the southern part of the County to serve Monroe County. The FKAA does not provide service within Miami-Dade County, despite some of their water supply, treatment, and transmission facilities being located within Miami-Dade County. These facilities include supply wells, a treatment facility and a transmission main to serve Monroe County.

2.6.6 Large and Small Public Water Supply Systems

Additional public water supply systems within Miami-Dade County exist. Miami-Dade County has conducted a preliminary survey of these public water systems. A list of these public water supply systems provided by the State of Florida Department of Health is contained in Appendix G.

Section 3
Existing Water Supply Facilities
3.1 Water Supply Wellfields (Sources of Water)

The MDWASD water system is currently served by the previously mentioned three large treatment plants and the smaller treatment plants in the southern portion of Miami-Dade County. The existing water supplies serving these treatment plants originate from two major aquifer systems in Miami-Dade County: the Surficial and the Floridan Aquifer Systems. The Surficial Aquifer System, also known as the Biscayne Aquifer, is the major source of drinking water and occurs at or near the land surface in most of the County, and is the principal water-bearing unit of the Surficial Aquifer System in the region (Causaras, 1987). Groundwater from the Floridan Aquifer is used for blending at the Alexander Orr, Jr. Water Treatment Plant (WTP). Blending of groundwater from the Floridan Aquifer is proposed at the Hialeah-Preston WTPs in 2010.

The 20-Year water use permit for Miami-Dade County was approved by the SFWMD Governing Board on November 15, 2007. The water use permit limits the annual allocation to 152,741 million gallons and the maximum monthly allocation to 13,364 million gallons. These allocations are further limited by the wellfield operational plan described in Limiting Condition 27 of the water use permit. A copy of the approved water use permit and limiting conditions is located in Appendix H.

3.1.1 Wellfields and Capacities

The existing MDWASD water supply system is comprised of eight major Biscayne Aquifer wellfields in the Hialeah-Preston and Alexander Orr, Jr. subareas, twelve Biscayne Aquifer water supply wells located at five individual water systems (formerly Rex Utility District water system) in South Dade County and the Floridan Aquifer blending wells at the Alexander Orr, Jr. Subarea, as shown in **Table 3-1, Table 3-2** and **Figure 3-1**. Each of the wellfield is described below.

3.1.2 Hialeah-Preston Subarea Wellfields

The Hialeah-Preston WTPs are supplied by four water supply wellfields, shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Hialeah-Preston subarea is approximately 295 million gallons per day (MGD). Appendix A provides detailed information about well construction and capacities of the Hialeah-Preston area wellfields.

In addition to these wellfileds, four abandoned wells at a medley wellfield have been rehabilitated and would be available on a stand-by basis in the event of an emergency.

Table 3-1 Biscayne Aquifer Wellfield Data

Wellfield	Wellfield Data	
	Installed Design Capacity (mgd)	**Number of Wells**
Hialeah-Preston		
Hialeah	12.54	3
John E. Preston	53.28	7
Miami Springs	79.30	20
Northwest[(a)]	149.35	15
Subtotal	**294.47**	**45**
Medley Wellfield [(b)]	43.20	4
Alexander Orr		
Alexander Orr	74.40	10
Snapper Creek	40.00	4
Southwest	161.20	17
West	32.40	3
Subtotal	**308.00**	**34**
Existing South Dade		
Elevated Tank	4.32	2
Everglades Labor Camp	4.18	3
Leisure City	6.12	4
Naranja	1.15	1
Newton	4.32	2
Subtotal	**20.09**	**12**
Proposed South Miami Heights		
Caribbean Park	*3.00*	*2*
Former Plant	*3.00*	*1*
Roberta Hunter Park	*14.00*	*8*
Rock Pit Park (Future)	*3.00*	*2*
Subtotal	***23.00***	***13***
MDWASD System Total (Biscayne Aquifer)	**645.56**	**104**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.
(b) Wells in this wellfield had been abandoned. They were recently restored with the purpose of using them only during an emergency
Source: MDWASDWater Use Permit No. Re-issue 13-00017-W, November 15, 2007

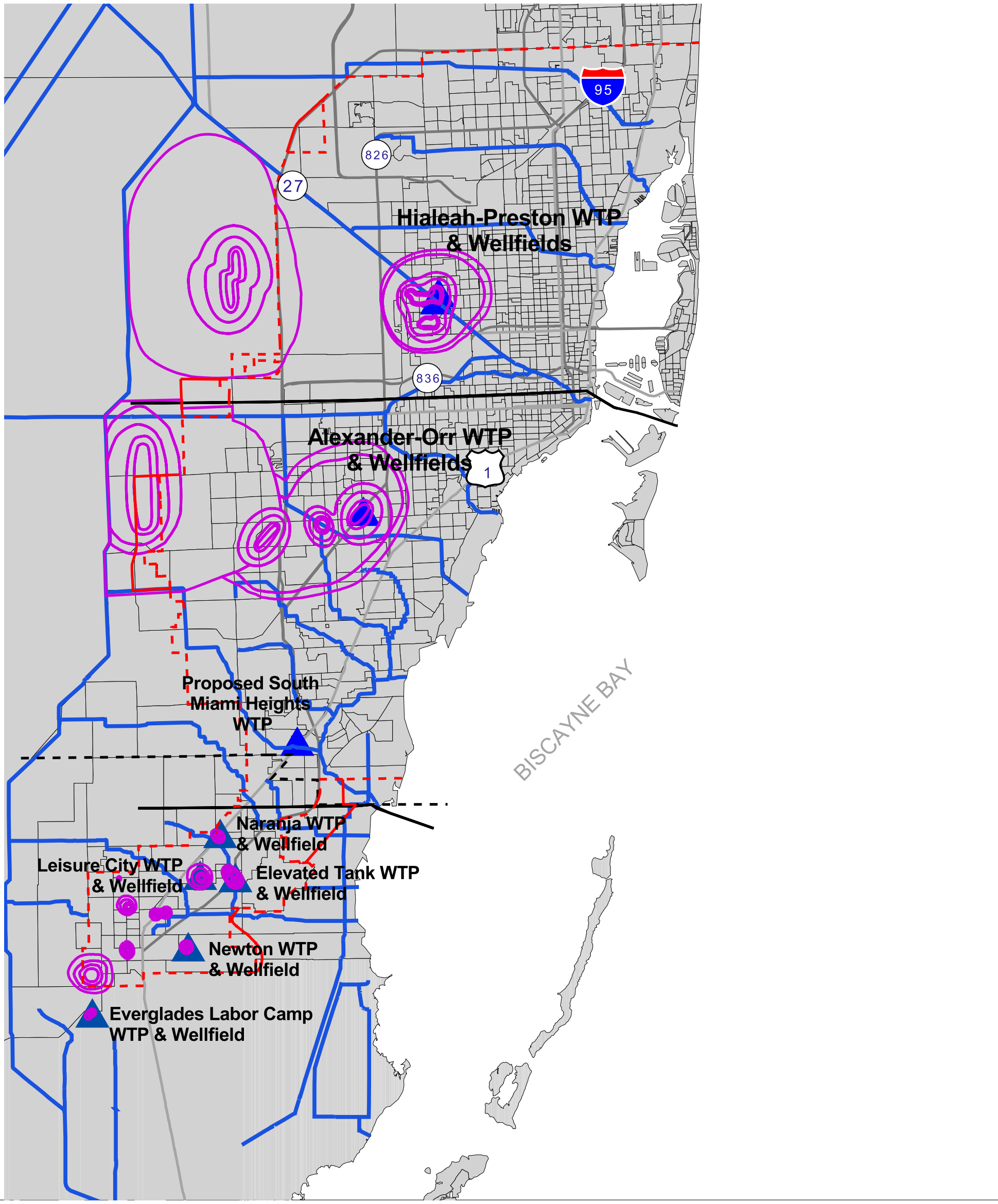

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Figure 3-1: MDWASD
Wellfields, Wellfield Protection Areas,
Raw Water Lines, and WTPs
3/7/2008

Table 3-2 Floridan Aquifer Wellfield Data

Wellfield	Wellfield Data	
	Design Capacity (mgd)	**Number of Wells**
Hialeah-Preston[(a)]	12.50	5
Alexander Orr		
Southwest	7.00	2
West	10.50	3
Subtotal	17.50	5
Hialeah RO WTP[(a)(b)]	24.00	7
MDWASD System Total (Floridan Aquifer)	**54.00**	**17**

(a) Proposed wells
(b) Hialeah RO WTP (Phase 1, 10 mgd by 2012; Phase 2, 5 mgd by 2018; Phase 3 2.5 mgd by 2028)
Source: MDWASD Water Use Permit No. Re-issue 13-00017-W, November 15, 2007

3.1.2.1 Hialeah Wellfield

The three active wells located in the Hialeah Wellfield were constructed in 1936. Each well is 14 inches in diameter, 115 feet deep and have casing depths of 80 feet. The total wellfield capacity is 12.5 mgd or 8,700 gpm (2,900 gpm for each well).

3.1.2.2 John E. Preston Wellfield

The seven active wells located in the John E. Preston Wellfield were constructed in 1966 and 1972. Each well is 42 inches in diameter, 107 feet deep and have casing depths of 66. The capacity of wells No. 1 through No. 6 is 5,000 gallons per minute (gpm) each and the capacity of well No. 7 is 7,000 gpm. The total wellfield capacity is 53.28 mgd.

3.1.2.3 Miami-Springs Wellfield

The twenty active wells located in the Miami Springs Wellfield were constructed between 1924 and 1954. These wells are 14 inches and 30 inches in diameter, 80 to 90 feet deep and have casing depths of 80 feet. The total wellfield capacity is 79.30 mgd or 55,070 gpm (ranging between or 2,500 and 5,000 gpm for each well).

3.1.2.4 Northwest Wellfield

The Northwest Wellfield has fifteen active wells that were constructed in 1980. The wells are 40 inches and 48 inches diameter and 80 to 100 feet deep, with casing depths ranging from 46 to 57 feet. These wells have two-speed motors. The total nominal capacity of the wells at the low speed flow rate is 149.35 mgd. The capacity of each well, except well No. 10, is 10 mgd at the low speed flow rate. Well 10 have a low speed capacity of 9.35 mgd. The total nominal capacity for the wells at the high speed flow is 220.94 mgd.

3.1.2.5 Medley Wellfield

The Medley wellfield had previously been abandoned. However, four wells were recently rehabilitated for emergency use only. The wells are 42 inches and 48 inches in diameter and 100 to 115 feet deep, with casing depths ranging from 42 to 48 feet. The total wellfield capacity is 43.20 mgd or 30,000 gpm (7,500 gpm for each well).

3.1.2.6 Floridan Aquifer Blending

Five Upper Floridan Aquifer wells are proposed in the Hialeah-Preston Wellfields. These proposed Upper Floridan Aquifer wells are for the blending of brackish and fresh water at the Hialeah-Preston WTPs. These wells are to be constructed in 2008. The design capacity of the Hialeah-Preston Upper Floridan Aquifer wells is 12.50 mgd and is proposed by 2010.

Pumpage from the Floridan aquifer wells and Biscayne aquifer wells recharged by reclaimed water will be operated on a priority basis, referred to as a "first on, last off" priority. Changes to wellfield operations must be approved via modification of the approved Wellfield Operation Plan by District staff prior to implementation.

3.1.3 Alexander Orr, Jr. Subarea Wellfields

The Alexander Orr, Jr. WTP is supplied by four water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the four wellfields in the Alexander Orr, Jr. service area is approximately 308 mgd. There are Floridan aquifer wells at two of the wellfields. Appendix A provides detailed information about well construction and capacities, of the Alexander Orr, Jr. area wellfields.

3.1.3.1 Alexander Orr, Jr. Wellfield

The ten active wells located in the Alexander Orr, Jr. Wellfield were constructed between 1949 and 1964. These wells are 16 inches and 42 inches in diameter, 100 feet deep and have casing depths ranging from 40 to 50 feet. The capacity of the wellfield is 74.4 mgd (ranging between 4,170 and 7,500 gpm for each well). Because this wellfield is closest to saline water, there exist the potential for saltwater intrusion, as has occurred in the past. Improvements to a control structure on the C-2 Canal has assisted in reducing saltwater intrusion in recent years.

3.1.3.2 Snapper Creek Wellfield

The four active wells located in the Snapper Creek Wellfield were constructed in 1976. These wells are 24 inches in diameter, 108 feet deep and have casing depths of 50 feet. The total wellfield capacity is 40.0 mgd or 27,760 gpm (6,940 gpm for each well).

3.1.3.3 Southwest Wellfield

The seventeen active wells located in the Southwest Wellfield were constructed between 1953 and 1997. These wells are 20 inches to 48 inches in diameter, 88 to 104 feet deep and have casing depths ranging from 33 to 54 feet. The total wellfield capacity is 161.16 mgd (ranging between or 4,900 and 7,500 gpm for each well).

3.1.3.4 West Wellfield

The West Wellfield has three wells that were constructed in 1994. The wells are 24 inches in diameter and 70 feet deep, with casing depths of 40 feet. The total wellfield capacity is 32.4 mgd or 7,500 gpm per well. This wellfield is limited by the SFWMD to 15 mgd on either an average or maximum daily basis. Well No. 29 pumpage is limited to 5 mgd; Well No. 30 is limited to 10 mgd; and Well No. 31 is to be used as a standby well only to be used with prior written approval from the SFWMD.

3.1.3.5 Floridan Aquifer Blending (and ASR)

Three Upper Floridan Aquifer wells are located in the West Wellfield and two are located in the Southwest Wellfield. Currently, there are Upper Floridan Aquifer wells in service and the blending of brackish and fresh water is occurring in the raw water line feeding the Alexander Orr, Jr. WTP. These wells were constructed in 1996 and 1997 and are 30 inches in diameter. The total depth of these wells is between 1,200 feet and 1,300 feet with casing depths between 835 feet and 850 feet. The total capacity of the West Wellfield wells is 15.12 mgd or 3,500 gpm per well. The total capacity of the Southwest Wellfield wells is 10.08 mgd or 3,500 gpm per well.

Blending is currently in operation. Therefore, there are no capital improvement requirements associated with the current blending activities.

MDWASD also anticipates using these wells for storage of fresh Biscayne Aquifer water in the Floridan Aquifer occasionally during the wet season (when operating water levels in canal permit) for extraction and use in the dry season. To do so, MDWASD designed an ultra-violet (UV) light disinfection system for each ASR site to treat the Biscayne aquifer water before injecting in the Floridan aquifer.

Prior to increasing withdrawals from the Biscayne Aquifer to store in the Floridan Aquifer, the MDWASD must request temporary authorization to do so. This storage of Biscayne Aquifer water must be consistent with the Department of Environmental Protection Underground Injection Control permits.

Pumpage from the Floridan aquifer wells and Biscayne aquifer wells recharged by reclaimed water will be operated on a priority basis, referred to as a "first on, last off" priority. Changes to wellfield operations must be approved via modification of the approved Wellfield Operation Plan by District staff prior to implementation.

3.1.4 South Dade Subarea Wellfields

The five South Dade WTPs are supplied by five individual water supply wellfields as shown on Figure 3-1. The total designed installed capacity from the five wellfields for the South Dade subarea is 19.80 mgd. Appendix A provides detailed information about well construction and capacities, of the existing South Dade area wellfields. The proposed South Miami Heights Wellfield will serve the South Dade area starting in 2012.

3.1.4.1 Elevated Tank Wellfield

The two active wells located in the Elevated Tank Wellfield were constructed in 1982 and 1996. These wells are 12 inches and 16 inches in diameter, 45 to 50 feet deep and have casing depths of 35 and 40 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well.

3.1.4.2 Everglades Wellfield

The three active wells located in the Everglades Wellfield were constructed from 2000 to 2001. These wells are 18 inches in diameter, between 50 and 55 feet deep and have casing depths of 40 and 45 feet. The wellfield's capacity totals 4.18 mgd, ranging between or 700 and 1,500 gpm for each well, excluding the three abandoned wells.

3.1.4.3 Leisure City Wellfield

The four active wells located in the Leisure City Wellfield were constructed between 1953 and 1971. These wells are 6 inches and 12 inches in diameter, approximately 30 to 40 feet deep and have casing depths ranging from 25 to 35 feet. The wellfield's capacity totals 6.12 mgd, ranging between or 450 and 1,500 gpm for each well.

3.1.4.4 Naranja Wellfield

The only active well located in the Naranja Wellfield was constructed in 1975. This well is 12 inches in diameter, 40 feet deep and has a casing depth of 35 feet. The wellfield's capacity totals 1.15 mgd or 800 gpm.

3.1.4.5 Newton Wellfield

The two active wells located in the Newton Wellfield were constructed in 2000 and 2001. These wells are 18 inches in diameter, approximately 65 feet deep and have casing depths ranging from 50 to 53 feet. The wellfield's capacity totals 4.32 mgd or 1,500 gpm for each well, excluding two abandoned wells.

3.1.4.6 Future South Miami Heights Wellfield

MDWASD has plans for the construction and operation of the South Miami Heights WTP and associated wellfields in the South Dade subarea. Of the five existing WTPs and wellfields in the South Dade subarea, only Everglades and Newton WTPs and wellfields will remain in service. The four anticipated wellfields and their capacities are: Caribbean Park Wellfield, 3.0 mgd; Former Plant Wellfield, 3.0 mgd; Roberta Hunter Park Wellfield, 14.0 mgd; and Rock Pit Park Wellfield, 3.0 mgd. The total annual average daily demand for the future South Miami Heights WTP will be approximately 18 mgd.

3.1.5 Other Water Supply Wellfields

3.1.5.1 City of North Miami

The City of North Miami Winson Water Treatment Plant (WTP) is currently supplied exclusively from the Biscayne Aquifer. There are presently eight 12-inch diameter

wells, ranging in depths from 56 to 124 feet. They were drilled and put into service in 1962. Two wells are located at the WTP site, and another three pairs are located at three different public parks in the vicinity of the WTP. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.1.5.2 City of North Miami Beach

The City of North Miami Beach Norwood Water Treatment Plant is supplied by 16 Biscayne aquifer and 4 Floridan aquifer wells. These wellfields provide water supply to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.1.5.3 City of Homestead

The City of Homestead is currently supplied by six Biscayne aquifer withdrawal wells, with a current capacity of 15.22 MGD. There are two 16-inch, two 18-inch, and two 20-inch diameter wells, all 60 feet in depth. The Wittkop Park wellfield, in the northwest part of the service area, has 4 wells, and the Harris wellfield, located just east of Federal Highway, US-1, has two wells. These wellfields provide water supply to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.1.5.4 Florida City

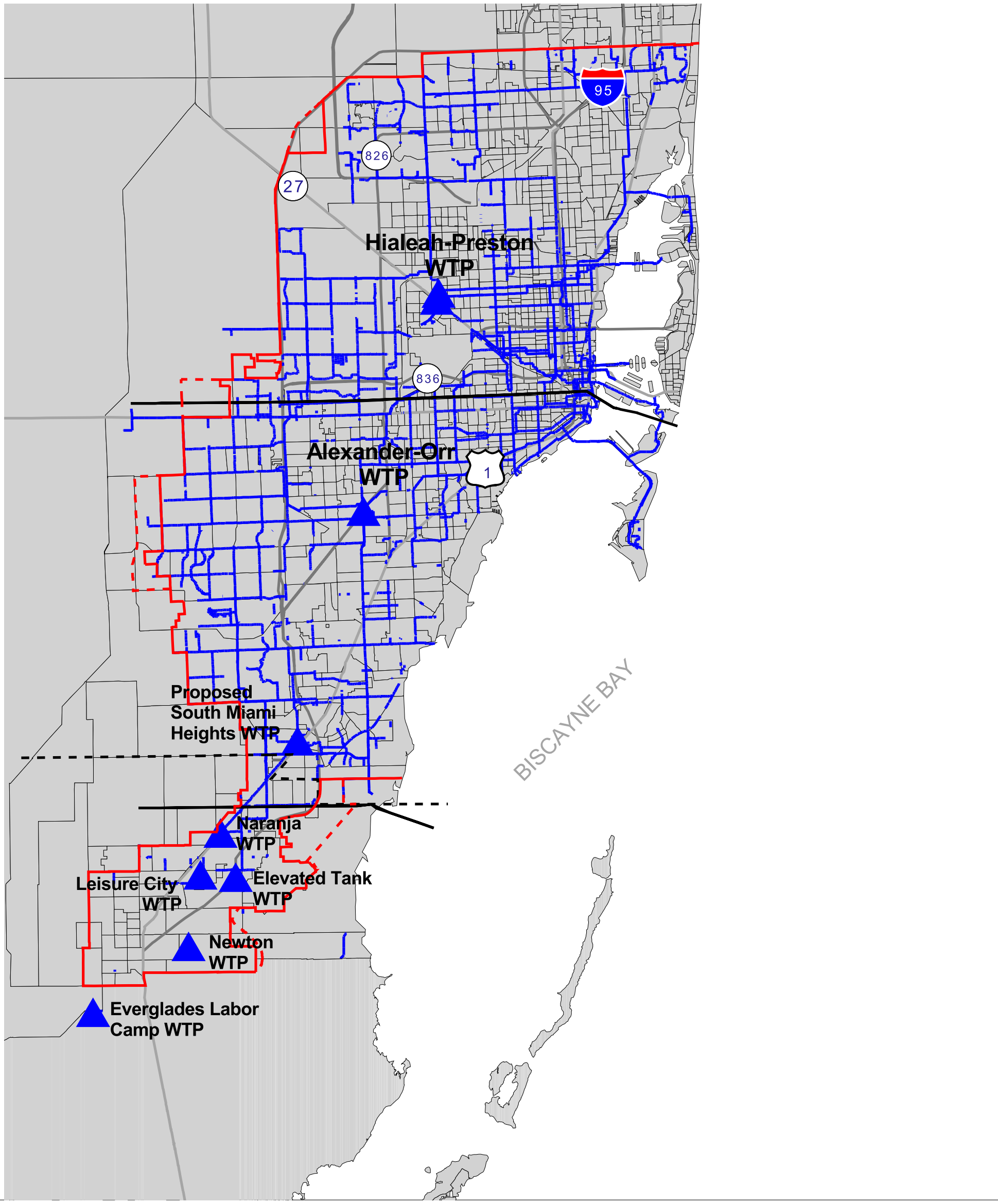
The City of Florida City water treatment plant is supplied by four production wells located on a site adjacent to the treatment plant. There are two 12-inch and two 10-inch diameter wells. All four wells withdraw water from the Biscayne aquifer.

3.2 Water Treatment/Storage Facilities

The MDWASD water system is based on the three large treatment plants and the smaller treatment plants in the extremely southern portion of Miami-Dade County, as shown on **Figure 3-2**.

3.2.1 Hialeah-Preston Water Treatment Plants (WTPs)

The Hialeah and John E. Preston WTPs are located at 200 W. 2nd Avenue and 1100 W. 2nd Avenue, respectively. The adjacent facilities in Hialeah share interconnected source water and finished water storage capacity. These two plants serve the Hialeah-Preston subarea, generally, the service area that lies north of Flagler Street. The two plants have similar treatment processes, which are described separately below. The Hialeah-Preston WTPs are to receive groundwater from five Upper Floridan Aquifer wells located in the Miami Springs Wellfield and the Northwest Wellfield.



CDM

Figure 3-2: MDWASD Water Treatment Plants and Finished Water Lines
6/27/2007

These blending activities of brackish and fresh water are proposed to occur at the Hialeah-Preston WTPs by 2010.

3.2.1.1 Hialeah Water Treatment Plant

The Hialeah WTP was originally designed in 1924 with a total capacity of 10 mgd. By 1935, the plant's capacity totaled 40 mgd. In 1946, capacity was increased to 60 mgd. Air strippers with a capacity of 84 mgd were added to the treatment process in 1991 to remove volatile organics from the finished water. A 3.2 MG storage reservoir for both the Hialeah and John E. Preston WTPs was also added in 1991. There are plans to rerate and upgrade the Hialeah WTP to a capacity of 70 mgd, if necessary.

The source water for Hialeah WTP is from the Hialeah-Miami Springs Wellfields, supplemented by the Northwest Wellfield. The Hialeah WTP has a current rated capacity of 60 mgd. The treatment process includes lime softening with sodium silicate activated by chlorine, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The plant site is relatively small, and is surrounded by residential areas.

3.2.1.2 John E. Preston Water Treatment Plant

The John E. Preston WTP was originally designed as a 60 mgd plant in 1968 and upgraded to 110 mgd in 1980. The plant was rerated to a total capacity of 130 mgd in 1984. The plant reached its present capacity of 165 mgd with another addition in 1988. In 1991, the plant was modified with an air stripping capacity of 185 mgd to remove VOCs. In 2005, the plant process modifications to provide enhanced softening for reduction of color and total organic carbon came on line.

The main source of water for the Preston WTP is from the Northwest Wellfield. The current rated capacity is 165 mgd with a treatment process similar to that of the Hialeah WTP. This includes lime softening with ferric and other coagulant and chemicals added prior to lime for enhanced softening, recarbonation, chlorination, ammoniation, fluoridation, filtration, and air stripping. The Preston plant is also sited in a residential area of Hialeah.

3.2.2 Alexander Orr, Jr. Water Treatment Plant

The Alexander Orr, Jr. WTP is located at 6800 S.W. 87th Avenue in Miami. The original design capacity was 40 mgd in 1954. This plant has undergone several expansions during the past 50 years. The raw water pumping capacity was increased by 32 mgd to 262 mgd in 1995 with an additional source from the West Wellfield. Additional reservoir and high pressure service capacities were also added to bring the total plant design capacity to 256 mgd. The plant rated capacity is 217.74 mgd.

The Alexander Orr, Jr. WTP receives its source water from the Alexander Orr, Jr. Wellfield, Snapper Creek Wellfield, Southwest Wellfield, and the West Wellfield. The Alexander Orr, Jr. WTP treatment process is similar to the other two major plants utilizing lime softening with activated sodium silicate added prior to lime as a

coagulant aid, recarbonation, fluoridation, chlorination, ammoniation, and filtration. Unlike the Hialeah and Preston WTPs, this plant does not utilize enhanced softening or air stripping towers. The Alexander Orr, Jr. WTP also receives groundwater from five Upper Floridan Aquifer wells located in the West Wellfield and the Southwest Wellfield. Currently, these Upper Floridan Aquifer wells are in service and the blending of brackish and fresh water is occurring in the raw water line feeding the WTP. Finished water is distributed to a service area generally delineated as south of Flagler Street.

3.2.3 South Dade Water Treatment Plants

In 1985, MDWASD purchased an existing private utility known as the Rex Utility District Water System. Today, this system is referred to as the South Dade Water System. At the time of purchase, the system consisted of six plants and associated wellfields. Since the time of purchase, the Redavo WTP has been taken out of service.

The South Dade Water System is currently made up of five small WTPs that draw groundwater from the 12 wells located at the plant sites. The five small plants serving the South Dade Service Area include Elevated Tank, Everglades Labor Camp, Leisure City, Naranja, and Newton WTPs. These plants are located in the Southern portion of the County as shown on Figure 3-2. The plants utilize in-line disinfection with free chlorine and stabilization with the addition of polyphosphate. The two-year average annual daily flow (ADF) for the plants ranges from approximately 0.2 mgd at Naranja to over 3 mgd at Leisure City. This system serves a population of approximately 15,500 in the Leisure City, Everglades Labor Camp, and Naranja areas excluding the cities of Homestead and Florida City, which provide their own water service. These small treatment plant capacities are limited by the pumping capabilities at each plant. It is anticipated that these treatment plants will be replaced by the proposed South Miami Heights WTP by 2012.

MDWASD has plans for the construction and operation of the South Miami Heights (SMH) WTP in the South Dade subarea. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain in service when the SMH WTP comes into service in July 2011. The total annual average daily demand for the future South Miami Heights WTP will be approximately 18 mgd.

3.2.4 Other Water Treatment Plants

3.2.4.1 City of North Miami

The City of North Miami Norman H. Winson Water Treatment Plant is located at Sunkist Grove, 12100 NW 11th Avenue, and was commissioned in 1962. The Winsom WTP utilizes lime-softening and is capable of supplying 9.3 MGD of water to consumers, but on average the plant produces 8.5 MGD, or 65 percent of the total demand which is approximately 13.5 MGD. The Winsom WTP provides treated water to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.2.4.2 City of North Miami Beach

The City of North Miami Beach supplies water through the City owned and operated Norwood-Oeffler Water Treatment Plant, located on the northeast corner of NW 191st Street and NW 9th Avenue. The Norwood-Oeffler Water Treatment plant, originally constructed in 1953, is a lime-softening water treatment facility. The plant was upgraded in 2007 to include membrane treatment of raw water from the Biscayne and Floridan Aquifers. The treatment now consists of blending of lime softening and nanofiltration of Biscayne Aquifer water with reverse osmosis for the Floridan Aquifer water. The treated water is stored in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The Water Treatment Plant is currently permitted by the South Florida Water Management District (SFWMD) to withdraw 26.31 mgd of raw water from the Biscayne Aquifer and 12.07 mgd from the Floridan Aquifer. The WTP provides treated water to a portion of unincorporated and incorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

3.2.4.3 City of Homestead

The City is supplied by two water treatment plants. The Wittkop Park plant is located at 505 NW 9th Street, and is supplied by four Biscayne aquifer wells with a capacity of 11.2 MGD. The Harris Field water treatment plant is located at 1084 NE 8th Street. This plant is supplied by two Biscayne aquifer wells, and has a capacity of 5.7 MGD. Both water treatment facilities use chlorination for disinfection, and have a combined capacity of 16.92 MGD. The Wittkop and Harris Field WTPs provide treated water to a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

3.2.4.4 Florida City

The City of Florida City supplies water through a chlorination water treatment facility, with a capacity of 4 MGD. The water treatment plant is located at 461 NW 6 Avenue, adjacent to the City's Loren Roberts Park.

3.2.5 Finished Water Storage

3.2.5.1 Hialeah Preston Subarea

The finished water storage facilities for the Hialeah-Preston subarea consist of both "in-plant" and remote storage facilities. The storage facilities are summarized in **Table 3-3**.

Table 3-3 Hialeah-Preston Finished Water Storage Facilities

Location	Description	Capacity (MG)
Hialeah WTP	Reservoir – Ground Storage	3.0
Hialeah WTP	Clearwell	1.7
John E. Preston WTP	Ground Storage Tank No. 1	9.0
John E. Preston WTP	Ground Storage Tank No. 2	14.0
John E. Preston WTP	Clearwell	1.1
N.W. 20th Street	Ground Storage Tank	7.5
N.W. 36th Street	Ground Storage Tank	5.0
N.W. 67th Street	Ground Storage Tank	8.2
N.W. 30th Street	Ground Storage Tank	2.5
N.E. 79th Street	Elevated Storage Tank	2.0
Carol City	Ground Storage Tank	2.0
	Total Storage	**56.0**

Source: MDWASD Water Facilities Master Plan, 2003 and MDWASD

3.2.5.2 Alexander Orr, Jr. Subarea

The water storage facilities of the Alexander Orr, Jr. subarea consist of a 39-MG ground storage tank located at the WTP site and a 1.6-MG plant clear well.

3.2.5.3 South Dade Subarea

The South Dade Subarea currently has no significant storage facilities. Therefore, the system is very vulnerable to emergency situations.

MDWASD has plans for the construction and operation of the South Miami Heights WTP in the South Dade subarea. Within those plans, a 5 MG reservoir is being planned for on-site plant finished water storage.

3.2.5.4 Other Water Suppliers

The City of North Miami has two storage tanks that hold treated water prior to being pumped into the distribution system. The total combined storage capacity of the two tanks is 2.25 million gallons, or 17 percent of the current average daily demand. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

The City of North Miami Beach stores the treated water in two above-ground storage tanks at the Norwood-Oeffler WTP prior to being pumped into the City's water transmission and distribution system. The storage capacities of the tanks are 4.2 and 2.0 million gallons. The City also uses a 2-million gallon remote tank bringing the total storage capacity in the City's water-supply system to 8.2 million gallons. These storage tanks provide storage of treated water to service a portion of unincorporated

Miami-Dade County in addition to within the City of North Miami Beach municipal boundary.

The City of Homestead stores the finished water in three elevated storage tanks. After treatment, water from five of the six wells is stored in an elevated water storage tank at either Harris Field (0.5 MG), Wittkop Park (0.5 MG), or the Homestead Motorsports Complex (1.0 MG). Water from Well No. 5 at Harris Field is pumped directly into the system after treatment on an as-needed basis. The combined capacity of the storage tanks is 2 MG. These storage tanks provide storage of treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of Homestead municipal boundary.

Florida City has one storage tank that holds treated water prior to distribution within its service area. The tank's storage capacity is 0.5 million gallons.

3.3 Water Distribution Facilities

The MDWASD water distribution system is currently supplied by the three large treatment plants and the smaller treatment plants in the southern portion of Miami-Dade County. The distribution systems serving these treatment plants are comprised of loops and are interconnected, as shown on Figure 3-2.

3.3.1 Hialeah-Preston Subarea

Finished water from the Hialeah and John E. Preston WTPs is pumped through a system of dedicated low-pressure pipelines to remote storage tanks and pumping facilities. This system provides water service to the southeastern part of the Hialeah-Preston subarea. The low pressure system starts at the Hialeah WTP with a 42-inch diameter main heading due east along N.W. 62nd Street, and 36-inch and 42-inch diameter mains running southeast along Okeechobee Road then parallel to the Miami River. The main on N.W. 62nd Street connects to the N.W. 67th Street pumping station, which pumps the water to the south through a 30-inch diameter main running along N.W. 10th Ave. The 30-inch diameter main continues south and connects into the N.W. 36th Street pumping station. This main continues further south and connects into the golf ground pump station.

The 36-inch and 42-inch diameter mains combine into a 54-inch diameter main at N.W. 42nd Avenue. They split again into a 36-inch and a 42-inch diameter main at N.W. 32nd Avenue. These mains connect to the 30th Avenue pump station. The 30th Avenue pump station feeds two 36-inch diameter mains that connect to the 20th Street pumping station to complete the loop. The pipe loop is made predominantly of concrete and cast iron pipes that were installed in the early 1930s. Some segments of this loop having been in service for more than 60 years. Replacement of these pipes are scheduled in the Department maintenance program.

The remaining part of this subarea is served by a high pressure system. Water is pumped into the system by five high service in-plant pumps with a total capacity of

34.1 mgd at 167 feet total dynamic head (TDH). The high pressure system delivers water service to Hialeah, Miami Springs, and a high pressure main connected to the City of Miami. The northern section of the subarea is supplied by one major piping loop. The loop begins at the plant with a 60-inch diameter main heading north along West 4th Avenue (N.W. 57th Ave.) to N.W. 191st Street. At this location, it turns east until it reaches N.E. 20th Avenue. It then turns south and connects into a 54-inch diameter main that connects to the N.W. 67th Street pumping station.

The southwestern portion of the subarea is supplied by a 36-inch diameter main that connects to the 60-inch diameter main heading out of the John E. Preston WTP at West 23rd Street. The main heads west on N.W. 74th Street then turns south on N.W. 107th Avenue. It eventually interconnects with the Alexander Orr, Jr. subarea piping network on S.W. 8th Street around S.W. 117th Avenue.

3.3.2 Alexander Orr, Jr. Subarea

The distribution system of the Alexander Orr, Jr. subarea is comprised of two major piping loops. The first major loop traverses the south and west portion of the subarea. The loop starts at the WTP with a 60-inch diameter main heading west on S.W. 64th Street and a 48-inch diameter main that runs south along S.W. 87th Avenue (Galloway Road) until S.W. 216th Street. The 48-inch diameter main then heads west along S.W. 216th Street to a tee connection at S.W. 127th Avenue. One branch of the tee runs north on S.W. 127th Avenue to S.W. 184th Street and then turns west to 137th Avenue. The 48-inch diameter main travels north on 137th Avenue to S.W. 152nd Street, where it connects into a 24-inch diameter main running east-west on 152nd Street and a 36-inch diameter main that continues north on 137th Avenue to S.W. 120th Street. There, the 36-inch diameter main turns west, then runs north along Hammocks Boulevard to S.W. 88th Street where it reduces to a 24-inch diameter main that runs north along S.W. 152nd Avenue to 72nd Street. The 24-inch diameter main then runs east-west on S.W. 72nd Street. At S.W. 147th Avenue, it connects with a 36-inch diameter main that runs north to S.W. 56th Street (Miller Road), where it connects with a 42-inch diameter main that runs east on Miller Road. This 42-inch diameter main enlarges to a 48-inch diameter main that eventually connects to the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue to complete the loop. A 36-inch diameter main branches off of the 60-inch diameter main at the intersection of Miller Road and S.W. 117th Avenue. This 36-inch diameter main heads north along S.W. 117th Avenue and eventually interconnects the Alexander Orr, Jr. and the Hialeah-Preston subareas.

The second loop starts at the WTP with two 48-inch diameter mains. One main runs north on S.W. 87th Avenue (Galloway Avenue) to S.W. 40th Street (Bird Road) and then turns east. The main continues east along Bird Road, reduces to a 42-inch diameter main at N.W. 57th Avenue, then connects through a 30-inch diameter pipe connection with the second 48-inch diameter main at Bird Road and S.W. 37th Avenue (Douglas Road). The second 48-inch diameter main travels along Highway 874 to S.W. 56th Street, where it turns east then northeast between S.W. 67th Avenue and S.W. 62nd

Avenue to S.W. 48th Street. The main runs east on S.W. 48th Street then northeast through several changes in direction, where it connects to the other 48-inch diameter main at Bird Road and S.W. 37th Avenue. The main then travels north along South Dixie Highway and eventually interconnects with the Hialeah-Preston Service Area piping network through a 36-inch diameter pipe that runs along S.W. 2nd Avenue.

3.3.3 South Dade Subarea

The South Dade water distribution system consists of small water mains with diameters ranging from 16 inches to 4 inches. The distribution system is centered around each individual WTP. Each has its own sets of water main loops within the distinct service areas. The Leisure City, Elevated Tank, and Naranja WTPs, however, are so well interconnected that they can be generally considered as one distribution area. More than 63 percent of the South Dade subarea is served by these three plants. The distribution system of these three plants form one major loop that is bounded on the north by S.W. 248th Street, on the south by S.W. 304th Street, on the east by S.W. 117th Avenue, and on the west by S.W. 172nd Avenue.

The Everglades Labor Camp WTP serves a small area that is bounded on the north by S.W. 376th Street, on the south by S.W. 384th Street, on the east by S.W. 192nd Avenue, and on the west by S.W. 194th Path. This distribution system consists of one 12-inch-diameter loop around the service area interconnected with several 8-inch diameter distribution mains. The Everglades Labor Camp and the Newton WTP distribution system are interconnected via an 8-inch diameter main that runs east along S.W. 376th Street then heads north on S.W. 187th Avenue, where it connects with a 12-inch diameter main at S.W. 360th Street. The 8-inch diameter main continues north on S.W. 187th Avenue until S.W. 352nd Street, where it connects into a small distribution loop that terminates with a 16-inch diameter stub-out.

The Newton WTP distribution system consists of a single 12-inch diameter water main that runs east and west on S.W. 336th Street. The eastbound main then branches north and south along S.W. 152nd Avenue. The southbound branch then turns east on S.W. 344th Street and ultimately connects to the FP&L Turkey Point generating plant. The northbound branch continues along S.W. 152nd Avenue, where it connects to the Leisure City WTP distribution system at S.W. 304th Street. A 6-inch diameter main running south from SW 288th Street on S.W. 137th Avenue then east on S.W. 328th Street connects to an 8-inch diameter main that runs south on 117th Street. This 8-inch diameter main connects to the 12-inch diameter main to FP&L Turkey Point generating plant. This main ultimately completes the interconnection of the Newton WTP with the Leisure City, Elevated Tank, and Naranja WTPs' distribution areas.

The westbound branch of the 12-inch diameter main turns south on S.W. 162nd Avenue then heads south and west on Palm Drive. The main then continues south on S.W. 167th Avenue then west on S.W. 360th Street until it connects to the Everglades Labor Camp WTP 8-inch diameter main that runs north on SW 187th Avenue.

The South Dade distribution system is interconnected with the Alexander Orr distribution system in the vicinity of SW 127th Avenue. MDWASD has plans for the construction and operation of the South Miami Heights WTP and associated wellfields in the South Dade Subarea. Of the five exsisting WTPs and wellfields in the South Dade area, only Everglades and Newton WTPs and wellfields will remain in service when the SMHWTP comes on line in 2012. MDWASD will be constructing a water main to interconnect with the Everglades and Newton Systems to provide water and meet additional future demands. The SMHWTP will connect to the existing distribution systems of the South Dade Plants to be taken out of service in 2012, when SMHWTP is online.

3.3.4 Other Water Distribution Facilities

3.3.4.1 City of North Miami

The City of North Miami's distribution system consists of two 16-inch and one 12-inch diameter ductile iron pipes. The two 16-inch diameter pipes mostly service the areas east of the WTP. One of the 16-inch pipes eventually connects to a 20-inch pipe and then to two 12-inch pipes. The 20-inch and one of the two 12-inch pipes connects o a large 30-inch transmission main at different points. This 30-inch pipe serves as the main transmission line on the far-east side of the City. The other 16-inch main reduces to a 12-inch pipe. The 12-inch transmission main leaving the WTP travels west, then north, and expands into the distribution system. The City also maintains seven supply interconnections with MDWASD and an emergency interconnection with the City of North Miami Beach. This distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary.

3.3.4.2 City of North Miami Beach

The City of North Miami Beach distribution system provides treated water to service a portion of unincorporated Miami-Dade County in addition to within the City of North Miami Beach municipal boundary from the WTP.

The City has eleven high service pumps that deliver finished water to the distribution system at approximately 60 to 80 psi and have a combined capacity of 32.4 mgd. The City's distribution system is fed by 18-inch, 24-inch, and 36-inch diameter transmission mains.

3.3.4.3 City of Homestead

The City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 24-inches in diameter, mostly of ductile iron pipe. The water from the storage tanks flows into the mains, with a pressure of 45 to 60 psi.

3.3.4.4 Florida City

Florida City's water distribution system is comprised of an interconnected string of mains ranging from 2-inches to 24-inches in diameter, mostly of ductile iron pipe.

The City's distribution system provides service within its municipal boundaries and provides service to and to a small portion of unincorporated Miami-Dade County. In addition, Florida City purchases water from the City of Homestead to service a small portion of Florida City's service area on the southeast corner of U.S. 1 and S.W. 328th Street.

3.4 Summary

As shown within this section, the MDWASD water supply and treatment systems have sufficient installed capacity to produce more potable water than is currently required. The supply capacity and treatment capacity are 645.56 MGD and 495.90 MGD, respectively. **Table 3-4** summarizes this information. **Table 3-5** summarizes other suppliers facilities capacities.

The capacities of these water supply and treatment systems have been coordinated with future demands and allocations. Sections 4 and 5 of this Work Plan address future demands and required water supply facilities.

Table 3-4 MDWASD Facilities Capacities

Facility	Installed Capacity (mgd)
Hialeah-Preston Water Treatment Plants	60 + 165 = **225**
Hialeah-Preston Well fields	
Preston	53.28
Hialeah	12.54
Miami Springs	79.30
Northwest[a]	149.35
Subtotal	**294.47**
Medley Wellfield [b]	43.20
Alexander Orr Water Treatment Plant	**248**
Alexander Orr Well fields	
Orr Plant	74.40
Snapper Creek	40.00
Southwest	161.20
West	32.40
Subtotal	**308.00**
South Dade Water Treatment Plants	**10.61**
South Dade Wellfields	
Elevated Tank	4.32
Everglades Labor Camp	4.18
Leisure City	6.12
Naranja	1.15
Newton	4.32
South Dade Wellfield Subtotal	**20.09**
South Miami Heights Water Treatment Plant [c]	***20***
South Miami Heights Wellfields [c]	
Caribbean Park	*3.00*
Former Plant	*3.00*
Roberta Hunter Park	*14.00*
Rock Pit Park	*3.00*
South Dade Wellfield Subtotal	***23.00***
WASD Wellfield Total	**645.56**
WASD Water Treatment Plant[d] Total	**495.90**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.
(b) Wells in this wellfield had been abandoned. They were recently restored with the purpose of using them only during an emergency.
(c) Proposed Facilities once these facilities come on line, South Dade's Elevated Tank, Leisure City and Naranja dropout.
(d) Not including Elevated Tank, Leisure City and Naranja, but including South Miami Heights.
Source: MDWASD Draft Wellfield Operational Plan, 2007 and MDWASD Water Use Permit No. Re-issue 13-00017-W, November 15, 2007

Table 3-5 Other Suppliers' Facilities Capacities

Facility	Installed Capacity (mgd)
City of North Miami	
Norman H. Winsom Water Treatment Plant	9.30
City's well fields (8 wells)	**14.96**
City of North Miami Beach	
Norwood-Oeffler Water Treatment Plant	**32.00**
City of North Miami Beach Wellfields	
Biscayne Aquifer Wellfields	27.90
Floridan Aquifer Wellfields	12.07
City of North Miami Beach Wellfields Total	**39.97**
City of Homestead	
Wittkop Park – Harris Field Water Treatment Plants	11.2+5.7=**16.9**
City of Homestead Wellfields	
Wittkop Park	11.23
Harris Field	5.76
City of Homestead Wellfields Total	**16.99**
Florida City	
Florida City Water Treatment Plant	***4***
Florida City Wellfields	***4***

Source: City of North Miami Beach SFWMD Water Use Permit Staff Report (August 2007) and Water Use Permit No. Re-issue 13-00060-W, Draft Water Supply Facilities Work Plan (City of North Miami, March 2008), Information provided by discussions with staff for the City of Homestead and Florida City

Section 4
Population and Water Demand Projections

This section presents historical and projected population projections from Year 2001 through Year 2030 for MDWASD's service area. Population data were obtained from the Miami-Dade County Planning and Zoning (P&Z) Department and were derived from Transportation Analysis Zone (TAZ). Further, the Consolidated Water Use Permit Application (No. 040511-5) submitted to South Florida Water Management District (SFWMD) in July 2005 indicates that the population data presented in this section was accepted by SFWMD for its use in the Lower East Coast (LEC) Plan 2005-2006 update. The Lower East Coast (LEC) Plan 2005-2006 update was approved on February 15, 2007.

4.1 Historical Population

Historical populations served by the MDWASD system are shown in **Table 4-1** in one year increments from Year 2001 to Year 2006. The population in MDWASD's service area grew approximately 7.3% between Year 2001 and year 2006. Table 4-1 also provides a summary of historical population within Miami-Dade County. The MDWASD system served approximately 90% of the County total population in 2006.

Table 4-1 Historical Population Served by MDWASD

YEAR	TOTAL MDWASD	TOTAL COUNTY
2001	2,073,679	2,283,887
2002	2,103,951	2,319,040
2003	2,134,223	2,354,193
2004	2,164,495	2,389,346
2005	2,194,768	2,424,499
2006	2,225,040	2,459,652

Source: Miami-Dade Planning & Zoning Department

4.2 Population Projections

Population projections for MDWASD's service area in five year increments from Year 2007 to 2027 and Year 2030 are shown in **Table 4-2**. Overall, the population served by MDWASD is expected in increase approximately 26.2% from Year 2006 to Year 2030. There are two important developments for the projected population distributions that should be noted. The first development concerns the population of the City of North Miami Beach currently served by MDWASD's water distribution system. The City of North Miami Beach has filed for a water use permit and will be implementing an alternative water use program that will allow the City to serve its entire population. As a result, the City of North Miami Beach's population currently served by MDWASD is expected to drop out by the end of 2007, resulting in a net negative growth rate (-0.89%) in the population served by MDWASD between 2007 and 2008.

Table 4-2 Population Projections to be Served by MDWASD

Year	Total MDWASD	Total County
2007	2,250,944	2,494,805
2012	2,349,221	2,670,569
2017	2,487,519	2,834,172
2022	2,609,268	2,979,533
2027	2,731,018	3,124,894
2030	2,804,068	3,212,111

Sources: Miami-Dade Planning & Zoning Department

The second development (mentioned earlier) concerns a general shift in the northern boundary of the South Dade area once the proposed South Miami Heights Water Treatment Plant comes into service in 2012. The northern boundary will be shifted northward such that portions of the population currently within the Alexander-Orr subarea will be within the South Dade subarea. **Figure 4-1** illustrates the boundary shift. The boundary shift will cause a general redistribution of service between the Alexander-Orr and South Dade areas, but will not have other effects on the population expected to be served by MDWASD. In 2030, MDWASD will serve potable water to approximately 87% of the total County population.

4.3 Historical Water Use

Historic water use figures were obtained from MDWASD and reflect water provided by the Hialeah-Preston, Alexander-Orr, Everglades, Leisure City, Newton, Elevated Tank, and Naranja WTPs and associated wellfields. These water use figures provide the basis for forecasting future water demands for MDWASD's service area. **Table 4-3,** referred to as Table F in previous submittals to MDWASD and the SFWMD**,** provides the historical raw and finished water use by subarea for Year 2001 through Year 2006. Information shown in Table 4-3 includes per capital annual average and maximum month water use.

4.4 Water Demand Projections

The water demand projections presented herein are based on initial system-wide finished water daily per capita use rate of 155 gallons per capita per day (gpcd). The per capita use was determined by taking a 5-year average from 2002 to 2006. The initial per capita rate was adjusted to reflect reductions resulting from water conservation and reuse irrigation water projects.

Table 4-4, referred to as Table G in previous submittals to the SFWMD**,** provides the projected raw and finished water use for Year 2007 through Year 2030. Table 4-4 also provides projected raw water pumpage from the Biscayne and Floridan Aquifers in five-year increments to indicate how the sources of water will be used to meet future demands.

TABLE 4-3(10/26/07)
Miami-Dade Water and Sewer Department (MDWASD)
Past Water Use (2001-2006)

1	2	3	4	5	6	7	8	9	10	11	12
FINISHED WATER HISTORICAL USE							RAW WATER HISTORICAL USE[(a)]				Ratio Finished : Raw (Total Annual Use)
Year	Population Served*	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max:Average Month	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max:Average Month	
TOTAL MDWASD WATER SYSTEM SERVICE AREA**											
2001	2,073,679	151.28	114,493	9,541	9,927.5	1.04	117,159	9,763	10,129	1.04	1.0233
2002	2,103,951	156.99	120,614	10,051	10,961.4	1.09	122,931	10,244	11,163	1.09	1.0192
2003	2,134,223	158.51	123,511	10,293	10,676.1	1.04	125,884	10,490	10,878	1.04	1.0192
2004	2,164,495	156.90	124,301	10,358	10,861.1	1.05	126,685	10,557	11,063	1.05	1.0192
2005	2,194,768	154.96	124,098	10,341	10,734.8	1.04	126,670	10,556	11,031	1.04	1.0207
2006	2,225,040	153.30	124,677	10,390	10,988.6	1.06	127,019	10,585	11,170	1.06	1.0188
	5-year Average (2002-2006)	156.13			3-year Average (2004-2006)	1.05			3-year Average (2004-2006)	1.05	1.02

* Source of Projected Population Information: Miami-Dade County Planning and Zoning Department

** From MDWASD Raw and Finished Water Historical Data 2001 - 2006

(a) Raw-to-finished water ratio is 1.02. MDWASD is in the process of improving its raw water metering/accounting system.

TABLE 4-4 (3/10/2008)
MDWASD WATER DEMAND BY SOURCE

1	2	3	4	5	6	7
PROJECTIONS						
Year	**Population**	**Finished Water Use (gpcd)**	**AADD Finished Water Use[(a)] (MGD)**	**Water Conservation[(b)] (MGD) Credit**	**Adjusted Finished Water Demand[(c)] (MGD)**	**Adjusted Finished Water Use (gpcd)**
2007	2,250,944	155	348.90	1.09	347.81	154.52
2008	2,230,894	155	345.79	2.24	343.55	154.00
2009	2,260,476	155	350.37	3.53	346.84	153.44
2010	2,290,058	155	354.96	4.82	350.14	152.90
2011	2,319,639	155	359.54	6.34	353.20	152.27
2012	2,349,221	155	364.13	7.77	356.36	151.69
2013	2,378,803	155	368.71	9.28	359.43	151.10
2014	2,408,385	155	373.30	10.09	363.21	150.81
2015	2,438,819	155	378.02	10.89	367.13	150.53
2016	2,463,169	155	381.79	11.70	370.09	150.25
2017	2,487,519	155	385.57	12.51	373.06	149.97
2018	2,511,869	155	389.34	13.30	376.04	149.71
2022	2,609,268	155	404.44	16.46	387.98	148.69
2027	2,731,018	155	423.31	19.62	403.69	147.82
2030	2,804,068	155	434.63	19.62	415.01	148.00

Footnotes

(a) Annual Average Daily Demand (AADD) Finished Water Projections between 2007 and 2030 assume 155 gpcd total water system demand prior to application of credits (e.g. conservation).

(b) WASD will be undertaking the 20-year water use efficiency plan and expects reductions in per capita water consumption. Water Conservation projections were taken from comments
MDWASD submitted to SFWMD on 4/6/2007. Values reflect projections as of 4/6/2007. Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. Water Conservation shall be in accordance with SFWMD Water Use Permit No. Re-Issue 13-00017-W, Limiting Condition Nos. 45 and 49 and Exhibit 27.

(c) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation.

4.5 Water Conservation and Reuse

4.5.1 MDWASD

4.5.1.1 Water Conservation

The per capita usages contained in Table 4-4 are adjusted taking into consideration MDWASD water conservation. MDWASD will be undertaking a 20-year water conservation plan and will evaluate ways for reducing non-revenue water. Water Conservation projections were taken from the MDWASD 20-year Water Use Efficiency Goal Based Plan (Plan) approved by the SFWMD in May 2007. Included in the Plan is the Water Conservation Best Management Practices (BMP) Planning Spreadsheet prepared by Malcolm Pirnie, Inc. in 2007. Table 5 Countywide BMP Implementation Schedule, Costs, and Savings Projections from The Water Use Efficiency 5-Year Plan is located in Appendix E. Currently, MDWASD implements all BMPs included in the 20-year plan in addition to various irrigation, xeriscape and plumbing fixture efficiency ordinances and some reuse within the three wastewater treatment plant sites or in their vicinities. Water conservation activities are funded annually through the operations and maintenance budget and are therefore not included in capital budgets. Values contained within Table 4-4 reflect projections as of May 31, 2007.

Water conservation projections do not reflect water demand reductions presented by the "Unaccounted Water Loss Reduction Plan (February 2007)" prepared by Malcolm Pirnie, Inc. and currently under review by MDWASD. The potential additional reduction in water demands as a result of real non-revenue water loss is estimated at 14.25 mgd over the next ten years.

Water Conservation will be in accordance with SFWMD Water Use Permit No. Re-Issue 13-00017-W, Limiting Condition Nos. 45 and 49 and Exhibit 27.

4.5.1.2 Water Reuse

MDWASD has committed to implement a total of 170 mgd of reuse in accordance with the County's 20-year water use permit. The reuse projects and implementation schedule are listed in in Exhibit 30 of the County's 20-year water use permit, included in Appendix F. Reuse projects to recharge the aquifer with highly treated reclaimed water will be in place before additional withdrawals over the base condition water use are made from the Alexander Orr and South Dade subarea wellfields. These wellfields supply water to several municipalities included in MDWASD's retail and wholesale customer service area.

A 7.0 mgd reuse irrigation project is anticipated at the North District Wastewater Treatment Plant in 2012. Of the 7.0 mgd, approximately 5.0 mgd are for projects associated with the City of North Miami and City of North Miami Beach service areas. A 1.0 mgd reuse irrigation project is anticipated at the Central District Wastewater Treatment Plant in 2011. This project is currently under construction in the Village of Key Biscayne.

4.5.2 Other Water Suppliers

4.5.2.1 City of North Miami

The City of North Miami has developed a water conservation plan to help reduce the demand for potable water and lower its consumption on a per capita basis. The conservation plan includes the adoption of Xeriscape/Florida friendly landscaping methods, the implementation of a water conservation public education program, the implementation of a leak detection program, water loss prevention programs, and the utilization of reuse water for irrigation and non-potable water uses. The City is also implementing an incentives program, and encouraging the development of "green buildings". They will also continue to enforce the wellfield protection ordinance which limits the allowable land uses within the wellfield's cone of influence, and will continue to monitor water quality levels in the drainage basins to maintain a minimum level of service standards. Currently, all the City's wastewater is treated by MDWASD, and therefore the City does not have a water reuse and reclamation program.

4.5.2.2 City of North Miami Beach

The City of North Miami Beach has seen major successes in way of alerting and educating residents on water and environmental conservation. In 2005, the City created a Water Conservation Program that applies conservation methods to reduce water demand and to lower the per capita consumption of potable water. The program includes collective efforts to increase the overall water use efficiency and to limit water losses to 10 percent or less. They have also initiated a water conservation educational and outreach program. Another aspect of the conservation program is the continuation and installation of water efficient landscape, plumbing and irrigation ordinances, as well as a water shortage and emergency ordinance. They have begun the use of alternative water sources, mainly the Floridan aquifer, and are developing a reclaimed water use method. Other methods for water conservation taking place at the City include meter replacements and a showerhead exchange program.

Also, the North Miami Beach Water fund established the Foundation for Water and Environmental Education which is a not-for-profit organization with funds and programs managed by its own directors and established to maintain and aid water resource management in the City of North Miami Beach community.

4.5.2.3 City of Homestead

The City of Homestead has developed a water conservation plan to reduce potable water consumption. The plan includes a permanent irrigation ordinance which establishes irrigation restrictions prohibiting landscape irrigation between 9:00 AM and 5:00 PM., a Xeriscape ordinance that promotes use of Xeriscape landscape methods, an ultra-low volume plumbing fixture ordinance that establishes water conservation standards for plumbing fixtures installed in new construction, a leak detection program expansion by using water correlators which pinpoint leaks that are yet to surface. In addition, the City has a residential and commercial meter

replacement program where all meters will be replaced within the next 5 years. The City will adopt the Automatic Meter Reading technology which allows the reading of water consumption remotely which will allow accurate and true monthly readings. Also, the City is implementing a rain sensor device ordinance that requires all irrigation systems equipped with automatic controls to have a rain sensor switch which turns off the system when more than 0.5 inches of rain has fallen. A water conservation education program is also taking place.

The City has also implemented a reclaimed water system, where most of the wastewater from the City's sewer service area is treated at the City's Wastewater Treatment Plant (WWTP). The wastewater from the City's WWTP receives treatment (including ultra-violet radiation to eliminate the possible formation of disinfection by-products) and is reused to recharge the surficial aquifer. 100% of the City's WWTP output [approximately 6 MGD (4.730 MGD, average)] is currently recharging the aquifer via two primary and four secondary rapid infiltration trenches.

4.5.2.4 Florida City

Florida City is currently implementing a water main replacement program, where they are abandoning all existing 2, 4 and 6-inch diameter mains and installing new 8 and 12-inch diameter DIP water mains. They are also following the SFWMD restrictions for irrigation water use that are currently in place.

4.6 Summary

In summary, the historically based MDWASD service area projected water demands as adjusted for water conservation and reuse are presented in **Table 4-5** as "adjusted" finished water demand and per capita water use. The resulting anticipated finished water demands in 5-year increments an in 2030 is as follows:

Table 4-5 MDWASD Service Area Incremental Water Demands

Year	Population	Adjusted Finished Water (mgd)	Per Capita Water Use (gpcd)
2007	2,250,944	347.81	154.52
2012	2,349,221	356.36	151.69
2017	2,487,519	373.06	149.97
2022	2,609,268	387.98	148.69
2027	2,731,018	403.69	147.82
2030	2,804,068	415.01	148.00

Section 5
Water Supply Facilities Work Plan

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2030. For ease of reference, the project start and finish dates have been provided below the title of the following subsections. The Capital Improvement Elements Tables 8 and 12 located in Appendix B.

5.1 South Miami Heights W.T.P. and Wellfield

Start 2007
Finish 2012

Construction on the South Miami Heights Water Treatment Plant (WTP) and Wellfield program will begin in 2008. This facility will use a parallel treatment train of ultra-low pressure/nanofiltration reverse osmosis and ultrafiltration membranes for treatment of 20 mgd of Biscayne aquifer water from ten wells.

5.2 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's increased water demands through 2030, which encompasses the proposed 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and are presented in **Table 5-1, Table 5-2** and **Figure 5-1**. These projects are to be completed in increments commensurate with the projected growth, as presented in **Figure 5-2** and **Figure 5-3**. All costs are in terms of December, 2006 (ENR CCI=7888) dollars.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to offset the corresponding raw water demand increases. These projects will undergo further refinement and development over the next few months. The flow (Q MGD) shown in parentheses below represents the corresponding amount of finished water annual average daily demand (AADD) provided by the projects in terms of million gallons per day (MGD). These AWS projects and AADD assume that all current wholesalers will remain on the MDWASD system through 2030, except the City of North Miami Beach which drops out after 2007.

Table 5-1: Miami-Dade Water and Sewer Department (MDWASD)
Proposed Alternative Water Supply Projects
From Alternative Water Supply Plan Submitted 10/26/2007

Year	Annual Average Finished Water Quantity in MGD and Source		
2007	7.20	ASR Ultraviolet (UV) Disinfection System for ASR Sys. @ W&SW Wellfield	AWS
2009	4.70	Floridan Aquifer Blending Wellfield at Hialeah/Preston	AWS
2011	8.50	Hialeah Floridan R.O. W.T.P. Phase 1 (WTP Initial Capacity 10.0 MGD)	AWS
2012	2.00	North District W.W.T.P. Reuse Projects	Credit
2012	1.00	Central Distr. W.W.T.P. Reuse Project	Credit
2013	18.60	South Distr. W.R.P. Groundwater Recharge Ph 1	Offset
2017	4.50	Hialeah Floridan R.O. W.T.P. Phase 2 (WTP Total Capacity 15.0 MGD)	AWS
2020	21.00	West District W.R.P. Canal Recharge Ph 2	Offset
2025	16.00	West District W.R.P. Canal Recharge Phase 3	Offset
2027	2.00	Hialeah Floridan R.O. W.T.P. Phase 3 (WTP Total Capacity 17.5 MGD)	AWS
Subtotal	85.50		
Water Conservation	19.62	20-year Water Use Efficiency Plan (4/6/2007)	Credit
Total	105.12		

Note:
Non-revenue potential real water loss reduction target is 14.25 MGD by 2017
No credit give for reuse projects in North District and Central District W.W.T.P.s. Future credits may be given to offset increases in per capita consumption.

TABLE 5-2 (3/25/2008)
MDWASD FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PROJECTIONS								ADJUSTED FINISHED WATER AADD (MGD)											
								Biscayne Aquifer							Floridan Aquifer				
								South Dade[e]		South Miami Heights Membrane Softening(f)									
Year	Population	Finished Water Use (gpcd)	AADD Finished Water Use[a] (MGD)	Water Conservation[b] (MGD) Credit	Reuse/ Reclaimed Water[c] (MGD) Credit	Adjusted Finished Water Demand[d] (MGD)	Adjusted Finished Water Use (gpcd)	Elevated Tank/ LeisureCity/ Naranja	Everglades Labor Camp/ Newton	Transfer from Elevated Tank/ LeisureCity/ Naranja	Caribb. Park/ Former Plant/ Roberta Hunter[g]	SW Wellfield Increase	Hialeah-Preston/ Alexander-Orr Lime Softening	Total Biscayne Aquifer[h]	Hialeah RO WTP[i]	Hialeah-Preston/ Alexander-Orr Blending[j]	Total Floridan Aquifer	Total All Sources	AADD Finsihed Water Deficit
2007	2,250,944	155	348.90	1.09	0.00	347.81	154.52	4.30	2.80	0.00	0.00	0.00	333.51	340.61	0.00	7.20	7.20	347.81	0.00
2008	2,230,894	155	345.79	2.24	0.00	343.55	154.00	4.30	3.06	0.00	0.00	0.00	328.99	336.35	0.00	7.20	7.20	343.55	0.00
2009	2,260,476	155	350.37	3.53	0.00	346.84	153.44	4.30	3.32	0.00	0.00	0.00	332.02	339.64	0.00	7.20	7.20	346.84	0.00
2010	2,290,058	155	354.96	4.82	0.00	350.14	152.90	4.30	3.60	0.00	0.00	0.00	330.34	338.24	0.00	11.90	11.90	350.14	0.00
2011	2,319,639	155	359.54	6.34	0.00	353.20	152.27	4.30	3.60	0.00	0.00	0.00	333.40	341.30	0.00	11.90	11.90	353.20	0.00
2012	2,349,221	155	364.13	7.77	0.00	356.36	151.69	4.30	4.10	0.00	0.00	0.00	331.34	339.74	4.72	11.90	16.62	356.36	0.00
2013	2,378,803	155	368.71	9.28	0.00	359.43	151.10	4.30	4.10	0.00	0.00	0.00	330.64	339.04	8.50	11.90	20.40	359.44	0.00
2014	2,408,385	155	373.30	10.09	0.00	363.21	150.81	0.00	4.10	2.17	6.72	0.00	329.81	342.81	8.50	11.90	20.40	363.21	0.00
2015	2,438,819	155	378.02	10.89	0.00	367.13	150.53	0.00	4.10	2.17	10.62	0.00	329.83	346.73	8.50	11.90	20.40	367.13	0.00
2016	2,463,169	155	381.79	11.70	0.00	370.09	150.25	0.00	4.10	2.17	11.33	0.00	332.09	349.69	8.50	11.90	20.40	370.09	0.00
2017	2,487,519	155	385.57	12.51	0.00	373.06	149.97	0.00	4.10	2.17	13.15	0.00	333.24	352.66	8.50	11.90	20.40	373.06	0.00
2018	2,511,869	155	389.34	13.30	0.00	376.04	149.71	0.00	4.10	2.17	13.15	0.00	331.72	351.14	13.00	11.90	24.90	376.04	0.00
2022	2,609,268	155	404.44	16.46	0.00	387.98	148.69	0.00	4.10	2.17	15.83	10.25	330.73	363.08	13.00	11.90	24.90	387.98	0.00
2027	2,731,018	155	423.31	19.62	0.00	403.69	147.82	0.00	4.10	2.17	15.83	25.96	330.73	378.79	13.00	11.90	24.90	403.69	0.00
2030	2,804,068	155	434.63	19.62	0.00	415.01	148.00	0.00	4.10	2.17	15.83	35.00	331.01	388.11	15.00	11.90	26.90	415.01	0.00

See Footnotes Page 2

NOTE: All water use numbers on this table are projections for planning purposes.
The Limiting Conditions contain the allocations authorized by the SFWMD water use permit.

Footnotes

(a) Annual Average Daily Demand (AADD) Finished Water Projections between 2007 and 2030 assume 155 gpcd total water system demand prior to application of credits (e.g. conservation).

(b) WASD will be undertaking the 20-year water use efficiency plan and expects reductions in per capita water consumption. Water Conservation projections were taken from comments MDWASD submitted to SFWMD on 4/6/2007. Values reflect projections as of 4/6/2007. Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. Conservation must be in accordance with Limiting Condition Nos. 45 and 49 and Exhibit 27 of the 20-year Water Use Permit approved on November 15, 2008.

(c) Tentative Alternative Water Supply Reuse/Reclaimed Water Projects to replace finished water demand. Items 1 and 2 result in credits that reduce finished water demands (demand management).

1. North District WWTP Reuse Projects. This excludes the 5 mgd that will be used by the City of North Miami Beach. See CIE Table 8, Project 29.		2.0 mgd +/-
2. Central District WWTP Reuse Projects. See CIE Table 8, Project 30.		1.0 mgd +/-
	Total (est.)	3.0 mgd +/-

(d) Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation and reuse (demand management).

(e) South Dade (Raw : Finished) Ratio = 1.0 : 1.0

(f) Membrane Softening (Raw : Finished) Ratio = 1.18 : 1.00 (85% Recovery)

(g) Beginning 2014, withdrawals from SMH WTP are considered offsets from Phase 1 GWR (23 mgd) near SMH (Metro Zoo)

(h) Base condition water use (347.0 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water fromt eh regional canal system. Biscayne Aquifer base condition water use of 347.0 mgd equates to 340.34 mgd of finished water annual average daily demand (AADD) **assuming a 1.02 raw-to-finished water ratio**. South District Water Reclamation Plant (SDWRP) Reclaimed Water Projects for Groundwater Recharge (GWR) and for future West District WRP (WDWRP) for Phases 2 and 3 Canal Recharge as shown in the table below and assuming a gallon-for-gallon offset. The applied (MGD) amounts represents total Biscayne Aquifer withdrawals to apply a gallon-for-gallon offset.

Phase	SDWWTP Reclaimed (mgd)	Recharge Area	Applied (MGD) Offset	AADD (mgd)	Implementation Year
1	30	S. Miami Heights	23	18	2014
2	28	Alex-Orr	21	20	2020
3	21	Alex-Orr	16	15	2026
Total (est.)	79		60	53	

(i) RO WTP (Raw : Finished) Ratio = 1.33 : 1.00

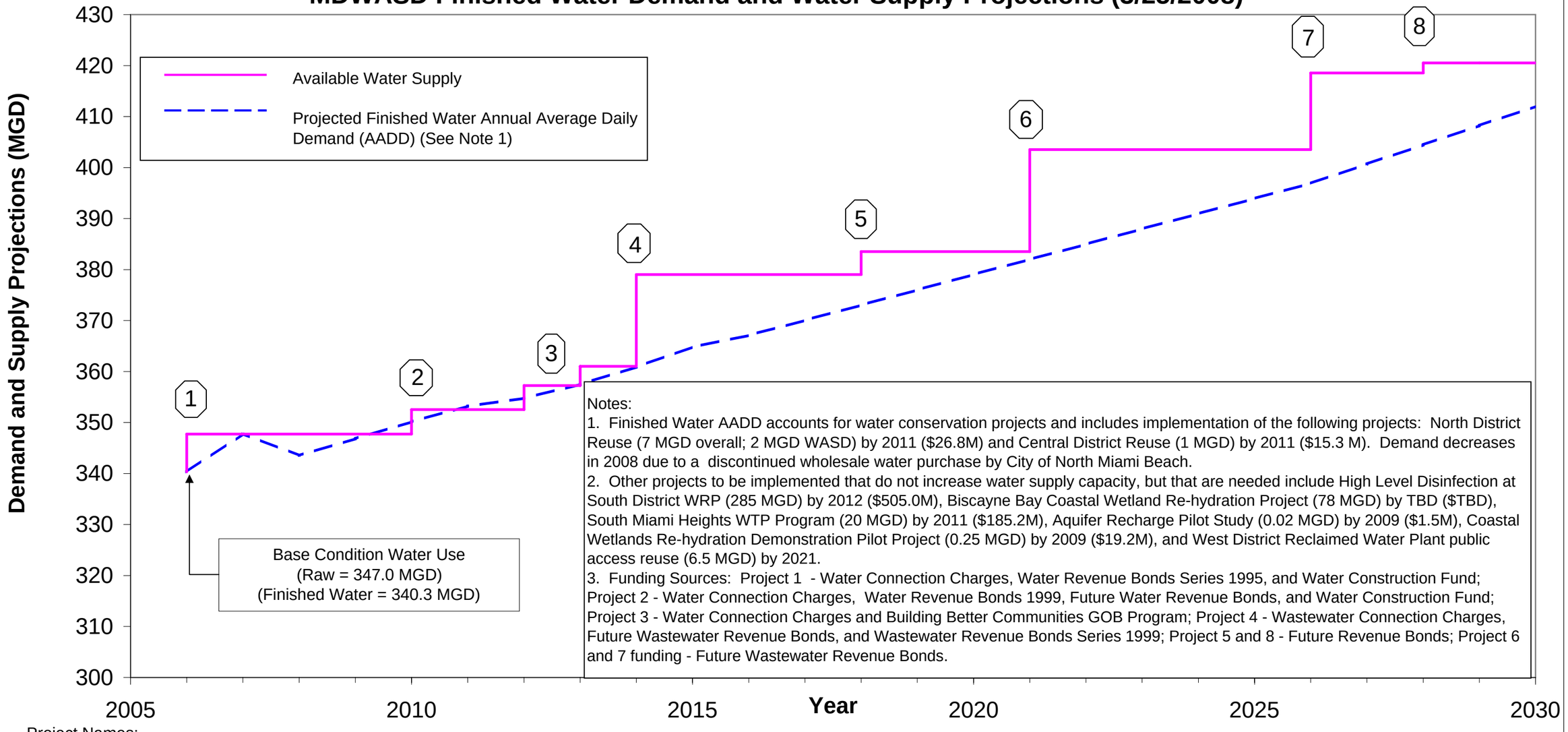
(j) Lime Softening UFA Blending (Raw : Finished) Ratio = 1.02 : 1.00 (Subject to ongoing field verification and subsequent adjustments.)

(k) MDWASD is in the process of improving its raw water metering/accounting system, which may result in an adjustment to the historical raw water values.

(l) Exclusive of any Biscayne water occasionally available for ASR

NOTE: All water use numbers on this table are projections for planning purposes. The Limiting Conditions contain the allocations authorized by the SFWMD water use permit.

Figure 5-1
MDWASD Finished Water Demand and Water Supply Projections (3/25/2008)



Notes:

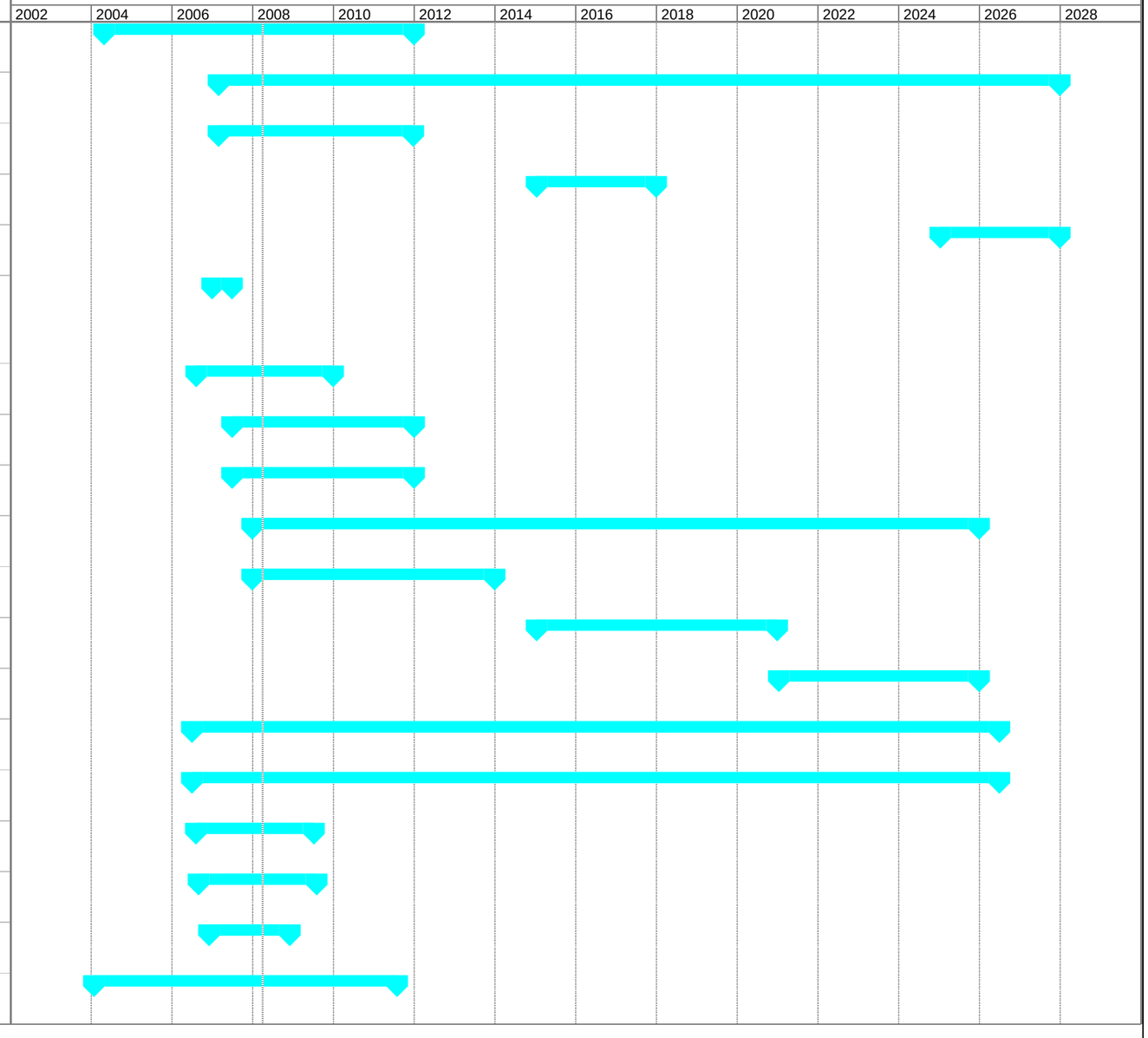
1. Finished Water AADD accounts for water conservation projects and includes implementation of the following projects: North District Reuse (7 MGD overall; 2 MGD WASD) by 2011 ($26.8M) and Central District Reuse (1 MGD) by 2011 ($15.3 M). Demand decreases in 2008 due to a discontinued wholesale water purchase by City of North Miami Beach.
2. Other projects to be implemented that do not increase water supply capacity, but that are needed include High Level Disinfection at South District WRP (285 MGD) by 2012 ($505.0M), Biscayne Bay Coastal Wetland Re-hydration Project (78 MGD) by TBD ($TBD), South Miami Heights WTP Program (20 MGD) by 2011 ($185.2M), Aquifer Recharge Pilot Study (0.02 MGD) by 2009 ($1.5M), Coastal Wetlands Re-hydration Demonstration Pilot Project (0.25 MGD) by 2009 ($19.2M), and West District Reclaimed Water Plant public access reuse (6.5 MGD) by 2021.
3. Funding Sources: Project 1 - Water Connection Charges, Water Revenue Bonds Series 1995, and Water Construction Fund; Project 2 - Water Connection Charges, Water Revenue Bonds 1999, Future Water Revenue Bonds, and Water Construction Fund; Project 3 - Water Connection Charges and Building Better Communities GOB Program; Project 4 - Wastewater Connection Charges, Future Wastewater Revenue Bonds, and Wastewater Revenue Bonds Series 1999; Project 5 and 8 - Future Revenue Bonds; Project 6 and 7 funding - Future Wastewater Revenue Bonds.

Project Names:

1. ASR Ultraviolet (UV) Disinfection System for ASR Sys. @ W&SW Wellfield (7.2 MGD ASR&bl, $6.4M)
2. Floridan Aquifer Blending Wellfield at Hialeah/Preston (4.7 MGD, $10.3M)
3. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1 (4.72 MGD in 2012, 8.5 MGD in 2013, $93.0M) (WTP Capacity = 10 MGD)
4. South Distr. W.R.P. Groundwater Recharge Ph 1(18.6 MGD, $357.5M)
5. Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (4.5 MGD, $25.0M) (WTP Capacity = 15.0 MGD)
6. West District W.R.P. Canal Recharge Ph 2 (21 MGD, $482.0M)
7. West District W.R.P. Canal Recharge Ph 3 (16 MGD, $317.5M)
8. Hialeah Floridan Aquifer R.O. W.T.P. Phase 3 (2.0 MGD, $9.7M) (WTP Capacity = 17.5 MGD)

Miami-Dade Reuse and Alternative Water Supply Conceptual Programs (3/25/2008)

ID	Project	Reuse Flow(a) (MGD)	Estimated Capital Cost(b) $(Million)
1	**HLD at SDWWTP**		**505.0**
2	**Hialeah Floridan Aquifer R.O. WTP (WTP Capacity)**		
3	**Hialeah Floridan Aquifer R.O. W.T.P. Phase 1 (10.0 MGD)**		**93.0**
7	**Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (5.0 MGD)**		**25.0**
11	**Hialeah Floridan Aquifer R.O. W.T.P Phase 3 (2.5 MGD)**		**9.7**
15	**ASR Ultraviolet (UV) Disinfection System for ASR System at W&SW Wellfield (7.2 MGD ASR & blending)**		**6.4**
17	**Floridan Aquifer Blending at Hialeah/Preston (4.7 MGD)**		**10.3**
21	**North District W.W.T.P. Reuse Projects (7.0 MGD)**	**7**	**26.8**
25	**Central District W.W.T.P. Reuse Project (1.0 MGD)**	**1**	**15.3**
29	**Water Reclamation Plants (WRP) Projects**		
30	**South District W.R.P. Groundwater Recharge Ph 1 (18.6 MGD)**	**30**	**357.5**
35	**West District W.R.P. Canal Recharge Ph 2 (21 MGD)**	**28**	**482**
39	**West District W.R.P. Canal Recharge Ph 3 (16 MGD)**	**21**	**317**
43	**Miscellaneous Programs/Projects/Studies**		
44	**Water Conservation/UFW Reduction Program (Up to 19.62 MGD)**		**25.2**
45	**Biscayne Bay Coastal Wetlands Rehydr. Pilot.**		**19.2**
46	**Aquifer Recharge Pilot Study (20,000 GPD)**	**0.02**	**1.0**
47	**Other AWS Studies/Evaluations**		**2.0**
48	**South Miami Heights W.T.P. & Wellfield**		**185.2**

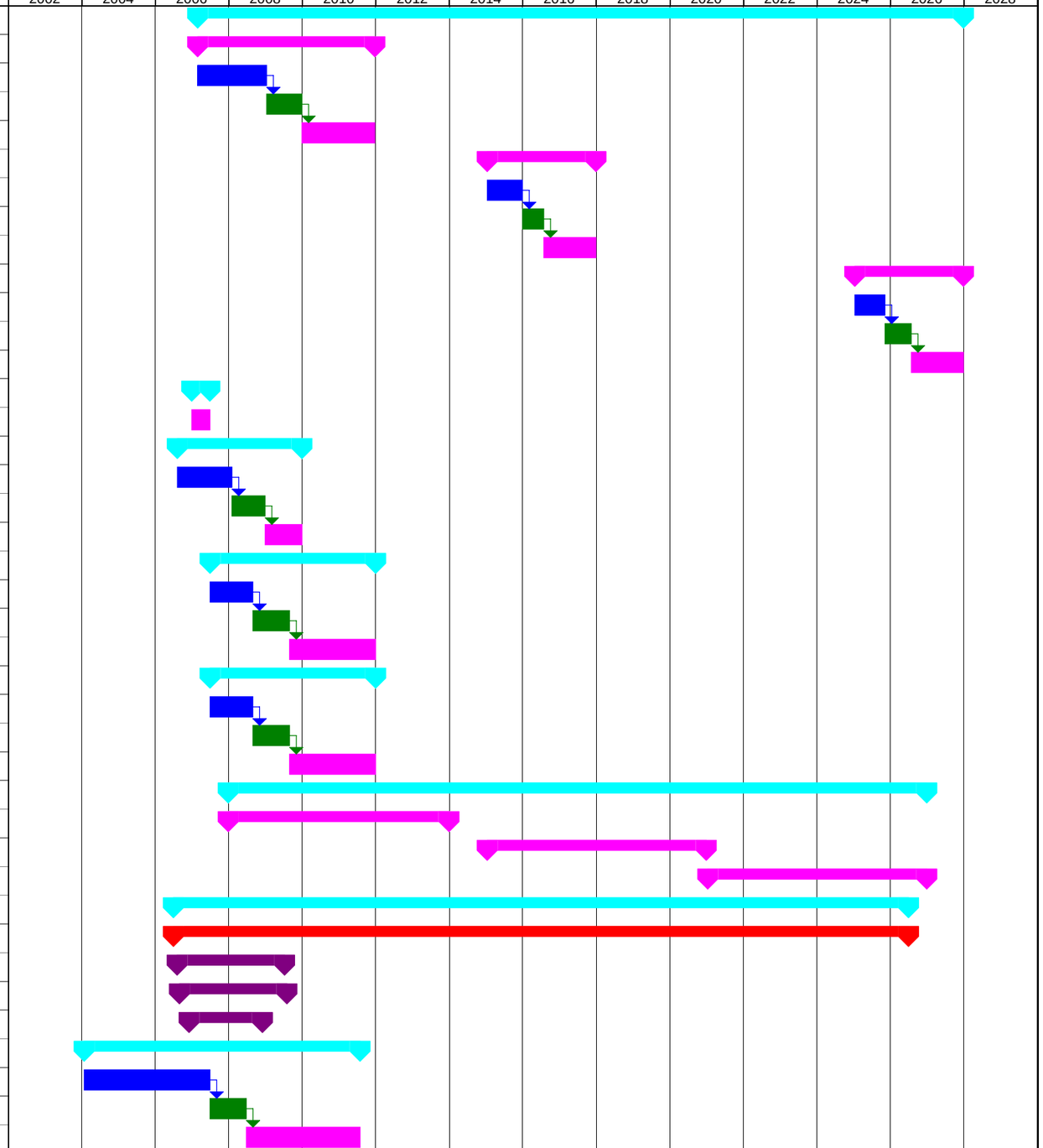


(a) Exclusive of Coastal Wetlands Rehydration Project (78 mgd)
(b) December, 2006 (ENR CCI = 7888)

FIGURE 5-2
Tue 3/25/08
Reuse Program ScheduleRev.mpp

Miami-Dade Reuse and Alternative Water Supply (AWS) Conceptual Programs (3/25/2008)
20-Year Water Use Permit

ID	Task Name	Start	Finish
1	**Hialeah Floridan Aquifer R.O. WTP (WTP Capacity)**	**Thu 3/1/07**	**Thu 12/30/27**
2	**Hialeah Floridan Aquifer R.O. W.T.P Phase 1 (10.0 MGD)**	**Thu 3/1/07**	**Sun 12/25/11**
3	Planning/Design	Thu 3/1/07	Tue 1/13/09
4	Permitting/Procurement	Wed 1/14/09	Tue 12/29/09
5	Construction/Start-up	Wed 12/30/09	Sun 12/25/11
6	**Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (5 MGD)**	**Thu 1/15/15**	**Sat 12/30/17**
7	Planning/Design	Thu 1/15/15	Wed 12/30/15
8	Permitting/Procurement	Thu 12/31/15	Fri 7/29/16
9	Construction/Start-up	Sat 7/30/16	Sat 12/30/17
10	**Hialeah Floridan Aquifer R.O. W.T.P. Phase 3 (2.5 MGD)**	**Wed 1/15/25**	**Thu 12/30/27**
11	Planning/Design	Wed 1/15/25	Mon 11/10/25
12	Permitting/Procurement	Tue 11/11/25	Wed 7/29/26
13	Construction/Start-up	Thu 7/30/26	Thu 12/30/27
14	**ASR UV Disinfection Sys. for ASR at W&SW Wellfield (7.2 MGD ASR & blending)**	**Mon 1/1/07**	**Fri 6/29/07**
15	Start-up	Mon 1/1/07	Fri 6/29/07
16	**Floridan Aquifer Blending Wellfield at Hialeah/Preston (4.7 MGD)**	**Fri 8/11/06**	**Wed 12/30/09**
17	Planning/Design	Fri 8/11/06	Sun 2/3/08
18	Permitting/Procurement	Mon 2/4/08	Mon 12/29/08
19	Construction/Start-up	Tue 12/30/08	Wed 12/30/09
20	**North District W.W.T.P. Reuse Projects (7.0 MGD)**	**Mon 7/2/07**	**Sun 1/1/12**
21	Planning/Design	Mon 7/2/07	Fri 8/29/08
22	Permitting/Procurement	Sat 8/30/08	Sat 8/29/09
23	Construction/Start-up	Sun 8/30/09	Sun 1/1/12
24	**Central District W.W.T.P. Reuse Projects (1.0 MGD)**	**Mon 7/2/07**	**Sun 1/1/12**
25	Planning/Design	Mon 7/2/07	Fri 8/29/08
26	Permitting/Procurement	Sat 8/30/08	Sat 8/29/09
27	Construction/Start-up	Sun 8/30/09	Sun 1/1/12
28	**Water Reclamation Plants (WRP) Projects**	**Sun 12/30/07**	**Wed 12/30/26**
29	**South District W.R.P. Groundwater Recharge Ph 1 (18.6 MGD)**	**Sun 12/30/07**	**Mon 12/30/13**
34	**West District W.R.P. Canal Recharge Ph 2 (21 MGD)**	**Thu 1/15/15**	**Wed 12/30/20**
38	**West District W.R.P. Canal Recharge Ph 3 (16 MGD)**	**Fri 1/15/21**	**Wed 12/30/26**
42	**Miscellaneous Programs/Projects/Studies**	**Mon 7/3/06**	**Wed 7/1/26**
43	**Water Conservation (Up to 19.62 MGD)**	**Mon 7/3/06**	**Wed 7/1/26**
44	**Biscayne Bay Coastal Wetlands Rehydr. Pilot.**	**Tue 8/8/06**	**Fri 7/10/09**
45	**Aquifer Recharge Pilot Study (20,000 GPD)**	**Fri 9/1/06**	**Mon 8/3/09**
46	**Other AWS Studies/Evaluations**	**Tue 12/5/06**	**Wed 12/3/08**
47	**South Miami Heights W.T.P. & Wellfield**	**Wed 1/28/04**	**Sun 7/31/11**
48	Planning/Design	Wed 1/28/04	Sat 6/30/07
49	Permitting/Procurement	Sun 7/1/07	Tue 6/24/08
50	Construction/Start-up	Wed 6/25/08	Sun 7/31/11



LEGEND: STUDY PLANNING/DESIGN PERMITTING/PROCUREMENT CONSTRUCTION/START-UP

CDM

FIGURE 5-3
Tue 3/25/08
WaterSupplyProjects.mpp

5.2.1 Hialeah Floridan Aquifer R.O. W.T.P

Start 2007
Finish 2027

A new upper Floridan aquifer reverse osmosis water treatment plant is to be constructed. The exact location of this plant has not yet been determined, but is expected to be in the northern part of the County (i.e., Hialeah). Ownership, financing, and operational issues associated with the RO WTP is the subject of a Joint Participation Agreement (JPA) between the County and the City of Hialeah, which was approved by the Miami-Dade County Board of County Commissioners on July 26, 2007. Regardless of the outcome, the WTP will directly utilize the Floridan Aquifer as the alternative water supply using the RO treatment to remove salt. The County is currently preparing a Notice to Professional Consultants (NTPC) to select the design professional for the project. It is anticipated that this plant will be constructed to an initial capacity and its capacity expanded, as required, in three phases, as described below.

5.2.1.1 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1 (10.0 MGD)

Start 2007
Finish 2011

Phase 1 planning and design of this WTP will begin in the middle of 2007, with construction and start-up extending to 2011. The Phase 1 production for this plant will be 10 mgd. The Phase 1 cost is estimated at $93 million.

5.2.1.2 Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (5.0 MGD)

Start 2015
Finish 2017

Phase 2 planning and design of this WTP will begin in the middle of 2015, with construction and start-up extending to 2017. The Phase 2 production for this plant will be 5 mgd. The Phase 2 cost is estimated at $25 million.

5.2.1.3 Hialeah Floridan Aquifer R.O. W.T.P. Phase 3 (2.5 MGD)

Start 2025
Finish 2027

Phase 3 planning and design of this WTP will begin in the middle of 2025, with construction and start-up extending to 2027. The Phase 3 production for this plant will be 2.5 mgd. The Phase 3 cost is estimated at $9.7 million.

5.2.2 ASR Ultraviolet (UV) Disinfection System for ASR System at W&SW Wellfield (7.2 MGD ASR and blending)

Start 2007
Finish 2007

The Upper Floridan Aquifer wells are in service and the blending of brackish and fresh water is underway in 2007. The anticipated UFA quantity is 7.2 MGD of

blending AADD capacity to the County's water supply. This project uses the brackish Floridan Aquifer water to blend with the fresh Biscayne Aquifer raw water. MDWASD also anticipates using these wells for storage of fresh Biscayne Aquifer water in the Floridan Aquifer during the wet season for extraction and use in the dry season. To do so, MDWASD designed a ultra-violet (UV) light disinfection system for each ASR site. Project construction costs totaled $6.4 million (for the UV system).

5.2.3 Floridan Aquifer Blending at Hialeah/Preston (4.7 MGD)

Start 2006
Finish 2009

MDWASD is planning on constructing two Floridan Aquifer blending wells to supply raw water to the Hialeah/Preston WTP complex. This project will further increase AADD capacity by 4.7 MGD by blending the Floridan Aquifer water with the raw water supply at an estimated cost of $10.3 million by 2009. This project is currently under design by MDWASD.

5.2.4 North District W.W.T.P. Reuse Projects (7.0 MGD)

Start 2007
Finish 2011

This project is a 7 MGD reclaimed water (e.g. purple pipe) irrigation project at the NDWWTP with an estimated cost of $26.8 million and its completion is scheduled for 2011. Part of the reclaimed water will be pumped to the City of North Miami Beach. Approximately 2 MGD will be used to replace a current potable water irrigation in the MDWASD service area. MDWASD has selected a Consultant to design the project.

5.2.5 Central District W.W.T.P. Reuse Project (1.0 MGD)

Start 2007
Finish 2011

This project is a 1 MGD reclaimed water (e.g. purple pipe) irrigation project at the CDWWTP with an estimated cost of $15.3 million and its completion is scheduled for 2011. The project will replace potable water irrigation at Crandon Park and certain areas of Key Biscayne as a potable water credit. MDWASD has prepared a NTPC for selecting a Consultant to design the project, and will take the requests to advertise to the December 2007 Board of County Commissioners.

5.2.6 Water Reclamation Plants (WRP) Projects

5.2.6.1 South District W.R.P. Groundwater Recharge Ph 1 (18.6 MGD)

Start 2007
Finish 2013

Phase 1 of the Groundwater Replenishment (GWR) project upstream of the South Miami Heights WTP is scheduled to be ready for implementation by 2014 expanding the finished water AADD by 18.6 MGD at a cost of $357.5 million. MDWASD has selected a Consultant to design the project. Design could be completed by mid-2009.

This potential certified project will provide advanced treatment of 30 MGD of secondary effluent to produce approximately 23 MGD of highly treated reclaimed water that will be piped to replenish ground water for water supply purposes. The technologies to be used include micro-filtration and reverse osmosis which filters out small particles and uses ultraviolet light for disinfection. High quality water would be piped to areas upgradient of the proposed South Miami Heights wellfield and discharged into the groundwater through underground trenches. Based upon this replenishment of water, more water can be withdrawn and treated for drinking water purposes at this treatment plant. This approach will enable the continuous use of the South Miami Heights WTP, which will be constructed over the next four to five years.

5.2.6.2 West District W.R.P. Canal Recharge Ph 2 (21 MGD)

Start 2015
Finish 2020

Phase 2 of the GWR for the Alexander-Orr WTP will add 21 MGD to the water supply with total costs estimated at $482 million. MDWASD recently completed the Interim Wastewater Facilities Master Plan, which recommends the establishment of the West District Water Reclamation Plant (WDWRP), combined with wastewater storage facilities for peak wet weather conditions in the Central West area of the County. MDWASD is looking at the option of constructing a new West District Water Reclamation Plant (WDWRP) to produce high quality recharge water to offset groundwater withdrawals in the Alexander Orr subarea wellfields namely, increased withdrawal at the Southwest Wellfield. This plant is scheduled to come on line in 2020 to provide additional water supply beginning in 2021.

5.2.6.3 West District W.R.P. Canal Recharge Ph 3 (16 MGD)

Start 2021
Finish 2025

Phase 3 of the GWR at Alexander-Orr will add 16 MGD to the water supply and is scheduled to be in operation in 2026 at a cost of $317 million. Originally, the Phase 3 GWR would be supplied by the SDWWTP. This plan was modified by the recently completed MDWASD Interim Wastewater Facilities Master Plan, which recommends the establishment of the West District Water Reclamation Plant (WDWRP), combined with wastewater storage facilities for peak wet weather conditions in the Central West area of the County. The WDWRP will produce high quality recharge water to offset groundwater withdrawals in the Alexander Orr subarea wellfields namely, increased withdrawal at the Southwest Wellfield. This plant is scheduled to come on line by 2026.

5.2.7 Miscellaneous Projects

5.2.7.1 Water Conservation/Non-Revenue Potential Water Loss Reduction Program (Up to 19.62 MGD)

Start 2006
Finish 2026

These projects serve to reduce the demand for water through demand management. They include, but are not limited to, various water conservation projects currently being implemented by MDWASD. The County's Water Use Efficiency Five-Year Plan was approved by the Board for the next five years and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. That represents more than 10% of the additional supply required to meet future demands. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, low income seniors full retrofit program, rebates for high efficiency toilets and washers, and landscaping irrigation evaluations. Similarly, the Non-Revenue Real Water Loss Program identified potential reductions in water demand of as much as 14.25 MGD by 2030 through demand management activities.

5.2.7.2 Biscayne Bay Coastal Wetlands Rehydration Pilot

Start 2006
Finish 2014

The Coastal Wetland Rehydration (CWR) program is an example of a project that will serve to reach effluent reuse goals of Miami-Dade County. The 0.25 MGD CWR demonstration project is estimated to cost $19.2 million with a project end date in 2009, whereas costs for the full scale of approximately 78 MGD plant are estimated at $621 million with a project completion date in 2014. The wetland rehydration process requires thorough removal of nutrients from the reuse water and is consistent with the Comprehensive Everglades Restoration Program (CERP), which envisions reused wastewater as a practical water supply source for this purpose. A pilot project to test different treatment technologies and to gain insights into the biological and ecological response of typical wetlands to highly treated effluent has been contemplated in the CERP and is a current requirement in the Agreement with the SFWMD. The results of the demonstration project will help to optimize the treatment system and the preferred areas for rehydration to maximize the benefits to the wetlands and to the Bay. The demonstration project advances the current CERP schedule by several years and provides a unique opportunity to accelerate this aspect of the Everglades' restoration. Currently, the Department and the SFWMD are reevaluating this project's scope and size. The Agreement with the SFWMD will be modified when the project's scope is agreed upon.

5.3 20-Year Work Plan and Capital Improvement Plan

As demonstrated in the previous sections, the Alternative Water Supply Plan being proposed by the County should meet the increased water demands through 2030. As

a confirmation that the County is committed to fund these projects, the projects for the 20-Year Work Plan have been included in the County's Capital Improvement Element. A copy of Tables 8 and 12 from the County's Capital Improvement Element is contained within Appendix D and summarized in **Table 5-3** for the next 5 years (2008 – 2012).

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami has plans for a two-phase expansion of the Winson WTP. Phase I, to be concluded by 2010, will add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II will add additional membrane treatment to the RO facility, which will create an additional 4.0 MGD capacity. The proposed improvements would total an increase of 12.5 MGD to the capacity of the WTP.

The City has also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City plans to construct an additional ten Floridan wells to supply the RO Facility. The City will add a raw water transmission main from the wells to the WTP.

A third expansion plan is the addition of a 5 MG storage tank, to be located on a vacant parcel owned by the City's new Biscayne Landing development. The City may decide to forgo with the construction of the tank and utilize the parcel for another smaller RO Treatment facility or a reuse facility.

These water supply system improvements planned by the City of North Miami will provide water supply for those portions of unincorporated Miami-Dade County which are currently served by the City of North Miami.

5.4.2 City of North Miami Beach

The Norwood-Oeffler WTP was recently (2006) expanded to a total capacity of 32 MGD. The expansion included 2 MG and 5 MG storage tanks for finished water. The City is also planning for a future expansion by 2015 to further increase the capacity of the WTP to a total of 42 MGD. The City also recently constructed four new Floridan wells and five new Biscayne wells which supply the WTP.

These water supply system improvements planned by the City of North Miami Beach will provide water supply for those portions of unincorporated and incorporated Miami-Dade County which are currently served by the City of North Miami Beach.

Table 5-3 MDWASD Water/Alternative Water Supply CIE Program

Project Name	Expenditure[(a)] (In Millions of Dollars)						Six Year Totals
	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	
Sewer Facilities							
Village of Key Biscayne Reuse Distr. System	2.85	0.00	0.00	0.00	0.00	0.00	2.85
Biscayne Bay Coastal Wetlands Rehydr. Pilot.	0.11	2.98	9.12	5.56	0.00	0.00	17.77
Aquifer Recharge Pilot Study (20,000 gpd)	0.24	2.00	0.00	0.00	0.00	0.00	2.24
North District W.W.T.P. Reuse Projects (7.0 mgd)	1.53	6.17	12.93	6.16	0.00	0.00	26.79
Central District W.W.T.P. Reuse Project (1.0 mgd)	0.90	3.36	7.03	4.00	0.00	0.00	15.29
South District W.R.P. Groundwater Recharge Ph 1 (18.6 mgd)	8.93	17.87	34.48	78.81	121.40	96.00	357.49
West District W.R.P. Canal Recharge Ph 2 (21 mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West District W.R.P. Canal Recharge Ph 3 (16 mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biscayne Bay Coast. Wetlands Reh. (75.7 mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Facilities							
South Miami Heights W.T.P. & Wellfield	13.14	19.12	26.58	12.92	12.48	0.00	84.24
ASR Ultraviolet (UV) Disinfection System for ASR Syst. @W&SW Wellfield(7.2 mgd ASR&bl)	6.83	0.00	0.00	0.00	0.00	0.00	6.83
Floridan Aquifer Blending at Hialeah/Preston(4.7 mgd)	0.82	2.57	6.60	0.00	0.00	0.00	9.99
Hialeah Floridan Aquifer R.O. W.T.P. Phase 1 (10.0 mgd)	10.49	18.29	34.44	26.67	2.66	0.00	92.55
Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (5.0 mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hialeah Floridan Aquifer R.O. W.T.P. Phase 3 (2.5 mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	**45.84**	**72.36**	**131.18**	**134.12**	**136.54**	**96.00**	**616.04**

Source: MDWASD CDMP CIE

[(a)] December, 2006 Dollars (ENR CCI=7888)

5.4.3 City of Homestead

The City of Homestead is currently in the process of analyzing the different ways of improving or expanding their systems to increase capacity as the population within its municipal boundary and in parts of unincorporated Miami-Dade County where it provides water increases. The two major alternatives are either upgrading the existing well pumping capacity or installing additional wells. However, the City has not yet agreed on any type of improvements, and therefore no additional information can be provided at this time.

5.4.4 Florida City

Due to the fact that the SFWMD is currently adjusting any further withdrawals from the Biscayne aquifer, the City plans to increase its Water Treatment Plant capacity by installing additional wells and withdrawing water from the Floridan aquifer, which will require membrane filtration treatment and chlorination prior to distribution. The timeline for this expansion is not yet known.

5.5 Conclusion

In conclusion, and as **Table 5-4** shows, MDWASD has prepared a work plan which demonstrates that Department (e.g. public) facilities are available to meet the projected growth demands (which reflect credits for conservation and for reuse/reclaimed water). As noted on the table, regarding Permitted Amounts, these amounts are in accordance with the 20-year Water Use Permit approved by SFWMD on November 15, 2007. This permit has 58 limiting conditions, which include numerous reporting requirements. The permit and the limiting conditions are located in Appendix H.

Table 5-4 Comparison of Facility Capacity and Anticipated Future Permitted Amount

	2007	2012	2017	2022	2027	2030
MDWASD Population Served	2,250,944	2,349,221	2,487,519	2,609,268	2,731,018	2,804,068
Average Daily Demand (Finished) MGD[1]	347.81	356.36	373.06	387.98	403.69	415.01
Demand per Capita Finished (GPCD) [1]	154.52	151.69	149.97	148.69	147.82	148.00
Available Facility Capacity (MGD)	483.61	495.90	495.90	495.90	495.90	495.90
Facility Capacity Surplus (Deficit)[2]	135.80	139.54	122.84	107.92	92.21	80.89
Permitted Amount (MGD Annual Avg.)[3]	347.81	356.36	373.06	387.98	403.69	415.01
Permitted Surplus MGD (Deficit)	0	0	0	0	0	0

MGD = Million Gallons per Day

1. Reflects credits for water conservation
2. Calculated by subtracting Average Daily Demand (finished) from Available Facility Capacity
3. The permitted amount are from Exhibit 13B from the Miami-Dade Water and Sewer 20-Year Water Use Permit, issued on November 15, 2007.

APPENDIX A

Wellfield Data Tables

EXHIBIT A-1
Summary of Construction and Capacity in the Hialeah-Preston Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
Hialeah Wellfield										
11		1936	14	115	80	C	2900	8,700	4.18	**12.54**
12		1936	14	115	80	C	2900		4.18	
13		1936	14	115	80	C	2900		4.18	
John E. Preston Wellfield										
1 (24)		1966	42	107	66	T	5000	37,000	7.20	**53.28**
2 (25)		1966	42	107	66	T	5000		7.20	
3 (26)		1966	42	107	66	T	5000		7.20	
4 (27)		1966	42	107	66	T	5000		7.20	
5 (28)		1966	42	107	66	T	5000		7.20	
6 (29)		1966	42	107	66	T	5000		7.20	
7 (30)		1972	42	107	66	T	7000		10.08	
Miami Springs (Lower) Wellfield										
1		1924	14	115	80	C	3000	23,000	4.32	**33.12**
2		1924	14	115	80	C	2500		3.60	
3		1924	14	115	80	C	2500		3.60	
4		1924	14	115	80	C	2500		3.60	
5		1924	14	115	80	C	2500		3.60	
6		1924	30	115	80	T	5000		7.20	
7		1924	14	115	80	C	2500		3.60	
8		1924	14	115	80	C	2500		3.60	
Miami Springs (Upper) Wellfield										
9		1949	14	115	80	C	2500	32,070	3.60	**46.18**
10		1954	14	115	80	C	2900		4.18	
14		1936	30	115	80	C	4170		6.00	
15		1945	14	115	80	C	2500		3.60	
16		1936	14	115	80	C	2500		3.60	

EXHIBIT A-1
Summary of Construction and Capacity in the Hialeah-Preston Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
17		1936	14	115	80	C	2500		3.60	
18		1945	14	115	80	C	2500		3.60	
19		1945	14	115	80	C	2500		3.60	
20		1945	14	115	80	C	2500		3.60	
21		1945	14	115	80	C	2500		3.60	
22		1945	14	115	80	C	2500		3.60	
23		1949	14	115	80	C	2500		3.60	
Northwest Wellfield[5]										
1 (31)		1980	48	80	46	T	6950	103,800	10.00	**149.35**
2 (32)		1980	48	80	46	T	6950		10.00	
3 (33)		1980	48	80	46	T	6950		10.00	
4 (34)		1980 & 1999	40	100	57	T	6950		10.00	
5 (35)		1980	48	80	46	T	6950		10.00	
6 (36)		1980	48	80	46	T	6950		10.00	
7 (37)		1980	48	80	46	T	6950		10.00	
8 (38)		1980	48	80	46	T	6950		10.00	
9 (39)		1980	48	80	46	T	6950		10.00	
10 (40)		1980 & 1999	40	100	57	T	6500		9.35	
11 (41)		1980	48	80	46	T	6950		10.00	
12 (42)		1980	48	80	46	T	6950		10.00	
13 (43)		1980 & 1999	40	100	57	T	6950		10.00	
14 (44)		1980 & 1999	40	100	57	T	6950		10.00	
15 (45)		1980 & 1999	40	100	57	T	6950		10.00	
Total Capacities - Biscayne Aquifer with NW Wellfield Pumps at Low Speed							**204,570**	**204,570**	**294.47**	**294.47**

EXHIBIT A-1
Summary of Construction and Capacity in the Hialeah-Preston Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
Emergency Wellfield [6]										
Medley Wellfield										
1	*Stand-by*	*N/A*	*42 - 48*	*100 - 115*	*42 - 48*	*T*	*7,500*	*30,000*	*10.80*	***43.20***
2	*Stand-by*	*N/A*	*42 - 48*	*100 - 115*	*42 - 48*	*T*	*7,500*		*10.80*	
5	*Stand-by*	*N/A*	*42 - 48*	*100 - 115*	*42 - 48*	*T*	*7,500*		*10.80*	
6	*Stand-by*	*N/A*	*42 - 48*	*100 - 115*	*42 - 48*	*T*	*7,500*		*10.80*	

Notes:

1. gpm = gallons per minute; MGD = million gallons per day; C = Centrifugal; T = Turbine; N/A = Not Available

2. Initial source for capacity information was extracted from the 2002 Water Facilities Master Plan. After site visits from MSA and documents provided by MDWASD well operator, conflicting information was provided to senior MDWASD staff for verification. When required, changes were made accordingly.

3. Information other than capacity information is based on data included in the South Dade Water Use Permit provided by MDWASD staff.

4. Well number in parenthesis represent the number of the wells as previously provided to the SFWMD in Item II-2A, Table A - Well Description Tables.

5. Capacity of Northwest Wellfield assumes that only the low speed flow rate of 10 MGD can be achieved from each well with all wells pumping (except for 9.35 for well #10.) If all pumps were to be run at high speed, the capacity of the wellfield would increase by an additional 71.59 MGD for a total of 220.94 MGD.

6. Wells in this wellfield had been abandoned. They were recently restored with the purpose of using them only for emergency purposes.

EXHIBIT A-2
Summary of Construction and Capacities in the Alexander Orr Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
Alexander Orr Wellfield										
1		1949	16	100	40	T	4170	51,690	6.00	**74.40**
2		1949	16	100	40	T	4170		6.00	
3		1949	16	100	40	T	4170		6.00	
4		1949	16	100	40	T	4170		6.00	
5		1952	16	100	40	T	4170		6.00	
6		1952	16	100	40	T	4170		6.00	
7		1952	16	100	40	T	4170		6.00	
8		1952	16	100	40	T	7500		10.80	
9		1964	24	100	50	T	7500		10.80	
10		1964	24	100	50	T	7500		10.80	
Snapper Creek Wellfield										
21		1976	24	108	50	T	6940	27,760	10.00	**40.00**
22		1976	24	108	50	T	6940		10.00	
23		1976	24	108	50	T	6940		10.00	
24		1976	24	108	50	T	6940		10.00	
Southwest Wellfield										
11		1953	20	100	40	T	4900	111,900	7.06	**161.16**
12		1953	20	100	40	T	4900		7.06	
13		1953	20	100	40	T	4900		7.06	
14		1953	20	100	40	T	4900		7.06	
15		1953	20	100	40	T	4900		7.06	
16		1953	20	100	40	T	4900		7.06	
17		1959	24	100	35	T	7500		10.80	
18		1959	24	100	35	T	7500		10.80	
19		1959	24	100	35	T	7500		10.80	

EXHIBIT A-2
Summary of Construction and Capacities in the Alexander Orr Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
20		1959	24	100	35	T	7500		10.80	
25		1982	24	104	54	T	7500		10.80	
26		1982	24	104	54	T	7500		10.80	
27		1982	24	104	54	T	7500		10.80	
28		1982	24	104	54	T	7500		10.80	
38 (32)		1997	48	88	33	T	7500		10.80	
39 (33)		1997	48	88	33	T	7500		10.80	
40 (34)		1997	48	88	33	T	7500		10.80	
West Wellfield										
29		1994	24	70	35	T	7500	22,500	10.80	**32.40**
30		1994	24	70	35	T	7500		10.80	
31	Stand-by	1994	24	70	35	T	7500		10.80	
Total Capacities - Biscayne Aquifer							**213,850**	**213,850**	**307.96**	**307.96**

Floridan Aquifer ASR Wells										
West Wellfield										
33 - ASR 1 (35)	Used for blending, not for injection.	1996	30	1300	850		3500		5.04	**15.12**
34 - ASR 2 (36)	Used for blending, not for injection.	1997	30	1250	845		3500		5.04	
35 - ASR 3 (37)	Used for blending, not for injection.	1997	30	1210	835		3500		5.04	

EXHIBIT A-2
Summary of Construction and Capacities in the Alexander Orr Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	Pump Type[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
Southwest Wellfield										
36 - ASR 4 (38)	Inactive	1997	30	1200	765		3500		5.04	**10.08**
37 - ASR 5 (39)	Inactive	1998	30	1200	760		3500		5.04	

Notes:

1. gpm = gallons per minute; MGD = million gallons per day; C = Centrifugal; T = Turbine; N/A = Not Available
2. Initial source for capacity information was extracted from the 2002 Water Facilities Master Plan. After site visits from MSA and documents provided by MDWASD well operator, conflicting information was provided to senior MDWASD staff for verification. When required, changes were made accordingly.
3. Information other than capacity information is based on data included in the South Dade Water Use Permit provided by MDWASD staff.
4. Well number in parenthesis represent the number of the wells as previously provided to the SFWMD in Item II-2A, Table A - Well Description Tables.

EXHIBIT A-3
Summary of Construction and Capacity in the South Dade Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	*Pump Type*[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
Existing Wellfields in South Dade										
Elevated Tank Wellfield										
1		1982	12	40	35	T	1500	3,000	2.16	4.32
2		1996	16	50	40	T	1500		2.16	
Everglades Wellfield										
1A		2000	18	55	45	T	1500	2,900	2.16	4.18
2A		2001	18	55	42	T	700		1.01	
3A		2000	18	50	40	T	700		1.01	
Leisure City Wellfield										
2		1953	6	30	25	T	450	4,250	0.65	6.12
3		1957	12	35	30	T	1500		2.16	
4		1966	12	35	30	T	800		1.15	
5		1971	12	40	35	T	1500		2.16	
Naranja Wellfield										
1		1975	12	40	35	T	800	800	1.15	1.15
Newton Wellfield										
1A		2000	18	65	50	T	1500	3,000	2.16	4.32
2B		2001	18	66	53	T	1500		2.16	
Total Capacities - Existing Wells								13,950	20.09	20.09
Proposed (South Miami Heights) Wellfields[4]										
Caribbean Park Wellfield										

EXHIBIT A-3
Summary of Construction and Capacity in the South Dade Subarea Wellfields
Wellfield Operational Plan, South Florida Water Management District

Well Number	Status if Not Active	Date Constructed	Diameter (Inches)	Total Depth (feet)	Casing Depth (feet)	*Pump Type*[1]	Capacity[1] (gpm)	Wellfield Capacity (gpm)[1]	Wells - Designed Installed Capacity (MGD)[1]	Wellfield Designed Installed Capacity (MGD)[1]
1		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*	*2,100*	*1.50*	*3.00*
2		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*1.50*	
Former Plant Wellfield										
1		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*2100*	*2,100*	*3.00*	*3.00*
Roberta Hunter Park Wellfield										
1		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*	*7,350*	*2.00*	*14.00*
2		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
3		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
4		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
5		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
6		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
7		*Proposed*	*N/A*	*N/A*	*N/A*	*T*	*1050*		*2.00*	
Rock Pit Park Wellfield										
1		*Future*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
2		*Future*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

Notes:
1. gpm = gallons per minute; MGD = million gallons per day; C = Centrifugal; T = Turbine; N/A = Not Available
2. Initial source for capacity information was extracted from the 2002 Water Facilities Master Plan. After site visits from MSA and documents provided by MDWASD well operator, conflicting information was provided to senior MDWASD staff for verification. When required, changes were made accordingly.
3. Information other than capacity information is based on data included in the South Dade Water Use Permit provided by MDWASD staff.
4. Proposed wells, already designed and permitted (except for Rock Pit Park wells which are only at the conceptual design level).

APPENDIX B

Miami-Dade County Capital
Improvements Element
Tables 8 and 12 (Partial)

EXHIBIT B-1
CIE TABLE 8 (Partial)
SEWER FACILITIES

April 2007

Project Name and Location	Purpose* / Year of Completion	Prior Years	Expenditures / Revenues 2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Six Year Totals	Future Years	Project Totals	Funding Source
			(In Millions of Dollars)									
Village of Key Biscayne Reuse Distr.System	3/2008	4.15	2.85	0.00	0.00	0.00	0.00	0.00	2.85	0.00	7.00	835,914
Village of Key Biscayne		7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	
Biscayne Bay Coastal Wetlands Rehydr. Pilot	2/2011	1.43	0.11	2.98	9.12	5.56	0.00	0.00	17.77	0.00	19.20	521,914
Systemwide		4.51	0.00	0.00	14.69	0.00	0.00	0.00	14.69	0.00	19.20	961
Aquifer Recharge Pilot Study (20,000 gpd) * *	2/2010	0.48	0.24	2.00	0.00	0.00	0.00	0.00	2.24	0.00	2.72	521,914
Systemwide		0.72	0.00	2.00	0.00	0.00	0.00	0.00	2.00	0.00	2.72	
North District W.W.T.P. Reuse Projects (7mgd)	2/2012	0.01	1.53	6.17	12.93	6.16	0.00	0.00	26.79	0.00	26.80	521,914,
W.W. System - North District Area		1.54	6.17	0.00	19.09	0.00	0.00	0.00	25.26	0.00	26.80	961
Central Distr. W.W.T.P. Reuse Project (1mgd)	2/2012	0.01	0.90	3.36	7.03	4.00	0.00	0.00	15.29	0.00	15.30	521,914,
W.W. System - Central District Area		0.91	3.36	0.00	11.03	0.00	0.00	0.00	14.39	0.00	15.30	961
South Distr. W.R.P. Groundwater Recharge Ph 1 (18.6 mgd)	2/2013	0.01	8.93	17.87	34.48	78.81	121.40	96.00	357.49	0.00	357.50	521,961,
W.W. System - South District Area		12.01	6.13	8.67	113.29	0.00	217.40	0.00	345.49	0.00	357.50	
West District W.R.P. Canal Recharge Ph 2 (21 mgd)	2/2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	298.00	298.00	961
W.W. System - South District Area		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	298.00	298.00	
West District W.R.P. Canal Recharge Ph 3 (16 mgd)	2/2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	217.50	217.50	961
W.W. System - South District Area		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	217.50	217.50	
Biscayne Bay Coast.Wetlands Reh.(75.7 mgd)	2/2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	621.00	621.00	1171
W.W. Systemwide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	621.00	621.00	
TOTALS		6.09	14.56	32.38	63.56	94.53	121.40	96.00	422.43	1,136.50	1,565.02	
		19.69	15.66	10.67	158.10	0.00	217.40	0.00	401.83	1,136.50	1,558.02	

* 1=Existing Deficiency; 2=Future Growth; 3=Combined
* * Aquifer Recharge Pilot Study includes 388,980 Expenditures in Prior Years for a Reuse Feasibility Study Update.
Projects "strikethrough" are proposed deletions, April 2007 CDMP Amendment Cycle

Source: Miami-Dade Water and Sewer Department and Department of Planning and Zoning.
Data provided by the Office of Strategic Business Management.

EXHIBIT B-2
CIE TABLE 12 (PARTIAL)
WATER FACILITIES

April 2007

Project Name and Location	Purpose* / Year of Completion	Prior Years	Expenditures / Revenues 2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Six Year Totals	Future Years	Project Totals	Funding Source
		(In Millions of Dollars)										
South Miami Heights W.T.P. & Wellfield	3/2013	15.65	13.14	19.12	26.58	12.92	12.48	0.00	84.24	0.00	99.89	520,1007,
11800 SW 208 St.		50.63	3.91	2.59	33.01	0.00	9.75	0.00	49.26	0.00	99.89	1170,1171,
Alternative Water Supply												
A. ASR Ultraviolet (UV) Disinfection System	3/2009	0.93	6.83	0.00	0.00	0.00	0.00	0.00	6.83	0.00	7.76	520,969
for ASR Sys. @ W&SW Wellfield (7.2 mgd ASR&bl)		7.47	7.48	0.28	0.00	0.00	0.00	0.00	7.76	0.28	15.51	7.76
B. Southwest Wellfield Monitoring	1/2006	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	520,912
Southwest		1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	
C. Floridan Aquifer Blending at	3/2009	0.41	0.82	2.57	6.60	0.00	0.00	0.00	9.99	0.00	10.40	520,959,
Hialeah/Preston (4.7 mgd)		3.80	0.00	0.00	6.60	0.00	0.00	0.00	6.60	0.00	10.40	998,1178
D. Hialeah Floridan Aquifer R.O. W.T.P.	1/2011	0.45	10.49	18.29	34.44	26.67	2.66	0.00	92.55	0.00	93.00	520,
Phase 1 (10 mgd)		37.70	4.94	3.90	41.63	2.17	2.66	0.00	55.30	0.00	93.00	1135
E. Hialeah Floridan Aquifer R.O. W.T.P.	2/2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	25.00	998
Phase 2 (5 mgd)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	25.00	
F. Hialeah Floridan Aquifer R.O. W.T.P.	2/2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	9.70	998
Phase 3 (2.5 mgd)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	9.70	
TOTALS		18.66	31.28	39.98	67.62	39.59	15.14	0.00	193.61	34.70	246.97	
		100.82	16.33	6.77	81.24	2.17	12.41	0.00	118.92	34.98	254.72	

* 1=Existing Deficiency; 2=Future Growth; 3=Combined
Projects "strikethrough" are proposed deletions, April 2007 CDMP Amendment Cycle

Source: Miami-Dade Water and Sewer Department and Department of Planning and Zoning.
Data provided by the Office of Strategic Business Management.

APPENDIX C

Water Supply for Municipalities

Appendix C

Water Supply for Municipalities

Service Area:

Miami-DadeCounty's 20-year Water Supply Facilities Work Plan (Work Plan) identifies traditional alternative water supply projects, conservation and reuse programs, and capital improvement projects necessary to meet the projected water demands within the Department's service area. The MDWASD's service area covers the entire Miami-Dade County within the Urban Development Boundary (UDB), excluding portions of North Miami and North Miami Beach, Homestead and Florida City. In 2008, North Miami Beach's new WTP will be in operation and the City will no longer be supplied by MDWASD. The areas within the Urban Expansion are included in the planning horizon after 2015. Future water supplies provided by MDWASD or other city utilities within the County's jurisdiction, including unincorporated areas are included in the County's 20-year Work Plan .

Population and Water Demand:

Exhibits C-1 through C-3 include municipal and service area population projections for all municipalities within Miami-Dade County through 2030. Population data was obtained from the Miami-Dade County Department of Planning and Zoning (P&Z) and was derived from Transportation Analysis Zone (TAZ) data. Exhibit C-4 contains the population projections for other utilities supplying water to areas within unincorporated Miami-Dade County. Also included in Exhibits C-1 through C-3 are the water demand projections using a system wide per capita of 155 as included in the Department's 20-year water use permit.

Water Conservation:

Currently, MDWASD is implementing all Best Management Practices (BMPs) included in the 20-year Water Use Efficiency Plan, which was approved by the South Florida Water Management District in May 2007. The Plan identifies a total of approximately 20 mgd of water saved through the year 2030. In addition, all of MDWASD's wholesale customers are required to submit a Water Conservation Plan to the Department's Water Use Efficiency Section as mandated by County Ordinance 06-177, Section 32-83.1 of the Miami-Dade County Code. The Plan will identify BMPs based on population characteristics and type of service for each municipal service area. The implementation of all BMPs in MDWASD's service area will result in a reduction in per capita usage as identified in Section 4, Table 4-4 of the County's Work Plan. Furthermore, Miami-Dade Water and Sewer Department will establish per capita consumption for all municipalities including those in MDWASD's retail customer service area. Based on this data, the Department will work with the municipalities to address those with higher than average per capitas and will target programs for those areas.

In addition, Miami-Dade County has developed recommendations for new development that would achieve higher water use savings than currently required by code. The recommendations were developed by an Advisory Committee and were presented to the Board of County Commissioners (BCC) on June 5, 2007. These Water Conservation recommendations were adopted by Ordinance on February 5, 2008. The Ordinance requires that a manual for implementation of the recommendations be developed by July 2008. These Water efficiency recommendations represent an additional 30% to the water savings identified in the 20-year Water Use Efficiency Plan. All applicants will be required to comply with these future code requirements. The list of recommendations submitted to the BCC and the Ordinance relating to water use efficiency standard are presented in Appendix D and are also posted in the Miami-Dade Water Conservation Portal. The implementation of all BMPs identified in the 20-year Water Use Efficiency Plan will result in an adjusted system wide per capita of 147.82 by year 2027.

Reuse:

MDWASD has committed to implement a total of 170 mgd of reuse as noted in the County's 20-year water use permit. A list of the reuse projects and deadlines as presented in Exhibit 30 of the County's 20-year water use permit and are included in Appendix F. Reuse projects to recharge the aquifer with highly treated reclaimed water will be in place before additional withdrawals over the base condition water use are made from the Alexander Orr and South Dade subarea wellfields. These wellfields supply water to several municipalities included in MDWASD's retail and wholesale customer service area. In addition, reuse irrigation projects are anticipated for the North and Central District Wastewater Treatment Plants. These projects will be implemented in the City of North Miami and North Miami Beach, and are currently under construction for Key Biscayne.

Exhibit C-1
Water Supply Service Area
Retail Customers by Municipality

Municipality	Municipal Population Projections						Service Area Population						Water Supply by MDWASD - Projected AADF Finished Water (MGD) - 155 gpcd[6]					
	Year						Year						Year					
	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030
Aventura[1]	34,927	35,414	36,224	36,595	36,965	37,335	23,030	23,495	24,270	24,622	24,974	25,325	3.57	3.64	3.76	3.82	3.87	3.93
Coral Gables	50,817	51,360	52,265	53,007	53,748	54,489	same as municipal						7.88	7.96	8.10	8.22	8.33	8.45
Cutler Bay	41,053	44,730	50,859	53,240	55,621	58,002	same as municipal						6.36	6.93	7.88	8.25	8.62	8.99
Doral	33,258	37,689	45,074	47,679	50,284	52,889	same as municipal						5.15	5.84	6.99	7.39	7.79	8.20
El Portal	1,854	1,850	1,844	1,831	1,818	1,805	same as municipal						0.29	0.29	0.29	0.28	0.28	0.28
Key Biscayne	12,606	12,837	13,220	13,538	13,856	14,174	same as municipal						1.95	1.99	2.05	2.10	2.15	2.20
Miami	404,266	418,508	442,246	468,507	494,769	521,030	same as municipal						62.66	64.87	68.55	72.62	76.69	80.76
Miami Gardens[2]	100,541	106,969	112,028	116,536	121,044	125,552	62,828	61,568	64,497	67,417	70,338	73,259	9.74	9.54	10.00	10.45	10.90	11.36
Miami Lakes	24,868	25,673	27,015	28,454	29,894	31,333	same as municipal						3.85	3.98	4.19	4.41	4.63	4.86
Miami Shores	12,159	12,187	12,233	12,278	12,324	12,370	same as municipal						1.88	1.89	1.90	1.90	1.91	1.92
Palmetto Bay	26,900	27,878	29,507	31,260	33,012	34,764	same as municipal						4.17	4.32	4.57	4.85	5.12	5.39
Pinecrest	19,484	19,765	20,233	20,596	20,960	21,323	same as municipal						3.02	3.06	3.14	3.19	3.25	3.31
South Miami	12,417	12,739	13,274	13,808	14,342	14,875	same as municipal						1.92	1.97	2.06	2.14	2.22	2.31
Sweetwater	13,645	14,168	15,039	15,921	16,803	17,685	same as municipal						2.11	2.20	2.33	2.47	2.60	2.74
Total	788,797	821,765	871,060	913,249	955,438	997,626	739,186	764,446	811,575	852,158	892,741	933,323	114.57	118.49	125.79	132.08	138.37	144.67

Notes:

1. A portion of Aventura's municipal population served by North Miami Beach (NMB).

2. Miami Garden's Municipal Boundary is within Miami-Dade Water and Sewer Department's(MDWASD), NMB and City of Opa Locka's Service Area. The water supply for a portion of Miami Garden's municipal population within NMB's Service Area is provided by MDWASD. In 2008, water for the area within NMB supplied by MDWASD, will be provided by the City of NMB.

3. Population projections provided by Miami-Dade Department of Planning and Zoning Transportion Analysis Zone (TAZ) 2004 population data.

4. 2008 -MDWASD no longer supplies North Miami Beach service area.

5. Population in Urban Expansion Areas included in projections after 2015.

6. Projections based on systemwide average per capita of 155 gpcd.

7. gpcd = gallons per capita per day
8. AADF = annual average daily flow
9. MGD = million gallons per day

Exhibit C-2

Water Supply Service Area

Wholesale Customers

Municipality	Municipal Population Projection						Service Area Population						Water Supply by MDWASD - Projected AADF Finished Water (mgd) - 155 gpcd[5]					
	Year						Year						Year					
	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030
Bal Harbour	4,091	4,205	4,397	4,589	4,781	4,973	same as municipal						0.63	0.65	0.68	0.71	0.74	0.77
Bay Harbour Islands	6,200	6,379	6,678	6,965	7,253	7,540	same as municipal						0.96	0.99	1.04	1.08	1.12	1.17
Hialeah	226,167	232,724	243,654	251,541	259,428	267,314	228,397	234,992	245,986	253,903	261,820	269,736	35.40	36.42	38.13	39.35	40.58	41.81
Hialeah Gardens	23,340	24,751	27,104	29,459	31,813	34,168	same as municipal						3.62	3.84	4.20	4.57	4.93	5.30
Indian Creek Village	49	50	52	54	56	58	same as municipal						0.01	0.01	0.01	0.01	0.01	0.01
Medley	612	639	684	741	799	856	same as municipal						0.09	0.10	0.11	0.11	0.12	0.13
Miami Beach	106,286	110,677	117,997	124,489	130,980	137,472	same as municipal						16.47	17.15	18.29	19.30	20.30	21.31
Miami Springs[1]	15,603	15,813	16,162	16,434	16,705	16,977	same as municipal						2.42	2.45	2.51	2.55	2.59	2.63
North Bay Village	8,113	8,405	8,890	9,379	9,867	10,356	same as municipal						1.26	1.30	1.38	1.45	1.53	1.61
North Miami[2]	69,368	72,482	77,891	80,772	83,652	86,532	97,504	101,012	113,385	110,496	115,034	118,453	10.76	11.24	13.00	12.43	13.00	13.41
North Miami Beach[3]	42,361	53,173	53,940	55,131	56,322	57,513	164,982	n/a					7.60	n/a				
Opa Locka[4]	15,941	16,260	16,792	17,264	17,736	18,208	18,447	18,803	19,396	19,922	20,448	20,975	2.86	2.91	3.01	3.09	3.17	3.25
Surfside	5,159	5,280	5,483	5,680	5,878	6,076	same as municipal						0.80	0.82	0.85	0.88	0.91	0.94
Virginia Gardens	2,157	2,205	2,285	2,354	2,424	2,494	same as municipal						0.33	0.34	0.35	0.36	0.38	0.39
West Miami	5,878	5,905	5,951	5,973	5,995	6,017	same as municipal						0.91	0.92	0.92	0.93	0.93	0.93
Total	531,324	558,950	587,960	610,825	633,689	656,554	686,817	525,727	560,731	576,430	599,556	621,564	84.14	79.14	84.47	86.82	90.32	93.65

Notes:

1. On August 27, 2007, Miami Springs passed and adopted a resolution No. 2007-336 Authorizing the Transfer of the City's Water and Sewer Public Utilities System to MDWASD.
2. Projected AADF for North Miami (NM) is based on population within NMs service area (larger than municipal boundary) supplied by MDWASD.
3. 2008 -MDWASD no longer supplies North Miami Beach service area.
4. Projected AADF for Opa Locka is based on the service area population
5. Projections based on systemwide average per capita of 155 gpcd.
6. gpcd = gallons per capita per day
7. AADF = annual average daily flow
8. MGD = million gallons per day

Exhibit C-3
Water Supply Service Area
Other Customers within MDWASD's service area

Municipality	Municipal Population Projection						Service Area Population						Population served by WASD						Water Supply by MDWASD - Projected AADF Finished Water (mgd) - 155 gpcd[7]					
	Year						Year						Year						F					
	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030
Biscayne Park[1]	3,443	3,453	3,471	3,476	3,480	3,484	n/a						Included in City of North Miami						Included in City of North Miami					
Golden Beach[2]	923	937	960	1,107	1,254	1,401	n/a						n/a						n/a					
Sunny Isles[3]	17,466	26,442	29,747	32,411	35,076	37,740	n/a						Included in City of NMB	n/a					Included in City of NMB	n/a				
Florida City[4]	13,105	15,371	19,148	22,466	25,783	29,101	13,105	15,371	19,148	22,466	25,783	29,101	1,498	2,005	2,851	3,284	3,718	4,151	0.23	0.31	0.44	0.51	0.58	0.64
Homestead[5]	54,653	62,475	76,921	86,166	97,985	107,494	52,796	60,155	72,419	80,953	89,486	98,020	2,354	3,002	5,492	6,346	7,200	8,054	0.36	0.47	0.85	0.98	1.12	1.25
Islandia[6]	1	0	0	0	1	1	n/a						n/a						n/a					
Total	89,591	108,679	130,247	145,626	163,578	179,221	65,901	75,526	91,567	103,418	115,270	127,121	3,852	5,008	8,343	9,630	10,918	12,205	0.60	0.78	1.29	1.49	1.69	1.89

Notes:

1. Municipality located within the City of North Miami's Service Area. The water supply for this area is provided by MDWASD. The water demand projections are included with the City of North Miami's service area supplied by MDWASD.

2. Municipality located within the City of North Miami Beach's Service Area. The water supply for this area is provided by the City of NMB.

3. Municipality located within the City of North Miami Beach's Service Area. Water supply for a portion within the Municipal Boundary is provided by NMB and the rest is provided by MDWASD. Note that in 2008, the water supply for Sunny Isles will be provided entirely by the City of NMB.

4. Population served by MDWASD is within Florida City's Municipal Boundary and within MDWASD's service area.

5. Population served by MDWASD is within Homestead's Municipal Boundary and within MDWASD's service area.

6. No water service.
7. Projections based on systemwide average per capita of 155 gpcd.
8. gpcd = gallons per capita per day
9. AADF = annual average daily flow
10. MGD = million gallons per day

Exhibit C-4

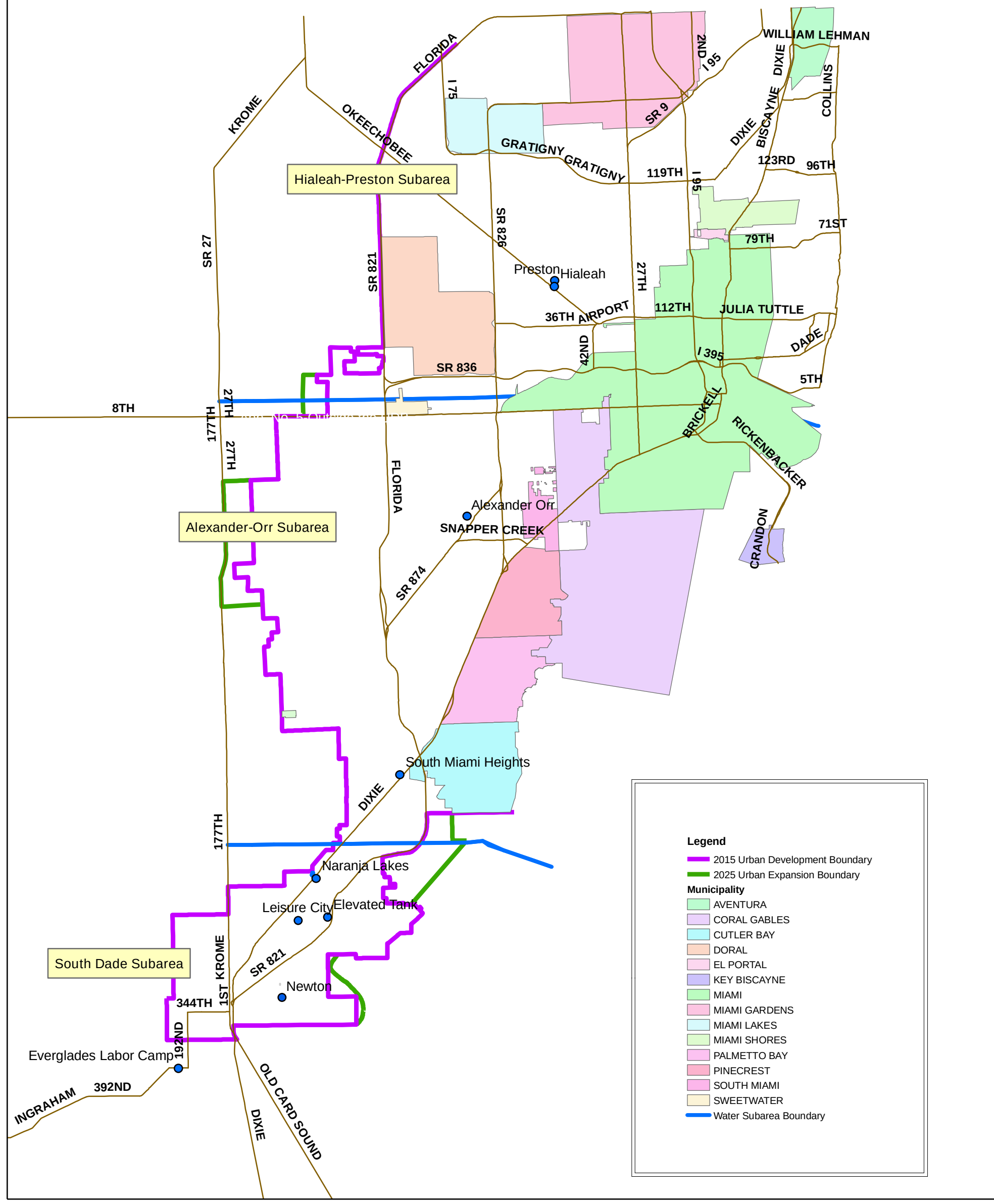
Other Utilities

Utility	Projected Unincorporated Population Served						Projected Water Demand (MGD)[1]					
	Year						Year					
	2007	2010	2015	2020	2025	2030	2007	2010	2015	2020	2025	2030
North Miami[1]	12158	12454	12948	13399	13849	14300	1.95	1.99	2.07	2.14	2.22	2.29
North Miami Beach[2]	25567	29728	30419	30948	31478	32007	3.68	4.28	4.38	4.46	4.53	4.61
Homestead[3]	2611	2844	3232	3660	4088	4516	0.46	0.50	0.57	0.64	0.72	0.79
Florida City[5]	See note No. 5						See note No. 5					
Total served by others	40,336	45,026	46,599	48,007	49,415	50,823	6.08	6.77	7.02	7.24	7.46	7.69

Notes:

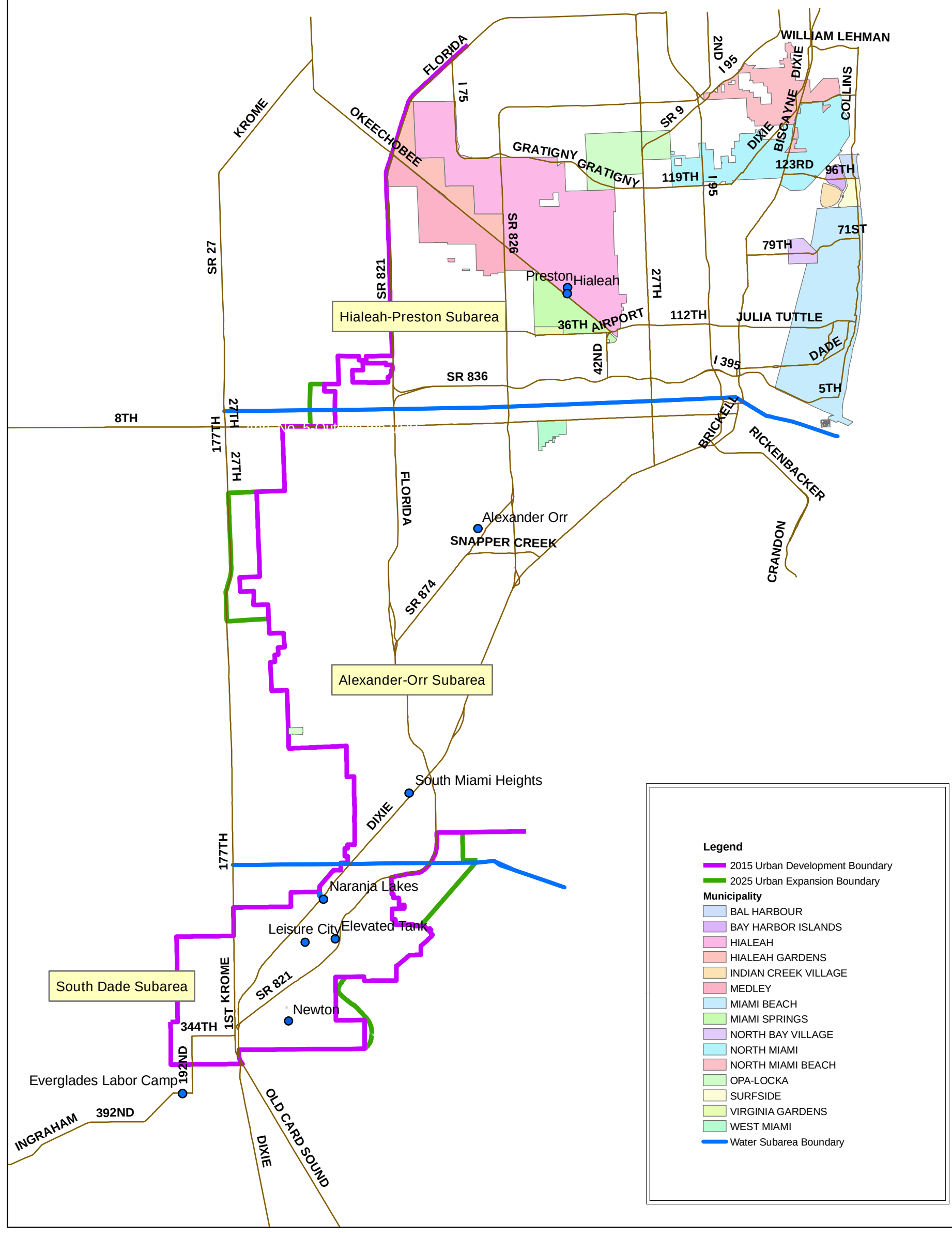
1. Projected water demands based on per capita provided by the Utility
   North Miami = 160 gpcd
   North Miami Beach = 144 gpcd
   Homestead = 175 gpcd
2. gpcd = gallons per capita per day
3. AADF = annual average daily flow
4. MGD = million gallons per day
5. Total area of unincorporated Miami-Dade County to be served by Florida City consist of commerical development with projected water demand of 72,100 gpd.

Exhibit C-5
Retail Customers by Municipality



April 2008

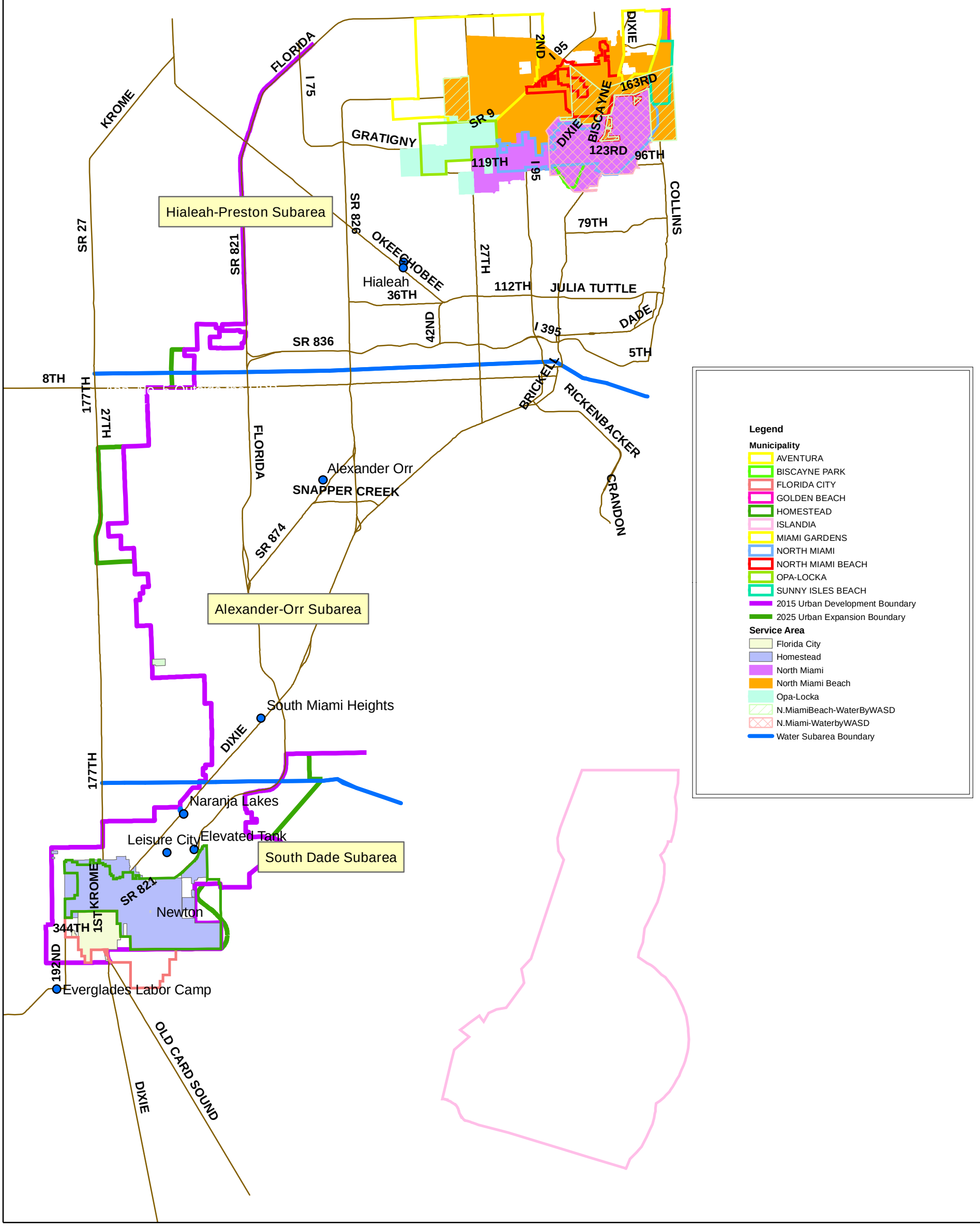
Exhibit C-6
Wholesale Customers by Municipality



April 2008

0 2.5 5 Miles

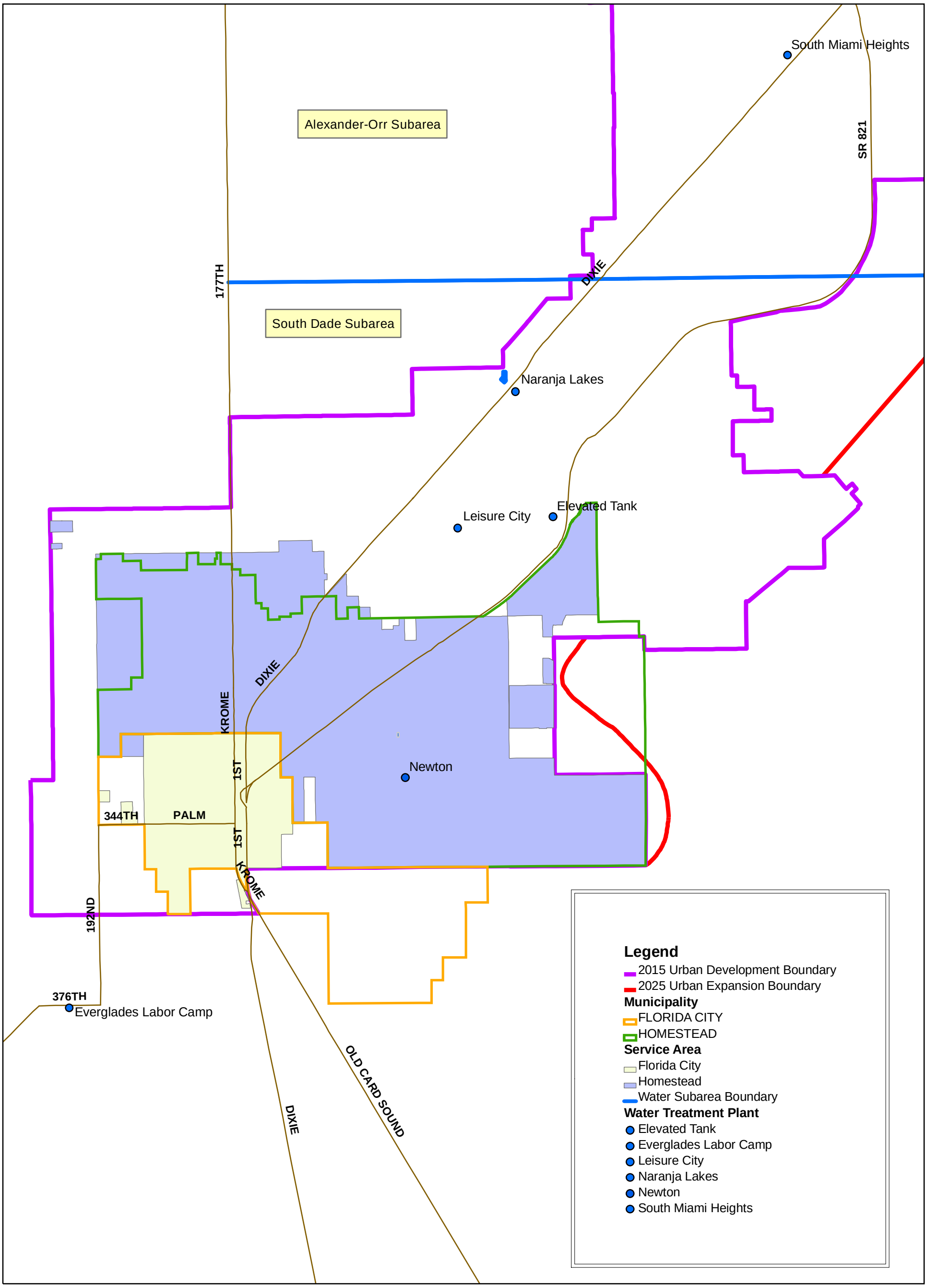
Exhibit C-7
Other Customers -Biscayne Park, Golden Beach, Sunny Isles, Fl City, Homestead, Islandia



April 2008

0 4 8 Miles

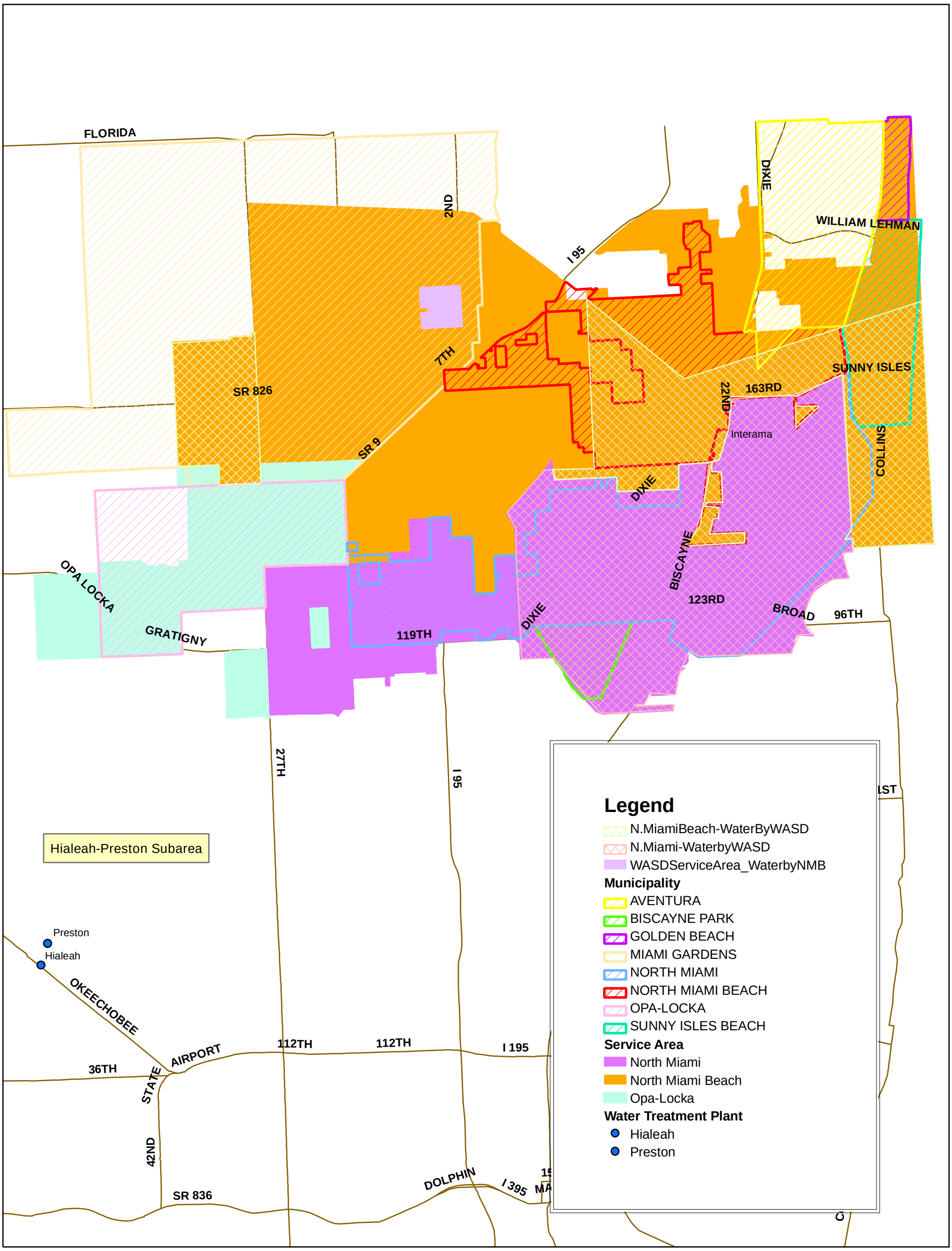
Exhibit C-8
Homestead and Florida City
Municipal and Service Area Boundary



April 2008

Exhibit C-9
North Miami Beach, North Miami, Aventura, Miami Gardens, Biscayne Park, Golden Beach, Opa-Locka, Sunny Isles Beach
Municipal and Service Area Boundary

MIAMI-DADE COUNTY



April 2008

APPENDIX D

Water Use Efficiency

Recommendation

Memorandum

MIAMI-DADE COUNTY

Date: June 5, 2007

Agenda Item No. 12(B)3

To: Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners

From: George M. Burgess County Manager

Subject: Set of standards and directions for the development community that addresses water conservation issues and alternative water supplies

At the request of the Government Operations and Environment Committee Chair, an Advisory Committee was established with the goal of developing countywide guidelines that address water conservation issues and alternative water supplies for the development community, specifically, for new development. The Advisory Committee is comprised of several departments including the Department of Environmental Resources Management, the General Services Administration, the Building Department, Park and Recreation, Planning and Zoning, the Building Code Compliance Office, the Fire Department, the Public Works Department and the Water and Sewer Department. In addition to County staff, the Advisory Committee includes representation from stakeholder groups such as the American Society of Landscape Architects, the South Florida Builders Association, the Sierra Club, the Latin Builders Association, the Tropical Audubon, the Association of Cuban American Engineers, the Florida Regional Planning Council, the Farm Bureau, the South Florida Water Management District, the Audubon Society and the Greater Miami Chamber of Commerce.

The Advisory Committee held five meetings between January 26, 2007 and April 20, 2007. These meetings were advertised in the County's meeting calendar and were open to public comment. The Advisory Committee, as part of its review process, evaluated the documents including "Green Building" practices, the Florida Friendly Landscape Guidelines and the Florida Yards and Neighborhoods criteria.

The Advisory Committee has summarized its findings as shown on Attachment A which consists of recommendations for 1) Residential New Construction, 2) Commercial Development, 3) Alternative Water Supplies, and 4) Public Information/Education/Legislation recommendations. In the first category, Residential New Construction, the recommendations are divided into two parts, indoor water use specifications such as high efficiency toilets, faucets, clothes washers, and outdoor water use specifications which include the implementation of the Florida Friendly Landscape Guidelines, gutter downspouts, roof runoffs and rain harvesting for recharge purposes as well as drip irrigation or micro-sprinklers. Examples of recommendations made in the second category, Commercial Development, take into account the use of automatic shut-offs, solenoids, controllers, flow restrictors, plumbing fixtures for toilets and faucets, designs for toilet and fixtures that reduce the volume of water wasted and the installation of overflow sensors on equipment cooling towers. The third category, Alternative Water Supplies, bases its recommendations on the eventuality that water service is not available in a particular area, as such the construction of a 1 million gallons per

day reverse osmosis plant is proposed as an option or the construction of an alternative water supply water treatment plant and distribution system. If water service is available and the area is considered to be within a reuse zone, developers should consider installing "purple pipes". The fourth category, Public Information/Education/Legislation provides recommendations on the dissemination of public information and education and legislation regarding water conservation.

Assistant County Manager

Attachment A

Water Conservation Issues & Alternative Water Supplies for the Development Community

1. Recommendations for Residential New Construction

Residential Indoor Water Use Specifications

1. Only High Efficiency Toilets (HET) which shall be defined as 1.2 gallons per flush, that meet the standard specifications of the Unified North America Requirements (UNAR) and display the Environmental Protection Agency's WaterSense label shall be installed. http://cuwcc.org/Uploads/product/HET_06-07-19.pdf

2. There shall be one control valve, or one set of hot and cold valves required for each High Efficiency Showerhead which shall be defined to provide no more than 1.5 gallons per minute (gpm).

3. High Efficiency faucets which shall be defined to provide 1.0 gpm.

4. Residential units equipped with clothes washer connections shall have installed High Efficiency (HE) Clothes Washer(s) with a water factor of 6 or less (Tier 3b) as identified by the Consortium for Energy Efficiency at http://www.ceel.org/reid/seha/rwsh.rwsh-prod.pdf, Energy Star (and WaterSense certified when available).

5. Dishwashers shall be rated with use of 6.5 gallons/cycle or less, Energy Star and WaterSense certified.

6. Multi-unit residential – apply items 1-6 and:
Require sub-metering for all multi-unit residential development which will include: separate meter and monthly records kept of all major water-using functions such as cooling towers and individual buildings.

Residential Outdoor Water Use Specifications:

1. Florida Friendly Landscapes guidelines and principles shall be applied to all landscape installations in compliance with Florida Yards & Neighborhoods criteria.

2. Gutter downspouts, roof runoff, and rain harvesting shall be used to encourage increased recharge and other non-potable uses on the property, thru the use of elements and features such as rain barrels and directing runoff to landscaped areas.

3. Require and provide "Florida Friendly Landscapes" within all public rights-of-way.

4. Use drip irrigation or micro-sprinklers when appropriate.

5. Use of porous surface (bricks, gravel, turf block, mulch, pervious concrete, etc) whenever possible on walkways, driveways, and patios.

6. Florida Yards and Neighborhoods Program information on Florida Friendly Landscapes shall be included in the sales literature provided to homebuyers.

7. The landscape plan and plant palette shall be developed based on site characteristics (soil, drainage, structural limitations (utilities, overhangs, lights, etc.) and shall include:

    a. Per the County's Landscaping Ordinance, existing native trees, palms and associated native understory, shall be retained and preserved along with identified undergrowth and be a focal point of the landscape.

    b. 80% of plant materials to be utilized on site shall be from the Florida-Friendly Plant List and shall have a moderate to high drought tolerance.

    c. All plants will be grouped in the landscape plan by similar water and maintenance requirements and shall be spaced to allow for maturation.

    d. Turf areas will be evenly shaped for ease of maintenance and will be no less than 4 feet wide and will not be placed on any berms.

e. No more than 30% of the total area required for landscaping may be turf or grass.
f. Soils analysis should be completed and used in the plant selection process where applicable and a copy should be provided to the home buyer.

g. Limit use of rock mulch due to heat loading: rock mulch shall not exceed 5% of total landscaped area.

h. Use of environmentally friendly organic mulches that are applied 3 inches deep around plants and trees with two inches clear around each plant.

i. Homes with landscapes adjoining surface water bodies should provide for maintenance free or low maintenance zone up to 10 feet within and to the water body. This area can be enhanced with natural wetland vegetation, in any case, the area should be planted to eliminate erosion potential.

The Irrigation Plan for Common Areas: Shall be developed to meet the water use requirements of the landscape plan.

a. All landscape beds shall be irrigated by a low volume irrigation system, preferably utilizing bubbler and low trajectory spray heads.

b. All landscape plant beds shall be irrigated with low-volume irrigation appropriate for plant type.

c. Turf shall be irrigated by zones separate from zones for irrigation of shrubs and ground cover plantings.

d. Swing joints or flex pipe shall be used when installing sprinklers to help prevent broken pipes and sprinklers.

e. Irrigation systems shall be designed for minimum overlap.

f. Soil moisture sensors or other water saving technologies shall be installed. Devices shall be installed and function according to manufacturers' recommendations.

2. Commercial Development Recommendations

1. Use waterless technologies where available.

2. Maximize use of on-site sources of water.

3. Choose equipment that is water and energy efficient.

4. Install automatic shut offs, solenoids and controllers to turn water off when not in use.

5. Install flow restrictors when possible.

6. Eliminate once-through cooling.

Plumbing Fixtures and Practices

Toilets and Urinals

a. Ensure all water closets use no more than 1.3 gallons per flush, high efficiency toilets (HETs) can achieve 20 to 25% water use savings.
b. Use toilets included the Uniform North American Requirements (UNAR) certified list.
c. Consider waterless urinals.

Faucets

a. Install hand washing faucets or aerators that use no more than 1.0 gallons per minute.
b. Install sensor controls on hand washing faucets in public restrooms.
c. Install showerheads that use no more than 1.5 gallons per minute.

Plumbing Design

a. Use tankless water heating or other devices that reduce water wasted waiting for the water to get hot where possible.

b. Post prominent signs in all restrooms and other water using areas listing telephone numbers to promptly report leaks and other plumbing problems.

Cooling Towers

a. Eliminate all once-through cooling.
b. On cooling towers, install both makeup and blowdown meters.
c. Equip cooling towers with overflow sensors on the overflow pipes to alert the operator to problems that can waste thousands of gallons daily.
d. All cooling towers should achieve at least (5.0) cycles of concentration.

Boilers

a. Equip boilers with makeup meters and conductivity controllers for blowdown control.
b. Reuse or return steam condensate to the boiler wherever possible.
c. Install makeup meters on all recirculating closed water loops used for heating and cooling systems so that leaks in the recirculating systems can be easily detected.

Equipment Selection

a. Eliminate all water cooled equipment using once-through cooling.
b. All water-cooled equipment should be eliminated unless it uses chilled water or cooling tower loop. This includes ice makers, refrigeration equipment, and ice cream machines.

Dishwashing Equipment

a. Dishwashers should use less than 1.2 gallons per rack for fill-and-dump machines and less than 0.9 gallons per rack for all other types of machines. For under the counter machines, water use should not exceed 1.0 gallons per rack for high-temperature machines and 1.7 gallons per rack for low-temperature machines.
b. Pre-rinse spray valves that use 1.6 gallons per minute and have a shot off valve.

Food Preparation

a. Use connectionless steamers. They do not need either a water supply or a wastewater drain.
b. Select ice machines that use no more than 20 gallons per hundred pounds of ice made.

Irrigation controllers

a. Soil moisture sensors or other water saving technologies shall be installed. Devices shall be installed and function according to manufacturers' recommendations.

Irrigation equipment and design

a. Use drip irrigation or microsprinklers for planning beds (once plants are established, irrigation is not usually needed).
b. Create hydrozoned areas, with beds and turf watered separately.
c. Design systems to maintain manufacturer-recommended pressure to prevent misting and unnecessary pipe wear.

Soil

a. Do not add soil on top of tree roots.

Mulch

a. Use organic, preferably locally derived mulch, such as pine bark, dyed landscape mulch, or enviromulch. Avoid cypress mulch which encourages deforestation of natural areas.
b. Limit use of rock mulch due to increased heat and reflection.
c. Mulch should be 3-4 inches deep over the root zone and several inches away from the base of plants.

Plant Selection

a. Use low-maintenance (drought tolerant) species. The Florida Extension Service's Florida Yards and Neighborhoods Program list these species in a publication for South Florida. http://miami-dade.ifas.ufl.edu/programs/fyn/publications/dtpl.htm.
b. Plant selection should be based on the plant's adaptability to the existing conditions present at the landscaped area and native plant communities. Select plants that are drought and freeze tolerant.
c. For areas with limited soil space such as parking lots, use naturally small stature trees or use palms. Information for small stature trees for restricted spaces, such as narrow swales and limited space residential lots where canopy and roots can become problem can be found at http://miami-dade.ufledu/programs/urbanhort/publications/PDF/SamII%20Trees%20for%20Miami-Dade.pdf.
d. Florida-friendly landscape principles should be applied. These principles conserve water and protect the environment and include efficient irrigation, practical use of turf, appropriate use of mulches, and proper maintenance. (Ref. 373.185 F.S.).

3. Alternative Water Supply Recommendations

Infrastructure Requirements

1. In the event that the MDWASD cannot provide services, the construction of Reverse Osmosis (RO) plants for

developments equal or larger than 1 MGD water allocation.

   a. Requirement of installation of a potable water treatment plant and distribution system. This requirement should exempt the developer from water connection charges.

   b. RO plants should be owned and operated by MDWASD – Chapter 24 language needs to be amended.

2. In the event that the MDWASD cannot provide services, the construction of satellite wastewater reclamation facilities producing irrigation quality reclaimed water (62-610, Part III), larger than 100,000 gallons per day.

   a. Modify language in Chapter 24 to allow for the construction of wastewater reclamation facilities plants even if the project is within feasible distance of, or actually connected to sanitary sewers. The quality of the treated effluent should be reviewed to possibly allow for a lower level of treatment for irrigation and other uses.

   b. Wastewater reclamation facilities should be owned and operated by MDWASD – Chapter 24 language needs to be amended.

3. For developments where water supply is available, all developers should consider the installation of "purple pipes" if the development is within a reuse zone and feasible distance from the "Mandatory Reuse Area" (MRA).

4. Public Information/Education/Legislation Recommendations

1. Expand "Factual Data" concept to encourage water conservation.
Revise Section 24-43.1(5) includes provisions for use of factual data in lieu of tabulated rates. Section can be expanded to provide credits for the use of water saving strategies (e.g., reuse of gray water for toilet flushing, dual-flush toilets, etc.).
NOTE: This will require similar adoption in MDWASD rules.

2. Add "Non-Revenue Water" ordinance to Chapter 24, Miami-Dade County Environmental Protection Ordinance. Implement an Ordinance for "unaccounted-for" water (a.k.a. "non-revenue" water) that requires compliance with an established standard. The ordinance shall be structured to address "real" and "apparent" water losses in accordance with the principles established by the International Water Association (IWA) and IWA book 'Losses in Water Distribution Networks - A Practitioner's Guide to Assessment, Monitoring and Control.' The ordinance can be incorporated into Chapter 24, Miami-Dade County Environmental Protection Code and managed by the Department of Environmental Resources Management (DERM) similar to the Volume Sewer Customer Ordinance.

3. Encourage the review and adoption of County ordinances for both:
   - landscape protection, preservation and management, and for
   - water conservation by the County and its municipalities

4. A Hot Water Recirculation System or Point-of-Use Hot Water heater shall supply water to hot water fixtures further than ten linear feet of pipe away from the hot water heater. All hot water pipes shall be insulated.

5. Promote use of grey water for toilets and other uses discharging to public sanitary sewers.

6. All withdrawal from the aquifer should be metered including residential irrigation wells.

7. Landscape irrigation controller, soil moisture sensor, and irrigation system run time information. This sleeve shall be connected to the irrigation controller for use by the homeowner.

MEMORANDUM

Agenda Item No. 7(A)

TO:	Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners	**DATE:**	February 5, 2008
FROM:	R. A. Cuevas, Jr. County Attorney	**SUBJECT:**	Ordinance relating to water use efficiency standards

Ordinance 08-14

The accompanying ordinance was prepared and placed on the agenda at the request of Commissioner Natacha Seijas.

R. A. Cuevas, Jr.
County Attorney

RAC/bw

Memorandum

Date: February 5, 2008

To: Honorable Chairman Bruno A. Barreiro
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Ordinance relating to water use efficiency standards

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The ordinance relating to water use efficiency standards will not have a fiscal impact to Miami-Dade County. The development of the Water Use Efficiency Manual, reviews of Development of Regional Impact (DRI) projects and the public information and outreach activities required in the ordinance will be performed using existing resources.

There will not be an impact to the public except for High Efficiency Appliances, which currently have a higher initial cost. In addition, there will be a fiscal impact to a developer if a DRI project is required to install an alternative water supply, however; the impact will depend on the size and scope of the project.

Susanne M. Torriente
Assistant County Manager

fs080808

MEMORANDUM

(Revised)

TO: Honorable Chairman Bruno A. Barreiro and Members, Board of County Commissioners

DATE: February 5, 2008

FROM: R. A. Cuevas, Jr. County Attorney

SUBJECT: Agenda Item No. 7(A)

Please note any items checked.

_____	"4-Day Rule" ("3-Day Rule" for committees) applicable if raised
_____	6 weeks required between first reading and public hearing
_____	4 weeks notification to municipal officials required prior to public hearing
_____	Decreases revenues or increases expenditures without balancing budget
_____	Budget required
_____	Statement of fiscal impact required
_____	Bid waiver requiring County Manager's written recommendation
_____	Ordinance creating a new board requires detailed County Manager's report for public hearing
_____	Housekeeping item (no policy decision required)
_____	No committee review

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 7(A)
2-5-08

ORDINANCE NO. 08-14

ORDINANCE RELATING TO WATER USE EFFICIENCY STANDARDS; CREATING SECTION 8-31 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; ADOPTING LOCAL TECHNICAL AMENDMENTS TO FLORIDA BUILDING CODE FOR NEW RESIDENTIAL AND COMMERCIAL DEVELOPMENTS; REVISING AND PROVIDING FOR MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES, FIXTURE FITTINGS AND APPLIANCES; CREATING SECTIONS 32-84, 32-85 AND 32-86 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; PROVIDING FOR PUBLICATION OF WATER USE EFFICIENCY STANDARDS MANUAL FOR NEW RESIDENTIAL AND COMMERCIAL DEVELOPMENTS; PROVIDING FOR EVALUATION OF ALTERNATIVE WATER SUPPLY PROJECTS FOR NEW DEVELOPMENTS OF REGIONAL IMPACT; PROVIDING FOR WATER USE EFFICIENCY AND CONSERVATION EDUCATION AND OUTREACH; AMENDING SECTION 8A-381 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA TO REQUIRE SUBMETERS IN MULTI-FAMILY RESIDENTIAL DEVELOPMENTS; PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

WHEREAS, Miami-Dade County's main source of drinking water is the Biscayne Aquifer which also serves two national parks, the Everglades and Biscayne National Park, agricultural interests, industrial and other users; and

WHEREAS, the Miami-Dade Water and Sewer Department ("Department") supplies potable water to over 400,000 retail customers and provides wholesale water service to 15 municipalities; and

WHEREAS, approximately 348 million gallons per day is withdrawn from the Biscayne Aquifer by the Department for public water supply; and

WHEREAS, Miami-Dade County is located within the Lower East Coast planning area of the South Florida Water Management District ("District"); and

WHEREAS, the District has adopted a new Regional Water Availability Rule that includes the Lower East Coast as a geographic area with restrictions on the utilization of specific water supply sources; and

WHEREAS, the Department has applied to the District for a 20-year Consumptive Use Permit; and

WHEREAS, the County is required to develop alternative water sources to meet increased demands over the next 20 years; and

WHEREAS, the County is making significant financial investments in capital improvement projects to provide adequate water supply for projected water demands by the use of alternative water supplies such as reclaimed water and brackish water from the Floridan Aquifer; and

WHEREAS, this Board finds that the efficient use and conservation of water reflect responsible use of a limited and precious resource that is essential to life, and will prevent and reduce wasteful, uneconomical, impractical, or unreasonable use of water resources; and

WHEREAS, in 2006, this Board approved the Miami-Dade County Water Use Efficiency Five-Year Plan ("Water Use Efficiency Plan") which is goal-based, accountable and measures water conservation efforts; and

WHEREAS, in 2007, the District approved the Water Use Efficiency Plan for 20 years to coincide with the County's proposed 20-year Consumptive Use Permit; and

WHEREAS, a stakeholder Advisory Committee appointed by the Director of the Water and Sewer Department provided this Board with recommendations to achieve maximum water use savings for all new development in Miami-Dade County; and

WHEREAS, in accordance with R-884-06, Miami-Dade County is a partner with the Environmental Protection Agency WaterSense Program for the promotion and implementation of water use saving technologies through its Water-Use Efficiency Plan; and

WHEREAS, Miami-Dade County is an active participant in the Florida Department of Environmental Protection Conserve Florida Water Program for the development of statewide guidelines for water use efficiency; and

WHEREAS, this Board finds that significant amounts of water can be saved through the installation of efficient water fixtures, appliances and other water saving measures and equipment; and

WHEREAS, such water use efficiency measures in new developments will help ensure that the County meets its water conservation goals provided in the Water Use Efficiency Plan for the duration of the County's 20-year water use permit; and

WHEREAS, the Florida Building Code, as amended by local technical amendments pursuant to Section 553.73(4)(b), Florida Statutes, is the uniform building code for Miami-Dade County; and

WHEREAS, based on the local conditions of water resources and the projected demand for water in Miami-Dade County, this Board finds that there is a local need to strengthen the requirements of the Florida Building Code for Miami-Dade County to meet the water conservation

goals provided in the Water Use Efficiency Plan and to ensure the availability of potable water to meet the County's projected demand for water and protect the public's health, safety and welfare; and

WHEREAS, the proposed local technical amendments to the Florida Building Code addresses the County's needs,

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA:

Section 1. Section 8-31 of the Code of Miami-Dade County is hereby created to read as follows: [1]

>>**Sec. 8-31. Local Technical Amendments to Florida Building Code**

(A) The County hereby adopts the following local technical amendments to Chapter 6 (Plumbing) of the Florida Building Code.

604.4 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table 604.4. Effective July 1, 2008, permit applications for new residential and commercial structures shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table 604.4. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications of U.S. Environmental Protection Agency (EPA) WaterSense Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.

Exceptions:

1. Blowout design water closets [3.5 gallons (13L) per flushing cycle].
2. Vegetable sprays.

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1 Words Stricken through and/or [[double bracketed]] shall be deleted. Words underscored and/or >>double arrowed<< constitute the amendment proposed. Remaining provisions are now in effect and remain unchanged.

3. Clinical sinks [4.5 gallons (17 L) per flushing cycle].
4. Service sinks.
5. Emergency showers.<<

TABLE 604.4

MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES>>,<< [[~~AND~~]] FIXTURE FITTINGS >>AND APPLIANCES<<

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE [[~~OR QUANTIFY~~]] [b]
Lavatory, private	[[~~2.2~~]] >>1.0<< gpm at 60 psi
Lavatory, public, (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head [a]	[[~~2.5~~]] >> 1.5<< gpm at 80 psi
Sink faucet	[[~~2.2~~]] >> 1.0<< gpm at 60 psi
Urinal	>>Waterless or 0.5<< gallon per flushing cycle
Water closet	[[~~1.6~~]] >>1.28<< gallons per flushing cycle
>>Dishwasher (residential)<<	>>6.5 gallons per cycle or less (Energy Star/Water Sense Certified) [c]<<
>>Dishwasher (commercial)<<	>>less than 1.2 gallons per rack for fill and dump machines and less than 0.9 gallons per rack for all other types of machines<<
>>Under the counter machines<<	>>1.0 gallon or less per rack for high-temperature machines and 1.7 gallons per rack for low-temperature machines<<
>>Washing machine<<	>>Water factor of 8 or lower (Energy Star/Water Sense Certified) [c]<<

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m
1 pound per square inch = 6.895 kPa.
a. A hand-held shower spray is a shower head.
b. Consumption tolerances shall be determined from referenced standards.
>>c. Water factor in gallons per cycle per cubic foot<<

>>(B) The County hereby adopts the following local technical amendments to Chapter 29 (Residential) of the Florida Building Code.

P2903.2 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table P2903.2a. Effective July 1, 2008, permit applications for new residential structures shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table P2903.2a. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications of U.S. Environmental Protection Agency (EPA) WaterSense Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.<<

TABLE P2903.2a
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES>>,<< [[AND]] FIXTURE FITTINGS AND >>APPLIANCES<<

PLUMBING FIXTURE OR FIXTURE FITTING	PLUMBING FIXTURE OR FIXTURE FITTING >>MAXIMUM FLOW RATE [b]<<
Lavatory faucet	[[2.2]] >>1.0<< gpm at 60 psi
Shower head [a]	[[2.5]]>>1.5<<gpm at 80 psi
Sink faucet	[[2.2]]>>1.0<< gpm at 60 psi
Water closet	[[1.6]]>>1.28<< gallons per flushing cycle
>>Dishwasher (residential)<<	>>6.5 gallons per cycle or less (Energy Star/Water Sense Certified) [c]<<
>>Washing Machine<<	>>Water factor of 8 or lower (Energy Star/Water Sense Certified) [c]<<

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m
1 pound per square inch = 6.895 kPa.
a. A handheld shower spray is a showerhead.
b. Consumption tolerances shall be determined from referenced standards.
>>c. Water factor in gallons per cycle per cubic foot<<

Section 2. Section 32-84 of the Code of Miami-Dade County, Florida is hereby created to read as follows:

>>**Sec. 32-84. Water use efficiency standards manual**

The Miami-Dade Water and Sewer Department ("MDWASD"), in consultation with the Planning Department and such other applicable county departments and agencies, shall publish a water use efficiency standards manual to achieve maximum water savings in new residential and commercial developments in the incorporated and unincorporated areas of Miami-Dade County. The manual shall be initially published on July 1, 2008 and shall be updated annually on July 1 following approval by the County Commission. Each applicant for water service to a new residential or commercial development in incorporated and unincorporated areas of Miami-Dade County shall include in its application every water use efficiency standard that will be incorporated into the new development. The County or applicable municipality shall review the application for compliance with the manual. In evaluating the application for compliance, the County or applicable municipality will consider the availability of products required to implement the water use efficiency standards. The developer's agreement for water service shall include the water use efficiency standards approved by the County.<<

Section 3. Section 32-85 of the Code of Miami-Dade County is hereby created to read as follows:

>>**Sec. 32-85. Alternative water supply for developments of regional impact.**

Applications for new Developments of Regional Impact ("DRI") with a projected water demand of one million gallons per day or greater shall be evaluated by MDWASD to determine the feasibility of an alternative water supply project. Such projects may include the installation of a reverse osmosis plant, wastewater reclamation facility and reuse distribution system.<<

Section 4. Section 32-86 of the Code of Miami-Dade County is hereby created to read as follows:

>>**Sec. 32-86. Water use efficiency and conservation education and outreach.**

The Miami-Dade County Water Use Efficiency Manager shall provide public information, education and outreach on all water use efficiency standards and water conservation programs.<<

Section 5. Section 8A-381 of the County of Miami-Dade County, Florida is hereby amended to read as follows:

Sec. 8A-381. Intent and application.

* * *

(c) The provisions of this article shall apply to multiple unit properties utilizing water services. >>Effective July 1, 2008, all permit applications for new multi-family residential developments shall be required to include a submeter for each individual dwelling unit.<<

Section 6. If any section, subsection, sentence, clause or provision of this ordinance is held invalid, the remainder of this ordinance shall not be affected by such invalidity.

Section 7. It is the intention of the Board of County Commissioners, and it is hereby ordained that the provisions of this ordinance, including any Sunset provision, shall become and be made a part of the Code of Miami-Dade County, Florida. The sections of this ordinance may be renumbered or relettered to accomplish such intention and the word "ordinance" may be changed to "section", "article" or other appropriate word.

Section 8. This ordinance shall become effective on July 1, 2008 unless vetoed by the Mayor within ten (10) days of enactment, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED: February 5, 2008

Approved by County Attorney as to form and legal sufficiency.

Prepared by:

Henry N. Gillman

Sponsored by Commissioner Natacha Seijas

APPENDIX E

Table 5 Countywide BMP Implementation

Schedule, Costs, and Savings Projections

from The Water Use Efficiency 5-Year Plan

Table 5: Countywide BMP Implementation Schedule, Costs, and Savings Projections

BMP	Category	Sector	Cost/ measure[7]	Savings Rate (gallons per meas. per day)	2007						2008						2009					
					No. of Meas. in 2007	Cumulative No. of Meas.	2007 Cost	Cum. Cost ($ to date)	New Water Savings (GPD)	2007 Cumula-tive Water Savings Rate (GPD)	No. of Meas. in 2008	Cumulative No. of Meas.	2008 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2008 Cumula-tive Water Savings Rate (GPD)	No. of Meas. in 2009	Cumulative No. of Meas.	2009 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2009 Cumula-tive Water Savings Rate (GPD)
Water-Efficient Landscape and Irrigation Evaluations and Rebates with Moisture Sensor Retrofit	Landscape & Irrigation Evaluations plus Moisture Sensor Retrofit (without Rebate)[1]	SF	$260	233	300	300	$78,000	$78,000	69,900	69,900	300	600	$78,000	$156,000	69,900	139,800	360	960	$93,600	$249,600	83,880	223,680
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	20	20	$160,200	$160,200	700,000	700,000	20	40	$160,200	$320,400	700,000	1,400,000	20	60	$160,200	$480,600	700,000	2,100,000
High-Efficiency Clothes Washer Rebate	Common-area Washers[2]	MF with Common-area Clothes Washers	$300	48	50	50	$15,000	$15,000	2,400	2,400	50	100	$15,000	$30,000	2,400	4,800	50	150	$15,000	$45,000	2,400	7,200
High Efficiency Toilet (HET) Retrofit/Rebate	Retrofit (includes showerhead and aerators)[3]	SF - Elderly	$250	64	1,000	1,000	$250,000	$250,000	64,000	64,000	1,000	2,000	$250,000	$500,000	64,000	128,000	1,000	3,000	$250,000	$750,000	64,000	192,000
		County-Owned MF Housing[8]	$0	64	0	0	$0	$0	0	0	1,000	1,000	$0	$0	64,000	64,000	2,500	3,500	$0	$0	160,000	224,000
	Rebate (toilet only)[4]	SF	$100	29	750	750	$75,000	$75,000	21,750	21,750	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750
	Toilet Exchange Program	SF	$130	29	0	0	$0	$0	0	0	1,630	1,630	$211,900	$211,900	47,270	47,270	1,630	3,260	$211,900	$423,800	47,270	94,540
	Toilet Exchange Program	MF	$130	29	0	0	$0	$0	0	0	0	0	$0	$0	0	0	0	0	$0	$0	0	0
Showerhead Exchange	No Categories	SF	$1.60	35	1,600	1,600	$2,560	$2,560	56,000	56,000	1,600	3,200	$2,560	$5,120	56,000	112,000	1,770	4,970	$2,832	$7,952	61,950	173,950
	No Categories	MF	$1.60	35	1,600	1,600	$2,560	$2,560	56,000	56,000	1,600	3,200	$2,560	$5,120	56,000	112,000	1,720	4,920	$2,752	$7,872	60,200	172,200
Retrofit Kit Give Away	No Categories	SF	$2.38	12	1,600	1,600	$3,808	$3,808	19,200	19,200	1,600	3,200	$3,808	$7,616	19,200	38,400	1,770	4,970	$4,213	$11,829	21,240	59,640
	No Categories	MF	$2.38	12	1,600	1,600	$3,808	$3,808	19,200	19,200	1,600	3,200	$3,808	$7,616	19,200	38,400	1,720	4,920	$4,094	$11,710	20,640	59,040
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	25	25	$118,500	$118,500	25,000	25,000	25	50	$118,500	$237,000	25,000	50,000	30	80	$142,200	$379,200	30,000	80,000
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	22	22	$35,200	$35,200	33,000	33,000	10	32	$16,000	$51,200	15,000	48,000	10	42	$16,000	$67,200	15,000	63,000
	Evaluate and Retrofit Private Commercial Buildings	NR	$1,600	1,500	0	0	$0	$0	0	0	0	0	$0	$0	0	0	0	0	$0	$0	0	0
	Hotel Program[6]	NR	$667	1,617	12	12	$8,000	$8,000	19,404	19,404	12	24	$8,000	$16,000	19,404	38,808	12	36	$8,000	$24,000	19,404	58,212
Plan Total					**For 2007**		**$753,000**	**$753,000**	**1,086,000**	**1,086,000**	**For 2008**		**$871,000**	**$1,623,000**	**1,158,000**	**2,244,000**	**For 2009**		**$911,000**	**$2,534,000**	**1,286,000**	**3,530,000**
Sub-total for SF							**$410,000**	**$410,000**	**231,000**	**231,000**			**$547,000**	**$956,000**	**257,000**	**488,000**			**$563,000**	**$1,519,000**	**279,000**	**766,000**
Sub-total for MF							**$22,000**	**$22,000**	**78,000**	**78,000**			**$22,000**	**$43,000**	**142,000**	**220,000**			**$22,000**	**$65,000**	**244,000**	**463,000**
Sub-total for NR							**$322,000**	**$322,000**	**778,000**	**778,000**			**$303,000**	**$625,000**	**760,000**	**1,537,000**			**$327,000**	**$952,000**	**765,000**	**2,302,000**

WSH = Water Savings Horizon
GPD = gallons per day
TG = thousand gallons

Table 5: Countywide BMP Implementation Schedule, Costs, and Savings Projections

BMP	Category	Sector	Cost/ measure[7]	Savings Rate (gallons per meas. per day)	2010						2011						2016					
					No. of Meas. in 2010	Cumulative No. of Meas.	2010 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2010 Cumula-tive Water Savings Rate (GPD)	No. of Meas. in 2011	Cumulative No. of Meas.	2011 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2011 Cumula-tive Water Savings Rate (GPD)	No. of Meas. in 2016	Cumulative No. of Meas.	2016 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2016 Cumula-tive Water Savings Rate (GPD)
Water-Efficient Landscape and Irrigation Evaluations and Rebates with Moisture Sensor Retrofit	Landscape & Irrigation Evaluations plus Moisture Sensor Retrofit (without Rebate)[1]	SF	$260	233	360	1,320	$93,600	$343,200	83,880	307,560	360	1,680	$93,600	$436,800	83,880	391,440	340	3,420	$88,400	$889,200	79,220	796,860
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	20	80	$160,200	$640,800	700,000	2,800,000	20	100	$160,200	$801,000	700,000	3,500,000	0	140	$0	$1,121,400	0	4,900,000
High-Efficiency Clothes Washer Rebate	Common-area Washers[2]	MF with Common-area Clothes Washers	$300	48	50	200	$15,000	$60,000	2,400	9,600	50	250	$15,000	$75,000	2,400	12,000	50	500	$15,000	$150,000	2,400	24,000
High Efficiency Toilet (HET) Retrofit/Rebate	Retrofit (includes showerhead and aerators)[3]	SF - Elderly	$250	64	1,000	4,000	$250,000	$1,000,000	64,000	256,000	1,000	5,000	$250,000	$1,250,000	64,000	320,000	1,000	10,000	$250,000	$2,500,000	64,000	640,000
		County-Owned MF Housing[8]	$0	64	2,500	6,000	$0	$0	160,000	384,000	2,500	8,500	$0	$0	160,000	544,000	0	11,000	$0	$0	0	704,000
	Rebate (toilet only)[4]	SF	$100	29	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750
	Toilet Exchange Program	SF	$130	29	1,630	4,890	$211,900	$635,700	47,270	141,810	1,630	6,520	$211,900	$847,600	47,270	189,080	1,630	14,670	$211,900	$1,907,100	47,270	425,430
	Toilet Exchange Program	MF	$130	29	0	0	$0	$0	0	0	0	0	$0	$0	0	0	2,240	11,200	$291,200	$1,456,000	64,960	324,800
Showerhead Exchange	No Categories	SF	$1.60	35	1,770	6,740	$2,832	$10,784	61,950	235,900	1,770	8,510	$2,832	$13,616	61,950	297,850	1,770	17,360	$2,832	$27,776	61,950	607,600
	No Categories	MF	$1.60	35	1,720	6,640	$2,752	$10,624	60,200	232,400	1,720	8,360	$2,752	$13,376	60,200	292,600	1,720	16,960	$2,752	$27,136	60,200	593,600
Retrofit Kit Give Away	No Categories	SF	$2.38	12	1,770	6,740	$4,213	$16,041	21,240	80,880	1,770	8,510	$4,213	$20,254	21,240	102,120	1,770	17,360	$4,213	$41,317	21,240	208,320
	No Categories	MF	$2.38	12	1,720	6,640	$4,094	$15,803	20,640	79,680	1,720	8,360	$4,094	$19,897	20,640	100,320	1,720	16,960	$4,094	$40,365	20,640	203,520
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	30	110	$142,200	$521,400	30,000	110,000	30	140	$142,200	$663,600	30,000	140,000	30	290	$142,200	$1,374,600	30,000	290,000
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	10	52	$16,000	$83,200	15,000	78,000	10	62	$16,000	$99,200	15,000	93,000	10	112	$16,000	$179,200	15,000	168,000
	Evaluate and Retrofit Private Commercial Buildings	NR	$1,600	1,500	0	0	$0	$0	0	0	0	0	$0	$0	0	0	213	1,065	$340,800	$1,704,000	319,500	1,597,500
	Hotel Program[6]	NR	$667	1,617	12	48	$8,000	$32,000	19,404	77,616	12	60	$8,000	$40,000	19,404	97,020	12	120	$8,000	$80,000	19,404	194,040
Plan Total					**For 2010**		**$911,000**	**$3,445,000**	**1,286,000**	**4,816,000**	**For 2011**		**$911,000**	**$4,356,000**	**1,286,000**	**6,102,000**	**For 2016**		**$1,378,000**	**$11,574,000**	**806,000**	**11,700,000**
Sub-total for SF							**$563,000**	**$2,081,000**	**279,000**	**1,044,000**			**$563,000**	**$2,644,000**	**279,000**	**1,323,000**			**$558,000**	**$5,441,000**	**274,000**	**2,700,000**
Sub-total for MF							**$22,000**	**$87,000**	**244,000**	**706,000**			**$22,000**	**$109,000**	**244,000**	**949,000**			**$314,000**	**$1,674,000**	**149,000**	**1,850,000**
Sub-total for NR							**$327,000**	**$1,278,000**	**765,000**	**3,066,000**			**$327,000**	**$1,604,000**	**765,000**	**3,831,000**			**$508,000**	**$4,460,000**	**384,000**	**7,150,000**

WSH = Water Savings Horizon
GPD = gallons per day
TG = thousand gallons

Table 5: Countywide BMP Implementation Schedule, Costs, and Savings Projections

BMP	Category	Sector	Cost/ measure[7]	Savings Rate (gallons per meas. per day)	2021						2026						Water Savings Across the 20-Year WSH (Cumulative Water Savings 2007-2026) (MG)	Total # of BMPs (Count of BMPs 2007-2026)
					No. of Meas. in 2021	Cumulative No. of Meas.	2021 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2021 Cumula-tive Water Savings Rate (GPD)	No. of Meas. in 2026	Cumulative No. of Meas.	2026 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2026 Cumula-tive Water Savings Rate (GPD)		
Water-Efficient Landscape and Irrigation Evaluations and Rebates with Moisture Sensor Retrofit	Landscape & Irrigation Evaluations plus Moisture Sensor Retrofit (without Rebate)[1]	SF	$260	233	340	5,120	$88,400	$1,331,200	79,220	1,192,960	340	6,820	$88,400	$1,773,200	79,220	1,589,060	6,076	6,820
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	0	140	$0	$1,121,400	0	4,900,000	0	140	$0	$1,121,400	0	4,900,000	30,405	140
High-Efficiency Clothes Washer Rebate	Common-area Washers[2]	MF with Common-area Clothes Washers	$300	48	50	750	$15,000	$225,000	2,400	36,000	50	1,000	$15,000	$300,000	2,400	48,000	184	1,000
High Efficiency Toilet (HET) Retrofit/Rebate	Retrofit (includes showerhead and aerators)[3]	SF - Elderly	$250	64	1,000	15,000	$250,000	$3,750,000	64,000	960,000	1,000	20,000	$250,000	$5,000,000	64,000	1,280,000	4,906	20,000
		County-Owned MF Housing[8]	$0	64	0	11,000	$0	$0	0	704,000	0	11,000	$0	$0	0	704,000	4,298	11,000
	Rebate (toilet only)[4]	SF	$100	29	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750	159	750
	Toilet Exchange Program	SF	$130	29	1,630	22,820	$211,900	$2,966,600	47,270	661,780	1,630	30,970	$211,900	$4,026,100	47,270	898,130	3,278	30,970
	Toilet Exchange Program	MF	$130	29	2,240	22,400	$291,200	$2,912,000	64,960	649,600	2,240	33,600	$291,200	$4,368,000	64,960	974,400	2,845	33,600
Showerhead Exchange	No Categories	SF	$1.60	35	1,770	26,210	$2,832	$41,936	61,950	917,350	1,770	35,060	$2,832	$56,096	61,950	1,227,100	4,664	35,060
	No Categories	MF	$1.60	35	1,720	25,560	$2,752	$40,896	60,200	894,600	1,720	34,160	$2,752	$54,656	60,200	1,195,600	4,555	34,160
Retrofit Kit Give Away	No Categories	SF	$2.38	12	1,770	26,210	$4,213	$62,380	21,240	314,520	1,770	35,060	$4,213	$83,443	21,240	420,720	1,599	35,060
	No Categories	MF	$2.38	12	1,720	25,560	$4,094	$60,833	20,640	306,720	1,720	34,160	$4,094	$81,301	20,640	409,920	1,562	34,160
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	30	440	$142,200	$2,085,600	30,000	440,000	30	590	$142,200	$2,796,600	30,000	590,000	2,228	590
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	0	122	$0	$195,200	0	183,000	0	122	$0	$195,200	0	183,000	1,035	122
	Evaluate and Retrofit Private Commercial Buildings	NR	$1,600	1,500	213	2,130	$340,800	$3,408,000	319,500	3,195,000	213	3,195	$340,800	$5,112,000	319,500	4,792,500	13,994	3,195
	Hotel Program[6]	NR	$667	1,617	12	180	$8,000	$120,001	19,404	291,060	12	240	$8,000	$160,001	19,404	388,080	1,487	240
Plan Total					**For 2021**		**$1,362,000**	**$18,397,000**	**791,000**	**15,669,000**	**For 2026**		**$1,362,000**	**$25,203,000**	**791,000**	**19,623,000**	**84,000**	**246,867**
Sub-total for SF							**$558,000**	**$8,228,000**	**274,000**	**4,069,000**			**$558,000**	**$11,014,000**	**274,000**	**5,437,000**	**21,000**	**128,660**
Sub-total for MF							**$314,000**	**$3,239,000**	**149,000**	**2,591,000**			**$314,000**	**$4,804,000**	**149,000**	**3,332,000**	**14,000**	**113,920**
Sub-total for NR							**$492,000**	**$6,931,000**	**369,000**	**9,010,000**			**$492,000**	**$9,386,000**	**369,000**	**10,854,000**	**50,000**	**4,287**

WSH = Water Savings Horizon
GPD = gallons per day
TG = thousand gallons

APPENDIX F

Exhibit 30 from Miami-Dade County
20-Year Water Use Permit,
November 15, 2007

Reuse Projects and Deadlines

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Implementation Deadline
1.	South District WWTP 21.9 mgd	18.6 MGD *finished water assuming 15% treatment loss. The recharge volume may vary depending on actual treatment loss*	Recharge South Dade Miami Heights wellfields or other project	January 1, 2014
2.	South District WWTP 89.1 mgd	75.7 MGD *finished reclaimed water assuming 15% treatment loss. The applied volume may vary depending on actual treatment loss.*	Biscayne Coastal Wetlands or other project	Jan. 1, 2021
3.	South District WWTP 1 mgd	1 MGD	Public access irrigation water (landfill cap)	Existing
4.	West District Reclaimed Water Plant 24.7 mgd	21 MGD *finished water assuming 15% treatment loss. The recharge volume may vary depending on actual treatment loss.*	Recharge Southwest, Snapper Creek, and Alex Orr Wellfields (Alex Orr WTP/Central water system)	January 1, 2021
5.	West District Reclaimed Water Plant 18.8 mgd	16 MGD *finished water assuming 15% treatment loss. The recharge volume may vary depending on actual treatment loss.*	Recharge Southwest, Snapper Creek, and Alex Orr Wellfields (Alex Orr WTP/Central water system)	January 1, 2026
6.	West District Reclaimed Water Plant 6.5 mgd	6.5 MGD minimal treatment losses	Public access projects to be determined	September 1, 2021
7.	North District WWTP 7 mgd	7 MGD minimal treatment losses	Public access irrigation projects	January 1, 2012
8.	Central District WWTP 1 mgd	1 MGD minimal treatment losses	Public access irrigation projects	January 1, 2012
	TOTAL REQUIRED PROJECTS = 170 MGD			January 1, 2026
9.	North and/or Central WWTP	Up to 70 MGD*	FP&L nuclear plant – Turkey Point	
10.	North and/or Central WWTP	14 MGD * .	FP&L gas powered plant expansion – Turkey Point	
	OTHER POTENTIAL LARGE-SCALE PROJECTS = 84 MGD			
	GRAND TOTAL = 254 MGD Miami-Dade is committed to providing 170 MGD reclaimed water + 84 MGD contingent on FP&L receiving authorization to construct these power facilities			January 1, 2026

EXHIBIT 30

APPENDIX G

List of Large and Small

Public Water Systems

Exhibit G-1
List of Large and Small Public Water Supply Systems

PWS ID	Mailing Name	Mailing Street	City	Zip	Capacity(GPD)
4130048	ANDERSON'S CORNER GROCERY	15730 SW 232 STREET	MIAMI	33170	8000
4130053	HIGHTAILIN' IT	20264 OLD CUTLER ROAD	MIAMI	33189	28000
4130112	BENSON LIGHTING	12955 SW 87 AVE	MIAMI	33176	36000
4130159	BROOKS (J R) & SON	18401-50 SW 256 STREET	HOMESTEAD	33031	28000
4130320	CAMP OWAISSA BAUER	17001 SW 264 STREET	MIAMI	33031	183000
4130322	REDLAND JR. HIGH SCHOOL	16001 SW 248 ST	HOMESTEAD	33031	144000
4130445	TROPICAL RESEARCH & EDUCATION C	18905 SW 280 STREET	HOMESTEAD	33031	36000
4130496	FRANKSHER BUILDING	9300 SOUTH DIXIE HIGHWAY	MIAMI	33170	64000
4130588	REDLANDS MOBILE HOME PARK	17360 S.W. 232 STREET	MIAMI	33170	100000
4130721	KOA MIAMI SOUTH	20675 SW 162 AVENUE	MIAMI	33187	122000
4130736	VILLA DE DON POLLO	20500 SOUTH DIXIE HIGHWAY	MIAMI	33189	36000
4130793	DELUXE MOTEL	28475 SOUTH DIXIE HIGHWAY	LEISURE CITY	33033	46000
4130811	DE LEON HARVESTING	19855 SW 272 STREET	HOMESTEAD	33031	36000
4130823	DAN LEWIS PROPERTIES	22401-22415 SO. DIXIE HWY.	MIAMI	33170	15000
4130833	JONES' TRAILER PARK	14601 NW 185TH STREET #11	MIAMI	33016	50000
4130871	MDWASA - MAIN SYSTEM	3071 SW 38 AVENUE	MIAMI	33146	442740000
4130891	ROBERTS AIR	28701 SW 219 AVENUE	HOMESTEAD	33030	28000
4130893	DADE HOMESTEAD GAA - ADMIN.	28700 SW 217TH AVENUE	HOMESTEAD	33030	28000
4130894	DADE HOMESTEAD GAA SKYDIVE	28700 SW 217 AVENUE	HOMESTEAD	33030	28000
4130897	DADE LANDSCAPE NURSERY	50 SW 32 ROAD	MIAMI	33129	86000
4130933	MONKEY JUNGLE	14805 SW 216 ST	MIAMI	33170	122000
4130934	MONTESSORI COUNTRY SCHOOL	20130 SW 304 ST	HOMESTEAD	33030	38000
4130951	LAST CHANCE LOUNGE	35800 SOUTH DIXIE HIGHWAY	FLORIDA CITY	33034	5000
4130977	NORTH MIAMI CITY OF	12100 NW 11 AVE (PLANT)	NORTH MIAMI	33161	9300000
4131080	PEDERSEN BUILDING	17511 SW 99 ROAD	MIAMI	33157	17000
4131185	GROVE INN	22540 S.W. 177 AVENUE	MIAMI	33170	36000
4131192	REDLAND GOLF & COUNTRY CLUB	24451 SW 177 AVENUE	HOMESTEAD	33090	57000
4131202	MDWASA/REX UTILITIES	P.O. BOX 316	MIAMI	33133	12030000
4131217	RINKER CEMENT MILL	1200 NW 137 AVENUE	MIAMI	33166	720000
4131250	ROYAL TERN MOTEL INC	26480 S DIXIE HIGHWAY	HOMESTEAD	33032	61000
4131312	SILVER PALM MOBILE HOMES	17350 SW 232 STREET	MIAMI	33170	122000
4131313	SILVER PALMS METHODIST CHURCH	15855 SOUTHWEST 248 STREET	HOMESTEAD	33031	36000
4131403	AMERICANA VILLAGE	19800 SW 180 AVE. #602	MIAMI	33187	500000
4131436	MASTER CARPETS	18040 SOUTH DIXIE HIGHWAY	MIAMI	33157	46000
4131454	R & R CAFE	18401 SW 256 ST	HOMESTEAD	33031	36000
4131618	NORTH MIAMI BEACH	19150 NW 8 AVENUE	NORTH MIAMI BEACH	33162	32000000
4131631	HOMESTEAD AIR FORCE BASE	31 CES/DEMW WATER PLANT	HOMESTEAD	33039	1300000
4131923	BISC NATL PK-ELLIOTT KEY	9700 SW 328 STREET	HOMESTEAD	33033	12000
4131958	SUNRISE COMMUNITY	22300 S.W. 162 AVENUE	MIAMI	33170	150000
4131961	REDLAND FRUIT AND SPICE PARK	24801 SW 187TH AVENUE	MIAMI	33031	46000
4131962	CASTELLOW HAMMOCK PARK	28450 SW 152 AVE	MIAMI	33129	1700
4134228	CHEVRON KROME	24800 SW 177 AVE.	HOMESTEAD	33031	1000
4134234	RINKER MATERIALS - SWEETWATER	1200 N.W. 137TH AVENUE	MIAMI	33165	5000
4134237	JACK'S BAIT & TACKLE	35412 SO. DIXIE HWY. .	FLORIDA CITY	33034	3200
4134239	LIBERTY (FORMERLY SHELL GAS STA	24797 SW 177 AVENUE	MIAMI	33030	9600
4134300	REDLAND CHRISTIAN ACADEMY	17700 SW 280 ST	HOMESTEAD	33031	10000
4134301	IGLESIA BUEN SAMARITANO	25795 SW 137 AVE	MIAMI	33032	12000
4134328	ATLANTIC FERTILIZER	18375 SW 260 ST	HOMESTEAD	33031	1000
4134334	COSTA NURSERY II	18201 SW 216 ST	MIAMI	33170	1000
4134338	BENITO JUAREZ PARK	19825 SW 376 STREET	HOMESTEAD	33034	1700
4134358	DADE JUVENILE RESIDENTIAL FACILIT	18500 SW 424 ST	FLORIDA CITY	33034	35000
4134363	HOMESTEAD JEHOVAH'S WITNESS	18505 SW 288 STREET	HOMESTEAD	33030	1
4134364	FROG POND/DADE CORNERS	17696 SW 8 STREET	MIAMI	33194	1
4134368	EVERGLADES PK-PINE ISLAND	PO BOX 279	HOMESTEAD	33030	100000
4134369	EVERGLADES PK-HEADQTRS	PO BOX 279	HOMESTEAD	33030	100000
4134371	EVERGLADES PK-DAN BEARD	40001 S.R. 9336	HOMESTEAD	33034	100000
4134372	EVERGLADES PK-LONG PINE KEY	PO BOX 279	HOMESTEAD	33030	10800
4134373	EVERGLADES NATIONAL PARK BILL R(	40001 S.R. 9336	HOMESTEAD	33034	20000
4134374	EVERGLADES PK-ROYAL PALM	40001 S.R. 9336	HOMESTEAD	33034	21600
4134375	EVERGLADES PK-SHARK VALLEY	PO BOX 279	HOMESTEAD	33030	8000
4134376	EVERGLADES SHARK VALLEY TOWER	PO BOX 279	HOMESTEAD	33030	1
4134379	BERNECKER'S NURSERY	16900 SW 216 STREET	MIAMI	33170	5000
4134382	BUTLER'S NURSERY	15870 SW 216 STREET	MIAMI	33170	5000
4134384	CAULEY SQUARE TEA ROOM	22400 OLD DIXIE HWY	MIAMI	33170	10000
4134385	UNITARIAN UNIVERSAL CONGR'N OF M	7701 SW 76 AVE	MIAMI	33143	5000
4134387	COCONUT PALM TRADING POST	17750 SW 248 STREET	HOMESTEAD	33187	5000
4134388	COFFEY'S MARKET	20090 SW 177 AVENUE	MIAMI	33187	5000
4134393	COOPERTOWN	22700 SW 8 ST	MIAMI	33144	5000
4134394	COSTA NURSERY	22290 SW 162 AVENUE	MIAMI	33170	5000
4134400	EL NOPAL	22605 S DIXIE HWY	MIAMI	33177	5000
4134402	GREENLEAF NURSERY	19355 SW 304 STREET	HOMESTEAD	33030	5000
4134414	PLAYPEN SOUTH (GATOR KICKS)	23101 S DIXIE HWY	MIAMI	33189	5000
4134417	REDLAND TAVERN	17701 SW 232 STREET	GOULDS	33170	5000

Exhibit G-1
List of Large and Small Public Water Supply Systems

PWS ID	Mailing Name	Mailing Street	City	Zip	Capacity(GPD)
4134420	SAFARI RESTAURANT	26700 SW 8 ST	MIAMI	33193	5000
4134422	SOUTH FLORIDA TESTING SERVICE	17301 OKEECHOBEE ROAD	HIALEAH	33016	5000
4134430	TOM THUMB #122	23200 SW 177 AVENUE MIAMI 33170	MIAMI 33170	33010	5000
4134431	REDLAND EXXON	14695 SW 216 STREET	MIAMI	33177	5000
4134434	COMMUNITY ASPHALT	14005 N.W. 186 STREET	HIALEAH	33018	5000
4134439	RINKER-F.E.C. OFFICE	13292 NW 119 AVENUE	HIALEAH	33178	3000
4134442	REDLAND COMMUNITY CHURCH	14601 SW 248 ST.	MIAMI	33032	3000
4134443	COMCAST CABLE	20800 SW 167 AVE.	MIAMI	33187	3000
4134445	FIRST GRACE FAITH PENTECOST	24637 SW 137 AVENUE	PRINCETON	33032	3000
4134446	KENT MOTEL	22345 S. DIXIE HWY.	GOULDS	33170	3000
4134448	PALMS PROFESSIONAL CENTER	18430 S. DIXIE HWY.	MIAMI	33157	3000
4134451	FARM CREDIT SERVICE	24700 SW 177 AVENUE	HOMESTEAD FL 33090	33030	2720
4134453	RINKER-F.E.C. SHOP	12155 NW 136 STREET	HIALEAH	33178	16000
4134454	OKEECHOBEE RANCH	17015 OKEECHOBEE RD	HIALEAH GARDENS	33018	3000
4134459	CIRCLE D FARMS	32700 SW 217 AVENUE	HOMESTEAD	33090	3000
4134462	REDLANDS GROCERY	26400 SW 187 AVENUE	HOMESTEAD	33031	3000
4134464	SUNRISE ADULT GROUP HOME (15190	15190 SW 272 STREET	NARANJA	33032	3000
4134465	SUNRISE ADULT SERVICES (29800)	29800 OLD DIXIE HWY	HOMESTEAD	33030	3000
4134468	U-HAUL RENTAL & SERVICES	16500 SO. DIXIE HIGHWAY	MIAMI	33157	3000
4134471	CERTIFIED AUTO	6812 SW 81 STREET	MIAMI	33143	3000
4134494	DINAS QUICK MART	22745 SO. DIXIE HWY	MIAMI	33170	3000
4134498	CREATIVE YEARS	15680 SW 232 STREET	MIAMI	33170	2000
4134499	OUR LADY OF MERCY CEMETERY	11411 NW 25 STREET	DORAL	33172	2000
4134502	CHRISTIAN FAMILY WORSHIP CENTER	27500 OLD DIXIE HIGHWAY	HOMESTEAD	33031	9600
4134506	FIRST BAPTIST CHURCH REDLAND	16390 SW 248 STREET	HOMESTEAD	33031	2000
4134508	AVIARY BIRD SHOP	22707 SO. DIXIE HIGHWAY	GOULDS	33170	2000
4134512	DE LEON BROMELIADS	13745 S.W. 216TH ST.	MIAMI	33170	5000
4134516	TOM THUMB #127	18400 SW 177 AVENUE MIAMI 33187	HIALEAH	33010	2400
4134518	CHRIST LIFE CENTER	9775 SW 87 AVENUE	MIAMI	33176	500
4134519	OKEECHOBEE BARRIER	FLA TURNPIKE & OKEECHOBEE	MIAMI	33016	9600
4134522	1ST BAPTIST CHURCH OF HOMESTEA	29050 KROME AVE. MAIL: POBOX 900428	HOMESTEAD	33030	5000
4134523	WOMEN'S CLUB OF HOMESTEAD	17905 SW 292 STREET	HOMESTEAD	33030	3300
4134524	REDLAND CHURCH OF THE NAZARENE	22755 SW 177 AVENUE	MIAMI	33170	7200
4134525	RINKER HYDRO-CONDUIT	13292 NW 118TH AVENUE	MIAMI	33178	1400
4134527	RINKER EMPLOYEES	12150 NW 136 ST	MIAMI	33178	3750
4134528	FRUTICUBA	16751 KROME AVENUE	MIAMI	33187	0
4134529	US 1 MOTORS	17528 SOUTH DIXIE HWY	MIAMI	33157	20
4134531	CITGO EXPRESS MART	24790 SW 177 AVE	HOMESTEAD	33031	1000
4134532	SUNOCO KROME AVE	26400 SW 177 AVE	MIAMI	33169	50
4134533	GATOR PARK	24050 SW 8 STREET	MIAMI	33193	30
4134535	VILA & SONS	13901 NW 118 AVE	MEDLEY	33178	50
4134536	EVERGLADES STORE	38005 INGRAHAM HWY	FLORIDA CITY	33034	15
4134537	MANNHEIMER FOUNDATION	20255 SW 360 STREET	HOMESTEAD	33034	0
4134538	BT SOUTH DBA BOODY TRAP	29000 SOUTH DIXIE HWY	HOMESTEAD	33033	120
4134540	CHEVRON GAS STATION	23150 SW 177 AVE	MIAMI	33170	320
4134542	LA CIDRA	19130 SW 177 AVENUE	MIAMI	33187	3200
4134543	SCHNEBLY WINERY	30205 SW 217 AVENUE	HOMESTEAD	33030	4800
4134544	FRUTERIA CACHITA	17800 SW 177 AVENUE	MIAMI	33187	200

APPENDIX H

Miami-Dade County Water and Sewer

Department 20-Year Water Use Permit

FORM #0299
Rev. 5/93

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
WATER USE PERMIT NO. RE-ISSUE 13-00017-W
(NON - ASSIGNABLE)

Date Issued: 15-NOV-2007 **Expiration Date:** November 15, 2027

Authorizing: THE CONTINUATION OF AN EXISTING USE OF GROUND WATER FROM THE BISCAYNE AQUIFER AND UPPER FLORIDAN AQUIFER FOR PUBLIC WATER SUPPLY USE WITH AN ANNUAL ALLOCATION OF 152741 MILLION GALLONS.

Located In: Miami-Dade County, S--/T53S/R39-41
S--/T54S/R39-42E
S--/T55S/R39-40E
S--/T56S/R38-39E
S--/T57S/R38-40E

Issued To: MIAMI-DADE WATER AND SEWER DEPARTMENT
(MIAMI-DADE CONSOLIDATED PWS)
P.O.BOX 330316
MIAMI. FL 33233-0316

This Permit is issued pursuant to Application No.040511-5 , dated May 11, 2004, for the Use of Water as specified above and subject to the Special Conditions set forth below. Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims or liabilities which may arise by reason of the construction, maintenance or use of activities authorized by this permit. Said application, including all plan and specifications attached thereto, is by reference made a part hereof.

Upon written notice to the permittee, this permit may be temporarily modified, or restricted under a Declaration of Water Shortage or a Declaration of Emergency due to Water Shortage in accordance with provisions of Chapter 373, Fla. Statutes, and applicable rules and regulations of the South Florida Water Management District.

This Permit may be permanently or temporarily revoked, in whole or in part, for the violation of the conditions of the permit or for the violation of any provision of the Water Resources Act and regulations thereunder.

This Permit does not convey to the permittee any property rights nor any privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation, or requirement affecting the rights of other bodies or agencies.

Limiting Conditions are as follows:

SEE PAGES 2 - 10 OF 10 (58 LIMITING CONDITIONS).

South Florida Water Management
District, by its Governing Board

On ORIGINAL SIGNED BY:

By ELIZABETH VEGUILLA
Deputy Clerk

LIMITING CONDITIONS

1. This permit shall expire on November 15, 2027.

2. Application for a permit modification may be made at any time.

3. Water use classification:

   Public water supply

4. Source classification is:

   Ground Water from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Annual allocation shall not exceed 152741 MG.

   Maximum monthly allocation shall not exceed 13364 MG.

   The allocations above are further constrained by the wellfield operational plan described in Limiting Condition 27. The offset reuse allocations are not applied to the reuse projects outlined in limiting condition #39 that are in addition to the wellfield recharge projects.
   The following limitations to the average annual withdrawals from specific sources are applicable through December 31, 2012:
   Biscayne aquifer: 126,425 MG
   Floridan aquifer: 6,723 MG
   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2013 through December 31, 2017:
   Biscayne aquifer: 132,119 MG
   Floridan aquifer: 8,555 MG
   Reuse offset: 5,647 MG (South Miami Heights recharge)
   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2018 through December 31, 2022:
   Biscayne aquifer: 136,156 MG
   Floridan aquifer: 10,741 MG
   Reuse offset: 10,614 MG (South Miami Heights & SWWF recharge)
   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2023 through December 31, 2027:
   Biscayne aquifer: 142,000 MG
   Floridan aquifer: 10,741 MG
   Reuse offset: 16,461 MG (So. Miami Heights & SWWF recharge)

6. Pursuant to Rule 40E-1.6105, F.A.C., Notification of Transfer of Interest in Real Property, within 30 days of any transfer of interest or control of the real property at which any permitted facility, system, consumptive use, or activity is located, the permittee must notify the District, in writing, of the transfer giving the name and address of the new owner or person in control and providing a copy of the instrument effectuating the transfer, as set forth in Rule 40E-1.6107, F.A.C.

   Pursuant to Rule 40E-1.6107 (4), until transfer is approved by the District, the permittee shall be liable for compliance with the permit. The permittee transferring the permit shall remain liable for all actions that are required as well as all violations of the permit which occurred prior to the transfer of the permit.

   Failure to comply with this or any other condition of this permit constitutes a violation and pursuant to Rule 40E-1.609, Suspension, Revocation and Modification of Permits, the District may suspend or revoke the permit.

This Permit is issued to:
Miami-Dade Water and Sewer Department
3071 SW 38th Ave.
Miami, FL 33146
Attn: John W. Renfrow, P.E., Director

7. Withdrawal facilities:

Ground Water - Existing:

1 - 18" X 50' X 500 GPM Well Cased To 40 Feet
1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet
3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet
1 - 30" X 1250' X 3500 GPM Well Cased To 845 Feet
4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet
1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet
4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet
1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet
2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet
10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet
1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 765 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet
1 - 12" X 40' X 800 GPM Well Cased To 35 Feet
4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet
1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet
1 - 30" X 1210' X 3500 GPM Well Cased To 835 Feet
4 - 24" X 104' X 6940 GPM Wells Cased To 54 Feet
2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet
1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet
6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet
1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet
1 - 6" X 30' X 400 GPM Well Cased To 25 Feet
1 - 18" X 55' X 500 GPM Well Cased To 42 Feet
20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet
1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet
2 - 42" X 68' X 8500 GPM Wells Cased To 54 Feet
1 - 12" X 35' X 800 GPM Well Cased To 30 Feet
1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet
1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet
7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet
1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet
2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet
6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet

Ground Water - Proposed:

12 - 17" X 1300' X 2083 GPM Wells Cased To 1150 Feet
2 - " X 1042 GPM Wells With Unknown Total And Cased Depth
9 - " X 1400 GPM Wells With Unknown Total And Cased Depth

1 - " X 2800 GPM Well With Unknown Total And Cased Depth

Reclaimed - Proposed:

1 - " x HP X 12000 GPM1 unspecified Pump
2 - " x HP X 10000 GPM1 unspecified Pumps

8. Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1 in 10 year drought event that results in the:

(1) Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

(2) Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

9. Permittee shall mitigate harm to existing off-site land uses caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm caused by withdrawals, as determined through reference to the conditions for permit issuance, includes:

(1) Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

(2) Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or

(3) Land collapse or subsidence caused by reduction in water levels associated with consumptive use.

10. Permittee shall mitigate harm to the natural resources caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

(1) Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

(2) Reduction in water levels that harm the hydroperiod of wetlands,

(3) Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

(4) Harmful movement of contaminants in violation of state water quality standards, or

(5) Harm to the natural system including damage to habitat for rare or endangered species.

11. If any condition of the permit is violated, the permit shall be subject to review and possible modification, enforcement action, or revocation.

12. Authorized representatives of the District shall be permitted to enter, inspect, and observe the permitted system to determine compliance with special conditions.

13. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.

14. The permit does not convey any property right to the Permittee, nor any rights and privileges other than those specified in the Permit and Chapter 40E-2, Florida Administrative Code.

15. Permittee shall submit all data as required by the implementation schedule for each of the limiting conditions to: S.F.W.M.D., Supervising Hydrogeologist - Post-Permit Compliance, Water Use Regulation Dept. (4320), P.O. Box 24680, West Palm Beach, FL 33416-4680.

16. In the event of a declared water shortage, water withdrawal reductions will be ordered by the District in accordance with the Water Shortage Plan, Chapter 40E-21, F.A.C. The Permittee is advised that during a water shortage, pumpage reports shall be submitted as required by Chapter 40E-21, F.A.C.

17. Prior to the use of any proposed water withdrawal facility authorized under this permit, unless otherwise specified, the Permittee shall equip each facility with a District-approved operating water use accounting system and submit a report of calibration to the District, pursuant to Section 4.1, Basis of Review for Water Use Permit Applications.

    In addition, the Permittee shall submit a report of recalibration for the water use accounting system for each water withdrawal facility (existing and proposed) authorized under this permit every five years from each previous calibration, continuing at five-year increments.

18. Monthly withdrawals for each withdrawal facility shall be submitted to the District quarterly. The water accounting method and means of calibration shall be stated on each report.

19. Within six months of permit issuance, the Permittee shall implement the following water level monitoring program:The existing monitoring program is described in Exhibit 9.
    The permittee submit annual Monitoring Program summary reports. The annual report will summarize hydrologic and water quality conditions ascertained from the monitoring data collected. The report will include review and analysis of the data collected and recommendations regarding the monitoring network.

20. Within six months of permit issuance, the Permittee shall implement the following water quality monitoring program:See exhibit 10 for a schedule of completion of the USGS project to update the salt front delineation and monitoring network.
    The permittee shall submit annual Monitoring Program summary reports. The annual report will summarize the status of the project to update the salt front and install new monitor wells.

21. The Permittee shall submit to the District an updated Well Description Table (Table A) within one month of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.In addition, the permittee shall submit an updated Table B within one month of installing the reclaimed water recharge pumps. If the location of a proposed well is different from the locations identified in this staff report, the permittee shall submit a report to the District for review and approval that demonstrates that the revised location meets the conditions for permit issuance. District approval of the report is required prior to the issuance of a well construction permit.

22. Permittee shall secure a well construction permit prior to construction, repair, or abandonment of all wells, as described in Chapters 40E-3 and 40E-30, Florida Administrative Code.

23. In the event that the treated water quality produced through the blending of Floridan aquifer water at the rates required under this permit degrades as a result of significant increase in salinity, or other water quality parameters of the Floridan aquifer, the permittee may request the District to authorize specific

actions to limit the water quality increases. Such actions could include a) authorization to inject specified volumes of fresh water into the Floridan aquifer as directed by the District (and otherwise consistent with the provisions of the DEP issued UIC permit), or b) temporarily reducing the volume of Floridan water required to be used for blending until water quality issues are resolved. The threshold of water quality degradation that would trigger the District to consider these relief actions include: a) significant adverse affects to the water treatment or distribution system that would affect the ability to deliver drinkable water or otherwise require modifications to the existing treatment process or equipment; or b) a violation of applicable State primary or secondary drinking water standards. In the event that the permittee is authorized to inject fresh water into the Floridan, the volume injected shall be measured and reported separately and reported on the timeframes outlined in limiting condition 18.

24. The Permittee is authorized to exercise the emergency wells at the Medley Wellfield for a total of two hours per month as needed for bacterial clearance and pump maintenance. Operation of the emergency wells at the Medley Wellfield for more than this amount shall require prior approval from SFWMD. Pumpage data shall be collected and report in accordance with Limiting condition 18.

25. Permittee shall implement the wellfield operating plan described in District staff report prepared in support of recommendation for permit issuance.See Exhibit 14

26. The permittee may request temporary authorization from the District to increase withdrawals from the Biscayne aquifer system wells during storm events, for storage within the Floridan aquifer system consistent with their Department of Environmental Protection (DEP) issued Underground Injection Control permits.The District will consider the availability of stormwater that is not otherwise needed for environmental protection or enhancement and is in no way bound to authorize such requests. All such requests shall be made in writing to the Director of Water Use Regulation.

    The permittee shall report injection/withdrawals from the ASR wells in the following manner:

    Biscayne Aquifer water injected
    Biscayne Aquifer water recovered
    Floridan Aquifer withdrawal

27. No more than 15 mgd shall be withdrawn from the West Biscayne aquifer Wellfield on any given day.

28. No more than 25,550 MGY shall be withdrawn during any 12 month consecutive period from the combined Hialeah, Preston and Miami Springs Biscayne aquifer wellfields

29. No more than 8,065 mgy shall be withdrawn during any 12 month consecutive period from the Snapper Creek Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 38 and 39.

30. No more than 31,353 mgy shall be withdrawn during any 12 month consecutive period from the Southwest Biscayne aquifer Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 38 and 39.

31. No more than 67,343 mgy shall be withdrawn during any 12 month consecutive period from the combined West, Southwest Snapper Creek and Alexander Orr Biscayne aquifer wellfields unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting conditions 38 and 39.

32. No more than 1,825 mgy shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield unless reclaimed water recharge is implemented in locations and amounts necessary to offset the impact of the increase to Everglades water bodies per limiting condition 38.

33. No more than 1,497 mgy shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.

34. No more than 1,745 mgy shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.

35. Pumpage from Floridan aquifer wells and Biscayne aquifer wells recharged by reclaimed water will be operated on a priority basis, referred to as a "first on, last off" priority. Changes to wellfield operations must be approved via modification of the approved Wellfield Operation Plan by District staff prior to implementation.

36. The permittee shall operate the West Wellfield in accordance with the Memorandum of Understanding between the U.S. Department of the Interior, the Governor of the State of Florida, Miami Dade County and the District incorporated in Exhibit 32.

37. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 29.
The permittee will provide annual updates per limiting condition 47 of the status of all alternative water supply projects. The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

38. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 29 is going to be missed, the permittee shall notify the Executive Director of the District in writing explaining the nature of the delay, actions taken to bring the project back on schedule and an assessment of the impact the delay would have on the rates of withdrawals from the Everglades water bodies and associated canals as defined in District CUP rules. The District will evaluate the situation and take actions as appropriate which could include: a) granting an extension of time to complete the project (if the delay is minor and doesn't affect the Everglades Waterbodies or otherwise violates permit conditions), b)take enforcement actions including consent orders and penalties, c) modify allocations contained in this permit from the Biscayne aquifer including capping withdrawal rates until the alternative water supply project(s) are completed (in cases where the delay would result in violations of permit conditions) or d) working with the Department of Community Affairs to limit increase demands for water until the alternative water supply project is completed.

39. The permittee shall implement a minimum of 170 MGD of reuse projects as set forth in Projects 1-8 of Exhibit 30 on or before the deadlines provided therein. The exact volume of reclaimed water applied will depend on the treatement losses resulting from the process that are implemented. In the event any of these projects do not require or allow as much reuse as anticipated, the County shall identify and implement other reuse projects that will provide provide beneficial reuse of water by the deadlines set forth in Exhibit 30. Any changes to Exhibit 30 must be reviewed and approved by the District in consultation with the Department of Environmental Protection (DEP) in accordance with Parts I & II of Chapter 373, Florida Statutes, and District rules governing consumptive uses of water in Chapter 40E-2, F.A.C., and DEP rules governing the treatment and use of reclaimed water in Chapter 62-610, F.A.C.

40. Reuse Project numbers 1, 4, and 5 in Exhibit 30 for wellfield recharge must be in place and operating prior to any additional withdrawals from the wellfield over the base condition water use as identified in Exhibit 14C.

41. In addition to the reuse required by limiting condition 39, the Permittee shall work with Florida Power and Light (FP&L) in their development of additional power projects such as the gas power plant expansion and the proposed nuclear power plant. In the event the nuclear power plant is approved, the County shall make public access reclaimed water available from the County's Central and North wastewater treatment plants which can be used for both the gas powered plant and the nuclear power plant.

42. By November 15, 2011, the Permittee shall submit a report for District review and approval identifying the location, treatment, timing and volume for Reuse Projects 4 & 5 which provide groundwater recharge for the Southwest Wellfield. The report shall demonstrate that the proposed recharge sites and operations shall at a minimum prevent increased withdrawals from the C-4, C-2 and eastward groundwater seepage from Everglades National Park over the base condition water use and is otherwise a beneficial reuse of water per Chapter 62-610, F.A.C..

43. For Reuse Project number 2 of Exhibit 30 for rehydration of Biscayne Coastal Wetlands, the Permittee shall develop and complete a pilot testing program in consultation with the District, the Florida Department of Environmental Protection (DEP) and Biscayne Bay National Park. Following the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility of this project on or before January 15, 2011. Extension of this deadline may be issued in writing by the District upon demonstration of good cause such as events beyond the control of the permittee or after consideration of the results/data collected, the District determines that additional testing is necessary. In determining the water quality needed, the parties will consider State and Federal water quality discharge standards, the volume and timing of water to be delivered to Biscayne Bay and the location of delivery. In the event the parties do not reach agreement on the feasibility by January 15, 2011, the Permittee shall begin development of an alternate reuse project from the South District wastewater facility and shall provide the District with a proposal for an alternate project including a conceptual design and schedule for implementation on or before December 15, 2011.

44. Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.Permittee shall maintain a calibrated flow meter(s) at the intake (raw water) and discharge (treated water) points within the Hialeah/Preston, Alexander Orr, and proposed Hialeah RO and South Miami Heights water treatment plants for the purpose of measuring treatment losses and shall submit monthly data quarterly as required pursuant to Limited Condition # 18.

45. The Water Conservation Plan required by Section 2.6.1 of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, must be implemented in accordance with the approved implementation schedule.The Water Conservation Plan outlined in Exhibit 27 must be implemented in accordance with the approved implementation schedule. The permittee shall submit an annual report covering water conservation activities during the prior calendar year by March 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

46. Permittee shall determine unaccounted-for distribution system losses on a quarterly basis and report the findings on an annual basis. The losses shall be determined for the entire system and for each of the water treatment plants (comparing water pumped from the wells compared to the volume into and out of the treatment plant), utilizing the most recent, approved water accounting and IWA/AWWA water audit methodologies. The permittee shall verify the IWA/AWWA water audit methods to be used with the District for the subsequent year in each annual report. The annual report shall cover activities during the prior calendar year and be submitted on March 15 of each year. In addition to the unaccounted-for loss data, the report shall include the status of the activities (actions and expenditures along with the associated water savings) completed during the year to implement the approved water loss reduction plan (Exhibit 26).
    In the event that the difference between the volume of water produced from the treatment plant (column 1 in Exhibit 25) and the sum of the metered and user sale amounts (columns 2, 11 and 13 in Exhibit 25) exceeds 10 percent of the treated water produced (column 4 in Exhibit 25), the permittee shall include in the annual report a description of additional actions which will be implemented the following year(s) to reduce the losses to less than ten percent. If the District concludes that the progress towards achieving losses of less than 10 percent as identified in the unaccounted for losses plan is inconsistent with the plan schedule, the Permittee shall be required to revise the plan, to be approved by the District.

47. All annual reports required in these limiting conditions shall address activities that occurred during a calendar year and shall be submitted to Water Use Compliance on or before March 15th of the following year.

48. By July 1, 2008, the permittee shall submit the final report comparing the volumes of water withdrawn using the cumulative calibrated wellhead flow meter data versus the methods formerly used to estimate flows into/out of the Hialeah-Preston and Alexander Orr water treatment plants. Based on the results of this report and upon District review, the permittee may be required to modify this permit. The necessity to modify the permit will be determined based on a) the degree to which the actual withdrawals (as determined by the calibrated wellhead meters) differs from the historic estimation method, and b) whether

the difference is sufficiently large to affect the demonstration that conditions of permit issuance will be met over the life of the permit. See exhibit 33 for all related milestones for this limiting condition.

49. Every five years, the permittee shall submit a water use compliance report for review and approval by District Staff. The compliance report shall contain sufficient information to maintain reasonable assurance the permittee's use will continue to meet the applicable rules and statutes for the remainder of the permit duration, including:
(a) The results of a water conservation audit that documents the efficiency of water use. The audit shall identify where the specific quantities of water are used and any unaccounted for losses. If the goals of the conservation plan are not achieved, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.
(b) A comparison of the permitted allocation, the actual and projected use, and reasonable-beneficial use of water as identified in District rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than necessary to meet the actual projected demands allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.
(c) Summary of the current and previous four years progress reports for implementation of the Alternative Water Supply Plan and any modifications necessary to continue to meet the Plan requirements, and conditions for issuance.
(d) Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Limiting Condition # 55 and Section 373.236, F.S.
(e) Updates or amendments to the County's reuse plan.
These compliance reports shall be due on March 15th, 2013, 2018, and 2023.

50. The Permittee shall provide the District with annual updates by March 15th each year describing the activities associated with the implementation of their approved reuse feasibility plan including the following information: (1) the status of distribution system construction, including location and capacity of a) existing reuse lines b) proposed reuse lines to be constructed in the next five years; (2) a summary of uncommitted supplies for the next five years; (3) the status of reuse plan implementation including status of pilot projects, plan design construction, volume of reuse available, volume of wastewater disposed of ; and (4) the status/copies of any ordinances related to reuse (5) any proposed changes to the reuse plan set forth in Exhibit 30. The first annual update is due March 15, 2008.

51. The Permittee shall notify the District within 30 days of any change in service area boundary. If the Permittee will not serve a new demand within the service area for which the annual allocation was calculated, the annual allocation may then be subject to modification and reduction.

52. It has been determined that this project relies, in part on the waters from the Central and Southern Project, and as such is considered to be an indirect withdrawal from an MFL water body under recovery (Everglades). The Lower East Coast Regional Water Supply Plan (May 2000), which is the recovery plan for the Everglades, incorporates a series of water resource development projects and operational changes that are to be completed over the duration of the permit and beyond. If the recovery plan is modified and it is determined that this project is inconsistent with the approved recovery plan, the Permittee shall be required to modify the permit consistent with the provisions of Chapter 373, Florida Statutes.

53. This Permit supersedes and/or cancels the following Water Use Permits:
13-00037-W (Hialeah/Preston/Miami Springs/Northwest)
13-00040-W (South Dade)

54. Within six months, executed large user water agreements with Hialeah and Miami Beach shall be submitted to the District. In the event that the final agreements are for volumes less than those used in

the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.

55. If it is determined that the conditions for permit issuance are no longer met for the 20 year permit duration, the permittee shall obtain a modification of the Permit from the District as necessary to come into compliance with the conditions for permit issuance. Such conditions for permit issuance include minimum flows and levels, water reservations, and other conditions ensuring the use does not cause water resource harm and is consistent with the objectives of the District, including implementation of the Comprehensive Everglades Restoration Plan.

56. Within two years of permit issuance, potable public water supply utilities are required to provide a study evaluating emergency water supply preparedness, including analysis of demand management measures, potential pumpage shifting and the feasibility of emergency interconnections for the purpose of supplying water on a short-term, emergency basis to adjoining utilities. The Permittee must provide the District with a copy of the study. As to emergency interconnects, the feasibility study must assess the technical, physical and economic ability of the Permittee to develop interconnecting pipes capable of delivering water to adjoining utilities to meet emergency, short-term water supply needs. (in the event of an interconnect being established, individual public water supply Permit allocations will not address the emergency usage.) It is the policy of the District to encourage emergency interconnects between adjoining public water supply utilities for the purpose of providing emergency water supply. Thus, where the feasibility study indicates emergency interconnects are possible, the District encourages the adjoining utilities to implement the same.

57. The permittee shall operate surface water control structure known as the Mid-canal structure and bridge in accordance with the approved operational plan included in Exhibit 31. In addition, whenever this structure is opened for the purpose of raising water in the Wellfield Protection Canal down stream of the structure, the upstream structure that delivers water from the L-30 canal shall be opened in a manner to deliver equal volumes to those passed through the Mid-canal structure and bridge. The permittee shall submit operation and flow data logs regarding both structures to the District quarterly.

58. If in the event the permittee does not comply with the limiting conditions herein, the District shall take appropriate action to require compliance, which may include imposition of penalties, injunctive relief and other enforcement mechanisms under Chapter 373, Florida Statutes.