APPENDIX PW-1

CITY OF MIAMI, FLORIDA

WATER SUPPLY FACILITIES WORK PLAN UPDATE

Prepared By:

City of Miami Planning and Zoning Department

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1.0 INTRODUCTION

The purpose of the City of Miami Water Supply Facilities Work Plan (Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within the City's jurisdiction. Chapter 163.3177(6)(c)3, Part II, F.S., requires local governments to prepare and adopt Work Plans into their comprehensive plans within 18 months after the water management district approves a regional water supply plan or its update. The *Lower East Coast Water Supply Plan Update* was previously approved by the South Florida Water Management District (SFWMD) Governing Board on February 15, 2007. The City adopted a 20 Year Water Supply Facilities Work Plan April 22, 2010. The SFWMD governing Board subsequently approved an update to the *Lower East Coast Water Supply Plan Update* (LEC Update) on Sept. 12, 2013. Based on Florida Statutes, the City must now update its Water Supply Facilities Work Plan by March 12, 2015.

The City of Miami has recognized the importance of water conservation through the Miami Comprehensive Neighborhood Plan (MCNP). The City recognizes that in order to maintain a proactive water conservation program there has to be an effective coordination program with Miami-Dade County Water and Sewer Department (MDWASD) to ensure the success of the program. In addition, the City maintains an excellent working relationship with WASD as a retail customer to ensure compliance with all applicable regulations and guidelines.

The City of Miami is one of 15 municipal "retail" customers. Residents receive 100% of its potable water directly from the Miami-Dade County Water and Sewer Department (MDWASD), which is responsible for ensuring that enough capacity is available for existing and future customers. Under this arrangement, the City will coordinates with MDWASD to ensure that enough capacity is available for existing and future customers and supporting infrastructure.

The Updated City of Miami Water Supply Facilities Work Plan (Work Plan) will reflect whatever changes in the regional plan affect its local water supply and work plan. In addition, since the City is a retail buyer, it will reference the initiatives already identified in Miami-Dade County's 20-year Work Plan. According to state guidelines, the Work Plan and the comprehensive plan amendment must address the development of traditional and alternative water supplies, bulk sales agreements and conservation and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. The City of Miami Work Plan will have the same planning time schedule as the most recently approved Miami-Dade County's 20-year Work Plan.

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise and is expected to present significant challenges related to water resource planning, management and infrastructure. Mitigation and adaption strategies are addressed herein as a primary focal area.

The information contained within this Work Plan Update will be included as amendments to the various elements of the City's Comprehensive Plan.

The City's Work Plan is divided into six sections:

Section 1 – Introduction
Section 2 – Background Information
Section 3 – Data and Analysis
Section 4 – Work Plan Projects/Capital Improvement Element/Schedule
Section 5 – Climate Change and Sea Level Rise
Section 6 – Goals, Objectives, Policies

1.1 Statutory History

The Florida Legislature enacted bills in the 2002, 2004, and 2005 sessions to address the state's water supply needs. These bills, especially Senate Bills 360 and 444 (2005 legislative session), significantly changed Chapter 163 and 373 Florida Statutes (F.S.) by strengthening the statutory links between the regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments. In addition, these bills established the basis for improving coordination between the local land use planning and water supply planning.

In 2005, lawmakers revised state water law, Section 373.707, F.S., and created the Water Resource Protection and Sustainability Program, which requires a higher level of water supply planning coordination between water management districts and local governments.

Effective July 1, 2010, the Florida legislature passed an amendment to Section 373.707, F.S., which concerns water management district funding of alternative water supply projects. The legislation added "water conservation projects that result in quantifiable water savings" to those projects eligible for funding,

In 2011, the Florida Legislature updated Chapter 163, Part II, F.S., to include The *Community Planning Act* (163.3164, F.S.), which addresses the state's water supply needs. The Act requires each municipality and county to adopt and maintain a comprehensive plan. In Florida, all proposed and approved development in the community must be consistent with the comprehensive plan. In terms of water supply planning, information about state requirements for local government comprehensive plans is available in each regional water supply plan update,

As of June 2012, 90 percent of all local governments within the SFWMD developed and formally submitted their Water Supply Facilities Work Plans. The development of these plans has assisted the SFWMD in coordinating future water supply planning and permitting with local government land use planning.

1.2 Statutory Requirements

In order to meet water supply and water facilities planning requirements, local government comprehensive plans must address the following:

1. Coordinate appropriate aspects of their comprehensive plan with the appropriate water management district's regional water supply plan. [Section 163.3177(4)(a), Florida Statutes.]

2. Revise the Potable Water Sub-Element to adopt a water supply facilities work plan covering at least a 10-year planning period to meet existing and projected demand. The work plan should address those water supply facilities for which the local government has responsibility and include the facilities needed to develop alternative water supplies. The work plan should also identify conservation and reuse measures to meet future needs. [Section 163.3177(6)(c), Florida Statutes.]

3. Revise the Conservation Element to assess current and projected water needs and sources for at least a 10-year planning period. The analysis must consider the existing levels of water conservation, use, and protection and the applicable policies of the water management district, and the district's approved regional water supply plan. In the absence of an approved regional water supply plan, the analysis must consider the district's approved water management plan. [Section 163.3177(6)(d)3, Florida Statutes.]

4. Revise the Capital Improvements Element to identify capital improvements projects to be implemented in the first 5 years of the work plan for which the local government is responsible, including both publicly and privately funded water supply projects necessary to achieve and maintain adopted level of service standards; and adopt a five-year schedule of capital improvements to include those projects as either funded or unfunded, and if unfunded, assigned a level of priority for funding. [163.3177(3)(a)4, Florida Statutes.]

5. Revise the Intergovernmental Coordination Element to adopt principles and guidelines to be used to coordinate the comprehensive plan with the regional water supply authority (if applicable) and with the applicable regional water supply plan. [163.3177(6)(h)1, Florida Statutes.]

6. During the Evaluation and Appraisal review, determine if comprehensive plan amendments are necessary to reflect statutory changes related to water supply and facilities planning since the last update to the comprehensive plan. If necessary, transmit the amendments to incorporate the statutory changes as appropriate. [Section 163.3191(1) and (2), Florida Statutes.]

7. Ensure that adequate water suppliers and facilities are available to serve new developments no later than the date on which the local government anticipates issuing a certificate of Occupancy and consult with applicable water suppliers 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. [FS 163.3180(2)(a), effective July 1, 2005.]

2.0 BACKGROUND INFORMATION

2.1 Overview

The City of Miami, known as the "Magic City", is located in Southeast Florida, in Miami-Dade County on the Miami River, between the Florida Everglades and the Atlantic Ocean. The current boundaries of the City encompass an area of approximately 35 square miles. The City of Miami was incorporated in 1896 and has grown into one of the world's renowned centers where people can work, live and play while enjoying a high quality of life. The City of Miami, known for its diverse culture and ethnicities, is the largest municipality in Miami-Dade County.

The City of Miami is substantially built-out. Between 2000 and 2010, the City of Miami population grew from 362,470 to 399,457, an increase of ten percent (10.2%)[1] . By all projections, growth will continue to occur in the region, with future development potential and population growth limited by the scarcity of vacant and developable land. Current estimates of population trends have incorporated the recent deluge of development and redevelopment of new large scale residential projects. The City's greatest development potential will occur as mid to high rise redevelopment projects. For these reasons, it is anticipated the City of Miami will receive a much greater share of the County's population growth.

2.2 Relevant Regional Issues

The Lower East Coast, LEC, Planning Area traditionally has relied on fresh groundwater from the Surficial Aquifer System, SAS, and fresh surface water *from Lake Okeechobee* as the primary water source for urban, agricultural, and industrial uses. In many areas of the LEC Planning Area, development of these sources has been maximized due to potential impacts on the regional system, wetlands, existing water users, and the potential for saltwater intrusion. *As population and water demand increased, the development of other water source options also increased*. Therefore, new or increased allocations from these freshwater sources will be reviewed on an application-by-application basis to determine if a project meets the consumptive use permitting criteria. As a result, diversification of water supply sources, such as use of the upper Floridan aquifer, increased storage, reclaimed water, and appropriate water conservation has been occurring in the LEC Planning Area and is expected to continue to occur in the future. The source options are dependent on location, use type, demand, regulatory requirements, and cost.

Since the previous water supply plan updates, the national economic downturn has slowed residential and commercial development, and in turn, overall population growth, leading to a reduced rate of increase in future urban water demands. Although population growth may be slower than previously projected, the growth is such that additional water supplies over the 20-year planning horizon will likely be required in many areas. This reinforces the need for local governments to develop alternative water sources to ensure adequate future water supplies.

Additionally, Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida,

[1] Population projections provided by *Miami-Dade County RER, Planning Division, 2010 Census TAZ Data*

including Broward, Miami-Dade, Monroe, and Palm Beach Counties. The primary concern to water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Local governments and water utilities in the southeast Florida region have begun to formalize the integration of water supply and climate change considerations as part of coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive storm water and wastewater systems. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate well fields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise, our well fields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

Regional issues that affect the City of Miami include minimizing pressure on the Everglades ecosystem. The South Florida Water Management District is the state agency responsible for water supply in the Lower East Coast planning area which includes the jurisdictional boundaries of the City of Miami. SFWMD plays a pivotal role in resource protection, through criteria used for Consumptive Use Permitting. As pressure increased on the Everglades ecosystem resource, the Governing Board initiated rule making to limit increased allocations dependent on the Everglades system. As a result, the Regional Water Availability Rule was adopted by the Governing Board on February 15, 2007 as part of the SFWMD's water use permit program. This reduced reliance on the regional system for future water supply needs, mandates the development of alternative water supplies, and increasing conservation and reuse.

As a result of these regional water supply issues the City has updated its “Water Supply Facilities Work Plan” as required by Florida Statutes. Since the City is a retail customer, adopted policies within the City’s Comprehensive Plan currently require the City to be consistent with the approved versions of the SFWMD’s LECWSP, and the County’s Water Supply Facilities Work Plan. The City shall coordinate with the County’s Work Plan to identify and develop those water supply projects necessary to meet the City’s projected water demands.

Additional Comprehensive Plan policies require the City to consider the impacts of climate change and sea level rise as an integral component of all planning processes. Rise in sea level shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the City to meet or exceed adopted Level of Service (LOS) Standards. The City shall work with Miami-Dade County to support the implementation of climate related policies.

The City of Miami has also established a “City of Miami Sea Level Rise Committee”, February 26, 2015, to study sea level rise and its effect on the City of Miami and make recommendations.

3.0 DATA AND ANALYSIS

The intent of the data and analysis section of the Work Plan is to describe the information that local governments need to provide to state planning and regulatory agencies as part of their proposed comprehensive plan amendments, particularly those that would change the Future Land Use Map (FLUM) to increase density and/or intensity. Additionally, population projections should be reviewed for consistency between the County and South Florida Water Management District's Water Supply Plan. For the purpose of this report Miami-Dade County Department of Regulatory and Economic Resources (RER) Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ) population projections will be used to calculate City of Miami projected water demands.

3.1 Population Information

The City's existing and future population figures as shown in **Table A** are derived from 2010 census and TAZ. Between 2000 and 2010, the City of Miami population grew from 362,470 to 399,457, an increase of ten percent (10.2%)[2]. By 2015, the City's population is anticipated to increase to 444,485; 2020 to 490,456; 2025 to 536,427; 2030 to 582,398; and 2033 to 609,981 [5] (represents an increase of forty percent over the 2014 population). By all projections, growth will continue to occur in the region, with future development potential and population growth limited by the scarcity of vacant and developable land.

Table A.
City of Miami
Population Projection Comparisons

YEAR	MDC-RER 2010 CENSUS TAZ[3]
2014	435,290
2015	444,485
2020	490,456
2025	536,427
2030	582,398
2033	609,981

3.2 Maps of Current and Future Areas Served

The map depicting the current City boundary served by the MDWASD system is provided in **Figure 1**.

[2] Population projections provided by *Miami-Dade County*, RER, Planning Division, 2010 Census TAZ Data
[3] Population projections provided by *Miami-Dade Department , RER, Planning Division, 2010 Census TAZ*

3.3 Potable Water Level of Service Standard

Based on the adopted 20 Year Water Supply Facilities Work Plan of April 22, 2010, the City of Miami adopted and currently maintains a potable water LOS level of 155 gallons per capita per day which was 17% of the county total demand for water. An update of the per capita use estimated by Miami-Dade Water and Sewer Department 20-Year Water Supply was determined by taking a 3-year average from 2011 to 2013. Results indicate that the initial per capita rate has declined due to water use reductions resulting from water conservation and reuse irrigation water projects. Therefore, the current water demand projections for Miami Dade County are based on an initial system-wide finished water daily per capita use rate of 137.2 gallons per capita per day (gpcd).

The MDWASD as also determined the City of Miami water demand projection has declined to 92.05 gallons per capita per day (gpcd). The City of Miami needs to revise the LOS level that the City has adopted. If future population increases project higher demands, the City will work with the County and SFWMD to refine projections during the five year updates to the water management plan and also through the State mandated Evaluation and Appraisal Report process.

3.4 Population and Potable Water Demand Projections by City

Population projections for the City of Miami's service area in five year increments from Year 2014 to 2033 are shown in **Table B**. Within the City, the population served by MDWASD is expected to increase approximately 40% from Year 2014 to Year 2033.

Table B.
Existing and Projected Potable Water Demand for the City of Miami

WATER SUPPLY UTILITY SERVICE WITHIN LOCAL GOVERNMENT'S JURISDICTION							
Million Gallons/day (MGD)							
Year	Population Projections[4]	Gallons/Capita/ Day	Average Demand (MGD)	MDWASD[5] Adjusted Finished System Demand	Demand as % of County	MDC Alexander Orr Plant Capacity (MGD)	MDC Hialeah-Preston Plant Capacity (MGD)
2014	435,291	92.05	40.07	306.43	13	217.74	225
2015	444,485	92.05	40.91	308.80	13	217.74	225
2020	490,456	92.05	45.17	319.76	14	217.74	225
2025	536,427	92.05	49.38	330.72	15	217.74	225
2030	582,398	92.05	53.61	344.37	16	217.74	225
2033	609,981	92.05	56.15	352.98	16	217.74	225

[4] Population projections provided by *Miami-Dade Department RER, Planning Division, 2010 Census TAZ Data*

[5] Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation *Miami-Dade County Water Supply Facilities Work Plan, 2015*

3.5 Water Supply Provided by MDWASD

The Miami-Dade County 20-Year Water Supply Facilities Work Plan (2014 - 2033) is attached as Appendix B. The intent of the County Work Plan is to meet the statutory requirements mentioned in subsection 1.2 of this plan and to coordinate the MDWASD's water supply initiatives with the SFWMD's *Lower East Coast Water Supply Plan Update*.

The SFWMD initially issued a Water Use Permit, (WUP) for Miami-Dade County on November 15, 2007. The water use permit limits the annual allocation and the maximum monthly allocation until the permit expires. Latest modification to this WUP, No.1300017-W, to the MDWASD were approved on February 9th, 2015. The modified and extended Permit has a duration of 20 years and expires on February 9th, 2035.

The MDWASD's service area is all portions of Miami-Dade County within the Urban Development Boundary (UDB), excluding the service area of North Miami Beach, Homestead, Florida City, and approximately 65% of North Miami's service area. The water demands of the areas within the Urban Expansion are considered in the planning horizon between 2015 - 2033.

The MDWASD water service area contains interconnected systems and, for the most part, functions as a single service area. The service area may be broken down into three sub areas by water treatment facilities: the Hialeah-Preston area, the Alexander Orr Jr. area, and the South Dade area.

The County's 20-Year Water Supply Facilities Work Plan (2014 - 2033), Appendix C, "Water Supply for Municipalities" summarizes Miami-Dade County's Work Plan for Municipalities as follows:

- Exhibit C -1 through 8, describe Water Supply Service Areas, Retail and Wholesale Customers, respectively, by utilizing municipal population projections and projected water demand projections. These water demand projections were computed utilizing the Municipal per capita value that applies to each municipality. The system wide water demands noted in Table 5-2 of the County's Work Plan are based on a system wide finished water daily per capita rate of 137.2 gallons per capita per day (gpcd). For the City of Miami the daily per capita rate is 92.05 gallons per capita per day (gpcd) was used. The population data was derived from Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division based on the 2010 Census and derived from Transportation Analysis Zone (TAZ). This subsection also provides a brief discussion of MDWASD's water conservation.);
- The Water Supply Facilities Work Plan details the facilities and proposed alternative water supply (AWS) projects that are planned in order to meet the water demands through 2033. The proposed projects, by their location, volume of water produced, and timing of implementation will be sufficient to meet the water demand increases. The AWS projects and annual average daily demand (AADD) assumes that all current wholesalers will remain in the MDWASD system through 2033. The AWS projects are included in the County's Capital Improvement Element.

In the 20-Year Work Plan, the MDWASD is committed to meet the water demand for the municipalities within the service area. The City of Miami is served by the Alexander Orr, Jr. sub-area and Hialeah-Preston sub-area water treatment plants.

Alexander Orr Jr. sub-area is comprised of a high pressure system with two major piping loops. This sub-area delivers water to nearly all of Miami-Dade County south of Flagler Street to SW 248th Street, including Virginia Key, Fisher Island, The Village of Key Biscayne and, upon request, to the City of Homestead, and Florida City. The Alexander Orr, Jr. subarea, water treatment plant is supplied by four water supply wellfields (Alexander Orr, Jr.- capacity 74.4 MGD; Snapper Creek – capacity 40.0 MGD; Southwest – capacity 161.2 MGD; and West 32.4 MGD), with a total designed capacity of approximately 308 MGD. In this subarea, there are also Upper Floridan Aquifer wells at two of the wellfields (West Wellfield (WWF) and the Southwest Wellfield (SWWF)). These wells have a total capacity of 25.08 MGD. MDWASD anticipates using these wells for storage of fresh Biscayne Aquifer water during the wet season (when operating water levels in the canal allows) for extraction and use in the dry season. In order to use the Upper Floridan Aquifer wells, the MDWASD installed an ultra-violet (UV) light disinfection system at both the SWWF and the WWF to provide treatment of the Biscayne aquifer water prior to injecting in the Floridan Aquifer. MDWASD is currently cycle testing the Aquifer Storage/ Recovery (ASR) wells at both the West and Southwest Wellfields.

Hialeah-Preston sub-area is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities, and high pressure systems. This sub-area delivers water to Hialeah, Miami Springs, the City of Miami, and other portions of northeastern Miami-Dade County. The Hialeah-Preston sub-area, water treatment plant is supplied by four water supply wellfields (Hialeah- capacity 12.5 MGD; John E. Preston – capacity 53.28 MGD; Miami Springs – capacity 79.30 MGD; and Northwest -149.35 MGD), with a total designed capacity of approximately 295 MGD.

3.6 Conservation

3.6.1 County-wide Issues

The Miami-Dade Water Use Efficiency Plan

Currently, MDWASD is implementing a 20 year Water Use Efficiency Plan and is experiencing reductions in per capita water consumption by 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 lower demand is also the result of lower-than-projected population growth, permanent landscape irrigation restrictions, water loss reduction from Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction and some reuse within the three wastewater treatment plant sites or in their vicinities.. As a result, the Water Conservation projections included within the MDWASD Water Supply Facilities Work Plan were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). The savings from water conservation translate into more potable water available for residential and non-residential use, capital and operating savings, which allow systems to defer or avoid significant expenditures for water supply facilities and wastewater facilities.

Water Conservation Plans and Development Codes

Miami-Dade County has developed recommendations for new development that would achieve higher water use savings than currently required by code. Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction and some reuse within the three wastewater treatment plant sites or in their vicinities. This was done by The Board of County Commissioners amending Water Use Efficiency standards creating or amending–Sections 8-31, 32-84, 8A-381, 32-8.2, 32-83.1, 18A, 18B of the Code of Miami-Dade. All future development within the City will be required to comply with these water conservation measures as provided through these water use efficiency legislations, which may be amended from time to time. The list of legislation and ordinances relating to water use efficiency standard are presented in Appendix D of the MDWASD Water Supply Facilities Work Plan and are also posted in the Miami-Dade Water Conservation Portal.

Per Capita Consumption

The MDWASD establishes per capita consumption for all municipalities including those in its retail customer service area. Based on this data, the MDWASD will work with the municipalities to address those with higher than average per capita and will target programs for those areas. The County anticipates that the implementation of the BMPs identified in the 20-year Water Use Efficiency Plan will result in an adjusted system wide per capita of 133.56 gpcd by 2033.

3.6.2 Local Government Specific Actions, Programs, Regulations, or Opportunities

The City will coordinate future water conservation efforts with the MDWASD and the SFWMD to ensure that proper techniques are applied. In addition, the City will continue to support and expand existing goals, objectives and policies in the comprehensive plan that promotes water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the SFWMD and Miami-Dade County in the implementation of new regulations or programs that are design to conserve water during the dry season.

3.7 Reuse

3.7.1 Regional and County-wide Issues

State law supports reuse efforts. For the past years, Florida's utilities, local governments, and water management districts have led the nation in implementing water reuse programs that increase the quantity of reclaimed water used and public acceptance of reuse programs. Section 373.250(1) F.S. provides that "water reuse programs designed and operated in compliance with Florida's rules governing reuse are deemed protective of public health and environmental quality." In addition, Section 403.064(1), F.S., provides that "reuse is a critical component of meeting the state's existing and future water supply needs while sustaining natural systems."

The City of Miami supports water reuse initiatives under consideration by both the SFWMD and Miami-Dade County. The County has committed to implement a total of 117.5 MGD of water reuse as noted in Appendix F. of the County's 20-year water Supply Facilities Work Plan (2014-2033). In the 20-year Work Plan, the County identified a number of water reuse projects and their respective schedule. According to the Plan, MDWASD is currently implementing a total of 16.49 mgd of reuse at the North,

Central, and South Wastewater Treatment Plants, used for industrial, public and non-public irrigation. Furthermore, 27.6 mgd of reclaimed water will be used to recharge the Floridan Aquifer, and up to 90 mgd of reuse water will be provided to the FPL for Turkey Point cooling.

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects. As such, reuse to address water supply is no longer required or needed.

3.7.2 Local Government Specific Actions, Programs, Regulations, or Opportunities

The City will support the SFWMD and Miami-Dade County water reuse projects, and implementation of new regulations or programs designed to increase the volume of reclaimed water used and public acceptance of reclaimed water.

4.0 CAPITAL IMPROVEMENTS

Work Plan

The City is within Miami-Dade County WASD service area which provides potable water and sanitary sewer services. As discussed, the potable water and sanitary sewer systems have adequate capacity to meet the needs of current and future residents. At this time the City of Miami has no water facility projects planned. This section details water supply facilities that are planned within the County in order for the City of Miami to meet MDWASD's water demands through 2033.

4.1 Alternative Water Supply Projects

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. The decrease in water demands is a result of a successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census.

As a result, the MDWASD applied for a modification and extension of the Water Use Permit No. 13-00017-W. to remove the requirements to complete costly and unnecessary alternative water supply projects from the existing permit. The SFWMD issued a revised Water Use Permit to the MDWASD on February 9th, 2015. The Permit has a duration of 20 years and now expires on February 9th, 2035.

The proposed alternative water supply (AWS) projects are to meet MDWASD's increase water demands through 2033, which encompasses the modification to the 20-year Consumptive Use Permit period. AWS projects have been identified to meet water demands in the MDWASD service area and may be found in the MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan, the MDC 20-Year Water Supply Facilities Work Plan (2014-2033) and Alternative Water Supply Projects, (Table 1 of Appendix A).

4.2 20 Year Work Plan and Capital Improvements Plan

As demonstrated in the previous sections, the Alternative Water Supply Plan being proposed by the County should meet the increased water demands through 2033. As a confirmation that the County is committed to fund these projects, the projects for the 20-Year Work Plan may be found in the MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan (Appendix A) and within the MDC 20-Year Water Supply Facilities Work Plan (Appendix B).

5.0 CLIMATE CHANGE AND SEA LEVEL RISE

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. These communities have agreed to partner in regionally-coordinated climate mitigation and adaptation strategies as part of the Southeast Florida Regional Climate Change Compact (Compact) and have adopted a Regional Climate Action Plan (RCAP) which highlights "Water Supply, Management, and Infrastructure" as a primary focal area.

Investigations and evaluations conducted at the national, regional, and local levels have reinforced the need to plan for the predicted impacts of more frequent and severe drought, increases in tidal and storm-related flooding, and the loss of coastal wellfield capacity due to saltwater contamination. In the absence of proactive planning, these impacts will present liabilities for coastal and inland communities with implications for urban water supplies, water and wastewater infrastructure, and both regional and local drainage/flood control systems. Investments in water supply planning and infrastructure that account for these predicted trends will improve the resilience of our communities, provide public health benefits, and reduce the potential for economic losses.

The City of Miami along with Miami-Dade County, Broward, Monroe, Palm Beach Counties, local governments and water utilities in the southeast Florida region have begun to formalize the integration of water supply and climate change considerations as part of coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive storm water and wastewater systems.

5.1 Sea Level Rise

Sea level rise has significant implications for water management and water supply planning in southeast Florida, the rate of which is accelerating. During the previous century, the global rate of sea level rise averaged approximately 1.6 mm per year. The rate or rise increased to an average of 1.7 mm per year during the second half of the last 1 century, followed by a more significant increase to 3.3 mm per year measured during the last decade. This trend of rising sea level is reinforced by local tide data which documents an increase in regional sea level of about 9 inches during the last 100 years. While

there continues to be uncertainty about the overall extent of sea level rise that might be realized in the coming century, the draft report of the Third National Climate Assessment (NCA) presents a probable range of 1 to 4 feet by 2100. In southeast Florida, partner counties in the southeast Florida Regional Climate Change Compact have collectively agreed to use modified guidance developed by the U.S. Army Corps of Engineers and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 NCA. This unified sea level rise projection has been formally adopted by Palm Beach, Broward, Miami-Dade and Monroe Counties and is now being used to inform planning process and project design throughout the region. As the impacts of historic sea level rise are already being realized and acceleration of the rate of rise is expected to compound local impacts and vulnerabilities, it is prudent that planning processes begin to formally reflect consideration of sea level rise as a future condition with recognized implications for near-term and longer-term planning decisions.

Sea level rise produces varied challenges with the respect to water resources sustainability, water management, and water/wastewater facilities and infrastructure. Impacts include salt water contamination of coastal wellfields, infiltration of groundwater with chloride levels into wastewater collection systems, impairing normal operations and maintenance as well as opportunities for beneficial use of reclaimed water as an alternative water supply. Water management systems are also at risk with systems constrained by rising groundwater and tail water elevations which reduce soil storage and discharge capacity, with increased potential for both inland and coastal flooding and less opportunity for long-term storage of storm water for beneficial reuse.

These realities necessitate consideration of plans and investments that may be needed to compensate for loss of existing water supplies through relocation of wellfields and the development of alternative water supplies while also seeking opportunities to expand regional water storage opportunities. These investments and considerations are in addition to concurrency planning for population growth and water demands that are typical requirements for water supply planning requirements.

5.2 Saltwater Intrusion

The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise the county's wellfields will not be impacted by salt water intrusion.

However, with that being said, along the coast of southeast Florida, and several miles inland, groundwater supplies and potable wells are vulnerable to saltwater contamination. The Biscayne Aquifer which serves as the region's primary water supply is a shallow, surficial aquifer characterized by limestone karst geology which is highly porous, and transmissive. As a result, coastal saltwater intrusion of the aquifer has begun to restrict coastal water supplies and necessitates the development of western wellfields, changes in wellfield in water management operations, and reclaimed water projects to enhance aquifer recharge. Historically, changes in land use, drainage of the Everglades, wellfield operations, and sea level rise have been recognized to influence the location of the saltwater front within the productive layer of the aquifer. At the toe of the front, chloride concentrations exceed drinking water standards of 250 mg/l and thus restrict and/or require abandonment of wellheads located east of the saltwater intrusion line. Hydrologic modeling has revealed that sea level rise when

combined with coastal wellfield pumping has accelerated the movement of the front, doubling the rate at which the front has progressed during the last several decades. It is expected that sea level rise will constitute an increasingly significant influence on the rate of saltwater migration during the next several decades and that significant wellfield capacity will be lost with an additional 2 foot increase in sea level, the extent of which will vary along the coast. It is therefore prudent for water utilities throughout the region (both inland and coastal) to consider adaptation plans that might include wellfield relocation or expansion of western wellfields as part of planned efforts to meet regional water demands. .Continuation of groundwater monitoring and modeling efforts will be critical to predicting the movement of the front under sea level rise scenarios anticipated over the next several decades and adaptation efforts should continue to be refined in accordance with predicted and realized trends.

5.3 Extreme Weather Events

As extreme events increase in frequency and severity, the city and MDWASD will consider impacts and risks associated with drought, water shortages and reduced groundwater tables, all of which can hasten saltwater intrusion and exacerbate water supply impacts. Conversely, more intense and rapid rainfall will cause flooding, increased runoff, as well as impacts to the natural systems and provide less recharge potential.

Extreme rainfall events can increase damage to low-lying utility infrastructure and prolong surface water flooding. The increases in groundwater and sea level will challenge the function of drainage systems and can contribute to excessive flooding for even mild storm events. Predicting for the combined influences of storm events, high tides and sea level rise on drainage system functions and other public infrastructure is a critical planning need as is the assessment of viable water supplies and impacts to the natural systems from prolong droughts.

5.4 Infrastructure Development

With increasing climate change there is a need to diversify water supply sources, treatment technologies and to provide adaptive storm water and wastewater infrastructure design criteria to ensure long-term sustainability of key facilities. Conversely, alternative water treatment technologies generally have a high energy demand and carbon footprint that can exacerbates the climate change impacts. Strategic infrastructure planning should incorporate these constraints and work within with the Goals, Policies and Objectives of the City's Comprehensive Planning processes and water supply facility work plans· to provide for long-term sustainable and balanced approach for future development.

Options that provide for a diversification of water projects and protection of resources will be fundamental to this effort and may include: regional water storage such as the C- 51 Reservoir; aquifer storage and recovery (ASR); the development and use of highly treated wastewater (reverse osmosis) for recharge hydrodynamic barriers; the relocation and/or regionalization of wellfields and treatment facilities away from low-lying areas; and enhancing operational flexibility.

Finally, the support of regional water conservation efforts is a proven strategy for extending the timeline to develop these expensive alternative water supply technologies and should be a prominent objective and dedicated effort to support water resource protections under the threat of sea level rise and climate change.

5.5 Recent Governmental Actions

As part of the Miami-Dade County Evaluation and Appraisal Report adopted in 2011, climate change was identified as one of the priorities to address in the County's Comprehensive Development Master Plan (CDMP). Miami-Dade has incorporated climate change considerations and language in several of the Elements of the CDMP update which was approved by the Board of County Commissioners in October, 2013. Additionally the following has taken place.

1. The Miami-Dade Sea Level Rise Task Force was created by Resolution R-599-13 on July 2, 2013 to review the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure.

2. Miami-Dade Board of County Commissioners adopted in September an ordinance relating to the rules of procedures of the Board of County Commissioners amending Section 2-1 of the Code of Miami-Dade County, Florida, to require that in all agenda items related to planning, design, and construction of county infrastructure a statement be included that the impact of sea level rise has been considered.

3. Sampling of the monitor wells is done by the USGS, under a co-operative Joint Funding Agreement (JFA) contract with Miami-Dade County for wells currently included in the salt front monitoring program (JFA #14GGESMC0000109).

4. Miami-Dade WASD entered into a JFA with the USGS in 2007 (JFA #08EOFL208004) to delineate the current extent of saltwater intrusion in the Biscayne aquifer, to characterize how the extent has changed since the last mapping effort, to improve salinity monitoring in the Biscayne aquifer and to identify the sources of the saltwater to better understand the actions required to prevent or mitigate saltwater intrusion.

5. Miami-Dade County entered into a Joint Funding Agreement GFA 08EOFL20817) with the USGS in February 2008 to develop an integrated surface/ groundwater numerical flow model, with one of the objectives of the project to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. The numerical model is designed among other uses to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion with projected population increase and sea level rise. The USGS has completed the preliminary model and initial scenarios regarding sea level rise, and results are pending publication. The model simulation period is from 1/1/1996 to 12/31/2010, with daily surface-water and groundwater timesteps.

6. MDWASD entered into a JFA in 2014 (JFA 14GGESMCOOOOllO) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, regional agencies for further climate change and sea level rise assessment.

7. The City of Miami established a "City of Miami Sea Level Rise Committee", February 26, 2015, (Resolution File Id: 15-00059) to study sea level rise and its effect on the City of Miami and make recommendations.

6.0 GOALS, OBJECTIVES AND POLICIES

FUTURE LAND USE

* * *

Objective LU-1.8: The location, design and management practices of development and redevelopment in the City shall ensure the protection of natural resources and systems by recognizing, and sensitively responding to constraints posed by climate change and sea level rise

Policy LU-1.8.1: The City shall assist Miami-Dade County in their analysis on climate change and its impacts on the built environment addressing development standards and regulations related to investments in infrastructure, development/redevelopment and public facilities in hazard prone areas including areas vulnerable to sea level rise, tidal flooding and other impacts of climate change. Recommendations from the analysis shall address appropriate changes to land use designations and zoning of impacted properties, and development standards, among other relevant considerations.

Policy LU-1.8.2: The City shall make the practice of adapting the built environment to the impacts of climate change and sea level rise, an integral component of all planning processes, including but not limited to comprehensive planning, infrastructure planning, building and life safety codes, emergency management and development regulations, storm water management, and water resources management.

Policy LU-1.8.3: The City shall actively participate in the Southeastern Florida Regional Climate Change Compact and collaborate to increase regional climate change resiliency by sharing technical expertise, assessing regional vulnerabilities, advancing agreed upon mitigation and adaptation strategies and developing joint state and federal legislation policies and programs.

Policy LU-1.8.4: The City shall work with Miami-Dade County to determine the feasibility of designating areas in the City as Adaptation Action Areas as provided by Section 163.3177(6)(g)(10), Florida Statute, and designate Adaptation Action Areas as provided by Section 163.3164(1), Florida Statute, in order to determine those areas vulnerable to coastal storm surge and sea level rise impacts for the purpose of developing policies for adaptation and enhance the funding potential of infrastructure adaptation projects.

Policy LU-1.8.5: The City shall work with Miami-Dade County to support the implementation of climate related policies, through education, advocacy and incentive programs such as public outreach, including workshops and a website with relevant information.

* * *

POTABLE WATER

* * *

Policy PW-1.2.2: Pursuant to Chapter 163.3177(6)(c), F.S., the City adopted an updated Water Supply Facilities Work Plan (contained in Appendix PW-1 of the MCNP) for a 20-year planning period (2014-2033) that is consistent with the current Lower East Coast Water Supply Plan Update approved by the South Florida Water Management District (SRWMD) and the current adopted County Water Supply Facilities Work Plan. The City's Work Plan and the County's Work Plan are incorporated into the City's Comprehensive Plan. The City's work plan will be updated, at a minimum, every 5 years and within 18 months after the South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan. (See Natural Resource Conservation Policy NR-2.1.7.)

* * *

Policy PW-1.3.1: The City's adopted an updated Water Supply Facilities Work Plan (Work Plan), dated ~~October 2009~~ March 2015, is incorporated as follows in Appendix PW-1 of the MCNP. This document is designed to: assess current and projected potable water demands; evaluate the sources and capacities of available water supplies; and, identify those water supply projects, using all available technologies, necessary to meet the City's water demands for a 20-year period. The Work Plan shall remain consistent with projects as listed in the South Florida Water Management District's Lower East Coast Regional Water Supply Plan. The Work Plan will be updated, at a minimum, every 5-years and within 18 months after the South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan. The Work Plan shall address climate change and sea level rise that may impact the potable water infrastructure and sources. The potable water supply facilities necessary to satisfy projected water demands for the City of Miami during the ~~2007-2030~~ 2014-2033 period are shown in Appendix A of the Water Supply Facilities Work Plan (Appendix PW-1).

* * *

Policy PW-1.3.3: The City shall support Miami-Dade County efforts to consider areas that will be impacted by sea level rise when building, expanding or planning for new facilities such as water treatment plants,

Policy PW-1.3.4: The City shall take all necessary steps to ensure that all future development shall comply with the landscape standards in Sections 18-A and 18-B of Miami-Dade County Code. (See related Policies NR-2.1.8 and NR-2.1.9)

* * *

COASTAL MANAGEMENT

* * *

Policy CM-1.4.2: Rise in sea level projected by the federal government, and refined by the Southeast Florida Regional Climate Change Compact, shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the City. (See related policy CI-1.2.6)

* * *

NATURAL RESOURCE CONSERVATION

* * *

Policy NR-2.1.7: The City adopted an Updated Water Supply Facilities Work Plan (contained in Appendix PW-1 of the MCNP) for a 20-year planning period from 2014 to 2033, that is consistent with the current South Florida Water Management District Lower East Coast Water Supply Plan Updates approved by the South Florida Water Management District (SFWMD) and the current adopted County Water Supply Facilities Work Plan. The City's Work Plan and the County's Work Plan are incorporated into the City's Comprehensive Plan. (See Potable Water Policy PW-1.2.2.)

* * *

Policy NR-3.2.6: The City will reduce human exposure to air pollution by taking into consideration climate change mitigation and adaptation strategies from the recommendations of the Southeast Florida Regional Climate Change Compact to reduce greenhouse gas emissions in accordance with all applicable regulations.

* * *

CAPITAL IMPROVEMENTS

* * *

Policy CI-1.2.3:

* * *

b) Potable Water Transmission Capacity – ~~155~~ 92.05 ~~-~~gallons/ resident/day. (See Potable Water Policy PW-1.2.1 and Natural Resource Conservation Policy NR-2.1.5.).

* * *

Policy CI-1.2.6: Rise in sea level projected by the federal government, and refined by the Southeast Florida Regional Climate Change Compact, shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the City to meet or exceed adopted Level of Service (LOS) Standards. (See related policy CM-1.4.2)

* * *

INTERGOVERNMENTAL COORDINATION

* * *

Policy IC-1.1.~~8~~9: In its development of future potable water supplies and the Water Supply Facilities Work Plan as outlined in Objective PW-1.3, the City shall consider, and be compatible, with the South Florida Water Management District's Lower East Coast Regional Water Supply Plan.

Policy IC-1.1.~~9~~10: The City of Miami shall coordinate with Miami-Dade County WASD by requiring applications to be reviewed by MDWASD during the site plan review process prior to approving a Building Permit, in order to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy for properties located within the City of Miami. The City will monitor proposed amendments to the Miami-Dade County Comprehensive Development Master Plan as they relate to water supply and sea level rise planning in the City of Miami and provide input as necessary.

Policy IC-1.1.11: The City shall participate in the Southeast Florida Regional Climate Change Compact and shall coordinate with other agencies, local municipalities, and the private sector to develop initiatives and goals to address climate change mitigation and adaptation. Climate related goals that support regional climate change objectives shall be integrated into the City's Comprehensive Plan as appropriate.

Policy IC-1.1.12: All City departmental master plans and strategic business plans shall include and prioritize climate change mitigation and adaptation strategies. Climate change related amendments shall be recommended through the next feasible, regularly scheduled amendment process or departmental master plan update for each respective planning document.

a) Each City department shall consider extending planning horizons as appropriate to adequately address (i.e. 30, 50, 75-year plans) the projected long-term climate change impacts into resource allocation recommendations.

b) All new departmental climate change policies and programs shall be monitored for effectiveness.

* * *

Policy IC-2.1.1: The City will continue its active participation in the Miami-Dade Planners' Technical Committee (PTC) for the purpose of addressing common concerns and sharing resources toward solving planning problems, water supply needs and coordinate water use and sea level rise issues as needed with particular emphasis on examining State of Florida planning requirements in the context of Miami-Dade County's unique governmental structure to more effectively coordinate local planning efforts.

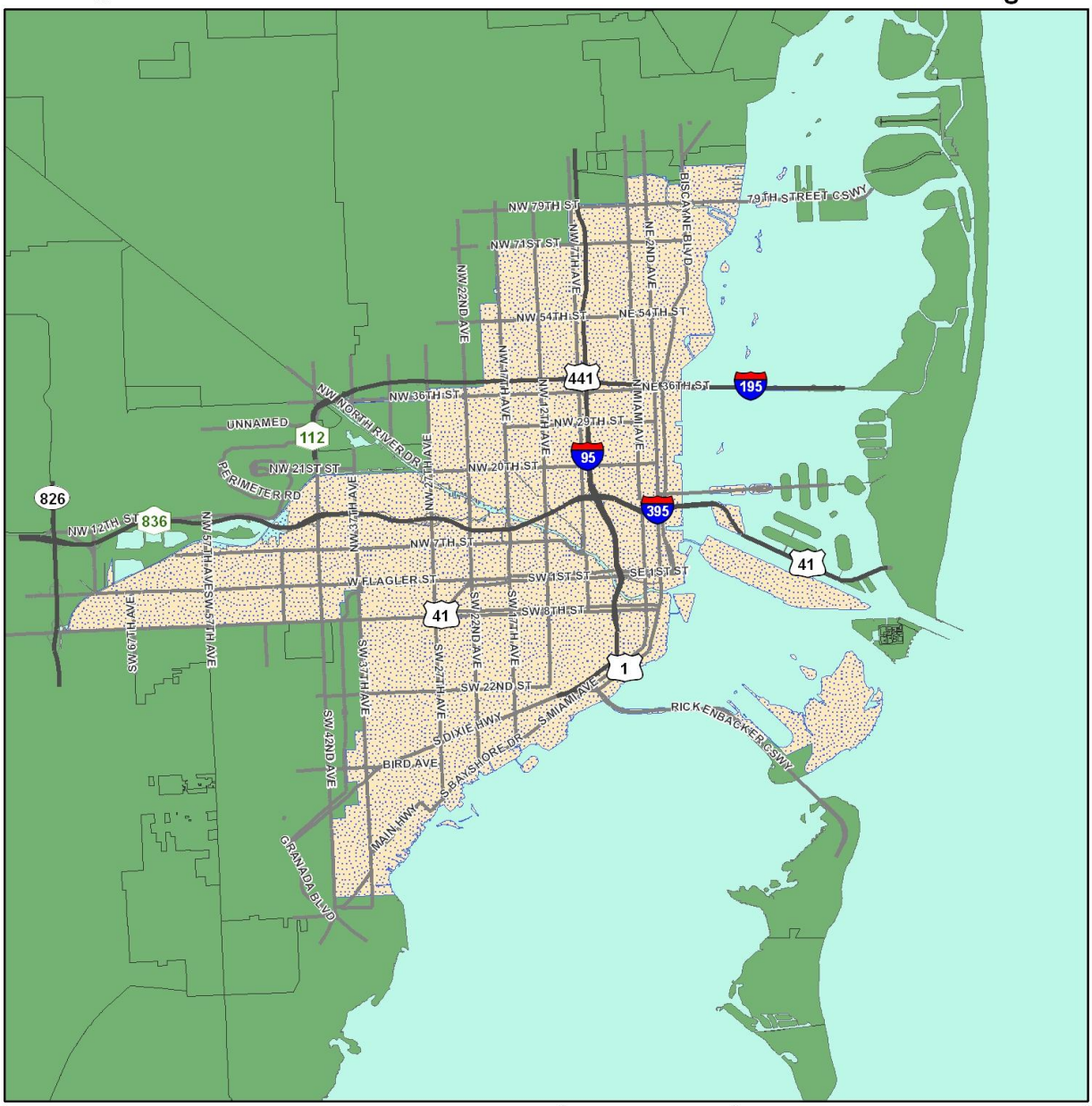
* * *

FIGURES/MAPS

The following map indicates the City of Miami service area by Miami-Dade County Water and Sewer Department (MDWASD).

City of Miami - Retail Water Supply Area
WASD Service Area

Figure 1



APPENDIX A

The following Alternative Water Supply Tables have been extracted from the MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan, and the MDC 20-Year Water Supply Facilities Work Plan (2014-2033), Alternative Water Supply Projects,

Table 1 MDWASD Water/Alternative Water Supply Projects

Project Name	Expenditures (a)						Six Year Totals
	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	4.90	30.44	36.48	5.73	15.73	0.00	93.28
Hialeah Floridan Aquifer R.O.W.T.P Phase 1 (10.0mgd)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: MDWASD Adopted 2014-2015 budget. (a) Millions of Dollars

MIAMI-DADE COUNTY
Delivering Excellence Every Day

MIAMI-DADE WATER AND SEWER DEPARTMENT

ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

SEPTEMBER 18, 2014

Prepared by Capital Planning and Coordination Section

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
1075	101245	WATER TREATMENT MODIFICATIONS TO COMPLY WITH SURFACE WATER TREATMENT AND DISINFECTANT/DISINFECTION BY PRODUCT REGULATIONS	532,624,063	15,200,885	517,522,203	200,000	1,000,000	7,500,000	30,000,000	176,682,053	183,710,573	33,430,577	0	0	0	0	519,523,203
	101880	NEW NWWF HIGH SERVICE PUMP STATION	43,250,000	0	43,250,000	0	0	1,500,000	12,500,000	15,000,000	14,500,000	2,253,000	0	0	0	0	43,250,000
		TOTAL - 1075	575,874,063	15,200,885	575,773,203	300,000	1,300,000	[illegible]	33,300,000	181,702,053	198,210,573	135,683,577	0	0	0	0	575,773,203
1077	101364	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WATER TREATMENT PLANT	75,421,139	5,283,391	70,065,340	200,000	1,253,900	30,800,000	26,513,067	5,757,131	15,731,122	0	0	0	0	0	70,065,240
	101365	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WELLFIELD	21,176,062	2,835,338	18,341,205	300,000	1,200,000	7,900,000	8,941,205	0	0	0	0	0	0	0	18,341,205
	101375	CONSTRUCTION MANAGEMENT AT SOUTH MIAMI HEIGHTS WTP	4,330,000	1,099,597	2,306,133	122,285	300,000	1,480,764	403,313	0	0	0	0	0	0	0	2,306,433
	101775	DESIGN AND CONSTRUCTION OF PROPOSED 16 INCH WATER MAIN	4,500,000	1,477,596	3,022,404	144,263	1,400,870	1,478,159	0	0	0	0	0	0	0	0	3,022,404
	101842	SOUTH MIAMI HEIGHTS RO MEMBRANES WTP	42,000,000	0	42,000,000	0	0	0	0	0	0	0	42,000,000	0	0	0	42,000,000
	102021	SOUTH MIAMI HEIGHTS - RO WELLS AND PIPING	21,600,000	0	21,600,000	0	0	0	0	0	0	0	21,600,000	0	0	0	21,600,000
		TOTAL - 1077	169,124,201	11,687,812	157,436,289	567,085	4,500,000	38,438,589	36,470,715	5,777,131	15,778,818	0	63,600,000	0	0	0	157,436,393
1078	121358	TELEMETERING SYSTEM - WATER	17,597,261	2,950,110	14,647,151	2,214,885	1,133,367	2,432,677	2,432,297	2,432,367	2,000,000	2,000,000	0	0	0	0	14,647,193

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MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond-Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
		TOTAL - 1878	17,297,268	2,650,113	14,647,155	2,254,625	1,123,807	2,455,307	2,453,037	2,433,307	2,830,000	2,000,000	0	0	0	0	14,647,150
1880	10[illegible]	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 1 (10 MGD) - OGB IN 1005.101.99	45,606,605	44,756,067	851,730	851,730	0	0	0	0	0	0	0	0	0	0	851,730
	10[illegible]	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 2 (5 MGD)	12,816,875	0	12,816,875	0	0	0	0	0	0	0	12,816,875	0	0	0	12,816,875
	[illegible]	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 3 (2.5 MGD)	6,099,120	0	6,099,200	0	0	0	0	0	0	0	6,099,200	0	0	0	6,099,120
		TOTAL - 1880	64,522,722	44,756,907	19,766,885	851,730	0	0	0	0	0	0	18,915,875	0	0	0	19,566,685
1881	131086	INSTALLATION OF 12-INCH DWM ON EAST DRIVE FROM NW 36 ST. TO LABARON DR.	487,042	302,598	84,445	50,000	34,396	0	0	0	0	0	0	0	0	0	84,446
		TOTAL - 1881	487,042	402,544	84,445	50,000	34,400	0	0	0	0	0	0	0	0	0	84,400
1882	[illegible]	WATER - PIPES AND INFRASTRUCTURE PROJECTS	82,605,444	28,120,567	54,485,877	10,715,456	8,000,000	14,602,405	6,201,688	5,547,726	4,874,170	4,183,200	0	0	0	0	54,485,877
		TOTAL - 1882	82,605,444	28,121,567	54,485,877	10,715,470	8,000,000	14,016,435	6,201,688	5,547,726	4,874,170	4,188,200	0	0	0	0	54,485,877
		TOTAL - Water	4,447,616,612	410,385,117	2,086,673,495	83,888,330	115,808,000	314,146,800	288,197,638	418,173,886	412,115,000	390,888,490	1,863,378,000	2,883,830	3,000,000	0	3,633,938,496

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APPENDIX B

The following attachment is the Miami Dade Water and Sewer Department (MDWASD) Final 20 Year Water Supply Facilities Work Plan (2014-2033) adopted February 2015.

Miami Dade Water and Sewer Department

20-year Water Supply Facilities Work Plan

(2014 – 2033)

Support Data

November 2014
(Revised January 2015)

Report

Executive Summary

The Update to the Miami-Dade Water and Sewer Department's (MDWASD) 20-Year Water Supply Facilities Work Plan is prepare as required by Section 163.3177(6)(c)3 of the Florida Statutes. Said statutory provision requires all local governments to adopt a water supply work plan that identifies the alternative water supply projects, traditional water supply projects and conservation and reuse measures necessary to meet projected water demand. The work plan is to be updated, at a minimum, every five years and within 18-months of an adopted update to the regional water supply plan. The Lower East Coast (LEC) Regional Water Supply Plan was adopted by the South Florida Water Management District Governing Board in September 2013.

The Water Supply Facilities Work Plan Update presents MDWASD's water supply systems and provides a plan for implementing water supply facilities, including the development of traditional and alternative water supplies necessary to serve existing and new development.

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

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change and Sea Level Rise Plan

The County's projected finished water demands are now significantly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. The updated water demand projections have resulted in a 71 million gallons per day decrease by the year 2030. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. As such, reuse projects to address water supply have been eliminated. However, MDWASD will be implementing a total of 117.5 mgd of

reuse to address the Ocean Outfall Legislation which includes 27.6 mgd of Floridan Aquifer Recharge and up to 90 mgd of reuse water to FPL for Turkey Point Units 5, and6.

The decrease in water demands has been a result of the successful implementation of the County's Water Conservation Plan, and new population projections based on the 2010 Census. Through 2013, a total of 11.2 mgd have been saved through the implementation of the Water Conservation Plan Best Management Practices. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction

Based on the decrease in water demands, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) on June 20, 2014. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. The alternative water supply project include a new South Miami Heights Reverse Osmosis Water Treatment Plant with a capacity of 17.45 mgd. This update to the Water Supply Plan reflects the water supply projects required per the WUP Modification request, which is anticipated to be approved by November 2014.

In addition, MDWASD's evaluation and planning for sea level rise and climate change is detailed over the planning horizon in the Work Plan. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years, MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise, the wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

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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 regulatory and statutory requirements, MDWASD is updating its comprehensive 20- year plan for water supply development. The previous Water Supply Facilities Work Plan was dated April 2008 and adopted by the County's Board of County Commissioners on April 24, 2008.

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.

Section 373.709, Florida Statutes, Section 163.3177(6)(c)3, Florida Statutes, requires that the water supply and work plan be updated within 18 months after a water management district's governing board approves an updated regional water supply plan to reflect whatever changes in the regional plan affect their local water supply and work plan. 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. Revise the Potable Water Sub-Element to adopt a water supply facilities work plan covering at least a 10-year planning period to meet existing and projected demand. The work plan should address those water supply facilities for which the local government has responsibility and include the facilities needed to develop alternative water supplies. The work plan should also identify conservation and reuse measures to meet future needs. [Section 163.3177(6)(c), Florida Statutes.]

3. Revise the Conservation Element to assess current and projected water needs and sources for at least a 10-year planning period. The analysis must consider the existing levels of water conservation, use, and protection and the applicable policies of the water management district, and the district's approved regional water supply plan. In the absence of an approved regional water supply plan,

the analysis must consider the district's approved water management plan. [Section 163.3177(6)(d)3, Florida Statutes.]

4. Revise the Capital Improvements Element to identify capital improvements projects to be implemented in the first 5 years of the work plan for which the local government is responsible, including both publicly and privately funded water supply projects necessary to achieve and maintain adopted level of service standards; and adopt a five-year schedule of capital improvements to include those projects as either funded or unfunded, and if unfunded, assigned a level of priority for funding. [163.3177(3)(a)4, Florida Statutes.]

5. Revise the Intergovernmental Coordination Element to adopt principles and guidelines to be used to coordinate the comprehensive plan with the regional water supply authority (if applicable) and with the applicable regional water supply plan. [163.3177(6)(h)1, Florida Statutes.]

6. During the Evaluation and Appraisal review, determine if comprehensive plan amendments are necessary to reflect statutory changes related to water supply and facilities planning since the last update to the comprehensive plan. If necessary, transmit the amendments to incorporate the statutory changes as appropriate. [Section 163.3191(1) and (2), Florida Statutes.]

7. 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.

This Water Supply Facilities Work Plan Update is meant to satisfy portions of the above statutory requirements (other portions are satisfied through existing policies in the County's Comprehensive Development Master Plan) as stated in Item 1 above, to coordinate with the Lower East Coast (LEC) regional water supply plan. The 2013 LEC Water Supply Plan Update was adopted by the South Florida Water Management District (SFWMD) Governing Board on September 12, 2013.

1.2 Purpose and Objectives

The purpose of this Water Supply Facilities Work Plan Update 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.

On May 2, 2014, the MDWASD and the SFWMD held a joint workshop with local governments to assist them in their efforts to prepare an update to the Water Supply Facilities Work Plan (Work Plan). MDWASD will coordinate and provide information to the local governments in Miami-Dade County to assist them in the preparation of their Work Plans Update.

The information contained within this Work Plan Update will be included in an amendment to various elements of the County's Comprehensive Plan. This Work Plan Update is to be updated and updated every five years within 18 months after the SFWMD Governing Board approves an updated LEC regional water supply plan.

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

- Section 1 - Introduction
- Section 2 – Water Service Area
- Section 3 – Existing Water Supply Facilities
- Section 4 – Population and Water Demand Projections
- Section 5 – Planned Water Supply Facilities
- Section 6 – Climate Change

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, shownon **Figure 2-1.**

Within the MDWASD service area, there are 15 wholesale customers. Thirteen (13) of the fifteen (15) wholesale customers have executed 20-year water use agreements, and one (1) has executed a 30-year water agreement. The water use agreement between MDWASD and the City of Hialeah is currently under negotiations. The City of North Miami Beach stopped purchasing water from MDWASD in 2008, and has a 30-year wholesale agreement with MDWASD to purchase water on an as needed basis. The City of Miami Springs is no longer a wholesale customer of MDWASD, as the water and sewer infrastructure was transferred to the County in July 2008. Table 2-1 identifies the 15 wholesale customers and the status of their large user contracts.

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 such water suppliers 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. In 2010, the City of Homestead entered into a 20-year water use agreement with MDWASD to purchase up to 3 MGD to meet the demands of its retail water customers. The water furnished will be received by the City of Homestead at the interconnection point located at SW 137th Avenue and 288th Street. In the North Dade area, the City of North Miami and the City of North Miami Beach provide water to portions of unincorporated and 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. The Hialeah Reverse Osmosis (R.O.) plant was completed in October 2013 and is providing water to the City of Hialeah and unincorporated Miami-Dade County.

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 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 unincorporated Miami-Dade County including the Redavo development. This development consists of 107 homes and an approximate population of 310. **Figure 2-4** shows the current South Dade subarea.

The design of the new South Miami Heights (SMH) WTP in the South Dade subarea is underway. The SMHWTP is scheduled to come on line by December 31, 2018. Of the five existing plants in the South Dade subarea, only Everglades and Newton WTPs will remain in service on a stand-by-basis after 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 by 2018. 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.

Figure 2-1: MDWASD Service Area and Wholesale Customers

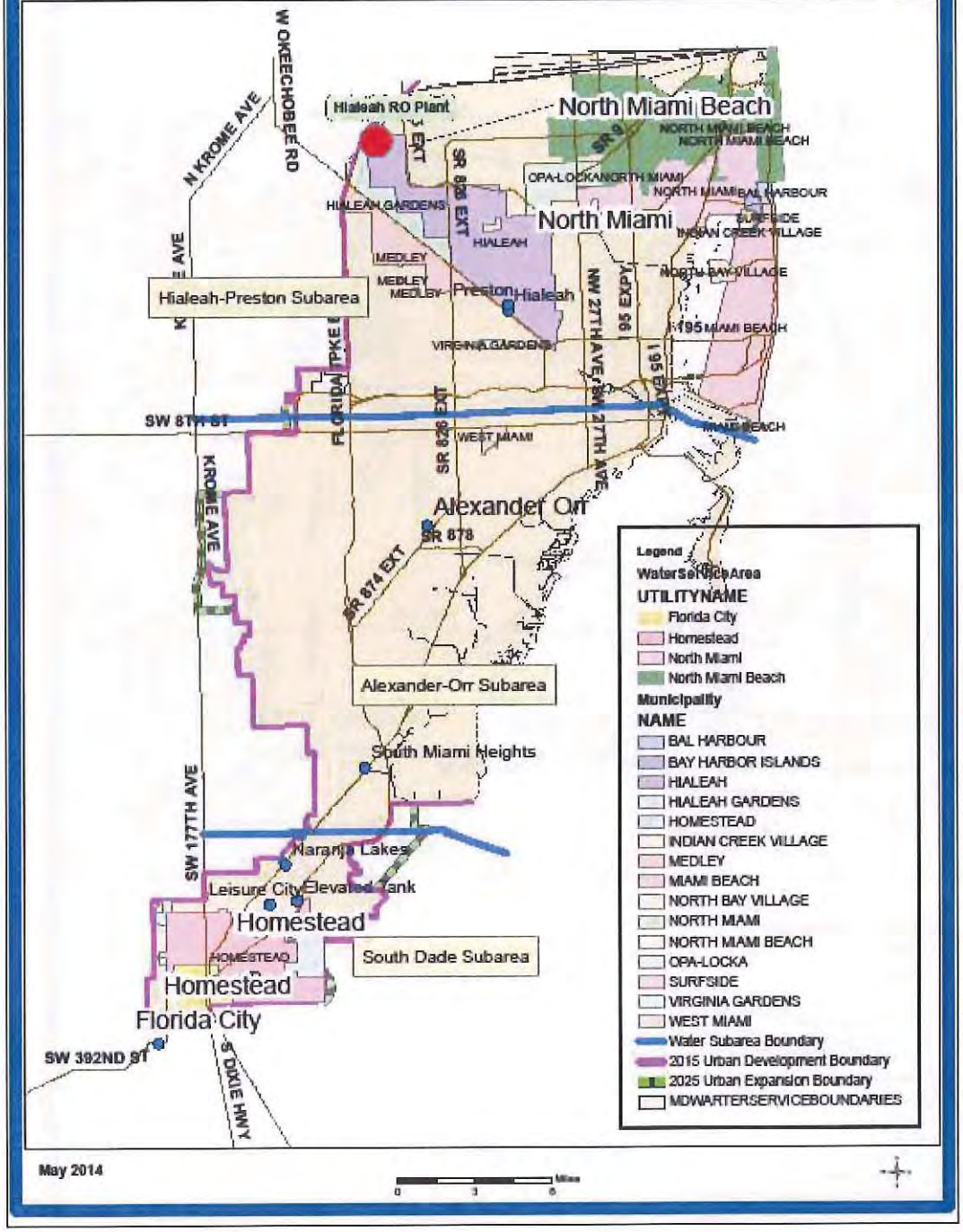


Figure 2-2:
Hialeah-Preston Sub-Area and Water Treatment Plants

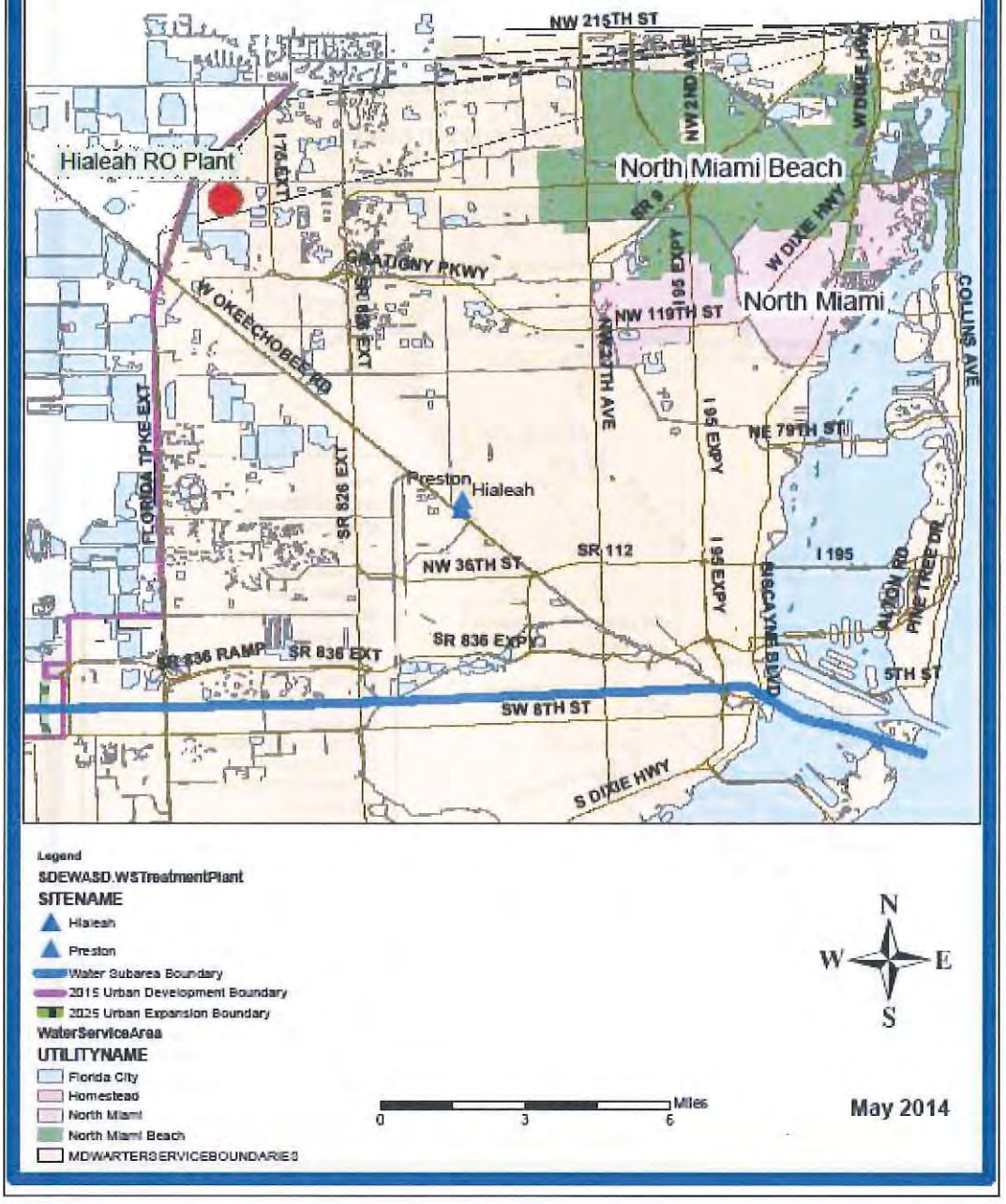
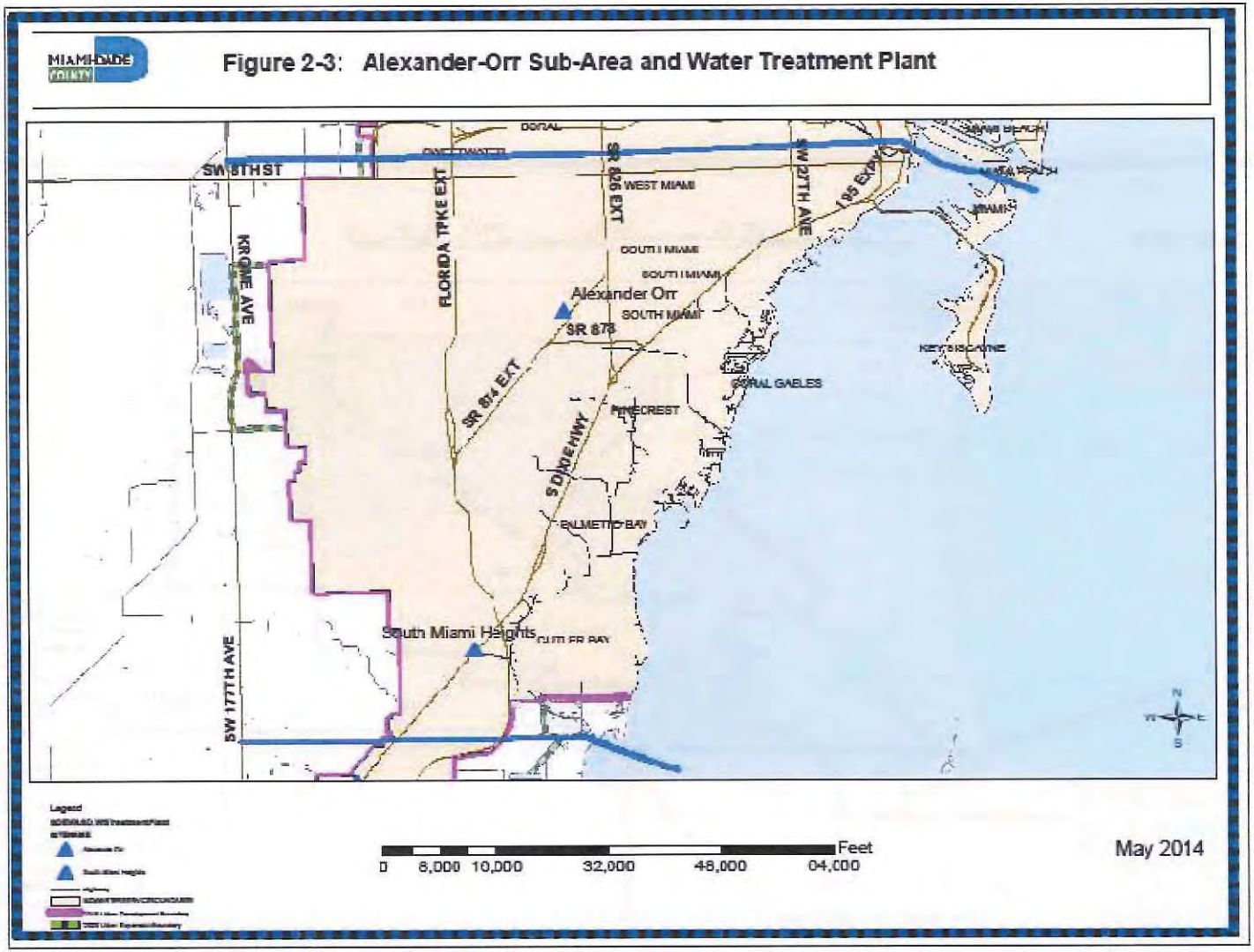


Figure 2-3: Alexander-Orr Sub-Area and Water Treatment Plant



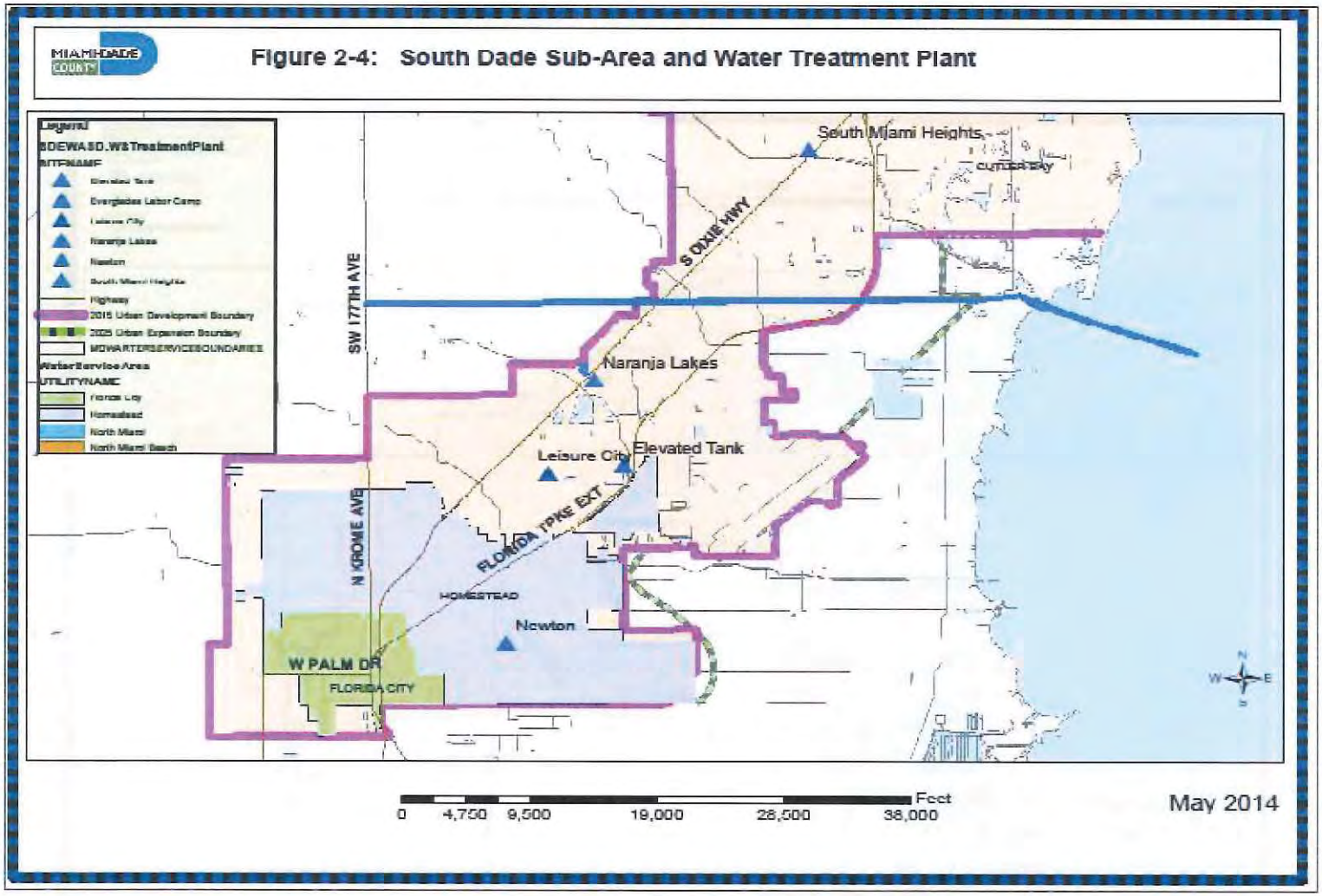


Figure 2-4: South Dade Sub-Area and Water Treatment Plant
MIAMI-DADE COUNTY
Legend
SDEWASD.WSTreatmentPlant
FACILITYNAME
Everglades Labor Camp
Leisure City
Naranja Lakes
Newton
South Miami Heights
Highway
2015 Urban Development Boundary
2025 Urban Expansion Boundary
WaterServiceArea
UTILITYNAME
Florida City
Homestead
North Miami
North Miami Beach
South Miami Heights
CUTLER BAY
S DIXIE HWY
SW 177TH AVE
Naranja Lakes
Leisure City
Elevated Tank
FLORIDA TPKE EXT
N KROME AVE
HOMESTEAD
Newton
W PALM DR
FLORIDA CITY
N
W
E
S
Feet
0
4,750
9,500
19,000
28,500
38,000
May 2014

2.5 Wholesale Customers

Fourteen (14) of the 15 wholesale water customers within the MDWASD service area have large user agreements. One (1) wholesale water agreement with the City of Hialeah is under negotiations. These agreements, with the exception of the City of North Miami Beach, are for 20-year periods. The water agreement with the City of North Miami Beach is for a period of 30-years. In 2007, the City of Miami Springs indicated their desired to pursue the transfer of the Miami Springs water and sewer department to the County. Said transfer was approved by the Miami-Dade County Board of County Commissioners (BCC) on July 17, 2008. **Table 2-1** identifies the 15 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 shall release the portion of the service area requested.

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 under negotiation. Joint participation agreement between Miami-Dade County and the City of Hialeah for the RO Plant was entered on 12/27/07.
City of Hialeah Gardens (HG)	Signed, executed agreement
City of Homestead (HOMSTD)	Signed, executed agreement; 3 MGD Max.
Indian Creek Village (IC)	Signed, executed agreement
Town of Medley (MED)	Signed, executed agreement
[illegible]	Signed, executed agreement
City of North Bay Village (NB)	Signed, executed agreement
City of North Miami (NM)	Signed, executed agreement
City of North Miami Beach (NMB)	Signed, executed agreement, as needed basis
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. 13-00017-W, Re-issue July 16, 2012

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

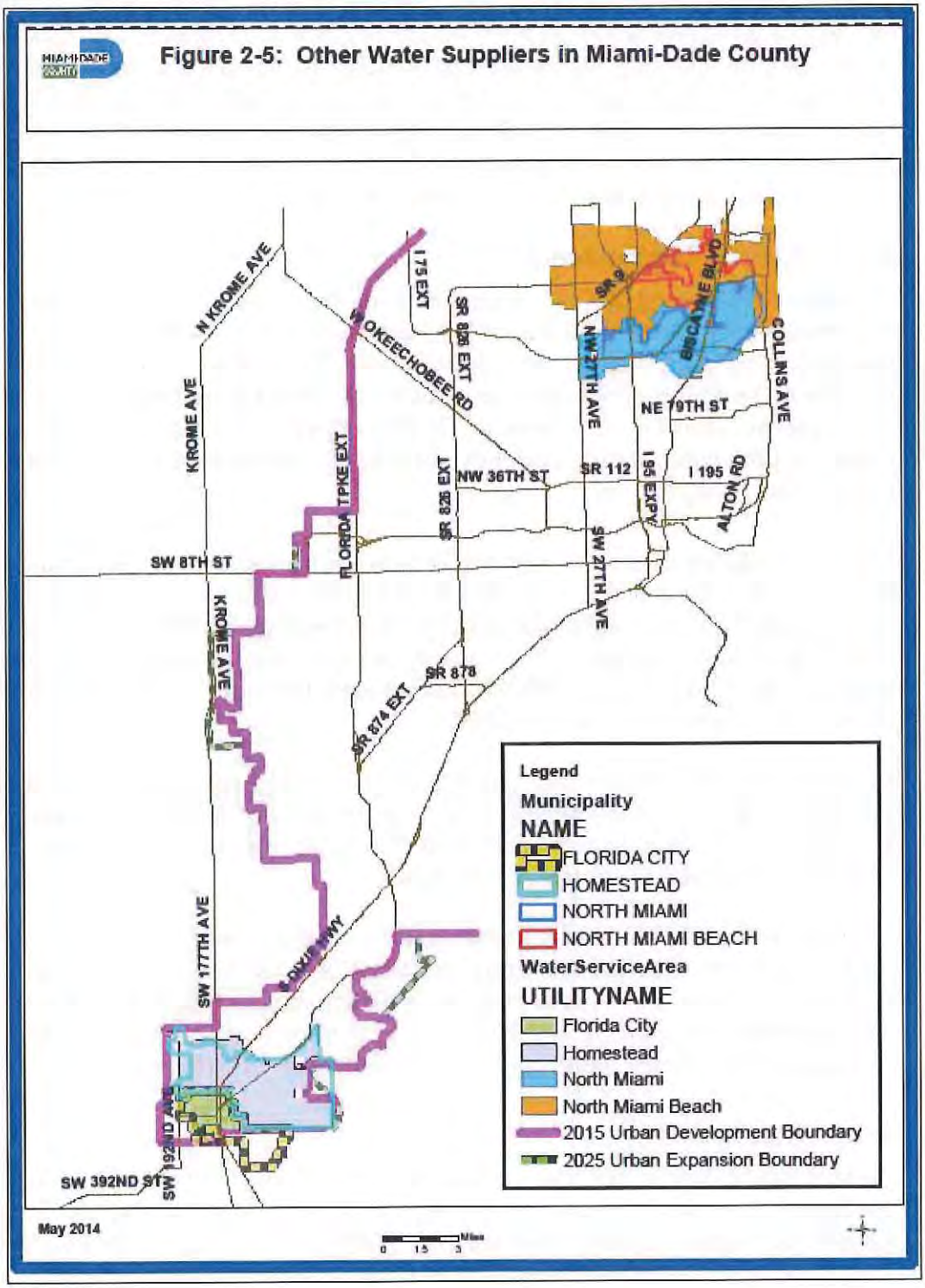
In the northern part of the County, the City of North Miami provides water service to parts of northern Miami-Dade County within its municipal boundaries, as well as outside of its municipal boundaries extending into the northwestern parts of unincorporated Miami-Dade County.

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 91,000 people in a 13 square-mile area, servicing the City of North Miami, the Village of Biscayne Park, small area of Miami Shores, and parts of unincorporated Miami Dade County. The City currently purchases approximately 37% of their water needs from MDWASD.

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.

Figure 2-5: Other Water Suppliers in Miami-Dade County



The City's distribution system consists of a high pressure system, distributing

potable water service to more than 163,962 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.

Pursuant to the terms of a Consent Decree between the City of Homestead and the SFWMD, dated December 7, 2009, the City is required to reduce its withdrawl from the Biscayne Aquifer by approximately 3 MGD to meet the conditions of the City's Water Use Permit. On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers.

In addition, MDWASD provides some water service within portions of the municipal boundary of the City of Homestead. Furthermore, 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 over 65,000. 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 9,700, and is generally bounded by SW 328th Street to the north, SW 172nd Avenue/SW 167th Avenue to the east, SW352nd Street/SW 360th Street to the south, and SW 187th Avenue to the west.

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, the new Hialeah Reverse Osmosis (RO) Water Treatment Plant (WTP), and the five (5) 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 (FA) is the drinking water source for the new Hialeah RO WTP.

The 20-Year Water Use Permit (WUP)for Miami-Dade County was approved by the SFWMD Governing Board on November 15, 2007. Subsequent modifications were issued, with the latest one dated July 16, 2012. The water use permit limits the annual allocation to 149,906 million gallons (MG) and the maximum monthly allocation to 13,117 million gallons until the permit expires on December 31, 2030. 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.

On June 20, 2014 the MDWASD submit an application for modification and extension of the existing WUP. Said modification includes new water demand projections based on 2010 population data and revised alternative water supply and reuse projects.

3.1.1 Wellfields and Capacities

The existing MDWASD water supply system is comprised of eight (8) major Biscayne Aquifer wellfields in the Hialeah-Preston and Alexander Orr, Jr. subareas, twelve (12) Biscayne Aquifer water supply wells located at five individual water systems (formerly Rex Utility District water system) in South Dade County and the ASR 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.

The new Hialeah RO WTP is supplied by six (6) FA wells, as noted on **Figure 3-2.** The total installed capacity for the six wells is 12 MGD. A total of four (4) additional FA wells wi+ll be constructed with a total capacity of 8 MGD. The City of Hialeah is in the process of bidding the four wells and are scheduled to be completed by April 2015.

In addition to these wellfields, 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 3-2 Floridan Aquifer Wellfield Data

Wellfield	Wellfield Data	
	Design Capacity (mgd)	**Number of Wells**
Alexander Orr WTP (use of FA Wells for ASR)(c)		
Southwest	10.00	2
West	15.00	3
Subtotal	25.00	**5**
Hialeah RO WTP (use of FA Wells for RO)		
Hialeah RO (b)(d)	12.00	6
Future Hialeah RO(a)(d)	8.00	4
South Miami Heights WTP (Future use of FA Wells for RO))(c)		
Future South Miami	24.00	7
Existing MDWASD System Total (Floridan Aquifer)	**37.00**	**11**
Future MDWASD System Total (Floridan Aquifer)	69.00	22

(a) Proposed wells
(b) Hialeah RO WTP (Phase 1, 10 mgd by 2015;
(c) Source: MDWASD Water Use Permit No. Re-issue 13-00017-W, July 16, 2012
(d) Source: MDWASD Water Use Permit No. 13-00017-W proposed modification, June 2014

Figure 3-1: MDWASD Wellfields, Wellfield Protection Areas

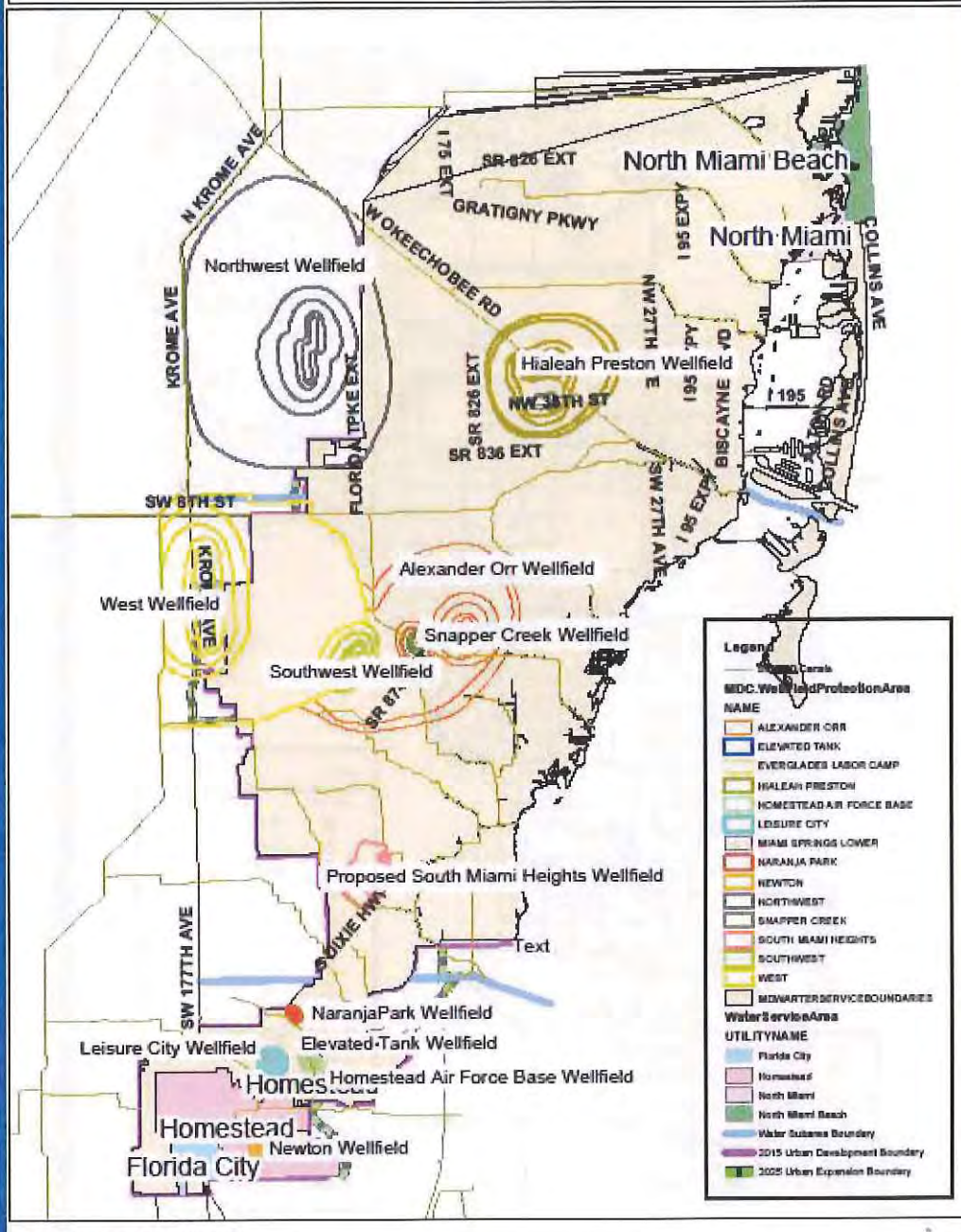


Figure 3-2: MDWASD Water Treatment Plants and Finished Water Lines

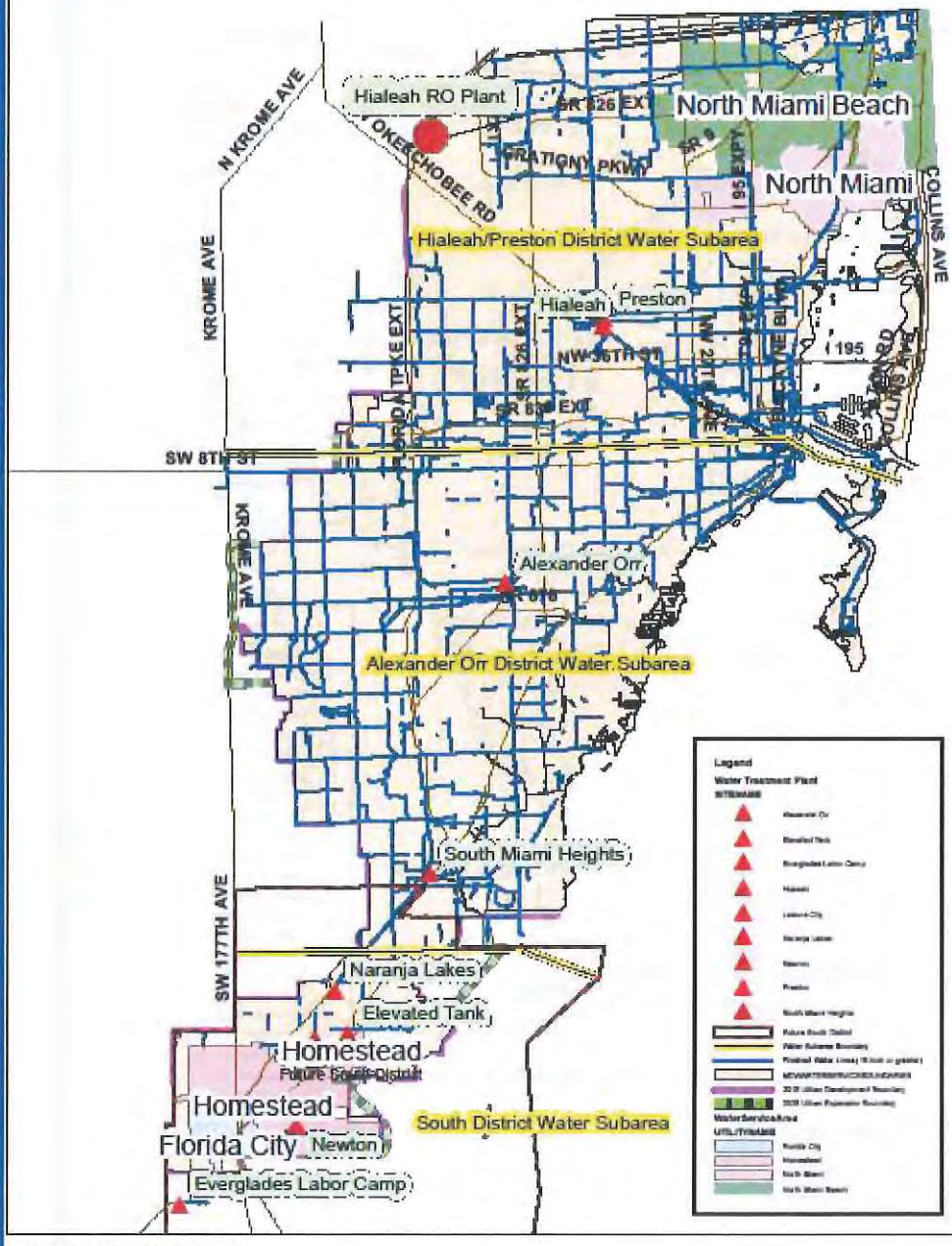


Table 3-1 Biscayne Aquifer Wellfield Data

Wellfield	Wellfield	
	Installed Design Capacity	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 (emergency only)[b]	48.96	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[c]	4.32	2
Everglades Labor[d]	5.04	3
Leisure City[c]	4.18	4
Naranja[c]	1.15	1
Newton[d]	4.32	2
Subtotal	**19.01**	**12**
***Proposed South Miami Heights*[e]**		
Former Plant	*4*	*1*
Roberta Hunter Park	*6*	*4*
Subtotal	***10.00***	*5*
Existing MDWASD System Total(Biscayne Aquifer)	**670.44**	**95**
Proposed MDWASD System Total(Biscayne Aquifer)	**680.44**	**100**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.
(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency
(c) Abandoned when SMH WTP on line by 2018
(d) Stand-by when SMH WTP on line by 2018
(e) SMH WTP on line by 2018
Source: MDWASDWater Use Permit No. Re-issue 13-00017-W, July 16, 2012, and proposed modification, June 2014

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 12.54 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 48.96 mgd or 34,000gpm

3.1.2.6 Hialeah RO Wellfield

The Hialeah RO wellfield has six (6) active wells that were contructed in 2012. The wells are 16 and 17-inches in diameter, with depth ranging from 1,452 to 1,490 and casing depths ranging from 1,060 to 1,080 feet. The capacity of each well is 2 mgd. The total capacity of the wellfield is 12 mgd.

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 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). In the past, there was some concern about Saltwater intrusion in this wellfield. As a result improvements were implemented to a control structure on the C-2 Canal, which reduced the saltwater intrusion.

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 (17) 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 161.20 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 ASR

Three Upper Floridan Aquifer wells are located in the West Wellfield (WWF) and two are located in the Southwest Wellfield (SWWF). 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 15.00 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.

MDWASD is cycle testing the ASR wells at the SWWF and WWF. MDWASD 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. As part of the Underground Injection Control (UIC) ASR permit requirements, MDWASD installed an ultra-violet (UV) light disinfection system at both the SWWF and the WWF to provide treatment of Biscayne Aquifer water prior to injecting in the Floridan Aquifer.

MDWASD operates the ASR system according to Department of Environmental Protection UIC permits. Injected water from the Biscayne Aquifer is from the Biscayne Aquifer water allocation in the 20-year Water Use Permit 13-00017-W for the WWF and the SWWF.

3.1.4 South Dade Subarea Wellfields

The five (5) 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 19.01 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 by December 31, 2018.

3.1.4.1 Elevated Tank Wellfield

The two (2) 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 (3) 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 5.04 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 (4) 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 4.18 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 (2) 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 commenced the design 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 on a stand-by basis The three anticipated wellfields and their capacities are: Former Plant Wellfield, 4.0 mgd; Roberta Hunter Park Wellfield,6 mgd; and South Miami Heights 24 mgd. The future SMHs WTP will have a capacity to produce 20 mgd (max day) finish water using a combination of Floridan and Biscayne raw water.

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 (8) 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 sixteen (16) Biscayne aquifer and four (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 (4) production wells located on a site adjacent to the treatment plant. There are two (2) 12-inch and two (2) 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, the Hialeah RO plant 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.

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 cited in a residential area of Hialeah.

3.2.1.3 Hialeah Reverse Osmosis (RO) Water Treatment Plant

On December 27, 2007, the Miami-Dade County and the City of Hialeah entered into a Joint Participation Agreement (JPA) to design, construct, and operate a water

treatment plant. The JPA specified that the County and the City would be equal partners in funding the project.

The Hialeah RO WTP was released for operation by the Florida Department of Health in November 2013. The Plant is located at 4250 W. 114th Terrace in the City of Hialeah, and is approved to operate at a capacity of 7.5 MGD. An additional capacity of 2.5 MGD is scheduled to be completed by December 31, 2015. The main source of water for the Hialeah RO WTP is the Floridan Aquifer. The Hialeah RO plant is currently in operation serving 50% of its water capacity to the City of Hialeah and 50% to unincorporated areas within the MDWASD's service area.

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 can also receive groundwater from five Upper Floridan Aquifer wells located in the West Wellfield and the Southwest Wellfield. 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 2013 annual average daily flow (ADF) for the plants is 7.29 mgd. This system serves a population of approximately 46,673 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.

MDWASD commenced the design of a new 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 on a stand-by basis when the SMH WTP comes into service by the end of 2018. 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, 12098 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 7.7 MGD, or 63 percent of the total demand which is approximately 12.2 MGD. The Winson WTP provides treated water to a portion of unincorporated Miami-Dade County in addition to within the City of North Miami municipal boundary and the Village of Biscayne Park.

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 treatment plant has an approved capacity of 32 mgd. 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 Park 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 commenced design of the new South Miami Heights WTP in the South Dade subarea. As part of the projects, a 5 MG reservoir was constructed in 2012, which is currently operating as a re-pump station, until the WTP is completed.

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 three regional treatment plants ,five (5) smaller treatment plants located in the southern portion of Miami- Dade County, and the Hialeah RO WTP. 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 MDWASD 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 72-inch diameter main heading north along West 2nd Avenue, next it turns west at West 20th Street, and then it turns North along West 4th Avenue to NW 191st Street. At this location, it turns east until it reaches N.E. 18th 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 54-inch diameter main heading out of the John E. Preston WTP at West 25th 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. 56th 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 commenced 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 on a stand-by service when the SMHWTP comes on line by 2018. 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 by 2018, when SMHWTP comes 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 south, and expands into the distribution system. The City also maintains seven supply interconnections with MDWASD and a emergency interconnections with the City of North Miami Beach and City of Opa-Locka. 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 45 mgd with largest one pump out of service. 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.

On July 9, 2010, the City of Homestead entered into a 20-year water wholesale agreement with MDWASD to purchase up to 3 MGD of water to meet the demands of its retail customers. The interconnection between the City and MDWASD occurs at SW 137th Avenue and SW 288th Street.

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 16-inches in diameter, mostly of ductile iron pipe. The City's distribution system provides service within its municipal boundaries..

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 724.44 MGD and 517.19 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
Medley Wellfield [b]	48.96
Hialeah RO Water Treatment Plant	**10**
Hialeah RO Wellfield (Floridan Aquifer)	
Existing Hialeah RO	12.00
Future Hialeah RO (2015)	8.00
Alexander Orr Water Treatment Plant	**248**
Alexander Orr Well fields	
Orr Plant	74.40
Snapper Creek	40.00
Southwest	161.20
West	32.40
South Dade Water Treatment Plants	**14.19**
South Dade Wellfields	
Elevated Tank	4.32
Everglades Labor Camp	5.04
Leisure City	4.18
Naranja	1.15
Newton	4.32
Future South Miami Heights Water Treatment Plant (2018)	***20.00***
Future South Miami Heights Wellfields	
Former Plant (Biscayne Aquifer)	*4.00*
Roberta Hunter Park (Biscayne Aquifer)	*6.00*
South Miami Heights RO (Floridan Aquifer)	*24.00*
Existing WASD Wellfield Total	**682.44**
Existing WASD Water Treatment Plant Total	**497.19**
Future WASD Wellfield Total	**724.44**
Future WASD Water Treatment Plant Total	**517.19**

(a) Northwest wellfield capacity at 150 mgd when pumps operate at low speed.

(b) Wells in this wellfield had been abandoned. They have been restored with the purpose of using them only during an emergency.
Source: MDWASD Water Use PermitNo. 13-00017-W, revised July 2012 , and requested revision June 2014.

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	**39.97**
City of Homestead	
Wittkop Park - Harris Field Water Treatment	11.2+5.7=**16.9**
City of Homestead Wellfields	
Wittkop Park	11.23
Harris Field	5.76
City of Homestead Wellfields	**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 2010 through Year 2033 for MDWASD's service area. Population data were obtained from the Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ), On June 20, 2014, MDWASD submitted an application for modification and extension of the 20-year Water Use Permit (WUP) No. 13-00017-W. The modification and extension to the current WUP are a result of revised population projections based on the 2010 Census and the continued successful implementation of the County's Water Conservation Plan. The requested modification to the WUP included new population data, revised water demand projections and alternative water supply projects to support water demands through the year 2033. MDWASD's Reuse projects were listed but they are not required to address water supply. The revised population projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

4.1 Historical Population

Historical populations served by the MDWASD system are shown in **Table 4-1** in one year increments from Year 2010 to Year 2013. The population in MDWASD's service area grew approximately 2.8% between Year 2010 and year 2013. Table 4-1 also provides a summary of historical population within Miami-Dade County. The MDWASD system served approximately 86% of the County total population in 2013.

Table 4-1 Historical Population Served by MDWASD

YEAR	TOTAL MDWASD	TOTAL COUNTY
2010	2,160,138	2,496,435
2011	2,181,073	2,523,474
2012	2,202,008	2,550,513
2013	2,222,944	2,577,552

Source: Miami-Dade County RER, Planning Division, 2010 Census TAZ data

4.2 Population Projections

Population projections for MDWASD's service area in five year increments from Year 2014 to 2033 are shown in **Table 4-2**. Overall, the population served by MDWASD is expected to increase approximately 17.78% from Year 2014 to Year 2033.

Table 4-2 Population Projections to be Served by MDWASD

Year	Total MDWASD	Total* County
2014	2,243,879	2,604,590
2015	2,266,092	2,631,629
2020	2,370,769	2,766,823
2025	2,475,446	2,902,018
2030	2,580,123	3,037,212
2031	2,601,058	3,064,251
2032	2,621,994	3,091,289
2033	2,642,929	3,118,328

Sources: *Miami-Dade County RER, Planning Division, 2010 Census TAZ Data

Upon completion of the New South Miami Heights Water Treatment Plant by 2018, the South-Dade subservice area 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 2033, MDWASD will serve potable water to approximately 85% of the total County population.

4.3 Historical Water Use

Historic water use figures 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 the SFWMD, provides the historical raw and finished water use for Year 2004 through Year 2013. 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 an initial system-wide finished water daily per capita use rate of 137.2 gallons per capita per day (gpcd). The per capita use was determined by taking a 3-year average from 2011 to 2013. The initial per capita rate has declined due to water use 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 2014 through Year 2033. 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 demand.

Figure 4-1: MDWASD Water Sub-Service Area

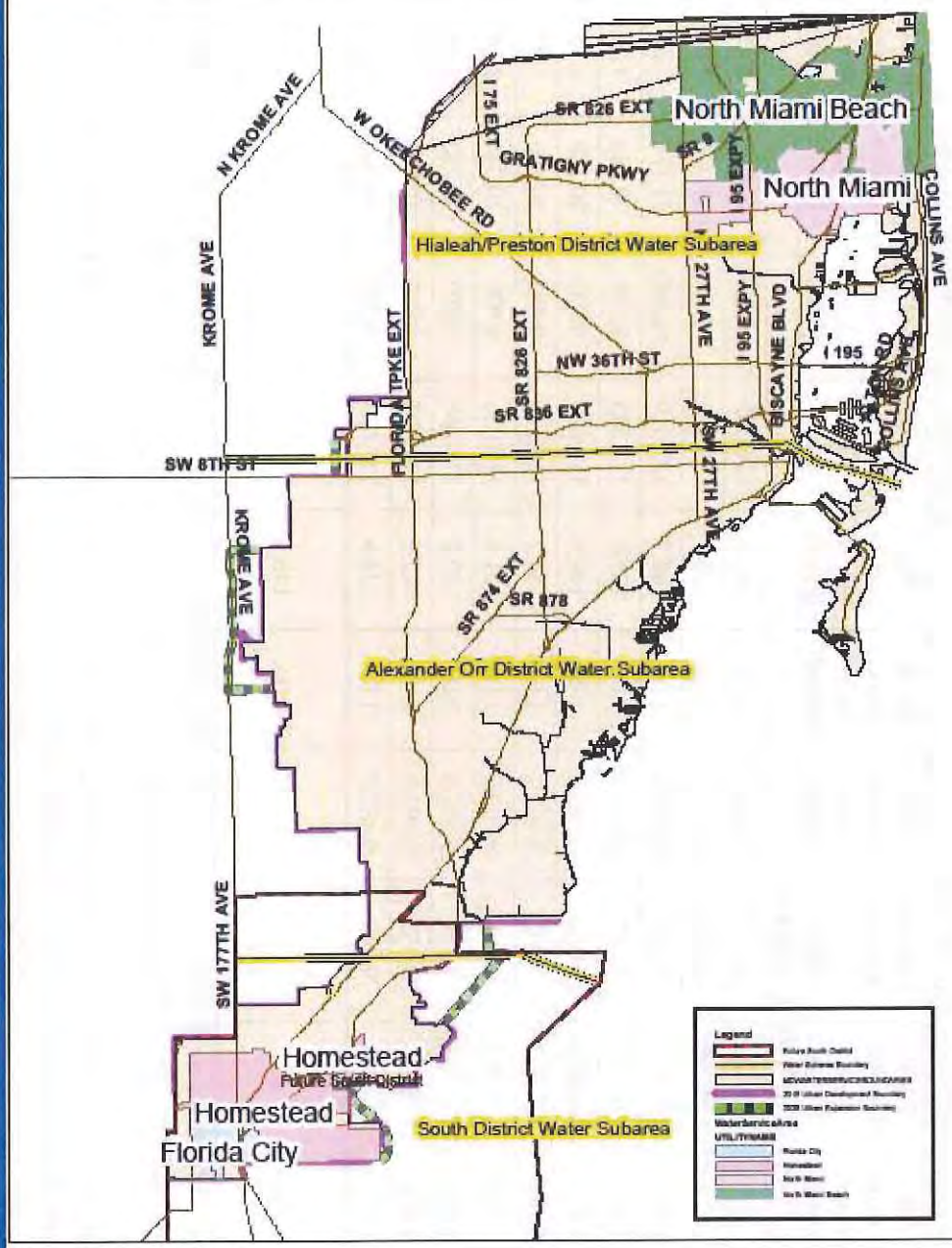


TABLE 4-3 (September 2014) Miami-Dade Water and Sewer Department (MDWASD) Past Water Use (2004-20013)

1	2	3	4	5	6	7	8	9	10	11	12	13
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 : Aver. Month	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max : Aver. Month	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	136.5	110,388	9,199	9,483.7	1.03	144.6	117,623	9,802	10,252	1.05	1.066
3-year Average (2011-2013)	-	137.2	-	-	-	1.04	145.4	-	-	-	1.05	1.062

* Source of Population Information: Miami-Dade County RER Planning Division. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010 TAZ population projections by the MDC RER Planning Division, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data, For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE 4-4 (September 2014)
MDWASD PROJECTED FINISHED WATER DEMANDS

1	2	3	4	5	6	7	8	9
Year	PROJECTIONS (2013) FOR MDWASD SERVICE AREA							
	Pop.[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water [d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)
System-Wide								
2014	2,243,879	137.2	307.19	1.36	0.00	306.43	136.56	2.50
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00

Footnotes

(a) Population Served represents the TAZ population projections based on 2010 Census Data provided by the MDC RER Planning Division.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2033 assume 137.2 gpcd (a decrease from 145.4 gpcd total water system demand prior to application of credits (e.g. conservation).

(c) MDWASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used

(e) 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 is implementing a 20-year water conservation plan and is implementing ways for reducing non-revenue water. The *MDWASD 20-year Water Use Efficiency Goal Based Plan* (Plan) was approved by the SFWMD in May 2007. The Water Conservation projections included in Table 4-4 were revised based on the *2010 Annual Water Conservation Plan Conserve Florida Report* (March 2011). Included in the 20-year 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 UseEfficiency 5-Year Plan* is located in Appendix E. Currently, MDWASD is implementing all BMPs included in the Plan. Additionally, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction (see Appendix D) 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 June 2014.

Water conservation projections do not reflect water demand reductions presented by the "Unaccounted Water Loss Reduction Plan (February 2007)" prepared by Malcolm Pirnie, Inc. 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 is in accordance with SFWMD Water Use Permit No. Re-Issue 13-00017-W, Limiting Condition Nos. 45 and 49 and Exhibit 27.

For more information about our Water Conservation Program please go to http://www.miamidade.gov/conservation/home.asp

4.5.1.2 Water Reuse

On June 28, 2013, MDWASD submitted to the Secretary of FDEP the Ocean Outfall Legislation Compliance Plan. A total of 117.5 mgd of reuse will be implemented, out of that 27.6 mgd of reclaimed water will be used to recharge the Floridan Aquifer. The Floridan Aquifer recharge will be applied on equal capacities at the existing Central and South District Wastewater Treatment Plants, and a proposed West District Wastewater Treatment

Plant (9.2 mgd each), and up to 90 mgd of reuse water will be provided to FPL for Turkey Points Units 5, 6 and 7 cooling. The reuse projects and completion dates are listed in Exhibit 14 of the County's 20-year water use permit modification request, included in Appendix F.

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects. As such, reuse to address water supply is no longer required or needed

As noted in Exhibit 14 in Appendix F, MDWASD is currently implementing a total of 16.49 mgd of reuse at each of the Wastewater Treatment Plants. The reclaimed water is used for industrial and public and non-public irrigation.

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 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 exploration of 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 ways 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. In addition, they have begun the use of alternative water sources, mainly the Floridan aquifer. 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 4:00 PM., a Florida Friendly ordinance that promotes use of drought landscape methods, a high efficiency plumbing fixture ordinance that establishes water conservation standards for plumbing fixtures installed in new construction, and a leak detection program. 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 to 2030, and from 2031-2033 is as follows:

Table 4-5 MDWASD Service Area Incremental Water Demands

Year	Population[a]	Adjusted Finished Water (mgd)	Adjusted Per Capita Water Use (gpcd)
System-Wide			
2014	2,243,879	306.43	136.56
2015	2,266,092	308.80	137.27
2020	2,370,769	319.76	134.88
2025	2,475,446	330.72	133.60
2030	2,580,123	344.37	133.47
2031	2,601,058	347.24	133.50
2032	2,621,994	350.11	133.53
2033	2,642,929	352.98	133.56

Section 5
Planned Water Supply Facilities

This section details the water supply facilities that are planned in order to meet MDWASD's water demands through 2033. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007. This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed. Reuse projects to address water supply have been eliminated. The decrease in water demands is a result of successful implementation of the County's Water Conservation Plan and new population projections based on the 2010 Census. 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.~~ The adopted FY 2014-2015 Capital Plan for the two alternative water supply projects is included in Appendix B.

5.1 Alternative Water Supply Projects

The following proposed alternative water supply (AWS) projects are to meet MDWASD's water demands through 2033, which encompasses the proposed modification to the 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**.

The plan described herein demonstrates that the proposed projects, by their location, volume of water produced, and timing of implementation, will be sufficient to meet the 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 2033.

Table 5-1: MDWASD) Proposed Alternative Water Supply Projects From Alternative Water Supply Project Development Submitted to SFWMD June 2014

Year	Annual Average Finished Water Quantity in MGD and Source		
2013	7.5	Hialeah Floridan Aquifer RO WTP-Phase 1-a, 10 MGD & 6 Floridan Aquifer supply wells	AWS
2015	2.5	Hialeah Floridan Aquifer RO WTP-Phase 1-b, 4 Floridan Aquifer supply wells	AWS
2018	12.45	South Miami Heights WTP Phase 1(RO portion)	AWS
2030	5.0	South Miami Heights WTP Phase 2(RO portion)	AWS
Total	27.45		

TABLE 5-2 (September 2014)

MDWASD FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	South Dade[g]		South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (j)	Total Biscayne Aquifer (f)	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
									Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]							
System-Wide																	
2014	2,243,879	137.2	307.79	1.36	0.00	306.43	136.56	2.50	4.30	4.08	0.00	293.05	301.43	7.50	0.00	7.50	308.93
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00	4.30	4.10	0.00	293.40	301.80	10.00	0.00	10.00	311.80
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00	0.00	*4.10*	2.55	297.76	300.31	10.00	12.45	22.45	322.76
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00	0.00	*4.10*	2.55	308.72	311.27	10.00	12.45	22.45	333.72
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00	0.00	*4.10*	2.55	322.37	324.92	10.00	12.45	22.45	347.37
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00	0.00	*4.10*	2.55	320.24	322.79	10.00	17.45	27.45	350.24
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00	0.00	*4.10*	2.55	323.11	325.66	10.00	17.45	27.45	353.11
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00	0.00	*4.10*	2.55	325.98	328.53	10.00	17.45	27.45	355.98

See Footnotes on page 5-3

Footnotes

(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 137.2 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).

(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used (TBD).

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

(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).

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

(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).

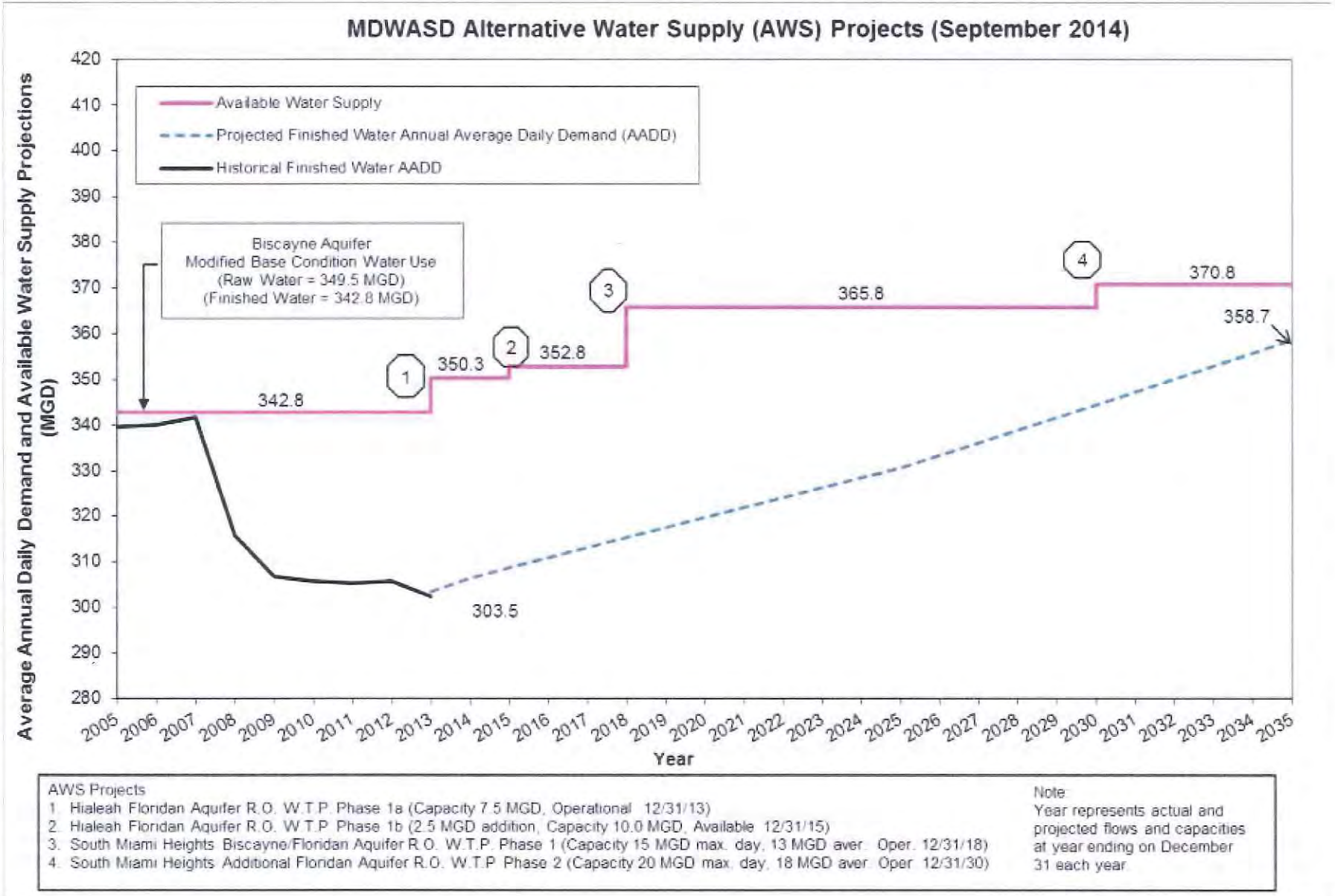
(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.060 : 1.00 (Lime Softening)

(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.

(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)

(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.

(n) An additional 0.82 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.


MDWASD Alternative Water Supply (AWS) Projects (September 2014)
Average Annual Daily Demand and Available Water Supply Projections (MGD)
Available Water Supply
Projected Finished Water Annual Average Daily Demand (AADD)
Historical Finished Water AADD
Biscayne Aquifer
Modified Base Condition Water Use
(Raw Water = 349.5 MGD)
(Finished Water = 342.8 MGD)
342.8
350.3
352.8
365.8
370.8
358.7
303.5
1
2
3
4
Year
AWS Projects
1. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1a (Capacity 7.5 MGD, Operational 12/31/13)
2. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1b (2.5 MGD addition, Capacity 10.0 MGD, Available 12/31/15)
3. South Miami Heights Biscayne/Floridan Aquifer R.O. W.T.P. Phase 1 (Capacity 15 MGD max. day, 13 MGD aver. Oper. 12/31/18)
4. South Miami Heights Additional Floridan Aquifer R.O. W.T.P. Phase 2 (Capacity 20 MGD max. day, 18 MGD aver. Oper. 12/31/30)
Note
Year represents actual and projected flows and capacities at year ending on December 31 each year

5.1.1 Hialeah Floridan Aquifer R.O. W.T.P (10 MGD)

A new upper Floridan Aquifer Reverse Osmosis (RO) water treatment plant was constructed in 2013, and is located at 4250 W. 114th Terrace in the City of Hialeah. The WTP was constructed pursuant to a Joint Participation Agreement between the City of Hialeah and the County which was approved by the Board of County Commissioners on July 24, 2007 and called for the design, construction, and operation of a water treatment plant constructed in the annexation area and supplied by the brackish Floridan aquifer to produce initially 10 mgd with the capacity to expand to 17.5 mgd.

Approval from the Florida Department of Health to produce and distribute water was received in November 2013. The WTP utilizes the Floridan Aquifer as the alternative water supply using the RO treatment to remove the salt. The initial operational phase of the Plant is 7.5 mgd, increasing to 10 mgd by the end of 2015 when construction of additional wells is expected to be completed.

5.1.1.1 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-a (7.5 MGD) Completed 2013

Phase 1-a of the RO WTP included a 10 mgd plant and an initial six (6) Floridan Aquifer supply wells. The phase 1-a cost was about $95 million.

5.1.1.2 Hialeah Floridan Aquifer R.O. W.T.P. Phase 1-b (2.5 MGD)

Start 2014
Finish 2015

Phase 1-b of the RO WTP will consist of the construction of four (4) Floridan Aquifer supply wells for a maximum treatment capacity of 10 mgd. The Phase 1-b cost is estimated at approximately $5 million.

5.1.2 South Miami Heights W.T.P. and Wellfield (20 MGD)- 17.45MGD Floridan Aquifer RO and 2.55 MGD Biscayne Aquifer

Start 2014
Finish 2018

Design of the South Miami Heights Water Treatment Plant (WTP) and Wellfield commenced in 2014. The WTP will be located at 18800 SW 208 Street in Miami. The RO WTP and associated facilities will have a capacity to produce 20 mgd (max day) finished water using a combination of 17.45 mgd from the Floridan Aquifer and 2.55 mgd from the Biscayne Aquifer. Phase 1 will have a maximum capacity of 15 mgd to be operational by December 31, 2018, and Phase 2 will a maximum capacity of 20 mgd, operational by December 31, 2030. A total of five (5) Biscayne Aquifer wells and seven (7) Floridan Aquifer wells are planned to be constructed.

Upon completion of the WTP, the Elevated Tank, Leisure City, and Naranja WTPs will be abandoned and their associated allocations will be transferred to the SMHs

WTP. Everglades Labor Camp and Newton WTPs will remain on stand-by service.

5.2 Miscellaneous Projects

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

Start 2006
Finish 2027

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 and has been expanded to cover the next 20 years with a projected reduction in demand of 19.62 MGD over that time period. Examples of ongoing conservation projects include the bathroom and kitchen retrofits program, Miami-Dade green lodging and restaurant program, , rebates for high efficiency toilets, and landscaping irrigation evaluations for residential, commercial and governmental uses. 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.

5.3 20-Year Work Plan and Capital Improvement Plan

As mentioned in the previous sections, the latest lower population projections based on the 2010 Census results and historically lower per capita daily finish water use have reduced the projected finish water demands which have eliminated the need for other alternative water supply projects by several years. The Alternative Water Supply projects to address water demands through 2033 include the Hialeah RO and South Miami Heights WTP.

The projects for the 20-Year Work Plan have been included in the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~. An update to the County's Capital Improvement Element to reflect the adopted FY 2014-2015 Budget will be processed in 2015. A copy of ~~Table 12 from~~ the County's adopted FY 2014-2015 Budget ~~Capital Improvement Element~~ is contained within Appendix ~~D~~B and summarized in **Table 5-3** for the next 5 years ~~(2014 – 2018).~~ (2015-2020).

Table 5-3 MDWASD Water/Alternative Water Supply ~~CIE~~ Projects

Project Name	Expenditure[(a)]						Six Year Totals
	2012~~4~~/ 201~~3~~5	201~~3~~5/ 201~~4~~6	201~~4~~6/ 201~~5~~7	201~~5~~7/ 201~~6~~8	201~~6~~8/ 201~~7~~9	201~~7~~9/ 201~~8~~20	
Water Facilities							
South Miami Heights W.T.P. & Wellfield	4.90 ~~17.11~~	30.44 ~~46.20~~	36.48 ~~43.80~~	5.73 ~~5.19~~	15.73 ~~0.00~~	0.00 ~~0.00~~	93.28 ~~112.31~~
Hialeah Floridan Aquifer R.O.W.T.P. Phase 1 (10.0 mgd)	0.00 ~~23.79~~	0.00 ~~4.77~~	0.00 ~~1.34~~	0.00 ~~7.383~~	0.00 ~~4.08~~	0.00 ~~6.09~~	0.00 ~~47.48~~

Source: MDWASD Adopted ~~FY 2012-2013~~ 2014-2015 budget, (a) Millions of Dollars

5.4 Other Water Suppliers Future Plans

5.4.1 City of North Miami

The City of North Miami's plans for a two-phase expansion of the Winson WTP have been put on hold. The plans entailed a Phase I, to be concluded by 2010, to add an additional 8.5 MGD capacity from a Reverse Osmosis (RO) system. Phase II to add additional membrane treatment to the RO facility, which would 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 also identified that the Floridan aquifer would be the only water resource alternative for the increase in demand. Therefore, the City planned to construct an additional ten Floridan wells to supply the RO Facility. The City planned to add a raw water transmission main from the wells to the WTP.

On hold is also the third expansion plan for 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.

The City is currently designing upgrades to the existing facility to maximize its efficiencies.

5.4.2 City of North Miami Beach

The City of North Miami Beach plans to increase the capacity of the its WTP to 35 MGD by 2020 and 38 (MGD) by 2025. 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.

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 5-2** shows, MDWASD has prepared a work plan which demonstrates that the Department (e.g. public) facilities are available to meet the projected growth demands (which reflect credits for conservation). The current permit and the limiting conditions are located in Appendix H, and the permit modification request is located in Appendix I.

Section 6
Climate Change and Sea Level Rise Plan

This section details MDWASD evaluation and planning for sea level rise and climate change over the planning horizon in this document. The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise our wellfields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out, and will include climate change such as increases and decreases in annual precipitation, and extreme weather events.

6.1 Introduction

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. These counties have agreed to partner in regionally-coordinated climate mitigation and adaptation strategies as part of the Southeast Florida Regional Climate Change Compact and have adopted a Regional Climate Action Plan which highlights "Water Supply, Management, and Infrastructure" as a primary focal area. (http://southeastfloridaclimatecompact.org/). Investigations and evaluations conducted at the national, regional, and local levels have reinforced the need to plan for the predicted impacts of more frequent and severe drought, increases in tidal and storm-related flooding, and the loss of coastal wellfield capacity due to saltwater intrusion. In the absence of proactive planning, these impacts will present liabilities for coastal and inland communities with implications for urban water supplies, water and wastewater infrastructure, and both regional and local drainage/flood control systems. Investments in water supply planning and infrastructure that account for these predicted trends will improve the resilience of our communities, provide public health benefits, and reduce the potential for economic losses.

Miami-Dade County along with Broward, Monroe, Palm Beach Counties, local governments and water utilities in the southeast Florida region have begun to formalize the integration water supply and climate change considerations as part of

coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive stormwater and wastewater systems. Sea level rise produces varied challenges with the respect to water resources sustainability, water management, and water/wastewater facilities and infrastructure. Impacts include salt water intrusion into coastal wellfields, infiltration of groundwater with chloride levels into wastewater collection systems, impairing normal operations and maintenance as well as challenges for beneficial use of reclaimed water as an alternative water supply. Water management systems are also at risk with systems constrained by rising groundwater and canal gate tailwater elevations, which reduce soil storage and discharge capacity, with increased potential for both inland and coastal flooding.

6.2 Miami-Dade County Sea Level Rise and Climate Change Recent Government Action

As part of the Miami-Dade County Evaluation and Appraisal Report adopted in 2011, climate change was identified as one of the priorities to address in the County's Comprehensive Development Master Plan (CDMP). Miami-Dade has incorporated climate change considerations and language in several of the Elements of the CDMP update which was approved by the Board of County Commissioners in October, 2013.

The Miami-Dade Sea Level Rise Task Force was created by Resolution R-599-13 on July 2, 2013 to review the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure (http://www.miamidade.gov/planning/boards-sea-level-rise.asp). Their recommendations included in the June 2014 Final Report Recommendation 4:

> *While recognizing the recent efforts to address flood protection and saltwater intrusion by the South Florida Water Management District and the Miami-Dade County, the Sea Level Rise Task Force recommends that Miami Dade County work jointly with the District and the SE Climate Compact partners to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and saltwater intrusion associated with sea level rise. This strategy should expeditiously address rising sea levels, a time frame for implementation, and a potential funding mechanism.*

Miami-Dade Board of County Commissioners adopted in September an ordinance relating to the rules of procedures of the Board of County Commissioners amending Section 2-1 of the Code of Miami-Dade County, Florida, to require that in all agenda items related to planning, design, and construction of county infrastructure a statement be included that the impact of sea level rise has been considered (File 141211 http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014).

6.3 Saltwater Intrusion

Along the coast of southeast Florida, and several miles inland, groundwater supplies and potable wells are vulnerable to saltwater contamination. The Biscayne Aquifer, which serves as the region's primary water supply, is a shallow, surficial aquifer characterized by limestone karst geology which is highly porous and transmissive. Salt water intrusion is defined by the South Florida Water Management District (SFWMD) as chloride concentrations exceed drinking water standards of 250 mg/l. The SFWMD has identified "Utilities at Risk" for salt water intrusion, which include utilities with wellfields near the saltwater/freshwater interface that do not have an inland wellfield, have not developed adequate alternative sources of water, and have limited ability to meet user needs through interconnects with other utilities; and "Utilities of Concern", which include utilities having wellfields near the saltwater/freshwater interface, the ability to shift pumpages to an inland wellfield, or an alternative source that is not impacted by the drought (SFWMD, 2007). Miami-Dade WASD wellfields included as "Utility at Risk" are South Miami-Dade Wellfields (Newton, Elevated Tank, Naranja, Leisure City, Roberta Hunter- Caribbean Park). MDWASD Utilities of Concern include the North and Central Miami-Dade Wellfields (Hialeah-Preston and Alexander Orr) (Figure 1).

Figure 6-1. Utilities and Risk and Utilities of Concern, Miami-Dade County (SFWMD, 2007).

6.3.1 Salt Intrusion Monitoring Network

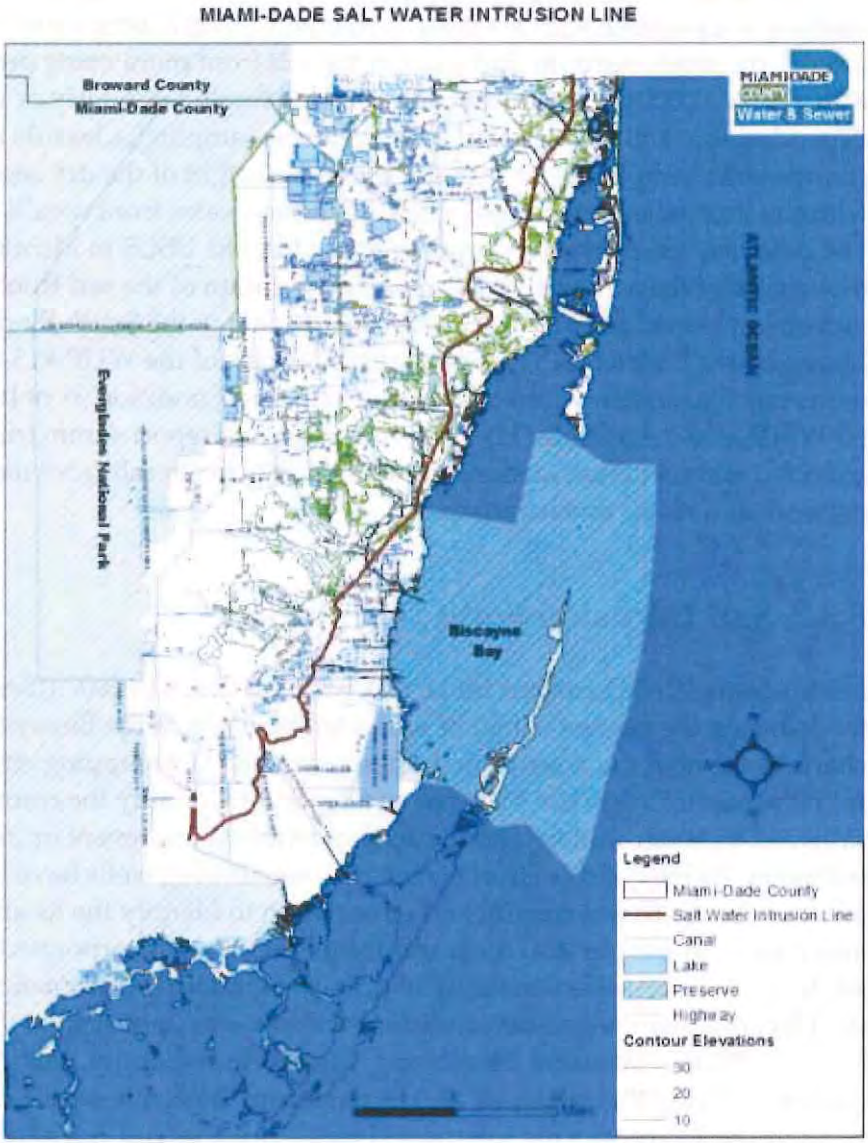
Saltwater intrusion in Miami-Dade County is monitored through a joint effort of the Miami-Dade Water and Sewer Department (MDWASD), Miami-Dade Department of Regulatory and Economic Resources (RER), and the U.S. Geological Survey (USGS). A network of small diameter wells have been drilled to the base of the aquifer to serve as monitor wells to identify the location of the saltwater

intrusion front. The salt front is identified as the location, at the base of the aquifer, of the 1,000 milligrams/per liter (mg/L) isochlor, or line of equal chloride concentration of 1,000 mg/L). Sampling of the monitor wells is done by the USGS, under a co-operative Joint Funding Agreement (JFA) contract with Miami-Dade County for wells currently included in the salt front monitoring program (JFA #14GGESMC0000109). Additional wells are sampled quarterly or yearly basis depending on well location, but every year the sampling schedule includes a county-wide sampling event conducted at the height of the dry season to coincide with the time when inland movement of the saltwater front would be at its peak. The data derived from that sampling is used by the USGS to identify any significant movement of the salt front, and to map the location of the salt front if a significant movement is evident. MDWASD reports the data to the South Florida Water Management District (SFWMD) quarterly, as part of the WUP #13-00017-W requirements, and is required as part of Limiting Condition 37 of the 20-Year WUP (SFWMD, 2007; Appendix H) to submit an annual report summarizing the data collected and recommendations for adjustments to the salt front monitoring network as a result of data analysis.

6.3.2 Salt Intrusion Front Delineation

Miami-Dade WASD entered into a JFA with the USGS in 2007 (JFA #08E0FL208004) to delineate the current extent of saltwater intrusion in the Biscayne aquifer, to characterize how the extent has changed since the last mapping effort, to improve salinity monitoring in the Biscayne aquifer and to identify the sources of the saltwater to better understand the actions required to prevent or mitigate saltwater intrusion. As part of this effort eleven new monitoring wells have been installed in areas where there was insufficient information to identify the location of the front, and data from geophysical tools and techniques were incorporated into the analysis. To improve accessibility of salinity monitoring information to the public, the USGS cooperative water conditions website was improved and a new website created. "Saline Intrusion Monitoring, Miami-Dade County, Florida," serves data collected during this study, as well as data from the active salinity monitoring network, and provides the interpreted maps of the inland extent of saltwater intrusion (*http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm*, U.S. Geological Survey, 2011g). This website allows the USGS to deliver timely hydrologic data, analyses, and decision-support tools concerning saltwater intrusion. As a result of the JFA, an updated salt front map was published in 2011 (Figure 2) and the final report summarizing the study and recommendations and conclusions published in 2014 (Prinos, et. al. 2014).

Figure 6-2. Salt Water Intrusion extent, Miami-Dade County, FL. (USGS 2011)



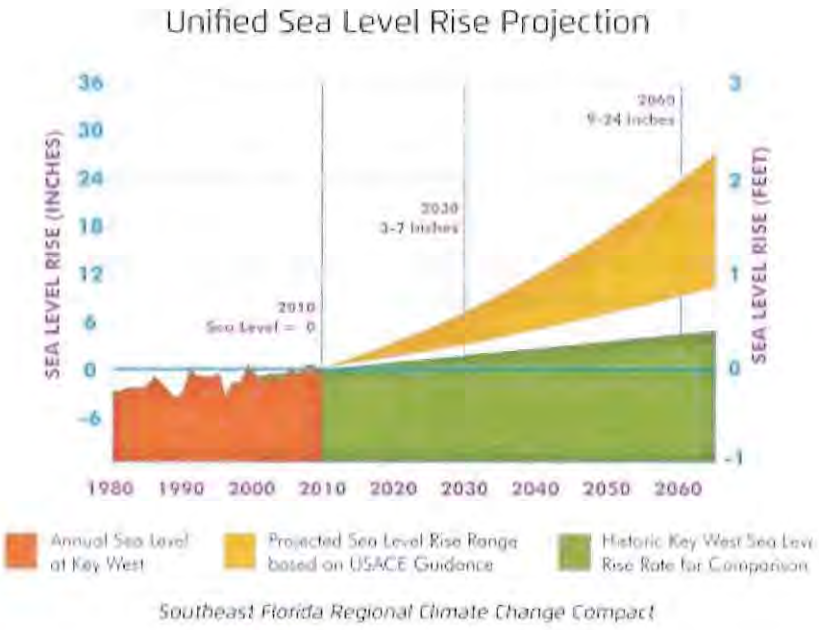
6.4 Urban Miami-Dade County Surface Water/Groundwater Model

Miami-Dade County entered into a Joint Funding Agreement (JFA 08E0FL20817) with the USGS in February 2008 to develop an integrated surface/groundwater numerical flow model, with one of the objectives of the project to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. The numerical model is designed among other uses to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion with projected population increase and sea level rise. MDWASD and the USGS use this integrated surface-water/groundwater model to evaluate how the position of the freshwater/saltwater interface will change with increased well field pumpage, increased sea level, and a combination of increased well field pumpage and increase sea level.

The model was developed and calibrated a coupled surface-water/groundwater model of the urban areas of Miami-Dade County, Florida. The model is designed to simulate surface-water stage and discharge in the managed canal system and dynamic canal leakage to the Biscayne aquifer as well as seepage to the canal from the aquifer. The model was developed using USGS MODFLOW-NWT with the SWR1 Process and the SWI2 Package to simulate the surface-water system and seawater intrusion, respectively (Hughes et. al., 2013). Automated parameter estimation software (PEST) and highly-parameterized inversion techniques were used to calibrate the model to observed surface-water stage, surface-water discharge, net surface-water sub-basin canal discharge, and groundwater level data from 1997 through 2004 by modifying hydraulic conductivity, specific storage coefficients, specific yield, evapotranspiration parameters, canal roughness coefficients (Manning's *n* values), and canal leakance coefficients (Walsh and Hughes, 2014).

MDWASD and the USGS used the modified guidance developed by the U.S. Army Corps of Engineers (USACE, 2011) and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 NCA, and formally adopted by the partner counties in the Southeast Florida Regional Climate Change Compact (Figure 3) for the modeling effort.

Figure 6-3: Unified Southeast Florida Sea Level Rise Projection for Regional Planning Purposes



The USGS has completed the preliminary model and initial scenarios regarding sea level rise, and results are pending publication (USGS, verbal communication). The model simulation period is from 1/1/1996 to 12/31/2010, with daily surface-water and groundwater timesteps. The model was calibrated using highly-parameterized inversion methods, with an 8 year calibration period (1997-2004) and a 6 year verification period (2005-2010). To represent future conditions, 30-year scenario simulation periods representing conditions from 2011 through 2040 were run. The thirty year scenario period was chosen as being scientifically defensible at this point in time with available sea level rise and climate change data available.

Four scenarios have been completed to date, and will be included in the pending publication:

- ***Base scenario***
  - Daily 2010 well field withdraws repeated for 30 year daily
  - meteorological data set (recycled twice)
  - 2008 land use
  - Predicted Virginia Key tidal stage with current linear rate of SEA LEVEL RISE-0.5 ft over 30 years

- Everglades Depth Estimation Network (EDEN) data set (recycled twice)
- Historical structure operations - effective gate openings

- ***Scenario 1***
  - Base scenario
  - Increased WASD well field withdrawals - increased rates provided by WASD (WUP 2012 allocations)

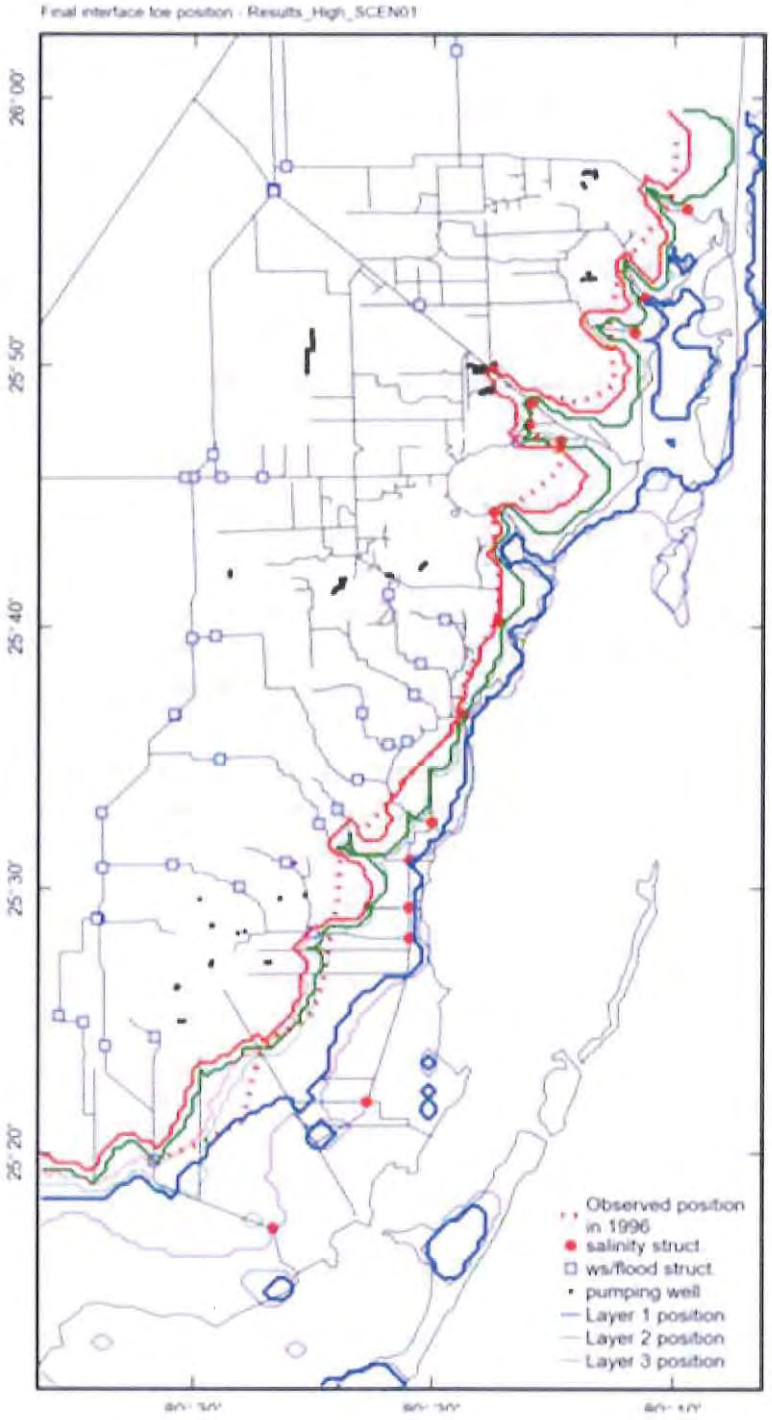
- ***Scenario 2***
  - Base scenario
  - High sea-level rise rate (NRC III rate - 1.23 ft increase over 30 years) added to predicted
  - Virginia Key tidal stage
  - Blend EDEN data and increased sea level where needed

- ***Scenario 3***
  - Scenario 2
  - Increased WASD well field withdrawals at permitted 2025 allocations

Therefore, Scenario 3 represents the high-level rate of sea level rise and the permitted wellfield withdrawals allocated in the SFWMD 20-Year WUP. Results of Scenario 3 indicate minimal change in the salt front (Figure 4).

As a result of the USGS Salt Front JFA, and the on-going salt front monitoring, and the groundwater flow modeling project, Miami-Dade WASD wellfields are not considered at risk for salt water intrusion within the next ten years.

Figure 6-4. Scenario 3 Salt Water Intrusion Results. (Walsh and Hughes, 2014).



6.5 Extreme Weather Events

As extreme events increase in frequency and severity, MDWASD will consider impacts and risks associated with drought, water shortages and reduced groundwater tables, all of which can hasten saltwater intrusion and exacerbate water supply impacts. Conversely, more intense and rapid rainfall will cause flooding, increased runoff, impacts to the natural systems and provide less recharge potential. Integrated water resources management strategies will help to mitigate for these impacts, particularly those projects that can serve to provide additional storage of stormwater runoff, long term storage, and redistribution of excess rainfall during dry periods and drought. Regional surface water reservoirs and belowground aquifer storage and recovery systems are potentially viable alternative water supply projects and climate adaptation strategies. Increases in groundwater elevations, in both direct and indirect response to sea level will challenge the function of drainage systems and is expected contribute to exacerbate flooding, for even mild storm events. Conditions will be more severe with extreme rainfall events can increase damage to lowlying utility infrastructure and contribute to prolonged surface water flooding. Planning for the combined influences of storm events, high tides and sea level rise on drainage system functions and other public infrastructure is a critical need as is the assessment of viable water supplies and impacts to the natural systems from prolonged droughts.

MDWASD has entered into a JFA in 2014 (JFA 14GGESMC0000110) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, regional agencies for further climate change and sea level rise assessment. These scenarios will include additional years simulation, changes in recharge as a result of climate change, land use changes, and revised sea level rise projections. Future model scenarios to be developed with the USGS include simulating extreme weather events superimposed on future conditions as simulated in model runs.

6.6 Infrastructure Assessment

Effective water treatment plant operations require proper control of flooding from both stormwater (riverine) and tidal sources. Comprehensive engineering analysis considers both short-term and long-term effects of climate change. Short-term effects, such as current increased sea levels and higher estimates of tidal boundary conditions, will be incorporated into the system design and operations as necessary. Potential longer-term climatic changes are typically addressed incrementally as needed through systems master planning, to provide the appropriate level of protection for the given time period, including:

- Greater levels and rates of sea level rise,
- Higher spring tides (exceptionally high astronomical tides that occur around the new and full moon when the planets align to exert maximum effect on the tides),
- Higher tidal boundary effects and backflow,
- Increased levels of tidal surge and wind and wave effects from tropical storms and hurricanes, and
- Potential changes in design rainfall depths and intensities.

MDWASD requires capital improvement projects to include an assessment of climate change and sea level rise. Background information on the site stormwater and tidal conditions is required for site specific projects, and assessment includes projections of potential increases in sea levels, potential ranges of effects on the WTP stormwater management system, and site grading considerations and access for proper operations. The Miami-Dade County hydrologic and hydraulic model XP-SWMM is used to develop peak stage and flood inundation maps. XPSWMM uses a node-link architecture to dynamically route rainfall-runoff through pipe networks and open channels. A variety of data can be analyzed (example FDEP and NOAA tidal data, canal stage data, tidal stillwater data) to adequately assess MDWASD operational sites' vulnerability to continued sea level rise and to provide for potential adaptation options (CDM Smith, 2013).

References

CDM Smith, 2013. Technical Memorandum *Miami-Dade Water and Sewer Department PSA No. 01CDAM003 – Task Authorization No. 12 South Miami Heights (SMH) Water Treatment Plant (WTP) Program Climate Change Adaptation Review*

http://www.envirobase.usgs.gov/FLIMS/SaltFront/viewer.htm

http://www.miamidade.gov/govaction/matter.asp?matter=141211&file=true&yearFolder=Y2014

Hughes, J.D., Langevin, C.D., Chartier, K.L., and White, J.T., 2012, *Documentation of the Surface-Water Routing (SWR1) Process for modeling surface-water flow with the U.S. Geological Survey Modular Ground-Water Model (MODFLOW–2005)*: U.S. Geological Survey Techniques and Methods, book 6, chap. A40 (Version 1.0), 113 p.

Miami-Dade County, July 1, 2014. *Miami-Dade Sea Level Rise Task Force Report and Recommendations (http://www.miamidade.gov/planning/boards-sea-level-rise.asp)*

Prinos, S.T., Wacker, M.A., Cunningham, K.J., and Fitterman, D.V., 2014, *Origins and delineation of saltwater intrusion in the Biscayne aquifer and changes in the distribution of saltwater in Miami-Dade County, Florida*: U.S. Geological Survey Scientific Investigations Report 2014–5025, 101 p., *http://dx.doi.org/10.3133/sir20145025*.

South Florida Water Management District, 2007. *Utilities of Concern in the Lower East Coast Region and Lake Okeechobee Service Area*.

Southeast Florida Regional Climate Change Compact, *http://southeastfloridaclimatecompact.org/*

U.S. Geological Survey, 2007 Joint Funding Agreement 08E0FL208004 *Assessment of seawater encroachment and seawater encroachment monitoring network improvements in Miami-Dade County, Florida.*

U.S. Geological Survey, 2008. Joint Funding Agreement 08E0FL208017 *An integrated model of surface and groundwater flow for evaluating the effects of competing water demands in Miami-Dade County.*

U.S. Geological Survey, 2013. Joint Funding Agreement 14GGESMC0000109 *Investigations of Water Resources.*

U.S. Geological Survey, 2014. Joint Funding Agreement 14GGESMC0000110 *Aquifer hydrogeologic framework, modeling tools and evaluating sea-level rise, Miami-Dade County.*

USACE Engineering Circular 1165-2-212: *Sea-Level Change Consideration for Civil Works Programs* USACE, 2011.

Walsh, V, and J. Hughes. 2014. *Urban Miami-Dade County Surface-Water/Groundwater Model – Application for Sea-Level Rise Evaluation.* 23rd Annual Southwest Florida Water Resources Conference, Fort Myers, FL. January 31, 2014

APPENDIX A

Wellfield Data Tables

TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217731	257400	257401	257402	257403	257404
Name	RO7 Hialeah	RO8 Hialeah	RO9 Hialeah	RO10 Hialeah	RO11 Hialeah	RO12 Hialeah
Map Designator	Hialeah 7 RO	Hialeah 8 RO	Hialeah 9 RO	Hialeah 10 RO	Hialeah 11 RO	Hialeah 12 RO
FLUWID Number						
Well Field	Hialeah RO WTP	Hialeah RO WTP	Hialeah RO WTP	Hialeah RO WTP	Hialeah RO WTP	Hialeah RO WTP
Existing/Proposed	E	P	P	P	P	P
Well Diameter(Inches)	17	17	17	17	17	17
Total Depth(feet)	1490	1490	1490	1490	1490	1490
Cased Depth(feet)	1080	1080	1080	1080	1080	1080
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	1400	1400	1400	1400	1400	1400
Year Drilled	2011	2011	2011	2011	2011	2011
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	867085	866240	865035	867410	867175	864485
Feet North	581265	584315	583230	574835	578665	582690
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Standby	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply Monitor	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer

Exhibit No: 5

TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	257405	257406	28291	28292	28293	28294
Name	RO13 Hialeah	RO14 Hialeah	1 NWWF	2 NWWF	3 NWWF	4 NWWF
Map Designator	Hialeah 13 RO	Hialeah 14 RO	1 NWWF	2 NWWF	3 NWWF	4 NWWF
FLUWID Number						
Well Field	Hialeah RO WTP	Hialeah RO WTP	Northwest	Northwest	Northwest	Northwest
Existing/Proposed	P	P	E	E	E	E
Well Diameter(Inches)	17	17	48	48	48	48
Total Depth(feet)	1490	1490	80	80	80	80
Cased Depth(feet)	1080	1080	46	46	46	46
Facility Elev. (ft. NGVD)						
Screened Interval From			0	0	0	0
To			0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)			40	40	40	40
Pump Capacity(GPM)	1400	1400	10420	10420	10420	10420
Year Drilled	2011	2011	1980	1980	1980	1980
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	863250	862450	847729	847805	847767	847747
Feet North	581590	580860	543166	543988	544714	545498
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28295	28296	28297	28298	28299	28300
Name	5 NWWF	6 NWWF	7 NWWF	8 NWWF	9 NWWF	10 NWWF
Map Designator	5 NWWF	6 NWWF	7 NWWF	8 NWWF	9 NWWF	10 NWWF
FLUWID Number						
Well Field	Northwest	Northwest	Northwest	Northwest	Northwest	Northwest
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	48	48	48	48	48	40
Total Depth(feet)	80	80	80	80	80	100
Cased Depth(feet)	46	46	46	46	46	57
Facility Elev. (ft. NGVD)						
Screened Interval From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)	40	40	40	40	40	40
Pump Capacity(GPM)	10416.67	10420	10420	10420	10420	10420
Year Drilled	1980	1980	1980	1980	1980	1980
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	847757	847705	847685	847664	849022	848971
Feet North	546203	546981	547728	548464	548516	549252
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28301	28302	28303	28304	28305	217680
Name	11 NWWF	12 NWWF	13 NWWF	14 NWWF	15 NWWF	1 Medley
Map Designator	11 NWWF	12 NWWF	13 NWWF	14 NWWF	15 NWWF	Medley - 1
FLUWID Number						
Well Field	Northwest	Northwest	Northwest	Northwest	Northwest	Medley
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	48	48	40	40	40	42
Total Depth(feet)	80	80	100	100	100	68
Cased Depth(feet)	46	46	57	57	57	60
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	
To	0	0	0	0	0	
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)	40	40	40	40	40	
Pump Capacity(GPM)	10420	10420	10420	10420	10420	10000
Year Drilled	1980	1980	1980	1980	1980	1975
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	848960	848929	848877	848877	848867	881370
Feet North	550030	550777	551492	552260	553017	548300
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Standby
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217681	217684	217686	28261	28262	28263
Name	2 Medley	5 Medley	6 Medley	1 MS Lower	2 MS Lower	3 MS Lower
Map Designator	Medley - 2	Medley - 5	Medley - 6	1 MS Lower	2 MS Lower	3 MS Lower
FLUWID Number						
Well Field	Medley	Medley	Medley	Miami Springs Lower	Miami Springs Lower	Miami Springs Lower
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	42	42	42	14	14	14
Total Depth(feet)	68	68	68	115	115	115
Cased Depth(feet)	54	60	54	80	80	80
Facility Elev. (ft. NGVD)						
Screened Interval						
From				0	0	0
To				0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Centrifugal	Centrifugal	Centrifugal
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)				0	0	
Pump Capacity(GPM)	8500	8500	10000	3800	2500	2500
Year Drilled	1975	1975	1975	1924	1924	1924
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	881370	880830	880820	890660	889990	889800
Feet North	548300	547620	548070	539170	538745	539400
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Standby	Standby	Standby	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply Monitor	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28264	28265	28268	28266	28267	28269
Name	4 MS Lower	5 MS Lower	6 MS Lower	7 MS Lower	8 MS Lower	9 MS Upper
Map Designator	4 MS Lower	5 MS Lower	6 MS Lower	7 MS Lower	8 MS Lower	9 MS Upper
FLUWID Number						
Well Field	Miami Springs Lower	Miami Springs Lower	Miami Springs Lower	Miami Springs Lower	Miami Springs Lower	Miami Springs Upper
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	14	14	30	14	14	14
Total Depth(feet)	115	115	115	115	115	115
Cased Depth(feet)	80	80	80	80	80	80
Facility Elev. (ft. NGVD)						
Screened Interval From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)	0	0	0	0	0	
Pump Capacity(GPM)	2500	2500	2500	2500	2500	2500
Year Drilled	1924	1924	1924	1924	1924	1949
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	890450	888955	888105	887545	888575	884630
Feet North	539785	539515	539115	538585	538565	544870
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Unspecified	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28280	28271	28272	28273	28274	28275
Name	10 MS Upper	14 MS Upper	15 MS Upper	16 MS Upper	17 MS Upper	18 MS Upper
Map Designator	10 MS Upper	14 MS Upper	15 MS Upper	16 MS Upper	17 MS Upper	18 MS Upper
FLUWID Number						
Well Field	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	14	30	14	14	14	14
Total Depth(feet)	115	115	115	115	115	115
Cased Depth(feet)	80	80	80	80	80	80
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)	0		0	0	0	0
Pump Capacity(GPM)	2500	4170	2500	2500	2500	2500
Year Drilled	1954	1936	1936	1936	1936	1945
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	888960	889520	888430	887776	888460	886890
Feet North	544210	544190	544440	544475	543550	544430
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Standby	Standby	Primary	Standby
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Monitor Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28276	28277	28278	28279	28270	28281
Name	19 MS Upper	20 MS Upper	21 MS Upper	22 MS Upper	23 MS Upper	1 Preston
Map Designator	19 MS Upper	20 MS Upper	21 MS Upper	22 MS Upper	23 MS Upper	1 Preston
FLUWID Number						
Well Field	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Miami Springs Upper	Preston
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	14	14	14	14	14	42
Total Depth(feet)	115	115	115	115	115	107
Cased Depth(feet)	80	80	80	80	80	66
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)	0	0	0	0	0	40
Pump Capacity(GPM)	2500	2500	2500	2500	2500	7000
Year Drilled	1945	1945	1945	1945	1949	1966
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	886105	887684	886890	886110	885590	890540
Feet North	544425	543499	543510	543510	545090	544500
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Standby	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28282	28283	28284	28285	28286	28287
Name	2 Preston	3 Preston	4 Preston	5 Preston	6 Preston	7 Preston
Map Designator	2 Preston	3 Preston	4 Preston	5 Preston	6 Preston	7 Preston
FLUWID Number						
Well Field	Preston	Preston	Preston	Preston	Preston	Preston
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	42	42	42	42	42	42
Total Depth(feet)	107	107	107	107	107	107
Cased Depth(feet)	66	66	66	66	66	69
Facility Elev. (ft. NGVD)						
Screened Interval From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)	40	40	40	40	40	40
Pump Capacity(GPM)	7000	7000	7000	7000	7000	7000
Year Drilled	1966	1966	1966	1966	1966	1972
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	890510	890430	891080	891029	891000	890100
Feet North	545010	544680	544650	545190	545680	544270
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	28288	28289	28290	26330	26331	26332
Name	11 Hialeah	12 Hialeah	13 Hialeah	1 Orr	2 Orr	3 Orr
Map Designator	11 Hialeah	12 Hialeah	13 Hialeah	ORR 1	ORR 2	ORR 3
FLUWID Number						
Well Field	Hialeah	Hialeah	Hialeah	Alexander Orr	Alexander Orr	Alexander Orr
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	14	14	14	16	16	16
Total Depth(feet)	115	115	115	100	100	100
Cased Depth(feet)	80	80	80	40	40	40
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Centrifugal	Centrifugal	Centrifugal	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	2500	2500	2500	4170	4170	4170
Year Drilled	1936	1936	1936	1949	1949	1949
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	891050	890830	890650	875100	875110	875000
Feet North	543550	544140	543790	499520	499640	499430
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply Monitor	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	26304	26306	26309	26310	26311	26312
Name	4 Orr	5 Orr	6 Orr	7 Orr	8 Orr	9 Orr
Map Designator	ORR 4	ORR 5	ORR 6	ORR 7	ORR 8	ORR 9
FLUWID Number						
Well Field	Alexander Orr	Alexander Orr	Alexander Orr	Alexander Orr	Alexander Orr	Alexander Orr
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	16	16	16	16	16	24
Total Depth(feet)	100	100	100	100	100	100
Cased Depth(feet)	40	40	40	40	40	50
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	4170	4170	4170	4170	7500	7500
Year Drilled	1949	1952	1952	1952	1952	1964
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	874830	874670	874500	874340	874160	874000
Feet North	499250	499070	498880	498690	498510	498310
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	26313	26314	26315	26319	27172	27173
Name	10 Orr	11 SW	12 SW	13 SW	14 SW	15 SW
Map Designator	ORR 10	Southwest 11	Southwest 12	Southwest 13	Southwest 14	Southwest 15
FLUWID Number						
Well Field	Alexander Orr	Southwest	Southwest	Southwest	Southwest	Southwest
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	24	20	20	20	20	20
Total Depth(feet)	100	100	100	100	100	100
Cased Depth(feet)	50	40	40	40	40	40
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	7500	4900	4900	4900	4900	4900
Year Drilled	1964	1953	1953	1953	1953	1953
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	873830	856559	856380	856180	855960	855740
Feet North	498110	496044	495440	495215	494980	494750
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	27174	27175	27176	27177	27178	27179
Name	16 SW	17 SW	18 SW	19 SW	20 SW	21 SC
Map Designator	Southwest 16	Southwest 17	Southwest 18	Southwest 19	Southwest 20	SNPR CRK 21
FLUWID Number						
Well Field	Southwest	Southwest	Southwest	Southwest	Southwest	Snapper Creek
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	20	24	24	24	24	24
Total Depth(feet)	100	100	100	100	100	108
Cased Depth(feet)	40	35	35	35	35	50
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	4900	4900	4900	4900	4900	8300
Year Drilled	1953	1959	1959	1959	1959	1976
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	855470	855280	855080	855850	854640	867480
Feet North	494440	494280	494050	493810	493590	496570
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	27180	27181	27182	27183	27184	27185
Name	22 SC	23 SC	24 SC	25 SW	26 SW	27 SW
Map Designator	SNPR CRK 22	SNPR CRK 23	SNPR CRK 24	Southwest 25	Southwest 26	Southwest 27
FLUWID Number						
Well Field	Snapper Creek	Snapper Creek	Snapper Creek	Southwest	Southwest	Southwest
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	24	24	24	24	24	24
Total Depth(feet)	108	108	108	104	104	104
Cased Depth(feet)	50	50	50	54	54	54
Facility Elev. (ft. NGVD)						
Screened Interval From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	8300	8300	8300	6940	6940	6940
Year Drilled	1976	1976	1976	1982	1982	1982
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	Migrate	REVIEWER
Feet East	866830	866640	866310	854400	854160	853920
Feet North	496920	496560	496750	493320	493060	492810
Accounting Method	Unspecified	Unspecified	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	27186	27187	27188	27189	27192	27191
Name	28 SW	29 W	30 W	31 W	32 SW	33 SW
Map Designator	Southwest 28	West Wellfield 29	West Wellfield 30	West Wellfield 31	SW 32	SW 33
FLUWID Number						
Well Field	Southwest	West	West	West	Southwest	Southwest
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	24	24	24	24	48	48
Total Depth(feet)	104	70	70	70	88	88
Cased Depth(feet)	54	35	35	35	33	33
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						0
Pump Capacity(GPM)	6940	6945	3470	6945	7500	7500
Year Drilled	1982				1997	1997
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	853830	830235	830220	830210	855470	855970
Feet North	492801	496590	497150	497700	495900	494350
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Unspecified
Use Status	Primary	Primary	Primary	Standby	Standby	Standby
Water Use Type	Public Water Supply	Public Water Supply Monitor	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	27190	27193	27195	27194	27196	27197
Name	34 SW	ASR/Blending 1W	ASR/Blending 2W	ASR/Blending 3W	ASR/Blending 4SW	ASR/Blending 5SW
Map Designator	Southwest 34	ASR 1W	ASR 2W	ASR 3W	ASR 4SW	ASR-5SW
FLUWID Number						
Well Field	Southwest	Alexander Orr WTP	Alexander Orr WTP	Alexander Orr WTP	Alexander Orr WTP	Alexander Orr WTP
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	48	30	30	30	30	30
Total Depth(feet)	88	1300	1250	1210	1200	1200
Cased Depth(feet)	33	850	845	835	765	760
Facility Elev. (ft. NGVD)						
Screened Interval From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	7500	3500	3500	3500	3500	3500
Year Drilled	1997	1996	1997	1997	1997	1998
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	854350	830190	830100	830160	855386	854880
Feet North	493690	496430	496700	497420	495060	494320
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Standby	Primary	Primary	Primary	Standby	Standby
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	23826	128172	128166	128168	23821	23822
Name	ET 1	ET 2	EVRGL 1	EVRGL 2	EVRGL 3	LC 2
Map Designator	ELEVATED TANK 1	ELEVATED TANK 2	EVERGLADES 1	EVERGLADES 2	EVERGLADES 3	LEISURE CITY 2
FLUWID Number						
Well Field	Elevated Tanks	Elevated Tanks	Everglades Labor Camp	Everglades Labor Camp	Everglades Labor Camp	Leisure City
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	12	16	18	18	18	6
Total Depth(feet)	40	50	55	55	50	30
Cased Depth(feet)	35	40	45	42	40	25
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0				0	0
To	0				0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)	37	37	38	38	38	22
Pump Capacity(GPM)	1600	1600	1500	1500	500	400
Year Drilled	1982	1996	2000	2001	2000	1953
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	847490	847500	818850	818880	818905	841830
Feet North	423470	423360	394500	394500	394500	422680
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Standby	Primary	Standby	Primary	Primary
Water Use Type	Public Water Supply Monitor	Public Water Supply Monitor	Public Water Supply Water Shortage Monitoring Facility	Public Water Supply	Public Water Supply Monitor	Public Water Supply Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	23823	23824	23825	27411	27407	27408
Name	LC 3	LC 4	LC 5	NJ 1	NWTN 1	NWTN 2
Map Designator	LEISURE CITY 3	LEISURE CITY 4	LEISURE CITY 5	NARANJA 1	NEWTON 1	NEWTON 2
FLUWID Number						
Well Field	Leisure City	Leisure City	Leisure City	Naranja Lakes	Newton	Newton
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	12	12	12	12	18	18
Total Depth(feet)	35	35	40	40	65	66
Cased Depth(feet)	30	30	35	35	50	53
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)	27	-27	27	32	45	43
Pump Capacity(GPM)	1200	800	1600	800	1500	1500
Year Drilled	1957	1966	1971	1975	2000	2001
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	841825	841770	841740	845240	838720	839675
Feet North	422746	422730	422725	430800	408020	408020
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply Monitor	Public Water Supply Monitor	Public Water Supply Monitor	Public Water Supply Monitor	Public Water Supply Water Shortage Monitoring Facility	Public Water Supply Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	128173	128178	128179	128180	128181	261790
Name	FP 1	RHP 1	RHP 2	RHP 3	RHP 4	SMH-F1
Map Designator	Former Plant 1	Roberta Hunter 1	Roberta Hunter 2	Roberta Hunter 3	Roberta Hunter 4	SMH-FA1
FLUWID Number						
Well Field	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights
Existing/Proposed	P	P	P	P	P	P
Well Diameter(Inches)	24	24	24	24	24	24
Total Depth(feet)	50	72	50	72	72	1200
Cased Depth(feet)	45	45	45	45	45	1100
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Submersible	Submersible	Submersible	Submersible	Submersible	Submersible
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	2800	1400	1400	1400	1400	2430
Year Drilled						2012
Planar Location						
Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	860980	860208	860255	860256	860255	860300
Feet North	458580	456482	455755	455142	454065	455490
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Upper Floridan Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	261791	261792	261793	261794	261795	262633
Name	SMH-F2	SMH-F3	SMH-F4	SMH-F5	SMH-F6	SMH-F7
Map Designator	SMH-FA2	SMH-FA3	SMH-FA4	SMH-FA5	SMH-FA6	SMH-FA7
FLUWID Number						
Well Field	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights	South Miami Heights
Existing/Proposed	P	P	P	P	P	P
Well Diameter(Inches)	24	24	24	24	24	24
Total Depth(feet)	1200	1200	1200	1200	1200	1200
Cased Depth(feet)	1100	1100	1100	1100	1100	1100
Facility Elev. (ft. NGVD)						
Screened Interval From						
To						
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Submersible	Submersible	Submersible	Submersible	Submersible	Submersible
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	2430	0	2430	2430	2430	2430
Year Drilled	2012	2012	2012	2012	2012	
Planar Location Source	REVIEWER		REVIEWER	REVIEWER	REVIEWER	
Feet East	860315	860315	860350	860785	861435	860256
Feet North	454555	453205	452090	451310	450545	457056
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Monitor	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	262635	217858	217859	217860	217861	257879
Name	SMH-F8	AO-6N	AO-8C	SC-1N	SC-6N	SW-2W
Map Designator	SMH-FA8					SW-2W
FLUWID Number						
Well Field	South Miami Heights					
Existing/Proposed	P	E	E	E	E	E
Well Diameter(Inches)	24					
Total Depth(feet)	1200	60	60	60	60	60
Cased Depth(feet)	1100	55	55	55	55	60
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing	P					
Pump Type	Submersible	None	None	None	None	Unspecified
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	2430	0	0	0	0	0
Year Drilled						
Planar Location						
Source						
Feet East	860256	871935	876599	866517	867733	852444
Feet North	458125	497928	503302	498298	494945	496094
Accounting Method	Flow Meter	None	None	None	None	None
Use Status	Primary	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Public Water Supply	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Upper Floridan Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217863	217869	217870	217881	217878	217877
Name	SW-7W	WWF-21S	WWF-755	NW-3A	NW-6F	NW-8D
Map Designator						
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						
Total Depth(feet)	60	48	55	88	60	60
Cased Depth(feet)	55	43	50	83	55	55
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	None	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location						
Source						
Feet East	852849	830122	833267	841714	850785	855531
Feet North	491131	496604	496314	562395	543261	548212
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217882	217879	137231	257889	257888	257887
Name	NW-19C	WASD-1C	F-45	F-279	G-354	G-432
Map Designator			F-45	F-279	G-354	G-432
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						
Total Depth(feet)	50	40	84.9	117	90.2	99.5
Cased Depth(feet)	45	35		113.5	89.2	97.5
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	Unspecified	Unspecified	Unspecified
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location Source			REVIEWER			
Feet East	863277	848891	918017	923283	896054	891645
Feet North	548736	553433	544328	565633	536487	506889
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
	Biscayne Aquifer	Biscayne Aquifer	Water Shortage Monitoring Facility	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer
Aquifer			Biscayne Aquifer			

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	257886	217851	257878	257885	137249	137251
Name	G-548	G-551	G-553	G-571	G-894	G-896
Map Designator	G-548		G-553	G-571	G-894	G-896
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)					2	2
Total Depth(feet)	97.3	80	91	94.5	76	74
Cased Depth(feet)	91.4	71	79	94.5	74.5	60
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	Unspecified	None	Unspecified	Unspecified	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location						
Source					DIGITIZED	DIGITIZED
Feet East	894029	855096	874041	893396	924897	892989
Feet North	539211	494095	479217	537785	569308	492088
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	257884	257883	217716	217853	257882	137233
Name	G-901	G-939	G-1009B	G-1074B	G-1179	G-1180
Map Designator	G-901	G-939	G-1009B		G-1179	G-1180
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						9
Total Depth(feet)	96	60	100	39	80	67
Cased Depth(feet)	94.8	57		17		
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	Unspecified	Unspecified	None	None	Unspecified	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location Source			REVIEWER			DIGITIZED
Feet East	889410	883435	887960	824944	856447	854786
Feet North	497387	466158	491810	498493	422815	423247
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Water Shortage Monitoring Facility Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	137236	137237	257880	217854	137240	217715
Name	G-1351	G-1354	G-1488	G-3074	G-3162	G-3224
Map Designator	G-1351	G-1354	G-1488			G-3224
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	2	2			2	
Total Depth(feet)	103	104	20	40	92	95.5
Cased Depth(feet)	100	91		40	82	93.5
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	Unspecified	None	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location						
Source	REVIEWER	DIGITIZED			DIGITIZED	REVIEWER
Feet East	896137	897679		866535	857302.951	916450
Feet North	535114	537142		496866	433858.484	560230
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor Water Shortage Monitoring Facility	Monitor Biscayne Aquifer	Monitor Biscayne Aquifer	Monitor Biscayne Aquifer	Monitor Biscayne Aquifer	Monitor Biscayne Aquifer
Aquifer	Biscayne Aquifer					

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	137241	137242	217872	217873	257881	217713
Name	G-3229	G-3250	G-3253	G-3259A	G-3313C	G-3313E
Map Designator	G-3229	G-3250			G-3313C	G-3313E
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)		2				
Total Depth(feet)	85	116	34.5	60	110	114
Cased Depth(feet)		106	18		107	32
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	None	Unspecified	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location						
Source	DIGITIZED	DIGITIZED				REVIEWER
Feet East	897343	889597	848470	853204	886586	886590
Feet North	515333	544468	548281	548219	476178	476160
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer
Aquifer						

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217864	217865	217866	217855	217867	217856
Name	G-3551	G-3553	G-3554	G-3555	G-3556	G-3563
Map Designator						
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						
Total Depth(feet)	18.3	19.9	20	19	19.1	18
Cased Depth(feet)	13.3	14.9	15	14	14.1	13
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	None	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location Source						
Feet East	822180	829849	833159	834977	830406	872346
Feet North	496766	496216	496238	492107	498278	507267
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217857	217874	217868	217875	217880	217944
Name	G-3565	G-3567	G-3577	G-3676	G-3760	G-3761
Map Designator						
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						8
Total Depth(feet)	19	18.7	8	33	72.7	16.3
Cased Depth(feet)	14	13.7	0	23	70.7	
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	None	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location						
Source						
Feet East	852082	841565	820631	845381	842356	842339
Feet North	498927	596563	497721	529396	548457	548452
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Water Table Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217876	257890	257891	257892	257893	217883
Name	G-3818	G-3885	G-3886	G-3887	G-3888	G-3897
Map Designator		G-3885	G-3886	G-3887	G-3888	SWWF-1(Boystown Pin
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						6
Total Depth(feet)	20	91	109	134	149	22.5
Cased Depth(feet)	15	86	101	130	143.5	22.5
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	Unspecified	Unspecified	Unspecified	Unspecified	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						2009
Planar Location Source						APPLICANT
Feet East	836580	863870	876430	888022	903086	847536
Feet North	549140	441922	457549	481537	519784	483700
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

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TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217884	217885	217887	217886	257894	257895
Name	G-3898	G-3899	G-3900	G-3901	G-3946	G-3947
Map Designator	WWF-1SW	SMH-1	Newton 1	Ever 1	G-3946	G-3947
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	6	6	6	6		
Total Depth(feet)	22.8	20.5	22	22.3	99	230
Cased Depth(feet)	22.8	20.5	22	22.3	90	200
Facility Elev. (ft. NGVD)						
Screened Interval						
From						
To						
Pumped Or Flowing						
Pump Type	None	None	None	None	Unspecified	Unspecified
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled	2009	2009	2009	2009		
Planar Location						
Source	APPLICANT	APPLICANT	APPLICANT	APPLICANT		
Feet East	828900	861418	838647	850586	863870	915184
Feet North	495915	450646	407718	394645	441939	546997
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Water Shortage Monitoring Facility Biscayne Aquifer	Water Shortage Monitoring Facility Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

Exhibit No. 5

TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	257896	257897	217829	217830	217831	217832
Name	G-3948	G-3949	FA-3N NDWWTP	FA-5 SDWWTP	ASR MW-1 (WEST)	ASR MW-1 (SW)
Map Designator	G-3948	G-3949	NDWWTP FA-3N	SDWWTP FA-5	ASR MW-1	SWWF MW-1
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)						
Total Depth(feet)	279		1510	1890	1396	1200
Cased Depth(feet)			1410	1790	1350	1110
Facility Elev. (ft. NGVD)						
Screened Interval						
From				1490	855	845
To				1588	1010	900
Pumped Or Flowing			F	F		F
Pump Type	Unspecified	Unspecified	None	None	None	None
Pump Int. Elev.						
Feet (NGVD)						
Feet (BLS)						
Pump Capacity(GPM)	0	0	0	0	0	0
Year Drilled						
Planar Location Source						
Feet East	926769	930332				
Feet North	577670	591728				
Accounting Method	None	None	None	None	None	None
Use Status	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Water Use Type	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer

Exhibit No: 5

TABLE - A

Description Of Wells.

Application Number: 110511-6

Well ID	217833
Name	CHI SDWWTP
Map Designator	Central Hospital
FLUWID Number	
Well Field	
Existing/Proposed	E
Well Diameter(Inches)	
Total Depth(feet)	1500
Cased Depth(feet)	1400
Facility Elev. (ft. NGVD)	
Screened Interval	
From	1000
To	1100
Pumped Or Flowing	F
Pump Type	None
Pump Int. Elev.	
Feet (NGVD)	
Feet (BLS)	
Pump Capacity(GPM)	0
Year Drilled	
Planar Location	
Source	
Feet East	
Feet North	
Accounting Method	None
Use Status	Monitor
Water Use Type	Monitor
Aquifer	Upper Floridan Aquifer

Exhibit No. 5

TABLE A
Description of Wells

Well Name or Number	1	2	3	4	10	11
Map Designation	PW-1	PW-2	PW-3	PW-4	PW-10	PW-11
Existing or Proposed	Existing	Existing	Existing	Existing	Existing	Existing
Date of Proposed Construction	N/A	N/A	N/A	N/A	N/A	N/A
Date Installed if Existing	6/7/09	3/5/12	2/24/12	4/05/12	10/15/12	6/25/12
Diameter (in)	17	16	16	16	16	16
Total Depth (ft)	1,490	1,452	1,497	1,467	1,480	1,482
Cased Depth (ft)	1,082	1,060	1,060	1,060	1,080	1,080
Screened Interval (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Pumped or Flowing	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing
Pump Type (see Instructions)	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE	SUBMERSIBLE
Pump Intake Depth (ft bls)	160	160	160	160	160	160
Pump or Flow Capacity (GPM)	1,400	1,400	1,400	1,400	1,400	1,400
Working Valve if Artesian (yes, no or not applicable)	Yes	Yes	Yes	Yes	Yes	Yes
Status (see Instructions)	PRIMARY	PRIMARY	PRIMARY	PRIMARY	PRIMARY	PRIMARY
Purpose (see Instructions)	Public Supply	Public Supply	Public Supply	Public Supply	Public Supply	Public Supply
Elevation of the Wellhead (ft NGVD - see Instructions)	10	10	10	10	10	10
Water Use Accounting Method (see Instructions)	FLOWMETER	FLOWMETER	FLOWMETER	FLOWMETER	FLOWMETER	FLOWMETER
Date Last Calibrated (ATTACH calibration report)	N/A	N/A	N/A	N/A	N/A	N/A
Planar Coordinates (if known - see instructions)	N/A	N/A	N/A	N/A	N/A	N/A
Section / Township / Range	17/52/40	17/52/40	17/52/40	17/52/40	17/52/40	17/52/40

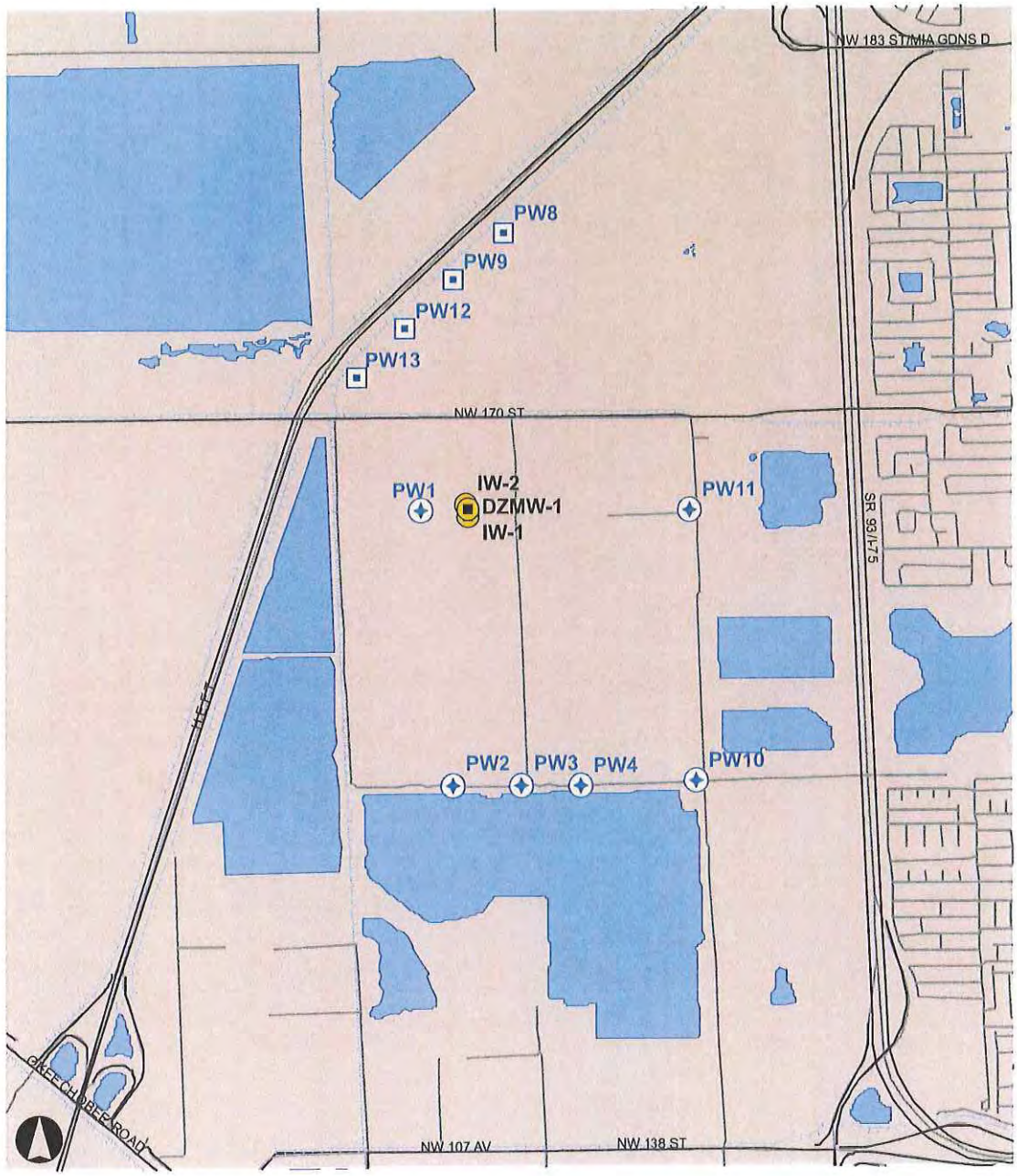

Figure1
City of Hialeah
Existing and Proposed Well Location Map

Schlumberger
WATER SERVICES

APPENDIX B

~~Miami-Dade County Capital Improvements Element Tables 8 and 12~~

MDWASD FY 2014-2020 Capital Budget And Multi-Year Capital Plan

MIAMI-DADE COUNTY

Delivering Excellence Every Day

MIAMI-DADE WATER AND SEWER DEPARTMENT

ADOPTED FY 2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN

SEPTEMBER 18, 2014

Prepared by Capital Planning and Coordination Section

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
1075	101546	WATER TREATMENT MODIFICATIONS TO COMPLY WITH SURFACE WATER TREATMENT AND DISINFECTANT/DISINFECTION BY PRODUCT REGULATIONS	532,824,088	13,200,885	519,623,203	300,000	1,000,000	7,500,000	20,000,000	176,682,053	180,710,573	133,430,577	0	0	0	0	519,623,203
	101891	NEW NWWF HIGH SERVICE PUMP STATION	43,250,000	0	43,250,000	0	0	1,500,000	10,000,000	15,000,000	14,500,000	2,250,000	0	0	0	0	43,250,000
		TOTAL - 1075	**585,954,088**	**13,200,885**	**572,753,203**	**300,000**	**1,300,000**	**12,200,000**	**33,300,000**	**194,762,053**	**195,210,573**	**135,680,577**	**0**	**0**	**0**	**0**	**572,753,203**
1077	101364	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WATER TREATMENT PLANT	75,456,139	5,389,891	70,066,248	200,000	1,500,000	20,000,000	26,913,097	5,727,131	15,726,020	0	0	0	0	0	70,066,248
	101365	SOUTH MIAMI HEIGHTS WTP AND WF - NEW WELLFIELD	20,878,062	2,836,758	18,041,304	100,000	1,500,000	7,500,000	8,941,305	0	0	0	0	0	0	0	18,041,305
	101575	CONSTRUCTION MANAGEMENT AT SOUTH MIAMI HEIGHTS WTP	4,700,000	1,993,567	2,706,433	123,356	500,000	1,460,764	622,313	0	0	0	0	0	0	0	2,706,433
	101778	DESIGN AND CONSTRUCTION OF PROPOSED 16 INCH WATER MAIN	4,500,000	1,477,596	3,022,404	144,249	1,400,000	1,478,155	0	0	0	0	0	0	0	0	3,022,404
	102020	SOUTH MIAMI HEIGHTS FA MEMBRANES WTP	42,000,000	0	42,000,000	0	0	0	0	0	0	0	42,000,000	0	0	0	42,000,000
	102021	SOUTH MIAMI HEIGHTS - FA WELLS AND PIPING	21,600,000	0	21,600,000	0	0	0	0	0	0	0	21,600,000	0	0	0	21,600,000
		TOTAL - 1077	**169,134,201**	**11,697,812**	**157,436,389**	**567,605**	**4,900,000**	**30,438,919**	**36,476,715**	**5,727,131**	**15,726,020**	**0**	**63,600,000**	**0**	**0**	**0**	**157,436,390**
1078	101368	TELEMETERING SYSTEM - WATER	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153

MIAMI-DADE WATER AND SEWER DEPARTMENT
2014-2020 CAPITAL BUDGET AND MULTI-YEAR CAPITAL PLAN
Projection by Project Sub-project by Year - Water
As of: 9/30/2013

Version 4

Proj	Sub-Proj	Sub-Proj Description	Current Bond/Fund Allocation	Expenditures As of 9/30/2013	Remaining Bond/Fund Allocation	PROJECTIONS 2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
		TOTAL - 1078	17,297,263	2,650,110	14,647,153	2,214,885	1,133,067	2,433,067	2,433,067	2,433,067	2,000,000	2,000,000	0	0	0	0	14,647,153
1080	101679	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 1 (10 MGD) - GOB IN 1065.101956	45,608,637	44,756,907	851,730	851,730	0	0	0	0	0	0	0	0	0	0	851,730
	101737	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 2 (5 MGD)	12,816,075	0	12,816,075	0	0	0	0	0	0	0	12,816,075	0	0	0	12,816,075
	101738	HIALEAH FLORIDAN AQUIFER R.O. W.T.P. PHASE 3 (2.5 MGD)	6,099,000	0	6,099,000	0	0	0	0	0	0	0	6,099,000	0	0	0	6,099,000
		TOTAL - 1080	64,523,712	44,756,907	19,766,805	851,730	0	0	0	0	0	0	18,915,075	0	0	0	19,766,805
1081	101966	INSTALLATION OF 12-INCH DIWM ON EAST DRIVE FROM NW 36 ST. TO LABARON DR.	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
		TOTAL - 1081	687,042	602,944	84,098	50,000	34,098	0	0	0	0	0	0	0	0	0	84,098
1082	101969	WATER - PIPES AND INFRASTRUCTURE PROJECTS	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - 1082	83,608,444	29,122,567	54,485,877	10,775,476	8,000,000	14,906,409	6,201,688	5,547,738	4,874,170	4,180,396	0	0	0	0	54,485,877
		TOTAL - Water	4,067,616,612	410,768,117	3,656,848,495	83,880,760	119,010,688	214,146,080	255,797,526	418,171,885	403,102,053	305,885,696	1,852,270,268	2,583,540	2,000,000	0	3,656,848,496

APPENDIX C

Water Supply for Municipalities

Appendix C
Water Supply for Municipalities

Service Area:

Miami-Dade Water and Sewer Department's (MDWASD) 20-year Water Supply Facilities Work Plan (WSFWP) identifies alternative water supply projects, conservation and capital improvement projects necessary to meet the projected water demands within the Department's service area. The MDWASD's service area includes the area within Miami-Dade County's Urban Development Boundary (UDB), excluding North Miami Beach, Homestead , Florida City and approximately 65% of North Miami's service area. The water demands for the areas within the Urban Expansion are considered for the planning horizon between 2015-2033.

The City of North Miami Beach stopped purchasing water from MDWASD in 2008, and has a 30-year wholesale agreement with MDWASD to purchase water on an as needed basis. The City of North Miami's Water Treatment Plant (WTP) supplies approximately 65% of the City's service area and purchases approximately 35% of its total water needs from MDWASD. Florida City and Homestead supply their customer's from their respective Water Treatment Plants. In 2010, the City of Homestead entered into a 20-year water use agreement with MDWASD to purchase up to 3 MGD to meet the demands of its retail water customers.

Retail and Wholesale Customers:

MDWASD supplies water to a total of fifteen wholesale customers, 15 municipal retail customers and areas of unincorporated Miami-Dade County. The other utilities such as North Miami Beach, North Miami, Homestead and Florida City also supply other local governments within Miami-Dade County as well as unincorporated areas. Exhibit C-1 shows the breakdown of the water suppliers and the local governments they serve.

Population and Water Demand:

Exhibits C-2 through C-4 include the per capita consumption and municipal and service area population projections for all municipalities within Miami-Dade County through 2035. Exhibit C-5 contains the population projections for other utilities supplying water to areas in Miami-Dade County, and Exhibit C-6 includes the unincorporated population served. The Population data was obtained from the Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ). The water demand projections for wholesale and retail municipal customers are included in Exhibits C-7 and C-8. These water demand projections were computed utilizing the Municipal per capita value that applies to each municipality.

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 2027. Through 2013, a total of 11.2 mgd have been saved.

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 shall 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 has resulted in a reduction in per capita usage as identified in Section 4, Table 4-4 of the WSFWP.

In addition, Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation, restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction 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.

Exhibit C-1

Water Suppliers for Local Governments

Miami-Dade Water and Sewer Department (WASD) Wholesale Customers	
Municipality	**% Population Served by WASD**
Bal Harbour	100%
Bay Harbour Island	100%
Hialeah	100%
Hialeah Gardens	100%
Homestead	3 MGD Max
Indian Creek	100%
Medley	100%
Miami Beach	100%
North Bay Village	100%
North Miami[2]	25%
North Miami Beach[3]	as needed only
Opa Locka	100%
Surfside	100%
Virginia Gardens	100%
West Miami	100%

Miami-Dade Water and Sewer Department (WASD) Retail Municipal Customers	
Municipality	**% Population Served by WASD**
Aventura[1]	68%
Coral Gables	100%
Cutley Bay	100%
Doral	100%
El Portal	100%
Key Biscayne	100%
Miami	100%
Miami Lakes	100%
Miami Shores[4]	97%
Miami Springs	100%
Palmetto Bay	100%
Pinecrest	100%
South Miami	100%
Sweetwater	100%
Miami Gardens[5]	57%
Unincorporated	See Exhibit C-6

Other Utilities - North Miami Beach (NMB)	
Municipality	**% Population Served by NMB**
Aventura[1]	32%
Golden Beach	100%
Miami Gardens[5]	41%
Sunny Isles	100%
North Miami Beach	100%
Unincorporated	See Exhibit C-6

Other Utilities - North Miami (NM)	
Municipality	**% Population Served by NM**
North Miami[2]	75%
Biscayne Park	100%
Miami Shores[4]	3%
Unincorporated	See Exhibit C-6

Other Utilities - Homestead	
Municipality	**% Population Served by Homestead**
Homestead[6]	96%
Unincorporated	See Exhibit C-6

Other Utilities - Florida City	
Municipality	**% Population Served by Fl City**
Florida City	100%

Note:

[1] Aventura is supplied by MDWASD, North Miami Beach, and City of Opa Locka (3% of population)

[2] 25% of North Miami's demand is supplied by MDWASD. Sixty-five (75%) is supplied by North Miami

[3] North Miami Beach is supplied on an as needed basis only by MDWASD

[4] Miami Shores is supplied by MDWASD and North Miami

[5] Miami Gardens is supplied by MDWASD, North Miami Beach, and Opa Locka. Opa Locka is a wholesale customer of MDWASD

[6] 4% of Homestead's population is within WASD's service area

Exhibit C-2
Municipal Per Capita - Water Supplied by Miami-Dade Water and Sewer Department

Retail Municipal Customer	2012 Consumption Per Capita (GPD)
Aventura*	147.3
Coral Gables	151.19
Cutler Bay	73.82
Doral	126.82
El Portal	114.37
Key Biscayne	173.11
Miami	92.05
Miami Gardens*	63.32
Miami Lakes	96.96
Miami Shores*	2768.97
Miami Springs	95.96
Palmetto Bay	93.45
Pinecrest	90.27
South Miami	117.57
Sweetwater	36.52

Note:

* Represents the per capita for the area supplied by MDWASD

Wholesale Customer	2012 Wholesale Per Capita Consumption (GPD)
Bal Harbour	482.52
Bay Harbor Islands	149.38
Hialeah	109.02
Hialeah Gardens	68.50
Indian Creek Village	3809.80
Medley	864.21
Miami Beach	245.99
North Bay Village	148.11
North Miami*	54.65
Opa-Locka	126.82
Surfside	148.04
Virginia Gardens	131.15
West Miami	126.50

Note:

* Represents the per capita for the area supplied by MDWASD

Exhibit C-3

MDWASD Wholesale Customers Population Projections

			2014	2015	2020	2025	2030	2033	2035
Service Area	Municipality	Bal Harbor							
Bal Harbor	Water By Utility	WASD	2684.65	2722.44	2911.35	3100.27	3289.18	3402.53	3478.09
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	2,685	2,722	2,911	3,100	3,289	3,403	3,478
Service Area	Municipality	Bay Harbor Islands							
Bay Harbor Islands	Water By Utility	WASD	5743.47	5772.33	5916.67	6061.00	6205.33	6291.93	6349.67
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	5,743	5,772	5,917	6,061	6,205	6,292	6,350
Service Area	Municipality	Hialeah							
Hialeah	Water By Utility	WASD	227901.94	228770.67	233114.36	237458.04	241801.73	244407.94	246145.41
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	227,902	228,771	233,114	237,458	241,802	244,408	246,145
	Unincorporated within Hialeah's Service Area								
	Water By Utility	WASD	2918.70	2956.17	3143.54	3330.91	3518.28	3630.70	3705.65
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	2,919	2,956	3,144	3,331	3,518	3,631	3,706
	Total Hialeah Service Area Pop.		230,821	231,727	236,258	240,789	245,320	248,039	249,851
	Total Hialeah Muni. Pop		227,902	228,771	233,114	237,458	241,802	244,408	246,145
Service Area	Municipality	Hialeah Gardens							
Hialeah Gardens	Water By Utility	WASD	23878.09	23998.83	24602.51	25206.20	25809.88	26172.09	26413.57
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	23,878	23,999	24,603	25,206	25,810	26,172	26,414
Service Area	Municipality	Indian Creek Village							
Indian Creek Village	Water By Utility	WASD	89.47	90.33	94.67	99.00	103.33	105.93	107.67
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	89	90	95	99	103	106	108
Service Area	Municipality	Medley							
Medley	Water By Utility	WASD	2252.69	2619.96	4456.31	6292.66	8129.02	9230.83	9965.37
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	2,253	2,620	4,456	6,293	8,129	9,231	9,966
	Municipality	Medley - WASD Service Area							
	Water By Utility	WASD	0.59	0.59	0.60	0.60	0.60	0.60	0.60
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	1	1	1	1	1	1	1
	Total Medley Muni. Pop.		2,253	2,621	4,457	6,293	8,130	9,231	9,966
	Total Medley Service Area Pop.		2,253	2,621	4,457	6,293	8,130	9,231	9,966
Service Area	Municipality	Miami Beach							
Miami Beach	Water By Utility	WASD	91988.04	92955.22	97791.13	102627.03	107462.93	110364.47	112298.83
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	91,988	92,955	97,791	102,627	107,463	110,364	112,299
Service Area	Municipality	North Bay Village							
North Bay Village	Water By Utility	WASD	7346.99	7403.94	7688.73	7973.52	8258.30	8429.17	8543.09
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	7,347	7,404	7,689	7,974	8,258	8,429	8,543

Exhibit C-3

MDWASD Wholesale Customers Population Projections

			2014	2015	2020	2025	2030	2033	2035
Service Area	Municipality	Opa Locka							
Opa Locka	Water By Utility	WASD	15184.75	15259.26	15631.80	16004.34	16376.88	16600.40	16749.42
		North Miami							
		Homestead							
		Florida City							
		Total	15,185	15,259	15,632	16,004	16,377	16,600	16,749
	Municipality	Opa Locka - WASD Service Area							
	Water By Utility	WASD	104.82	105.55	109.20	112.85	116.50	118.69	120.15
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	105	106	109	113	117	119	120
	Miami Gardens within Opa Locka Service Area								
	Water By Utility	WASD	2907.31	2928.80	3036.24	3143.68	3251.11	3315.58	3358.55
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	2,907	2,929	3,036	3,144	3,251	3,316	3,359
	Unincorporated within Opa Locka Service Area								
	Water By Utility	WASD	1029.68	1032.73	1047.99	1063.26	1078.52	1087.68	1093.78
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	1,030	1,033	1,048	1,063	1,079	1,088	1,094
	Total Opa Locka Muni. Pop		15,290	15,365	15,741	16,117	16,493	16,719	16,870
	Total Opa Locka Service Area Pop		19,122	19,221	19,716	20,211	20,707	21,004	21,202
Service Area	Municipality	Surfside							
Surfside	Water By Utility	WASD	5835.23	5865.89	6019.18	6172.46	6325.75	6417.73	6479.04
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	5,835	5,866	6,019	6,172	6,326	6,418	6,479
Service Area	Municipality	Virginia Gardens							
Virginia Gardens	Water By Utility	WASD	1967.44	1979.80	2041.60	2103.41	2165.21	2202.30	2227.02
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	1,967	1,980	2,042	2,103	2,165	2,202	2,227
Service Area	Municipality	West Miami							
West Miami	Water By Utility	WASD	6605.75	6746.71	7451.49	8156.28	8861.07	9283.94	9565.86
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	6,606	6,747	7,451	8,156	8,861	9,284	9,566

Exhibit C-4

MDWASD Retail Municipal Customers Population Projections

		2014	2020	2025	2030	2033	2035
Municipality	Coral Gables						
Water By Utility	WASD	47438.4774	48991.205	50285.1447	51579.0843	52355.4481	52873.024
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	47,438	48,991	50,285	51,579	52,355	52,873
Municipality	Cutler Bay						
Water By Utility	WASD	41226.0714	42258.93	43119.6456	43980.3611	44496.7904	44841.0766
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	41,226	42,259	43,120	43,980	44,497	44,841
Municipality	Doral						
Water By Utility	WASD	48782.98	55001.78	60184.12	65366.46	68475.86	70548.80
	North Miami						
	NMB						
	Homestead						
	Outside UDB	17.15	17.15	17.15	17.15	17.15	17.15
	Total	48,800	55,019	60,201	65,384	68,493	70,566
Municipality	El Portal						
Water By Utility	WASD	1969.01	2042.12	2103.05	2163.98	2200.53	2224.91
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	1,969	2,042	2,103	2,164	2,201	2,225
Municipality	Key Biscayne						
Water By Utility	WASD	12394.81	12558.85	12695.56	12832.27	12914.29	12968.98
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	12,395	12,559	12,696	12,832	12,914	12,969
Municipality	Miami						
Water By Utility	WASD	435290.473	490455.805	536426.915	582398.024	609980.69	628369.134
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	435,290	490,456	536,427	582,398	609,981	628,369
Municipality	Miami Lakes						
Water By Utility	WASD	28724.32	29807.73	30710.57	31613.41	32155.12	32516.25
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	28,724	29,808	30,711	31,613	32,155	32,516

Exhibit C-4

MDWASD Retail Municipal Customers Population Projections

		2014	2020	2025	2030	2033	2035
Municipality	Miami Shores						
Water By Utility	WASD	11907.42	12095.37	12252.00	12408.63	12502.61	12565.26
	NM WASD	367.60	371.00	373.84	376.68	378.38	379.52
	NMB						
	Homestead						
	Florida City						
	Total	12,275	12,466	12,626	12,785	12,881	12,945
Municipality	Miami Springs						
Water By Utility	WASD	14233.92	14472.90	14672.05	14871.20	14990.69	15070.35
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	14,234	14,473	14,672	14,871	14,991	15,070
Municipality	Palmetto Bay						
Water By Utility	WASD	24236.24	24847.54	25356.95	25866.36	26172.01	26375.78
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	24,236	24,848	25,357	25,866	26,172	26,376
Municipality	Pinecrest						
Water By Utility	WASD	17768.65	17971.21	18140.00	18308.80	18410.07	18477.59
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	17,769	17,971	18,140	18,309	18,410	18,478
Municipality	South Miami						
Water By Utility	WASD	11681.55	12357.94	12921.61	13485.27	13823.47	14048.93
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	11,682	12,358	12,922	13,485	13,823	14,049
Municipality	Sweetwater						
Water By Utility	WASD	18892.77	19645.22	20272.27	20899.32	21275.55	21526.37
	North Miami						
	NMB						
	Homestead						
	Florida City						
	Total	18,893	19,645	20,272	20,899	21,276	21,526
Municipality	Aventura						
Water By Utility	WASD	24516.30	25360.82	26064.60	26768.37	27190.63	27472.14
	North Miami						
	NMB	11286.17	11679.45	12007.18	12334.92	12531.56	12662.65
	Homestead						
	Florida City						
	Total	35,802	37,040	38,072	39,103	39,722	40,135

Exhibit C-4

MDWASD Retail Municipal Customers Population Projections

		2014	2020	2025	2030	2033	2035
Municipality	Biscayne Park						
Water By Utility	WASD						
	North Miami	3017.99	3039.72	3057.82	3075.93	3086.79	3094.03
	NMB						
	Homestead						
	Florida City						
	Total	3,018	3,040	3,058	3,076	3,087	3,094
Municipality	Miami Gardens						
Water By Utility	WASD	64583.80	68913.39	72521.39	76129.38	78294.18	79737.37
	North Miami						
	NMB	46651.89	51494.48	55529.96	59565.45	61986.74	63600.93
	Homestead						
	Florida City						
Water by Opa Locka		2907.31	3036.24	3143.68	3251.11	3315.58	3358.55
	Total	114,143	123,444	131,195	138,946	143,596	146,697
Municipality	Golden Beach						
Water By Utility	WASD						
	North Miami						
	NMB	950.27	986.88	1017.39	1047.90	1066.21	1078.42
	Homestead						
	Florida City						
	Total	950	987	1,017	1,048	1,066	1,078
Municipality	Sunny Isles Beach						
Water By Utility	WASD						
	North Miami						
	NMB	21695.83	23245.43	24536.76	25828.09	26602.88	27119.42
	Homestead						
	Florida City						
	Total	21,696	23,245	24,537	25,828	26,603	27,119

Exhibit C-5

Exhibit C-5 Other Utilities Population Projections

			2014	2015	2020	2025	2030	2033	2035
Service Area	Municipality	Florida City							
Florida City	Water By Utility	WASD							
		North Miami							
		NMB							
		Homestead							
		Florida City	9790.86	9790.86	9790.86	9790.86	9790.86	9790.86	9790.86
		Total	9,791	9,791	9,791	9,791	9,791	9,791	9,791
	Municipality	Florida City-WASD Service Area							
	Water By Utility	WASD	0.90	0.93	1.04	1.16	1.28	1.35	1.40
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	1	1	1	1	1	1	1
	Total WASD		1	1	1	1	1	1	1
	Total Florida Service Area Pop.		9,791	9,791	9,791	9,791	9,791	9,791	9,791
	Total Florida City Muni. Pop		9,792	9,792	9,792	9,792	9,792	9,792	9,792
Service Area	Municipality	Homestead-Homestead service area							
Homestead	Water By Utility	WASD							
		North Miami							
		NMB							
		Homestead	60238.47	61294.84	66576.74	71858.63	77140.52	80309.65	82422.41
		Florida City							
		Total	60,238	61,295	66,577	71,859	77,141	80,310	82,422
	Municipality	Homestead within WASD service area							
	Water By Utility	WASD	2778.33	2839.66	3146.32	3452.98	3759.64	3943.64	4066.30
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	2,778	2,840	3,146	3,453	3,760	3,944	4,066
	Municipality	Unincorporated-Homestead Service Area							
	Water By Utility	WASD	5150.39	5233.24	5647.50	6061.76	6476.02	6724.57	6890.28
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	5,150	5,233	5,648	6,062	6,476	6,725	6,890
	Total Homestead Municipal Population		63,017	64,135	69,723	75,312	80,900	84,253	86,489
	Total Homestead Service Area Population		65,389	66,528	72,224	77,920	83,617	87,034	89,313
Service Area	Municipality	North Miami							
North Miami	Water By Utility	WASD	14334.20	14669.80	16347.81	18025.81	19703.81	20710.61	21381.81
		North Miami	43494.82	43534.68	43734.01	43933.34	44132.66	44252.26	44331.99
		NMB							
		Homestead							
		Florida City							
		Total	57,829	58,204	60,082	61,959	63,836	64,963	65,714
	Unincorporated within NM Service Area								
	Water By Utility	WASD	7667.74	7725.56	8014.68	8303.81	8592.93	8766.40	8882.05
		North Miami	22868.76	22969.46	23472.96	23976.46	24479.96	24782.06	24983.46
		NMB							
		Homestead							
		Florida City							
		Total	30,536	30,695	31,488	32,280	33,073	33,548	33,866
	Municipality	Biscayne Park							
	Water By Utility	WASD							
		North Miami	3017.99	3021.61	3039.72	3057.82	3075.93	3086.79	3094.03
		NMB							
		Homestead							
		Florida City							
		Total	3,018	3,022	3,040	3,058	3,076	3,087	3,094
	Municipality	Miami Shores							
	Water By Utility	WASD	367.60	368.16	371.00	373.84	376.68	378.38	379.52
		North Miami							
		NMB							
		Homestead							
		Florida City							
		Total	368	368	371	374	377	378	380
	Total Muni. Population		57,829	58,204	60,082	61,959	63,836	64,963	65,714
	Total Pop. Served by WASD		22,370	22,764	24,733	26,703	28,673	29,855	30,643
	Total Pop. Served by NM		66,364	66,504	67,207	67,910	68,613	69,034	69,315
	Total NM Service Area		91,751	92,289	94,980	97,671	100,362	101,977	103,053

Exhibit C-5

Exhibit C-5 Other Utilities Population Projections

			2014	2015	2020	2025	2030	2033	2035
Service Area	Municipality	North Miami Beach							
North Miami Beach	Water By Utility	WASD							
		North Miami							
		NMB	39242.69	39466.13	40583.28	41700.44	42817.60	43487.90	43934.76
		Homestead							
		Florida City							
		Total	39,243	39,466	40,583	41,700	42,818	43,488	43,935
	Municipality	Aventura							
	Water By Utility	WASD							
		North Miami							
		NMB	11286.17	11351.71	11679.45	12007.18	12334.92	12531.56	12662.65
		Homestead							
		Florida City							
		Total	11,286	11,352	11,679	12,007	12,335	12,532	12,663
	Municipality	Golden Beach							
	Water By Utility	WASD							
		North Miami							
		NMB	950.27	956.37	986.88	1017.39	1047.90	1066.21	1078.42
		Homestead							
		Florida City							
		Total	950	956	987	1,017	1,048	1,066	1,078
	Municipality	Miami Gardens							
	Water By Utility	WASD							
		North Miami							
		NMB	46651.89	47458.99	51494.48	55529.96	59565.45	61986.74	63600.93
		Homestead							
		Florida City							
		Total	46,652	47,459	51,494	55,530	59,565	61,987	63,601
	Municipality	Sunny Isles Beach							
	Water By Utility	WASD							
		North Miami							
		NMB	21695.83	21954.10	23245.43	24536.76	25828.09	26602.88	27119.42
		Homestead							
		Florida City							
		Total	21,696	21,954	23,245	24,537	25,828	26,603	27,119
	Unincorporated within NMB Service Area								
	Water By Utility	WASD							
		North Miami							
		NMB	47090.83	47260.14	48106.70	48953.25	49799.81	50307.74	50646.36
		Homestead							
		Florida City							
		Total	47,091	47,260	48,107	48,953	49,800	50,308	50,646
	Total NMB Municipal Population		39,243	39,466	40,583	41,700	42,818	43,488	43,935
	Total NMB Service Area Pop.		166,918	168,447	176,096	183,745	191,394	196,983	199,043

Exhibit C-6

Unincorporated Population Served

		2014	2015	2020	2025	2030	2033	2035
Municipality	Unincorporated - WASD Service Area							
Water By Utility	WASD	1,031,919.22	1,039,493.75	1,077,366.40	1,115,239.05	1,153,111.70	1,175,835.29	1,190,984.35
	North Miami							
	NMB							
	Homestead							
	Florida City							
	Total	1,031,919	1,039,494	1,077,366	1,115,239	1,153,112	1,175,835	1,190,984
Unincorporated within Hialeah's Service Area								
Water By Utility	WASD	2,918.70	2,956.17	3,143.54	3,330.91	3,518.28	3,630.70	3,705.65
	North Miami							
	NMB							
	Homestead							
	Florida City							
	Total	2,919	2,956	3,144	3,331	3,518	3,631	3,706
Municipality	Unincorporated - Homestead Service Area							
Water By Utility	WASD							
	North Miami							
	NMB							
	Homestead	5,150.39	5,233.24	5,647.50	6,061.76	6,476.02	6,724.57	6,890.28
	Florida City							
	Total	5,150	5,233	5,648	6,062	6,476	6,725	6,890
Unincorporated within NM Service Area								
Water By Utility	NM by WASD	7,667.74	7,725.56	8,014.68	8,303.81	8,592.93	8,766.40	8,882.05
	North Miami	22,868.76	22,969.46	23,472.96	23,976.46	24,479.96	24,782.06	24,983.46
	NMB							
	Homestead							
	Florida City							
	Total	30,536	30,695	31,488	32,280	33,073	33,548	33,866
Unincorporated within NMB Service Area								
Water By Utility	WASD							
	North Miami							
	NMB	47,090.83	47,260.14	48,106.70	48,953.25	49,799.81	50,307.74	50,646.36
	Homestead							
	Florida City							
	Total	47,091	47,260	48,107	48,953	49,800	50,308	50,646
Unincorporated within Opa Locka Service Area								
Water By Utility	WASD	1,029.68	1,032.73	1,047.99	1,063.26	1,078.52	1,087.68	1,093.78
	North Miami							
	NMB							
	Homestead							
	Florida City							
	Total	1,030	1,033	1,048	1,063	1,079	1,088	1,094
Unincorporated outside UDB[1]								
Water By Utility	WASD	25,699.06	26,314.00	29,388.70	32,463.41	35,538.12	37,382.94	38,612.82
	North Miami							
	NMB							
	Homestead							
	Florida City							
	Total	25,699	26,314	29,389	32,463	35,538	37,383	38,613
Total Unincorporated Population within MDWASD service area		1,031,919	1,039,494	1,077,366	1,115,239	1,153,112	1,175,835	1,190,984
Total unincorporated Population seviced by others		112,425	113,491	118,822	124,153	129,484	132,682	134,814
Total Unincorporated Miami Dade Area Pop.		1,144,344	1,152,985	1,196,188	1,239,392	1,282,595	1,308,517	1,325,799

Note:

(1) Population served outside the UDB include correctional facilities, Biscayne National Park, Miccosukee Resort and Gaming, and Everglades Labor Camp

Exhibit C-7

Wholesale Water Demand Projections

Wholesale Customer	Projection Year	Population	Baseline Wholesale Per Capita Consumption (GPD)	Projected Wholesale Consumption (GPD)	Projected Wholesale Consumption (MGD)
Bal Harbour	2014	2,529.07	482.52	1,220,318.54	1.22
Bal Harbour	2020	2,791.67	482.52	1,347,027.60	1.35
Bal Harbour	2025	3,010.50	482.52	1,452,618.48	1.45
Bal Harbour	2030	3,229.33	482.52	1,558,209.36	1.56
Bal Harbour	2033	3,360.63	482.52	1,621,563.89	1.62
Bal Harbour	2035	3,448.17	482.52	1,663,800.24	1.66
Bay Harbor Islands	2014	5,743.47	149.38	857,939.07	0.86
Bay Harbor Islands	2015	5,772.33	149.38	862,251.08	0.86
Bay Harbor Islands	2020	5,916.67	149.38	883,811.09	0.88
Bay Harbor Islands	2025	6,061.00	149.38	905,371.10	0.91
Bay Harbor Islands	2030	6,205.33	149.38	926,931.11	0.93
Bay Harbor Islands	2033	6,291.93	149.38	939,867.12	0.94
Bay Harbor Islands	2035	6,349.67	149.38	948,491.12	0.95
Hialeah	2014	231,021.00	109.02	25,184,942.51	25.18
Hialeah	2020	236,412.00	109.02	25,772,646.77	25.77
Hialeah	2025	240,904.50	109.02	26,262,400.32	26.26
Hialeah	2030	245,397.00	109.02	26,752,153.87	26.75
Hialeah	2033	248,092.50	109.02	27,046,005.99	27.05
Hialeah	2035	249,889.50	109.02	27,241,907.41	27.24
Hialeah Gardens	2014	23,877.93	68.50	1,635,719.37	1.64
Hialeah Gardens	2015	23,998.67	68.50	1,643,990.01	1.64
Hialeah Gardens	2020	24,602.33	68.50	1,685,343.22	1.69
Hialeah Gardens	2025	25,206.00	68.50	1,726,696.44	1.73
Hialeah Gardens	2030	25,809.67	68.50	1,768,049.65	1.77
Hialeah Gardens	2033	26,171.87	68.50	1,792,861.58	1.79
Hialeah Gardens	2035	26,413.33	68.50	1,809,402.86	1.81
Indian Creek Village	2014	89.47	3,809.80	340,850.23	0.34
Indian Creek Village	2015	90.33	3,809.80	344,152.06	0.34
Indian Creek Village	2020	94.67	3,809.80	360,661.20	0.36
Indian Creek Village	2025	99.00	3,809.80	377,170.34	0.38
Indian Creek Village	2030	103.33	3,809.80	393,679.48	0.39
Indian Creek Village	2033	105.93	3,809.80	403,584.96	0.40
Indian Creek Village	2035	107.67	3,809.80	410,188.62	0.41
Medley	2012	1,518.53	864.21	1,312,328.77	1.31
Medley	2013	1,885.80	864.21	1,629,723.59	1.63
Medley	2014	2,253.07	864.21	1,947,118.40	1.95
Medley	2015	2,620.33	864.21	2,264,513.22	2.26
Medley	2016	2,987.60	864.21	2,581,908.04	2.58
Medley	2017	3,354.87	864.21	2,899,302.86	2.90
Medley	2018	3,722.13	864.21	3,216,697.68	3.22
Medley	2019	4,089.40	864.21	3,534,092.50	3.53
Medley	2020	4,456.67	864.21	3,851,487.32	3.85
Medley	2021	4,823.93	864.21	4,168,882.13	4.17
Medley	2022	5,191	864.208	4,486,276.95	4.49
Medley	2023	5,558	864.208	4,803,671.77	4.80
Medley	2024	5,926	864.208	5,121,066.59	5.12
Medley	2025	6,293	864.208	5,438,461.41	5.44
Medley	2026	6,660	864.208	5,755,856.23	5.76
Medley	2027	7,028	864.208	6,073,251.05	6.07
Medley	2028	7,395	864.208	6,390,645.86	6.39

Exhibit C-7

Wholesale Water Demand Projections

Wholesale Customer	Projection Year	Population	Baseline Wholesale Per Capita Consumption (GPD)	Projected Wholesale Consumption (GPD)	Projected Wholesale Consumption (MGD)
Medley	2029	7,762	864.208	6,708,040.68	6.71
Medley	2030	8,129	864.208	7,025,435.50	7.03
Medley	2031	8,497	864.208	7,342,830.32	7.34
Medley	2032	8,864	864.208	7,660,225.14	7.66
Medley	2033	9,231	864.208	7,977,619.96	7.98
Medley	2034	9,598	864.208	8,295,014.78	8.30
Medley	2035	9,966	864.208	8,612,409.59	8.61
Medley	2036	10,333	864.208	8,929,804.41	8.93
Medley	2037	10,700	864.208	9,247,199.23	9.25
Medley	2038	11,067	864.208	9,564,594.05	9.56
Medley	2039	11,435	864.208	9,881,988.87	9.88
Medley	2040	11,802	864.208	10,199,383.69	10.20
Miami Beach	2014	90,254	245.991	22201794.66	22.20
Miami Beach	2015	91,288	245.991	22456116.65	22.46
Miami Beach	2020	96,458	245.991	23727726.59	23.73
Miami Beach	2025	101,627	245.991	24999336.54	25.00
Miami Beach	2030	106,796	245.991	26270946.48	26.27
Miami Beach	2033	109,898	245.991	27033912.45	27.03
Miami Beach	2035	111,966	245.991	27542556.42	27.54
Miami Beach	2028	104,728.60	245.99	25,762,302.50	25.76
Miami Beach	2029	105,762.47	245.99	26,016,624.49	26.02
Miami Beach	2030	106,796.33	245.99	26,270,946.48	26.27
Miami Beach	2033	109,897.93	245.99	27,033,912.45	27.03
Miami Beach	2035	111,965.67	245.99	27,542,556.42	27.54
North Bay Village	2014	7,346.87	148.11	1,088,106.96	1.09
North Bay Village	2015	7,403.83	148.11	1,096,544.00	1.10
North Bay Village	2020	7,688.67	148.11	1,138,729.22	1.14
North Bay Village	2025	7,973.50	148.11	1,180,914.43	1.18
North Bay Village	2030	8,258.33	148.11	1,223,099.64	1.22
North Bay Village	2033	8,429.23	148.11	1,248,410.77	1.25
North Bay Village	2035	8,543.17	148.11	1,265,284.86	1.27
North Miami	2014	68,966.73	54.65	3,768,802.66	3.77
North Miami	2015	69,007.17	54.65	3,771,012.20	3.77
North Miami	2020	69,209.33	54.65	3,782,059.94	3.78
North Miami	2025	69,411.50	54.65	3,793,107.68	3.79
North Miami	2030	69,613.67	54.65	3,804,155.41	3.80
North Miami	2033	69,734.97	54.65	3,810,784.05	3.81
North Miami	2035	69,815.83	54.65	3,815,203.15	3.82
Opa-Locka	2014	19,122.13	126.82	2,425,119.34	2.43
Opa-Locka	2015	19,221.17	126.82	2,437,679.00	2.44
Opa-Locka	2020	19,716.33	126.82	2,500,477.35	2.50
Opa-Locka	2025	20,211.50	126.82	2,563,275.69	2.56
Opa-Locka	2030	20,706.67	126.82	2,626,074.03	2.63
Opa-Locka	2033	21,003.77	126.82	2,663,753.03	2.66
Opa-Locka	2035	21,201.83	126.82	2,688,872.37	2.69
Surfside	2014	5,835.53	148.04	863,864.14	0.86
Surfside	2015	5,866.17	148.04	868,398.95	0.87
Surfside	2020	6,019.33	148.04	891,073.01	0.89
Surfside	2025	6,172.50	148.04	913,747.06	0.91
Surfside	2030	6,325.67	148.04	936,421.11	0.94

Exhibit C-7

Wholesale Water Demand Projections

Wholesale Customer	Projection Year	Population	Baseline Wholesale Per Capita Consumption (GPD)	Projected Wholesale Consumption (GPD)	Projected Wholesale Consumption (MGD)
Surfside	2033	6,417.57	148.04	950,025.54	0.95
Surfside	2035	6,478.83	148.04	959,095.16	0.96
Virginia Gardens	2014	1,967.47	131.15	258,038.36	0.26
Virginia Gardens	2015	1,979.83	131.15	259,660.28	0.26
Virginia Gardens	2020	2,041.67	131.15	267,769.88	0.27
Virginia Gardens	2025	2,103.50	131.15	275,879.49	0.28
Virginia Gardens	2030	2,165.33	131.15	283,989.09	0.28
Virginia Gardens	2033	2,202.43	131.15	288,854.85	0.29
Virginia Gardens	2035	2,227.17	131.15	292,098.69	0.29
West Miami	2014	6,605.87	126.50	835,665.57	0.84
West Miami	2015	6,746.83	126.50	853,498.35	0.85
West Miami	2020	7,451.67	126.50	942,662.27	0.94
West Miami	2025	8,156.50	126.50	1,031,826.18	1.03
West Miami	2030	8,861.33	126.50	1,120,990.10	1.12
West Miami	2035	9,566.17	126.50	1,210,154.02	1.21

Exhibit C-8

Retail Municipal Customers Water Demand Projections

Municipality	Projection Year	Total Population	Baseline Consumption Per Capita (GPD)	Projected Consump with Cons (GPD)	Projected Consump with Cons (MGD)
Aventura	2014	27472	147.3	4037836.32	4.0378
Aventura	2015	27629	147.3	4058119.49	4.0581
Aventura	2020	28415	147.3	4160202.41	4.1602
Aventura	2025	29200	147.3	4262643.74	4.2626
Aventura	2030	29986	147.3	4375964.09	4.376
Aventura	2033	30457	147.3	4445387.48	4.4454
Aventura	2035	30771	147.3	4491669.74	4.4917
Coral Gables	2014	47438	151.19	7103590.04	7.1036
Coral Gables	2015	47697	151.19	7120523.75	7.1205
Coral Gables	2020	48991	151.19	7210371.99	7.2104
Coral Gables	2025	50285	151.19	7303003.47	7.303
Coral Gables	2030	51579	151.19	7480114.79	7.4801
Coral Gables	2033	52355	151.19	7597495.22	7.5975
Coral Gables	2035	52873	151.19	7675748.84	7.6757
Cutler Bay	2014	41226	73.82	2982203.42	2.9822
Cutler Bay	2015	41398	73.82	2975094.5	2.9751
Cutler Bay	2020	42259	73.82	2944175.32	2.9442
Cutler Bay	2025	43120	73.82	2915741.54	2.9157
Cutler Bay	2030	43980	73.82	2962747.35	2.9627
Cutler Bay	2033	44497	73.82	3000875.21	3.0009
Cutler Bay	2035	44841	73.82	3026293.78	3.0263
Doral	2014	48800	126.82	6124942.42	6.1249
Doral	2015	49836	126.82	6235726.6	6.2357
Doral	2020	55019	126.82	6794468.44	6.7945
Doral	2025	60201	126.82	7355800.75	7.3558
Doral	2030	65383	126.82	7995761.71	7.9958
Doral	2033	68493	126.82	8390082.18	8.3901
Doral	2035	70566	126.82	8652962.5	8.653
El Portal	2014	1969	114.37	221807.04	0.2218
El Portal	2015	1981	114.37	222107.96	0.2221
El Portal	2020	2042	114.37	223867.98	0.2239
El Portal	2025	2103	114.37	225765.26	0.2258
El Portal	2030	2164	114.37	231828.62	0.2318
El Portal	2033	2201	114.37	236014.7	0.236
El Portal	2035	2225	114.37	238805.42	0.2388
Key Biscayne	2014	12394	173.11	2137041.36	2.137
Key Biscayne	2015	12422	173.11	2138982.96	2.139
Key Biscayne	2020	12559	173.11	2149343.55	2.1493
Key Biscayne	2025	12696	173.11	2160054.77	2.1601
Key Biscayne	2030	12832	173.11	2181408.99	2.1814
Key Biscayne	2033	12914	173.11	2195621.65	2.1956
Key Biscayne	2035	12969	173.11	2205096.76	2.2051
Miami	2014	435291	92.05	39725190.51	39.7252
Miami	2015	444485	92.05	40460551.82	40.4606
Miami	2020	490456	92.05	44163249.14	44.1632
Miami	2025	536427	92.05	47879858.53	47.8799
Miami	2030	582398	92.05	52018740.79	52.0187
Miami	2033	609981	92.05	54557621.79	54.5576

Exhibit C-8

Retail Municipal Customers Water Demand Projections

Miami	2035	628369	92.05	56250209.12	56.2502
Miami Gardens	2014	64584	63.32	4021380.18	4.0214
Miami Gardens	2015	65305	63.32	4045036.74	4.045
Miami Gardens	2020	68913	63.32	4168461.89	4.1685
Miami Gardens	2025	72521	63.32	4294650.21	4.2947
Miami Gardens	2030	76129	63.32	4504709.09	4.5047
Miami Gardens	2033	78294	63.32	4641777.91	4.6418
Miami Gardens	2035	79737	63.32	4733157.13	4.7332
Miami Lakes	2014	28724	96.96	2748681.14	2.7487
Miami Lakes	2015	28905	96.96	2754373.4	2.7544
Miami Lakes	2020	29808	96.96	2785592.29	2.7856
Miami Lakes	2025	30711	96.96	2818292.95	2.8183
Miami Lakes	2030	31613	96.96	2895969.74	2.896
Miami Lakes	2033	32155	96.96	2948492.6	2.9485
Miami Lakes	2035	32516	96.96	2983507.84	2.9835
Miami Shores	2014	367	2768.97	1002367.56	1.0024
Miami Shores	2015	368	2768.97	999204.15	0.9992
Miami Shores	2020	371	2768.97	984491.62	0.9845
Miami Shores	2025	374	2768.97	970372.6	0.9704
Miami Shores	2030	376	2768.97	974268.19	0.9743
Miami Shores	2033	378	2768.97	978975.43	0.979
Miami Shores	2035	379	2768.97	982113.59	0.9821
Miami Springs	2014	14234	95.96	1347427.64	1.3474
Miami Springs	2015	14274	95.96	1345266.89	1.3453
Miami Springs	2020	14473	95.96	1335858.8	1.3359
Miami Springs	2025	14672	95.96	1327200.63	1.3272
Miami Springs	2030	14871	95.96	1341304.97	1.3413
Miami Springs	2033	14990	95.96	1352762.08	1.3528
Miami Springs	2035	15070	95.96	1360400.15	1.3604
Palmetto Bay	2014	24236	93.45	2230610.5	2.2306
Palmetto Bay	2015	24338	93.45	2228966.79	2.229
Palmetto Bay	2020	24848	93.45	2223353.76	2.2234
Palmetto Bay	2025	25357	93.45	2219140.76	2.2191
Palmetto Bay	2030	25866	93.45	2257422.91	2.2574
Palmetto Bay	2033	26172	93.45	2285982.6	2.286
Palmetto Bay	2035	26376	93.45	2305022.39	2.305
Pinecrest	2014	17769	90.27	1584482.74	1.5845
Pinecrest	2015	17803	90.27	1581186.17	1.5812
Pinecrest	2020	17971	90.27	1566183.46	1.5662
Pinecrest	2025	18140	90.27	1551976.06	1.552
Pinecrest	2030	18309	90.27	1561908.89	1.5619
Pinecrest	2033	18410	90.27	1571044.33	1.571
Pinecrest	2035	18477	90.27	1577134.63	1.5771
South Miami	2014	11682	117.57	1357826.27	1.3578
South Miami	2015	11795	117.57	1366018.84	1.366
South Miami	2020	12358	117.57	1408162.92	1.4082
South Miami	2025	12922	117.57	1450941.74	1.4509
South Miami	2030	13486	117.57	1512986.64	1.513
South Miami	2033	13824	117.57	1552748.1	1.5527
South Miami	2035	14049	117.57	1579255.75	1.5793
Sweetwater	2014	18893	36.52	676093.95	0.6761

Exhibit C-8

Retail Municipal Customers Water Demand Projections

Sweetwater	2015	19018	36.52	676197.25	0.6762
Sweetwater	2020	19645	36.52	677758.36	0.6778
Sweetwater	2025	20272	36.52	679880.78	0.6799
Sweetwater	2030	20899	36.52	699040.79	0.699
Sweetwater	2033	21275	36.52	712778.15	0.7128
Sweetwater	2035	21526	36.52	721936.39	0.7219

APPENDIX D

Water Use Efficiency

MEMORANDUM

Agenda Item No. 7(D)

(Second Reading 9-2-08)

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

DATE: May 20, 2008

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

SUBJECT: Ordinance relating to Water Use Efficiency Standards

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

R. A. Cuevas, Jr.
County Attorney

RAC/bw

Memorandum

MIAMI-DADE COUNTY

Date: September 2, 2008

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

From: George M. Burgess
County Manager

Subject: Ordinance relating to Water Efficiency Standards

The ordinance relating to water efficiency standards will not have a fiscal impact to Miami-Dade County.

There will be an impact to the public for High Efficiency Appliances, which currently have a higher initial cost.

Susanne M. Torriente
Chief Assistant County Manager

fis05108

MEMORANDUM

(Revised)

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

DATE: September 2, 2008

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

SUBJECT: Agenda Item No. 7(D)

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(D)
9-2-08

ORDINANCE NO. _____

ORDINANCE RELATING TO WATER USE EFFICIENCY STANDARDS; AMENDING SECTIONS 8-31, 32-84, AND 8A-381 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA; CHANGING EFFECTIVE DATES TO JANUARY 1, 2009 AND CLARIFYING STANDARDS FOR PLUMBING FIXTURES, FIXTURE FITTINGS AND APPLIANCES; PROVIDING SEVERABILITY; INCLUSION IN CODE AND AN EFFECTIVE DATE

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 amended 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~~]] >>January 1, 2009,<< 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 >>in Table 604.4 or have received the<< [[~~of~~]] U.S. Environmental Protection Agency (EPA) WaterSense >>Label.<< [[~~Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.~~]]

1Words 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.

Exceptions:

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

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE [b]
Lavatory, private	[[~~1.0~~]] >>1.5<<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]	1.5 gpm at 80 psi
Sink faucet	[[~~1.0~~]] >>1.5<< gpm at 60 psi
Urinal	Waterless or 0.5 gallon per flushing cycle
Water closet	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~~]] >>January 1, 2009,<< 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 >>in Table P2903.2a or have received the<<of U.S. Environmental Protection Agency (EPA) WaterSense >>Label.<< [[~~Program or the Uniform North American Requirements (UNAR) Guidelines and Specifications.~~]]

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

PLUMBING FIXTURE OR FIXTURE FITTING	PLUMBING FIXTURE OR FIXTURE FITTING MAXIMUM FLOW RATE [b]
Lavatory faucet	[[~~1.0~~]] >>1.5<<gpm at 60 psi
Shower head [a]	1.5 gpm at 80 psi
Sink faucet	[[~~1.0~~]] >>1.5<<gpm at 60 psi
Water closet	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 amended 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~~]] >>January 1, 2009<< and [[~~shall~~]] >>may<< be updated annually on [[~~July 1~~]] >>January 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 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~~]] >>January 1, 2009<<, all permit applications for new multi-family residential developments shall be required to include a submeter for each individual dwelling unit.

Section 4. 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 5. 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 6. This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as
to form and legal sufficiency.

Prepared by:

Henry N. Gillman

Prime Sponsor: Commissioner Natacha Seijas

MEMORANDUM

Agenda Item No. 7(B)

TO:	Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners	**DATE:**	April 7, 2009
FROM:	R. A. Cuevas, Jr. County Attorney	**SUBJECT:**	Ordinance amending Section 32-8.2 of the Code relating to the permanent landscape irrigation restrictions

This ordinance was amended by the Governmental Operations Committee to correct scrivener's errors regarding the current drought restriction in the third Whereas clause and the irrigation of new lawns for thirty days in Section (d) (ii) (7).

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

R. A. Cuevas, Jr.
County Attorney

RAC/cp

Memorandum

MIAMI-DADE COUNTY

Date: April 7, 2009

To: Honorable Chairman Dennis C. Moss
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Ordinance amending Section 32-8.2 of the Code relating to the permanent landscape irrigation restrictions

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The ordinance relating to permanent landscape irrigation restrictions is not expected to have a fiscal impact to Miami-Dade County. The permanent landscape irrigation restrictions are a continuation of the watering restriction imposed by the South Florida Water Management District for more than two years. In the long term, it is expected that water conservation measures such as this are more cost effective in meeting our future water demands in lieu of constructing and operating new water supply facilities.

Alex Munoz
Assistant County Manager

Fis02109

MEMORANDUM

(Revised)

TO: Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners

DATE: April 7, 2009

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

SUBJECT: Agenda Item No. 7(B)

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 Mayor'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(B)
4-7-09

ORDINANCE NO. _____

ORDINANCE AMENDING SECTION 32-8.2 OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA, RELATING TO PERMANENT LANDSCAPE IRRIGATION RESTRICTIONS; PROVIDING MANDATORY YEAR-ROUND LANDSCAPE IRRIGATION CONSERVATION MEASURES; AMENDING CHAPTER 8CC OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA, RELATING TO CODE ENFORCEMENT; PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

>>**WHEREAS**, the South Florida Water Management District ("District") has statutory authority to declare a water shortage when insufficient ground or surface water is available to meet the needs of the users or when conditions are such as to require temporary reduction in total use within an area to protect water resources from serious harm; and[1]

WHEREAS, the District previously issued a declaration of water shortage condition for Miami-Dade County based on the region's ongoing drought and the water level of Lake Okeechobee which is operationally controlled by the District; and

WHEREAS, the District invoked Modified Phase II drought restrictions which limited landscape irrigation to two days per week in Miami-Dade County; and

WHEREAS, to protect the water resources in Miami-Dade County, this Board previously enacted Section 32-8.2 of the Code of Miami-Dade County which permanently

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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.

prohibits landscape irrigation daily between 9:00 am and 5:00 pm except as otherwise provided; and

WHEREAS, due to fluctuating weather conditions and changing water levels of Lake Okeechobee, it is anticipated the District will impose and lift restrictions periodically in order to properly manage flood and drought conditions in the region; and

WHEREAS, this Board finds that it is in the best interest of the people of Miami-Dade County to have a consistent and permanent landscape irrigation policy; and

WHEREAS, this Board finds that a year-round uniform policy for landscape irrigation will effectively protect the water resources of Miami-Dade County and help ensure the availability of potable water to meet the County's projected demand for water,

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

Section 1. Section 32-8.2 of the Code of Miami-Dade County, Florida, is hereby amended to read as follows:

Sec. 32-8.2. Permanent landscape irrigation restrictions.

(a) *Intent and purpose.* To protect the water resources of Miami-Dade County, Florida from the harmful effects of over utilization[[~~by prohibiting~~]]>>, increase water use efficiency and prevent and curtail wasteful water use practices by providing mandatory year-round<< landscape irrigation >>conservation measures<< [[~~during periods of high evaporation,~~]] and prohibiting the operation of irrigation systems [[~~operated~~]] in a manner causing water to be wasted.

(b) *Definitions.* In construing the provisions of this section, the following definitions shall apply:

>>(1) *Address* shall mean the "house number" (a numeric or alphanumeric designation) that, together with the

street name, describes the physical location of a specific property. This includes "rural route" numbers but excludes post office box numbers. If a lot number in a mobile home park or similar community is used by the U.S. Postal Service to determine a delivery location, the lot number shall be the property's address. If a lot number in a mobile home park or similar residential community is not used by the U.S. Postal Service (e.g. the park manager sorts incoming mail delivered to the community's address), then the community's main address shall be the property's address. If a property has no address it shall be considered "even-numbered".

(2) *Athletic play area* shall mean all golf course fairways, tees, roughs and greens and other athletic play surfaces; including, football, baseball, soccer, polo, tennis and lawn bowling fields, rodeo, equestrian and livestock arenas.

(3) *Even Numbered Address* means an address ending in the numbers 0, 2, 4, 6, 8, or rights-of-way or other locations with no address or the letters A-M.

(4) *Existing Landscape* shall mean any landscaping where a period of 90 days has lapsed from the date of purchase.<<

[[~~(1)~~]]>>(5)<<*Irrigation* shall mean the application of water by means other than natural precipitation.

[[~~(2)~~]]>>(6)<<*Irrigation systems* shall mean equipment and devices which deliver water to the [[~~plants~~]] >>landscape<< being irrigated including, but not limited to, pumping stations, controls, main and submain pipelines, lateral pipelines, emitters, valves, fittings and safety devices.

[[~~(3)~~]]>>(7)<<*Landscape* shall mean all residential, commercial, institutional, industrial or governmental areas which are ornamentally planted including, but not limited to, turf, ground covers, flowers, shrubs, trees, sand, mulch, hedges and similar plant materials>>, lawns, sod, grass and such other flora, not intended for resale, which are situated in locations including, but

not limited to, residential landscapes, recreation areas, cemeteries, public, commercial, and industrial establishments, public medians, and rights-of-way except athletic play areas and public gardens as defined herein.

(8) *Low Volume Hand Watering* shall mean the watering of landscape by one person, with one hose, fitted with a self-canceling or automatic shutoff nozzle.

(9) *Low Volume Irrigation* shall mean the use of equipment and devices specifically designed to allow the volume of water delivered to be limited to a level consistent with the water requirement of the plant being irrigated and to allow that water to be placed with a high degree of efficiency in the root zone of the plant. The term also includes water used in mist houses and similar establishments for plant propagation. Overhead irrigation and flood irrigation are not included.

(10) *Landscape Irrigation* shall mean the outside watering of shrubbery, trees, lawns, sod, grass, ground covers, plants, vines, ornamental gardens, and such other flora not intended for resale, which are planted and are situated in such diverse locations as residential landscapes, recreation areas, cemeteries, public, commercial, and industrial establishments, public medians, and rights-of-way except athletic play areas and public gardens as defined herein.

(11) *Micro-Irrigation* shall mean the application of small quantities of water on or below the soil surface as drops or tiny streams of spray through emitters or applicators placed along a water delivery line. Micro-irrigation includes a number of methods or techniques such as bubbler, drip, trickle, mist or microspray, and subsurface irrigation.

(12) *New Landscaping* shall mean any landscaping where the period of time from the date of purchase is ninety (90) days or less.

(13) *Odd Numbered Address* shall mean an address ending in the numbers 1, 3, 5, 7, 9, or the letters N-Z.

(14) *Public Gardens* shall mean botanical gardens and zoological parks and any planned outdoor space where landscaping is cared for and exhibited and the facility is open to the public at least six months during a twelve month period.

(15) *Reclaimed Water* shall mean wastewater as defined in Rule 62-40.210, F.A.C.

(16) *User* shall mean any person, individual, firm, association, organization, partnership, business trust, corporation, company, agent, employee or other legal entity whether natural or artificial, the United States of America, and the State and all political subdivisions, regions, districts, municipalities, and public agencies thereof, which directly or indirectly takes water from the water resource, including users of private or public utility systems, individual wells or pumps.

(17) *Wasteful and Unnecessary* shall mean allowing water to be dispersed without any practical purpose to the water use; for example, excessive landscape irrigation, leaving an unattended hose on a driveway with water flowing, allowing water to be dispersed in a grossly inefficient manner, regardless of the type of water use; for example, allowing landscape irrigation water to unnecessarily fall onto pavement, sidewalks and other impervious surfaces; allowing water flow through a broken or malfunctioning water delivery or landscape irrigation system.<<

[[~~(4)~~]]>>(18)<<*Water resource* shall mean water on or beneath the surface of the ground including, but not limited to, natural or artificial watercourses, lakes, ponds, or diffused surface water, and water percolating, standing, or flowing beneath the surface of the ground.

[[~~(5) *Low-volume irrigation* shall mean the use of equipment and devices specifically designed to~~

~~allow the volume of water delivered to be limited to a level consistent with the water requirement of the plant being irrigated and to allow that water to be placed with a high degree of efficiency in the root zone of the plant including, but not limited to, water use in mist houses and similar establishments for plant propagation.~~]]

(c) *Application of section:* The provisions of this section shall apply to all [[~~persons using~~]]>>users of<< any water resource within Miami-Dade County, whether from publicly or privately owned water utility systems, private wells, or private connections with surface water bodies. >>The provisions of this section shall not apply to athletic play areas and public gardens as defined herein and users under water use permits issued pursuant to Chapter 40E-2 and 40E-20, F.A.C.<<

(d) *Permanent landscape irrigation restrictions:*

(i) [[~~It shall be unlawful for any person to irrigate or to cause, let, permit, allow or suffer the irrigation of any residential, commercial, institutional, governmental or industrial landscape areas between the hours of 9:00 a.m. and 5:00 p.m. daily.~~]]>>It shall be the duty of each user to keep informed as to the landscape irrigation conservation measures presented within this section, which affect each particular water use.<<

(ii) >>The following requirements shall apply to all users unless specified otherwise herein:

(1) Irrigation of existing landscaping shall comply with the following:<<

[[~~(i)~~]]>>(a)<<It shall be unlawful for any [[~~person~~]] >>user<< to irrigate or to cause, let, permit, allow or suffer the irrigation of any residential, commercial, institutional, governmental or industrial landscape areas between the hours of [[~~9:00 a.m. and 5:00 p.m.~~]] >>10:00 am and 4:00 pm daily except as otherwise provided herein.<<

[[~~(ii)~~]] >>(b)<<It shall be unlawful for any [[~~person~~]]>>user<< to operate or cause, let, permit, allow or suffer the operation of any irrigation system or device in a >>wasteful and unnecessary<< manner [[~~causing water to be wasted~~]] including, but not limited to, watering paved areas, sidewalks, driveways, and parking lots.

>>(c) Even addresses, installations with irrigation systems that irrigate both even and odd addresses within the same zones, including multi-family units and homeowners' associations, and rights-of-way or other locations with no address, as defined in this section shall only conduct necessary landscaping irrigation on Thursday or Sunday or both Thursday and Sunday.

(d) Odd addresses as defined in this section shall only conduct necessary landscape irrigation on Wednesday or Saturday or both Wednesday and Saturday.

(2) Users irrigating new landscaping shall comply with the following:

(a) Irrigation of new landscaping shall be prohibited between the hours of 10:00 a.m. and 4:00 p.m. daily, except as otherwise provided herein.

(b) On the day the new landscaping is installed, the new landscaping may be irrigated once without regard to the normally allowable watering days and times. Irrigation of the soil immediately prior to the installation of the new landscaping is also

allowable without regard to the normal allowable watering days and times.

(c) Irrigation of new landscaping which has been purchased for ninety (90) days or less may be conducted on any day except Friday.

(d) The date of purchase of new landscaping may be demonstrated with a dated receipt or invoice.

(e) Irrigation of new landscaping is limited to areas containing the new landscaping only. An entire zone of an irrigation system shall only be utilized for landscape irrigation under this paragraph if the zone in question is for an area that contains at least 50% new landscaping. If a zone contains less than 50% new landscaping, or if the new landscaping is in an area that will not typically be irrigated by an irrigation system, only the individual new plantings are eligible for additional irrigation under this paragraph. Targeted watering may be accomplished by low volume hand watering, or any appropriate method which isolates and waters only the new landscaping.

(3) Landscape irrigation systems may be operated during restricted days and times for cleaning, maintenance, and repair purposes with an attendant on site in the area being tested. Landscape irrigation systems may routinely be operated for such purposes no more than once per week, and the run time for any one test should not exceed 10 minutes per zone.

(4) Landscape irrigation for the purpose of watering-in fertilizers, insecticides, pesticides, fungicides and herbicides, where such watering-in is recommended by the manufacturer, or by federal, state or local law, or by Florida Green Industries Best Management Practices for Protection of Florida Water Resources Manual, shall be allowed under the following conditions:

(a) Such watering-in shall be limited to one application unless the need for more than one application is stated in the directions for application specified by the manufacturer; and

(b) Such watering-in shall be accomplished during normally allowable watering days and times set forth in paragraphs (d)(ii)(1)(c) and (d)(ii)(1)(d) unless a professional licensed applicator has posted a temporary sign containing the date of application and the date(s) of needed watering-in activity.

(5) Any landscaping may be irrigated using low volume irrigation, micro-irrigation, low-volume hand watering methods including but not limited to the use of a hose with a self-canceling or closing nozzle, rain barrels, cisterns, or other similar rain-harvesting devices without regard to the watering days or times allowed pursuant to this section.

(6) Any landscaping may be irrigated with reclaimed water in accordance with federal, State and local water reuse quality standards, or the use of saltwater without regard to the watering days or times allowed pursuant to this section.

(7) Irrigation of new lawns and landscaping shall be allowed between 11:00 a.m. and 12:01 p.m. daily for a period of thirty (30)

days or until the lawn or landscaping is considered established, whichever period is shorter. <<

~~[[(iii) The following shall be exempt from the requirements of Section 32-8.2(d)[[(i):~~

~~1. Low-volume irrigation systems and hand watering including but not limited to the use of a hose with a self-canceling or closing nozzle.~~

~~2. Irrigation with treated wastewater effluent, in accordance with federal, State and local water reuse quality standards, or the use of saltwater.~~

~~3. Irrigation of landscaping for purposes of watering in fungicides, insecticides and herbicides, where watering is required by the manufacturer or by federal, State or local laws. This exemption shall apply only to licensed pest control applicators and shall be limited to the minimum amount specified by the manufacturer's recommendations for the products applied.~~

~~4. The operation of irrigation systems for installation, cleaning, repairs, and maintenance purposes by a licensed irrigation contractor or the property owner(s). Each irrigation zone may be tested no more than once a week by the property owner(s) and more frequently by a licensed irrigation contractor. However, such testing shall be limited to the minimum necessary to maintain efficient operation of the system.~~

~~5. Irrigation of new lawns and landscaping between 11:00 a.m. and 12:01 p.m. daily for a period of thirty (30) days or until the lawn or landscaping is considered established, whichever period is shorter.]]~~

>>(e) *Enforcement.*

Every police officer or sheriff having jurisdiction in the area governed by this section shall, in connection with all other duties imposed by law, diligently enforce the provisions of this section. Officers may provide violators with no more than one (1) written warning. This section shall also be enforceable in accordance with the provisions of Chapter 8CC of this code. The County may take any appropriate legal action, including but not limited to emergency prohibitory and mandatory injunctive action to enforce the provisions of this section.

(f) *Penalties.*

Violations of any provision of this section shall be subject to the following penalties:

First violation: Seventy-five ($75.00) fine.

Second and subsequent violations: Fine not to exceed five hundred dollars ($500.00) and/or imprisonment in the County jail not to exceed sixty (60) days.

Each day in violation of this section shall constitute a separate offense.<<

Section 2. Chapter 8CC of the Code of Miami-Dade County, Florida, is hereby amended to read as follows:

Sec. 8CC-10. Schedule of civil penalties.

Code Section	*Description of Violation*	*Civil Penalty*
>>32-8.2	Violation of Permanent Landscape Irrigation Restrictions	$75.00<<

Section 3. 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 4. 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 5. This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as
to form and legal sufficiency:

Prepared by:

Henry N. Gillman

Prime Sponsor: Commissioner Natasha Seijas

OFFICIAL FILE COPY
CLERK OF THE BOARD
OF COUNTY COMMISSIONERS
MIAMI-DADE COUNTY, FLORIDA

Memorandum

MIAMI-DADE COUNTY

Date: (Second Reading 12-05-06)
September 26, 2006

Agenda Item No. 7(D)

To: Honorable Chairman Joe A. Martinez and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Ordinance Creating Sections 32-83.1 of the Miami-Dade County Code

O#06-177

RECOMMENDATION

It is recommended that the Board of County Commissioners (Board) approve and adopt the attached ordinance creating Sections 32-83.1 of the Miami-Dade County Code. This new section will require for publicly owned water distribution systems served by the Miami-Dade Water and Sewer Department (MDWASD) to prepare water conservation plans and submit same to the County.

BACKGROUND

The Water Use Efficiency Five-Year Plan adopted by the Board through Resolution R-468-06 includes requirements for water conservation planning, implementation and reporting by wholesale customers (Section 4.2.9). MDWASD has existing contracts with the fifteen (15) wholesale customers; these contracts contain language relating to water conservation, most particularly in drought situations. The essence of the agreement is that if there is a shortage in the supply of water, wholesale customers will curtail their usage to the same extent as MDWASD. At this time there are no specific conservation requirements beyond the drought scenario.

MDWASD is presently developing a twenty-year water conservation plan as a requirement of the Interim Consumptive Use Authorization and Agreement with the South Florida Water Management District (SFWMD). In order to accurately determine the water demand projections and propose water demand reduction goals it is necessary to account for all water produced by MDWASD. In order to accomplish this task it is necessary to have the wholesale customers develop plans similar to the one developed for MDWASD's retail service area.

The 20-year plan presently under development by MDWASD utilizes the Department of Environmental Protection web-based Conserve Florida Guide. The wholesale customers would be required to use this tool in the development of their plans to allow MDWASD to consolidate the plans of the wholesale customers and combine them with the 20-year plan. This practice will also facilitate the annual reporting to the Board and the SFWMD. MDWASD will provide assistance to the wholesalers in the development of their water conservation plans and in the use of the Conserve Florida Guide. The adoption of this ordinance will provide a strategic advancement in water conservation effectiveness to MDWASD. Historically, utilities with wholesale customers have typically been ultimately responsible for the implementation of water conservation measures and best management practices, and general demand management that are required by consumptive use permits. Yet, there has been no authority to require their wholesale customers to help them meet demand management goals.

Assistant County Manager

Memorandum

MIAMI-DADE COUNTY

Date: December 5, 2006

To: Honorable Chairman Joe A. Martinez
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Ordinance Creating Section 32-83.1 of the Miami-Dade County Code

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The ordinance creating Section 32-83.1 of the Miami-Dade County Code requires publicly owned water distribution systems served by the Miami-Dade Water and Sewer Department to prepare water conservation plans and to submit the plans to Miami-Dade County.

The ordinance will not have a fiscal impact to Miami-Dade County. However, wholesale customers may incur expenses developing the plans.

Assistant County Manager

Fls00206

MEMORANDUM
(Revised)

TO: Honorable Chairman Joe A. Martinez and Members, Board of County Commissioners

DATE: December 5, 2006

FROM: Murray A. Greenberg
County Attorney

SUBJECT: Agenda Item No. 7(D)

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(D)

12-05-06

ORDINANCE NO. 06-177

ORDINANCE CREATING SECTION 32-83.1 OF THE CODE OF MIAMI-DADE COUNTY; PROVIDING FOR PUBLICLY OWNED WATER DISTRIBUTION SYSTEMS TO PREPARE WATER CONSERVATION PLANS AND SUBMIT SAME TO THE COUNTY; PROVIDING ENFORCEMENT PROCEDURE AND REMEDY; PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

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

Section 1. Section 32-83.1 of the Code of Miami-Dade County, Florida, is hereby created to read as follows[1]

>>32-83.1 Water Conservation Plans

A) *Submission of Water Conservation Plan*

Every publicly owned or operated water distribution system supplied potable water, in whole or in part, by Miami-Dade County, shall submit a water conservation plan to the County. All water conservation plans submitted must comply with the South Florida Water Management District Basis of Review for Consumptive Use Permit Application and the Florida Department of Environmental Protection Conserve Florida Guide, as well as the Environmental Protection Agency WaterSense Program. Said Plan shall be updated for the County's approval every five years following submittal and Conserve Florida Guide generated reports shall be filed annually at the close of the fiscal year. All water conservation plans submitted shall consider a twenty year horizon. In the event a publicly owned or operated water distribution system fails to provide its water

[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.

conservation plan by the close of the fiscal year, the County shall determine and establish the conservation measures to be implemented by said system and the amount of water supplied to such system by the County which could be conserved via implementation of such measures, and such system shall be bound by such determination and the publicly owned or operated water distribution system shall be subject to the provisions in subsection (B).

B) *Enforcement; procedure; remedies*

Where the County has, pursuant to Subsection (A), established the conservation measures and the amount of water supplied to a water distribution system which could be conserved through the implementation of such measures, the owner or operator of such system shall be required to pay additional fees, in accordance with the Miami-Dade Water and Sewer Department's schedule of rates, fees and charges, as amended, for continued use of the water which could be conserved through implementation of the specified conservation measures. The Miami Dade Water and Sewer Department shall develop a water conservation plan for the water distribution system documenting the proposed measures, best management practices and projected water savings, <<

Section 2. 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 3. 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.

5

Section 4. This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED: December 5, 2006

Approved by County Attorney as to form and legal sufficiency.

Prepared by:

David M. Murray

Memorandum

MIAMI-DADE COUNTY

Date: May 5, 2009

To: Honorable Chairman Dennis C. Moss
and Members, Board of County Commissioners

Agenda Item No. 7(G)

From: George M. Burgess
County Manager

Subject: Ordinance Creating Chapter 18B of the Code of Miami-Dade County, the Miami-Dade County Right-of-Way Landscape Ordinance.

This Substitute Item #2 differs from the original item as follows:

- **It exempts from the ordinance zoned or dedicated rights-of-way adjacent to land being used for bonafide agricultural activities.**
- **Revises the mulching criteria in order to reflect Florida Friendly landscapes.**
- **Substitute No. 2 differs from Substitute No. 1 in that it complies with the new rule change regarding substitutes and alternates as provided in Ordinance #09-13 adopted on March 3, 2009.**

Recommendation
It is recommended that the Board of County Commissioners (BCC) adopt the attached ordinance creating the Miami-Dade County Right-of-Way Landscape Ordinance. This ordinance is being created to supplement outdoor water conservation measures in accordance with the Miami-Dade Water Use Efficiency Plan adopted pursuant to Resolution No. R-468-06.

Scope
This ordinance is of countywide impact.

Fiscal Impact/Funding Source
The proposed ordinance creates no fiscal impact on Miami-Dade County.

Track Record/Monitor
Not applicable.

Background
On April 25, 2006 the Board adopted Resolution R-468-06 which approves the Miami-Dade Water Use Efficiency Plan (Plan) as a part of a larger effort to improve the management of traditional water supplies while improving the efficiency of the County's current water use. The Plan outlines the County's water efficiency measures and best management practices. The South Florida Water Management District (District) approved the Plan as a condition of the County's 20-Year Water Use Permit issued on November 15, 2007. During the first year of the Plan, WASD kicked-off its conservation efforts by implementing a series of efficiency projects. It is calculated that the total water use savings from these projects will yield a savings of 20 million gallons a day through 2026, including indoor and outdoor water use.

In addition to the implementation of the Plan, an Advisory Committee was established in 2007 at the request of the Government Operations and Environment Committee Chair with the goal of developing countywide guidelines that address water conservation issues and alternative water supplies to assist the County in meeting the conditions of the 20-Year Water Use Permit.

The Advisory Committee is comprised of several county agencies including the departments of Building, Environmental Resources Management, Fire Rescue, Park & Recreation, Planning & Zoning, Public Works, and Water and Sewer; the Building Code Compliance Office and the General Services Administration. In addition to County staff, the Advisory Committee includes representation from stakeholder groups such as the American Society of Landscape Architects, South Florida Builders Association, Sierra Club, Latin Builders Association, Tropical Audubon Society, Association of Cuban Engineers, South Florida Regional Planning Council, Farm Bureau, South Florida Water Management District and the Greater Miami Chamber of Commerce.

On June 5, 2007, the Advisory Committee summarized its findings and presented them to the BCC. These findings included specific recommendations for indoor and outdoor water conservation measures such as the use of high efficiency plumbing fixtures and the use of Florida Friendly landscape principles and irrigation soil moisture sensors. With regards to landscape irrigation, the Advisory Committee's findings were consistent with the "Landscape Irrigation & Florida-Friendly Design Standards" issued by the Florida Department of Environmental Protection in December 2006.

On February 5, 2008 the BCC adopted Ordinance No. 08-14 establishing indoor water conservation measures. The adopted measures call for the installation of efficient water fixtures, appliances and other water saving measures and equipment in new developments. In order to meet the water conservation goals provided in the Plan, the County must also address outdoor water conservation measures.

The proposed Right-of-Way Landscape Ordinance assists the County in meeting the outdoor water conservation goals specified in the Plan for the duration of the County's 20-Year Water Use Permit. In the development of the proposed ordinance the staff of the Department of Planning and Zoning has been working closely with the membership of the Advisory Committee to address outdoor water conservation issues and alternative water supplies for the development community as well as with the members of the Community Image Advisory Board and its Tree and Landscape Projects Sub-Committees. Consultation with other municipalities was also facilitated through these committees.

The proposed ordinance seeks to address outdoor water conservation measures in connection with rights-of-ways in both unincorporated Miami-Dade and in municipalities. It creates a Right-of-Way Landscape Ordinance (Chapter 18B) that mirrors the existing Landscape Ordinance contained in Chapter 18A of the Code, including the proposed concurrent amendments to the same. Presently rights-of-ways are not specifically regulated for water conservation measures. Interlocal agreements with the municipalities will be subsequently executed in order to implement the proposed ordinance.

Section 1 of this ordinance establishes Chapter 18B as the Miami-Dade County Right-of-Way Landscape Ordinance and provides applicability, definitions, purpose and intent of the

same. It also provides the minimum standards for irrigation, plant material and mulch. More specifically this section:

- Establishes the irrigation sub-section in order to address the design, operation and maintenance of effective irrigation systems. Efforts are made to minimize free water flow conditions and to maximize the uniformity of the system by considering the emitters type, the head spacing, the sprinkler patterns and the water pressure. The section also requires the use of rain switches such as soil moisture sensors.
- Requires that fifty (50) percent of the plant material to be low maintenance and drought tolerant. Canopy trees are preferred where conditions are appropriate.
- Requires that eighty (80) percent of the trees and shrubs provided be listed in the Landscape Manual, the Street Tree Master Plan or the University of Florida's Low Maintenance Landscape Plants for South Florida list.
- Requires mulches to be applied and maintained in accordance with Florida Friendly Landscaping.

This ordinance is complementary to the Miami-Dade Landscape Ordinance and its proposed update.

Alex Muñoz
Assistant County Manager

MEMORANDUM

(Revised)

TO: Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners

DATE: May 5, 2009

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

SUBJECT: Agenda Item No. 7(G)

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 Mayor'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(G)

5-5-09

ORDINANCE NO. _____

ORDINANCE CREATING CHAPTER 18B OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA ("CODE"), MIAMI-DADE COUNTY RIGHT-OF-WAY LANDSCAPE ORDINANCE, CREATING SECTIONS 18B-1 THROUGH 18B-4; PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

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

Section 1. Chapter 18B of the Code of Miami-Dade County is hereby created as follows:

CHAPTER 18B MIAMI-DADE COUNTY RIGHT-OF-WAY LANDSCAPE ORDINANCE

Sec. 18B-1. Short title and applicability.

(A) This chapter shall be known and may be cited as the "Miami-Dade County Right-of-Way Landscape Ordinance".

(B) *Applicability.* This chapter shall be a minimum standard and shall apply to all public rights-of-way both in the incorporated and unincorporated areas >>except for zoned or dedicated rights-of-way adjacent to lands being used for bonafide agricultural activities as defined in Chapter 18A of this Code<<. Enforcement in the unincorporated area shall be by the County and in the incorporated areas by the municipalities; provided, any municipality may establish and enforce more stringent regulations as such municipality may deem necessary. In the event the provisions hereof are not enforced within any municipality, the County shall enforce same.

Sec. 18B-2. Purpose and intent.

It is the intent of this chapter to establish minimum landscape standards for public rights-of-way in incorporated and unincorporated Miami-Dade County that enhance, improve and maintain the quality of the landscape, and to:

(A) Promote [[~~xeriscape and~~]] Florida Friendly principles through the use of drought-tolerant landscape species, grouping of plant material by water requirements, the use of irrigation systems that conserve the use of potable and nonpotable water supplies and restrictions on the amount of lawn areas.

(B) Use landscape material, specifically street trees, to visually define the hierarchy of roadways, and to provide shade and a visual edge along roadways.

(C) Prevent the destruction of the community's existing tree canopy and promote its expansion.

(D) Provide for the preservation of existing natural forest communities and specimen sized trees in conformance with Section 24-49, as may be amended from time to time; re-establish native habitat where appropriate, and encourage the appropriate use of native plant material in the landscape.

(E) Promote the use of trees and shrubs for energy conservation by encouraging cooling through the provision of shade and the channeling of breezes, thereby helping to offset global warming and local heat island effects through the added absorption of carbon dioxide and reduction of heat islands.

(F) Contribute to the processes of air movement, air purification, oxygen regeneration, ground water recharge, and retention of stormwater runoff, as well as aiding in the abatement of noise, glare, heat, air pollution and dust generated by major roadways and intense use areas.

(G) Reduce the negative impacts of exotic pest plant species and prohibit the use of noxious exotic plants which invade native plant communities.

(H) Promote the use of trees to protect and buffer the effects of high winds on structures.

(I) Promote the concept of planting the right tree or plant in the right place to avoid problems such as clogged sewers, cracked sidewalk and power services interruptions.

Sec. 18B-3. Definitions.

The definitions contained in Chapters 18A, Code of Miami-Dade County, Florida, shall apply to this chapter.

Sec. 18B-4. Minimum standards.

(A) *Irrigation.*

(1) All newly-planted and relocated plant material shall be watered by temporary or permanent irrigation systems until such time as they are established and subsequently on as needed basis to prevent stress and die off in compliance with existing water use restrictions.

(2) Irrigation systems shall be prohibited within native plant communities and natural forest communities, except for temporary systems needed to establish newly planted material. Temporary irrigation systems shall be disconnected immediately after establishment of plant communities.

(3) Irrigation systems shall be designed, operated and maintained to:

(a) Meet the needs of the plants in the landscape.

(b) Conserve water by allowing differential operation schedules based on hydrozone.

(c) Consider soil, slope and other site characteristics in order to minimize water waste, including overspray or overflow on to impervious surfaces and other non-vegetated areas, and off-site runoff.

(d) Minimize free flow conditions in case of damage or other mechanical failure.

(e) Use low trajectory spray heads, and/or low volume water distributing or application devices.

(f) Maximize uniformity, considering factors such as:
(1) Emitters types,
(2) Head spacing,
(3) Sprinkler pattern, and
(4) Water pressure at the emitter.

(g) Use the lowest quality water feasible (graywater shall be used where approved systems are available).

(h) Rain switches or other devices, such as soil moisture sensors, shall be used with automatic controls.

(i) Operate only during hours and on days permitted under Chapter 32 of this Code.

(j) Where feasible, drip irrigation or micro-sprinklers shall be used.

(4) During dry periods, irrigation application rates of between one (1) and one and one-half (1 1/2) inches per week are recommended for turf areas.

(B) *Plant Material and Mulch.*

(1) At least fifty (50) percent of the plant material shall be low maintenance and drought tolerant. Canopy trees are preferred where conditions are appropriate.

(2) Eighty (80) percent of the plant material shall be listed in the Miami-Dade Landscape Manual, the Miami-Dade Street Tree Master Plan and/or the University of Florida's Low-Maintenance Landscape Plants for South Florida list.

(3) Right-of-way landscaping shall include the use of native plant species in order to re-establish an aesthetic regional quality and take advantage of the unique diversity and adaptability of native species to the environmental conditions of South Florida.

(4) Where feasible, the re-establishment of native habitats shall be incorporated into the landscaping.

(5) Existing specimen trees, native vegetation (including canopy, understory, and ground cover) and Natural Forest Communities shall be preserved to the maximum extent possible and all requirements of Section 24-49 of the Code of Miami-Dade County.

(6) In order to conserve water, reduce maintenance, and promote plant health, plant species shall be selected and installed based on their water needs, growth rate and size, and resource inputs. Plants with similar water needs shall be grouped in hydrozones. Adequate growth area (including rooting space), based on natural mature shape and size shall be provided for all plant materials.

(7) Trees and shrubs shall be planted in the energy conservation zone where feasible, in order to reduce energy consumption by shading buildings and other structures and shall be used to reduce heat island effects by shading paved surfaces.

(8) Street trees shall be used to shade roadways and provide visual order. Where feasible, selected species shall be used to establish a road hierarchy by defining different road types.

(9) Prohibited trees shall be removed.

(10) Special attention shall be given to the use of appropriate species located under, or adjacent to overhead power lines, and near native plant communities and near underground utility lines. Adequate growth area shall be provided for all plant materials.

(11) Landscaping shall be designed in such a way as to provide safe and unobstructed views at intersections of roadways, driveways, recreational paths and sidewalks in accordance with Section 33-11 of the Code of Miami-Dade County and in compliance with federal and state standards.

(12) Historic landscapes and landscape features designated by local, State or federal governments shall be preserved.

[[~~(13) Environmentally friendly organic mulches shall be applied and maintained in a minimum three (3) inch layer under and around all trees and shrubs, and in a minimum two (2) inch layer under and around all ground cover.~~

~~(14) The use of mulch shall be restricted to planting areas.~~]]

>>(13) Mulches shall be applied and maintained in accordance with the most recent edition of the Florida Yards & Neighborhoods Handbook titled "A Guide to Florida Friendly Landscaping" by the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) and available online at http://www.floridayards.org/landscape/FYN-Handbook.pdf.<<

[[~~(14)~~]] >>(15)<< Cypress mulch shall not be used because its harvest degrades cypress wetlands.

Section 2. 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 3. 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 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 4. This ordinance shall become effective ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as to form and legal sufficiency: APW for RAC

Prepared by: CHC

Craig H. Coller

Memorandum

MIAMI-DADE COUNTY

Date: May 5, 2009

To: Honorable Chairman Dennis C. Moss
and Members, Board of County Commissioners

Agenda Item No. 7(F)

From: George M. Burgess
County Manager

Subject: Ordinance Revising Chapter 18A of the Code of Miami-Dade County, the Landscape Ordinance.

This Substitute Item #2 differs from the original item as follows:

- **Replaces references to "Xeriscape" landscapes with "Florida Friendly" landscapes as promoted by the State.**
- **Updates the definition of "native" plants.**
- **Keeps the native plants requirement to 30% as provided in the current code. Original item increased the native requirement to 50%.**
- **Requires that 50% of the plant material be low maintenance and drought tolerant.**
- **Revises the definition of mulch and the pertinent criteria in order to reflect Florida Friendly landscapes.**
- **Substitute No. 2 differs from Substitute No. 1 in that it complies with the new rule change regarding substitutes and alternates as provided in Ordinance #09-13 adopted on March 3, 2009.**

Recommendation
It is recommended that the Board of County Commissioners (BCC) adopt the attached ordinance revising the Miami-Dade County Landscape Ordinance to supplement outdoor water conservation measures in accordance with the Miami-Dade Water Use Efficiency Plan adopted pursuant to Resolution No. R-468-06.

Scope
This ordinance is of countywide impact.

Fiscal Impact/Funding Source
The proposed ordinance creates no fiscal impact on Miami-Dade County.

Track Record/Monitor
Not applicable.

Background
On April 25, 2006 the Board adopted Resolution R-468-06 which approves the Miami-Dade Water Use Efficiency Plan (Plan) as a part of a larger effort to improve the management of traditional water supplies while improving the efficiency of the County's current water use. The Plan outlines the County's water efficiency measures and best management practices.

The South Florida Water Management District (District) approved the Plan as a condition of the County's 20-Year Water Use Permit issued on November 15, 2007. During the first year of the Plan, WASD kicked-off its conservation efforts by implementing a series of efficiency projects. It is calculated that the total water use savings from these projects will yield a savings of 20 million gallons a day through 2026, including indoor and outdoor water use.

In addition to the implementation of the Plan, an Advisory Committee was established in 2007 at the request of the Government Operations and Environment Committee Chair with the goal of developing countywide guidelines that address water conservation issues and alternative water supplies to assist the County in meeting the conditions of the 20-Year Water Use Permit.

The Advisory Committee is comprised of several county departments including DERM, GSA, Building, Park and Recreation, Planning and Zoning, Building Compliance, Fire, Public Works, and Water and Sewer. In addition to County staff, the Advisory Committee includes representation from stakeholder groups such as the American Society of Landscape Architects, South Florida Builders Association, Sierra Club, Latin Builders Association, Tropical Audubon Society, Association of Cuban Engineers, South Florida Regional Planning Council, Farm Bureau, South Florida Water Management District and the Greater Miami Chamber of Commerce.

On June 5, 2007, the Advisory Committee summarized its findings and presented them to the BCC. These findings included specific recommendations for indoor and outdoor water conservation measures such as the use of high efficiency plumbing fixtures and the use of Florida Friendly landscape principles and irrigation soil moisture sensors. With regards to landscape irrigation, the Advisory Committee's findings were consistent with the "Landscape Irrigation & Florida-Friendly Design Standards" issued by the Florida Department of Environmental Protection in December 2006.

On February 5, 2008 the BCC adopted Ordinance No. 08-14 establishing indoor water conservation measures. The adopted measures call for the installation of efficient water fixtures, appliances and other water saving measures and equipment in new developments. In order to meet the water conservation goals provided in the Plan, the County must also address outdoor water conservation measures.

The proposed revisions to the attached Landscape Ordinance assist the County in meeting the outdoor water conservation goals specified in the Plan for the duration of the County's 20-Year Water Use Permit. In the development of the proposed revisions to the ordinance, the staff of the Department of Planning and Zoning has been working closely with the membership of the Advisory Committee to address outdoor water conservation issues and alternative water supplies for the development community as well as with the members of the Community Image Advisory Board and its Tree and Landscape Projects Sub-Committees. Consultation with other municipalities was also facilitated through these committees.

The proposed ordinance seeks to address outdoor water conservation measures by amending the countywide Landscape Ordinance (Chapter 18A) in order to revise the required plant material, and update the outdoor irrigation language and criteria.

Section 1 of this ordinance revises the Purpose and Intent section of Chapter 18A in order to add by reference the Florida Friendly landscaping principles.

Section 2 of this ordinance revises the Definitions in order to provide additional definitions including definitions for Florida Friendly and the State's Florida Yards & Neighborhood Program. A definition of the County's newly adopted Street Tree Master Plan is also added to this section.

Section 3 of this ordinance revises the Plans Required section in order to include the location of rain switches and soil moisture sensors on the required plans.

Section 4 of this ordinance amends the Minimum Standards section in order to revise the irrigation, trees, shrubs, mulching and plant quality criteria. More specifically this section:

- Updates and rearranges the irrigation sub-section in order to address the design, operation and maintenance of effective irrigation systems. Efforts are made to minimize free water flow conditions and to maximize the uniformity of the system by considering the emitters type, the head spacing, the sprinkler patterns and the water pressure. The section also requires the use of rain switches such as soil moisture sensors.
- Requires that thirty (30) percent of the required plant material shall be native species. No more than 30% of the required shall be palms.
- Requires that fifty (50) percent instead of the required plant material shall be low maintenance and drought tolerant.
- Requires that eighty (80) percent of the plant material required listed in the Landscape Manual, the Street Tree Master Plan or the University of Florida's Low Maintenance Landscape Plants for South Florida list.
- Requires mulches to be applied and maintained in accordance with Florida Friendly Landscaping.

Section 5 of this ordinance revises the Landscape Plan Review Criteria section in order to provide reference to Florida Friendly landscaping.

This ordinance will be complemented by an ordinance establishing minimum landscaping and irrigation criteria for public rights-of-way.

Alex Muñoz
Assistant County Manager

MEMORANDUM

(Revised)

TO: Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners

DATE: May 5, 2009

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

SUBJECT: Agenda Item No. 7(F)

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 Mayor'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(F)

5-5-09

ORDINANCE NO. _____

ORDINANCE REVISING CHAPTER 18A OF THE CODE OF MIAMI-DADE COUNTY, FLORIDA ("CODE"), MIAMI-DADE COUNTY LANDSCAPE ORDINANCE, AMENDING SECTIONS 18A-2 THROUGH 18A-4 AND SECTIONS 18A-6 THROUGH 18A-7, PROVIDING SEVERABILITY, INCLUSION IN THE CODE AND AN EFFECTIVE DATE

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

Section 1. Section 18A-2 of the Code of Miami-Dade County, Florida is hereby amended as follows[1]:

Sec. 18A-2. Purpose and intent.

It is the intent of this chapter to establish minimum landscape standards for Incorporated and Unincorporated Miami-Dade County that enhance, improve and maintain the quality of the landscape, and to:

(A) Promote [[~~xeriscape and~~]] >>Florida Friendly landscaping<< principles through the use of drought-tolerant [[~~landscape~~]] >>plant<< species, grouping of plant material by water requirements, the use of irrigation systems that conserve the use of potable and nonpotable water supplies and restrictions on the amount of lawn areas. >>Florida Friendly landscape principles also promote planting the

[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.

right plant in the right place and appropriate fertilization and mulching.<<

* * *

Section 2. Section 18A-3 of the Code of Miami-Dade County, Florida is hereby amended as follows:

Sec. 18A-3. Definitions.

The definitions contained in Chapters 24 and 33, Code of Miami-Dade County, Florida, shall apply to this chapter except as otherwise changed herein:

* * *

[[~~(A)~~]] *Accessways:* The maximum width of an accessway through the perimeter landscaped strip to an off-street parking or other vehicular use area shall be determined according to the Public Works Manual, Part I, Standard Details. No more than one (1) two-way accessway shall be permitted or any street frontage up to one hundred (100) lineal feet or no more than two (2) one-way accessways shall be permitted for any street frontage up to one hundred (100) lineal feet, such standards to be applicable to any property under one (1) ownership. Where such ownership involves over one hundred (100) feet of street frontage, one (1) additional two-way or two (2) additional one-way drives may be permitted for each additional one hundred (100) feet of frontage or major fraction thereof. The balance of such street frontage not involved with access ways shall be landscaped in accordance with the provisions of this chapter.

>>*ANSI A300 Standards:* Industry-developed standards of practice for tree care. Acronym for American National Standards Institute.<<

[[~~(B)~~]] *Automatic irrigation system:* An irrigation system with a programmable controller or timing mechanism.

[[~~(C)~~]] *Bonafide agricultural activities:*. Land used for the growing of food crops, nurseries for the growing of landscape material, the raising of livestock, horse farms, and other good faith agricultural uses, except any portion of the property not eligible for agricultural exemption.

[[~~(D)~~]] *Buffer, perimeter landscape:* An area of land which is set aside along the perimeter of a parcel of land in which landscaping is required to provide an aesthetic transition between different land

uses and to eliminate or reduce the adverse environmental impact, and incompatible land use impacts.

[[~~(E)~~]] *Caliper:* For trees under four (4) inches in diameter, the trunk diameter measured at a height of six (6) inches above natural grade. For trees four (4) inches and greater in diameter, the trunk diameter measured at twelve (12) inches above natural grade.

[[~~(F)~~]] *Clearance pruning:* Pruning required to avoid damage or danger related to structures, power distribution and property, as defined in the current ANSI A300 Standards.

[[~~(G)~~]] *Colonnade:* A roof or building structure, extending over the sidewalk, open to the street and sidewalk, except for supporting columns or piers.

[[~~(H)~~]] *Common open space:* Area required as open space under Chapter 33 or municipal codes for various zoning districts.

[[~~(I)~~]] *Controlled plant species:* Those plant species listed in the Landscape Manual which tend to become nuisances because of their ability to invade proximal native plant communities or native habitats, but which, if located and cultivated properly may be useful or functional as elements of landscape design.

[[~~(J)~~]] *Diameter at breast height (DBH):* Diameter of a tree's trunk measured at a height four and one-half (4.5) feet above natural grade. In the case of multiple-trunk trees, the DBH shall mean the sum of each trunk's diameter measured at a height of four and one-half (4.5) feet above natural grade.

[[~~(K)~~]] *Differential operation schedule:* A method of scheduling an irrigation system to apply different quantities of water, and/or apply water at different frequencies as appropriate, for different hydrozones.

[[~~(L)~~]] *Dissimilar land uses:* Proximate or directly associated land uses which are contradictory, incongruous, or discordant such as higher intensity residential, commercial or industrial uses located adjacent to lower intensity uses.

[[~~(M)~~]] *Drip line:* An imaginary vertical line extending from the outermost horizontal circumference of a tree's branches to the ground.

[[~~(N)~~]] *Duplex dwelling:* A residence building designed for, or used as the separate homes or residences of two (2) separate and distinct families, but having the appearance of a single family dwelling house. Each individual unit in the duplex shall comply with the definition for a one-family dwelling.

>>*Emitters:* devices which are used to control the discharge of irrigation water from lateral pipes.<<

[[~~(O)~~]] *Existing development:* [[~~Existing development shall~~]] >>Shall<< mean a site with structures that were legally approved through the issuance of a certificate of use and occupancy or a certificate of completion as of the effective date of this chapter.

[[~~(P)~~]] *Energy conservation zone:* A zone located no more than twenty-two (22) feet from a structure in a one hundred eighty (180) degree band from due east of the northeast point of the structure, to due south, to due west of the northwest point of the structure.

>>*Environmentally Endangered Lands:* lands that contain natural forest, wetland or native plant communities, rare and endangered

plants and animals, endemic species, endangered species habitat, a diversity of species, outstanding geologic or other natural features, or land which functions as an integral and sustaining component of an existing ecosystem.<<

[[~~(Q)~~]] *Facultative:* Plants with a similar likelihood of occurring in both wetlands and uplands, which are not recognized indicators of either wetland or upland conditions.

>>*Florida Friendly Landscaping:* practices, materials or actions developed by the Florida Yards & Neighborhood Program that help to preserve Florida's natural resources and protect the environment.

Florida Yards & Neighborhood Program: Is a partnership of the University of Florida/Institute of Food and Agricultural Sciences, Florida's water management districts, the Florida Department of Environmental Protection, the National Estuary Program, the Florida Sea Grant College Program and other agencies, managed locally by the Miami-Dade Cooperative Extension Division of the Consumer Services Department.<<

[[~~(R)~~]] *Forbs:* Herbaceous plants other than grasses.

[[~~(S)~~]] *Geologic feature:* A natural rock or mineral formation.

[[~~(T) Gray water~~]] >>*Graywater*<<: That portion of domestic sewage emanating from residential showers, >>residential baths,<< residential bathroom washbasins, or residential clothes washing machines.

[[~~(U)~~]] *Ground cover:* A dense, extensive growth of low-growing plants, other than turfgrass, normally reaching an average maximum height of not more than twenty-four (24) inches at maturity.

[[~~(V)~~]] *Hatrack:* To flat-cut the top of a tree, severing the leader or leaders, or the removal of any branch three (3) inches or greater in diameter at any point other than the branch collar.

[[~~(W)~~]] *Hazard pruning:* The removal of dead, diseased, decayed, or obviously weak branches two (2) inches in diameter or greater.

[[~~(X)~~]] *Heat island:* An unnaturally high temperature [[~~microclimate~~]] >>microclimate<< resulting from radiation from unshaded impervious surfaces.

[[~~(Y)~~]] *Hedge:* A landscape barrier consisting of a continuous, dense planting of shrubs, not necessarily of the same species.

[[~~(Z)~~]] *Herbaceous plant:* A plant having little or no woody tissue.

[[~~(AA)~~]] *Hydromulch:* A sprayed application of seed, mulch and water.

[[~~(BB)~~]] *Hydrozone:* A zone in which plant material with similar water needs are grouped together.

[[~~(CC)~~]] *Included bark:* Bark that is >>embedded in a crotch between a branch and trunk or between co-dominant stems<< [[~~pushed inside a developing crotch~~]], causing a weakened structure.

[[~~DD~~)]] *Irrigation detail:* A graphic representation depicting the materials to be used and dimensions to be met in the installation of the irrigation system.

[[~~(EE)~~]] *Irrigation plan:* A plan drawn at the same scale as the landscape plan, indicating location and specification of irrigation system components and other relevant information as required by this chapter.

[[~~(FF)~~]] *Irrigation system:* A system of pipes or other conduits designed to transport and distribute water to keep plants in a healthy and vigorous condition.

[[~~(GG)~~]] *Landscape feature:* Trellis, arbor, fountain, pond, garden sculpture, garden lighting, decking, patio, decorative paving, gazebo>>,<< and other similar elements.

[[~~(HH)~~]] *Landscape material:* Plants such as grass, ground cover, forbs, shrubs, vines, hedges, trees and non-living material such as rocks, pebbles, sand, mulch, or pervious decorative paving materials.

[[~~(II)~~]] *Landscape plan:* A plan indicating all landscape areas, stormwater retention/detention areas, areas which qualify to be excluded from maximum permitted lawn area, existing vegetation to be retained, proposed plant material, landscape legend, landscape features, planting specifications, and details, and all other relevant information in compliance with this chapter.

[[~~(JJ)~~]] *Lawn area:* An area planted with lawn grasses.

[[~~(KK)~~]] *Manual irrigation system:* An irrigation system in which control valves and switches are manually operated rather than operated by automatic controls.

[[~~(LL)~~]] *Mixed use:* A mixture of land uses such as provided in Traditional Neighborhood Development (TND), Planned Area Development (PAD), and Planned Development (PD).

[[~~(MM)~~]] *Moisture and rain sensor switches:* Devices which have the ability to switch off an automatic irrigation controller after receiving a predetermined amount of rainfall or moisture content in the soil.

[[~~(NN)~~]] *Mulch:* [[~~Non-living organic materials~~]] >>Materials<< customarily used in landscape design to retard erosion, weed infestation, and retain moisture and for use in planting areas.

[[~~(OO)~~]] *Multifamily residential development:* Any residential development other than attached or detached single family or duplex.

[[~~(PP)~~]] *Multiple single family developments:* Attached and detached single family developments that are planned as a total project and not as a single family unit on a single lot.

[[~~(QQ)~~]] *Native habitat:* An area enhanced or landscaped with an appropriate mix of native tree, shrub and groundcover species that resembles a native plant community or natural forest community in structure and composition or is naturally occurring.

[[~~(RR)~~]] *Native plant species:* Plant species with a geographic distribution indigenous to all or part of Miami-Dade County. Plants which are described as being native to Miami-Dade County in botanical manuals such as, but not limited to, "A Flora of Tropical Florida" by Long and Lakela [[~~and "The Biology of Trees Native to Tropical Florida" by P. B. Tomlinson~~]], are native plant species within the meaning of this definition. Plant species which have been introduced into Miami-Dade County by man are not native plant species.

[[~~(SS)~~]] *Native plant community:* A natural association of plants dominated by one (1) or more prominent native plant species, or a characteristic physical attribute.

[[~~(TT)~~]] *Natural [[~~forest community~~]]* >>*Forest Community*<<: All assemblages of vegetation designated as Natural Forest

Communities on the Miami-Dade County Natural Forest Community Maps and approved by the Board of County Commissioners, pursuant to Resolution No. R-1764-84 and further defined in Section 24-[[3]]>>5<< of the Miami-Dade County Code.

[[~~(UU)~~]] *Net lot area:* For the purpose of this chapter, net lot area shall be the area within lot boundaries of all lands comprising the site. Net lot area shall not include any portion of the abutting dedicated streets, alleys, waterways, canals, lakes or any other such dedications.

[[~~(VV)~~]] *One family dwelling:* A private residence building used or intended to be used as a home or residence in which all living rooms are accessible to each other from within the building and in which the use and management of all sleeping quarters, all appliances for sanitation, cooking, ventilating, heating or lighting are designated for the use of one (1) family only.

[[~~(WW)~~]] *Overhead irrigation system:* A high pressure, high volume irrigation system.

[[~~(XX)~~]] *Planting detail:* A graphic representation of the plant installation depicting the materials to be used and dimensions to be met in the placement of plants and other landscape materials.

[[~~(YY)~~]] *Prohibited plant species:* Those plant species listed in the >>Miami-Dade<< Landscape Manual which are demonstrably detrimental to native plants, native wildlife, ecosystems, or human health, safety, and welfare.

[[~~(ZZ)~~]] *Shrub:* A self-supporting woody perennial plant normally growing to a height of twenty-four (24) inches or greater, characterized by multiple stems and branches continuous from the base.

[[~~(AAA)~~]] *Site plan:* A comprehensive plan drawn to scale indicating appropriate site elevations, roadways, and location of all relevant site improvements including structures, parking, other paved areas, ingress and egress drives, landscaped open space and signage.

[[~~(BBB)~~]] *Specimen tree:* A tree with any individual trunk which has a DBH of eighteen (18) inches or greater, but not including the following:

(1) All trees listed in Section 24-[[~~60~~]]>>49<<(4)(f);

(2) Non-native fruit trees that are cultivated or grown for the specific purpose of producing edible fruit, including, but not limited to, mangos, avocados, or species of citrus;

(3) Non-native species of the genus *Ficus*, and

(4) All multitrunk trees in the palm family, except [[~~Accelorrhaphe~~]]>>*Acoelorrhaphe*<< *wrightii* >>*and Phoenix reclinata*<< which have a minimum overall height of fifteen (15) feet.

[[~~(CCC)~~]] *Spray head:* An irrigation device which applies water to the soil or plant surface by fixed spray or mist nozzles.

>>*Sprinkler Head:* a sprinkler head that provides above ground or overhead irrigation.<<

[[~~(DDD)~~]] *Stabilized lawn area:* An area of ground underlain with structural support in the form of grass pavers or stabilized soil prepared to withstand the load of intended vehicular use, such as automobiles, fire trucks and garbage trucks.

[[~~(EEE)~~]] *Stormwater retention/detention area:* An area designed, built and used for temporary storage of stormwater. For purposes of this chapter, these areas are intended to be permanently exempt from wetland regulations.

>>*Street Tree Master Plan:* A greenprint for Miami-Dade County as adopted by the Board of County Commissioners on March 6, 2007 as may be amended from time to time.<<

[[~~(FFF)~~]] *Tree abuse.* Tree abuse shall include:

(1) Damage inflicted upon any part of a tree, including the root system, by machinery, construction equipment, cambium layer penetration, storage of materials, soil compaction, excavation, chemical application or spillage, or change to the natural grade.

(2) Hatracking.

(3) Girdling or bark removal of more than one-third (1/3) of the tree diameter.

(4) Tears and splitting of limb ends or peeling and stripping of bark resulting from improper pruning techniques not in accordance with the current ANSI A300 Standards.

[[~~(GGG)~~]] *Tree canopy [[~~cover~~]]:* The aerial extent of the branches and foliage of a tree >>as defined by the drip line<<.

[[~~(HHH)~~]] *Temporary irrigation systems:* A system including surface distribution elements (hose, pipe, etc.) which may be easily removed when landscape is established.

[[~~(III)~~]] *Understory:* The complex of woody, fibrous, [[~~and~~]] herbaceous >>and graminoid<< plant species that are typically associated with a natural forest community, native plant community, or native habitat.

[[~~(JJJ)~~]] *Vegetation required to be preserved by law:* Portions of a site, including but not limited to specimen trees, natural forest communities and native vegetation which are clearly delineated on site plans, plats, or recorded restrictions, or in some other legally binding manner that are to be protected from any tree or understory removal or effective destruction and maintained without any development.

[[~~(KKK)~~]] *Vegetation survey:* A drawing provided at the same scale as the landscape plan which includes relevant information as required by this chapter.

[[~~(LLL)~~]] *Vehicular use area:* A hard surface area designed or used for off-street parking and/or an area used for loading, circulation, access, storage, including fire trucks, garbage trucks, or display of motor vehicles.

[[~~(MMM)~~]] *Vine:* A plant with a flexible stem which normally requires support to reach mature form.

Section 3. Section 18A-4 of the Code of Miami-Dade County, Florida is hereby amended as follows:

Sec. 18A-4. Plans required.

* * *

(D) *Irrigation plans.* An irrigation plan shall be submitted if a sprinkler system is required by Chapter 33, or as required in the individual municipalities or where an irrigation system is to be provided regardless of code requirements. Where a landscape plan is required, an irrigation plan shall be submitted concurrently.

(1) For a new one-family or duplex dwelling the irrigation plan may be indicated on a plot plan or a separate drawing prepared by the owner or the owner's agent indicating area(s) to be irrigated, location and specifications of lines and heads and pump specifications.

(2) All other development other than those provided in a subsection (1) above shall:

(a) Be drawn on a base plan at the same scale as landscape plan(s).

(b) Delineate landscape areas, major landscape features, and hydrozones.

(c) Delineate existing and proposed structures, parking areas or other vehicular use areas, access aisles, sidewalks, driveways, the location of utilities and easements, and similar features,

(d) Include water source, design operating pressure and flow rate per zone, total volume required for typical depths of application, and application rate.

(e) Include locations of pipes, controllers, valves, sprinklers, back flow prevention devices>>, rain switches or soil moisture sensors,<< and electrical supply.

(f) Irrigation details.

Section 4. Section 18A-6 of the Code of Miami-Dade County, Florida is hereby amended as follows:

Sec. 18A-6. Minimum standards.

The following standards shall be considered minimum requirements unless otherwise indicated:

* * *

(B) *Irrigation.*

(1) All newly-planted and relocated plant material shall be watered by temporary or permanent irrigation systems until such time as they are established >>and subsequently on as needed basis to prevent stress and die off in compliance with existing water use restrictions<<.

(2) Irrigation shall be prohibited within native plant communities and natural forest communities, except for temporary systems needed to establish newly planted material. Temporary irrigation systems shall be disconnected immediately after establishment of plant communities.

~~[[(3) Irrigation systems shall be designed to]] conserve water by allowing differential operation schedules based on hydrozone.~~

~~(4) Irrigation systems shall be designed, operated, and maintained to not overthrow or overflow on to impervious surfaces.~~

~~(5) Low trajectory spray heads, and/or low volume water distributing or application devices, shall be used. Overhead irrigation systems shall only be permitted in bonafide agricultural activity areas.~~

~~(6) Gray water shall be used where approved systems are available.~~

~~(7) During dry periods, irrigation application rates of between one (1) and one and one-half (1 1/2) inches per week are recommended for turf areas.~~

~~(8) A moisture or rain sensor device shall be required on all irrigation systems equipped with automatic controls.~~

~~(9) Irrigation systems shall be timed to operate only during hours and on days permitted under Chapter 32 of the Code.~~

~~(10) If an irrigation system is not provided, a hose bib shall be provided within seventy-five (75) feet of any landscape area.]]~~

>>(3) Irrigation systems shall be designed, operated and maintained to:

(a) Meet the needs of all the plants in the landscape.

(b) Conserve water by allowing differential operation schedules based on hydrozone.

(c) Consider soil, slope and other site characteristics in order to minimize water waste, including overspray or overflow on to impervious surfaces and other non-vegetated areas, and off-site runoff.

(d) Minimize free flow conditions in case of damage or other mechanical failure.

(e) Use low trajectory spray heads, and/or low volume water distributing or application devices.

(f) Maximize uniformity, considering factors such as:

(1) Emitters types,

(2) Head Spacing,

(3) Sprinkler pattern, and

(4) Water pressure at the emitter.

(g) Use the lowest quality water feasible (graywater shall be used where approved systems are available).

(h) Rain switches or other devices, such as soil moisture sensors, shall be used with automatic controls.

Operate only during hours and on days permitted under Chapter 32 of the Code of Miami-Dade County.

(i) Where feasible, drip irrigation or micro-sprinklers shall be used.

(4) During dry periods, irrigation application rates of between one (1) and one and one-half (1 1/2) inches per week are recommended for turf areas.

(5) If an irrigation system is not provided, a hose bib shall be provided within seventy-five (75) feet of any landscape area.<<

(C) *Trees.*

(1) *Tree size.* All trees, except street trees [[~~and trees located beneath power lines~~]], shall be a minimum of ten (10) feet high and have a minimum caliper of two (2) inches at time of planting except that thirty (30) percent of the tree requirement may be met by native species with a minimum height of eight (8) feet and a minimum caliper of one and one-half (1 1/2) inches at time of planting.

* * *

(11) [[~~Thirty (30)~~]] [[~~>>Fifty (50)<<~~]] [[~~percent of the required trees and/or palms shall be native species.~~]] >>Of the required trees at least:
(a) Thirty (30) percent shall be native species; and
(b) Fifty (50) percent shall be low maintenance and drought tolerant; and
(c) No more than thirty (30) percent shall be palms.<<

>>(12) Eighty (80) percent of the trees shall be listed in the Miami-Dade Landscape Manual, the Miami-Dade Street Tree Master Plan and/or the University of Florida's Low-Maintenance Landscape Plants for South Florida list.<<

[[~~(12)~~]] >>(13)<< In order to prevent adverse environmental impacts to existing native plant communities, [[~~only existing Sabal Palmettos (Cabbage Palms)~~]] >>cabbage palms (Sabal palmetto) that are harvested from the wild shall not be used to satisfy minimum landscaping requirements.<< [[~~shall be used to satisfy minimum tree and native plant requirements, except that~~]] >>Only existing cabbage palms,<< [[~~Cabbage Palms~~]] which are rescued from government approved donor sites, transplanted within the site, or commercially grown from seed shall be counted towards the minimum tree and native plant requirements.

[[~~(13)~~]] >>(14)<< When trees are planted within the right-of-way, the owners of land adjacent to the areas where street trees are planted must maintain those areas including the trees, plants and sod, using pruning methods specified in this Code. A covenant executed by those owners is required, or a special taxing district must be created to maintain these areas. Where the State, County or municipality determines that the planting of trees and other landscape material is not appropriate in the public right-of-way, they may require that said trees and landscape material be placed on private property.

[[~~(14)~~]] >>(15)<< Consideration shall be given to the selection of trees, plants and planting site to avoid serious problems such as clogged sewers, cracked sidewalks, and power service interruptions.

[[~~(15)~~]] >>(16)<< Municipalities shall meet all the above requirements in the corresponding zoning districts or land use categories of the particular municipality.

(D) *Shrubs.*

(1) All shrubs shall be a minimum of eighteen (18) inches in height when measured immediately after planting. Shrubs shall be provided at ratio of ten (10) per required tree. [[~~Thirty (30)~~]] [[~~>>Fifty (50)<<~~]] [[~~percent of the shrubs shall be native species.~~]] >>Of the provided shrubs at least:
(a) Thirty (30) percent shall be native species; and
(b) Fifty (50) percent shall be low maintenance and drought tolerant; and
(c) Eighty (80) percent shall be listed in the Miami-Dade Landscape Manual, the Miami-Dade Street Tree Master Plan and/or the University of Florida's Low-Maintenance Landscape Plants for South Florida list.<<

(2) When used as a visual screen, buffer, or hedge, shrubs shall be planted at a maximum average spacing of thirty (30) inches on center or if planted at a minimum height of thirty-six (36) inches, shall

have a maximum average spacing of forty-eight (48) inches on center and shall be maintained so as to form a continuous, unbroken and solid visual screen within one (1) year after time of planting. Shrubs used as a buffer, visual screen, or hedge need not be of the same species.

* * *

(G) *Mulch.*

(1) [[~~Weed-free mulch~~]] [[~~Environmentally friendly organic mulches~~]] >>Mulches<< shall be applied and maintained in [[~~a minimum three (3) inch layer under and around all trees and shrubs, and in a minimum two (2) inch layer under and around all ground cover~~]] >>accordance with the most recent edition of the Florida Yards & Neighborhoods Handbook titled "A Guide to Florida Friendly Landscaping" by the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) and available online at http://www.floridayards.org/landscape/FYN-Handbook.pdf.<<

[[~~(2) The use of mulch shall be restricted to planting areas.~~

~~(3)~~]] >>(2)<< Cypress mulch shall not be used because its harvest degrades cypress wetlands.

* * *

Section 5. Section 18A-7 of the Code of Miami-Dade County, Florida is hereby amended as follows:

Sec. 18A-7. Landscape plan review criteria.

In the unincorporated area all landscape plans shall be reviewed by the Department of Planning and Zoning, and where existing trees or [[~~natural forest communities~~]] >>Natural Forest Communities or Environmentally Endangered Lands<< are involved, the Department of Environmental Resources Management. In the case of a municipality, landscape plans shall be approved by the department(s) or board(s) as deemed appropriate within the municipality. Landscape plans shall be reviewed in accordance with the following goals and objectives and the guidelines and illustrations provided in the Landscape Manual >>as well as the Guide to Florida-Friendly Landscaping provided by the Florida Yards and Neighborhoods Program<<:

(A) Landscape design shall enhance architectural features[[,]]>>;<< relate structure design to the site[[,]]>>;<< visually screen dissimilar uses and unsightly views[[,]]>>;<< reduce noise>>,glare and heat gain<< [[~~impacts~~]] from >>paved areas,<< major roadways and incompatible uses[[,]]>>;<< strengthen important vistas and reinforce neighboring site design and architecture.

(B) Existing specimen trees, native vegetation (including canopy, understory, and ground cover) and Natural Forest Communities shall be preserved to the maximum extent possible and all requirements of Section 24-[[60]]>>49<< of the Code >>of Miami-Dade County shall be met. Preserved Natural Forest Community areas shall be deducted from the total area used to calculate minimum landscaping requirements. Native vegetation in these Natural Forest Community areas shall not be used to satisfy minimum landscape requirements<<.

(C) In order to conserve water, reduce maintenance, and promote plant health, plant species shall be selected and installed based on their water needs, growth rate and size, and resource inputs. Plants with similar water needs shall be grouped in hydrozones. Adequate growth area >>, including rooting space<<, based on natural mature shape and size shall be provided for all plant materials.

* * *

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 is hereby ordained that the provisions of this ordinance shall become and made a part of the Code of Miami-Dade County, Florida. The section 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 ten (10) days after the date of enactment unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

PASSED AND ADOPTED:

Approved by County Attorney as to form and legal sufficiency: APW for RAC

Prepared by: CHC

Craig H. Coller

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APPENDIX E

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

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

BMP	Category	Sector	Cost/ measure[7]	Savings Rate (gallons per meas. per day)	2007						2011						2016					
					No. of Meas. in 2007	Cumulative No. of Meas.	2007 Cost	Cum. Cost ($ to date)	New Water Savings (GPD)	2007 Cumulative Water Savings Rate (GPD)	No. of Meas. in 2011	Cumulative No. of Meas.	2011 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2011 Cumulative Water Savings Rate (GPD)	No. of Meas. in 2016	Cumulative No. of Meas.	2016 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2016 Cumulative Water Savings Rate (GPD)
Water-Efficient Landscape and Irrigation Evaluations and Rebates with Rain Sensor Retrofit	Landscape & Irrigation Evaluations plus Rain Sensor Retrofit (without Rebate)[1]	SF	$260	233	300	300	$78,000	$78,000	69,900	69,900	300	1,500	$78,000	$390,000	69,900	349,500	300	3,000	$78,000	$780,000	69,900	699,000
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	20	20	$160,200	$160,200	700,000	700,000	20	100	$160,200	$801,000	700,000	3,500,000	0	100	$0	$801,000	0	3,500,000
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	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	1,000	$250,000	$250,000	64,000	64,000	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	0	0	$0	$0	0	0	2,500	8,500	$0	$0	160,000	544,000	0	11,000	$0	$0	0	704,000
	Rebate (toilet only)[4]	SF	$130	29	750	750	$97,500	$97,500	21,750	21,750	750	3,750	$97,500	$487,500	21,750	108,750	750	7,500	$97,500	$975,000	21,750	217,500
Showerhead Exchange	No Categories	SF	$1.60	35	1,600	1,600	$2,560	$2,560	56,000	56,000	1,600	8,000	$2,560	$12,800	56,000	280,000	1,600	16,000	$2,560	$25,600	56,000	560,000
	No Categories	MF	$1.60	35	1,600	1,600	$2,560	$2,560	56,000	56,000	1,600	8,000	$2,560	$12,800	56,000	280,000	1,600	16,000	$2,560	$25,600	56,000	560,000
Retrofit Kit Give Away	No Categories	SF	$2.38	12	1,600	1,600	$3,808	$3,808	19,200	19,200	1,600	8,000	$3,808	$19,040	19,200	96,000	1,600	16,000	$3,808	$38,080	19,200	192,000
	No Categories	MF	$2.38	12	1,600	1,600	$3,808	$3,808	19,200	19,200	1,600	8,000	$3,808	$19,040	19,200	96,000	1,600	16,000	$3,808	$38,080	19,200	192,000
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	125	$118,500	$592,500	25,000	125,000	25	250	$118,500	$1,185,000	25,000	250,000
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	22	22	$35,200	$35,200	33,000	33,000	10	62	$16,000	$99,200	15,000	93,000	10	112	$16,000	$179,200	15,000	168,000
	Hotel Program[6]	NR	$667	1,617	12	12	$8,000	$8,000	19,404	19,404	12	60	$8,000	$40,000	19,404	97,020	12	120	$8,000	$80,000	19,404	194,040
Plan Total					For 2007		$776,000	$776,000	1,086,000	1,086,000	For 2011		$756,000	$3,780,000	1,228,000	5,902,000	For 2016		$596,000	$5,778,000	368,000	7,901,000
Sub-total for SF							$432,000	$432,000	231,000	231,000			$432,000	$2,160,000	231,000	1,155,000			$432,000	$4,319,000	231,000	2,309,000
Sub-total for MF							$22,000	$22,000	78,000	78,000			$22,000	$107,000	238,000	932,000			$22,000	$214,000	78,000	1,480,000
Sub-total for NR							$322,000	$322,000	776,000	776,000			$303,000	$1,533,000	760,000	3,816,000			$143,000	$2,246,000	60,000	4,113,000

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 Cumulative Water Savings Rate (GPD)	No. of Meas. in 2026	Cumulative No. of Meas.	2026 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2026 Cumulative Water Savings Rate (GPD)		
Water-Efficient Landscape and Irrigation Evaluations and Rebates with Rain Sensor Retrofit	Landscape & Irrigation Evaluations plus Rain Sensor Retrofit (without Rebate)[1]	SF	$260	233	300	4,500	$78,000	$1,170,000	69,900	1,048,500	300	6,000	$78,000	$1,560,000	69,900	1,398,000	5,358	6,000
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	0	100	$0	$801,000	0	3,500,000	0	100	$0	$801,000	0	3,500,000	22,995	100
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	$130	29	750	11,250	$97,500	$1,462,500	21,750	326,250	750	15,000	$97,500	$1,950,000	21,750	435,000	1,667	15,000
Showerhead Exchange	No Categories	SF	$1.60	35	1,600	24,000	$2,560	$38,400	56,000	840,000	1,600	32,000	$2,560	$51,200	56,000	1,120,000	4,292	32,000
	No Categories	MF	$1.60	35	1,600	24,000	$2,560	$38,400	56,000	840,000	1,600	32,000	$2,560	$51,200	56,000	1,120,000	4,292	32,000
Retrofit Kit Give Away	No Categories	SF	$2.38	12	1,600	24,000	$3,808	$57,120	19,200	288,000	1,600	32,000	$3,808	$76,160	19,200	384,000	1,472	32,000
	No Categories	MF	$2.38	12	1,600	24,000	$3,808	$57,120	19,200	288,000	1,600	32,000	$3,808	$76,160	19,200	384,000	1,472	32,000
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	25	375	$118,500	$1,777,500	25,000	375,000	25	500	$118,500	$2,370,000	25,000	500,000	1,916	500
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	10	162	$16,000	$259,200	15,000	243,000	10	212	$16,000	$339,200	15,000	318,000	1,291	212
	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		$596,000	$9,757,000	368,000	9,740,000	For 2026		$596,000	$12,735,000	368,000	11,580,000	56,000	182,052
Sub-total for SF							$432,000	$6,479,000	231,000	3,463,000			$432,000	$8,638,000	231,000	4,617,000	18,000	105,000
Sub-total for MF							$22,000	$321,000	78,000	1,868,000			$22,000	$428,000	78,000	2,256,000	11,000	76,000
Sub-total for NR							$143,000	$2,958,000	60,000	4,410,000			$143,000	$3,671,000	60,000	4,707,000	28,000	1,052

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

APPENDIX F

Proposed Reuse Projects

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) **4.44 MGD**	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) **7.84 MGD**	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) **4.17 MGD**	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	South District WWTP **9.2 MGD**	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP **9.2 MGD**	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant **9.2 MGD**	9.2 MGD		Dec 31, 2025
7.	South District WWTP **90 MGD**	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.5 MGD			Dec 31, 2025

EXHIBIT 14

August 2014

APPENDIX G

List of Large and Small

Public Water Systems

Appendix G
List of Large and Small Public Water Supply Systems

PWS ID	Mailing Name	Mailing Street	City	Zip	Capacity (GPD)
4130048	LAS MERCEDES ENTERPRISE INC.	15730 SW 232 STREET	MIAMI	33170	8000
4130053	OLD CUTLER BAIT AND TACKLE	20264 OLD CUTLER ROAD	MIAMI	33189	28000
4130077	BAL HARBOUR VILLAGE	655 96TH ST	BAL HARBOUR	33154	0
4130089	BAY HARBOR ISLANDS TOWN OF	9665 BAY HARBOR TERRACE	BAY HARBOR ISLANDS	33154	0
4130112	BENSON LIGHTING	12955 SW 87 AVE	MIAMI	33176	3600
4130159	BROOKS (J R) & SON	18400-50 SW 256 STREET	HOMESTEAD	33031	80000
4130255	FLORIDA CITY	461 NW 6 AVENUE	FLORIDA CITY	33034	4000000
4130320	CAMP OWAISSA BAUER	17001 SW 264 STREET	HOMESTEAD	33031	183000
4130322	REDLAND MIDDLE SCHOOL	16001 SW 248 ST	HOMESTEAD	33031	144000
4130445	TROPICAL RESEARCH & EDUCATION CENTER	18905 SW 280 STREET	HOMESTEAD	33031	82190
4130496	FRANKSHER BUILDING	9300 SOUTH DIXIE HIGHWAY	MIAMI	33156	64000
4130588	REDLANDS MOBILE HOME PARK	17360 S.W. 232 STREET	MIAMI	33170	100000
4130604	HIALEAH CITY OF	3700 W 4TH AVE	HIALEAH	33012	0
4130645	HOMESTEAD CITY OF	505 NW 9 ST. EMERGENCY: 305-247-4116	HOMESTEAD	33030	19200000
4130662	INDIAN CREEK VILLAGE	50 INDIAN CREEK DRIVE	MIAMI BEACH	33154	0
4130721	MIAMI EVERGLADES CAMPGROUND	20675 SW 162 AVENUE	MIAMI	33170	122000
4130793	DELUXE MOTEL	28475 SOUTH DIXIE HIGHWAY	HOMESTEAD	33033	46000
4130811	TROPICAL PRODUCE	19855 SW 272 STREET	HOMESTEAD	33031	36000
4130833	JONES' TRAILER PARK	14601 NW 185TH STREET #11	MIAMI	33016	100000
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	3200
4130894	DADE HOMESTEAD GAA SKYDIVE	28700 SW 217 AVENUE	HOMESTEAD	33030	6400
4130897	DADE LANDSCAPE NURSERY	50 SW 32 ROAD	MIAMI	33129	86000
4130900	HOMESTEAD EXECUTIVE JET CENTER	28700 SW 217 AVENUE	HOMESTEAD	33030	3200
4130901	MIAMI BEACH CITY OF	1700 CONVENTION CENTER DR.	MIAMI BEACH	33139	0
4130933	MONKEY JUNGLE	14805 SW 216 ST	MIAMI	33170	122000
4130934	KINGSWOOD MONTESSORI ACADEMY INC.	20130 SW 304 ST	HOMESTEAD	33030	9600
4130951	LAST CHANCE LOUNGE	35800 SOUTH DIXIE HIGHWAY	FLORIDA CITY	33034	5000
4130970	NORTH BAY VILLAGE CITY OF	1666 KENNEDY DRIVE	NORTH BAY VILLAGE	33141	0
4130977	NORTH MIAMI CITY OF	12100 NW 11 AVE (PLANT)	NORTH MIAMI	33161	9300000
4131001	OPA LOCKA CITY OF	1021 BURLINGTON ST	OPA LOCKA	33054	0
4131185	LA MISION HOSTEL AND LODGE	22540 S.W. 177 AVENUE	MIAMI	33170	36000
4131192	REDLAND GOLF & COUNTRY CLUB	24451 SW 177 AVENUE	HOMESTEAD	33030	19200
4131202	MDWASA/REX UTILITIES	P.O. BOX 316	MIAMI	33133	12030000
4131206	REX UTILITIES INC/REDAVO	15225 SW HARDING LANE	HOMESTEAD	33033	0
4131217	CEMEX CEMENT MILL	1200 NW 137 AVENUE	MIAMI	33166	720000
4131250	AMERICA'S BEST INN	26480 S DIXIE HIGHWAY	HOMESTEAD	33032	3200
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
4131424	SURFSIDE TOWN OF	9293 HARDING AVE	SURFSIDE	33154	0
4131474	MEDLEY WATER DEPARTMENT	7777 NW 72 AVE	MEDLEY	33166	0
4131531	VIRGINIA GARDENS VILLAGE OF	6498 NW 38 TERRACE	VIRGINIA GARDENS	33166	0
4131558	WEST MIAMI CITY OF	901 SW 62ND AVE	WEST MIAMI	33144	0
4131618	NORTH MIAMI BEACH	19150 NW 8 AVENUE	NORTH MIAMI BEACH	33169	32000000
4131631	HOMESTEAD AIR FORCE BASE	31 CES/DEMW WATER PLANT	HOMESTEAD	33039	0
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	22301 SW 162 AVE	MIAMI	33170	17000
4134228	CHEVRON 24800	24800 SW 177 AVE.	HOMESTEAD	33031	5000
4134234	CEMEX MATERIALS - SWEETWATER	1200 N.W. 137TH AVENUE	MIAMI	33165	5000
4134239	STOP N SHOP FOOD AND DELI	24791 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	DIAMOND R. 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
4134357	FKAA J. ROBERT DEAN W.T.P.	19201 SW 354 ST	FLORIDA CITY	33034	29800000
4134358	DADE JUVENILE RESIDENTIAL CENTER	18500 SW 424 ST	FLORIDA CITY	33034	35000
4134363	HOMESTEAD JEHOVAH'S WITNESS	18505 SW 288 STREET	HOMESTEAD	33030	8000

Appendix G
List of Large and Small Public Water Supply Systems

PWS ID	Mailing Name	Mailing Street	City	Zip	Capacity (GPD)
4134365	HIALEAH GARDENS	13601 NW 107 AVE	HIALEAH GARDENS	33018	0
4134368	EVERGLADES PK-PINE ISLAND	40000 SR 9336	HOMESTEAD	33034	400000
4134369	EVERGLADES PK-HEADQTRS	40000 SR 9336	HOMESTEAD	33034	100000
4134370	EVERGLADES PK-HIDDEN LK	PO BOX 279	HOMESTEAD	33030	10000
4134371	EVERGLADES PK-DAN BEARD	40000 S.R. 9336	HOMESTEAD	33034	4000
4134372	EVERGLADES PK-LONG PINE KEY	40000 SR 9336	HOMESTEAD	33034	10800
4134373	EVERGLADES NATIONAL PARK BILL ROBERTSON	40000 S.R. 9336	HOMESTEAD	33034	20000
4134374	EVERGLADES PK-ROYAL PALM	40000 S.R. 9336	HOMESTEAD	33034	21600
4134376	EVERGLADES SHARK VALLEY	40000 SR 9336	HOMESTEAD	33034	5000
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 I	22400 OLD DIXIE HWY	MIAMI	33170	10000
4134385	UNITARIAN UNIVERSAL CONGR'N OF MIAMI	7701 SW 76 AVE	MIAMI	33143	5000
4134387	COCONUT PALM TRADING POST	24814 SW 177 AVENUE	HOMESTEAD	33031	64000
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
4134402	GREENLEAF NURSERY	19355 SW 304 STREET	HOMESTEAD	33030	5000
4134417	REDLAND SPORTS BAR AND GRILL	17701 SW 232 STREET	GOULDS	33170	200
4134420	SAFARI RESTAURANT	26700 SW 8 ST	MIAMI	33194	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	CEMEX-F.E.C. OFFICE	13292 NW 119 AVENUE	HIALEAH	33178	3000
4134440	LAS DELICIAS	16585 SW 177 AVE	MIAMI	33187	3000
4134442	REDLAND COMMUNITY CHURCH	14601 SW 248 ST.	MIAMI	33032	3000
4134443	COMCAST REDLANDS	20800 SW 167 AVE.	MIAMI	33187	3000
4134448	PALMS PROFESSIONAL CENTER	18430 S. DIXIE HWY.	MIAMI	33157	3000
4134451	FARM CREDIT	24700 SW 177 AVENUE	HOMESTEAD FL 33090	33030	2720
4134453	CEMEX-F.E.C. SHOP	12155 NW 136 STREET	HIALEAH	33178	16000
4134459	CIRCLE D FARMS	32700 SW 217 AVENUE	HOMESTEAD	33034	3000
4134462	REDLANDS GROCERY	26400 SW 187 AVENUE	HOMESTEAD	33031	3000
4134464	SUNRISE ADULT GROUP HOME (15190)	15190 SW 272 STREET	HOMESTEAD	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
4134498	CREATIVE YEARS	15680 SW 232 STREET	MIAMI	33170	2000
4134499	OUR LADY OF MERCY CEMETERY ADM.	11411 NW 25 STREET	DORAL	33172	2000
4134502	CHRISTIAN FAMILY WORSHIP CENTER	27550 OLD DIXIE HIGHWAY	HOMESTEAD	33031	9600
4134506	CHRIST FELLOWSHIP	16390 SW 248 STREET	HOMESTEAD	33031	2000
4134512	DE LEON BROMELIADS	13745 S.W. 216TH ST.	MIAMI	33170	5000
4134513	MIAMI INTL AIRPORT	P.O. BOX 592075	MIAMI	33159	0
4134516	TOM THUMB 127	18400 SW 177 AVENUE MIAMI 33187	HIALEAH	33010	24000
4134520	RANCHO GASPAR	16480 NW 117 AVENUE	MIAMI	33018	9600
4134522	1ST BAPTIST CHURCH OF HOMESTEAD	29050 KROME AVE. MAIL: POBOX 900428	HOMESTEAD	33030	6500
4134523	WOMEN'S CLUB OF HOMESTEAD	17905 SW 292 STREET	HOMESTEAD	33030	3300
4134524	KROME AVENUE CHURCH	22755 SW 177 AVENUE	MIAMI	33170	7200
4134525	RINKER HYDRO-CONDUIT	13100 NW 118TH AVENUE	MIAMI	33178	1400
4134527	CEMEX EMPLOYEES	12150 NW 136 ST	MIAMI	33178	3750
4134528	FRUTICUBA OF MIAMI INC.	16751 KROME AVENUE	MIAMI	33187	3200
4134531	TOM THUMB 131	24790 SW 177 AVE	HOMESTEAD	33031	10000
4134532	SUNOCO KROME AVE	26400 SW 177 AVE	HOMESTEAD	33031	5000
4134533	GATOR PARK	24050 SW 8 STREET	MIAMI	33193	3000
4134537	MANNHEIMER FOUNDATION	20255 SW 360 STREET	HOMESTEAD	33034	2800
4134538	DIAMOND SOUTH	29000 SOUTH DIXIE HWY	HOMESTEAD	33033	120
4134539	GRANDMA'S U-PICK	18001 SW 177 AVE	MIAMI	33187	1000
4134540	CHEVRON 232	23150 SW 177 AVE	MIAMI	33170	5000
4134542	REDLAND PLAZA SHOPPING CENTER	19130 SW 177 AVENUE	MIAMI	33187	3200
4134543	SCHNEBLY WINERY	30205 SW 217 AVENUE	HOMESTEAD	33030	30000
4134546	MY LITTLE ANGELS DAYCARE	29400 OLD DIXIE HWY	HOMESTEAD	33033	30000
4134547	GLASER FARMS	19100 SW 137 AVENUE	MIAMI	33177	43000
4134548	JMW FARMS LLC.	15585 SW 177 AVENUE	MIAMI	33170	43000

Appendix G
List of Large and Small Public Water Supply Systems

PWS ID	Mailing Name	Mailing Street	City	Zip	Capacity (GPD)
4134549	ROBERT IS HERE	19200 SW 344 STREET	FLORIDA CITY	33034	1000
4134551	TROPICAL VILLAGE FARM (WINTERGREEN NUR)	22601 SW 177 AVE	MIAMI	33170	1000
4134553	UNITED MIAMI ORCHIDS	24000 SW 162 AVENUE	HOMESTEAD	33031	1200
4134554	FARMER'S MARKET SAN GERMAN	17800 SW 100 ST	MIAMI	33196	5000
4134556	GATOR GRILL	36600 SW 192 AVENUE	HOMESTEAD	33031	4500
4134557	OUR LADY OF MERCY MAUSOLEUM	11411 NW 25 STREET	DORAL	33172	1000
4134558	OUR LADY OF MERCY CHAPEL	11411 NW 25 STREET	DORAL	33172	1000
4134560	CAULEY SQUARE II	22400 SW SOUTH DIXIE HWY	MIAMI	33170	10000
4134561	SAM & PHILLY'S U-PICK AND MARKET	16790 SW 177 AVENUE	MIAMI	33187	7200
4134562	COSTA FARMS	21800 SW 162 AVENUE	MIAMI	33170	10000
4134563	VALUE PAWN AND JEWELRY	18494 SOUTH DIXIE HWY	MIAMI	33157	1000
4134564	GUS' RANCH	17480 SW 232 STREET	MIAMI	33170	1000

APPENDIX H

MDWASD 20-Year Water Use Permit,
July 16, 2012 Modification

FORM 80229
Rev. 07/09

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

Date Issued: July 16, 2012 **Expiration Date:** December 16, 2030

Authorizing: THE INCREASED USE OF GROUND WATER FROM THE UPPER FLORIDAN AQUIFER AND BISCAYNE AQUIFER FOR PUBLIC WATER SUPPLY FOR COUNTY WIDE SYSTEM SERVING 2,787,451 PERSONS IN THE YEAR 2030 WITH AN AVERAGE PER CAPITA USE RATE OF 147 GALLONS PER DAY AND A MAXIMUM MONTHLY TO AVERAGE MONTHLY PUMPING RATIO 1.06 WITH AN ANNUAL ALLOCATION OF 149,906.00 MILLION GALLONS.

Located In: Miami-Dade County, S-/T53S/R39E (SEE ATTACHED FOR ADDITIONAL SECTIONS, TOWNSHIPS S-/T53S/R40E AND RANGES)

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

This is to notify you of the District's agency action concerning Permit Application No. 110511-6, dated May 3, 2011. This action is taken pursuant to the provisions of Chapter 373, Part II, Florida Statutes (F.S.), Rule 40E-1.603 and Chapter 40E-2, Florida Administrative Code (F.A.C.). Based on the information provided, District rules have been adhered to and a Water Use Permit is in effect for this project subject to:

1. Not receiving a filed request for an administrative hearing pursuant to Section 120.57 and Section 120.569, or request a judicial review pursuant Section 120.68, Florida Statutes.
2. The attached 52 Limiting Conditions.
3. The attached 37 exhibits.

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 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.

Should you object to these conditions, please refer to the attached "Notice of Rights" which addresses the procedures to be followed if you desire a public hearing or other review of the proposed agency action. Should you wish to object to the proposed agency action or file a petition or request, please provide written objections, petitions, requests and/or waivers to:

Elizabeth Veguilla, Deputy Clerk, MSC2440
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416-4680

Please contact this office if you have any questions concerning this matter. If we do not hear from you in accordance with the "Notice of Rights", we will assume that you concur with the District's action.

CERTIFICATION OF SERVICE

I HEREBY CERTIFY that the Staff Report, Conditions and Notice of Rights have been mailed to the Permittee (and the persons listed on the attached staff report distribution list) no later than 5:00 p.m. on this 17th day of July, 2012, in accordance with Section 120.60(3), Florida Statutes, and a copy has been filed and acknowledged with the Deputy District Clerk.

By Elizabeth Veguilla
DEPUTY CLERK
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Attachments

LIMITING CONDITIONS

1. This permit shall expire on December 16, 2030.

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

3. Water use classification:

   Public water supply
   Aquifer storage and Recovery

4. Source classification is:

   Ground Water from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Annual allocation shall not exceed 149906 MG.

   Maximum monthly allocation shall not exceed 13117 MG.

   The following limitations to the average annual withdrawals from specific sources are applicable through December 31, 2021:
   Biscayne aquifer: 127,568 MG
   Floridan aquifer: 17,031 MG

   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2022 through December 31, 2026:
   Biscayne aquifer: 135,233 MG
   Floridan aquifer: 17,031 MG
   Reuse offset: 7,665 MG (21 MGD SWWF recharge)

   The following limitations to the average annual withdrawals from specific sources are applicable from January 1, 2027 through December 31,2030:
   Biscayne aquifer: 141,073 MG
   Floridan aquifer: 17,009 MG
   Reuse offset: 13,505 MG (37 MGD SWWF recharge)

   The allocations are further constrained by the wellfield operational plan described in Limiting Condition 27. Reuse offsets are required for withdrawals above 109.4 MGD at the SWWF. The offset reuse volumes do not include other reuse projects outlined in Limiting Condition 39, which are in addition to the wellfield recharge project.

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: Utility Director

7. Withdrawal Facilities:

Ground Water - Proposed:

3 - 24" X 72' X 1400 GPM Wells Cased To 45 Feet
1 - 24" X 50' X 1400 GPM Well Cased To 45 Feet
7 - 24" X 1200' X 2430 GPM Wells Cased To 1100 Feet
1 - 24" X 50' X 2800 GPM Well Cased To 45 Feet
7 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet

Ground Water - Existing:

20 - 14" X 115' X 2500 GPM Wells Cased To 80 Feet
4 - 24" X 100' X 4900 GPM Wells Cased To 35 Feet
2 - 24" X 100' X 7500 GPM Wells Cased To 50 Feet
1 - 24" X 70' X 3470 GPM Well Cased To 35 Feet
1 - 18" X 65' X 1500 GPM Well Cased To 50 Feet
1 - 12" X 35' X 800 GPM Well Cased To 30 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 42 Feet
6 - 42" X 107' X 7000 GPM Wells Cased To 66 Feet
1 - 18" X 55' X 1500 GPM Well Cased To 45 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 60 Feet
2 - 24" X 70' X 6945 GPM Wells Cased To 35 Feet
1 - 16" X 50' X 1600 GPM Well Cased To 40 Feet
4 - 24" X 108' X 8300 GPM Wells Cased To 50 Feet
2 - 12" X 40' X 1600 GPM Wells Cased To 35 Feet
1 - 16" X 100' X 7500 GPM Well Cased To 40 Feet
3 - 48" X 88' X 7500 GPM Wells Cased To 33 Feet
6 - 17" X 1490' X 1400 GPM Wells Cased To 1080 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased To 46 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 760 Feet
1 - 30" X 1250' X 3500 GPM Well Cased To 845 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
6 - 20" X 100' X 4900 GPM Wells Cased To 40 Feet
1 - 18" X 50' X 500 GPM Well Cased To 40 Feet
1 - 12" X 40' X 800 GPM Well Cased To 35 Feet
1 - 18" X 66' X 1500 GPM Well Cased To 53 Feet
1 - 42" X 107' X 7000 GPM Well Cased To 69 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 60 Feet
1 - 42" X 68' X 8500 GPM Well Cased To 54 Feet

7 - 16" X 100' X 4170 GPM Wells Cased To 40 Feet
1 - 42" X 68' X 10000 GPM Well Cased To 54 Feet
1 - 14" X 115' X 3800 GPM Well Cased To 80 Feet
1 - 30" X 1300' X 3500 GPM Well Cased To 850 Feet
1 - 17" X 1490' X 1400 GPM Well Cased To 1150 Feet
1 - 6" X 30' X 400 GPM Well Cased To 25 Feet
1 - 30" X 1200' X 3500 GPM Well Cased To 765 Feet
4 - 40" X 100' X 10420 GPM Wells Cased To 57 Feet
1 - 30" X 115' X 4170 GPM Well Cased To 80 Feet
1 - 30" X 115' X 2500 GPM Well Cased To 80 Feet
1 - 12" X 35' X 1200 GPM Well Cased To 30 Feet
10 - 48" X 80' X 10420 GPM Wells Cased To 46 Feet

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: SFWMD, Regulatory Support Division, MSC 9611, 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.
    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

19. The Permittee shall provide annual status reports to the District that summarize the ASR cycle testing activities. The first report shall be submitted by:
    March 15, 2013

20. 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.

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.

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. Every ten years from the date of permit issuance, the permittee shall submit a water use compliance report for review and approval by District Staff, which addresses the following:

    1. The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, 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.

    2. A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation 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 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.

    3. Summary of the current and previous nine 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.

    4. Information demonstrating that the conditions for issuance of the permit are being complied with, pursuant to Limiting Condition # 51 and Section 373.236, F.S.

    5. Updates or amendments to the County's reuse plan.

24. In order to promote use of alternative water supplies, pumpage from Floridan aquifer wells and from those Biscayne aquifer wells whose use is offset by reclaimed water will be conducted 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.

25. 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 22. 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.

26. 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.

27. Permittee shall implement the wellfield operating plan described in District staff report prepared in support of recommendation for permit issuance.
See Exhibit 10

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

29. 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

30. No more than 7,993 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 39 and 41.

31. No more than 39,931 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 39 and 41.

32. No more than 67,999 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 39 and 41.

33. No more than 1,095 MGY shall be withdrawn during any 12 month consecutive period from the South Miami Heights Wellfield.

34. No more than 1,752 MGY shall be withdrawn during any 12 month consecutive period from the combined Everglades Labor Camp and Newton wellfields.

35. No more than 1,571 MGY shall be withdrawn during any 12 month consecutive period from the combined Elevated Tank, Leisure City and Naranja wellfields.

36. The Permittee shall continue to submit monitoring data in accordance with the approved water level monitoring program for this project.
The existing monitoring program is described in Exhibits 30 and 32B.

37. The Permittee shall continue to submit monitoring data in accordance with the approved saline water intrusion monitoring program for this project.
See exhibits 28A and 32B for a list of monitor wells and and required sampling schedule.
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.

38. Within six months of permit issuance, an executed large user water agreement with the City of Hialeah shall be submitted to the District. In the event that the final agreement is for volumes less than those used in the formulation of the allocations in this permit, the allocations shall be reduced through a letter modification.

39. The permittee shall implement a minimum of 170 MGD of reuse projects as set forth in Projects 1-8 of Exhibit 14 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 14. Any changes to Exhibit 14 must be reviewed and approved by the District in consultation with the FDEP 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 FDEP rules governing the treatment and use of reclaimed water in Chapter 62-610, F.A.C.

40. The permittee will develop alternative water supplies in accordance with the schedules described in Exhibit 13.

The permittee will provide annual updates of the status of all alternative water supply projects (per the timeframes contained in Limiting Condition 50). The status report shall include work completed to date, expenditures and any anticipated changes in the timelines.

41. In the event that a milestone specified in the alternative water supply schedule and plan contained in Exhibit 13 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 SFWMD consumptive use permitting 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.

42. 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 14. The first annual update is due March 15, 2013.

43. Reuse Project numbers 5 and 6 in Exhibit 14 for wellfield recharge, which must be in place and operating prior to any additional withdrawals from the wellfield over the base condition water use as identified in Exhibit 10.

44. July 1, 2013, the Permittee shall submit a report for District review and approval identifying the location, treatment, timing and volume for Reuse Projects 5 & 6 on Exhibit 14 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.

45. For Reuse Project number 4 of Exhibit 14 for rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 3.2.3.2 of the Basis of Review for Water Use, of this project on or before January 15, 2014. 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, 2014, 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, 2014.

46. The permittee may request temporary authorization from the District to capture and store stormwater via withdrawals from the permitted Biscayne aquifer production wells, for storage within the Floridan aquifer system consistent with their FDEP 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.

47. 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.

48. 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 is contained in Exhibit 18. 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.

49. 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 International Water Association / American Water Works Association (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 April 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 17).

    In the event that the water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent, 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.

50. 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 April 15th of the following year.

51. 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.

52. 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 35.

Permit No. 13-00017-W
Application No. 110511-6
Miami-Dade County

S-/T53S/R41E
S-/T54S/R39E
S-/T54S/R40E
S-/T54S/R41E
S-/T54S/R42E
S-/T55S/R39E
S-/T55S/R40E
S-/T56S/R38E
S-/T56S/R39E
S-/T57S/R38E
S-/T57S/R39E
S-/T57S/R40E

NOTICE OF RIGHTS

As required by Sections 120.569(1), and 120.60(3), Fla. Stat., following is notice of the opportunities which may be available for administrative hearing or judicial review when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Not all the legal proceedings detailed below may be an applicable or appropriate remedy. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (SFWMD or District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Fla. Stat. Persons seeking a hearing on a District decision which does or may determine their substantial interests shall file a petition for hearing with the District Clerk within 21 days of receipt of written notice of the decision, unless one of the following shorter time periods apply: 1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Fla. Stat.; or 2) within 14 days of service of an Administrative Order pursuant to Subsection 373.119(1), Fla. Stat. "Receipt of written notice of agency decision" means receipt of either written notice through mail, or electronic mail, or posting that the District has or intends to take final agency action, or publication of notice that the District has or intends to take final agency action. Any person who receives written notice of a SFWMD decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

Filing Instructions

The Petition must be filed with the Office of the District Clerk of the SFWMD. Filings with the District Clerk may be made by mail, hand-delivery or facsimile. **Filings by e-mail will not be accepted.** Any person wishing to receive a clerked copy with the date and time stamped must provide an additional copy. A petition for administrative hearing is deemed filed upon receipt during normal business hours by the District Clerk at SFWMD headquarters in West Palm Beach, Florida. Any document received by the office of the SFWMD Clerk after 5:00 p.m. shall be filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the SFWMD Clerk, P.O. Box 24680, West Palm Beach, Florida 33416.
- Filings by hand-delivery must be delivered to the Office of the SFWMD Clerk. **Delivery of a petition to the SFWMD's security desk does not constitute filing. To ensure proper filing, it will be necessary to request the SFWMD's security officer to contact the Clerk's office.** An employee of the SFWMD's Clerk's office will receive and file the petition.
- Filings by facsimile must be transmitted to the SFWMD Clerk's Office at (561) 682-6010. Pursuant to Subsections 28-106.104(7), (8) and (9), Fla. Admin. Code, a party who files a document by facsimile represents that the original physically signed document will be retained by that party for the duration of that proceeding and of any subsequent appeal or subsequent proceeding in that cause. Any party who elects to file any document by facsimile shall be responsible for any delay, disruption, or interruption of the electronic signals and accepts the full risk that the document may not be properly filed with the clerk as a result. The filing date for a document filed by facsimile shall be the date the SFWMD Clerk receives the complete document.

Initiation of an Administrative Hearing

Pursuant to Rules 28-106.201 and 28-106.301, Fla. Admin. Code, initiation of an administrative hearing shall be made by written petition to the SFWMD in legible form and on 8 and 1/2 by 11 inch white paper. All petitions shall contain:

1. Identification of the action being contested, including the permit number, application number, District file number or any other SFWMD identification number, if known.
2. The name, address and telephone number of the petitioner and petitioner's representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency determination.
4. A statement of when and how the petitioner received notice of the SFWMD's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the SFWMD's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the SFWMD's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the SFWMD to take with respect to the SFWMD's proposed action.

A person may file a request for an extension of time for filing a petition. The SFWMD may, for good cause, grant the request. Requests for extension of time must be filed with the SFWMD prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and that the SFWMD and any other parties agree to or oppose the extension. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

If the District takes action with substantially different impacts on water resources from the notice of intended agency decision, the persons who may be substantially affected shall have an additional point of entry pursuant to Rule 28-106.111, Fla. Admin. Code, unless otherwise provided by law.

Mediation

The procedures for pursuing mediation are set forth in Section 120.573, Fla. Stat., and Rules 28-106.111 and 28-106.401-.405, Fla. Admin. Code. The SFWMD is not proposing mediation for this agency action under Section 120.573, Fla. Stat., at this time.

RIGHT TO SEEK JUDICIAL REVIEW

Pursuant to Sections 120.60(3) and 120.68, Fla. Stat., a party who is adversely affected by final SFWMD action may seek judicial review of the SFWMD's final decision by filing a notice of appeal pursuant to Florida Rule of Appellate Procedure 9.110 in the Fourth District Court of Appeal or in the appellate district where a party resides and filing a second copy of the notice with the SFWMD Clerk within 30 days of rendering of the final SFWMD action.

APPENDIX I

MDWASD June 2014 Modification request to the 20-year Water Use Permit

MIAMI-DADE COUNTY

Carlos A. Gimenez, Mayor

Miami-Dade Water and Sewer Department
P.O. Box 330316 • 3071 SW 38th Avenue
Miami, Florida 33233-0316
T 305-665-7471

miamidade.gov

June 20, 2014

Certified Mail 7001 0360 0001 6783 7652
Electronic Correspondence
CCN: 58468
File Nos. 8DC.19.2

Ms. Maria C. Clemente, P.E.
Bureau Chief, Water Use
South Florida Water Management District
P.O. Box 24680
West Palm Beach, FL 33416-4680
Email: mclement@sfwmd.gov

Subject: Application for Modification and Extension of Water Use Permit No. 13-00017-W

Dear Ms. Clemente:

In accordance with limiting condition 2 and 41 of the subject water use permit, enclosed is a completed application form and check number 00551601 in the amount of $12,500.00 for processing the proposed modifications.

The proposed modifications and extension to the current permit are a result of revised population projections based on the 2010 Census and the continued successful implementation of our County's Water Conservation Plan. The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted, and this demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly near-term alternative water supply projects that are longer required or needed.

The revised projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013.

Please contact me at 786-552-8571, or Ms. Bertha Goldenberg, P.E. at 786-552-8120 if there are any questions regarding this application.

Sincerely,

Juan Carlos Arteaga, AIA
Deputy Director

Enclosures: Check Number 00551601 in the Amount of $12,500.00
Completed Water Use Permit Application Form 0645-W01

ec: John A. Lockwood, P.G. jlockwo@sfwmd.gov

L14063SFWMD-WUP-Mod

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

WATER USE PERMIT APPLICATION FORM (RC-1A, RC-1W, RC-1G)
For all water uses EXCEPT dewatering for mining or construction

General and Specific Authority, Chapter 373, State Statutes, 40E-20 Florida Administrative Code and Basis of Review, Vol III, South Florida Water Management District www.sfwmd.gov/ePermitting.

A. GENERAL INFORMATION

1. *Name of Owner, Responsible Entity, etc.*

Name: Juan Carlos Arteaga, AIA **Project Name:** Modification and Extension of Permit 13-00017-W
Address: P.O. Box 330316
City: Miami **County:** Miami-Dade **State:** FL **ZIP:** 33233-0316
Phone: 786-552-8571 **Cell Phone:** _____ **Fax:** _____ **E-mail:** JCARTEAGA@miamidade.gov

2. *Proof of Ownership is required, in the form of a Deed, tax certificate, lease, or Articles of Incorporation*

ATTACH Proof of Ownership to this Form – Previously Submitted

3. *Name of Engineer, Contractor or Other.*

Name: Bertha M. Goldenberg **Firm:** Miami-Dade Water and Sewer Department
Address: P.O. Box 330316
City: Miami **County:** Miami-Dade **State:** FL **ZIP:** 33233-0316
Phone: 786-552-8120 **Cell Phone:** 305-903-9807 **Fax:** 786-552-8640 **E-mail:** BMG@miamidade.gov

4. *If the above person(s) filling out this form will sign this Application on behalf of the owner, a letter of authorization signed by the owner, stating they are acting on behalf of the owner, must be submitted.*

ATTACH Letter of Authorization to this form – Not Applicable

5. *Is this a* **New Permit** _____ ~~**Renewal**~~/**Modification**/~~**Expired**~~ _____ **Permit No.:** 13-00017-W

6. *Amount of water applied for:* 386.07 million gallons per day (24.63 MGD less than 410.70 MGD in permit)

7. *Has a Surface Water Management Permit or Environmental Resource Permit from the District been issued for this Project?* **SWM / ERP Permit No.:** _____
or has a Surface Water Management Permit or Environmental Resource Permit from the District been applied for? **SWM / ERP Application No.:** _____

8. *A fee of* **$12,500** *is required to process this Application. See Chapter 40E-1.607, F.A.C. for fee schedule.*

ATTACH Application fee to this Form – Check Number 00551601 in the Amount of $12,500.00

9. *Please Identify any District Staff member you have discussed this Application with:*
Mr. John A. Lockwood, P.G. , Lead Hydrogeologist

B. LOCATION OF THE PROPERTY – Previously Submitted

1. *General Location of the Property/Project* – **Previously Submitted**

County: _____ **City:** _____
Sections _____
Township (s) _____ **Range (s)**_____ **(or Land Grant Name)** _____

2. *It will be necessary to submit two drawings to be used as exhibits for this Permit.*
   a. **Location Map**, ($8^1/_2$ x 11), *showing location of the project in relation to major roads.*
   b. **Site Map**, ($8^1/_2$ x 11) *locating project in relation to adjacent streets, canals and water bodies, and showing property boundaries, buildings, on-site lakes/ponds and the location of pumps and wells.*

ATTACH Location Map and Site Map to this Form – Previously Submitted (Exhibits 1, 2, 3, 4)

sfwmd.gov

C. WATER SOURCE and WATER USE TYPE

Please indicate the source of water.

__X__ **Groundwater from an underground aquifer:**

Aquifer Name (if known): Biscayne and Floridan Aquifers

ATTACH Table A for Wells to this form Previously Submitted (Exhibit 5)

_____ **Surface water:**

___ **Onsite Lake/Pond** ___ **Onsite Ditch/Canal**

___ **Adjacent Lake/Open Water, Name:** _____

___ **Adjacent Canal, Name:** _____

ATTACH Table B for Pumps to this Form Not Applicable

Type of water use (Please check at least one)

___ **Agricultural Irrigation** ___ **Landscape Irrigation** ___ **Golf Course Irrigation**

__X__ **Public Water Supply** ___ **Industrial/Commercial** ___ **Aquaculture**

__X__ **Aquifer Storage/Recovery (ASR)** ___ **Other (Please describe):** _____

D. IRRIGATION WATER USE - **Not Applicable**

1. *Is this permit for irrigation?* **Landscape:** _____ **Golf:** _____ **Agriculture:** _____ **Crop type:** _____
   What is the **Total Project Acreage:** _____ **Irrigated Acreage:** _____

ATTACH Table D for Crop Information to this Form - Not Applicable

2. *Applications for golf or landscape irrigation in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.3.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for golf or landscape irrigation - Not Applicable

E. PUBLIC WATER SUPPLY WATER USE

1. *Is this permit for Public Water Supply?* **Yes**

   Maximum gallons per month needed: 13,117 MG **Average gallons per day:** 386.07MGD (End of 2033)

   Permit Duration requested: 19 **Years** - Requested 386.07MGD (2033) is less than 410.7 MGD (2030)

2. *A map of the service area for the utility, ($8^1/_2$ x 11) showing boundaries of service, water treatment plants, storage facilities, the location of all production and monitor wells is required.*

ATTACH Location Map and Service Area Map to this Form - Previously Submitted

3. *For public water supplies using more than 100,000 gallons per day, applicants must meet criteria and identify the demand for each use/component including number, type and size of service connections; past pumpage, projected population data, future expected pumpage, water treatment method and losses and other specific data as identified in Section 2.1 and 2.6 of the Basis of Review. Tables F (past water use), Table G (projected water use) and Table I (treatment method and losses) must be submitted.*

ATTACH water supply demand computations and Tables F, G and I to this Form - Attached are updated forms Tables F (Exhibit 7) and G (Exhibit 8a and 8b)

4. *For public water supplies using more than 100,000 gallons per day, other necessary information requirements may include if applicable: explanations of per-capita greater than 200 GPD, water supply system interconnections, water received from or distributed to other entities, and aquifer storage and recovery. Please submit Tables H (for per capita use greater than 200 GPD), Table J (ASR), Table K (interconnections), and Table E (water received from or distributed to other entities) if necessary.*

ATTACH, if needed, Tables H, J, K and E to this Form – Updated Table E (Exhibit 11) attached, Table H (Not Applicable), Table J (Not Applicable, pending ASR cycling testing), Table K (Exhibits 12A-C Previously Submitted)

5. *Applications for public water supply in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.6.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for public water supply to this Form - Previously Submitted

F. INDUSTRIAL, COMMERCIAL AND OTHER WATER USES - **Not Applicable**

1. *Is this permit for Industrial/Commercial?* **Nature of the Business:** _____

   _____

   Maximum gallons per month needed: _____

   Average gallons per day needed: _____

2. *Industrial/commercial applicants using more than 100,000 gallons per day must provide information on the water balance for the operation, including all sources of water and losses of water for processes, personal/sanitary needs, treatment losses and unaccounted uses. A flow chart for the water balance should be submitted.*

ATTACH water balance and flow chart to this Form - Not Applicable

3. *For uses other than Irrigation, Public Water Supply, Industrial or Commercial, but excluding mining/dewatering (Air conditioning, pool heating, mitigation, etc.):*

   Describe Water Needs: _____

   Maximum gallons per month needed: _____

   Average gallons per day needed: _____

ATTACH a written explanation and calculations used to determine the amount of water you need - Not Applicable

4. *Applications for industrial, commercial and other water uses in excess of 500,000 gallons per day require a water conservation plan as explained in Section 2.4.1 of the Basis of Review.*

ATTACH, if needed, a water conservation plan for industrial, commercial or other water supply - Not Applicable

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G. ADDITIONAL REQUIREMENTS IF YOU ARE USING MORE THAN 100,000 GALLONS PER DAY

1. *The withdrawal of water must not cause harm to sensitive areas, wetlands or saline water intrusion. It may be necessary to supply modeling to address impacts of the water use.*

ATTACH, if needed, modeling or documentation on environmental impacts to this Form – Previously Submitted

2. *All applicants withdrawing water in proximity to saline surface or ground water, or withdrawing saline water that may come in contact with fresh surface or ground water, are required to develop a saline water monitoring program as described in Section 4.2 of the Basis of Review.*

ATTACH, if needed, a saline water monitoring program – Previously Submitted (Exhibits 27 through 28)

3. *Except for Public Water Supply, reclaimed water must be used when readily available, unless it is not environmentally, technically or economically feasible to do so, as explained in Section 3.2.3 of the Basis of Review.*

ATTACH, if needed, an evaluation of the feasibility of using reclaimed water and a letter from your local utility regarding their availability of reclaimed water to this Form - Not Applicable, Public Water Supply

4. *An aerial photograph of the entire project site is required.*

ATTACH an aerial photograph – Previously Submitted

5. *Section 4.1 of the Basis of Review requires all wells and pumps be equipped with a calibrated meter or other acceptable water use accounting method.*

ATTACH calibration reports of the water use accounting method for each well and pump – Previously Submitted

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H. ATTACHMENTS

Please make sure you have included the following attachments with your Application: **– Previously Submitted**

___ **Proof of Ownership**
___ **Letter of Authorization (where required)**
___ **Location Map**
___ **Site Map**
___ **Table A for Wells – Previously Submitted**
___ **Table B for pumps – Not Applicable**
_X_ **Application Fee – Attached**

*For **Irrigation water use**, also make sure you have included the following attachments:*

___ **Table D for crop information**
___ **Water conservation plan (if needed)**

*For **Public Water Supply water use of more than 100,000 gallons per day**, also make sure you have included the following attachments:*

_X_ **Table F for past water use**
_X_ **Table G for projected water use**
___ **Table H for projected water use greater than 200 gpcd (if needed)**
___ **Water conservation plan (if needed)**
___ **Service Area Map – Previously Submitted**
___ **Table I for treatment method and losses**
___ **Table J for ASR well operations (if needed)**
___ **Table K for interconnections (if needed)**
___ **Table E for water received from or delivered to other entities (if needed)**

*For **Industrial water use of more than 100,000 gallons per day**, also make sure you have included the following attachments:*

____ **Water balance and flow chart**
___ **Water conservation plan (if needed)**

*For **Commercial or other water use** that is not irrigation, public water supply, or industrial, also make sure you have included the following attachments:*

____ **Explanation of how you determined the amount of water you need**
____ **Water conservation plan (if needed)**

Attachments for additional special requirements – **Previously Submitted**

___ **Saline Water Monitoring Plan – Previously Submitted**
___ **Feasibility evaluation or reclaimed water use**
___ **Aerial Photograph**
___ **Letter from reclaimed water utility**
___ **Modeling or documentation of impacts of water use – Previously Submitted**
___ **Reports of calibration of water use accounting method for wells and pumps – Previously Submitted**

I. CERTIFICATION

I hereby certify that, to the best of my knowledge, the total project acreage listed above is owned or controlled by me and encompasses the project referenced in this permit application. In addition, I agree to provide entry to the project site for South Florida Water Management inspectors with proper identification or documents as required by law for the purpose of making analyses of the site. Further, I agree to provide entry to the project site for such inspectors to monitor permitted work if a permit is granted. If I do not use the water for which this permit is issued within two years the permit may be revoked. If this application is not complete within 240 days, it may be denied pursuant to Rule 40E-1.603, Florida Administrative Code.

Juan Carlos Arteaga, AIA
Print: **Name of Owner or Authorized Agent**

Deputy Director
Title

Juan C Arteaga
Signature:

Attachment to Application for Modification and Extension of
Water Use Permit Number 13-00017-W
Miami-Dade County
June 2014

This application is to extend and to make modifications to the water use permit 13-00017-W consistent with the County's most recent projected finished water demands to 2035 as determined with latest lower population projections based on 2010 Census results and historically lower per capita daily finish water use. These reduced projected finish water demands has eliminated the need for several costly alternative water supply projects in their entirety and postponed the need for other alternative water supply projects by several years. The revised projections for the year 2030 are consistent or slightly lower, than the projections in the District's Lower East Coast Water Supply Update, dated October 2013. This application seeks to remove the requirements to complete any costly unnecessary alternative water supply projects from the existing permit and to reschedule the timing and completion of the alternative water supply projected that are needed. Additional revisions to the permit conditions are also sought to reflect annual reporting submittal dates, to allow District staff additional authority in the promotion of alternative water supply use and providing additional water for aquifer recharge and subsequent recovery, and provide clarification. The following revisions to the water use permit 13-00017-W:

LIMITING CONDITION 1
Revise Limiting Condition 1 to read:
This permit shall expire on December 31, 2033.

LIMITING CONDITION 5
Revise Limiting Condition 5 to reflect reduction in annual allocation from 149906 MG (previously projected 2030 demand) to 140916 MG (the currently projected 2033 demand). Other revisions as needed.

LIMITING CONDITION 19
Revise Limiting Condition 19 to read:
The Permittee shall provide annual status reports to the District that summarizes the ASR well cycle testing activities by April 15th each year until the conclusion of ASR well cycle testing.

LIMITING CONDITION 24
MDWASD is requesting that Limiting Condition 24 be deleted. In accordance with the permit, MDWASD is including the use of the Floridan aquifer as an alternative water supply source in the following two locations:

1. The Hialeah Reverse Osmosis Water Treatment Plant (WTP). At this WTP, the construction of the treatment process has been completed, but there are wells pending to be constructed, by April 2015. When all the wells are completed, the plant will be operated at the maximum flow of 10 MGD, in accordance with the operating contract. Therefore, condition 24 is not applicable.
2. The proposed South Miami Heights (SMH) WTP. This SMH program is being developed at this time. At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with our Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate

with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization. The Biscayne allocation is only 11% of the total supply and it is less than the current allocation of 9.1 MGD for the South Dade Water System, which is a 67% reduction in pumpage from the Biscayne.

LIMITING CONDITION 28
Revise Limiting Condition 28 to read:
No more than 15 MGD shall be withdrawn from the West Biscayne aquifer Wellfield on any given day; except when additional withdrawals, consistent with Exhibit 35, are authorized by District staff for West Floridan aquifer recharge.

LIMITING CONDITION 39
Revise Limiting Condition 39 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 40
No revisions to limiting condition 40 required, however a revised Exhibit 13 is being submitted with changes to the alternative water supply projects and development deadlines.

LIMITING CONDITION 41
No revisions to limiting condition 41 required, however a revised Exhibit 13 is being submitted with changes to the alternative water supply projects and development deadlines.

LIMITING CONDITION 42
Delete the last sentence in Limiting Condition 42 and revise the first portion of Limiting Condition 42 to read:
The Permittee shall provide the District with annual updates by April 15th each year…

LIMITING CONDITION 43
Revise Limiting Condition 43 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 44
Revise first sentence in Limiting Condition 44 to read:
The permittee shall update the District on the status of reuse projects included in Exhibit 14 on an annual basis in accordance with Limiting Condition 42.

LIMITING CONDITION 45
Revise Limiting Condition 45 to read:
For rehydration of Biscayne Coastal Wetlands, in consultation with the District, the FDEP and Biscayne Bay National Park, upon completion of the pilot testing program, the parties shall agree on the water quality treatment required and the feasibility, as defined in Section 3.2.3.2 of the Basis of Review for Water Use, of this project on or before August 15, 2014. 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 August 15, 2014, 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 July 15, 2015.

LIMITING CONDITION 48
Revise the last sentence of Limiting Condition 48 to read:
The permittee shall submit an annual report covering water conservation activities during the prior calendar year by April 15 of each year describing water conservation activities for the year including expenditures, projects undertaken and estimated water savings.

LIMITING CONDITION 49
Revise first sentence in Limiting Condition 49 to read:
Permittee shall determine unaccounted-for distribution system losses on a quarterly basis and report the findings on an annual basis (Exhibit 16A). 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 International Water Association / American Water Works Association (IWA / AWWA) water audit methodologies (Exhibit 16B). The permittee shall verify the most recent IWA / AWWA water audit methodologies to be used in each annual report. The annual report shall cover activities during the prior calendar year and be submitted on April 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 17).

In the event that the annual unaccounted-for distribution system losses, as defined by Section 5.2.1.E of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, exceeds 10 percent, 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.

EXHIBITS 1 through 6
No revisions are proposed.

EXHIBIT 7
Remove or replace original Exhibit 7 (Table F) with the revised Exhibit 7 (Table F) to reflect past water usage from 2004 to 2013 and update historical population served based on 2010 census.

EXHIBIT 8
Replace the original Exhibits 8A and 8B (Table G) with updated Exhibits 8A and 8B (Table G) reflecting decreased per capita finished water usage, projected population served, decreased finished water demands, and raw water demands to 2033.

EXHIBIT 9
Replace the original Exhibit 9 with the new Exhibit 9 depicting the historical and projected finish water demands, available supply with proposed alternative water supply ground water facilities to 2035.

EXHIBIT 10
Replace the original Exhibits 10A and 10B with the attached revised Exhibits 10A and 10B to reflect the extension to 2035 and changes in the proposed the Biscayne and Floridan aquifer water supply wells.

EXHIBIT 11
Replace the original Exhibit 11 with updated Exhibit 11.

EXHIBIT 12
No revision is proposed.

EXHIBIT 13
Replace the original Exhibit 13 with the attached revised Exhibit 13 reflecting the proposed changes to the alternative water supply projects and development deadlines.

EXHIBIT 14
Replace the original Exhibit 14 with the attached revised Exhibit 14 reflecting the proposed changes to the reuse projects and deadlines.

EXHIBITS 15 through 37
No revisions are proposed.

Table F (June 2014)
Miami-Dade Water and Sewer Department (MDWASD)
Past Water Use (2004-2013)

1	2	3	4	5	6	7	8	9	10	11	12	13
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 : Aver. Month	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max : Aver. Month	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	135.7	110,388	9,199	9,483.7	1.03	144.6	117,623	9,802	10,252	1.05	1.066
3-year Average (2011-2013)	-	136.9	-	-	-	1.04	145.4	-	-	-	1.05	1.062

EXHIBIT 7

* Source of Population Information: Miami-Dade County (MDC) Planning Department. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010TAZ population projections by the MDC Planning Department, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data, For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE G (June 2014)
MDWASD PROJECTED RAW WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	19	20	21	22	23	24	25	26	27	28	29
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA									RAW WATER AADD (MGD)									
										Biscayne Aquifer[f]						Floridan Aquifer			
										South Dade[g]									
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	AADD Finished Water "SURPLUS" (Col. 18 - Col. 9 - Col. 7)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]	South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening [j,n]	ASR Losses[k]	Total Biscayne Aquifer [f,n]	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
System-Wide																			
2014	2,243,879	136.9	307.19	1.36	0.00	305.83	136.30	2.50	0.00	4.30	4.08	0.00	310.58	0.14	319.10	10.00	0.00	10.00	329.10
2015	2,266,092	136.9	310.23	2.04	0.00	308.19	136.00	3.00	0.00	4.30	4.10	0.00	310.94	0.14	319.48	13.30	0.00	13.30	332.78
2020	2,370,769	136.9	324.56	5.44	0.00	319.12	134.61	3.00	0.00	0.00	*4.10*	3.00	310.23	0.14	313.37	13.30	23.27	36.57	349.94
2025	2,475,446	136.9	338.89	8.84	0.00	330.05	133.33	3.00	0.00	0.00	*4.10*	3.00	321.84	0.14	324.98	13.30	23.27	36.57	361.55
2030	2,580,123	136.9	353.22	9.55	0.00	343.67	133.20	3.00	0.00	0.00	*4.10*	3.00	336.30	0.14	339.44	13.30	23.27	36.57	376.01
2031	2,601,058	136.9	356.08	9.55	0.00	346.53	133.23	3.00	0.00	0.00	*4.10*	3.00	339.34	0.14	342.48	13.30	23.27	36.57	379.05
2032	2,621,994	136.9	358.95	9.55	0.00	349.40	133.26	3.00	0.00	0.00	*4.10*	3.00	342.39	0.14	345.53	13.30	23.27	36.57	382.10
2033	2,642,929	136.9	361.82	9.55	0.00	352.27	133.29	3.00	0.00	0.00	*4.10*	3.00	346.36	0.14	349.50	13.30	23.27	36.57	386.07

MDWASD PROJECTED FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
									South Dade[g]		South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening (j)	Total Biscayne Aquifer (f)	Hialeah RO WTP[f]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]							
System-Wide																	
2014	2,243,879	136.9	307.19	1.36	0.00	305.83	136.30	2.50	4.30	4.08	0.00	292.45	300.83	7.50	0.00	7.50	308.33
2015	2,266,092	136.9	310.23	2.04	0.00	308.19	136.00	3.00	4.30	4.10	0.00	292.79	301.19	10.00	0.00	10.00	311.19
2020	2,370,769	136.9	324.56	5.44	0.00	319.12	134.61	3.00	0.00	*4.10*	2.55	292.12	294.67	10.00	17.45	27.45	322.12
2025	2,475,446	136.9	338.89	8.84	0.00	330.05	133.33	3.00	0.00	*4.10*	2.55	303.05	305.60	10.00	17.45	27.45	333.05
2030	2,580,123	136.9	353.22	9.55	0.00	343.67	133.20	3.00	0.00	*4.10*	2.55	316.67	319.22	10.00	17.45	27.45	346.67
2031	2,601,058	136.9	356.08	9.55	0.00	346.53	133.23	3.00	0.00	*4.10*	2.55	319.53	322.08	10.00	17.45	27.45	349.53
2032	2,621,994	136.9	358.95	9.55	0.00	349.40	133.26	3.00	0.00	*4.10*	2.55	322.40	324.95	10.00	17.45	27.45	352.40
2033	2,642,929	136.9	361.82	9.55	0.00	352.27	133.29	3.00	0.00	*4.10*	2.55	325.27	327.82	10.00	17.45	27.45	355.27

EXHIBIT 8A

TABLE G (June 2014)
MDWASD PROJECTED RAW AND FINISH WATER DEMAND BY SOURCE

Footnotes

(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 136.9 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).

(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Not Used (TBD).

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

(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).

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

(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).

(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.062 : 1.00 (Lime Softening)

(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.

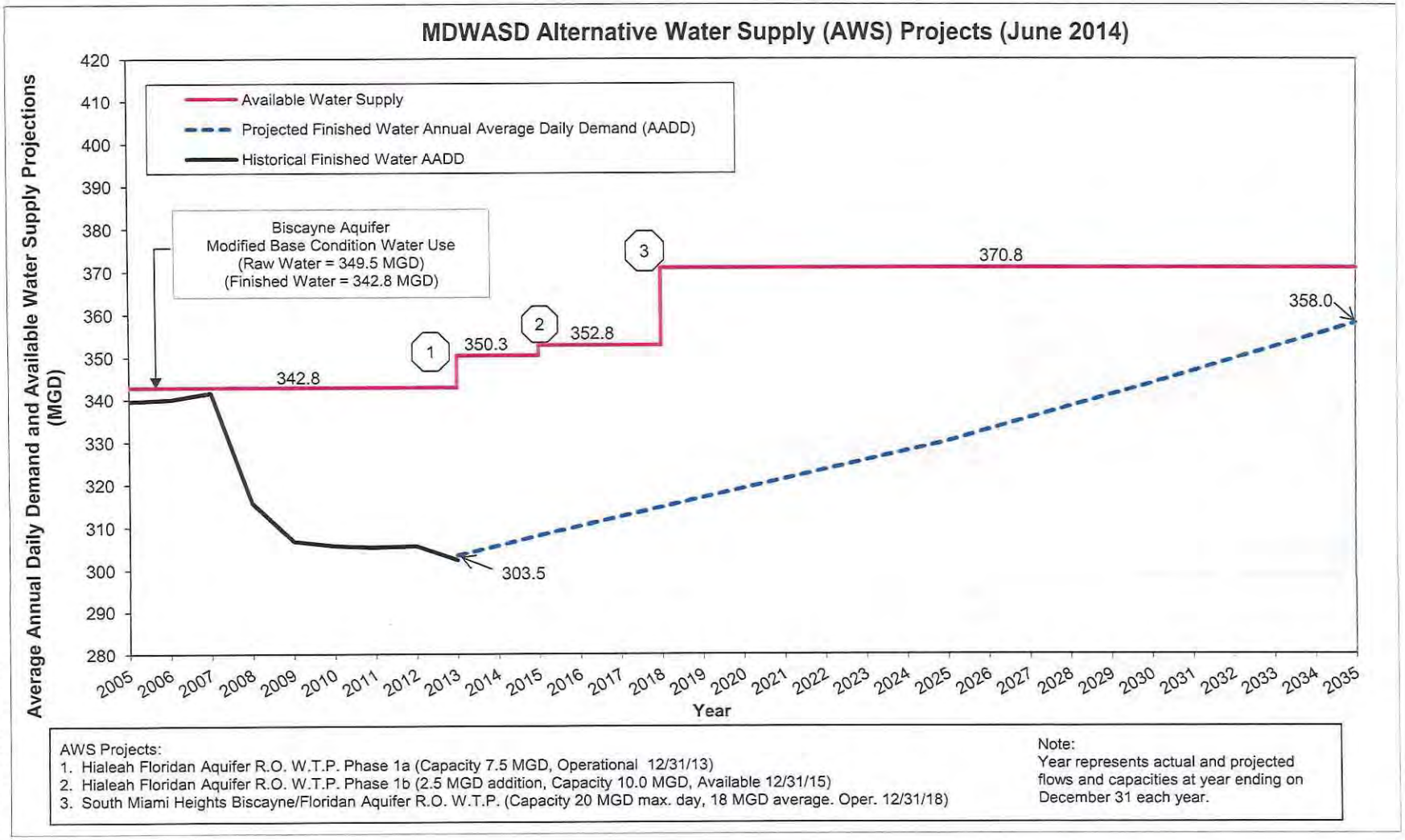
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)

(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.

(n) An additional 0.92 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.

EXHIBIT 8B

EXHIBIT 9



Alternative Water Supply Projects Step Chart June 2014

MDWASD Biscayne Aquifer Wellfields Operation Plan Summary (June 2014)

1	2	3	4		5	6	7	8	9	10	11	12	13
WTP Subarea and Wellfield	Existing Wellfield Data (2014		Historic [b] (Pre 4/1/2006) Base Condition Annual Average Pumpage (MGD)	Revised Base Condition Annual Average Pumpage (MGD)	Individual Wellfield ANNUAL AVERAGE Pumpage Allocation								Remarks
	Design Capacity (mgd)	Number of Wells			2014-2017		2018 - 2025		2026 - 2030		2031 - 2033		
					BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	
Hialeah-Preston [c]													
Hialeah	12.54	3	3.1										
John E. Preston	53.28	7	37.2	70.0	25.550	70.00	25.550	70.00	25.550	70.00	25.550	70.00	Total not to exceed 25.500 BGY
Miami Springs	79.3	20	29.7										
Medley	48.96	4	0										
Northwest [a]	149.35	15	88.7	96.8	35.332	96.80	35.332	96.80	35.332	96.80	35.332	96.80	
Subtotal	**343.43**	**49**	**164.5**	**155.4**	**56.721**	**155.40**	**56.721**	**155.40**	**56.721**	**155.40**	**56.721**	**155.40**	
Alexander Orr [d]													
Alexander Orr	74.40	10	62.0	40.0									
Snapper Creek	40.00	4	20.4	21.9	62.524	171.30	62.524	171.30	62.524	171.30	62.524	171.30	
Southwest	161.20	17	83.8	109.4									
West	32.40	3	15.0	15.0	5.475	15.00	5.475	15.00	5.475	15.00	5.475	15.00	
Subtotal	**308.00**	**34**	**181.2**	**186.3**	**67.999**	**186.30**	**67.999**	**186.30**	**67.999**	**186.30**	**67.999**	**186.30**	
South Dade [e]													
Elevated Tank	4.32	2	1.3	1.3									Drops out when SMH comes on line.
Leisure City	4.18	4	2.9	2.9	1.570	4.30	-	-	-	-	-	-	Turning off at 4.3 mgd resulted in a 2.5 mgd reduction in impact to regional canals, making 2.5 mgd available to SMH wellfield.
Naranja	1.15	1	0.1	0.1									
Everglades Labor Camp [e]	5.04	3	0.7	2.2	1.752	4.80	*1.752*	*4.80*	*1.752*	*4.80*	*1.752*	*4.80*	Goes to standby after SMH comes online in 2018. Subject to limitation of 4.8 mgd (1.752 BGY) and system wide total not-to-exceed allocation.
Newton [e]	4.32	2	2.1	2.6									
Subtotal	**19.01**	**12**	**7.1**	**7.8**	**2.847**	**7.80**	*1.752*	*4.80*	*1.752*	*4.80*	*1.752*	*4.80*	
South Miami Heights [f]													
Former Plant	*4*	*1*	*NA*	*NA*	-	-	1.095	3.00	1.095	3.00	1.095	3.00	Initial 2.5 mgd transfer from shut down of 4.3 mgd at South Dade plus 0.5 mgd additional
Roberta Hunter Park	*6*	*4*	*NA*	*NA*									
Subtotal	***10.00***	***5***			**0.000**	**0.00**	**1.095**	**3.00**	**1.095**	**3.00**	**1.095**	**3.00**	
MDWASD System Total	**680.44**	**100**	**347.0**	**349.5**									
Total Not-To-Exceed System Wide Pumpage			**Annual in BGY (mgd)**		**127.567**	**349.50**	**127.567**	**349.50**	**127.567**	**349.50**	**127.567**	**349.50**	System wide allocation, not less than revised baseline allocation, not the sum of individual wellfield pumpage allocations, and may be more restrictive.

Notes: BG = Billion Gallons; MGD = Million Gallons per Day

(a) Northwest wellfield design capacity at 110 mgd when pumps operate at low speed.

(b) These numbers are based on historical raw water values at the treatment plants for a 12-month running average during the five-year period preceding 4/1/2006 in accordance with SFWMD Water Availability Rule (April 28, 2007). Values for the individual wellfields are approximations.

(c) Base Condition Water Use of the North System, Hialeah-Preston is 164.5 mgd. The base condition impacts of 9.1 mgd for historical water deliveries by MDWASD to City of North Miami Beach were transferred to the City with re-issuance of their permit in July 2007; revising the base condition to 155.4 mgd.

(d) Base Condition Water Use of the Central System, Alexander Orr is 181.2 mgd. It was demonstrated through modeling that transfering 22.0 MGD from Alexander Orr WTP well field to the Southwest and an additional withdrawal of 1.5 MGD at Snapper Creek and 3.6 MGD at Southwest would not cause a net increase in volume or cause a change in timing of surface and groundwater from Everglades water bodies, consistent with Section 3.2.1.E(2) of the BOR; revising the base condition to 214.18 mgd.

(e) The South Dade allocation associated with Elevated Tank, Leisure City, and Naranja is transferred to SMH when the new WTP is planned to begin operation in 2016. Everglades Labor Camp and Newton wellfields are placed in stand by service after the SMHWTP begins planned operations in 2016, with operations limited to minimum amount required to maintain operational readiness and Florida Department of Health clearance. For Everglades Labor Camp and Newton the historical pumpage of 2.8 mgd was increased by 1.5 mgd at Everglades Labor Camp and 0.5 mgd at Newton to 4.8 mgd total, consistent with Section 3.2.1E(2) of the Basis of Review for Water Use Applications within the South Florida Water Management District. Turning off Elevated Tank, Leisure City, and Naranja at 4.3 mgd results in a 2.5 mgd reduction in impact to regional canals, therefore 2.5 mgd is available to transfer to SMH wellfield, plus an additional 0.5 mgd was allowed to account for the reduced treatment efficiency of the proposed membrane softening plant, pursuant to Section 3.2.1E(3)(a).

(f) These proposed facilities are for membrane softening portion of SMH Water Treatment Plant.

EXHIBIT 10A

8/13/2012

Table 4 - MDWASD Floridan Aquifer Wellfields Operation Plan Summary (June 2014) Pumpage by Wellfield

1	2	3	4	5	6	7	8	9	10	11	12
WTP Subarea and Wellfield	Wellfield Data		Individual Wellfield ANNUAL Pumpage / Allocation								Remarks
	Design Capacity (mgd)	Number of Wells	2014 - 2017		2018 - 2025		2026 - 2030		2031 - 2033		
			BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	See Footnote (a)
Hialeah RO WTP [(a)]	20.00	10	4.855	13.30	4.855	13.30	4.855	13.30	4.855	13.30	
Alexander Orr WTP (Use of Floridan Aquifer Wells for ASR) [(b)]											
Southwest Wellfield ASR	10.00	2	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	See Footnote (b)
			1.522	10.08	1.522	10.08	1.522	10.08	1.522	10.08	
West Wellfield ASR	15.00	3	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	
			2.283	15.12	2.283	15.12	2.283	15.12	2.283	15.12	
South Miami Heights WTP (Use of Floridan Aquifer Wells for RO) [(c)]											
South Miami Heights WTP [(c)]	24.00	7	0	0.00	8.494	23.27	8.494	23.27	8.494	23.27	See Footnote (c)
MDWASD System Total	69.00	22									
Total Not-To-Exceed Pumpage	Annual Average		4.805	13.30	13.299	36.57	13.299	36.57	13.299	36.57	

Notes

BG = Billion Gallons; MGD = Million Gallons per Day

(a) New Upper Floridan Aquifer RO WTP - Finish water supply of 10.0 mgd, 7.5 mgd Phase 1a by Dec. 31, 2013, 10.0mgd Phase 1b by Dec. 31, 2015. Initial six (6) Floridan aquifer supply wells completed prior to Dec. 31, 2013; the additional four Floridan aquifer supply wells to becompleted prior to Dec. 31, 2015.

(b) Based on 153 days of storage (indicated as negative withdrawal) and 151 days of recovery (positive withdrawal) per ASR well a year. Excludes initial Cycle and Operational Testing of the ASR Wells and ASR Facility UV Disinfection System Testing (Testing is currently underway at Southwest Wellfield ASR and is pending at West Wellfield ASR).

(c) New Upper Floridan Aquifer RO Treatment at South Miami Heights WTP (Finish water supply of 17.45 mgd by Dec. 31, 2018)

Revised June 2014

EXHIBIT 10B

Wholesale Customer Treated Water Deliveries

Entity	Treatment Plant	Deliveries in Millions gallons per fiscal year					
		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Bal Harbor	Hialeah-Preston	447	466	455	486	430	494
Bay Harbor	Hialeah-Preston	358	329	317	302	310	309
Hialeah	Hialeah-Preston	8081	8110	9103	9598	9121	9429
Hialeah Gardens	Hialeah-Preston	694	695	654	693	591	576
Homestead (1)	Alexander Orr	0	0	0	0	40	151
Indian Creek Village	Hialeah-Preston	133	140	121	133	122	120
Medley	Hialeah-Preston	398	393	400	328	479	516
Miami Beach	Hialeah-Preston	6848	6489	6952	8410	7918	7903
Miami Springs (2)	Hialeah-Preston	771	-	-	-	-	-
North Bay Village	Hialeah-Preston	343	365	395	387	391	415
North Miami	Hialeah-Preston	2123	1502	1175	1331	1374	1655
North Miami Beach (3)	Hialeah-Preston	1013	107	100	-	-	-
Opa-Locka	Hialeah-Preston	909	845	788	887	876	876
Surfside	Hialeah-Preston	327	343	328	317	312	299
Virginia Gardens	Hialeah-Preston	63	100	98	91	93	95
West Miami	Alexander Orr	266	290	293	275	292	236
Water Received from Others		676	386	145	179	152	172

(1) Homestead usage of water is limited to an as needed basis. Their usage is not consistent to that of a wholesale customer.
(2) The City of Miami Springs water system was purchased by WASD and beginning fiscal year 2009, was no longer a wholesale customer. WASD is now providing direct services to customers.
(3) North Miami Beach constructed their own water plant and beginning fiscal year 2009, has not had the need to purchase significant amounts of water.
* Volumes for North Miami Beach reflect total delivered minus water passed thru for Aventura.

EXHIBIT 11
June 2014

Alternative Water Supply Project Development Deadlines Tied to Increased Withdrawal Above the Base Condition Water Use

Project / Milestone	Average Finish Water daily flow	Milestone Completion Date
Hialeah Floridan Aquifer R.O. WTP, Phase 1-a, 10.0 mgd WTP and initial 6 Floridan aquifer supply wells. (7.5 mgd, limited by water supply)	(7.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		Completed
Hialeah Floridan Aquifer R.O. WTP, Phase 1-b, additional 4 Floridan aquifer supply wells. (10.0 mgd, maximum treatment capacity)	(2.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		12/31/2015
South Miami Heights WTP (R.O. portion)	(17.45 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2015
• Turnover / Project Completion		12/31/2018

EXHIBIT 13

Revised June 2014

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) **4.44 MGD**	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) **7.84 MGD**	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) **4.17 MGD**	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	North District WWTP **9.2 MGD**	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP **9.2 MGD**	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant **9.2 MGD**	9.2 MGD		Dec 31, 2025
7.	South District WWTP **90 MGD**	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.5 MGD			Dec 31, 2025

EXHIBIT 14

June 2014

APPENDIX J

MDWASD September 19, 2014 Response to Request for Information for the Water Use Permit Modification

MIAMI-DADE COUNTY

Carlos A. Gimenez, Mayor

Miami-Dade Water and Sewer Department
P.O. Box 330316 • 3071 SW 38th Avenue
Miami, Florida 33233-0316
T 305-665-7471

miamidade.gov

September 19, 2014

Electronic Submittal via ePermitting
CCN: 58724
File Nos. 8DC.19.2

Mr. Jonathan E. Shaw, P.G.
Section Leader, Water Use Bureau
South Florida Water Management District
P.O. Box 24680
West Palm Beach, FL 33416-4680
Email: jshaw@sfwmd.gov

Subject: Response to Request For Information – Advisory Comments, Miami-Dade County Water and Sewer Department, Water Use Permit Application No. 140627-12, Permit No. 13-00017-W

Dear Mr. Shaw:

Attached as requested are the responses to the July 25, 2014 request for additional information.

Please contact me at 786-552-8571, or Ms. Bertha M. Goldenberg, P.E. at 786-552-8120 or Mr. Richard M. O'Rourke, P.E. at 786-552-8123 if there are any questions regarding the responses.

Sincerely,

Juan Carlos Arteaga, AIA
Deputy Director

Attachment

ec: John A. Lockwood, P.G. jlockwo@sfwmd.gov

Delivering Excellence Every Day

Response to Request for Additional Information – Advisory Comments
Water Use Permit Application No. 140627-12
Water Use Permit Number 13-00017-W
Miami-Dade County
September 19, 2014

The following is the additional and revised information submitted in response to the request for additional information items and the advisory comments in the July 25, 2014 in support of the subject application:

Item 1. For the requested modification to Limiting Condition 28, please provide a description of the conditions and typical operating plan when withdrawals would exceed 15 million gallons per day and how the proposed operating plan is consistent with Exhibit 35. Please be advised that any increase in withdrawals over 15 million gallons per day will require a hydrogeologic evaluation of potential impacts to sensitive environmental features (Section 2.2.2 of the Applicants Handbook for Water Use Permit Applications [AH]):

LIMITING CONDITION 28
MDWASD requests no change to Limiting Condition 28 at this time.

Item 2. The requested modification to Limiting Condition 49 proposes to change the wording in the second paragraph from "In the event that water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent... " to "In the event that water losses, as defined by Section 5.2.1.E of the Basis of Review ... " This section of the Basis of Review (BOR) refers to maintaining an accurate flow meter at the intake of the water treatment plant.

You may be aware that the District is now using the Applicant's Handbook, dated July 16, 2014. Please indicate which section of the AH you are referring to and any proposed changes to the water loss reporting resulting from the requested change. Please note that the District would prefer all public water supply entities to report losses defined by the AWWA method (Section 2.3.2.F.2.c, of the AH).

LIMITING CONDITION 49
MDWASD notes the change from the Basis of Review to the Applicant's Handbook for Water Use Permit Applications. MDWASD requests no change to the first paragraph of Limiting Condition 49. MDWASD requests that the first sentence of the second paragraph of Limiting Condition 49 be revised to read:

In the event that the annual unaccounted-for distribution system losses, as defined by Section 2.3.2.F.2.c, of the Applicants Handbook for Water Use Permit Applications [AH], exceeds 10 percent, 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.

Item 3. Regarding the proposed changes to Limiting Condition 45, please provide a more detailed schedule (i.e. scheduled meetings, progress reports) of the proposed process for the development of an alternate reuse project in the event the parties do not reach agreement on the feasibility of the Biscayne Bay Coastal Wetlands project by August 15, 2014 (Section 2.2.4 of the AH).

MDWASD received an extension of time to October 15, 2014 on August 15, 2014 on Condition 45 regarding the rehydration of coastal wetlands so that MDWASD can clarify with the District on how additional wastewater reclamation and reuse that is unrelated to the withdrawals being authorized in the water use permit should best be addressed within the a consumptive water use permit. MDWASD thinks there may be some more cost-effective options for excess stormwater reuse utilizing ASR that could be helpful overall to water management and could provide dry season rehydration to the coastal wetlands and reduce dry season stress on the Everglades by shifting some drinking water demands to ASR reserves during the dry season.

LIMITING CONDITION 45
Revise Limiting Condition 45 as to be determined by subsequent discussions following MDWASD response to Item 3.

ADDITIONAL CORRECTIONS, REVISIONS, AND UPDATES TO EXHIBITS

CORRECTED EXHIBIT 7
A corrected Exhibit 7 (Table F) is attached reflecting past water usage from 2004 to 2013 (with 2013 use correction and updated per capita use) and the update historical population served based on 2010 census.

UPDATED EXHIBIT 8
An updated Exhibits 8A and 8B (Table G) is attached reflecting a 137.2 gallons per capita day finished water usage, projected population served, decreased finished water demands, and raw water demands to the year 2033.

NEW EXHIBIT 9
Attached is a new Exhibit 9 showing historical and projected finish water demands, available supply with the revised schedule to the proposed ground water facilities alternative water supply projects to the year 2035.

REVISED EXHIBIT 10
Attached is a new Exhibit 10B reflecting changes in the alternative water supply projects schedule on Biscayne and Floridan aquifer water supply well operations.

NEW EXHIBIT 13
Attached is a new Exhibit 13 reflecting proposed changes to the alternative water supply projects and development schedule.

EXHIBIT 14
Replace the original Exhibit 14 with the attached revised Exhibit 14 reflecting proposed changes to the development of wastewater reclamation reuse projects and schedules.

Table F (September 2014)
Miami-Dade Water and Sewer Department (MDWASD)
Past Water Use (2004-2013)

1	2	3	4	5	6	7	8	9	10	11	12	13
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 : Aver. Month	Per Capita Usage (gpcd)	Total Annual Use (MG)	Average Month Use (MG)	Max Month Use (MG)	Ratio Max : Aver. Month	
TOTAL MDWASD WATER SYSTEM SERVICE AREA **												
2004	2,090,099	162.5	124,301	10,358	10,861.1	1.05	165.6	126,685	10,557	11,063	1.05	1.019
2005	2,101,772	161.8	124,098	10,342	10,734.8	1.04	165.1	126,670	10,556	11,031	1.04	1.021
2006	2,113,445	161.6	124,677	10,390	10,988.6	1.06	164.7	127,019	10,585	11,170	1.06	1.019
2007	2,125,118	150.3	116,602	9,717	10,485.4	1.08	151.6	117,585	9,799	10,648	1.09	1.008
2008	2,136,791	138.1	108,029	9,002	9,583.0	1.06	149.4	116,820	9,735	10,508	1.08	1.081
2009	2,148,464	142.3	111,627	9,302	9,662.7	1.04	151.2	118,575	9,881	10,550	1.07	1.062
2010	2,160,138	141.4	111,453	9,288	9,700.0	1.04	151.0	119,056	9,921	10,346	1.04	1.068
2011	2,181,073	140.2	111,585	9,299	9,597.6	1.03	149.2	118,768	9,897	10,273	1.04	1.064
2012	2,202,008	134.8	108,626	9,052	9,693.9	1.07	142.5	114,807	9,567	10,223	1.07	1.057
2013	2,222,944	136.5	111,052	9,254	9,483.7	1.02	144.6	117,623	9,802	10,252	1.05	1.059
3-year Average (2011-2013)	-	137.2	-	-	-	1.04	145.4	-	-	-	1.05	1.060

EXHIBIT 7

* Source of Population Information: Miami-Dade County (MDC) Planning Department. Historic Population 2001 to 2009 adjusted (downward) based on, and 2010 to 2013 represents the 2010 TAZ population projections by the MDC Planning Department, based on 2010 Census.

** For 2004 - 2007 from MDWASD Raw & Finished Water Historical Data, For 2008 - 2013 from MDWASD reports to SFWMD of Water Treatment Plant Influent & Effluent Flow Meter Flows

(a) Raw-to-finished water ratio is 1.06. MDWASD is improving its raw water metering/accounting system.

TABLE G (September 2014)
MDWASD PROJECTED RAW WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	19	20	21	22	23	24	25	26	27	28	29
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA									RAW WATER AADD (MGD)									
										Biscayne Aquifer[f]						Floridan Aquifer			
										South Dade[g]									
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	AADD Finished Water "SURPLUS" (Col. 18 - Col. 3 - Col. 7)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]	South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening [j,n]	ASR Losses[k]	Total Biscayne Aquifer [f,n]	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
System-Wide																			
2014	2,243,879	137.2	307.79	1.36	0.00	306.43	136.56	2.50	0.00	4.30	4.08	0.00	310.63	0.14	319.15	10.00	0.00	10.00	329.15
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00	0.00	4.30	4.10	0.00	311.00	0.14	319.54	13.30	0.00	13.30	332.84
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00	0.00	0.00	*4.10*	3.00	315.63	0.14	318.77	13.30	16.60	29.90	348.67
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00	0.00	0.00	*4.10*	3.00	327.24	0.14	330.38	13.30	16.60	29.90	360.28
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00	0.00	0.00	*4.10*	3.00	341.71	0.14	344.85	13.30	16.60	29.90	374.75
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00	0.00	0.00	*4.10*	3.00	339.45	0.14	342.59	13.30	23.27	36.57	379.16
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00	0.00	0.00	*4.10*	3.00	342.50	0.14	345.64	13.30	23.27	36.57	382.21
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00	0.00	0.00	*4.10*	3.00	346.36	0.14	349.50	13.30	23.27	36.57	386.07

MDWASD PROJECTED FINISHED WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PROJECTIONS (2013) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)								
									Biscayne Aquifer					Floridan Aquifer			
									South Dade[g]								
Year	Population[a]	Finished Water Use (gpcd)	AADD Finished Water Use[b] (MGD)	Water Conservation[c] (MGD) Credit	Reuse/ Reclaimed Water[d] (MGD) Credit	Adjusted Finished Water Demand[e] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	Elevated Tank/ Leisure City/ Naranja	Everglades Labor Camp/ Newton[h]	South Miami Heights (SMH) Membrane Softening WTP[i,m]	Hialeah-Preston/ Alexander-Orr Lime Softening [j]	Total Biscayne Aquifer [f]	Hialeah RO WTP[l]	South Miami Heights (SMH) RO WTP[m]	Total Floridan Aquifer	Total All Sources
System-Wide																	
2014	2,243,879	137.2	307.79	1.36	0.00	306.43	136.56	2.50	4.30	4.08	0.00	293.05	301.43	7.50	0.00	7.50	308.93
2015	2,266,092	137.2	310.84	2.04	0.00	308.80	136.27	3.00	4.30	4.10	0.00	293.40	301.80	10.00	0.00	10.00	311.80
2020	2,370,769	137.2	325.20	5.44	0.00	319.76	134.88	3.00	0.00	*4.10*	2.55	297.76	300.31	10.00	12.45	22.45	322.76
2025	2,475,446	137.2	339.56	8.84	0.00	330.72	133.60	3.00	0.00	*4.10*	2.55	308.72	311.27	10.00	12.45	22.45	333.72
2030	2,580,123	137.2	353.92	9.55	0.00	344.37	133.47	3.00	0.00	*4.10*	2.55	322.37	324.92	10.00	12.45	22.45	347.37
2031	2,601,058	137.2	356.79	9.55	0.00	347.24	133.50	3.00	0.00	*4.10*	2.55	320.24	322.79	10.00	17.45	27.45	350.24
2032	2,621,994	137.2	359.66	9.55	0.00	350.11	133.53	3.00	0.00	*4.10*	2.55	323.11	325.66	10.00	17.45	27.45	353.11
2033	2,642,929	137.2	362.53	9.55	0.00	352.98	133.56	3.00	0.00	*4.10*	2.55	325.98	328.53	10.00	17.45	27.45	355.98

EXHIBIT 8A

TABLE 3 (September 2014)
MDWASD PROJECTED RAW AND FINISH WATER DEMAND BY SOURCE

Footnotes

(a) Population Served represents most recent represents the 2010TAZ population projections by the MDC Planning Department.

(b) Annual Average Daily Demand (AADD) Finished Water Projections between 2014 and 2035 assume 137.2 gpcd (a decrease from 145.4 gpcd) total water system demand prior to application of credits (e.g. conservation).

(c) WASD has implemented a 20-year water use efficiency plan and is experiencing reductions in per capita water consumption. Water Conservation projections were revised based on the 2010 Annual Water Conservation Plan Conserve Florida Report (March 2011). Real losses in non-revenue water (e.g. unaccounted-for-water) are assumed to remain at less than 10%. The conservation amounts experienced through 2010 (6.54 MGD) were deducted from the 20-year conservation amount in the Conserve Florida Report and the remaining conservation amounts were distributed for the balance of the 20-year period (2011-2027).

(d) Net Used (TBD).

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

(f) The Modified Base condition raw water use (349.5 mgd) represents values agreed to by SFWMD and MDWASD and demonstrated by modeling to not cause a net increase in water from the regional canal system. Biscayne Aquifer base condition raw water use allocation of 349.5 mgd (South Dade at 7.1 mgd, North and South at 342.4 mgd) equates to 342.8 mgd of finished water annual average daily demand (AADD).

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

(h) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(i) Assumes withdrawals from Elevated Tank, Leisure City, Naranja, Caribbean Park, Former Plant, and Roberta Hunter Park are consolidated. Biscayne Aquifer supplied Membrane Softening (Raw : Finished) Ratio = 1.17 : 1.00 (85% Recovery).

(j) Hialeah-Preston / Alexander-Orr (Raw : Finished) Ratio = 1.060 : 1.00 (Lime Softening)

(k) The values are based on initial cycle testing of the ASR well facilities and the projected seasonal operations of the ASR well facilities at full design capacities with the storing of Biscayne aquifer water during the wet weather months of June through October and the recovery of the stored Biscayne aquifer water during the dry weather months of December through April, assuming an ultimate storage loss of 1.31%.

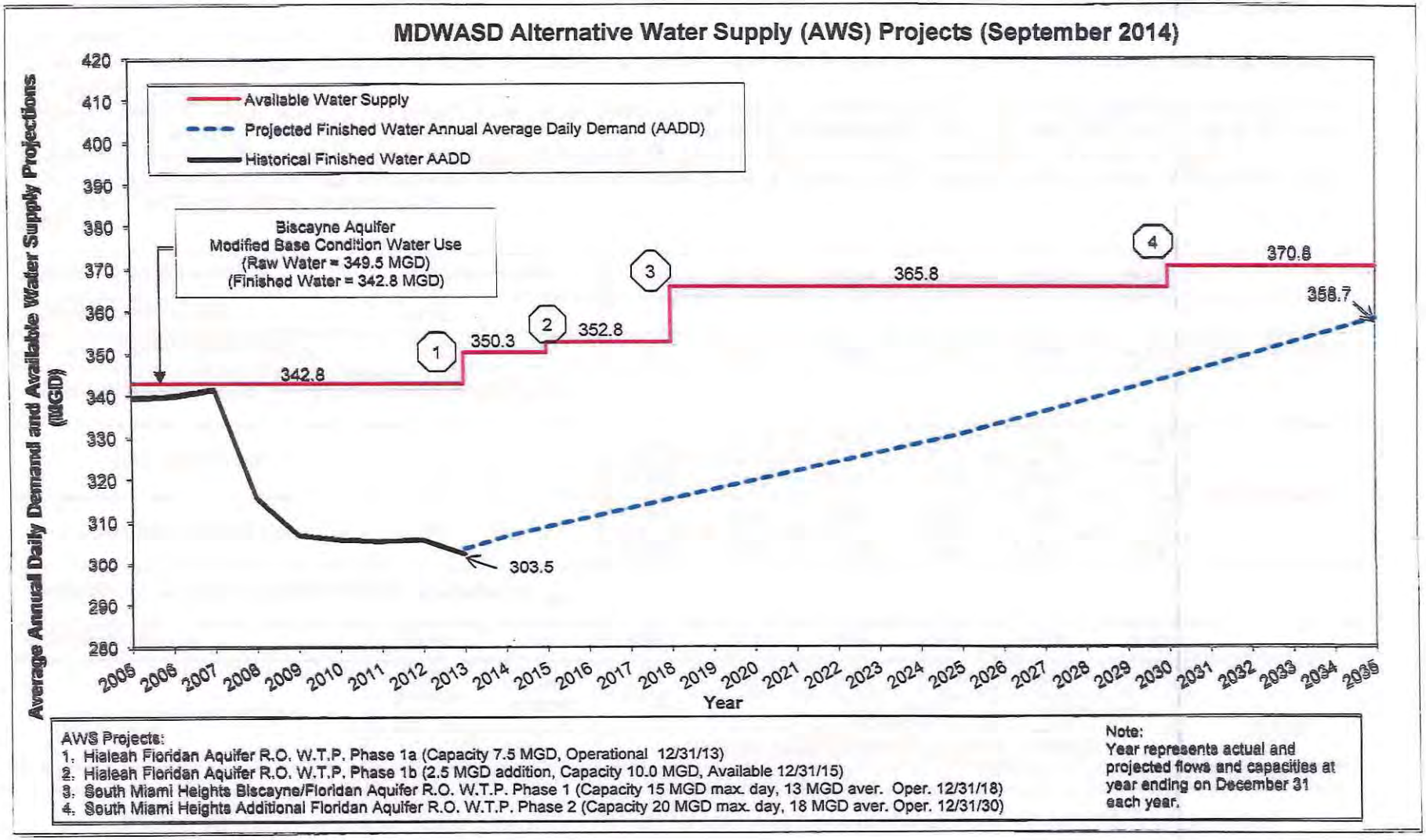
(l) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.333 : 1.00 (75% recovery)

(m) At an ultimate 20 mgd plant operating capacity, the raw water withdrawal would be 3.00 MGD from the Biscayne and 23.27 MGD from the Floridan in accordance with the Wellfield Operation Plan. In order to maintain operational flexibility and protect the nanofiltration membranes (Biscayne supply), MDWASD is requesting that the WTP be allowed to operate with up to a constant supply of 3.0 MGD from the Biscayne aquifer and the rest, to meet demand, be provided from the Floridan aquifer. The full use of the small Biscayne aquifer allocation at SMH supplemented by Floridan aquifer water will allow a blended finished water product that is expected to be lower in sodium and chloride, which will be beneficial to customers on low sodium diets, and more will require less chemical addition for product water stabilization.

(n) An additional 0.62 MGD of Raw Water AADD has been included in year 2033 for Hialeah-Preston / Alexander Orr Lime Softening to maintain the total Biscayne aquifer Modified Base condition raw water use at 349.5 mgd and to provide needed operational flexibility in withdrawals of Floridan aquifer water.

EXHIBIT 8B

EXHIBIT 9



Alternative Water Supply Projects Step Chart September 2014

Table 4 - MDWASD Floridan Aquifer Wellfields Operation Plan Summary (September 2014) Pumpage by Wellfield

1	2	3	4	5	6	7	8	9	10
WTP Subarea and Wellfield	Wellfield Data		Individual Wellfield ANNUAL Pumpage / Allocation						Remarks
	Design Capacity (mgd)	Number of Wells	2014 - 2017		2018 - 2030		2031 - 2033		
			BG	(mgd)	BG	(mgd)	BG	(mgd)	
Hialeah RO WTP [a]	20.00	10	4.855	13.30	4.855	13.30	4.855	13.30	See Footnote (a)
Alexander Orr WTP (Use of Floridan Aquifer Wells for ASR) [b]									
Southwest Wellfield ASR	10.00	2	(1.542)	10.08	(1.542)	10.08	(1.542)	10.08	See Footnote (b)
			1.522	10.08	1.522	10.08	1.522	10.08	
West Wellfield ASR	15.00	3	(2.313)	15.12	(2.313)	15.12	(2.313)	15.12	
			2.283	15.12	2.283	15.12	2.283	15.12	
South Miami Heights WTP (Use of Floridan Aquifer Wells for RO) [c]									
South Miami Heights WTP [c]	24.00	7	0	0.00	6.059	16.60	8.494	23.27	See Footnote (c)
MDWASD System Total	69.00	22							
Total Not-To-Exceed Pumpage	Annual Average		4.805	13.30	10.864	29.90	13.299	36.57	

Notes

BG = Billion Gallons; MGD = Million Gallons per Day

(a) New Upper Floridan Aquifer RO WTP - Finish water supply of 10.0 mgd, 7.5 mgd Phase 1a by Dec. 31, 2013, 10.0mgd Phase 1b by Dec. 31, 2015. Initial six (6) Floridan aquifer supply wells completed prior to Dec. 31, 2013; the additional four Floridan aquifer supply wells to becompleted prior to Dec. 31, 2015.

(b) Based on 153 days of storage (indicated as negative withdrawal) and 151 days of recovery (positive withdrawal) per ASR well a year. Excludes initial Cycle and Operational Testing of the ASR Wells and ASR Facility UV Disinfection System Testing (Testing is currently underway at Southwest Wellfield ASR and is pending at West Wellfield ASR).

(c) New Upper Floridan Aquifer RO Treatment at South Miami Heights WTP (Phase 1 Finish water supply of 12.45 mgd by Dec. 31, 2018 with Phase 2 total Finish water supply of 17.45 mgd by Dec. 31, 2030)

Revised September 2014

EXHIBIT 10B

Alternative Water Supply Project Development

Project / Milestone	Average Finish Water daily flow	Milestone Completion Date
Hialeah Floridan Aquifer R.O. WTP, Phase 1-a, 10.0 mgd WTP and initial 6 Floridan aquifer supply wells. (7.5 mgd, limited by water supply)	(7.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		Completed
Hialeah Floridan Aquifer R.O. WTP, Phase 1-b, additional 4 Floridan aquifer supply wells. (10.0 mgd, maximum treatment capacity)	(2.5 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		12/31/2015
South Miami Heights WTP (R.O. portion) Phase 1	(12.45 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2015
• Turnover / Project Completion		12/31/2018
South Miami Heights WTP (R.O. addition) Phase 2	(5.0 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		12/31/2028
• Turnover / Project Completion		12/31/2030

EXHIBIT 13

Revised September 2014

Reuse Projects

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Anticipated Completion
1.	North District WWTP (Permitted) **4.44 MGD**	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Previous Permitted Limit) **7.84 MGD**	7.84 MGD	Industrial Use Only	Existing
3.	South District WWTP (Previous Permitted Limit) **4.17 MGD**	4.17 MGD	Industrial & Non-Public Access Irrigation	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	South District WWTP **9.2 MGD**	9.2 MGD	Floridan aquifer recharge. The scope of these projects is part of the Ocean Outfall legislation implementation plan submitted to the Secretary of FDEP on June 28, 2013.	Dec 31, 2025
5.	Central District WWTP **9.2 MGD**	9.2 MGD		Dec 31, 2025
6.	West District Water Reclamation Plant **9.2 MGD**	9.2 MGD		Dec 31, 2025
7.	South District WWTP **90 MGD**	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	TOTAL NEW PROJECTS = 117.5 MGD			Dec 31, 2025

EXHIBIT 14

September 2014

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Regulation Division

July 25, 2014

Juan Carlos Arteaga, AIA
Miami-Dade County Water and Sewer Department
P.O. Box 330316
Miami, FL 33233-0316

Subject: Miami-Dade County Water and Sewer Department
Water Use Permit Application No. 140627-12, Permit No. 13-00017-W
Miami-Dade County

Dear Mr. Arteaga:

District staff have reviewed the above-referenced application. As discussed with Bertha Goldenberg on July 24, 2014, the District is requesting the following information, in accordance with Section 40E-1.603, Florida Administrative Code (F.A.C.), to complete the application and provide reasonable assurances for permit issuance:

1. For the requested modification to Limiting Condition 28, please provide a description of the conditions and typical operating plan when withdrawals would exceed 15 million gallons per day and how the proposed operating plan is consistent with Exhibit 35. Please be advised that any increase in withdrawals over 15 million gallons per day will require a hydrogeologic evaluation of potential impacts to sensitive environmental features (Section 2.2.2 of the Applicants Handbook for Water Use Permit Applications [AH]).

2. The requested modification to Limiting Condition 49 proposes to change the wording in the second paragraph from "In the event that water losses, as defined by the AWWA method (Exhibit 16B), exceed 10 percent..." to "In the event that water losses, as defined by Section 5.2.1.E of the Basis of Review..." This section of the Basis of Review (BOR) refers to maintaining an accurate flow meter at the intake of the water treatment plant.

   You may be aware that the District is now using the Applicant's Handbook, dated July 16, 2014. Please indicate which section of the AH you are referring to and any proposed changes to the water loss reporting resulting from the requested change. Please note that the District would prefer all public water supply entities to report losses defined by the AWWA method (Section 2.3.2.F.2.c, of the AH).

3. Regarding the proposed changes to Limiting Condition 45, please provide a more detailed schedule (i.e. scheduled meetings, progress reports) of the proposed process for the development of an alternate reuse project in the event the parties do not reach agreement on the feasibility of the Biscayne Bay Coastal Wetlands project by August 15, 2014 (Section 2.2.4 of the AH).

Advisory Comment: The following comments are advisory in nature and do not require a response from the applicant to complete the application. However, satisfactory resolution of these issues is required for staff to recommend approval.

District staff is concerned that Exhibit 14 shows significantly less proposed reuse water projects than Exhibit 14 in the active permit. Please consider modifying this Exhibit to include the Biscayne Bay Coastal Wetlands Rehydration Project (or Potential Alternate Reuse Project), consistent with the proposed Limiting Condition 45.

Please submit responses to this letter electronically on the District's ePermitting website (www.sfwmd.gov/epermitting) using the Additional Submittals link to expedite administrative processing of the application and to save paper. Please note that an electronic response may be submitted even if the original application was submitted via hard copy. Information regarding the District's comprehensive ePermitting program is enclosed. Alternatively, please provide one (1) original and one (1) copy of the requested information, clearly labeled with the application number, to District Headquarters.

In accordance with paragraph 40E-1.603(1)(b) F.A.C., if the requested information is not received within 90 days of the date of this letter, this application may be processed for denial, if not withdrawn by the applicant. If additional time is needed, please contact one of the District staff members below with a request for an extension before the 90 day period ends.

The District recommends contacting the assigned staff members to resolve the above questions and concerns prior to submitting a response. John Lockwood, Lead Hydrogeologist at 561-682-6884, or via email at jlockwo@sfwmd.gov is available to assist with questions.

Sincerely,

Jonathan E. Shaw, P.G.
Section Leader, Water Use Bureau
South Florida Water Management District

JS/jl

Enclosure

cc: Applicant/Owner
Consultant
Other interested parties (if any)