2012 ANNUAL WATER LOSS REDUCTION PLAN

Implementation Status Report

BLACK & VEATCH PROJECT NO. 178364

PREPARED FOR

MIAMI-DADE COUNTY

Miami-Dade Water and Sewer Department

15 APRIL 2013

BLACK & VEATCH
Building a world of difference.

Table of Contents

1 Introduction 1
1.1 Background and Scope of Work 1
2 2012 Water Audit and Water Loss Overview 3
2.1 Water Loss Control Improvements in the Audit Year 3
2.2 Estimated Water Savings 4
2.3 AWWA Water Balance Analysis Overview 4
2.4 Water Loss Standards and Reduction Strategies 7
3 Data Analysis 12
4 Water Treatment Plant Losses 24
5 Results 35
5.1 Real Water Loss Goals 35
5.2 Apparent Water Loss Goal 36
6 Recommendations 37
6.1 Recommended Best Practice Improvements 37
6.2 Economic Analysis of Losses 44
Appendix A—Water Use Permit 45
Appendix B—Water Audit Report 46
Appendix C—Implementation Plan 48

LIST OF TABLES

Table 2-1 – Standard AWWA Water Balance Analysis 5
Table 2-2 - Details of Selected Key Performance Indicators 9
Table 3-1 – Miami-Dade Water and Sewer Department Water Treated and Water Sales 13
Table 3-2 - Water Supplied Validation Grading 14
Table 3-3 - Authorized Consumption Validation Grading 15
Table 3-4 - Water Losses Validation Grading 18
Table 3-5 – Leak Detection Equipment Summary 18
Table 3-6 - System Data Validation Grading 20
Table 3-7 - Operating Cost Details 2012 20
Table 3-8 - Retail Unit Cost CY 2012 21
Table 3-9 - FY 2012 Water Volumetric Rate 21
Table 3-10 – Variable Production Cost 2012 22
Table 3-11 - Cost Data Validation Grading 23
Table 4-1 WTP Capacities and Flows 24
Table 4-2 Summary of Biscayne Aquifer Wellfields 25
Table 4-3 Summary of Floridan Aquifer Wellfields 25
Table 4-4 Venturi Meter Calibration Results: Raw and Finished Water 27
Table 4-5 Alex Orr WTP Raw Water Flows 28
Table 4-6 Hialeah & Preston WTPs Combined Raw Water Flows 30
Table 4-7 Orr WTP Treated vs. Raw Water Flows 33
Table 5-1 – Performance Indicators FY 2012 35
Table 6-1 - Example Meter Volume Warranties 42
Table 6-2 - AWWA Standard Flow Test Ranges 43

LIST OF FIGURES

Figure 2-1 - Water Audit software for CY 2012 6
Figure 2-2 - The Standard IWA Water Balance 8
Figure 3-1 – Example Meter Accuracy analysis of degrading meters (below 90% accuracy) from 2012 5/8-inch meter tests 17
Figure 3-2 – Average length of Service Line, Meter at the Curb Stop (source: AWWA Software) 19
Figure 4-1- Alex Orr WTP Raw Water Flows 29
Figure 4-2 Hialeah/Preston Combined Raw Water Flows 31
Figure 4-3 Preston WTP Difference between Treated and Raw Water Flows 31
Figure 4-4– Hialeah WTP Difference between Treated and Raw Water Flows 32
Figure 4-5– Hialeah/Preston WTPs Combined Difference between Treated and Raw Water Flows 32
Figure 4-6 Orr WTP Difference between Treated and Raw Water Flows 33
Figure 6-1 - Example Pressure Logger Installation 41

1 Introduction

The South Florida Water Management District (SFWMD or District) requires the Miami-Dade Water and Sewer Department (MDWASD) to prepare an annual status report of its 20-year Water Loss Reduction Plan implementation, per Limiting Condition 49 of the Miami-Dade County Water Use Permit. The Department retained Black & Veatch Corp ("Black & Veatch") to prepare the 2012 Annual Water Loss Reduction Plan Implementation Status Report (2012 Annual Status Report) and provide assistance with the Plan implementation in 2013. This document is the 2012 Annual Status Report, which includes water audits as required by Limiting Condition 49.

The MDWASD water system consists of three regional water treatment plants (WTPs), the South Dade Water System (a series of wellfields and 5 small treatment facilities), treated water storage and pumping facilities, and approximately 7,700 miles of water transmission and distribution pipelines. The regional facilities are the Hialeah, John E. Preston, and Alexander Orr, Jr. WTPs, which have a total combined rated treatment capacity of 473 MGD. The Hialeah and Preston plants serve the north part of the system, the Alex Orr plant serves the central part of the system, and five small wellfields and treatment facilities, referred to as the South Dade Water System that serves the southernmost part of the County. The South Dade Water System has a permitted capacity of 12 MGD collectively.

Distribution of finished water throughout the service area is accomplished with the use of seven remote finished water storage and pumping facilities as well as storage and pumping stations located at the water treatment facilities. The water system serves approximately 439,000 retail customers, and 15 wholesale customers in a service area of approximately 400 square miles

The overall annual average daily flow of the entire system is approximately 313 MGD. Raw water supply for the three treatment plants is currently drawn from 83 Biscayne aquifer wells located in the major wellfields (Miami Springs, Northwest, West, Southwest, and Snapper Creek) and several wells onsite at the three treatment plants. The South Dade Water System is served by 12 Biscayne aquifer wells located at the five smaller wellfields mentioned above.

Two new WTPs will provide additional capacity to the water system. The new Hialeah Reverse Osmosis (RO) WTP is owned jointly by the City of Hialeah and MDWASD. The RO plant will have an initial treatment capacity of 10 MGD and it is designed to have an ultimate capacity of 17.5 MGD. The raw water source for this plant will be the brackish Upper Floridan aquifer. The Hialeah RO WTP is expected begin service in the first half of 2013. The proposed South Miami Heights WTP will replace three of the small treatment plants of the South Dade Water System. This plant will be a 20 MGD membrane softening and RO plant and will have the capacity to treat water from both the Biscayne and Floridan aquifers. This plant is scheduled to go into service in 2015.

1.1 BACKGROUND AND SCOPE OF WORK

The Department's 20-year Water Loss Reduction Plan was based on an evaluation of the Department's water supply and demand for Fiscal Year (FY) 2005. On November 15, 2007, the SFWMD approved and issued the Department its Consolidated Public Water Supply (PWS) Water Use Permit (WUP) - Water Use Permit No. 13-00017-W.

In December 2009, the Department submitted an application for a permit modification to the SFWMD pertaining to the Department's alternative water supply plan. The modifications were requested as a result of the lower demands experienced and population projections.

In November 2010, the SFWMD issued a revised Water Use Permit No. RE-ISSUE 13-00017-W which expires in 2030.

In May 2011, the Department submitted a second application for a second permit modification to SFWMD pertaining to the Department's alternative water supply plan. The proposed modifications were requested based on current water use reductions, as a result of the lower than anticipated population growth, water loss reduction and the successful implementation of the Department's Water Conservation Plan, and permanent two day a week landscape irrigation restrictions by county wide ordinance. The County's finished water demand is now 44 million gallons per day (MGD) lower than what was anticipated when the first 20-year water use permit application was submitted in 2007, and this demand reduction has eliminated the anticipated supply shortage which was the basis for an ambitious schedule of several costly near-term alternative water supply projects.

In July 16, 2012, the SFWMD issued a revised Water Use Permit No. RE-ISSUE 13-00017-W which expires in December 16, 2030. A copy of the revised WUP is included in Appendix A.

The Water Loss Reduction Plan recommended real and apparent water loss mitigation approaches over the next 20 years with corresponding monetary savings and implementation schedule recommendations. The schedules of the real and apparent water loss reduction activities are presented in Appendix B as Exhibits 17A and 17B of the revised WUP. The tables also provide the anticipated annual water savings and associated annual value of water savings for the water loss reduction activities. Limiting Condition 49 of the revised WUP specifically applies to implementation of the approved Water Loss Reduction Plan. Key requirements of Limiting Condition 49 are:

- Quarterly determination of distribution system losses
- Annual reporting of distribution system losses on April 15 of each year for the previous calendar year
- Determination of losses in each water treatment plant (WTP)
- Water audits in accordance with IWA/AWWA standard methodologies
- Planned annual reporting of water loss reduction activities and expenditures, along with associated water savings for the subsequent calendar year
- Annual reporting of water loss reduction trends and changes from the previous year
- Annual reporting of additional water loss reduction activities if water losses as defined by AWWA methodology exceed ten percent.

2 2012 Water Audit and Water Loss Overview

Both real and apparent losses are very important to the Department, specifically leakage of mains, and service lines, the accuracy of meters and the interaction/analysis of the customer billing system. The Department continuously is implementing improvements that can be made to enhance revenue and improve efficiency. In 2012, 950 million gallons of water was estimated to be saved from leakage reduction compared with 2011. This equates to a value of $338,000 at the variable cost of water. Significant data improvements were also made, especially with respect to metering and testing of meters.

2.1 WATER LOSS CONTROL IMPROVEMENTS IN THE AUDIT YEAR

2.1.1 Validation of Results

MDWASD has increased and improved its efforts over the past calendar year to more accurately understand and audit all the variables within the AWWA standard water audit. In order to make informed decisions a significant amount of meter testing, analysis of leakage and water supplies has improved the validation. The estimated validation utilizing the AWWA grading has increased from 73 to 78 (out of 100) between 2011 and 2012. This shows a significant improvement in the level of knowledge of the water system. This, in conjunction with an overall reduction of water losses in the past year suggests that MDWASD is showing improvement in its water loss reduction plan. More detail can be found in Section 2.3 and 3.1

2.1.2 Leakage Reduction

In 2012 there has been a continued focus on leakage reduction. The leakage control group has increased the frequency of surveys and continued night shift work to get access to sites not normally possible to survey during the day (busy intersections, etc.). The operations group has also continued to review the locations of different types of leakage in order to better understand the nature of leakage with respect to pipe material and size. This has also led to the start of a major dual main replacement project which targets small galvanized service lines which are localized in alleyways or behind homes. It was estimated that 950 million gallons of water was saved by leakage reduction in 2012 compared to 2011. This equates to $338,000 at the most conservative estimates using the variable cost of water (just treatment, chemicals and electricity – without any fixed costs). More detail can be found in section 6.1.2.

2.1.3 Meter Testing and Replacement

The meter testing program has been increased in 2012 to include a significant amount of small residential meters. This, coupled with the continuing production meter testing allows the Department to more accurately allocate the losses shown on the audit. Increased testing also suggested that the accuracy of the smallest residential meters was actually better than previously anticipated (2.2% inaccurate rather than the estimated 4% from previous years). More detail can be found in sections 3.1.3 and 6.1.3.

2.1.4 Asset Condition Assessment

The Pure Technologies condition assessment program targeted the large pre-stressed concrete cylinder (PCCP) transmission mains. A significant amount of transmission pipeline (total of 19.88 miles) was analyzed in 2012 including the following segments;

- On W 2ND Avenue/W 13TH Street/NW 67Street from Hialeah-Preston Plant to NW 67TH Street Pump Station (4.8 miles). This included both Smartball and Pipe Diver to analyze the pipe condition and existing leaks in the system. A valve leak was recorded and repaired.
- On SW 87TH Avenue/SW 40TH Street from Alexander Orr Plant to SW 27TH Avenue & 28TH Lane (7.95 miles). The assessment found two leaks on fittings connecting to the pipeline.
- On SR 874 Ext/SW 82ND Avenue/56TH Street/48TH Street/28TH Lane from Alexander Orr Plant to SW 27TH Avenue & 28TH Lane (7.13 miles). The assessment found two leaks on 6-inch connections to the pipeline.

Five definite leaks were found and fixed on the transmission mains analyzed in 2012. One of the main functions of the surveys is to catch any leaks or catastrophic breaks before they happen. These surveys will also reduce the future "rate of rise" of leakage. This rate of rise can be considerable (2% or more per year), unless the rate of rise is checked with additional leakage detection and asset condition assessment. The amount spent on these assessments was $1,463,308.

2.2 ESTIMATED WATER SAVINGS

Part of the WUP is to prove the level of water savings and continually improve water loss control through 2030. The 2012 audit data shows that there was a real loss savings of 6 gallons per connection per day, or a total additional savings of approximately **950 million gallons** in 2012 compared with 2011.

This level of savings needs to be trended over time to prove out that the savings are consistent and improving the system's efficiency.

As the understanding of the losses (both real and apparent) improves, these audit values may change. However, overall improvement appears to be valid and is matched by the evidence of increased focus on meter testing, leak detection and asset condition assessment.

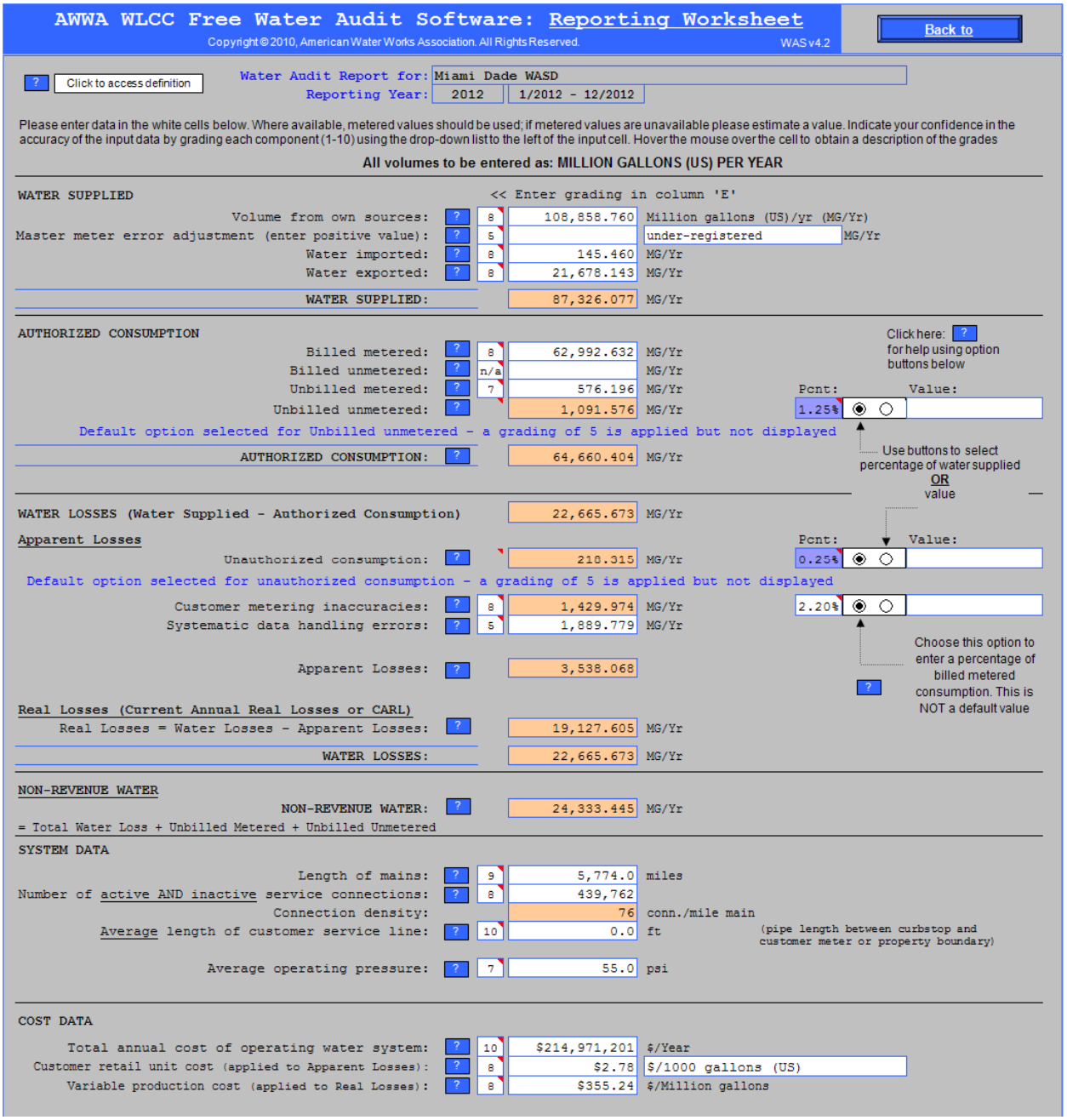
2.3 AWWA WATER BALANCE ANALYSIS OVERVIEW

The water balance was created using the AWWA Software, and analysis of existing data provided by the Department. The 2012 data in comparison to 2011 data are shown on Table 2-1. It should be noted that there are still a few areas where data validation needs to be improved to prove out the performance indicators. However, it does appear as though the utility has begun to improve in its reduction of water losses.

Table 2-1 – Standard AWWA Water Balance Analysis

PERFORMANCE INDICATOR (PI)	UNITS	2011	2012
Total NRW (% by volume)	%	30.2%	27.9%
Apparent Loss	Gallons/conn/day	44	22
Real Loss	Gallons/conn/day	126	120
AWWA grading	(1-100)	73	78

Figure 2-1 shows a screenshot of the completed AWWA Free Water Audit Software© for 2012. All the data for the Figure 1 were developed from the information provided by the Department, and flow and billing records analyzed for calendar year 2012. The detailed reporting worksheets for the audit are found in Appendix B.



AWWA WLCC Free Water Audit Software: Reporting Worksheet

Copyright © 2010, American Water Works Association. All Rights Reserved. WAS v4.2

Back to

Click to access definition

Water Audit Report for: Miami Dade WASD

Reporting Year: 2012 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED			<< Enter grading in column 'E'		
Volume from own sources:	?	8	108,858.760	Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	?	5		under-registered	MG/Yr
Water imported:	?	8	145.460	MG/Yr	
Water exported:	?	8	21,678.143	MG/Yr	
WATER SUPPLIED:			87,326.077	MG/Yr	
AUTHORIZED CONSUMPTION					
Billed metered:	?	8	62,992.632	MG/Yr	
Billed unmetered:	?	n/a		MG/Yr	
Unbilled metered:	?	7	576.196	MG/Yr	
Unbilled unmetered:	?		1,091.576	MG/Yr	Pcnt: 1.25% Value:
Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed					
AUTHORIZED CONSUMPTION:	?		64,660.404	MG/Yr	
WATER LOSSES (Water Supplied - Authorized Consumption)			22,665.673	MG/Yr	
Apparent Losses					
Unauthorized consumption:	?		210.315	MG/Yr	Pcnt: 0.25% Value:
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed					
Customer metering inaccuracies:	?	8	1,429.974	MG/Yr	Pcnt: 2.20% Value:
Systematic data handling errors:	?	5	1,889.779	MG/Yr	
Apparent Losses:	?		3,538.068		
Real Losses (Current Annual Real Losses or CARL)					
Real Losses = Water Losses - Apparent Losses:	?		19,127.605	MG/Yr	
WATER LOSSES:			22,665.673	MG/Yr	
NON-REVENUE WATER					
NON-REVENUE WATER:	?		24,333.445	MG/Yr	
= Total Water Loss + Unbilled Metered + Unbilled Unmetered					
SYSTEM DATA					
Length of mains:	?	9	5,774.0	miles	
Number of active AND inactive service connections:	?	8	439,762		
Connection density:			76	conn./mile main	
Average length of customer service line:	?	10	0.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	7	55.0	psi	
COST DATA					
Total annual cost of operating water system:	?	10	$214,971,201	$/Year	
Customer retail unit cost (applied to Apparent Losses):	?	8	$2.78	$/1000 gallons (US)	
Variable production cost (applied to Real Losses):	?	8	$355.24	$/Million gallons	

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Figure 2-1 - Water Audit software for CY 2012

Section 3 Analysis of this report is structured in the format of the standard water balance, focusing on the following sections: water supplied, authorized consumption, water losses, system data and cost data. The AWWA Free Water Audit Software© (version 4.2) has been used to calculate all the required indicators. This is then used to develop an overall water balance, and relevant performance indicators. Each variable has been discussed and the reasoning behind each value recorded. All values noted in this section have been developed from data provided by MDWASD, and are for the Calendar Year 2012.

In overview the data provided by MDWASD appears to be of good quality and validation. The overall data validation score of 78/100 is good.

There are a number of variables that are currently estimated (including meter accuracy, and unbilled unmetered water). These need to be measured and more accurate analysis conducted for the next audit in 2013. All the data developed is included either in the AWWA Free Water Audit Software©, or in additional spreadsheets attached to this memo in Appendix B.

The reported performance of apparent losses of approximately 21 gallons per connection per day, the real loss performance of approximately 120 gallons per connection per day, and Infrastructure Leakage Index of 9.8 are within the range of performance indicators for peer utilities within North America.

It should be noted that the level of water loss has been reduced between 2011 and 2012.

2.4 WATER LOSS STANDARDS AND REDUCTION STRATEGIES

This section presents current international water loss reduction strategies, and highlights the advantages, disadvantages, and their applicability to the Department's system. In this section the following will be covered:

- Identify current water loss reduction strategies,
- Critique and highlight advantages and disadvantages of identified strategies,
- Compare strategy implementation to current Department policy, and
- Research strategy and implementation.

Water loss reduction strategies are best built upon calibrated and standardized models. There are two kinds of audits that can be performed: a top-down water audit, and a bottom-up water audit. The following section is split into two parts. The first part, the top-down water audit, discusses the modeling/audit tools and methods that are used to properly quantify losses, and design the strategy. The second part, the bottom-up water audit, discusses intervention tools commonly used to reduce losses.

2.4.1 Top-Down Water Audit

The first step of the Top-Down Water Audit is to identify a group of stakeholders within the utility to aid with gathering the required data for a first look at the utility performance. Data is gathered and entered initially into a simple water balance model. The water balance model provides the level of detail for which data is currently available at this desktop analysis (top-down) level. Figure 2 shows the major components of the most current AWWA/IWA standard water balance model.

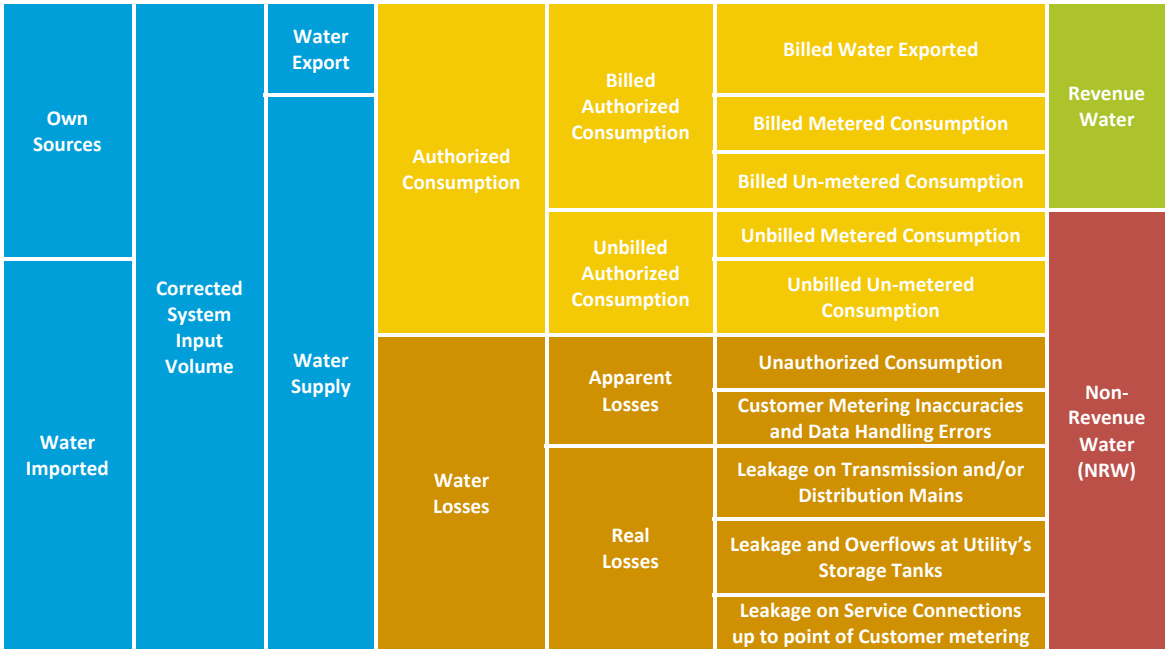


Figure 2-2 - The Standard IWA Water Balance

Once data is gathered, and the utility starts entering it in the water balance model, it is likely that some components of the required data are either not available or were originally derived from estimates or engineering judgments. During the top-down auditing process, these components are assigned a relatively low data confidence level through a standardized grading system developed by AWWA in the AWWA Free Water Audit Software©.

Even with basic data, most utilities find that they are able to prepare an initial water balance. Confidence or grading levels for each input component is recorded, and the model provides an aggregated confidence level for the main water loss component categories.

Once an aggregate confidence level is obtained, the utility can identify the components that will have the largest impact on improving the aggregated confidence of either the apparent loss volume or the real loss volume. These input components are then typically prioritized for field validation as discussed below.

2.4.2 Data Validation & Confidence Limits

The key to building a business case for intervention against water loss is to base it on facts. Building a business case on anecdotal or estimated data can result in costly investments that do not provide the expected return. Field-validating data can be expensive, but the alternative may be more expensive if the wrong decisions are made.

Without field validation of data, an interim measure includes the analysis using the grading scale associated with the AWWA water audit software (AWWA - Version 4.2, 2009). This measurement is not as valid as a field-study audit. However, it gives an indication of the accuracy of results, and where data collection and water loss investment should be targeted.

Currently, MDWASD has an estimated data confidence grade of 78 (out of 100) on the AWWA software for CY 2012. This grade is developed through estimation of the data validity of each of the

input values. As the validation of data improves, this grade will also improve. The current grade suggests that the data still need to be improved, but that some high-level decisions on targeting of resources can be made to improve the level of service, reduce losses, and enhance revenue.

One typical place to begin field validation is usually with the assessment of the accuracy of the supply meters, and an update to the supplied volume entered in the model for the audit period. After investigation of the supply meters, the next step is an assessment of the accuracy of various categories of consumer meters. MDWASD has conducted testing of all the supply meters from the treatment plants in 2011 and 2012. Consumer meter accuracy validation is usually done on statistically representative batches of meters. A final step in this process is to validate the various consumption volumes. This is usually done by a series of data mining tasks. While this has been completed on a broad level, more detailed analysis will still be necessary to determine if any adjustments need to be made to the input numbers or the confidence level. MDWASD has conducted approximately 1,000 tests on small meters in 2012 and also conducts field testing of larger retail meters (three-inch or larger) on a rotating basis to ensure these meters are accurate.

2.4.3 Performance Indicators

Another component of the water balance model in addition to confidence levels is the existence of performance indicators (PIs). The new standard audit provides performance indicators for all of the water loss components, as well as for some of the basic financial indicators (Table 12). As the audit is refined over time, additional PIs can be incorporated to expand the scope and depth of the analysis. The use of various indicators, as opposed to the old practice of using a percentage loss based on the total water supplied, allows the utility to accurately produce baseline data, track performance, and set targets with priority on the components of water loss that will reap the most cost effective returns.

Tracking several standard PIs allows utilities to easily see the longer-term performance of water loss management programs as a unique entity. Shorter payback initiatives can quickly be identified ensuring a rapid return on investment.

Within the financial, operational, and water resources categories, PIs have been recommended for both basic and detailed levels. Intermediate PIs have also been proposed in some cases; however, this report will concentrate on only a few of the key and most useful PIs relating to water losses and non-revenue water.

Table 2-2 - Details of Selected Key Performance Indicators

COMPONENT	TYPE	BASIC PI	DETAILED PI
Non-Revenue Water (NRW)	Financial	Volume of NRW as % of System Input Volume	Value of NRW as % of cost of running system. $ for apparent and real losses.
Real Losses (RL)	Water Resources	Volume of RL as % of System Input Volume	

COMPONENT	TYPE	BASIC PI	DETAILED PI
Real Losses	System Operational	Gallons/service connection/day	Infrastructure Leakage Index (ILI)
		Gallons per mile of main per day (not used for DWU as not relevant for urban utility)	Defined as the ratio of the current annual real loss to the unavoidable annual real loss = CARL/UARL
Apparent Losses (AL)	Operational	Volume of AL as % of System Input Volume	Gallons/service connection/year
Water Losses (WL)	Operational	Gallons/service connection/year	

Key PIs recommended for use in the MDWASD water loss management study are:

- Apparent Losses (Gallons/service connection/day, and lost revenue),
- Real Losses (Gallons/service connection/day, and lost revenue), and
- Infrastructure Leakage Index (ILI - dimensionless).

Apparent and real loss PIs can be used to establish baseline information and track performance of an individual utility's loss management efforts. The volumes can be directly translated into dollar values for simple or more complex economic calculations as the scope of this or subsequent analysis evolves. The percentage terms are not recommended as they are subject to wider variations, and conflict with previously reported data due to differing methodologies in the analysis.

To better start understanding and calculating these PIs, below are definitions of the performance indicators, and key related terms for this stage of the Department's audit:

- *Apparent Losses* – Apparent losses consist of unauthorized consumption and volumes of water lost through meter under-registration and data handling errors. The key impact of reducing apparent losses is an improved revenue stream, and a more equitable distribution of cost to the customer.
- *Real losses* – Real losses consist of water leaks and breaks (either reported or unreported), background leakage that is attributed to infrastructure conditions, and reservoir or storage overflows or leakage. The key impact of reducing real losses is a direct reduction in water use.
- *Infrastructure Leakage Index* – A dimensionless ratio of the Current Annual Real Losses (CARL) to the Unavoidable Annual Real Losses (UARL).
- *Unavoidable Annual Real Loss* – The theoretical lowest level of annual real losses achievable when the system is pressurized. The UARL calculation takes into account length of the water mains, number of service connections, average length of service connections (curb stop to meter or first point of usage), and operating pressure.

Once volumes of apparent and real losses have been identified and validated using the water balance tools, the dollar values of these components can be clearly defined. The value of the loss along with the cost of intervention can be assessed, and a business case can be made for reduction of volumes of loss to economic levels.

There are additional targeted PIs which can be used by MDWASD to analyze specific areas of the utility's business. These PIs include the number of zero readings, stopped meters, and testing of inaccurate meters. These indicators can be recorded and trended over time to improve system knowledge, efficiency, and accountability.

3 Data Analysis

The AWWA Free Water Audit Software© (version 4.2) has been used to calculate all the required indicators. This is then used to develop an overall water balance, and relevant performance indicators for the utility. The details of this methodology are found in AWWA Manual M36 (Water Audits and Loss Control Programs) and within the AWWA Free Water Audit Software. Information on the validation methods and rankings in the software are copied in Appendix D. The following sections are structured to follow the in the format of the standard water balance as described in the previous section 2.4 and depicted in Figure 1. The following categories of the report are the focus for the analysis:

- **Water supplied**, (all the water input into the system, including imports and removing exported or wholesale water)
- **Authorized consumption**, (metered and billed usage and other authorized uses)
- **Water losses**, (meter inaccuracies, billing errors, theft and leakage)
- **System data, and** (miles of main, pressure, number of connections)
- **Cost data**. (total cost of operating the water system, retail unit and variable production costs)

Each variable has been discussed and the reasoning behind each value recorded. All values noted in this section have been developed from data provided by the utility, and are for CY 2012.

This data which is used to determine the following inputs should be validated by MDWASD staff on a regular basis to ensure inputs are as accurate as possible. Additionally, this audit needs to be conducted on an annual basis to determine performance trends and any data errors. There are a number of variables that are currently estimated (including meter accuracy, and unbilled unmetered water) as defined in the following subsections. For a more accurate analysis these data points should be measured in the system for future audits.

3.1.1 Water Supplied

Total Water Supplied = 87,326.077 Million gallons

[Calculation: Volume from Own Source + Imported water – Exported (wholesale) water]

Volume from Own Sources

This includes all the volume from the water treatment plants.

The details of production utilized for the audit were obtained by summarizing SCADA pumpage data. MDWASD provided SCADA data with daily system pumpage for both the raw water from the wells and for the influent and finished water from the treatment plants. This pumpage data was used as an approximation of the produced volume.

The total produced volume for 2012 was recorded as 108,858.760 million gallons.

Master Meter Error Adjustment

No additional evaluation of the electronic or flow test calibration records were conducted in this initial review. However, analysis of the Alexander Orr , Jr. Plant (Orr), Hialeah and John E Preston

(Preston) Water Treatment Plants Venturi meters (Raw) were analyzed as within allowable limits of accuracy (av ~101%) and the Finished water meters were analyzed as within allowable limits of accuracy (av ~99.5%).

The total master meter error adjustment assigned for CY 2012 was recorded as 0 million gallons.

Imported Water

In 2012, MDWASD imported water from two suppliers – the City of Homestead and the City of North Miami Beach. These provide water to locations within the Department's system that are difficult to reach with the current pumping system. In 2012, 145.46 million gallons were provided by the two utilities to the Department.

The value for 2012 was recorded as 145.46 million gallons.

Exported Water

MDWASD sells water to both retail and wholesale customers. The MDWASD has 15 water wholesale customers and at the end of CY 2012, 439,762 retail water customers. These wholesale uses were summarized from the MDWASD wholesale records from metered sales data from 2012. The list of wholesale entities is shown in the table below with their respective annual use in 2012.

Table 3-1 – Miami-Dade Water and Sewer Department Water Treated and Water Sales
Calendar Year 2012 Units - thousand gallons

WATER SYSTEM	
Water sold by customer	
Wholesale customers	
Hialeah	8,295,082
Miami Beach	7,973,062
North Miami Beach	104
North Miami	1,407,678
Opa-Locka	871,140
Hialeah Gardens	565,938
Bal Harbour	420,938
Medley	535,462
North Bay Village	398,558
Bay Harbor Islands	310,819
Surfside	312,792
West Miami	296,785
Indian Creek Village	125,097
City of Homestead	70,871
Virginia Gardens	93,817

WATER SYSTEM	
Total Wholesale	**21,678,143**
Retail	62,992,632
Total water sold	**84,670,775**

Source: MDWASD

The total water sold to wholesale customers in 2012 was recorded at 21,678.143 million gallons

Other Water Supplied notes

There are no other known water supplies, other than the ASR wells which are used for testing, but not connected to the supply system currently.

Table 3-2 - Water Supplied Validation Grading

GRADED VARIABLE	GRADING	REASONING
Volume from Own Sources	8	Calibration conducted annually, occasional flow testing
Master Meter Error	5	Meter calibrations conducted, continuously evaluated
Water imported	8	Calibrations conducted annually by wholesale entities. Results not known.
Water Exported	8	Meters calibrated, occasional flow testing conducted

3.1.2 Authorized Consumption

Total Authorized Consumption = 64,660.404 Million gallons

[Calculation: Authorized Consumption =Billed metered + Billed unmetered + Unbilled metered + Unbilled unmetered]

Authorized consumption includes the volume of water taken by registered customers, the water supplier, and others who are authorized to do so by the water supplier, for any purpose. It should be noted that this does not include water exported.

Authorized consumption may include items such as fire-fighting and training, flushing of sewers, transmission and distribution mains, street cleaning, watering of Department facilities, etc.

Billed Metered Consumption

The billed metered consumption is almost all customers within the Department's jurisdiction. This will include all residential, commercial, industrial, and institutional customers. Since the system is reportedly 100% metered, all but a very small portion should fall into this category. Note that the wholesale volume has been removed from this billed metered value (each wholesale customer has its own regulatory reporting requirements, and own water losses, and these are not calculated in this audit). Miami Dade have conducted extensive retail meter testing over the past year to evaluate the level of losses with respect to meter accuracy.

The value of Billed Metered Consumption for 2012 was recorded as 62,992.632 million gallons.

Billed Unmetered Consumption

There is reportedly no billed unmetered consumption.

The value for Billed Unmetered Consumption in 2012 was recorded as 0 million gallons.

Unbilled Metered Consumption

There is usually only a small amount of water in this category. It can include Department facilities that have a meter but do not receive a bill, parks, fountains etc. Currently this is an estimation based on reviews of other utilities.

The value for Unbilled Metered Consumption in 2012 was recorded as 576.196 million gallons.

Unbilled Unmetered Consumption

Unbilled unmetered consumption is often difficult to calculate, although almost every utility has consumption in this category (due to the way systems are flushed, and fire-fighting occurs, which make it almost impossible to measure by metering effectively). Therefore a default has been developed within the water audit software to allow an approximate calculation using validated data from other systems. In this initial audit this default of 1.25% of water supplied has been chosen.

The value for 2012 was recorded as 1,089.758 million gallons.

Other Authorized Consumption notes

Water treatment plants do have a requirement to use water in certain situations (backflushing, etc.). However, it is anticipated that all these locations occurred prior to the finished water meter. Therefore this data is not included in this water audit.

Table 3-3 - Authorized Consumption Validation Grading

GRADED VARIABLE	GRADING	REASONING
Billed Metered	8	Good billing systems, extensive meter accuracy testing, but regular replacement of oldest meters
Billed Unmetered	n/a	No billed unmetered consumption reported
Unbilled Metered	7	Meters are read and maintained, but need to evaluate testing and billing procedures for unbilled properties
Unbilled Unmetered	-	The default was used for this variable

3.1.3 Water Losses

Total Water Losses = Total Water Supplied – Total Authorized Consumption
= 22,665.673 Million gallons

The water losses are further broken down into apparent losses and real losses, which are both outlined below.

Apparent Water Losses

Total Apparent Water Losses = 3,538.068 Million gallons

[Calculation: Apparent Water Losses =Unauthorized consumption + Customer metering inaccuracies + Systematic data handling errors]

Unauthorized Consumption

Unauthorized consumption includes all uses not authorized by the Department, including illegal use of hydrants, bypasses etc., as well reversed or tampered meters and AMR systems. In this audit the data was not available; therefore, the default of 0.25% of water supplied was used.

The value for 2012 was recorded as 218.315 million gallons.

Customer Meter Inaccuracies

All the meters three inches and larger are anticipated to be tested and repaired or replaced (if necessary) at least every three years. A testing program for the smaller meters is also operational and almost 1,000 5/8-inch meters were tested in 2012. It is expected that the current meter stock is relatively accurate; however, additional testing on the 1-inch to 2-inch meters may be necessary to prove out the accuracy of these groups of meters. Testing should analyze both meter age, throughput (volume through the meter), and if possible the average pressure for the location of the meter.

A high-level evaluation was performed to review water meter accuracy data from studies developed between 2008 through 2012 and to outline any potential issues for the MDWASD. Reporting and test data reviewed included.

- Comparison of current Department practices for meter testing and replacement with industry standards;
- Review of meter testing procedures and results conducted for the 2009 Residential Meter Replacement Report and provide recommendations for developing an ongoing and dynamic performance-based meter testing program. The performance-based meter testing program should have the capability to periodically update and refine the degradation curves for residential meters.
- Practice of Large meter testing in-situ (in the field) by a dedicated testing crew.
- The testing includes a portable meter tester which is connected to the downstream test port for the duration of the test.
- Field crews all follow AWWA guidelines for the testing limits and frequency of tests.

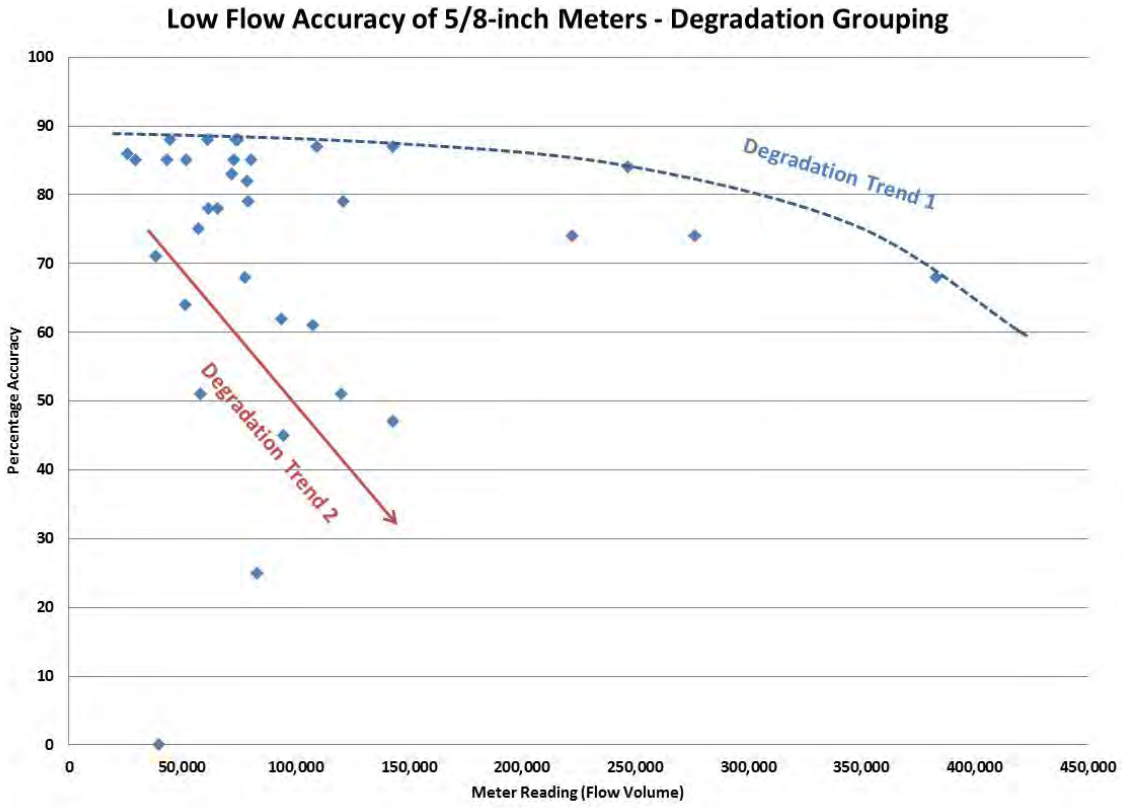


Figure 3-1 – Example Meter Accuracy analysis of degrading meters (below 90% accuracy) from 2012 5/8-inch meter tests

An estimate of 2.2% (1,429 million gallons) underreporting across the meter stock has been used for this audit. This suggests meters of varying age and reliability.

Systematic Data Handling Error Estimation

The Department utilizes several automated and human error checking processes for their billing practices. Although billing system reports are sizeable, specific triggers built in to track potential data handling errors are built in and forwarded on to staff specifically assigned for addressing potential data errors in the billing process. To the best of our knowledge, there are no systems with zero systematic data handling errors, therefore an estimated value of 3% of water supplied, or 1,889.779 million gallons has been used for this variable.

Table 3-4 - Water Losses Validation Grading

GRADED VARIABLE	GRADING	REASONING
Unauthorized Consumption	-	The default was used for this variable
Meter Inaccuracies	8	A detailed testing program was initiated for 5/8-inch meters in 2012. Additional testing on other small sized meters will aid and improve validation
Data Handling Errors	5	This is an estimate assuming a complex billing system

3.1.3.1 Real Losses

In the AWWA software the real loss value is the remainder, or what is left over after all the other variables (water supplied, authorized consumption, and apparent losses) are calculated. In order to provide a better estimate the review of system data and leak detection programs the Water Distribution Division collects and estimates leakage and authorized uses. These values are matched to the software calculation to act as a validation tool.

The Department has, however, conducted a significant amount of leak detection during the audit year. This appears to be improving efficiency and will be monitored in future years. A listing of the equipment used on a daily basis is outlined in Table 3-5.

Table 3-5 – Leak Detection Equipment Summary

EQUIPMENT	TYPE (MANUFACTURER/MODEL)	QUANTITY
ELECTRONIC SOUND AMPLIFIER	AQUASCOPES / HEATH CONSULTANTS	9
ELECTRONIC SOUND AMPLIFIER	STETHOPHON 04 /SEWERIN-HERMANN	5
ELECTRONIC SOUND AMPLIFIER (WIRELESS)	AQUATEST T-10 /SEWERIN-HERMANN	4
ELECTRONIC SOUND AMPLIFIER	LD15/ SUBSURFACE INSTRUMENTS	2
MECHANICAL SOUND AMPLIFIER	GEOPHONES / HEATH CONSULTANTS	5
MECHANICAL SOUND AMPLIFIER	GEOPHONES / SEWERIN-HERMANN	6
UNDERGROUND LINE LOCATOR	SURE-LOCK / HEATH CONSULTANTS	7
ELECTRIC DRILLS	BOSCH	6
METAL LOCATOR	ML-1M / SUBSURFACE INSTRUMENTS	1
METAL LOCATOR	PIPEHORN 800-HL	1
SOUND CORRELATOR	LC2500 / SUBSURFACE INSTRUMENTS	2
SOUND CORRELATOR	SECORR 08 /SEWERIN-HERMANN	3
SOUND CORRELATOR	ACCUCORR 3000 / FCS	1
CORRELATING LOGGER	SEPEM02/SEWERIN	98
CORRELATING LOGGER	SOUNDSENS/FCS	36

EQUIPMENT	TYPE (MANUFACTURER/MODEL)	QUANTITY
CORRELATING LOGGER	PERMALOG/FCS	100

The recorded value in the AWWA software is 19,078.180 million gallons.

Total Real Water Losses = 19,127.605 Million gallons

3.1.4 System Data

Length of Mains

MDWASD's water system consists of three regional water treatment plants (WTPs), the South Dade Water System (a series of well fields and 5 small treatment facilities), treated water storage and pumping facilities, and approximately 7,700 miles of water transmission and distribution pipelines. The regional water treatment facilities are the Hialeah, John E. Preston, and Alexander Orr, Jr. WTPs, which have a total combined rated treatment capacity of 473 MGD.

Number of Service Connections

The number of service connections includes both active and inactive service lines. This value was calculated by the customer services department in the 2012 and includes 439,762 accounts. This includes both active and inactive connections.

Average Length of Customer Service Line

The average length of customer service line is zero (note that the distance from the main to the property boundary has already been factored in to this calculation, and so the distance is 0 feet).

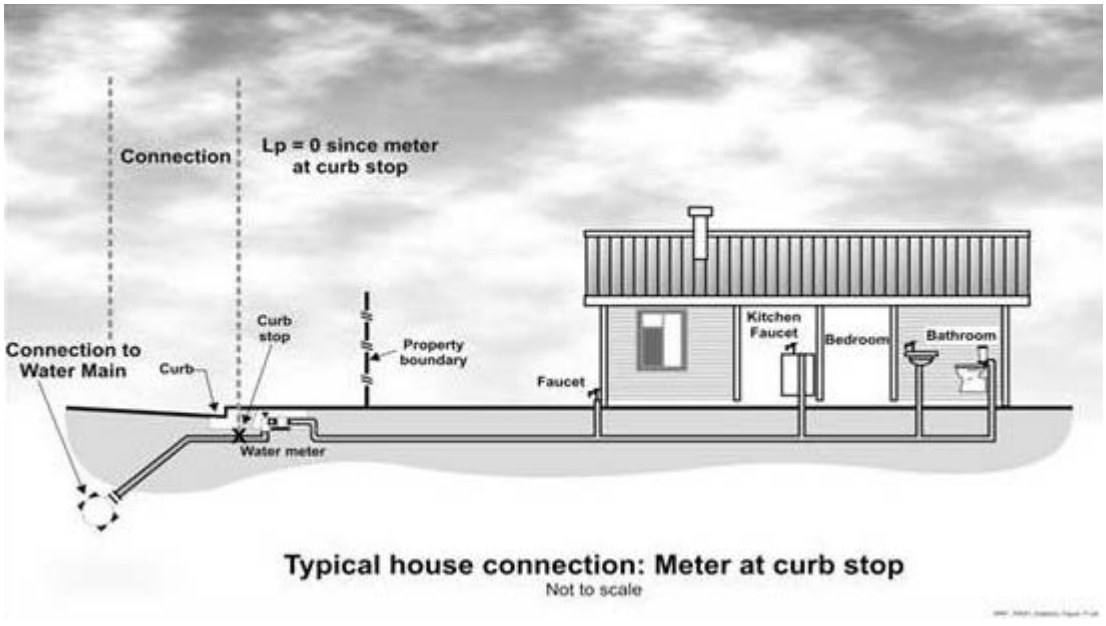


Figure 3-2 – Average length of Service Line, Meter at the Curb Stop (source: AWWA Software)

Average Operating Pressure

The average operating pressure was estimated from a large amount of field operations data from tests within the distribution system. Analysis of the hydraulic model was also conducted to give a

second opinion. This provided a value of just over 56 psi. However, since 55 psi is used in all the water loss calculations it was decided that the difference was not great enough to warrant a change. An average system pressure of 55 psi was used for this audit.

Table 3-6 - System Data Validation Grading

GRADED VARIABLE	GRADING	REASONING
Length of Mains	9	Developed through GIS, uncertain protocols for transfer of new data
Number of Services	8	Good billing records, uncertain policies and procedures
Customer Service Line	10	All services at property boundaries (therefore zero (0) value)
Average Operating Pressure	7	Utilized operations average which was near validated by analysis of the hydraulic model.

3.1.5 Cost Data

Total Annual Cost of Operating the Water System

The total annual cost of operating the water system includes operations, maintenance and any annually incurred costs for long-term upkeep of the system, such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply and system. Based on the Department's water system financial statements for the CY 2012 the total annual cost of operating the water system was derived from the following components:

- Operations and maintenance incurred costs
- Depreciation costs

Less:

- Capital contributions
- Non-operating revenue

Table 3-7 - Operating Cost Details 2012

Total Cost	CY 2012
O&M	153,968,223.63
Depreciation	61,002,977.25
Total Annual Cost	**$ 214,971,201**

Source: MDWASD

Because the Department operates on an October through September fiscal year, financial statements from FY 2012 and FY 2013 were utilized to develop CY 2012 financial data. The full annual cost utilized for the audit is the total operating costs including operating and maintenance expenses and depreciation.

In 2012 the overall cost of running the water system (including depreciation) was $214,971,201.

Customer Retail Unit Cost

Customer retail unit cost represents the weighted average of individual costs and number of customer accounts of each class. This is calculated as annual retail revenue divided by annual retail sales volume. Total retail water revenue is utilized, however, in order to calculate volumetric based water sales unit cost, MDWASD's meter base charge revenue and unread/unbilled water revenues are removed isolating the volumetric based water sales for the calculation of customer retail unit cost. Retail water sales less these items for 2012 were approximately $175.2 million.

Table 3-8 - Retail Unit Cost CY 2012

Retail Unit Cost		CY 2012
Metered Sales-Residential-Watr	$	54,883,654
Metered Sales-Multi Family-Wtr	$	26,102,460
Metered Sales-Res Sprink-Wtr	$	3,617,410
Metered Sales-Commercial-Water	$	65,438,595
Metered sales-WASD Wtr facilit	$	289,171
Metered Sales-NonResSprink-Wtr	$	7,596,248
Metered Sales-Marina-Water	$	81,446
Metered Sales - Firelines	$	159,181
Water Conservation Surcharge for Excess Water Usage	$	16,993,960
Total Retail Water Sales	**$**	**175,162,125**
Billed Water (1,000 gallons)		62,992,632
Retail Unit Cost of Water Sold	**$**	**2.78**

Source: MDWASD

Total billed water for 2012 was approximately 63,000,000 thousand gallons. Customer retail sales divided by the associated billed water for 2012 results in a customer retail unit cost of $2.78 per thousand gallons.

MDWASD has an inclining block water conservation rate structure for all its residential customers. The table below shows the current volumetric rate structure for a water customer:

Table 3-9 - FY 2012 Water Volumetric Rate

ORDINARY COMMODITY CHARGE	2012 RATE (PER 100 CUBIC FEET)
0 to 5 hundred cubic feet	$0.37
6 to 9 hundred cubic feet	$ 2.25
10 to 17 hundred cubic feet	$ 2.92
18 and over hundred cubic feet	$ 3.86

In this audit the main retail rate from 2012 of $2.92 per hundred cubic feet (CCF) is the most likely rate where losses would be set as average monthly use is usually between 8 and 12 hundred cubic feet for a normal residential customer (note that residential customers are billed on a quarterly basis). In order to further validate this, a review of the metered sales against billed metered water was also conducted and an average of $2.78 per 1000 gallons was calculated. The calculated

average was used in the calculations as it is a more conservative value of what cost could be recovered.

Variable Production Cost

Variable production costs represent the cost to produce and supply one additional unit of water and are estimated as total production costs of the water system including variable costs of source of supply, power and pumping, purification, and distribution divided by the total volume of water supplied to the water distribution system including imported water.

Variable costs included:

- Electrical services
- Natural gas
- Water and sewer service
- Purchased water
- Calcium carbonate disposal
- Fuel
- Petroleum gas
- Hazardous waste disposal
- Chemicals
- Laboratory supplies
- Gases
- And others

Total variable production costs were estimated to be approximately $38.7 million in 2012.

Table 3-10 – Variable Production Cost 2012

Marginal Cost	CY 2012
Water Source of Supply	$ 4,224,030
Water Pumping	$ 1,434,904
Water Treatment and Purification	$ 31,477,447
Water Transmission and Distribution	$ 1,586,612
Total Marginal Cost	**$ 38,722,994**
Finished Water (MG)	108,858.76
Purchased Water (MG)	145.46
Cost to produce 1 million gallons of water	**$355.24**

Source: MDWASD

Finished water supplied to the distribution system plus purchased water from the cities of Homestead and North Miami Beach was approximately 109,000 million gallons in 2012 resulting in a variable production cost of $355.24 per 1 million gallons of water.

The variable production costs include all the costs for pumping, treatment and chemicals from the treatment plants. In this case, the calculation for 2012 was $355.24 per million gallons. This was calculated using the financial reports, allocating only variable costs to the calculation.

Table 3-11 - Cost Data Validation Grading

GRADED VARIABLE	GRADING	REASONING
Total Cost of Operation	10	All costs developed and Third party CPA audited
Customer Retail Unit Cost	8	Used the calculation of metered sales against the total billed metered, this matches relatively well with the average use block ($2.92 per CCF)
Variable Production Cost	8	An evaluation of the financial reports calculating only fixed costs

4 Water Treatment Plant Losses

The Department operates three regional WTPs: Hialeah, Preston, and Orr; and smaller plants that are part of the South Dade Water System. Table 4-1 summarizes the plant capacities and actual flows. A description of each WTP is provided in the subsections below.

Table 4-1 WTP Capacities and Flows

COMPONENT	FACILITY		
	Hialeah/Preston	Alex Orr	South Dade Water System[1]
Permitted Plant Rated Capacity (MGD)	225.0 [2]	256.0 [3]	12.3
Actual Flows[4]			
Average Daily (MGD)	135.0	162.5	14.3
Peak Day (MGD)	172.5	184.0	

[1]Represents five smaller WTPs in southern Miami-Dade County.
[2]Hialeah Plant permit capacity is 60 MGD and Preston Plant is 165 MGD for a total of 225 MGD.
[3]Treatment Facility capacity is 256 MGD but the permit is currently limited to 214.74 MGD, based on water allocation.
[4]For Calendar Year 2012

The overall annual average daily flow of the entire system is approximately 313 MGD. Raw water supply for the three treatment plants is currently drawn from 83 Biscayne aquifer wells located in the major wellfields (Miami Springs, Northwest, Medley which is in stand-by, West, Southwest, and Snapper Creek) and several wells onsite at the three treatment plants. The South Dade Water System is served by 12 Biscayne aquifer wells located at the five smaller wellfields mentioned above. Table 4-2 provides a summary of each of the Miami-Dade County permitted Biscayne aquifer wells.

Two new WTPs will provide additional capacity to the water system. The new Hialeah Reverse Osmosis (RO) WTP is owned jointly by the City of Hialeah and MDWASD. The RO plant will have an initial treatment capacity of 10 MGD and it is designed to have an ultimate capacity of 17.5 MGD. The raw water source for this plant will be the brackish Upper Floridan aquifer. The proposed South Miami Heights WTP will replace three of the small treatment plants of the South Dade Water System. This plant will be a 20 MGD membrane softening and RO plant and will have the capacity to treat water from both the Biscayne and Floridan aquifers. This plant is scheduled to go into service in 2015. The Department also has the ability to withdraw water from the Florida aquifer and from Aquifer Storage and Recovery (ASR) wells. Floridan aquifer and ASR wells are listed in the Table 4-3 below.

Table 4-2 Summary of Biscayne Aquifer Wellfields

WELLFIELDS	WTP SERVED	DESIGN CAPACITY (MGD)	NUMBER OF WELLS
Hialeah	Hialeah/ Preston	12.54	3
John E. Preston	Hialeah/ Preston	53.28	7
Miami Springs Upper Lower	Hialeah/ Preston	79.30	 Upper–12 Lower–8
Medley (Stand-by)	Hialeah/ Preston	48.96	Stand-by-4
Northwest	Hialeah/ Preston	149.35	15
Alexander Orr	Orr	74.40	10
Snapper Creek	Orr	40.00	4
Southwest	Orr	161.20	17
West	Orr	32.40	3
South Dade	South Dade Water System	19.01	Leisure City–4 Everglades–3 Elevated Tank–2 Newton–2 Naranja–1
South Miami Heights	New SMH WTP	10.00	New Proposed- 5

Source: MDWASD

Table 4-3 Summary of Floridan Aquifer Wellfields

WELLFIELDS	WTP SERVED	DESIGN CAPACITY (MGD)	NUMBER OF WELLS	PERMITTED ALLOCATION (MGY)
Hialeah RO WTP	New Hialeah Plant	24.00	14	8,517
Southwest Wellfield ASR	Alex Orr	10.00	2	1,522
West Wellfield ASR	Alex Orr	15.00	3	2,283
South Miami Heights	New SMH WTP	24.00	7	8,494

Source: MDWASD

The Hialeah and Preston treatment facilities pump into both the high pressure and low pressure systems. The plants are interconnected prior to the high service distribution pumping system and operate a single high service pumping station. Independent pumping stations at each plant pump into the low pressure system.

"Real" water losses in facilities that use conventional lime softening processes can account for 3 to 5 percent of raw water supplied. A large portion of this real loss can be accounted for by the handling and disposal of residuals. As previously indicated lime softening is the primary treatment of the groundwater at the three regional treatment facilities. The residuals generated in the process are comprised almost entirely of calcium carbonate ($CaCO_3$) solids.

The Hialeah and Preston plants discharge the calcium carbonate residuals- lime slurry- from the lime softening process through a 12-in diameter line from the Hialeah plant and a 16-in diameter line from the Preston plant to either the Miami Springs and/or Northwest Wellfield residuals lagoons.

The Hialeah WTP also includes a lime recalcination facility. This facility is a rotary kiln-natural gas fired type facility. Dewatered lime is then recycled through the process of recalcination. The lime kiln burns off the carbon dioxide (CO_2) and produces up to 100-115 tons per day of calcium oxide (CaO) which is then slaked and returned to the headworks for reuse in the lime softening process. The plant also treats the residuals generated at the Preston WTP from accelator units 1, 2, and 3. The carbon dioxide (CO_2) is captured and used in the recarbonation process at the plant.

At the Orr plant, one hundred percent of the residuals generated in the lime softening process are stored and processed through a lime recalcination facility similar to the one at the Hialeah plant. Any excess calcium carbonate from the treatment processes is sent to the sludge holding cells at the Southwest wellfield or the cells at the Orr plant.

Prior to recalcination, some of the water is extracted from the solids via centrifugation and returned to the treatment process. Water vaporized during the heating of the solids during recalcination is not recovered. Small amounts of water are also used (lost) or monitoring plant performance. Water may also be lost via undetected leaks in water treatment plant structures and piping.

In addition to real losses, apparent water loss may also occur as a result of errors in the individual well meters, raw water influent plant Venturi meters, and finished water effluent meter readings. Analysis of the metered raw water flows and finished water flows for the plants is presented in the following sub-sections to quantify the overall water losses at the Orr and Hialeah/Preston WTPs. Although large quantities of water are used in the process for backwashing filters, feeding chemicals, etc., the great majority of this water is recycled back into the treatment process. Since all large process recycle streams occur internal to the plant, these flows are not measured twice by either the raw or finished water venturi meters.

4.1.1 Raw Water Flows

Raw water flows continued to be measured both at each individual well in the system and entering the treatment plants. In 2012 MDWASD;

- Contracted with GE Measurement and Control to conduct flow diagnostics of all the magnetic flow meters currently installed at all the supply wells in the system. The test results presented in the June 3, 2012 report titled "Well Water Flow Meter Verification Report" showed that all the meters are within the manufacturer's normal operating range and are registering flows accurately

- In 2012 the Department also conducted their biannual calibration of the flow transmitters at all the raw and finished water venturi meters in the three plants. Calibration reports indicated that all transmitters "passed" the calibration tests in both the "as found" and "as left" condition.

Table 4-4 Venturi Meter Calibration Results: Raw and Finished Water

LOCATION	METER DESCRIPTION	"AS FOUND" (AVG % VARIANCE)	"AS LEFT" (AVG % VARIANCE)
Orr	Finished Water #1	-0.112%	-0.112%
Orr	Finished Water #2	0.006%	0.006%
Orr	Finished Water #3	-0.002%	-0.002%
Orr	Finished Water #4	0.032%	0.032%
Orr	Finished Water #5	0.01%	0.01%
Orr	Raw Water #1	0.07%	0.07%
Orr	Raw Water #2	-0.042%	-0.042%
Orr	Raw Water #3	-0.068%	-0.068%
Orr	Raw Water #4	0.000%	0.000%
Hialeah	Finished B Flow Meter	0.2618%	0.2618%
Hialeah	Finished Low Pressure #4	0.001%	0.001%
Hialeah	Finished Low Pressure #5	-0.01196%	-0.01196%
Hialeah	Finished Water Miami Springs	0.19036%	0.19036%
Hialeah	Raw Water #1	0.0444%	0.0444%
Hialeah	Raw Water #2	0.60792%	0.0323%
Preston	Raw Water #1	0.02%	0.00%
Preston	Raw Water #2	0.00%	0.02%
Preston	Raw Water #3	0.13046%	0.13046%
Preston	Finished Water #1		0.088%
Preston	Finished Water #2		0.02%

Differences in measured flows at the wells vs. entering the plants or measured flows entering the plants vs. treated water being pumped into the system are consistent with results reported in 2011. Testing and calibration of the transmitters reflect that all are performing within the accuracy standards of the manufacturer.

4.1.1.1 Alex Orr Water Treatment Plant

Tables 4-4 and Figure 4-1 below compare the raw water flows metered at the well fields and the raw water flows metered at the plant.

Table 4-5 Alex Orr WTP Raw Water Flows

MONTH	SUM OF INDIVIDUAL WELL FLOWS	RAW WATER PLANT FLOWS	VOLUME DIFFERENCE	PERCENT DIFFERENCE
January	5,492	5,155	338	7%
February	5,100	4,787	313	7%
March	5,382	5,064	319	6%
April	5,136	4,888	248	5%
May	4,817	4,957	(139)	-3%
June	5,232	4,978	254	5%
July	5,620	5,347	274	5%
August	5,160	5,186	(26)	0%
September	5,119	5,033	86	2%
October	4,828	4,965	(137)	-3%
November	5,074	4,764	310	7%
December	5,570	5,259	311	6%
CY 2012 Avg	**5,211**	**5032**	**179**	**4%**

Source: MDWASD

At the Orr WTP the sum of the individual wells raw water flows registered on average 4 percent higher than measured at the plant raw water influent venturi meters. This is a reflection of both under/over registration and meter accuracies given that these totals reflect the sum of 38 individual meters- 34 remote well meters and 4 raw water venturi meters at the plant.

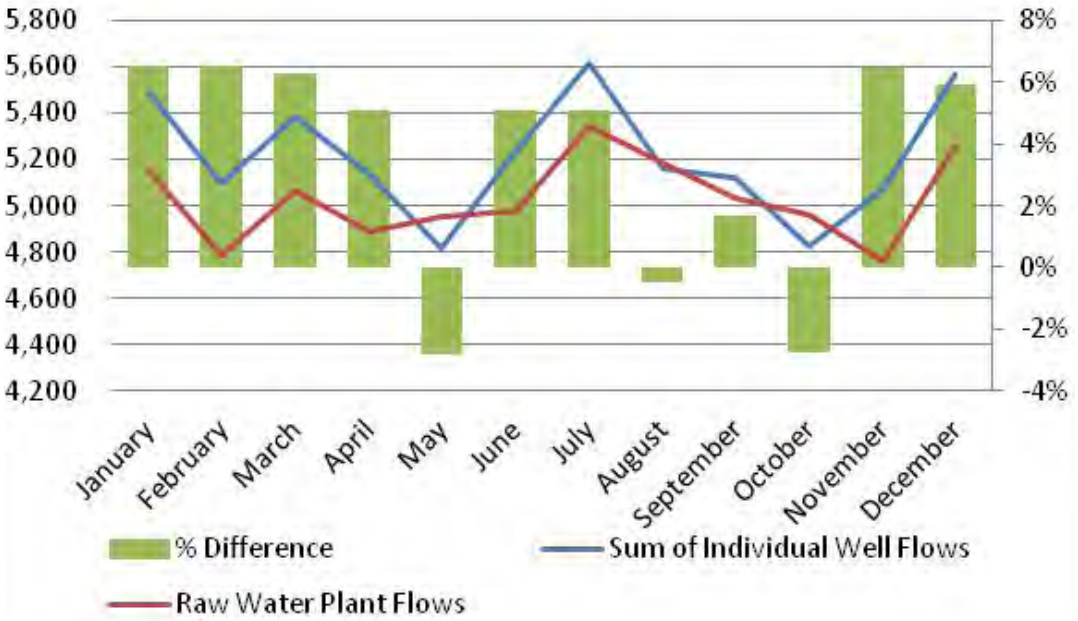


Figure 4-1- Alex Orr WTP Raw Water Flows

4.1.1.2 Hialeah and John Preston Water Treatment Plant

The Hialeah and Preston plants receive a combination of the flows coming from the Northwest and Miami Springs (Upper and Lower) wellfields in addition to the wellfields located within the plant sites. The Preston plant receives primarily flows from the Northwest wellfield but it also receives a portion of the flows from the Miami Springs upper wellfield. The Hialeah plant receives mostly flows from the Miami Spring wellfields but also receives a portion of flows from the Northwest wellfield.

Tables 4-5 and Figure 4-2 below compare the raw water flows metered at the well fields and the raw water flows metered at the Hialeah and Preston plants combined

Table 4-6 Hialeah & Preston WTPs Combined Raw Water Flows

MONTH	SUM OF INDIVIDUAL WELL FLOWS	RAW WATER PLANT FLOWS	VOLUME DIFFERENCE	PERCENT DIFFERENCE
January	4,589	4,509	79	2%
February	3,476	4,179	(703)	-17%
March	4,565	4,505	60	1%
April	4,605	4,515	90	2%
May	4,156	4,323	(166)	-4%
June	4,151	4,171	(20)	0%
July	4,163	4,044	119	3%
August	4,388	4,202	186	4%
September	4,075	3,824	251	7%
October	4,441	4,366	76	2%
November	4,557	4,471	86	2%
December	4,006	3,986	20	0%
CY 2012 Avg	4,264	4,258	7	0%

Source: MDWASD

The Hialeah/Preston combined sum of the individual wells raw water flows reflects both under/over registration throughout the year. However when looking at the total raw water pumped in CY2012 from the wells and raw water entering the plants, the difference is less than 0.5%. The monthly under/over registration of these totals reflect inherent meter inaccuracies given that these reflect the sum of 50 individual meters- 45 remote well meters and 5 raw water venturi meters at the two plants

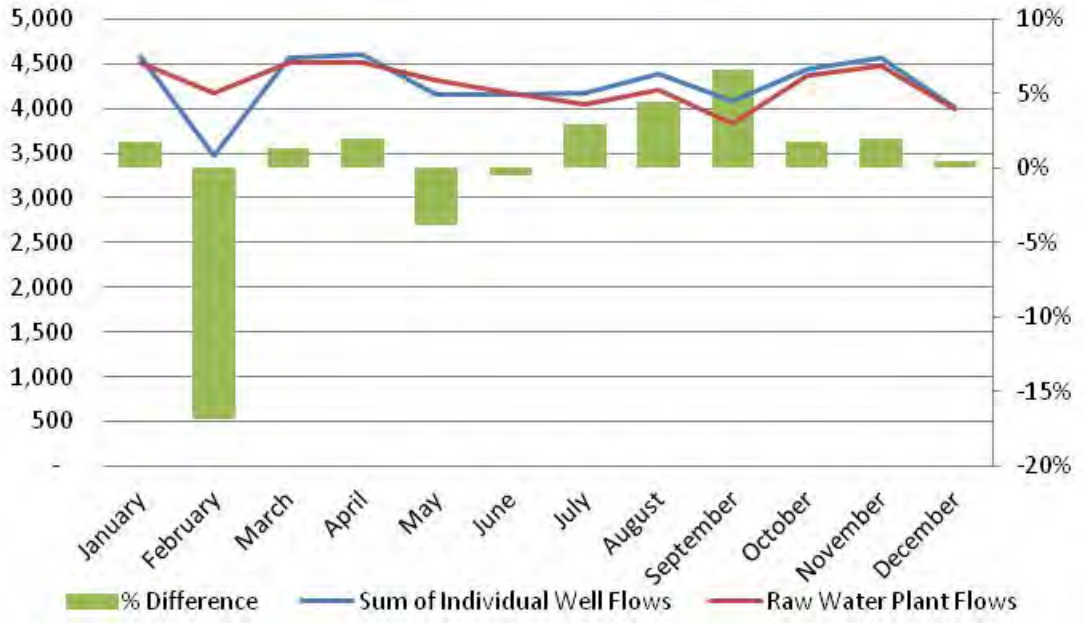


Figure 4-2 Hialeah/Preston Combined Raw Water Flows

4.1.2 Treated Water Flows

4.1.2.1 Hialeah and Preston Water Treatment Plants

Results presented in Figure 4-3 indicate that the raw water influent flow was on an average 20% more than the metered treated water at the Preston Plant.

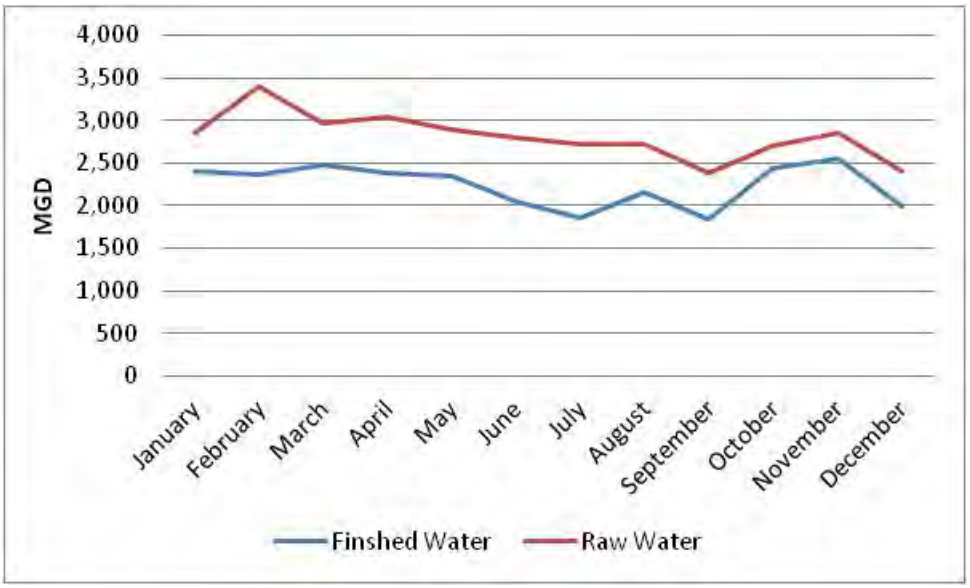


Figure 4-3 Preston WTP Difference between Treated and Raw Water Flows

Figure 4-4 indicates that the raw water influent flow was on average 20% lower than the treated water flow metered at the Hialeah Plant.

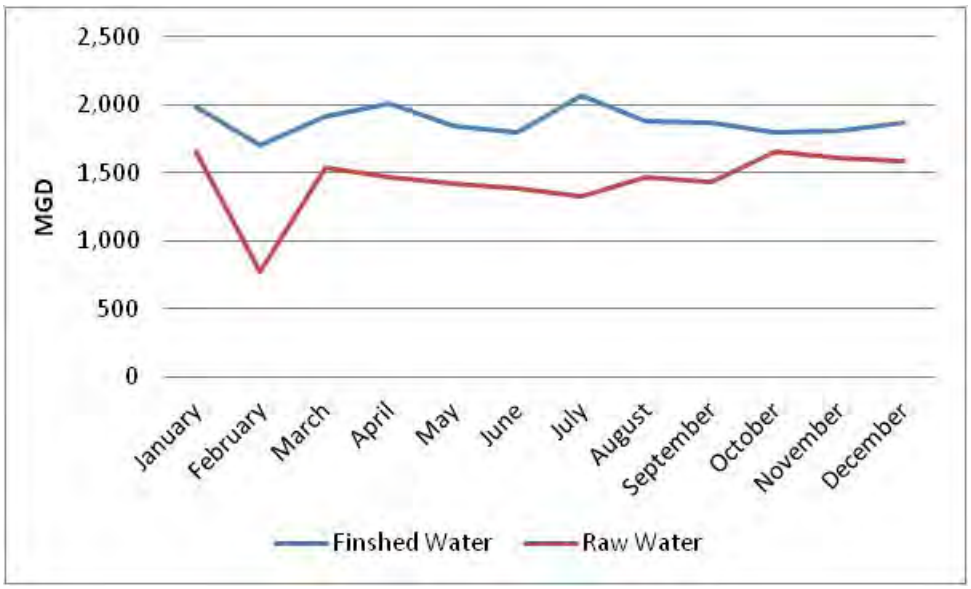


Figure 4-4– Hialeah WTP Difference between Treated and Raw Water Flows

When these two plant flows are combined and added up, the results indicate that, on average, there is less than a three percent water loss through the Hialeah/Preston treatment complex. This is shown in Figure 4-5 below. This is consistent with the results reported for calendar year 2011. .

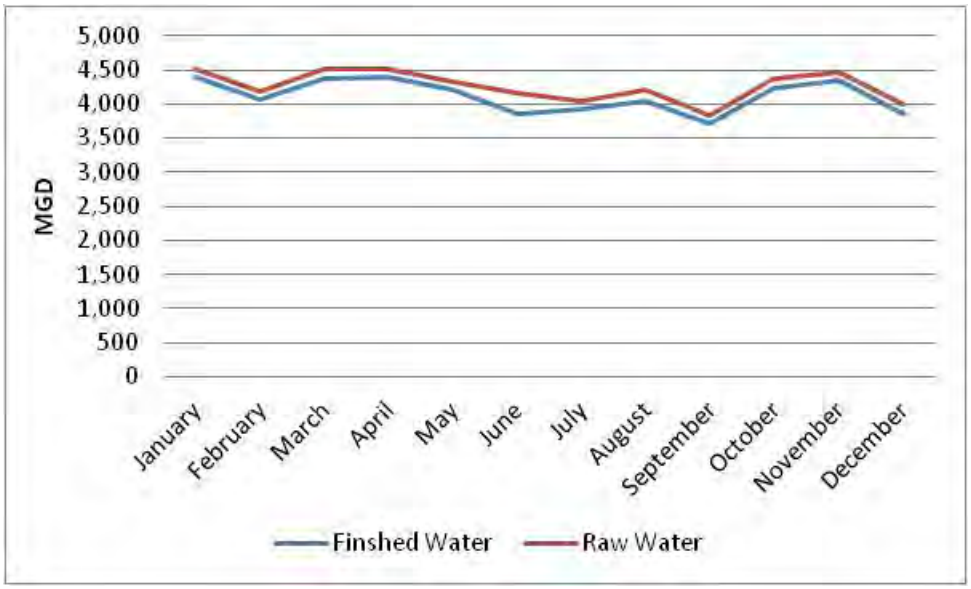


Figure 4-5– Hialeah/Preston WTPs Combined Difference between Treated and Raw Water Flows

The differences in the metered flows for each individual plant reflect the fact that they need to be combined given the hydraulics between the two plants. The Preston plant feeds treated water to the finished water clearwell at the Hialeah plant. This inter plant flow is not measured but explains the underegistration of treated water flows metered at Preston and over registration of treated water flows metered at the Hialeah plant.

4.1.2.2 Alexander Orr Water Treatment Plant

Table 4-6 below indicate that the raw water flows measured at the Orr plant were on average 1.5% higher than the treated water flows metered at the plant. This represents a water loss of less than two percent through the plant, and well within expected typical losses.

Table 4-7 Orr WTP Treated vs. Raw Water Flows

2012	TOTAL RAW WATER (MGD)	TOTAL FINISHED WATER (MGD)	DIFFERENCE (FINISHED LESS RAW)	% DIFFERENCE
January	5,155	5,077	(78)	-1.50%
February	4,787	4,714	(73)	-1.51%
March	5,064	4,986	(78)	-1.53%
April	4,888	4,813	(75)	-1.53%
May	4,957	4,879	(78)	-1.56%
June	4,978	4,903	(75)	-1.51%
July	5,347	5,269	(78)	-1.45%
August	5,186	5,108	(78)	-1.49%
September	5,033	4,958	(75)	-1.49%
October	4,965	4,887	(78)	-1.56%
November	4,764	4,689	(75)	-1.57%
December	5,259	5,181	(78)	-1.47%

Source: MDWASD

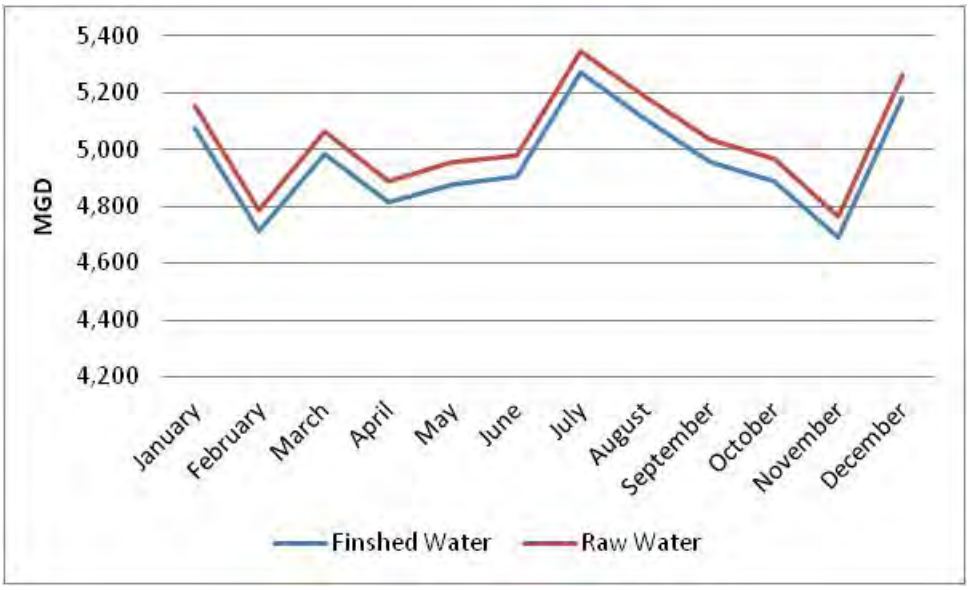


Figure 4-6 Orr WTP Difference between Treated and Raw Water Flows

4.1.3 Conclusions

Hialeah/Preston WTPs

Combined flows indicate- shown in Figure 4-5above- that, on average, there is less than a three percent water loss through the Hialeah/Preston treatment complex. This is consistent with the results reported for calendar year 2011 for the combined plants. This volume of loss is more commensurate with typical water losses through conventional treatment plants.

Raw water flow through a booster pump station installed in 2004 at the Preston WTP is not currently accounted for at the raw water Venturi meters at the Hialeah/Preston WTPs. It is recommended that MDWASD take actions to remedy this, which will allow for more accurate estimates of the raw and finished water losses to be estimated for subsequent years.

Orr WTP

Overall raw water discrepancies between the wellfields flow meters and the plant raw water meters increased at the Orr plant. All the well flow meters were replaced in 2011 and were tested and found accurate in 2012, and the Venturi meters transmitters were calibrated in 2012, so it's unlikely to be the result of meter accuracies

Apparent water losses were on average less than 1.5 percent. This is an improvement from 2011 water losses.

5 Results

Performance indicators are an important measurement tool, to make sure that the utility is keeping on track (with respect to its operational practices and to reduce any water losses) both internally and in comparison to its peers. The new standard methodology fundamentally breaks down each major aspect of water losses and uses into specific categories. This breakdown then allows for more detailed and accurate reporting, and more accurate targeting of the volume and cost of losses, thereby allowing targeting of resources to the areas most in need.

MDWASD appears to have reasonable performance as determined and recorded in Table 11 below. However, there are a number of variables such as the unauthorized use and unbilled unmetered consumption which still need to be calculated in future years to further validate these figures. Benchmark data is under development by AWWA, against which the data and results can be directly compared to in the future.

Table 5-1 – Performance Indicators FY 2012

INDICATOR	VALUE	UNITS
Validation Grading	78	out of 100
Non-revenue water as percent by volume of Water Supplied:	27.7%	%
Apparent Losses per service connection per day:	21.60	Gallons per connection per day
Real Losses per service connection per day:	119.64	Gallons per connection per day
Infrastructure Leakage Index	9.82	Dimensionless
Annual Cost of Apparent losses	$9,573,904	$
Annual Cost of Real Losses	$6,760,353	$

5.1 REAL WATER LOSS GOALS

MDWASD's Real loss performance indicators included the real loss in gallons per service connection of approximately 120, and Infrastructure Leakage Index (ILI) which is estimated to be approximately 9.6 in 2012. ILI is a dimensionless ratio of the Current Annual Real Losses (CARL) to the Unavoidable Annual Real Losses (UARL). It is a function of the number of miles of pipe, number of connections, and pressure in the system. Each of these variables has an effect on the leakage – as the values for miles, number of connections, and pressure increases, the UARL will increase. More details regarding calculation of the ILI can be found in AWWA manual M36 (third edition, 2009) and the AWWA free Water Audit Software.

Based on 2010 and 2011 benchmark data from the AWWA Water Audit Data Initiative, the average utility reported real loss of 63 gallons/connection/day.[1] As another point of comparison, an ILI

[1] Alan Plummer Associates, Inc. and Water Prospecting and Resource Consulting, LLC, January 24, 2007. *Final Report: An Analysis of Water Loss as Reported by Public Water Suppliers in Texas*, prepared for the Texas Water Development Board.

value of 3 is considered reasonable for utilities in the United States who have similar resource needs compared with MDWASD.[2]

5.2 APPARENT WATER LOSS GOAL

Apparent loss is water that is being used but for which the utility receives no compensation. Reducing apparent loss does not reduce water use, but does enhance utility revenue. Estimated apparent losses are approximately 20 gallons/connection/day. Based on the 2011 and 2012 AWWA National Water Audit Data Initiative (WADI) data, the average utility reported apparent loss of approximately 10 gallons/connection/day.

With respect to apparent losses, such as meter and billing inaccuracies, a target of 10 gallons/connection/day for apparent losses has been used in this analysis. It is theoretically possible to reduce apparent losses to zero, but this will not be possible due to the size and complexity of the MDWASD system, and the amount of funding that would be necessary.

The combination of best management practices and recommendations, which are proposed to improve the billing system, reduce meter inaccuracy, and further reduce leakage, can have a significant positive financial effect in the short-term. The program can start with a relatively small capital investment to research and reduce the billing inconsistencies and inaccurate meters. The resulting additional revenue can then be used to help enhance the meter replacement and leakage reduction programs in the near future, if additional funds for these programs are not immediately available.

The targets discussed in the previous section are excellent medium to long-term goals. However, a roadmap is needed to reach these goals. The recommended management strategies are the beginning of the process. These strategies should be reviewed at least every five years, preferably every two years to re-assess their effectiveness.

[2] AWWA Manual M36

6 Recommendations

There are many on-going activities which MDWASD will continue to conduct during the next audit year. These will include active leakage detection, testing and replacement of under-performing meters and testing and re-calibration of the production meters. In addition to these normal operational improvements it is recommended that the following programs are conducted in 2013.

1. Continue with the dual main replacement project. The replacement of the old galvanized service lines will have a significant effect on reducing water loss in the distribution system.

2. The Miami Springs pilot zone should be set up (this is the only unit of the distribution system that is ready made for a district analysis (one supply pipe with existing metered connection) with the following goals

    a. To install and analyze the effectiveness of new acoustic logger systems within a MDWASD network area.

    b. To comparatively analyze the effectiveness of a ground survey (ground microphones and correlators versus the data logging systems)

    c. Evaluate the data availability from the currently installed AMR system and use this data to perform a water loss analysis in the pilot zone.

    d. Continue with the development of the AMI system data evaluation software with Sensus Meter.

The true picture of what is physically lost out of the system will only be truly known after field validation of water losses through measurements such as district metered areas. In the short to medium-term the knowledge can be improved by more detailed evaluation of the metering and billing systems to improve the estimations of apparent losses (and so reduce the error in the remainder which is real loss). The WUP highlights areas for implementation (see Appendix C). In addition the initial review of the Audit Software results highlighted the following as possible issues

I. Validity of data – a number of the data evaluations were estimates which need additional work to prove and validate. The evaluation is only as good as the data used to develop it.

II. Leakage – There is a relatively large real loss volume expected to be leakage. Distribution and Transmission main leakage surveys will continue to be needed.

III. Meter accuracy – more analysis needs to be conducted to determine if meter accuracy is a problem. Testing data needs to be evaluated, and a detailed testing program for 1- to 2-inch meters initiated.

IV. Billing system accuracy – the relatively large water loss component means that evaluation of customer accounts to reduce apparent loss error from mis-classified or missing accounts is advisable.

6.1 RECOMMENDED BEST PRACTICE IMPROVEMENTS

Recommended items for best practice improvement include;

Validity of Data

1. Conduct discussions with the relevant staff for each of the priority items. Re-evaluate data from multiple years and remove or understand anomalies
2. Continue to evaluate calibration data and testing data for production/finished water meters on an annual basis. Estimate the master meter error adjustment. (Also see meter accuracy section for retail meter data validity)
3. Continue to conduct the audit on an annual cycle. Create a working group to analyze and assess water losses, and to create accountability for data.

Reduce Leakage

1. Conduct evaluation of surveys methods to improve active leakage control.
2. Construct pilot district metered area(s) and analyze actual leakage for specific system sectors.
3. Conduct additional "bottom-up" analysis of leakage results through testing in district areas to determine effectiveness of manual surveys versus acoustic noise loggers. Evaluate pressure management potential.

Meter Accuracy

1. Conduct testing of a selection of retail meters of 1-inch, 1.5-inch and 2-inch sizes to complement the work on the 5/8-inch and 3-inch and larger meters that were conducted in 2012. Record the average inaccuracy, weight the average depending on the volume through each meter size, and record in the audit for CY 2013 year.
2. Test the wholesale customer meters twice a year. Determine if there are any inaccuracies and record this in the overall audit.
3. Analyze master meter testing results every year, and note and calculate on the audit the discrepancies.

Billing System Accuracy

1. Conduct detailed review of billing system operations, including
    a. Review of large meter multipliers
    b. Review of classifications for accounts with change of use
    c. Cross-reference tax and utility records to water utility account records
2. Conduct pilot billing system assessment to make sure that there are no errors in accounting of data, or from meter readings to the billing system.

Some of the main business best practice changes which could be used to improve and reduce water losses are outlined in Sections 6.1.1 through 6.1.4

6.1.1 Validity of Data - Improving Validation

Improvements in validation could include annual review of data and more discussion regarding the scoring of the accuracy of data. The performance indicators developed above should be used in this effort. This is also completed within the AWWA Free Water Audit Software on a basic level (using a

1 to 10 scoring system), and this format could be included in the additional performance indicators. Staff would then review the scoring and the importance of the variable, and work towards improving the validation scores of the most important indicators.

Transparent analysis of data must be developed. A revenue enhancement team should be set up to include members from each department, who make sure all the data is reviewed, and estimates are replaced by actual data through increased validation. Each member should be accountable for their portion of the data set. The data set could be divided among team members in a similar format with the performance indicators. This group should meet at least every quarter. The departments involved in this team should include (but not be limited to): Administration/Management, Customer Service/Billing, Finance, Meter Maintenance, Operations, Personnel/Human Resources, Special Projects, and Treatment.

6.1.1.1 Continue Annual Water Audit

Conduct an annual water audit for the entire Department's system, and if possible for selected pressure zones. In addition, future auditing and reporting for the Department should be performed with either an overreaching audit department/management analyst or a third party auditor. This party will review the documentation, and report it annually to all departments (at least internally).

The AWWA methodology removes itself from the unaccounted-for-water percentages used in previous years, and focuses more on performance indicators such as gallons per connection. These indicators are generally more robust and less susceptible to climatic changes from year to year. It is expected that percentages will still be used by administration and budget staff. However, with respect to water losses percentage is a poor indicator and should be used sparingly.

Once performance trends are established, a staff member should be assigned to review and control the data. In many cases the most efficient method is to have a Management Analyst working full-time on this analysis. This work almost always pays for itself with the revenue enhancements and savings that this individual can find and help to manage reduction.

6.1.2 Reduce Leakage

General Department response and action with respect to water main breaks is equal to or above industry averages. There are some areas of possible improvement available in all three components of reported leakage: awareness, location, and repair.

The Department currently has an excellent active leakage control program, and this program should improve with the addition of extra staff. With respect to unreported leaks, the Department can improve by reducing the time to survey the system. However, there are significant constraints beyond the control of MDWASD which hamper this effort. These include the line location company time requirements which are set and fixed timelines. Once more detailed analysis of the costs and benefits of the leak detection program is performed; the actual reduction in water losses can be estimated. If the real losses are still greater than the ILI goal, then additional resources could be targeted to reduce the survey cycle further or otherwise improve the leak detection and repair process. This would reduce the run time of unreported leaks and reduce water losses proportionally.

To control leakage to the economic level,[3] an increased level of active leakage control beyond that currently employed by the Department is likely to be required. The current practice of utilizing acoustic noise loggers is excellent practice; however, this will not find all the leakage in a system due to the conflicting noises in a distribution system. Electrical transformers, street lights, pumping equipment and pipeline bends and constrictions can all cause noise signatures which can confuse the noise logging units. Therefore a component of this program should also include field staff conducting acoustic surveys with ground microphones, and listening to all the hydrants, valves, and fittings in targeted areas. Remote technology is an excellent tool, but it does not yet act as a total replacement for active surveys. Performance indicators showing the number of leaks, types of leaks, and identification method should be recorded and reported.

The current dual main replacement program will also aid the reduction of leakage as the old galvanized service lines in alleyways are known to be a major source of leakage wherever they are still part of the infrastructure mix. Also, hot-spot areas with unusually large leakage should be identified and measured through active surveys, and targeting methods such as District Metered Areas (DMA). This would allow better targeting of resources to the most problematic areas.

6.1.2.1 District Zone Active Leak Detection

Active leak detection should include the development of a DMA to improve the knowledge of actual amount of water loss in a pilot zone. This subsection also describes an overview of an active leak detection processes which could be used for the Department.

6.1.2.2 District Metering

District metering refers to recording all flows into a discrete area of the distribution system. Data regarding inflows into the discrete area provide the basis of an assessment of levels of water loss, as well as aiding in quantifying actual reductions in the levels of water losses achieved by various activities. Real loss is usually assessed based on the minimum flow rate in a given area. The Minimum Night Flow (MNF) usually occurs between 02:00 AM and 04:00 AM each morning, and is one of the most meaningful pieces of data for measuring leakage. However, in the Department-specific case, there will be sectors within the distribution system where the minimum flow rate does not occur during this period. Those areas with newer homes, which have automatic sprinkler systems, can change the water use characteristics considerably. Automatic sprinklers are often set between 2 AM and 4 AM. In these cases, it is more difficult to determine the minimum flow unless artificial methods are incorporated such as restricting outdoor water use to specific days of the week. During the lowest-use period, the pressure is higher, authorized consumption is at a minimum, and therefore, leakage is at its maximum percentage of the total flow. If there were days within the week where no irrigation was allowed, then it would be possible to continue with this practice during the rest of the year.

Analysis of minimum night flows requires the use of sophisticated techniques to determine legitimate night use, which include conducting an Assessed Night Use study. Currently no DMA studies have been conducted within the Department service area.

[3] At the economic level of water loss, the cost of additional water loss reduction outweighs the benefits.

6.1.2.3 Acoustic Leak Detection

The goal of district metering is to identify excess flows, and quantify reduction in water losses. The Department has excellent acoustic leak detection procedures. Acoustic leak detection surveys are needed to actually pinpoint unreported leaks by detecting leak noise. Leak "noise" simply refers to a hum (or hiss) caused by vibrations created on pipes, when pressurized water escapes through a crack or pinhole. Vibrations can also transfer onto pipes from traffic, other underground infrastructure, etc., but noises heard on fittings such as hydrants or valves alert technicians to possible leaks. Sophisticated computers (leak noise correlators) can be used to pinpoint the source of the vibration along the pipe. Acoustic leak detection surveys therefore describe technicians listening to hydrants and/or valves within the system.

Traffic, other underground utilities, and customer usage can also transfer vibrations onto water mains and services. These vibrations can mask leak noise as well as be misinterpreted. Correlating noise loggers offer the distinct advantage of being deployed during the day, but programmed to listen for leak noise overnight during periods when traffic and customer usage may be minimal.

6.1.2.4 Analysis of Flow and Pressure Data

Analysis of flow and pressure should be conducted in order to evaluate the greatest risk for leakage. In general, the higher the pressure, the greater the risk of leakage there is.

Figure 6-1 shows an example installation of a pressure logger on the outlet from a PRV.

Figure 6-1 - Example Pressure Logger Installation

6.1.2.5 Improve Current Leak locations practices

Decreasing leak awareness times can be accomplished by educating and engaging the public, utility staff, and private groups to be more vigilant in reporting leakage. This can be partially achieved through the existing Public Awareness Program. Leak location times can be reduced by utilizing

specific technology and by providing additional trained leak-locating crews. The limiting factor associated with faster repair times may be associated with obtaining timely utility locates. By improving other utility (gas, electric Department, etc.) location times, repairs can be completed in a more timely manner.

6.1.3 Meter Accuracy - Water Meter Testing and Replacement

Meter accuracy is one of the most important factors with respect to overall water losses in the Department system at the time of this project. Improvement in this area will not reduce the amount of water delivered, but will significantly increase revenues from previously under-performing meters. The following subsections outline some of the methods which can be used to analyze the true value of the losses and ways to alleviate them.

6.1.3.1 Volume Limits

A sample of residential meters with throughput volumes which are above the warranty limits (Table 10) for repaired meters should be tested. It is expected that there are a number of 2-, 1.5-, 1-, and $^{5}/_{8}$-inch meters with flow volumes in excess of the warranty limits. The 5/8-inch meters are already being tested as part of the 2012 program. This needs to be expanded to the larger meters.

Meter testing is expected to determine that degradation of the meter accuracy occurs at a rate of throughput greater than the warranty volume. This may be up to three times the warranty (as developed in previous studies, but only organized testing and analysis of these results will allow this to be determined.

Table 6-1 - Example Meter Volume Warranties

METER SIZE	UNITS	WARRANTY LIMITS	1.5 X WARRANTY
5/8-inch	CCF	2,005 (1.5MG)	3,008 (2.25 MG)
1-inch	CCF	4,010 (3MG)	6,015 (4.5 MG)
1.5-inch	CCF	6,684 (5MG)	10,026 (7.5 MG)
2-inch	CCF	10,694 (8MG)	16,041 (12 MG)

If the customer is using enough water for the meter to be out of warranty (through flow volume) within five years, then the customer should be contacted in an effort to reduce their usage to within the normal range of the meter warranty. If this is not possible, the meters should be changed out for meters with larger diameters (once meter-sizing analysis [see AWWA manuals M22 and M6 for more information] determines the best meter size for the customer). In addition, improvements in meter accuracy will improve revenue recovery from sewer usage charges. These need to be reviewed within this strategy.

6.1.3.2 Age Limits

Most meter replacement programs are based on age. In many cases, the turnover of meters is quicker than necessary. The same standardized testing regime used for volume of throughput should be completed for meters with respect to age as well. Tests from other systems have determined ages of replacement up to 25 years (depending also on other factors such as volume of throughput). This would be 10 years beyond the factory warranty limits, and could theoretically

defer 40% of normal expenditure on the meters compared to a repair policy just based on warranty.

It should be noted that we are not recommending a blanket meter replacement program of every 25 years. This is the expected average age of meters, due to programs and testing developed through careful study, and would need to be related to the Department specific data for it to apply to the Department as well. The structured approach evaluating volume, variations in high, intermediate, and low flow, as well as age and meter sizing is recommended.

6.1.3.3 Testing of Meters

The format of meter testing should follow the current AWWA standards. This is as follows:

Table 6-2 - AWWA Standard Flow Test Ranges

METER SIZE	UNITS	FULL	INT	LOW
5/8-inch	GPM	15	2	¼
1-inch	GPM	40	4	¾
1.5-inch	GPM	50	8	1.5
2-inch	GPM	100	15	2
3-inch	GPM	150	20	4
4-inch	GPM	200	40	7
6-inch[4]	GPM	500	60	12

Additionally, each test should include a "test blank" which is a new meter with known test history from the manufacturer. If this meter when tested is more than 2% outside the manufacturer tested range, then this meter should be sent back to the manufacturer for re-testing. If there is still a 2% discrepancy between the manufacturer's test and the test conducted by Department staff, then another representative test should be conducted by a "third-party" meter tester. Once this is conducted the correct analysis can be evaluated.

6.1.3.4 Conduct Assessment of AMR Implementation

Conduct an evaluation of the costs and benefits of the current AMR program, review expected timelines and costs for future maintenance and/or replacement. Currently the staff costs for billing are very low, and additional factors would be required to make a fixed network or similar AMR/AMI implementation cost effective. Staff would assess and report on these costs and benefits, and recommend the most advantageous program.

6.1.4 Billing System Accuracy

The Department has dedicated staff and processes in place to assist in detecting billing system inaccuracies; however many of these checks and controls are dedicated to high or low exceptions, meter changes, sub meter usage, and no-reads with limited checks for reviewing billing system accuracy on other bills.

[4] The large meter testing flow rates are being changed in the newest version of AWWA Manual M6 (Due December 2010). See this manual for more detailed testing information.

6.1.4.1 Review Unauthorized Uses

Conduct an analysis of theft of service, and customers not currently receiving the correct bill. This needs to be in conjunction with a billing analysis. Initial review would include analysis of customers with water service but no wastewater service, accounts that consistently read zero, identification of addresses with no service, etc.

6.1.4.2 Evaluate Mis-classified Accounts

Evaluate and correct accounts with mis-classified meter types (residential or irrigation) to enable more equitable cost of service for all customers. The water use associated with a sprinkler account is not assessed a sewerage charge, therefore any mis-classified accounts would need to be determined and changed.

6.1.4.3 Water Billing Data Quality Control

Although the Department has staff specifically dedicated to billing process and read exception analyses, additional resources would enhance the progress. Existing staff have other billing related tasks. Under this strategy, the Department would dedicate a full-time Management Analyst to oversee the water loss reduction and revenue enhancement program. Improvements in water loss reduction must be documented to show that the Department is improving, and that the investment committed to the Billing, Meter Maintenance, and Leak Detection/Operations departments is reducing these losses. The Management Analyst should interface with all relevant Departments, collate and organize all the data, and prepare reports on the performance of each area. This will include, but not be limited to, the following recommended activities:

- Review sewer usage charges to improve revenue recovery from inaccurate meters. This is an add-on to the analysis of meter accuracy. Since it is not exactly a one-to-one relationship between the inaccuracy of the water meter and the loss of sewer charges, this needs to be analyzed separately.
- Review customer accounts with a water account, but no wastewater account.
- Review fireline classification, and determine if any are unbilled.

6.2 ECONOMIC ANALYSIS OF LOSSES

In the current economic climate, financial pressure will drive all investments in infrastructure which can drive down leakage and apparent losses. It will be a very important next step to continue to evaluate the economic level of each of the water loss areas.

Focusing on one or more of the best practice improvements depicted above can have the effect of driving the annual water loss volume from the current level towards the unavoidable annual volume level. Somewhere in between will be the economic level for the utility to maintain. The economic level of losses is usually described as follows: when the savings from the recovered water exactly offset the expenditure to save the water. However, all new sources have an associated development cost. Therefore, the economic level of recovery for real losses should also account for the minimum amount that a new water resource can cost. This avoided cost is a more relevant baseline for the Department due to the future water resource constraints suggested in the 20 year planning horizon of the Water Use Plan.

Appendix A—Water Use Permit

FORM #0229
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 _____
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.

Last Date for Agency Action:
July 17, 2012

FINAL APPROVED BY EXECUTIVE DIRECTOR JULY 16, 2012

WATER USE STAFF REPORT

Application Number: 110511-6

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

Water Use Permit Status: MODIFICATION/RENEWAL

Location: MIAMI-DADE COUNTY,
S-/T53S/R39E
S-/T53S/R40E
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

Applicant's Name and Address: MIAMI-DADE WATER AND SEWER DEPARTMENT
P O BOX 330316
MIAMI, FL 33233-0316

Water Use Classification: Public Water Supply
Aquifer Storage And Recovery

Sources: **Ground Water from:** Biscayne Aquifer
Upper Floridan Aquifer

Authorized Allocation:

Annual Allocation:	149,906	Million Gallons (MG)
Maximum Monthly Allocation:	13,117	Million Gallons (MG)

Existing Withdrawal Facilities - Ground Water

Source: Biscayne Aquifer
1 - 18" X 66' X 1500 GPM Well Cased to 53 Feet
1 - 30" X 115' X 2500 GPM Well Cased to 80 Feet
2 - 24" X 70' X 6945 GPM Wells Cased to 35 Feet
1 - 42" X 68' X 8500 GPM Well Cased to 54 Feet
1 - 30" X 115' X 4170 GPM Well Cased to 80 Feet
1 - 14" X 115' X 3800 GPM Well Cased to 80 Feet

Source: Biscayne Aquifer
1 - 16" X 50' X 1600 GPM Well Cased to 40 Feet
1 - 6" X 30' X 400 GPM Well Cased to 25 Feet
7 - 16" X 100' X 4170 GPM Wells Cased to 40 Feet
1 - 42" X 68' X 8500 GPM Well Cased to 60 Feet
1 - 24" X 70' X 3470 GPM Well Cased to 35 Feet
1 - 16" X 100' X 7500 GPM Well Cased to 40 Feet
6 - 42" X 107' X 7000 GPM Wells Cased to 66 Feet
1 - 18" X 55' X 1500 GPM Well Cased to 42 Feet
1 - 12" X 40' X 800 GPM Well Cased to 35 Feet
4 - 24" X 108' X 8300 GPM Wells Cased to 50 Feet
3 - 48" X 88' X 7500 GPM Wells Cased to 33 Feet
1 - 18" X 50' X 500 GPM Well Cased to 40 Feet
4 - 24" X 104' X 6940 GPM Wells Cased to 54 Feet
1 - 18" X 65' X 1500 GPM Well Cased to 50 Feet
1 - 12" X 35' X 1200 GPM Well Cased to 30 Feet
6 - 20" X 100' X 4900 GPM Wells Cased to 40 Feet
2 - 24" X 100' X 7500 GPM Wells Cased to 50 Feet
4 - 24" X 100' X 4900 GPM Wells Cased to 35 Feet
1 - 48" X 80' X 10416.67 GPM Well Cased to 46 Feet
10 - 48" X 80' X 10420 GPM Wells Cased to 46 Feet
1 - 42" X 68' X 10000 GPM Well Cased to 54 Feet
1 - 18" X 55' X 1500 GPM Well Cased to 45 Feet
1 - 42" X 107' X 7000 GPM Well Cased to 69 Feet
2 - 12" X 40' X 1600 GPM Wells Cased to 35 Feet
20 - 14" X 115' X 2500 GPM Wells Cased to 80 Feet
4 - 40" X 100' X 10420 GPM Wells Cased to 57 Feet
1 - 12" X 35' X 800 GPM Well Cased to 30 Feet
1 - 42" X 68' X 10000 GPM Well Cased to 60 Feet
Source: Upper Floridan Aquifer
1 - 30" X 1200' X 3500 GPM Well Cased to 765 Feet
6 - 17" X 1490' X 1400 GPM Wells Cased to 1080 Feet
1 - 30" X 1210' X 3500 GPM Well Cased to 835 Feet
1 - 30" X 1300' X 3500 GPM Well Cased to 850 Feet
1 - 30" X 1250' X 3500 GPM Well Cased to 845 Feet
1 - 30" X 1200' X 3500 GPM Well Cased to 760 Feet
1 - 17" X 1490' X 1400 GPM Well Cased to 1150 Feet

Proposed Withdrawal Facilities - Ground Water

Source: Biscayne Aquifer
1 - 24" X 50' X 1400 GPM Well Cased to 45 Feet
1 - 24" X 50' X 2800 GPM Well Cased to 45 Feet
3 - 24" X 72' X 1400 GPM Wells Cased to 45 Feet
Source: Upper Floridan Aquifer
1 - 24" X 1200' X 2340 GPM Well Cased to 1100 Feet
6 - 24" X 1200' X 2430 GPM Wells Cased to 1100 Feet
7 - 17" X 1490' X 1400 GPM Wells Cased to 1080 Feet

Rated Capacity

Source	Status Code	GPM	MGM	MGY
Biscayne Aquifer	E	518,777	22,710.0	272,669
Upper Floridan Aquifer	E	27,300	1,195.1	14,349
Biscayne Aquifer	P	8,400	367.7	4,415
Upper Floridan Aquifer	P	26,810	1,173.6	14,091
Totals:		**581,287**	**25,446.4**	**305,524**

PURPOSE

The purpose of this application is to renew and modify a Water Use Permit for public water supply for the Miami-Dade Water and Sewer Department (MDWASD) service area serving 2,787,451 persons in the year 2030 with an average finished water per capita use rate of 140 gallons per day (gpcd) and a maximum monthly to average monthly pumping ratio of 1.05:1. Withdrawals are from the Biscayne aquifer via 95 existing and 5 proposed withdrawal facilities and from the upper Floridan aquifer system (FAS) via 12 existing withdrawal (7 Hialeah RO wells and 5 ASR wells) facilities and 14 proposed withdrawal facilities. No changes to the finished water demand projections or existing permit expiration date are requested.

The following modifications to the existing water use permit are recommended:

Facility Changes: - Add proposed South Miami Heights (SMH) FAS well field (Exhibit 3L), consisting of 8 wells (7 production and 1 monitor) with an allocation of 23.3 million gallons per day (MGD). Increase the allocation from the Hialeah FAS well field from 19.95 to 23.3 MGD. Remove seven previously proposed Biscayne aquifer wells in the SMH wellfield (CP1, CP2, RHP5, RHP6, RHP7, RPP1, RPP2). Update locations of proposed Floridan aquifer wells at Hialeah wellfield (Exhibit 3B).

Allocation Changes: - Reduce Biscayne aquifer allocation by 22.7 MGD, from 141,824 million gallons per year (MGY) (388.56 MGD) to 133,539 MGY (365.9 MGD) due to the change in source from the Biscayne aquifer to the FAS for the proposed SMH Wellfield, and a reduction of 18.12 MGD from the SMH System (which was credited in the previous permit based on the proposed implementation of the South District WRP Groundwater Recharge project). Increase the Floridan aquifer allocation from 7,282 MGY (19.95 MGD) to 17,009 MGY (46.6 MGD) through the addition of the SMH FAS and the increase from the Hialeah FAS. Adjust the Biscayne aquifer base condition pumping rate from 347 MGD to 349.5 MGD, based on modeling which demonstrates that additional water can be derived from certain wellfields without inducing seepage from regional waterbodies, as well as accounting for a transfer of 9.1 MGD of base condition allocation from the North (Hialeah/Preston) system to the City of North Miami Beach (Exhibit 10C). All proposed Biscayne aquifer withdrawals above the base condition water use of 349.5 MGD are to be offset through the use of reclaimed water to recharge groundwater and canals in the vicinity of the wellfields and have been shown to prevent increased withdrawals from Everglades water bodies.

Shift the Biscayne aquifer base condition in the Central System by reducing the allowable pumpage at the Alexander Orr Wellfield to 40 MGD (from 62 MGD) and increasing the Biscayne aquifer pumpage at the Southwest Wellfield to 110 MGD (from 85.9 MGD).

Reuse Projects: - Remove from permit a requirement to provide up to 18.6 MGD of advanced treated reclaimed water to provide aquifer recharge upgradient of the South Miami Heights area, in the vicinity of the Zoo Miami.

These changes result in a total Biscayne aquifer allocation reduction from 388.56 MGD to 365.9 MGD.

PROJECT DESCRIPTION

The Miami-Dade Consolidated Public Water Supply (PWS) project is a currently permitted (13-00017-W) project located in eastern Miami-Dade County (Exhibit 1). The Miami-Dade Water and Sewer Department (MDWASD) is permitted to provide potable water from 15 wellfields (Exhibit 3A) to a projected population of 2,787,451 persons in the year 2030. MDWASD's service area is depicted on Exhibit 2A. Withdrawals are from the Biscayne aquifer via 95 existing and 5 proposed withdrawal facilities and from the upper Floridan aquifer via 12 existing withdrawal facilities (7 Hialeah RO wells and 5 ASR wells) and 14 proposed withdrawal facilities. See Exhibits 3B-3R and 5A-5R.

SYSTEM DESCRIPTION

The overall system is divided into North, Central and South systems with some interconnection between the systems at the treated water distribution level (Exhibits 2B and 3A).

The North system includes the Hialeah and John E. Preston Water Treatment Plants (WTPs), which are supplied by the Hialeah, Preston, Miami Springs (upper and lower) and Northwest wellfields and by the Medley wellfield on an emergency basis. A reverse osmosis (RO) treatment plant, producing 10 MGD of treated FAS water from 14 Floridan aquifer wells, is expected to begin operation in by the end of 2012 (Phase 1) in the City of Hialeah. The Hialeah FAS system will ultimately produce 17.5 MGD of treated water water upon completion of Phase 3 in 2026 (Exhibit 13). See Exhibits 3B-3G for well locations for the North System.

The Central system includes the Alexander Orr, Jr. WTP, which is supplied by the Alexander Orr, Snapper Creek, Southwest and West Wellfields. There are 3 existing ASR Floridan aquifer wells at the West wellfield and 2 at the Southwest wellfield.

An additional 21 MGD (above the calculated base condition of 85.9 MGD) is expected to be withdrawn from the Southwest wellfield (SWWF) beginning in 2021, and an additional 16 MGD, for a total of 37 MGD over the calculated base condition is expected to be withdrawn beginning in 2028, for a total of 122.9 MGD (see Exhibit 8A Column 24). These additional withdrawal rates are required to be offset on a 1:1 basis by applying reclaimed water between the SWWF and regional waterbodies. Up to 37 MGD of advanced treated reclaimed water from the proposed West District Water Reclamation Plant is required to provide aquifer recharge in the vicinity of the Southwest wellfield to offset these proposed increases in withdrawals.

For this permit modification, modeling was conducted to show that the base condition allocation for the Southwest Wellfield can be increased from 85.9 MGD TO 110 MGD (an additional 24.1 MGD) by reducing the base conditon allocation for the Alexander Orr Wellfield from 62 MGD to 40 MGD without inducing additional seepage from the Regional Waterbodies. This shift in allocation from Alexander Orr to the Southwest Wellfield will allow the ASR wells to be used on a regular basis storing Biscayne aquifer volumes not exceeding the Biscayne aquifer wellfield limits. See Exhibits 3H-3K for well locations for the Central System. Exhibit 10C shows components used to derive the modified Biscayne aquifer base condition for the various well fields.

The South system currently consists of 5 wellfields and associated equipment: 1) Everglades Labor Camp, 2) Leisure City, 3) Newton, 4) Elevated Tank, and 5) Naranja. A new South Miami Dade membrane-softening WTP is scheduled to provide water service to this area by 2015. Two new Biscayne aquifer well fields in South Miami Heights (SMH), at the Former Plant site and Roberta Hunter Park, will provide 3 MGD of raw water to the new membrane plant. A new 23.3 MGD FAS wellfield and RO treatment plant capable of providing 17.5 MGD of treated water will also be constructed in the SMH area. See Exhibits 3L-3R for well locations. Leisure City, Elevated Tank and Naranja WTPs and wellfields will be taken off-line upon operational status of the new South Miami-Dade membrane WTP and the

PROJECT DESCRIPTION (CONTINUED)

Everglades and Newton facilities will go to standby status.

PERMIT HISTORY

North Miami-Dade:

The South Florida Water Management District (SFWMD or District) issued the first Water Use Permit for the Hialeah-Preston Water Treatment Plants (Water Use Permit No. 13-00018) on February 7, 1975 with an annual allocation of 38.74 billion gallons per year (BGY) (106.14 MGD) from the Miami Springs, Medley, Hialeah and Preston Wellfields. This permit 13-00018-W was reissued on February 12, 1981 for a ten-year period and an annual allocation of 45.62 BGY (124.97 MGD). The first WUP for the Northwest Wellfield (WUP No. 13-00037-W) was issued on September 4, 1975 for an annual allocation of 18.15 BGY (50 MGD). The Northwest Wellfield permit 13-00037-W with an annual allocation of 60.23 BGY (165 MGD) was issued on March 12, 1987.

The Hialeah-Preston and Northwest permits were combined into one master permit No. 13-00037-W on March 14, 1991. The permit authorized a withdrawal of 60.20 BGY, an average daily withdrawal of 164.93 MGD, and a maximum daily withdrawal of 197.91 MGD. In February 1999, the permit was reissued for an annual allocation of 72,703 million gallons (MG) (72.7 BGY) and a maximum day allocation of 235.04 MGD. The permit included a maximum pumpage from the Northwest Wellfield of 155 MGD, and 70 MGD from the Hialeah, Preston, and Miami Springs Wellfields, and the remainder, but not limited to 10 MGD from the ASR wells. The permitted wellfields include 45 Biscayne aquifer production wells located in the Hialeah, Preston, Miami Springs and Northwest Wellfields. An application to modify the permit was received on January 8, 2001. The permit expiration date was February 11, 2004.

Central Miami-Dade:

The SFWMD issued the first WUP for Alexander Orr, Southwest and Snapper Creek wellfields (No. 1300017-W) on February 7, 1975 with an annual allocation of 30.66 BGY (84 MGD). On September 4, 1975, the annual allocation was increased to 34.31 BGY (94 MGD). The permit was renewed on December 13, 1979 with an annual allocation of 47.45 BGY (130 MGD) and included the allocations and service areas previously associated with WU Ps 13-00028-W, (Florida Water & Utilities), 13-00058-W (General Water Works), and 13-00067-W (South Miami Heights). On April 10, 1986, the permit was renewed with an annual allocation of 60.408 BGY (165.5 MGD), and a maximum day allocation of 198.2 MG. The permit was renewed again on November 10, 1993 with an annual allocation of 66.231 BGY (181.45 MGD) from the Alexander Orr, Southwest, Snapper Creek and West Wellfields. In May 1995, the SFWMD issued Water Use Permit No. 13-00017-W for the Alexander-Orr WTP with an annual allocation of 74,136 MG (203.11 MGD), and a maximum day allocation of 241.60 MGD, of which 23.96 MGD are allocated to ASR. The permit expiration date was May 11, 2004 and an application to renew and modify the permit was received on the expiration date.

South Miami-Dade:

Water use permit No. 13-00040-W was initially issued to Rex Utilities, Inc. on March 18, 1976 with an annual allocation of 4.15 BGY (11.4 MGD) and a maximum day of 14.8 MGD. Subsequently, MDWASD acquired the facilities that are now known as the South Miami-Dade Water Supply System. The original permit was modified and renewed on July 8, 1982 with an allocation of 3.76 BGY (10.61 MGD) and a maximum day of 15.9 MGD for the six wellfields. The permit expired on July 8, 1992 and was reissued to MDWASD on July 14, 1994 with an allocation of 3.873 BGY (10.61 MGD) and a maximum day of 15.92 MGD. On July 11, 1998, the permit was renewed again with an allocation of 3.902 BGY (10.69 MGD) and a maximum day of 13.58 MGD. On March 13, 2003, the SFWMD re-issued permit number 1300040-W

PROJECT DESCRIPTION (CONTINUED)

with an annual allocation of 3.997 BG (10.95 MGD), and a maximum daily allocation of 13.4 MGD and authorization to install four new wellfields to supply water to a new membrane softening WTP. The permit expiration date was March 13, 2008.

Consent Agreement:

On May 10, 2006, Miami-Dade County and the SFWMD entered into an Interim Consumptive Use Authorization and Agreement. The agreement authorized withdrawals of up to 349.76 MGD for a duration of 18 months, required completion of a list of tasks to respond to an outstanding Request for Additional Information necessary to issue a 20 year permit, granted 18 months to complete the tasks and required the County to develop a plan to use alternative sources to meet all future demands over 347 MGD.

Consolidated Permit:

On November 15, 2007, permit 13-00017-W was renewed and consolidated all facilities and water demands of permits 13-00017-W, 13-00037-W and 13-00040-W into one permit. It was issued with a duration of 20 years, an annual allocation of 152,741 MGY (418.47 MGD) and a maximum monthly allocation of 13,364 MGM. Along with the existing wellfields and the proposed South Dade wellfield, a new Floridan aquifer wellfield and reverse osmosis plant were proposed in Hialeah. The Biscayne aquifer base condition was established at 347 MGD, pursuant to Section 3.2.1E of the BOR, Regional Water Availability. Additional groundwater modeling conducted during the permit review showed that an additional 5.0 MGD (1.5 MGD at Snapper Creek, 1.5 MGD at Southwest, 0.5 MGD at Newton and 1.5 MGD at Everglades wellfields) would not cause a net increase in volume or cause a change in timing of surface and groundwater from Everglades water bodies. Groundwater and canal recharge projects were required to offset proposed increased Biscayne aquifer withdrawals beyond the calculated Base Condition limit of 347 MGD.

On November 1, 2010, the consolidated permit (13-00017-W) was modified (to remove proposed FAS blending wells and re-start the existing ASR wells) and renewed for a 20 year duration, with an annual allocation of 149,106 MGY (408.51 MGD) and a maximum monthly allocation of 13,047 MGM to provide potable water to a projected population of 2,787,451 persons in the year 2030.

PROJECTED WATER USE DEMANDS

There are no requested modifications to the projected demands. From the previous staff report, the permittee estimates a 2030 population of 2,787,451 persons. The initial per capita use rate (145.4 gallons per capita per day) was calculated from a three year average for 2006 - 2008 (see Exhibit 7). In accordance with Table G (Exhibit 8), the per capita use rate is projected to decline over the 20 year life of the permit as a result of water conservation measures (see column 8 of Exhibit 8A) from 145 to 140 gallons per capita day in 2030. The raw water per capita is higher due to treatment losses. The maximum monthly peaking ratio (1.05) was calculated by dividing the peak monthly rate by the average monthly rate for the three year time period of 2007 - 2009.

Staff recommends an annual allocation of 150,533 million gallons (412.42) MGD through the year 2030. Staff further recommends a maximum month allocation of 13,172 MG/MO based on a maximum month to average month ratio of 1.05. These total allocation values are slightly higher than shown in the previous permit due to the greater reliance on the FAS and the lower efficiency of treating this water with RO technology. See Exhibit 8A for projected demand tables and Exhibit 9 for a step chart of raw supply and finished demand. Pursuant to Limiting Condition 5, withdrawals from the Biscayne aquifer and upper Floridan aquifer are further limited in 10 year increments based on projected demand. The reuse offsets in Limiting Condition 5 are derived from column 6 of Exhibit 8A. Additional restrictions on individual

wellfield withdrawals are contained in Limiting Conditions 28 through 35.

HYDROLOGIC MODELING

Modflow

FAS - Hialeah Wellfield:

Impacts due to the operation of the proposed Hialeah RO Wellfield were evaluated prior to the issuance of the 2010 permit. The City of Hialeah's consultant (Schlumberger Water Services) ran the SFWMD East Coast Floridan Aquifer System (ECFAS) SEAWAT model developed for the SFWMD. The model has 14 layers representing the surficial aquifer System to the Boulder Zone and includes all or part of seven counties. The applicant created a local scale model in the vicinity of the Hialeah RO wellfield based on the regional model. The local model has 106 rows, 112 columns and grid spacing between 75 and 2,400 feet. The 14 model layers were maintained, however the depths of some layers were adjusted based on local field data (see Exhibit 26A). The open interval of the Hialeah RO wells is within layers 3, 4 and 5 of the model. The model was calibrated to the results of a 5 day pump test of well R01 Hialeah with three monitor wells. Hydraulic conductivity was 90 feet per day, storativity was 5.25E-07 and the ratio of horizontal to vertical hydraulic conductivity was set to 0.1 in the model.

The Hialeah wellfield includes 14 wells (including 12 primary production wells and 2 backup wells) with a total pumping capacity of 23.33 MGD. Pumpage in the model was distributed among all 14 wells. Predictive simulations were run for 30 years with pumpage rates varying from 13.33 MGD to 23.33 MGD. The maximum drawdown when pumping 13.33 MGD is predicted to be 65 feet with an increase in chloride concentration from the initial value of 1,650 milligrams per liter (mg/l) to 1,875 mg/1. The maximum drawdown when pumping at 23.33 MGD is predicted to be 107 feet with chloride concentrations increasing to 2,025 mg/1. See Exhibit 26B and 26C for drawdown maps.

FAS - South Miami Heights

MDWASD is proposing to use the Floridan aquifer as an alternative water supply source to meet the expected demands for the planned SMH wellfield. The location of the wellfield is shown on Exhibit 3L, and the well construction details are shown on Exhibit 5. MDWASD is proposing a maximum monthly withdrawal rate of 23.3 MGD raw Floridan aquifer water, which will result in 17.5 MGD of treated water, based on 75 percent treatment efficiency. The SMH FAS Wellfield consists of 8 wells with a withdrawal rate of 3.0 MGD each for a design withdrawal capacity of 24 MGD.

To assess the impacts from the proposed withdrawals from the SMH Floridan aquifer system wellfield, the City developed an uncalibrated MODFLOW model consistent with Section 1.7.5.2 A of the BOR. A report detailing the model development and results are contained in the permit file. This report describes modeling and results for an 18 MGD SMH RO Wellfield. Additional modeling was performed subsequent to this report with a withdrawal rate of 24 MGD from 8 wells for the SMH FAS Wellfield. Individual and cumulative drawdown maps shown in this staff report (Exhibits 26D and 26E) reflect the 24 MGD withdrawal rate.

The closest wellfields to SMH have existing drawdowns based on the modeled results of 44.09 feet for Florida Power and Light (FPL), and 12.18 feet for Florida Keys Aquaduct Authority (FKAA - 13-00005-W). Exhibit 26F shows existing legal users in the area and Exhibit 26E shows the cumulative drawdowns for existing legal users. SMH lies just outside the 1 foot drawdown contour of FPL and FKAA.

Results of the model run simulating SMH only with a continuous withdrawal for 90 days at 24 MGD were analyzed for the 1 foot drawdown contour. This simulation represents the cone of depression in the upper Floridan aquifer due to pumping of only the SMH wellfield. The MDWASD ASR facility at the

SWWF lies just inside the 1 foot contour, while the MDWASD WWF ASR facility, FPL and FKAA lie outside the 1 foot drawdown contour. Drawdowns were 0.58 feet at the West wellfield (WWF) ASR, 1.28 feet for SWWF ASR, 0.54 feet at FPL, and 0.21 feet at FKAA.

Results were analyzed for the continuous withdrawal for 90 days of SMH at 24 MGD and existing legal users at their permitted allocation. Drawdowns were observed at WWF of 0.63 feet, at SWWF 1.36 feet, at FPL 44.63 feet, and at FKAA 12.39 feet. Exhibit 26E shows the cumulative drawdown due to pumping at SMH and existing legal users.

The WWF and SWWF ASR facilities are designed to inject freshwater for later retrieval as part of ASR operations. In order to assess possible impact to the operation of these facilities as a result of SMH withdrawals on the ASR operation, MODPATH, a particle tracking post-processing package for MODFLOW (Pollack, 1994) was run. Particles were added directly to south of the SWWF ASR well model cells. Simulation 5 was run for 30 years first in MODFLOW, and then MODPATH was run in order to assess particle movement. The MODPATH model run was analyzed to assess the impact of SMH and the existing legal users on the SWWF ASR system. After a run of 30 years, particles traveled 365 feet from their original position. Because the residence time of fresh water injected into the ASR wells will typically be around 6 months, the travel distance of the fresh water bubble should be substantially less than that calculated for 30 years and should not have a significant impact on the ability of the ASR wells to recover the fresh water bubble.

Modflow

Biscayne Aquifer:
For the 2010 permit issuance, modeling was performed to assess impacts from the existing and proposed withdrawals on the Biscayne aquifer. The applicant used the SFWMD Lower East Coast subRegional (LECsR) Modflow model, modified to meet the requirements for permit applications. The model is documented in a draft SFWMD publication dated March 2006. The model cells are 704 feet by 704 feet and the model domain extends from the St. Lucie Canal and River in Martin County south to Biscayne Bay in Miami-Dade County. Additionally, it extends from the western county boundaries of Martin, Palm Beach, Broward and Miami-Dade counties to the Atlantic Ocean. The model has daily time steps and simulates 14 years from January 1986 to September 1999.

For the 2010 permit, the model was calibrated for the time period July 1988 to March 1990. This 21 month period included 3 months of average rainfall conditions followed by 15 months of 1-in-10 year drought conditions and then 3 months of average conditions. This time period was also used for the predictive runs. The C-100, C-102, C-103, C-1, C-1 N, C-1W and L-31 canals were calibrated to flow data between water control structures. Monitor wells at each wellfield were used to check local calibration and at least three wells at each wellfield had model water levels that were within 1 foot of actual water levels for the 1-in-10 year drought period. Permitted users within the 0.1 foot cone of influence of each wellfield were included in the cumulative model runs submitted by the applicant. These 2010 predictive model scenarios are listed in Exhibit 23.

Effects of Shifting Base Condition Allocation from Alexander Orr to Southwest Wellfield:
Base Condition water use was established for each Biscayne aquifer wellfield, consistent with Section 3.2.1E of the BOR, in the permit issued in 2007. In 2010 the permit was modified allowing the withdrawal of up to 388 MGD of groundwater from the Biscayne aquifer. This quantity of water was granted based (in part) on an evaluation of the impact of MDWASD's groundwater withdrawals on Regional Waterbodies under its Base Condition Water Use and its requested allocation. As defined by

Section 3.2.1E of the BOR, Base Condition Water Use is the maximum quantity of water withdrawn during a consecutive 12-month period between 2001 and 2006. The amount of seepage from Regional Waterbodies (primarily SFWMD Canals and Everglades National Park) induced by MDWASD's groundwater pumpage under Base Conditions was evaluated with the LECsR groundwater model developed by the SFWMD. This model was also used to evaluate the impacts associated with MDWASD's projected water demands. As many of MDWASD's wells did not have flow meters, the Base Condition groundwater pumpage rates for several wellfields were estimated. Exhibit 10C shows the Base Condition groundwater pumpage rates for MDWASD's Biscayne aquifer wellfields established in 2007, as well as the Modified Base Condition resulting from subsequent modeling and a shift of base condition from this permit to the City of North Miami Beach (13-00060-W).

In compliance with Limiting Condition 17 of the 2007 permit, MDWASD began installing flow meters in all of its wells and recalibrating wells with existing flow meters. It was discovered that the actual capacity of its Alexander Orr Wellfield is on the order of 35 MGD, which is approximately 27 MGD less than that assumed for the Base Condition (62 MGD).

Limiting Condition No. 31 limited annual withdrawals from the Southwest Wellfield to 85.9 MGD. However, the capacity of the Southwest Wellfield is considerably higher (approximately 161 MGD). MDWASD requested to shift 20 mgd to 30 mgd of groundwater pumpage from the Alexander Orr Wellfield to the Southwest Wellfield to maximize its production capabilities at the Alexander Orr WTP.

The LECsR model was used by the applicant's consultant to evaluate the impacts on Regional Waterbodies resulting from the proposed shift in Base Condition allocation. A technical report documenting the modeling effort and the results is contained in the permit file. The modeling compared withdrawals from the Alexander Orr and Southwest wellfields as established in the previous permit and the proposed shift in allocation from Alexander Orr wellfield to the Southwest wellfield. Several potential scenarios were modeled. For each scenario, seepage rates from all potential Regional Waterbodies were calculated using the USGS MULTIBUD program. Regional Waterbodies used in this analysis are shown on Exhibit 25E.

According to the LECsR model simulations, MDWASD's proposed shift of pumpage from the Alexander Orr Wellfield to the Southwest Wellfield would result in approximately 1 MGD to 3 MGD of additional seepage from the upper reaches of the C-2 and C-1W Canals (MULTIBUD Zones A and D) to the Biscayne aquifer, relative to the seepage that occurs under Base Conditions. Approximately 4 MGD to 10 MGD more groundwater would discharge from the Biscayne aquifer to the lower portion of the C-2 Canal (MULTIBUD Zone B), relative to Base Conditions. In the C-1 Canal (MULTIBUD Zone E), the net additional seepage, relative to Base Conditions, is similar under all scenarios evaluated. The additional seepage that occurs in the C-100C Canal (MULTIBUD Zone L), L-31N Canal (MULTIBUD Zone M), and the C-4 Canal (MULTIBUD Zone N) is less than 0.3 MGD for all scenarios. Overall, the total simulated change in seepage, relative to Base Conditions, is a 2 MGD to 6 MGD decrease in the seepage from the canal system to the Biscayne aquifer, relative to Base Conditions. Exhibit 25F shows the difference in net seepage on a monthly basis for the modeling scenarios. The modeling results indicate the proposed pumping would not cause an increase in canal seepage to the Biscayne aquifer, and the implementation of any scenario would not cause additional indirect withdrawals from Regional Waterbodies.

IMPACT ASSESSMENTS

Water Resource Availability

IMPACT ASSESSMENTS (CONTINUED)

Biscayne Aquifer

There are two major aquifer systems in Miami-Dade County, as discussed in the United States Geological Survey (USGS) Water Resource Investigations Report 90-4108. Overlying the Floridan aquifer system in Miami-Dade County is a 550- to 800-ft thick sequence consisting of sediments that have relatively low permeability, referred to as the intermediate confining unit. Overlying the intermediate confining unit is the surficial aquifer system, the source of freshwater supplies for Miami-Dade County and for most of southeast Florida. The surficial aquifer system base is -180 to -220 feet NGVD and includes the Biscayne aquifer and the gray limestone aquifer. The base of the Biscayne aquifer is 80 -100 feet below land surface (bls) at all the Miami-Dade public water supply wellfields except the Hialeah/Preston, Miami Springs and Medley wellfields, where the aquifer base is 130-150 feet bls.

According to USGS aquifer performance tests in the area, the transmissivity of the Biscayne aquifer is approximately 500,000 feet squared per day (ft2/d) at most of the Miami-Dade wellfields. At the Northwest and West wellfields, the transmissivity is 1 million ft2/d and at Alexander Orr and Snapper Creek the transmissivity is 750,000 ft2/d.

Land surface elevations in Miami-Dade County average 5-10 feet NGVD, with coastal dune remnants reaching 15-20 feet NGVD. The approximate dry season depths to water at the wellfields are as follows:

Northwest: 6' (-1' NGVD)
Preston: 14' (-5' NGVD)
Miami Springs: 7' (-1' NGVD)
West: 3' (3' NGVD)
Southwest: 13' (-4 NGVD)
Snapper Creek: 8' (-3' NGVD)
Alexander Orr: 13.5' (-5.5' NGVD)
Naranja: 4' (2' NGVD)
Newton: 4.5' (1.5' NGVD)
Everglades: 3' (2' NGVD)
Leisure City: 4' (2' NGVD)
Elevated Tank: 6' (3' NGVD)
South Miami Heights: 6'* (2'* NGVD) predicted

The water levels are based on monitor well data for the north wellfields and from results of modeling data in 2030 at the Southwest, Alexander Orr and south system wellfields. In the dry season, approximately 86 feet of the Biscayne aquifer would remain saturated.

Sources of recharge to the surficial aquifer system in Miami-Dade County are: (1) infiltration of rainfall or irrigation water; (2) infiltration of surface water and groundwater imported from the water-conservation areas/Everglades National Park; (3) infiltration of urban runoff by way of drains, wells, or ponds; and (4) groundwater inflow from southwestern Broward County. Recharge by rainfall is greatest during the wet season, from June to November, and recharge by canal seepage is greatest during the dry season, from December to May. Water level data is collected from an extensive USGS monitor network (see Exhibits 29 and 30). This data indicates that groundwater flows from western Miami-Dade County towards the coast and fluctuates approximately 2 feet from wet to dry season.

The Preston, Medley and Miami Springs wellfields are adjacent to the C-6 canal upstream of the S-26 structure, which is operated to maintain a headwater elevation of 2.5 feet NGVD. The Alexander Orr

and Snapper Creek wellfields are adjacent to the C-2 canal upstream of the S-22 structure, which is operated to maintain a headwater elevation of 2.9 feet NGVD. The two South Miami Heights proposed wellfields are in the vicinity of the C-1W and C-1N canals upstream of the S-21 structure, which is operated to maintain a headwater elevation of 2 feet NGVD in the dry season and 2.4 feet NGVD in the wet season. Monitor wells have been installed to observe the impact of new or increased pumpage near these regional canals. See Exhibits 33A and 33B for location maps and Exhibit 33C for a table of well information.

Based on historic data for existing wellfields and model results for proposed withdrawals, the potential for harm to occur to the water resource availability of the aquifer as a result of withdrawal of the recommended allocation is considered minimal.

Upper Floridan Aquifer

The deeper aquifer system is commonly known as the Floridan aquifer system and it is present in all of Florida and parts of adjacent states. USGS Water Resource Investigation (WRI 94-4010) is a study of the Floridan aquifer system in southeastern Florida. In Miami-Dade County, the top of the Floridan aquifer system occurs at about -950 to -1,000 feet NGVD. The Floridan aquifer system is divided into three general hydrogeologic units: (1) the upper Floridan aquifer, which contains brackish ground water, (2) the middle confining unit, which contains saline groundwater, and (3) the lower Floridan aquifer, which contains groundwater closely resembling seawater. The upper Floridan aquifer, where Miami-Dade's ASR and RO wells are completed, is generally 500 to 600 feet thick, and its transmissivity has been measured to be as high as 31,000 ft2/d. Transmissivities for the ASR wells at the SWWF were measured ranging from 9,451 to 22,873 ft2/day. Transmissivities for the ASR wells at the WWF ranged from 10,293 to 19,650 ft2/day.

Groundwater movement in the upper Floridan aquifer is generally southward to the Gulf of Mexico and the Atlantic Ocean from recharge areas in central Florida. In southern Florida, the Floridan aquifer system is a confined aquifer with potentiometric head elevations of 30 to 50 ft NGVD in Miami-Dade County. There are no current water level maps of the upper Floridan aquifer available to determine actual water levels at the permittee's facilities. Limiting Conditions 36 and 37 require water level and chloride monitoring of one standby well at each of the upper Floridan aquifer wellfields in this permit. See Exhibit 32A and 32B for a table and map of Floridan aquifer system wells monitored by MDWASD. Model results predict maximum drawdowns of 65 feet at the Hialeah RO wellfield when pumping 13.33 MGD and 107 feet when withdrawing 23.33 MGD (see Exhibit 26B and 26C). Model results for the SMH RO Wellfield predict drawdowns of 40 to 50 feet in the vicinity of the wellfield at a maximum withdrawal rate of 24 MGD for 90 days and no recharge (Exhibits 26D and 26E).

Water levels in the upper Floridan aquifer will remain approximately 970 feet above the top of the aquifer at the location of maximum drawdown.

Based on model results, the potential for harm to occur to the water resource availability of the aquifer as a result of the withdrawal of the recommended allocation is considered minimal.

Existing Legal Users
Biscayne Aquifer

An existing legal user is a water use that is authorized under an SFWMD water use permit or is existing and exempt from permit requirements (domestic uses). A map of existing public water supply permits in Miami-Dade County is shown in Exhibit 4A. Monitor data indicates that the existing withdrawals result in a maximum depth to water of 12 to 14 feet at the center of the Preston, Alexander Orr and Southwest

wellfields. The other wellfields have depths to water of 3 to 7 feet.

Model results predict that approximately 0.7 feet of additional drawdown, beyond that shown in the modeling conducted for the previous permit (Exhibit 25A), could occur at the Kendall Soccer Park (13-01648-W) due to increased withdrawals at the Southwest wellfield due to the shift in pumpage (see Exhibits 25A and 25C). Water levels at the nearest five permittees are currently around 1 foot NGVD and are predicted to decline to about 0 feet NGVD with the increase at the Southwest wellfield due to the increase in pumpage scheduled to occur in 2030 (to be offset by reuse projects as described in the previous permit). Land surface is approximately 10 feet NGVD. Therefore, users with centrifugal pumps (which are capable of withdrawing water up to 20 feet below land surface) will not be impacted by the proposed withdrawals.

In addition, the model predicts up to 0.2 feet of drawdown at the center of the proposed SMH wellfields (Exhibit 25D). Drawdown at the nearest existing legal users is predicted to be less than 0.1 feet, resulting in neglegable impacts to existing legal users in this area. The Newton and Everglades Labor Camp withdrawal increases result in no impacts at the closest existing legal users. All other wellfields will have no increases in withdrawals over historic use.

Based on observation of historic data and the predicted impact based on model results, the withdrawals from the Biscayne aquifer are not anticipated to result in the inability of an existing legal user to withdraw water, change the quality of the water to the extent that it can no longer be used for its authorized purpose, or prevent an existing legal user from meeting its permitted demands without exceeding the permitted allocation.

Upper Floridan Aquifer

Hialeah RO wellfield:
The existing legal users of the upper Floridan aquifer in Miami-Dade County and southern Broward County are mapped on Exhibit 4B and listed on Exhibit 4C.

The nearest permitted user to the Hialeah Floridan aquifer wells is the City of Miramar, whose closest well is approximately 3 miles from the northernmost Hialeah RO wellfield well (see Exhibit 4B for location). Model results predict the proposed withdrawals will result in an additional decline in water level of 20 feet at the nearest Miramar well, which would result in water levels at or above land surface and approximately 1,000 remaining feet of available drawdown. Solute transport model results predicted an increase in the concentration of total dissolved solids (TDS) of 135 mg/l after 20 years of pumping at a distance of 2 miles from the wellfield. The increase in TDS is considered by staff to be minimal.

South Miami Heights RO wellfield:
The nearest existing legal users to the SMH Wellfield are the FKAA (Permit No. 13-0005-W) and FP&L Turkey Point Power Plant. Results of the model run simulating SMH only with a continuous withdrawal for 90 days at 24 MGD were analyzed within the 1 foot drawdown contour. This simulation represents the cone of depression in the upper Floridan aquifer due to pumping of only the SMH wellfield. The MDWASD ASR facility at the SWWF lies just inside the 1 foot drawdown contour, while the MDWASD WWF ASR facility, FPL and FKAA lie outside the 1 foot drawdown contour. Exhibit 26D shows the extent of the drawdown due to pumping at SMH. Drawdown is predicted to be 0.58 feet for the WWF ASR site, 1.28 feet for SWWF ASR site, 0.54 feet for FPL, and 0.21 feet for FKAA.

In addition, results were analyzed for the continuous withdrawal for 90 days of SMH at 24 mgd and existing legal users at their permitted allocation. Drawdowns were predicted of 0.63 feet at WWF, 1.36

feet at SWWF, 44.63 feet at FPL, and at 12.39 feet at FKAA. Exhibit 26E shows the cumulative drawdown due to pumping at SMH and existing legal users.

The predicted impact on existing users, based on model results, is considered by staff to be minimal. Therefore, the proposed use of the upper Floridan aquifer is not anticipated to result in the inability of an existing legal user to withdraw water, change the quality of the water to the extent that it can no longer be used for its authorized purpose, or prevent an existing legal user from meeting its permitted demands without exceeding the permitted allocation.

Saline Water Intrusion
Biscayne Aquifer

Inland movement of sea water in Miami-Dade County began in the 1920's and 1930's when canals were constructed that lowered groundwater levels. In the 1940's salinity control structures were installed in the canals as far seaward as possible, which prevented unimpeded inland saltwater flow. In the 1960's other structures were installed along the canals and water levels were stepped down, which lowered water levels at the final "step" before discharging to tide. This resulted in some inland movement of saltwater. Beginning in 1976, additional water was routed to the county, raising water levels along the coast and slowing or reversing inland movement of the saltwater front. In addition, withdrawals have been reduced at coastal wellfields when western wellfields became operational.

The SFWMD operates numerous salinity control structures in Miami-Dade County. The water control levels were discussed in the Water Resource Availability section above. Additional protection for the central wellfields is provided by the construction of a water control structure located on the Ludlum Canal, south of S.W. 88th Street and east of the Alexander Orr wellfield and U.S. Highway 1, completed in May, 2004 to further reduce the potential for saltwater intrusion.

Miami-Dade County has a cooperative agreement with the USGS to collect water level and chloride data from 29 wells and induction logs from 10 of the wells as part of a saline water intrusion monitor network. Since 2007, nine new saline intrusion monitor wells have been installed in the county. Chloride sampling is done monthly, quarterly or annually depending on location and induction logs are collected annually for select wells. Current monitoring facilities are listed in Exhibit 28A and are mapped on Exhibits 27A-D. An additional 19 saltwater monitor wells not funded by the MDWASD are sampled by the USGS and induction logs are collected annually for 17 of the wells (see Exhibit 28B).

Of the 48 monitor wells sampled in Miami-Dade County, 16 are east of the 1,000 mg/l isochlor line defined in 2008, to monitor saltwater movement as opposed to being early warning wells. The saline water interface in the Biscayne aquifer as delineated in 2008 can be seen on Exhibit 27A-C. All 10 wells east of the salt front from the Broward County line to the C-2 Canal have been showing an increasing trend in chloride concentration, which indicates a regional cause for the movement rather than localized well withdrawals. The applicant's nearest wellfields to the 2008 salt front are Miami Springs Lower (1.75 miles) and Hialeah (2.1 miles) in the north system and Alexander Orr (3.1 miles) in the central system. These wellfields are a significant distance from the saltwater front compared to the slow rate of movement and no increases in allocation are authorized from the north system wellfields, and pumpage limits are reduced at the Alexander Orr Wellfield with this permit modification. In addition, continued monitoring is required in this permit pursuant to Limiting Condition 37.

For the proposed South Miami Heights and Former Plant Wellfields, modeled drawdowns from the 3 MGD scenario were plotted and analyzed to determine the potential for inducing saline water intrusion. There are regional canals surrounding the wellfield that are maintained at levels to reduce the potential for saline intrusion. The model results indicate that the cone of depression does not extend to these

canals (Exhibit 25D). Therefore, the proposed withdrawals will not cause further net inflow of water from the saline source toward the withdrawal points.

Pursuant to Section 3.4(2) of the BOR, the existing and proposed use will not cause saline water intrusion because the use is not expected to cause further net inflow of groundwater from the saline water source toward the withdrawal point.

Upper Floridan Aquifer

Water in the upper Floridan aquifer in southeastern Florida is brackish with chloride and dissolved-solids concentrations generally greater than 1,000 mg/L. Salinity in the upper Floridan aquifer usually increases with depth. The lower Floridan aquifer contains water with a salinity similar to that of seawater. Because of the relative lack of development of the Floridan aquifer system in southeastern Florida, the quality of groundwater in the aquifer system is considered to have remained virtually constant during the period 1940-1990. USGS WRI 94-4010 mapped the base of the brackish water zone at approximately -1,800 feet below land surface. The Floridan aquifer wells at the Hialeah and SMH Wellfields are designed to be approximately 1,200 - 1,300 feet deep. Chloride concentrations at the Hialeah RO site are currently 1,650 mg/l and modeling predicted increases to 1,875 mg/l after pumping 30 years at 13 MGD and increases to 2,025 mg/l when pumping 23 MGD. Chloride concentrations at the proposed SMH wellfield are unknown but are assumed to be similar to the Hialeah RO Wellfield. Increases in salinity will result in an increase the treatment losses and additional withdrawals may become necessary to meet finished water demands. Limiting Condition 37 requires that the applicant sample for chloride concentration at the production wells to monitor for increases in concentration which could indicate upconing and affect the RO treatment efficiencies (see Exhibits 32A and 32B).

Pursuant to Section 3.4.1 of the BOR, the proposed use from the upper Floridan aquifer may cause limited increases in salinity but not to the extent of interfering with presently existing legal users, otherwise harming the resource or rendering the resource no longer usable by the Permittee.

Wetlands

Biscayne Aquifer

Pursuant to the BOR, the applicant must demonstrate that hydrologic alterations caused by the water use will not adversely impact the values of wetland and other surface water functions so as to cause harm to abundance, diversity and habitat of fish, wildlife and listed species. The applicant performed a wetland survey at each of the twelve Biscayne aquifer wellfields in 2007. Wetlands were identified within the 0.1 foot drawdown cone at five wellfields (Snapper Creek, Southwest, Northwest, West and Elevated Tank). Most of the wetlands are Category 2 seasonally inundated wetlands which have a numeric threshold of harm of 1.0 feet of drawdown. Category 3 temporarily flooded wet prairie are found in the vicinity of the West wellfield and the Northwest wellfield. Monitor data was used to assess withdrawal impacts on water levels around existing wellfields and model results were also used where monitor data was not available at the wetlands.

Modeling predicts 4-5 acres of wet prarie habitat fall within the 0.5 feet drawdown cone at the West wellfield (Exhibit 24A), which is limited to 15 MGD. Field surveys, historic aerial imagery reviews and review of pumpage and monitor well data found no signs that the wetland functions have been adversely affected by the historic withdrawals from the West wellfield and no increases are to be authorized in this permit. An additional monitoring well (G-3898), with a continuous water level recorder, was installed in 2009 to monitor wetland water levels southwest of the wellfield.

IMPACT ASSESSMENTS (CONTINUED)

Impacts to Everglades National Park (ENP), located 1.5 miles west, are not predicted to occur as a result of withdrawals from the West Wellfield (see Exhibit 24A). A "four party" agreement involving ENP, the State of Florida, SFWMD and Miami-Dade County was developed to provide adequate assurances that withdrawals from the West Wellfield will not cause adverse impacts to the hydrologic resources of ENP (see Exhibit 35A-I). The agreement requires the County to curtail or cease pumpage at any time if ENP determines that adverse impacts due to wellfield withdrawals have occured, as measured by a comprehensive monitoring network.

Modeling presented in the previous (2010) staff report showed that the 1- foot drawdown contour (Exhibit 29B) reaches the Boystown Pineland property to the southwest of the Southwest Wellfield, which was identified by the applicant's consultant as a wetland, based on historic soil maps. Correspondence with Miami-Dade County Permitting, Environment and Regulatory Affairs (PERA), formerly known as DERM, states that there are no wetland species on the property. However, a monitor well (G-3897) was installed at that location in 2008, as required by the previous permit. Modeling conducted to evaluate the effect of shifting base condition pumpage from the Alexander Orr Wellfield to the Southwest Wellfield show that up to an additional 0.2 feet of drawdown (beyond that shown in the modeling for the 2010 permit) could occur at the edge of these wetlands (Exhibit 25C). Although the hydrodrology of these wetlands is supported by the surficial aquifer system, this aquifer is highly transmissive in this region. Based upon this information, the potential for harm to occur to wetlands as a result of the recommended increased allocation from the surficial aquifer in the southwest wellfield is considered minimal.

Approximately 1,000 acres of wet prairie are within the 0.5 foot cone of influence at the Northwest wellfield (NWWF) when modeled pumpage is 89 MGD (Exhibit 24B). The 0.5 foot drawdown contour extends 2 miles to the edge of the Pennsuco wetlands and proposed Dade/Broward levee CERP project and monitor well G-3818 is located there. See Exhibit 29E for the entire NWWF monitor network. Wetland impacts at the NWWF were mitigated in 1999 up to a withdrawal rate of 155 mgd. In addition to the mitigation, MDWASD installed two monitoring wells in the Pennsuco wetlands in 2001 and a water control structure for the Northwest Wellfield Protection Canal [known as the Mid-canal structure and bridge (MCSB)] in 2003. See Exhibit 21 for a location map. This structure was required in order to prevent drainage of the Pennsuco wetlands which provided water to maintain water levels in the Wellfield Protection Canal. Pursuant to Limiting Condition 25, the MCSB structure is to be opened simultaneously with the upstream structure located on the L-30 canal in order to prevent drainage of the Pennsuco wetlands (see Exhibit 22 for operation letter).

Due to the proximity of the wetlands to the Biscayne aquifer wells, continuation of the current wetland monitoring program, pursuant to Limiting Condition 36, is required in this permit. Sampling requirements can be found in Exhibit 30 and maps on Exhibit 29A-29E.

Pursuant to Section 3.3.4, BOR, the proposed use at South Miami Heights and the increased withdrawals at Southwest are not considered harmful because modeled drawdown is less than 1.0 feet beneath the Category 2 wetlands. All other wellfields are existing with no changes in allocation or operation. Therefore, the potential for impacts to occur to wetlands as a result of withdrawal of the recommended allocation is considered minimal.

Upper Floridan Aquifer

The wetlands are separated from the upper Floridan aquifer well drawdowns by 600 feet of low permeability material. Therefore, the upper Floridan aquifer well withdrawals do not impact the wetlands.

IMPACT ASSESSMENTS (CONTINUED)

Source Of Pollution
Biscayne Aquifer

Hialeah/Preston/Miami Springs area:
Groundwater from the Biscayne aquifer in the vicinity of the Hialeah/Preston/Miami Springs Wellfields is polluted with low levels of volatile organic compounds (VOCs). The wellfields were shut down in 1982 as a consequence. The U.S. Environmental Protection Agency (USEPA) primary remedial action to clean up the aquifer was to use the wellfields to remove contaminants and provide a water treatment system that uses air stripping. As a consequence, MDWASD constructed a treatment train comprised of 64, 14-foot diameter air stripping towers along with two low-lift pumping stations with nine turbine pumps and piping. Total system design capacity varies from 152 MGD to 256 MGD, depending on the level of contaminants. The USEPA paid for 41 percent of the total project costs. Use of the air stripping towers, initiated in 1992, allowed the Hialeah/Preston/Miami Springs wellfields to begin operation again. These wellfields, along with associated treatment of the groundwater by air stripping, continue to remove VOCs from the Biscayne aquifer in the vicinity.

Northwest Wellfield area:
Groundwater in the Biscayne aquifer beneath the 58th Street Landfill (58SLF) and the Resource Recovery Landfill (RRLF), which are located approximately 3 miles to the east of the Northwest wellfield (NWWF), has been contaminated by leachate generated from these landfills. Due in part to concerns about the potential migration of leachate from these landfills, MDWASD and SFWMD created the NWWF Protection Canal Modification system to create and maintain a groundwater divide between the NWWF and the landfills (Exhibits 21 and 22). Since completion of the Protection Canal in 1991, groundwater and surface water monitoring performed by Miami-Dade County PERA have indicated that a groundwater divide has been maintained between the NWWF and the contaminant plume. Restrictions on urban development set forth in the Comprehensive Development Master Plan (CDMP) also serve to keep urbanized industrial and commercial activities east of the Turnpike Extension and away from this wellfield. Furthermore, Chapter 24 of the Miami-Dade County Code (MDCC) contains a provision empowering PERA to implement emergency water conservation restrictions when such measures are needed to reduce the pumpage of that wellfield and prevent migration of groundwater contamination.

PERA's various wellfield protection elements serve to significantly reduce the risk of manmade groundwater contamination being transported to unpolluted portions of the Biscayne aquifer because of wellfield pumpage. Pertinent activities and provisions include the following:
- Surveillance and regulation of operations generating hazardous waste under the provisions of the Miami-Dade County Environmental Protection Ordinance (Chapter 24 of the MDCC)
- Assessments and cleanups of sites with groundwater contamination are enforced under the provisions of Chapter 24 MDCC, with expedited action when the site is within a wellfield protection area.
- Qualified companies are contracted with Miami-Dade County and are available when emergency cleanups are considered necessary.
- Ongoing groundwater quality monitoring is conducted using a network of monitoring wells sited for wellfield and groundwater protection (see Exhibit 30 for a table of monitor wells sampled, Exhibit 31 for sampling frequency and constituents sampled and Exhibit 29A-E for monitor locations)

The recommended allocations are consistent with County wellfield protection areas and programs. Pursuant to Section 3.5 of the BOR, the use is not expected to result in altering the rate or direction of movement of pollutants, if present, to cause significant degradation of surface or groundwater quality through the induced movement of pollutants into a water resource that is not polluted.

IMPACT ASSESSMENTS (CONTINUED)

Upper Floridan Aquifer

There are no known sources of pollution reported within the Upper Floridan aquifer. Potential pollution sources located near surface are separated from the Upper Floridan Aquifer well drawdowns by 600 feet of low permeability material. Therefore, the Upper Floridan Aquifer well withdrawals are not anticipated to impact the movement of pollutants.

Other Impacts

Biscayne Aquifer

EXISTING OFFSITE LAND USES

Land uses that are dependant upon water being on or near land surface and that existed prior to this application are protected from harm. The surrounding land uses at each of the wellfields are as follows:

North system wellfields:
Preston - residential north, east and west, industrial/commercial south
Miami Springs Upper - in residential neighborhood with schools and parks
Miami Springs Lower - on golf course with residential on all sides
Northwest - rock mining to north, south and east, undeveloped to west

Central system wellfields:
Alexander Orr - residential to east and west, commercial to south, water treatment plant to north
Snapper Creek - residential to east, west and south, commercial to north
Southwest - residential on all sides, commercial to south, rural residential/agricultural to north
West - agricultural to east, south and west, undeveloped to north

South system wellfields:
Everglades Labor Camp - residential to east and south, agricultural to north and west
Newton - residential on all sides
Former Plant - residential on all sides and commercial to south
Roberta Hunter Park - residential on all sides

All wellfields, except Southwest and the south county wellfields will remain at current withdrawal rates. No problems have been reported due to historic pumping from these facilities.

Model results predict that the drawdown at the nearest water bodies to the SWWF (Winston Lake to the west, Calusa Country Club to the south and Town and Country Center to the east), which is currently around 1.7 feet, will increase an additional 0.8 feet, for a total of about 2.5 feet of drawdown with the proposed 37 MGD increase in withdrawals scheduled to occur at the SWWF in 2030. Up to 0.6 feet of additional drawdown (3.1 feet total drawdown) could occur due to the shift in allocation from the Alexander Orr Wellfield to the SWWF. Small nurseries to the north of the wellfield may experience an additional 1 foot of drawdown (2.0 feet total) due to the increase at the Southwest wellfield. However, these are container nurseries which should not be affected by the drawdowns. See Exhibit 25A for a map of the users and the model drawdown predicted to occur due to the increase in allocation from the SWWF in 2030. Exhibit 25B shows the additional drawdown that could occur as a result of the shift in allocation from the Alexander Orr Wellfield to the SWWF.

Model results in the area of the proposed South Miami Heights wellfields predict less than 0.1 feet of drawdown at the nearest lakes to the east and west, respectively. There are no impacts on adjacent lakes from withdrawals at the Newton wells, which will increase by 0.5 MGD. Withdrawals at the

IMPACT ASSESSMENTS (CONTINUED)

Everglades Labor Camp wells increase by 1.5 mgd from 0.7 MGD, which results in drawdowns of about 0.1 feet at the edge of the adjacent farms.

Pursuant to 3.6.2 of the BOR, the use is not expected to result in significant reduction in water levels on the property of an existing offsite land use to the extent that the designed function of a water body and related surface water management improvements are damaged (not including aesthetic values), damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use, or land collapse or subsidence caused by reduction in water levels associated with consumptive use.

Upper Floridan Aquifer

IMPACTS ON ASR WELLS

The WWF and SWWF ASR facilities inject fresh Biscayne aquifer water for later retrieval as part of ASR operations. The cone of influence for the Hialeah RO wellfield does not extend to the West and Southwest ASR wells, however the proposed SMH FAS wellfield cone does (Exhibit 26E). In order to assess possible impact as a result of the SMH FAS withdrawals on the ASR operation, MODPATH, a particle tracking post-processing package for MODFLOW (Pollack, 1994) was run. Particles were added directly to the south of the SWWF ASR well model cells. Simulation 5 was run for 30 years first in MODFLOW, and then MODPATH was run in order to assess particle movement. The MODPATH model run was analyzed to assess the impact of SMH and the existing legal users on the SWWF ASR system. After a run of 30 years, particles traveled 365 feet from their original position.

FACILITY OPERATION

All primary wells within each wellfield are rotated for equal use. Each wellfield or group of wellfields has limitations on annual withdrawal rates as conditioned herein. MDWASD has operational flexibility to run the wells at varying daily rates as long as the annual average limits are not exceeded. The only wellfield with daily limitations is the West wellfield, which cannot exceed 15 MGD. In addition, the Medley wells can only be operated 2 hours per month unless authorized for emergency use. Withdrawals from the Medley wells are counted towards the annual limits for the Hialeah/Preston/Miami Springs wellfield group. The maximum monthly withdrawal rate is applied to the total pumpage from all wellfields. A summary of the operation plan in 5 year increments for the Biscayne and Floridan aquifers is shown in Exhibits 10A and 10B. The operational plan for the aquifer storage and recovery wells is shown in Exhibit 10B. Injection of up to 50 MGD of Biscayne aquifer water into the ASR wells would occur from June through October. Recovery of water from the ASR wells would occur from December through April. The permittee intends to recover almost 100 percent of the volume of injected water with withdrawals that will continue until background Floridan aquifer water quality is encountered.

ADDITIONAL INFORMATION

EXISTING AND PROPOSED SERVICE AREA AND INTERCONNECTS:

MDWASD supplies treated water on a volume basis to most of the municipally owned water utilities of Miami-Dade County, with the exceptions of Florida City and North Miami Beach and a portion of the water requirements of the City of North Miami. A map showing the MDWASD Service Areas is presented as Exhibit 2B. Exhibit 11 lists the Miami-Dade wholesale customers and water delivered for the years 2008-2011. For those municipalities that distribute the MDWASD water themselves, all have a large user agreement for the duration of this permit except the City of Hialeah. The City has provided a letter of intent to sign an agreement and will be required to complete the agreement within 6 months of permit

ADDITIONAL INFORMATION (CONTINUED)

issuance, pursuant to Limiting Condition 38.

The Hialeah-Preston and Alexander Orr, Jr. WTPs are connected via their distribution systems (Exhibit 2B). There is no direct, metered interconnect between the two systems, however, it is estimated that approximately 40 MGD of finished water can be transferred between the systems. The five existing WTPs of the South Miami-Dade Service Area currently share a 48-inch interconnection with the Alexander Orr Jr. WTP. The two proposed wellfields are to be added to the South Miami-Dade Service Area. An interconnection to the Alexander Orr Jr. WTP system is planned for the future South Miami-Dade Membrane and RO Plants. There are also emergency interconnects to adjacent utilities in the cities of North Miami, North Miami Beach and Homestead (Exhibits 12A-C).

FACILITIES

Hialeah-Preston WTP: The John E. Preston WTP-Hialeah WTP has a combined DERM rated capacity of 225 MGD. The total installed capacity for Hialeah-Preston WTPs is 235 MGD. The Hialeah and John E. Preston WTPs treatment process includes primarily lime softening, disinfection, and filtration.

Hialeah Reverse Osmosis WTP: Phase 1 of the Hialeah RO Plant will be completed by December 31, 2012. Of the 10 MGD produced, 5 MGD will be routed to the MDWASD transmission line through a 36-inch line along NW 170 Street, and will enter the MDWASD transmission pipelines via connection at 179th Street and NW 87th Ave. Five MGD will be routed to the City of Hialeah transmission system, and will be routed through a 30-inch line from NW 166th Street, down south along NW 97th Ave, and will enter into the City of Hialeah system at NW 154th Street and NW 97th Ave.The design build-out of the Hialeah RO plant is for a capacity to treat 23.33 MGD of raw water to produce 17.5 MGD of finished water (Exhibit 10B).

Alexander Orr: The Alexander Orr, Jr. WTP has a DERM rated capacity of 214.74 MGD and a total installed capacity of 256 MGD. The WTP utilizes lime softening with activated sodium silicate, recarbonation, chlorination, ammoniation, and filtration.

South Miami-Dade: The existing five wellfields in the South Miami-Dade area have a treatment facility that disinfects the raw water by chlorination. The Leisure City facility has a design flow of 6.48 mgd. The DERM-rated capacity for the Newton Water Plant, the Elevated Tank facility, the Everglades Labor Camp Water Plant, and the Naranja Water Plant are 2.01 MGD, 1.44 MGD, 0.96 MGD, and 1.38 MGD respectively. The future South Miami-Dade membrane and RO WTP initial design is with a capacity to treat 26.33 MGD of raw water (23.33 MGD FAS and 3 MGD Biscayne) and produce 19.5 MGD of finished water. The proposed SMH RO treatment plant will have a design finished water capacity of 17.5 MGD (23.3 MGD raw) by December 2015.

WATER USE ACCOUNTING

Water use accounting is by flow meters. Factory and field calibrated flow meters were newly installed in 2007 in 96 supply wells and were all connected to a SCADA system which records flow at each facility and transmits the information to a central station. The meter calibration is field verified annually.

WATER CONSERVATION PLAN

The elements of the water conservation plan are documented in Exhibit 18.

As part of the Interim Consumptive Use Agreement, the applicant was required to develop a 20-year water conservation plan that included water reduction goals, actions and funding requirements to achieve

ADDITIONAL INFORMATION (CONTINUED)

the goals and milestone dates for implementation of the actions. The applicant used the new goal-based Conserve Florida program developed by the Florida Department of Environmental Protection (FDEP) in conjunction with the states five water management districts. The County's plan was developed for the region served by MDWASD as well as the 15 water utilities that receive wholesale water from MDWASD. Details of the actions, costs and timelines can be found in Exhibit 19A-E. The estimated reduction in demands over the life of the permit are shown in Exhibit 20 and the allocations have been adjusted to include the effects of the conservation program. Limiting Condition 48 requires implementation of the plan along with annual reporting of progress and 10-year audits to determine if water use adjustments are necessary.

ALTERNATIVE WATER SUPPLIES

The proposed Permit requires the implementation of approximately 205 MGD of alternative water supplies during the next 20 years. These sources include the Floridan aquifer water to be treated with reverse osmosis to produce 35 MGD of finished water, and reuse of at least 170 MGD of highly treated wastewater to reduce ocean discharges and offset Everglades impacts and for other beneficial uses.

In addition, this permit allows, under extreme wet conditions, the Permittee to request to store excess stormwater within the Floridan aquifer ASR wells. Excess stormwater is that deemed not required to achieve the restoration benefits to the Everglades Waterbodies pursuant to the Comprehensive Everglades Restoration Plan and the Accceler8 program. Available stormwater will be identified pursuant to Section 3.2.1.E.(5)(e) of the BOR.

REUSE OF RECLAIMED WATER

Staff evaluated whether the applicant's proposed use of water is consistent with the public interest and is reasonable-beneficial. In determining consistency with the public interest, Staff recognized the need to promote the availability of sufficient water for existing uses, future reasonable-beneficial public water supply uses, and natural systems.

The Applicant's withdrawal and use of water for public water supply impacts water supplies in the Greater Everglades, the Biscayne aquifer, and Biscayne Bay, through interception of seepage and surface water discharges. Once the water is distributed and used by the customer, it is treated and disposed of via deep well injection or ocean outfall. During 2011 the average daily rate of disposal for water used by MDWASD was 275 MGD (127 MGD disposed via deep well and 148 MGD disposal via ocean outfall), which nearly equals the volume of raw fresh water withdrawn from the Biscayne aquifer. By 2030, the wastewater flow is estimated to be 355 MGD.

The use of water from the Biscayne aquifer only once (especially withdrawn from sources recharged by the Everglades system) is considered inefficient under the reasonable-beneficial use test and inconsistent with the public interest, under Section 373.223, Florida Statutes. In addition, the State Water Resource Implementation Rule [Rule 62-40, Florida Administrative Code (FAC)] and District consumptive use rules require that reclaimed water be used when technically, environmentally and economically feasible.

To resolve this issue and other permit requirements, working with MDWASD, a series of alternative sources have been identified to meet the County's future needs, while increasing the use of reclaimed water. Alternative sources include the development of Floridan wells, implementation of a strong conservation program developed using the Conserve Florida Guide (a joint initiative of FDEP, the WMDs, and others), and the high level treatment and disinfection of wastewater for reuse including aquifer

ADDITIONAL INFORMATION (CONTINUED)

recharge. Design of the West District Water Reclamation Plant is ongoing, while on hold for the Central and North plants pending evaluation of reuse options for the ocean outfall legislation (see discussion below).

Additional filtration and high level disinfection requirements for wastewater treatment has been required at the South District Wastewater Treatment Plant recently imposed by the FDEP and United States Environmental Protection Agency (USEPA) and will result in a significant increase in the amount of reclaimed water that will be made available for reuse (for some applications, additional treatment may be required). Additionally. Chapter 2008-232, Laws of Florida, requires sixty percent of water previously discharged out the existing North and Central wastewater treatment plant ocean outfalls (117.5 MGD) to be beneficially reused by 2025.

Typically, reclaimed water is treated to levels sufficient for irrigation of public access areas such as golf courses and other landscaped areas pursuant to Part III of Chapter 62-610, FAC. See Exhibit 15 for a map of public access reuse lines. For some applications of reclaimed water proposed by the permittee it will be necessary to treat wastewater to levels beyond the public access irrigation level of treatment. Each level of treatment will be determined based on the requirements of the USEPA, FDEP and any applicable County requirements.

In order to meet the reasonable-beneficial use and public interest tests, the Permittee is proposing to implement at least 175 MGD of reuse projects over the life of the permit that return fresh water to the hydrologic cycle in a manner that provides for beneficial use. See Exhibit 14 for a list of the reuse projects. These projects include: 1.) use of reclaimed water as a source for the Biscayne Bay rehydration project in the Comprehensive Everglades Restoration Plan (CERP); 2.) use of reclaimed water for aquifer recharge and indirect wellfield recharge to offset impacts of any increased withdrawals from the Biscayne aquifer on the Everglades system; 3.) implementation the County's reuse feasibility plan elements that include public access reuse for irrigation and 4.) implement 60 percent reuse of the flows going out through ocean outfall by 2025. In addition, a joint participation agreement has been signed for use of up to 90 MGD of highly treated reclaimed water for cooling for the Florida Power and Light nuclear and gas powered plants at Turkey Point beginning in 2022.

Based on the above, the Permit includes detailed limiting conditions requiring completion of feasibility pilot tests and implementation of projects for the purpose of assuring that the County's use of water is reasonable-beneficial and in the public interest. If any of the identified reuse projects are determined to be infeasible, the Permittee shall timely propose and implement SFWMD approved alternatives that return freshwater to the system for meeting future reasonable-beneficial uses that are consistent with the public interest. If it is determined that lower volumes of reclaimed water are needed than those specified in Limiting Condition 5, for offsetting the impacts of the wellfields, the County shall reuse the difference for other uses that are reasonable-beneficial and consistent with the public interest as approved by the SFWMD.

In addition, Section 3.2.3.1. of the BOR requires utilities that control wastewater treatment plants that have determined the use of reclaimed water is feasible in accordance with Section 403.064, F.S., to provide the SFWMD with: a) the reuse feasibility study, b) the schedule for implementation of reuse, c) documentation of the amounts of uncommitted reclaimed water, and d) information regarding any local ordinances concerning the use of reclaimed water. This information, which is to be updated annually, is used by the District to assist in the implementation of the utility's reuse plan by directing other water users to the utility's reclaimed supplies. Per Limiting Condition 42, the Permittee shall provide annual updates regarding the County's reuse feasibility plan implementation.

Furthermore, staff recommends that Miami-Dade County continue to pursue grants, loans and other

ADDITIONAL INFORMATION (CONTINUED)

publicly funded sources of money to assist with local implementation of reclaimed water projects considered in the public interest. Such money sources may include the SFWMD's Alternative Water Supply Funding Program, other state funding appropriations and CERP federal cooperative funding. However, failure to secure funding from any or all such external sources does not relieve the County of responsibility for compliance with all permit conditions.

MINIMUM FLOW AND LEVEL (MFL)

As part of the conditions for permit issuance in Chapter 373, F.S., including SFWMD implementing rules, a consumptive use permit applicant must provide reasonable assurances regarding protection of Lower East Coast Everglades and MFL Water Bodies, including the Biscayne aquifer, Everglades National Park and the Water Conservation Areas (Everglades/MFL Waterbodies).

Biscayne Aquifer MFL and Prevention Strategy

The MFLs for the Biscayne aquifer, identifying the point at which further withdrawals would cause significant harm, are set forth in Rule 40E-8.23, F.A.C. The Biscayne aquifer is in prevention as the MFL is not expected to be exceeded over the next twenty years providing the Prevention Strategy as identified in Rule 40E-8.421(4), F.A.C. is maintained.

The Applicant has provided reasonable assurances that the proposed allocations will not cause the coastal canal stages to drop below their minimums as all increased withdrawals from the Biscayne aquifer will be offset with equal volumes of reclaimed water discharged into or adjacent to the regional canals affected by the withdrawals. As outlined above, the applicant has provided reasonable assurances that the proposed allocations are consistent with the saltwater intrusion prevention criteria in 40E-2, F.A.C. and they will be maintaining an adequate saltwater monitoring network. The permit is conditioned to require the applicant to implement alternative water supply development projects as well as providing freshwater recharge to Biscayne Bay. The applicant is also working with the USGS to conduct saltwater modeling. Based on these findings, the applicant has demonstrated that the proposed use is consistent with the prevention strategy.

Everglades MFL and Recovery Strategy

The MFLs for Everglades Waterbodies, identifying the point at which further withdrawals would cause significant harm, are set forth in Rule 40E-8.221(3), F.A.C. The Everglades MFL Waterbodies are in recovery as the MFL is not met under current system conditions. The Everglades MFL Recovery Strategy is identified in Rule 40E-8.421(1) and (2), F.A.C.

The primary component of the MFL recovery strategy is implementation of the Everglades restoration projects, including CERP. The Everglades MFL recovery strategy also includes limitations on impacts to the MFL Waterbodies due to consumptive use permit withdrawals in Section 3.9.1 of the BOR.

Section 3.9.1 of the BOR requires the permit applicant to demonstrate the impact of the proposed withdrawal will be corrected through implementation of the recovery strategy, including Everglades restoration under CERP, and that the level of impacts from the proposed allocation would not exceed those authorized under the permits under review for renewal. A pumpage value higher than 347 MGD was used in the analysis to develop the recovery strategy and the Everglades water body impacts above 343.7 MGD are being offset by the applicant. As a result, the MFL recovery plan requirements are met.

REGIONAL WATER AVAILABILITY

ADDITIONAL INFORMATION (CONTINUED)

Allocation restrictions in the Lower East Coast Service Areas 1, 2 and 3, (Section 3.2.1.E of the BOR) ensures that continuing and increasing consumptive use withdrawals in identified portions of Miami-Dade, Broward and Palm Beach Counties are consistent with Everglades restoration and MFL recovery plans, including CERP. Several technical evaluations were conducted to provide reasonable assurances pursuant to Regional Water Availability Rule requirements. These evaluations, along with staff findings and recommendations under these rules, are outlined below:

Pursuant to Section 3.2.1.E of the BOR, the requested allocation cannot cause a net increase in the volume or cause a change in timing on a monthly basis of the surface and groundwater withdrawn from the Lower East Coast Everglades Waterbodies over base condition water use withdrawals from such Waterbodies. For public water supplies, the base condition water use is that withdrawn over any consecutive twelve month period during the five years preceding April 1, 2006.

Pumpage records for the five years preceding April 1, 2006 were used to establish a base condition water use from the Biscayne aquifer, consistent with Section 3.2.1.E of the BOR. It was determined that Miami-Dade County's historic Biscayne aquifer base condition water use was 352.8 MGD. Subsequent modeling performed to maximize well field limits and an adjustment for a transfer in base condition alllocation to the City of North Miami Beach results in a Modified Base Condition of 349.5 MGD (Exhibit 10C).

After evaluating withdrawals under the 2007 permit calculated base condition water use of 347 MGD (including 9.1 MGD transfer to NMB and 3.3 MGD increase for Alex Orr wellfields), MDWASD's projected demands for increased water supplies over the next 20-year period and potential sources and other actions for meeting such demands were identified. MDWASD requests a total Biscayne aquifer allocation of 365.86 MGD, an increase in allocation from the Biscayne aquifer of 16.36 MGD over the modified Base Condition of 349.5 MGD for the year 2030.

Adjustments were made for the cancellation of demands previously provided to North Miami Beach of 9.1 MGD from the Northwest Wellfield. It was demonstrated through modeling presented in the 2010 permit that an additional withdrawal of 1.5 MGD at Snapper Creek, 1.5 MGD at Southwest, 0.5 MGD at Newton and 1.5 MGD at Everglades Labor Camp wellfields 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. Additionally, it was determined that turning off pumpage at the Elevated Tank, Leisure City and Naranja Wellfields results in a 2.5 MGD reduction in impacts to regional canals. This 2.5 MGD in retired base condition can be transferred to the new SMH Wellfield. An additional 0.5 MGD is allowed at the SMH WTP to allow for the inefficiency of nanofiltration (about 85% treatment efficiency). Modeling conducted for this permit modification demonstrated that an additional 24.1 MGD (85.9+24.1=110), could be withdrawn from the SWWF with a corresponding reduction in withdrawals from the Alexander Orr Wellfield of 22 MGD (62-22=40 MGD) without inducing additional seepage from Regional Waterbodies (net additional of 2.1 MGD).

Exhibit 10C lists how the historic base condition of 352.8 MGD is broken down by wellfield as well as the adjustments for the City of North Miami Beach and the modeling adjustments which result in an adjusted base condition of 349.5 MGD.

All proposed Biscayne aquifer withdrawals above the adjusted base condition water use of 349.5 MGD, are proposed to be offset through the use of reclaimed water to recharge groundwater and canals in the vicinity of the wellfields. The Applicant has proposed reclaimed water projects sufficient to offset a total annual Biscayne aquifer withdrawal rate of 386.5 (note: 349.5+37=386.5) MGD in the year 2030 (See Exhibits 8A and 13).

In order to ensure that the increased withdrawals are consistent with Section 3.2.1.E of the BOR,

ADDITIONAL INFORMATION (CONTINUED)

MDWASD will provide reclaimed water recharge into or in the immediate vicinity of regional canals connected to the Everglades (C2 and C4 canals) via shallow injection wells or direct canal recharge in volumes equal to or greater than the requested increased withdrawals above the Modified Base Condition of 109.4 MGD at the SWWF. These canals are in the vicinity of the SWWF Wellfield, where the requested increase in Biscayne aquifer withdrawals above the Modified Base Condition are to occur. Limiting Condition 43 requires that the recharge occur simultaneously with the increased pumpage. In addition to the reclaimed water offsets, the County will meet the remainder of the projected increase in raw water demands (46.6 MGD) from the Floridan aquifer.

In summary, Staff determined that the AWS Plan submitted by MDWASD (Exhibit 13) and the additional modeling provides reasonable assurances that the proposed permit does not cause a net increase in the volume or change in timing on a monthly basis of surface and groundwater withdrawn from the LEC Coast Everglades over that which occurred under the base condition water use.

CERP PROJECTS

There are several CERP projects within Miami-Dade County: Biscayne Bay Coastal Wetlands, Broward County Water Preserve Area Water Conservation Area (WCA) 3A/3B Seepage Management, C-111 Spreader Canal, and Everglades National Park Seepage Management Project (see Exhibit 34).

The goal of the Biscayne Bay Coastal Wetlands project is to restore coastal wetlands and provide more natural overland freshwater discharges to Biscayne Bay. The project consists of constructing and operating a series of pumps, culverts canal improvements and ditch infilling. The northernmost flow-way will be located near the Deering Estate, the southernmost flow-way will be located in the Cutler wetlands near the C-1 Canal, while a series of culverts and pump stations will be installed between the C-102 and C-103 Canals to re-establish sheet flow to the east of the L-31E Canal. The Cutler location is immediately north of the Miami-Dade South Wastewater Treatment Plant (SDWWTP). In the FDEP Consent Order for the SDWWTP, Miami-Dade County committed to be the local sponsor for the South Miami-Dade Reuse project which will benefit the Biscayne Bay Coastal Wetlands (BBCW) Project by providing new water in the form of reuse to the project. MDWASD plans on providing approximately 89 MGD of wastewater to be reclaimed for this project.

The WCA 3A/3B Seepage Management Project objective is to reduce the rate of seepage from Water Conservation Areas 3A and 3B by increasing groundwater levels by one foot in the seepage management area using water captured from storm events. Withdrawals from the Northwest wellfield were included in the analysis of the project design and no increases from the wellfield are included in this permit renewal.

The Everglades National Park Seepage Management Project includes 4 components: L31N (L-30) Seepage Management Pilot Project, Dade-Broward Levee, Bird Drive Recharge Area and S-356 Structure Relocation. The purpose of the L31N (L30) Seepage Management Pilot Project is to investigate technologies to manage seepage along the L-30 and L-31N canals while providing adequate wet season flows to the West Wellfield and Biscayne Bay. The Dade/Broward Levee component includes building a new Dade/Broward levee and canal to reduce seepage losses to the east from WCA-3B and the Pennsuco wetlands. The Bird Drive Recharge Area's purpose is to recharge groundwater and reduce seepage from Everglades National Park by increasing water table elevations east of Krome Avenue.

The C-111 Spreader Canal Western Project's goal is to improve the quantity, timing, and distribution of water delivered to Florida Bay via Taylor Slough, and improve hydroperiods and hydropatterns within the Southern Glades and Model Lands. The future C-111 Spreader Canal Eastern Project is intended to increase sheetflow within the Southern Glades and Model Lands as a means of more naturally delivering water to Florida Bay. There are no MDWASD withdrawals in the vicinity of the C-111 Spreader Canal

ADDITIONAL INFORMATION (CONTINUED)

projects.

Based on best available information, it is reasonable to assume that negative impacts to CERP projects will not occur as a result of this renewal. Pursuant to Limiting Condition 51, if the use of water becomes inconsistent with implementation of CERP or causes harm to a CERP project, the permit shall be modified.

MONITORING PLAN

The permittee currently has a water level and water quality monitoring program sampled by the USGS and Miami-Dade PERA (fka DERM), respectively. The water level data is used to monitor impacts of withdrawals on wetlands, existing users and the regional canal system. The water quality monitoring program determines water quality within the wellfields and identifies groundwater contaminants. The USGS also collects chloride data from a series of wells along the coast to monitor for saline water intrusion. Six existing and one proposed Floridan aquifer system wells are sampled monthly for chlorides and have continuous recorders for potentiometric heads. Pursuant to Limiting Conditions 36 and 37, MDWASD submits annual Monitoring Program summary reports. The annual report summarizes hydrologic and water quality conditions ascertained from the monitoring data collected. The report includes review and analysis of the data collected and recommendations regarding the monitoring network.

PERMIT DURATION

Pursuant to Section 1.7.2.2.B.2., BOR, the Biscayne Aquifer is a source of limited availability to the extent that withdrawals result in induced seepage from the Central and Southern Florida Project. The adjusted base condition water use (349.5 MGD), reflects the demand of the population existing at the time of permit renewal and thus may be authorized for 20 years. The impacts on the source of limited availability due to the increase of 29.68 MGD (from the SWWF in the year 2030) over the adjusted base condition water use are offset through implementation of groundwater / canal recharge projects as identified herein (Exhibits 8A, 8B, 9 and 14). As a result, the permit duration for such increase may be up to 20 years.

The Floridan aquifer is not a source of limited availability and therefore the permit duration may be up to 20 years for this source, pursuant to Section 1.7.2.2.C.

Staff recommends a permit duration of 20 years as conditioned herein.

ENVIRONMENTAL RESOURCE PERMIT STATUS:
Not Applicable.

RIGHT OF WAY PERMIT STATUS:
Not Applicable

RECOMMENDATIONS

Project Name: MIAMI-DADE CONSOLIDATED P W S

Application Number: 110511-6

Permit Number: 13-00017-W

RECOMMENDATION TO EXECUTIVE DIRECTOR

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

STAFF EVALUATION

REVIEWER

Trisha Stone, NRM

John A. Lockwood, P.G., WU

SUPERVISOR

Anita R. Bain, NRM

Karin A. Smith, P.G., WU

CONSULTING HYDROGEOLOGIST:

Simon Sunderland, P.G.

Date: July 11, 2012

WATER USE BUREAU CHIEF:

Maria C. Clemente, P.E.

Date: 7/13/12

Limiting Conditions

1. This permit shall expire 18.42 years from final action date.

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

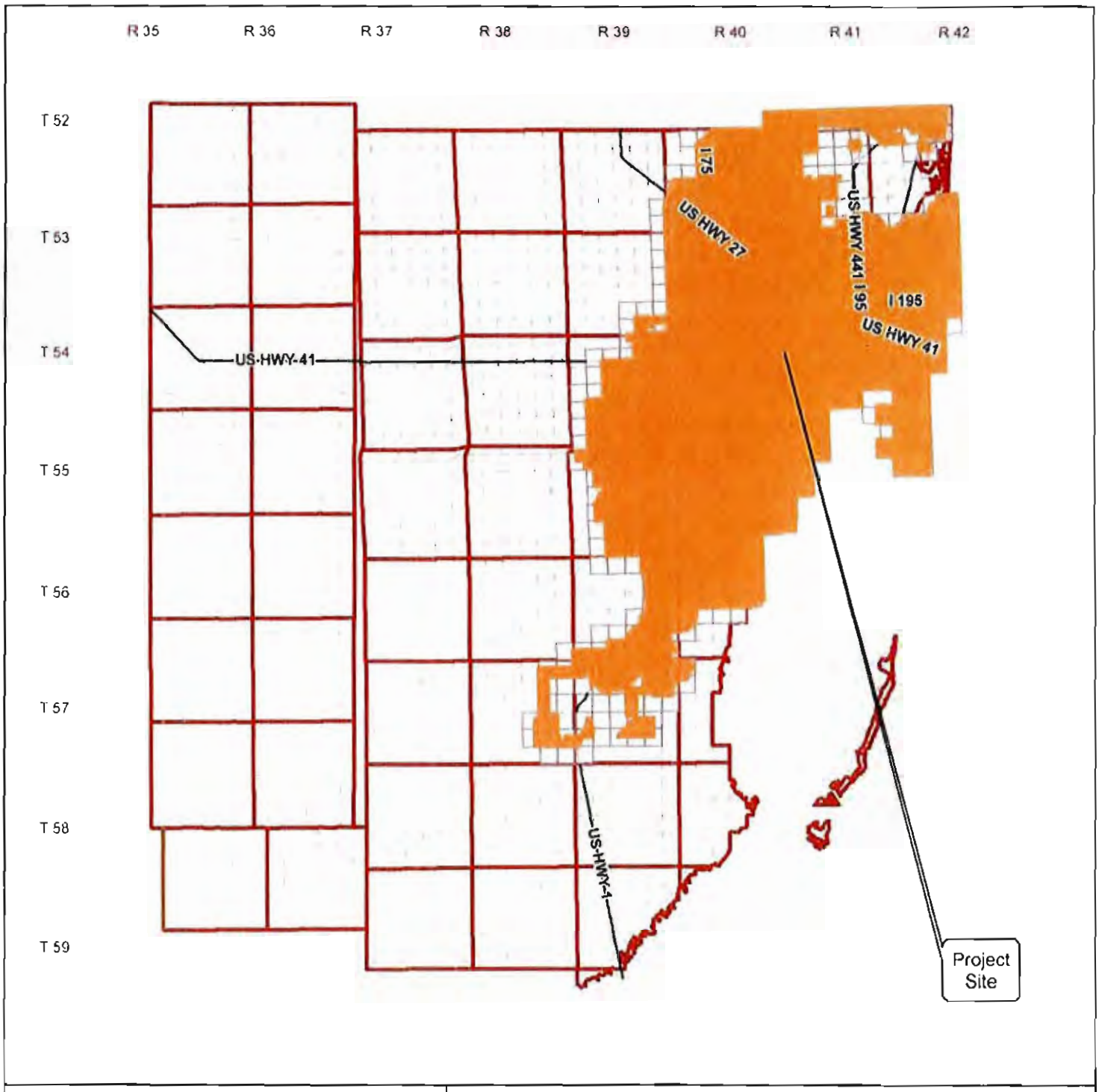
the water treatment plants (comparing water pumped from the wells compared to the volume into and out of the treatment plant), utilizing the most recent, approved water accounting and International Water Association / American Water Works Association (IWA/AWWA) water audit methodologies. The permittee 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.



MIAMI-DADE COUNTY, FLORIDA

Legend

Application

Application Sections

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

N

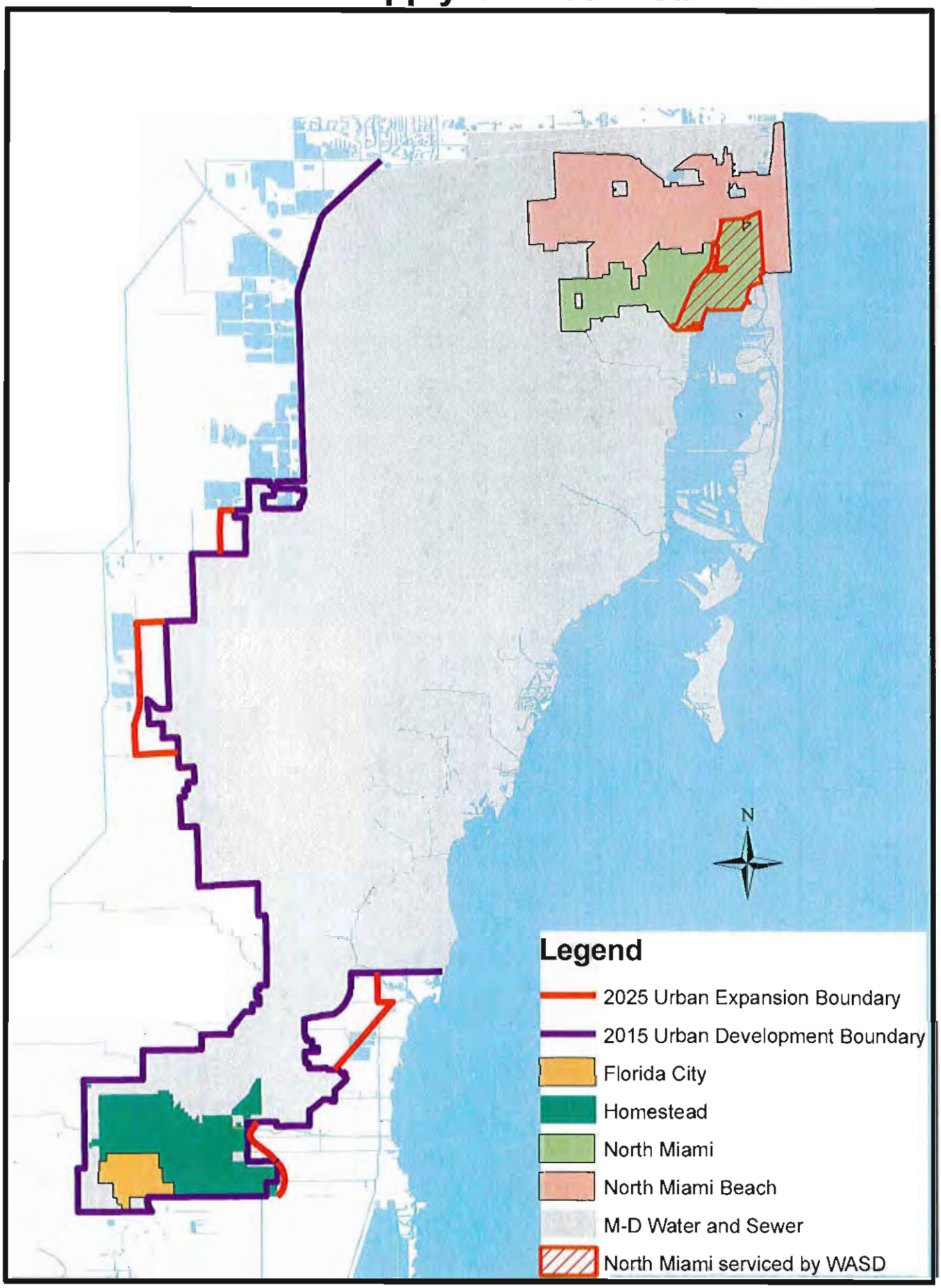
Map Date: 10/11/2010

0 10 20

Miles

Exhibit : 1

Miami-Dade County Water and Sewer Department
Water Supply Service Area



MIAMI-DADE COUNTY

0 2.5 5 10 15 20 Miles

Exhibit 2A

Miami-Dade Water and Sewer Department
Water Transmission System

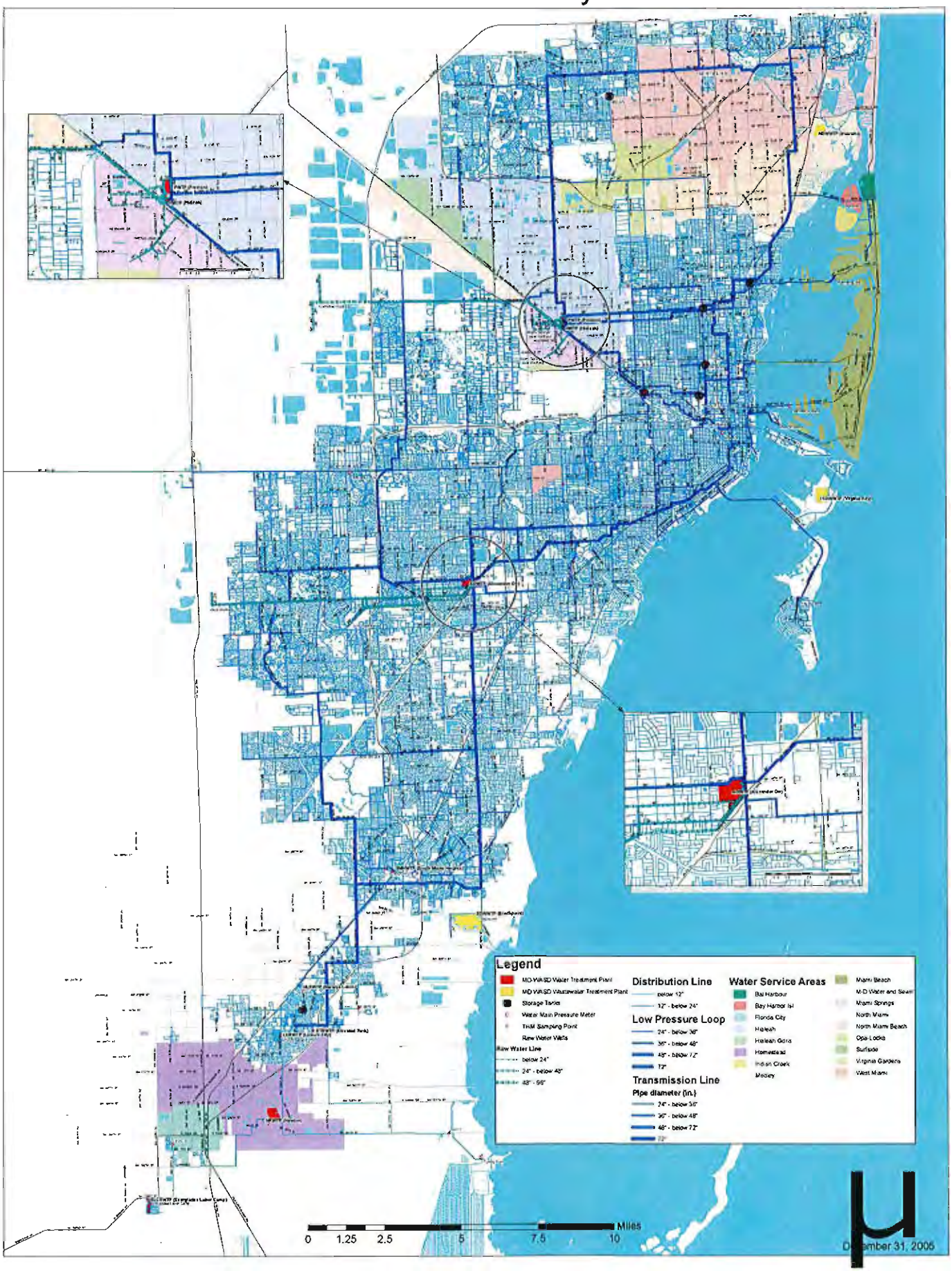
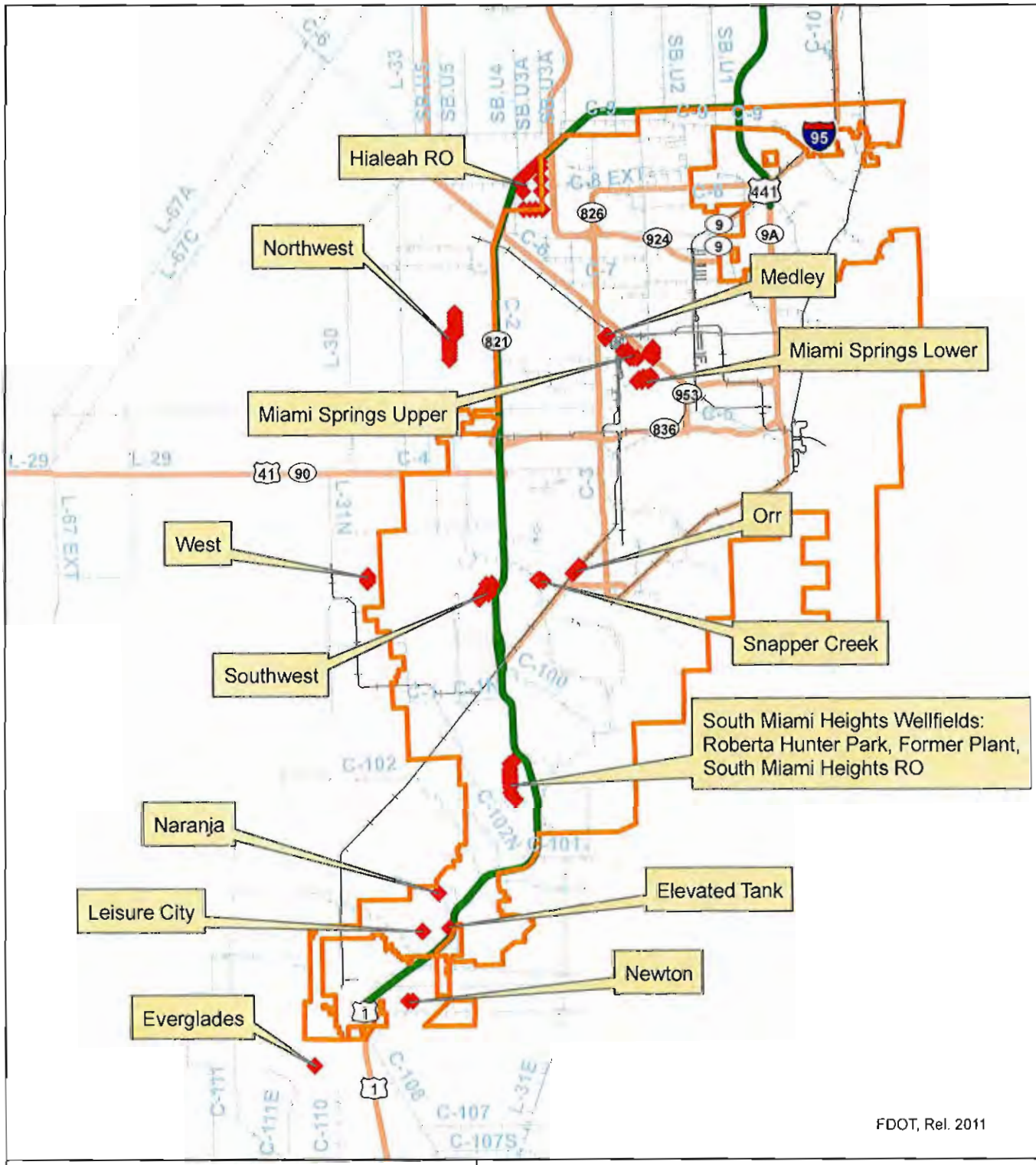


EXHIBIT 2B



MIAMI-DADE COUNTY, FLORIDA

Application

WELL

N

Map Date: 2012-06-13

Application Number: 110511-6

Permit Number: 13-00017-W

Sec - / Twp 53 / Rge 39

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 37,000 74,000

Feet

Exhibit No: 3A

MIAMI-DADE COUNTY, FLORIDA

Application

WELL

N

Map Date: 2012-04-06

Application Number: 110511-6

Permit Number: 13-00017-W

Sec - / Twp 53 / Rge 39

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.2 0.4

Miles

Exhibit No: 3B

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

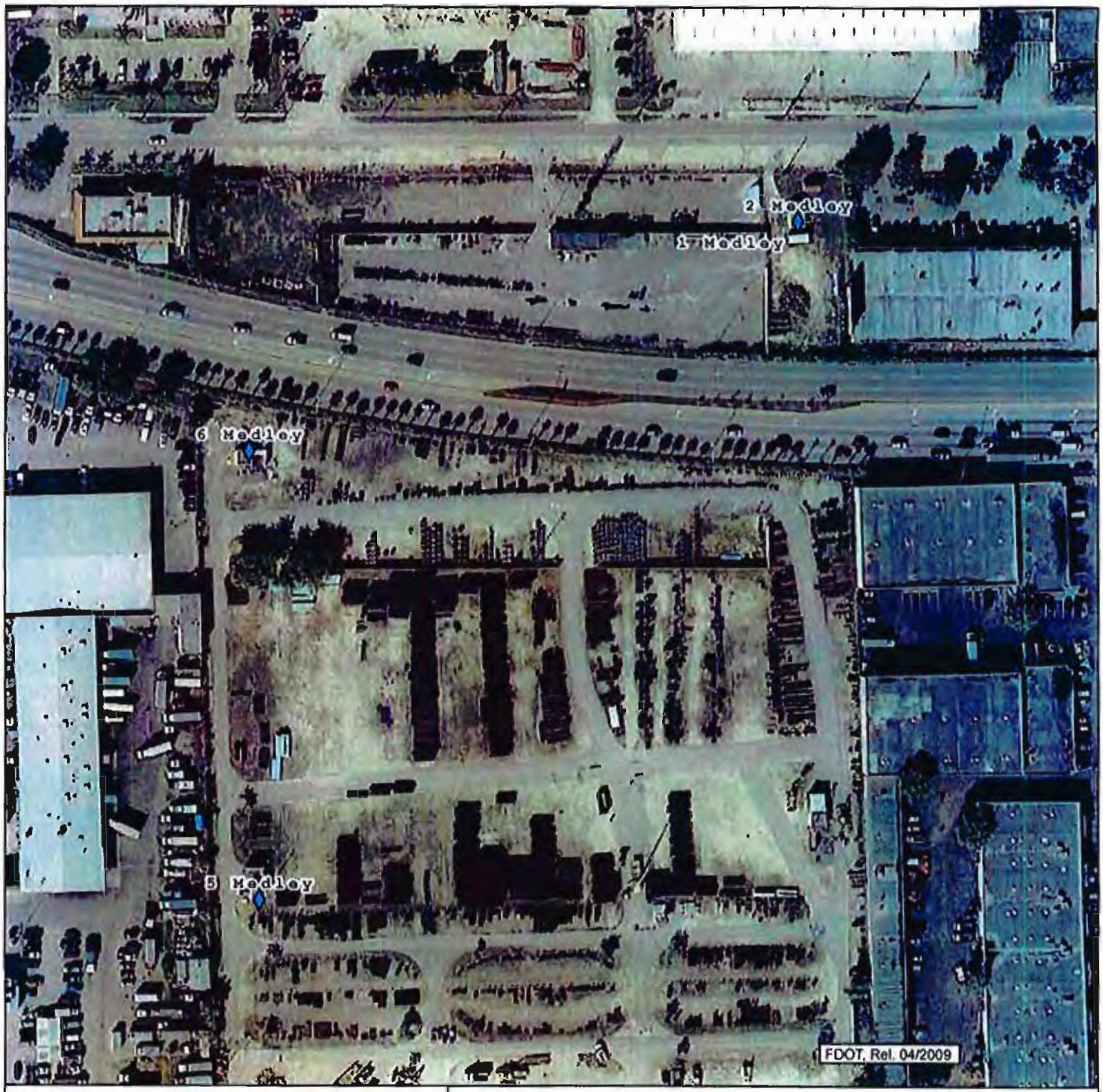
Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.125 0.25

Miles

Exhibit : 3C



MIAMI-DADE COUNTY, FLORIDA

Legend

Application ◆ Pumps

◆ Wells

N

Map Date: 10/11/2010

Application Number: 091228-14

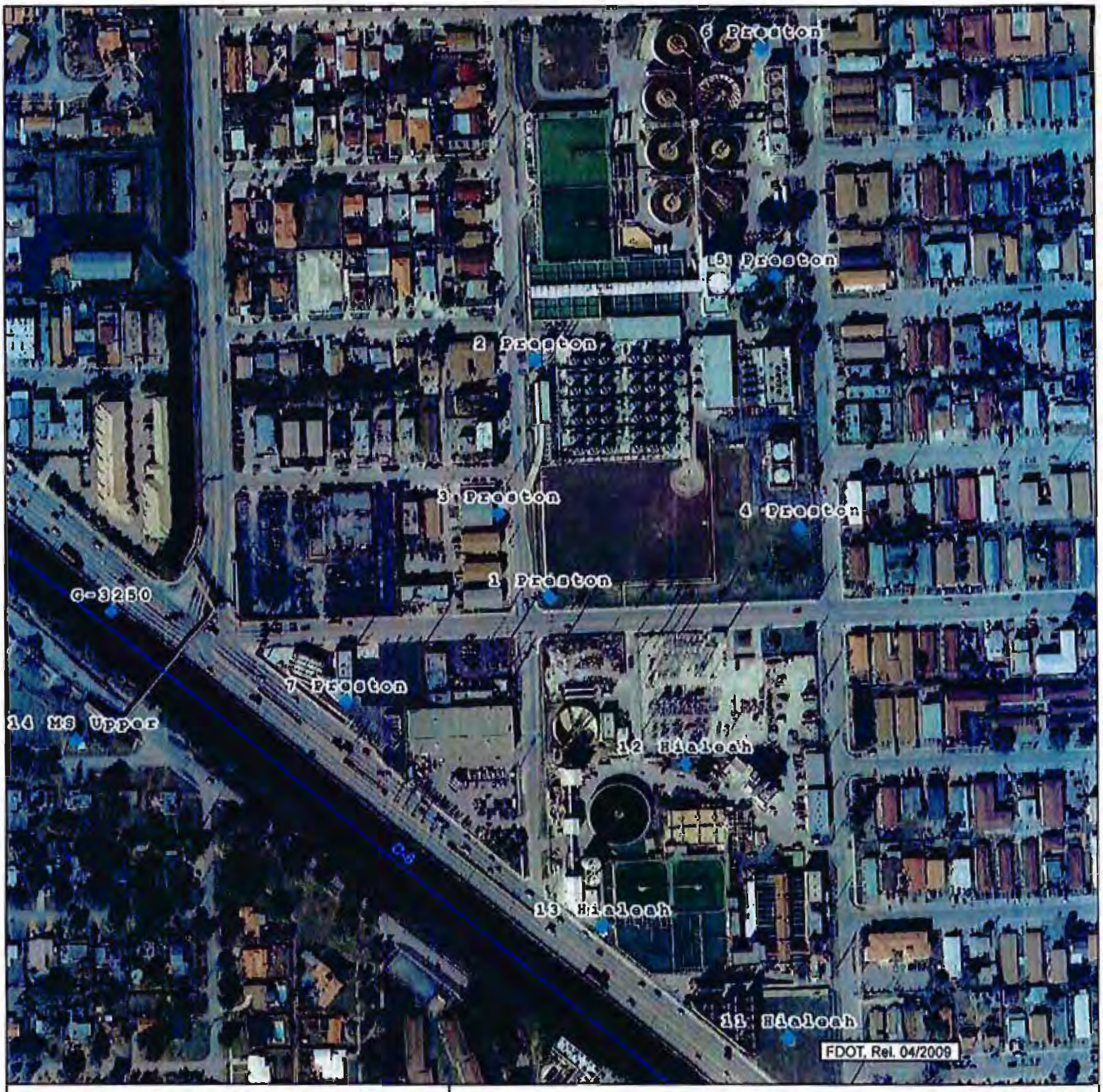
Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.01 0.02

Miles

Exhibit : 3D



MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

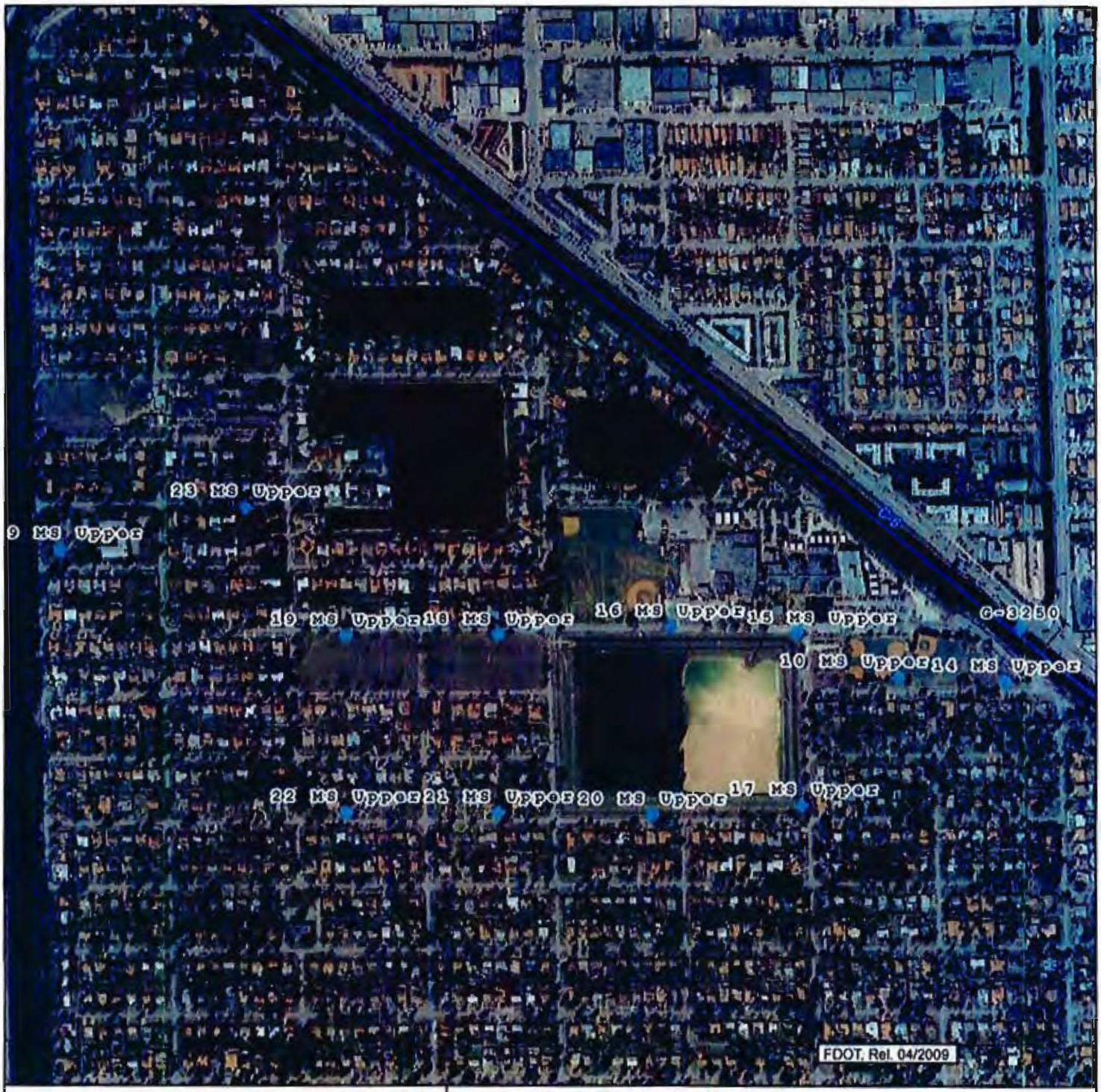
Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.02 0.04

Miles

Exhibit : 3E



MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.05 0.1

Miles

Exhibit : 3F

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.04 0.08

Miles

Exhibit : 3G

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.015 0.03

Miles

Exhibit : 3H

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.04 0.08

Miles

Exhibit : 3I

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.015 0.03

Miles

Exhibit : 3J

MIAMI-DADE COUNTY, FLORIDA

Legend

Application ◆ Pumps

◆ Wells

N

Map Date: 10/11/2010

Application Number: 091228-14

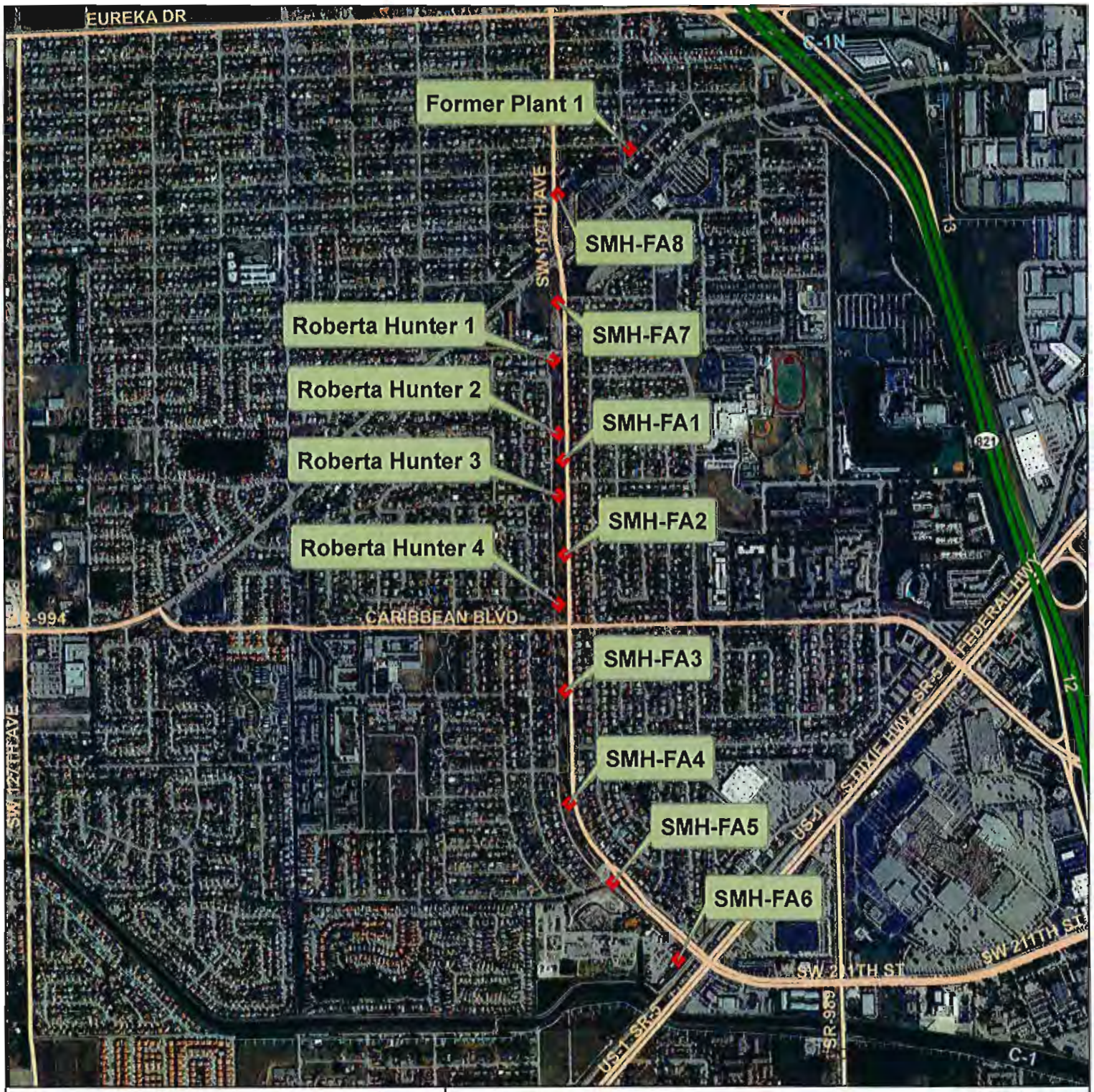
Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.02 0.04

Miles

Exhibit : 3K



MIAMI-DADE COUNTY, FLORIDA

Application

WELL

N

Map Date: 2012-06-13

Application Number: 110511-6

Permit Number: 13-00017-W

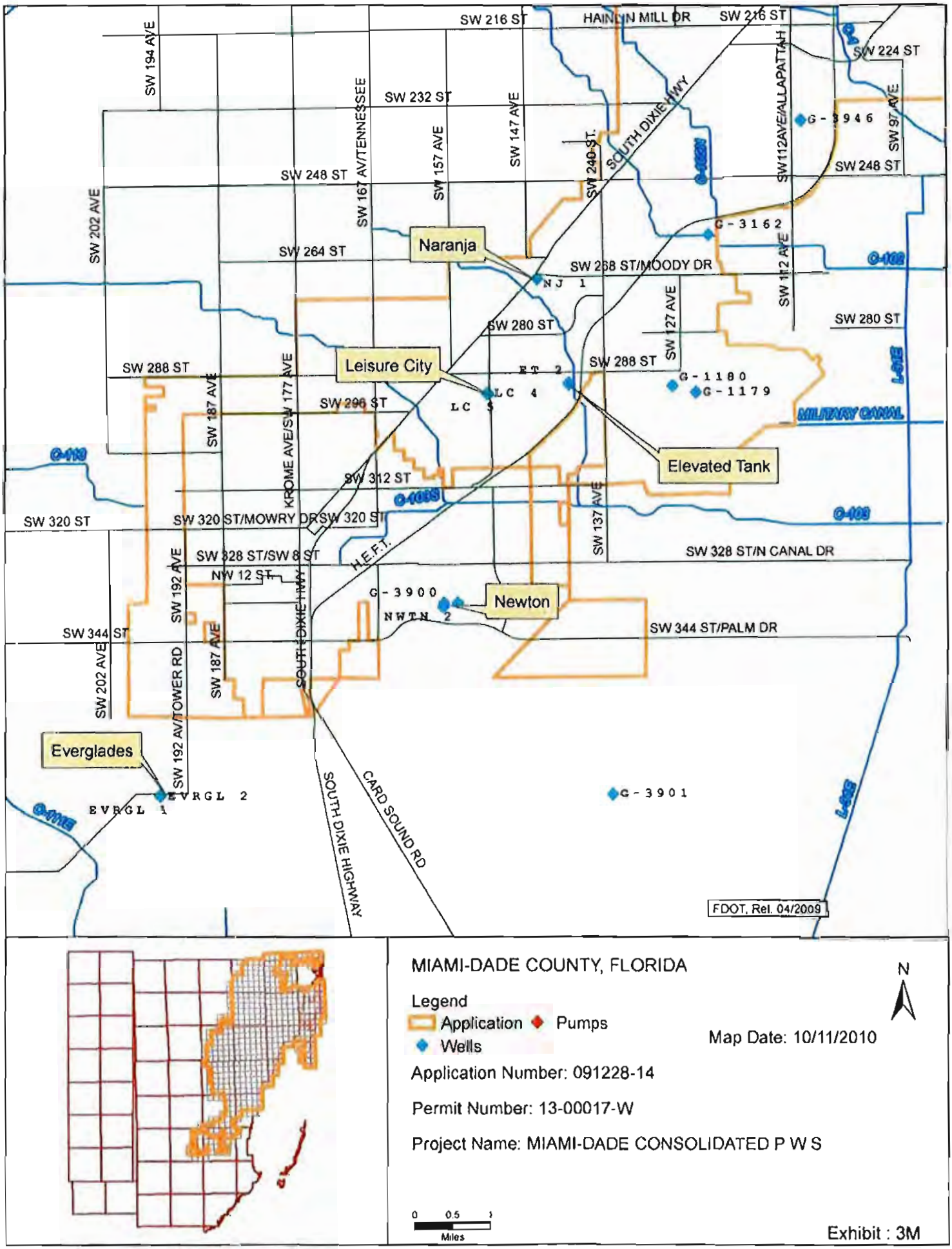
Sec - / Twp 53 / Rge 39

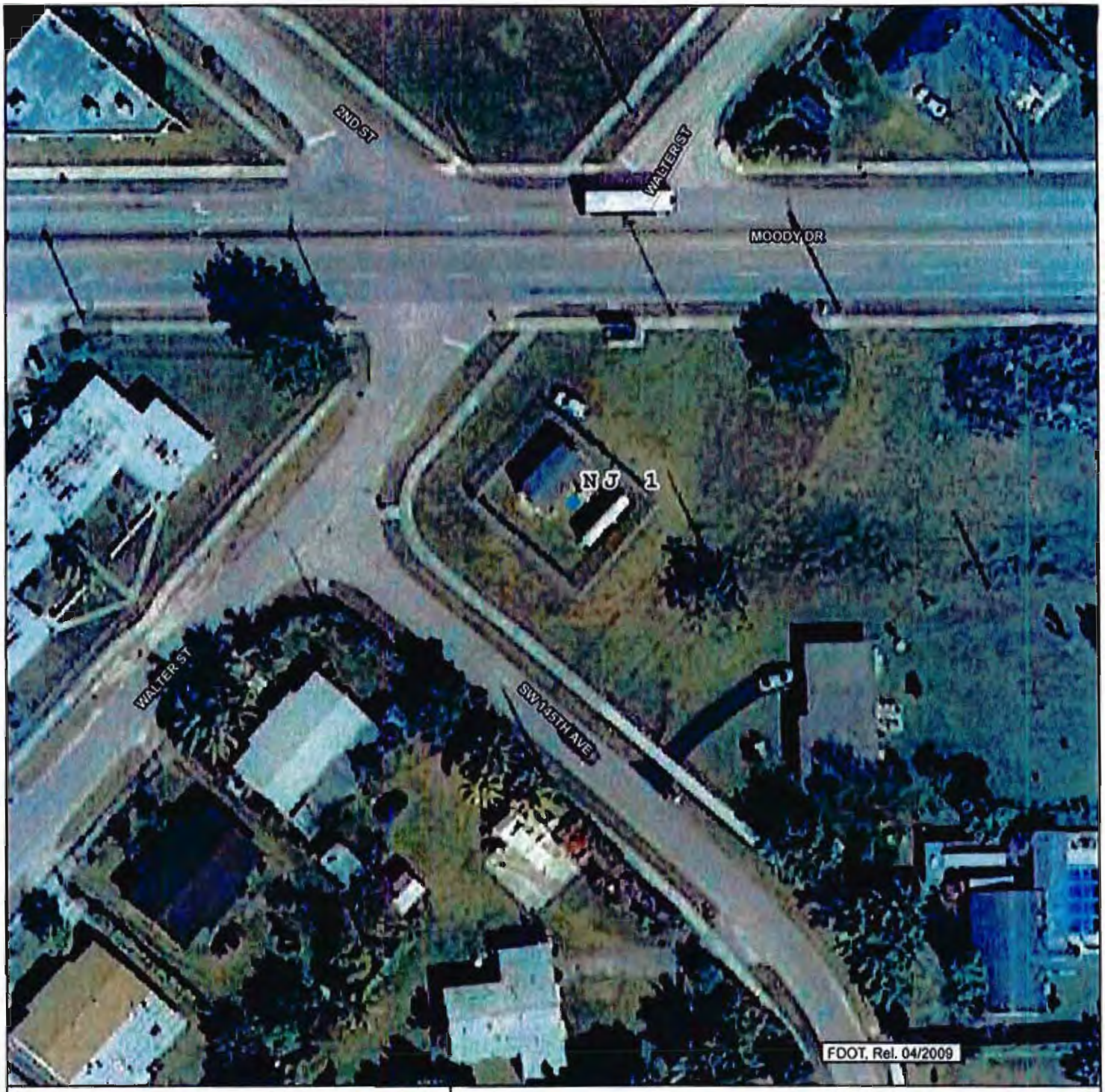
Project Name: MIAMI-DADE CONSOLIDATED P W S

0 1,550 3,100

Feet

Exhibit No: 3L


SW 216 ST
HAINLIN MILL DR
SW 224 ST
SW 194 AVE
SW 232 ST
SW 167 AV/TENNESSEE
SW 157 AVE
SW 147 AVE
SW 240 ST.
SOUTH DIXIE HWY
SW112AVE/ALLAPATTAH
SW 97 AVE
G - 3946
SW 248 ST
SW 202 AVE
G - 3162
Naranja
SW 264 ST
SW 268 ST/MOODY DR
NJ 1
SW 112 AVE
C-102
SW 280 ST
SW 127 AVE
Leisure City
SW 288 ST
ET 2
LC 4
LC 5
G - 1180
G - 1179
SW 296 ST
SW 187 AVE
KROME AVE/SW 177 AVE
MILITARY CANAL
L-31E
C-113
Elevated Tank
SW 312 ST
C-103S
SW 320 ST
SW 320 ST/MOWRY DR
SW 320 ST
C-103
SW 137 AVE
H.E.F.T.
SW 328 ST/SW 8 ST
SW 328 ST/N CANAL DR
NW 12 ST
SW 192 AVE
G - 3900
NWTN 2
Newton
SW 344 ST
SW 344 ST/PALM DR
SW 202 AVE
SW 187 AVE
SOUTH DIXIE HWY
SW 192 AV/TOWER RD
Everglades
EVRGL 2
EVRGL 1
C-111E
SOUTH DIXIE HIGHWAY
CARD SOUND RD
G - 3901
L-31E
FDOT, Rel. 04/2009
MIAMI-DADE COUNTY, FLORIDA
N
Legend
Application
Pumps
Wells
Map Date: 10/11/2010
Application Number: 091228-14
Permit Number: 13-00017-W
Project Name: MIAMI-DADE CONSOLIDATED P W S
0 0.5 1
Miles
Exhibit : 3M



MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.005 0.01

Miles

Exhibit : 3N

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.01 0.02

Miles

Exhibit : 3O

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.0125 0.025

Miles

Exhibit : 3P

MIAMI-DADE COUNTY, FLORIDA

N

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.02 0.04

Miles

Exhibit : 3Q

MIAMI-DADE COUNTY, FLORIDA

Legend

Application ◆ Pumps

◆ Wells

Map Date: 10/11/2010

Application Number: 091228-14

Permit Number: 13-00017-W

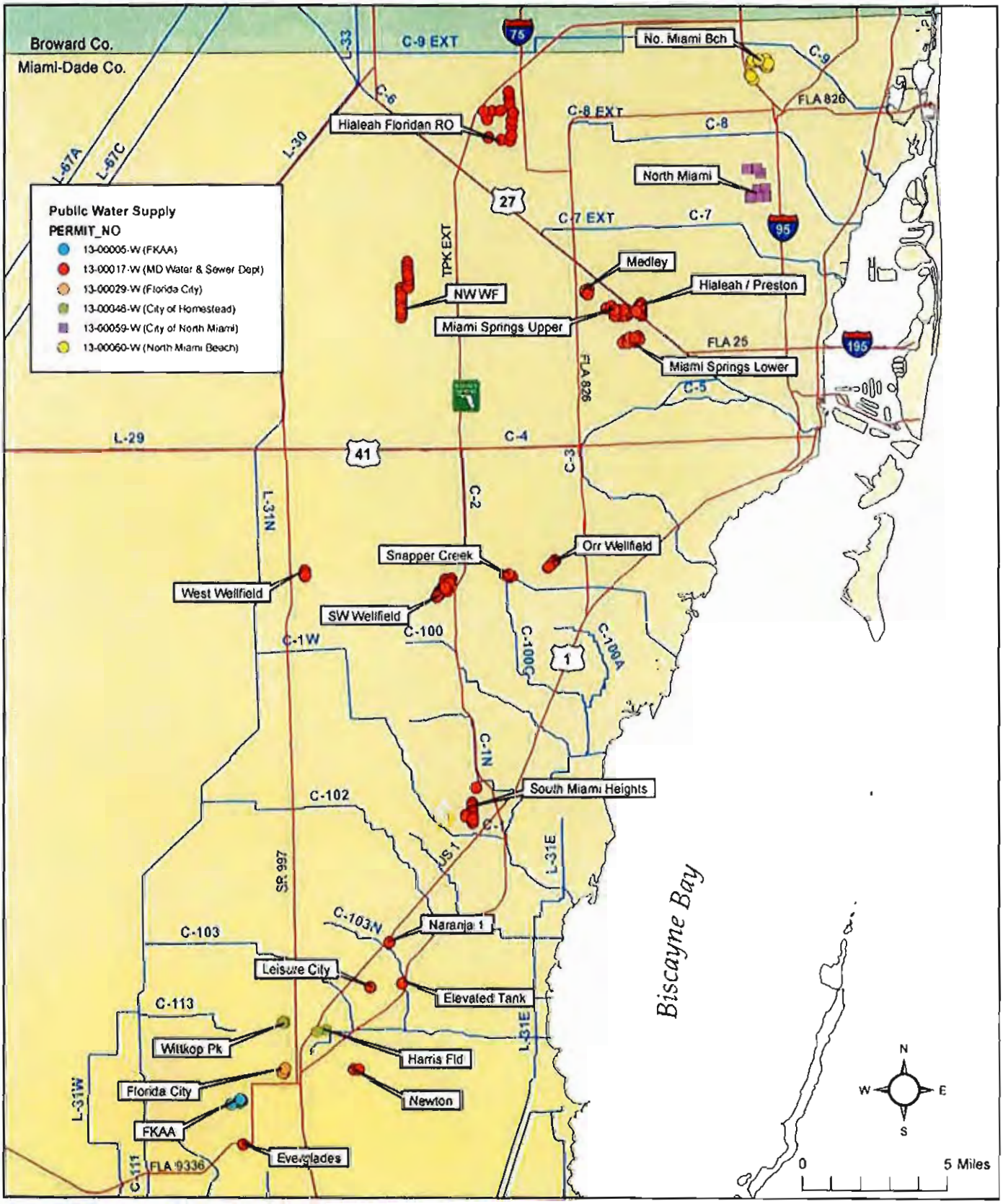
Project Name: MIAMI-DADE CONSOLIDATED P W S

N

0 0.005 0.01

Miles

Exhibit : 3R



South Florida Water Management District
Water Use Regulation
3301 Gun Club Road, West Palm Beach, FL 33406
561-686-8800 – www.sfwmd.gov

Miami-Dade County
PWS Wellfields

DISCLAIMER:
This map is a conceptual tool utilized for project development and implementation only. This map is not self-executing or binding, and does not otherwise affect the interests of any person including any vested rights or existing uses of real property. Any information, including but not limited to maps and data, received from the SFWMD is provided "as is" without any warranty and the SFWMD expressly disclaims all express and implied warranties of merchantability and fitness for a particular purpose. The District does not make any representations [illegible] the information provided to you by the Distr

Exhibit 4A

Tuesday, September 7, 2010
\\sdd\dfs\coutdata\dn_wu\Water_Use_Data\PWS_Wellfields\MDWD_Wellfields_Rev_9-7-10.mxd

Upper Floridan Aquifer
Permitted Users

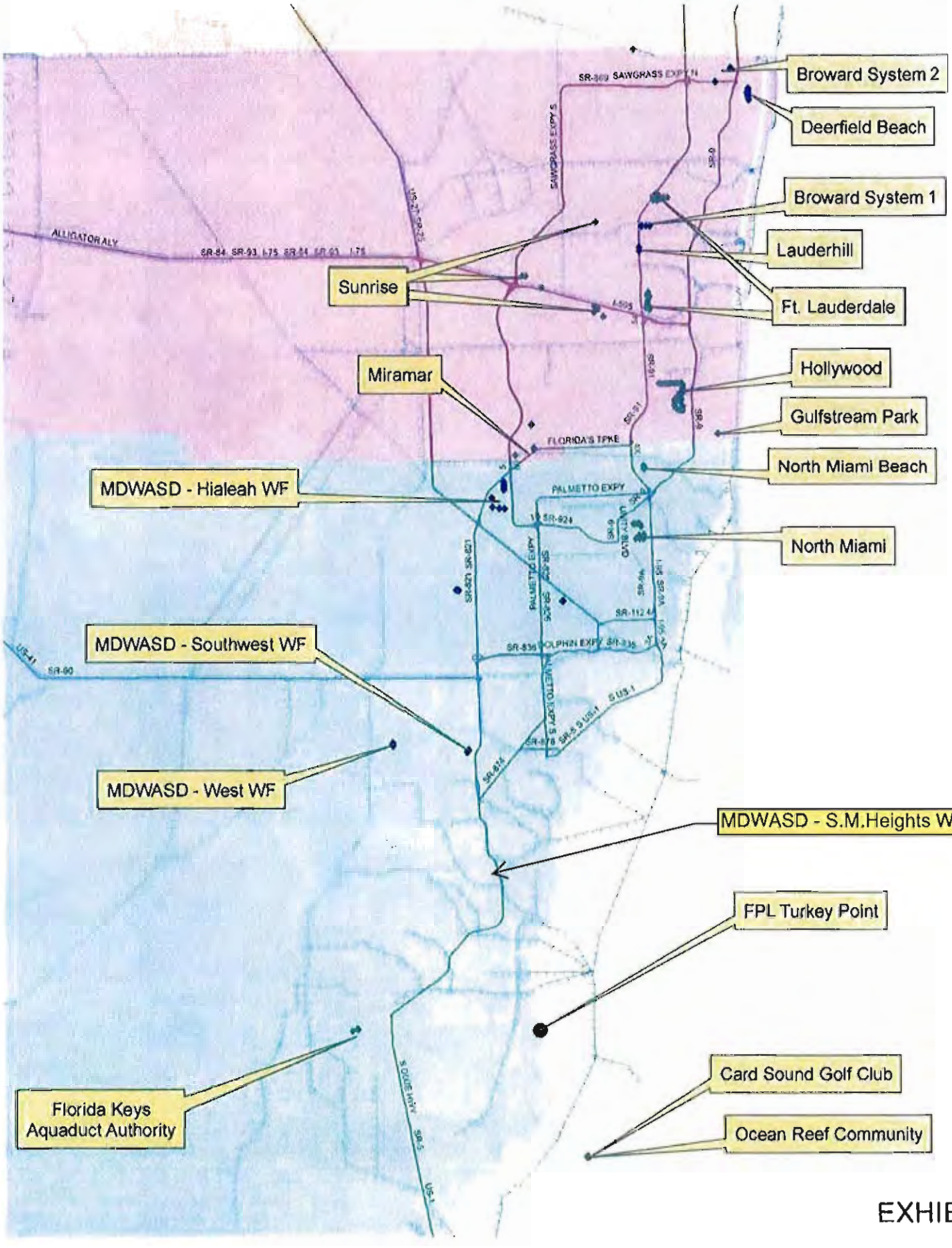


EXHIBIT 4B

Permitted Floridan Users
Miami-Dade, Broward, Monroe

PERMIT_NO	Permittee	Facility Status	Allocation (mgd)
44-00284-W	SILVER SHORES MOBILE HOME PARK	1 existing	0.0200
44-00002-W	OCEAN REEF COMMUNITY	4 existing	1.42
44-00001-W	CARD SOUND GOLF CLUB	1 existing	0.58
13-00005-W	FLORIDA KEYS AQUEDUCT AUTHORITY	5 existing	6.18
13-00017-W	MIAMI-DADE CONSOLIDATED P W S	6 existing; 13 proposed	19.95
13-01556-W	LA GORCE COUNTRY CLUB INC	1 existing; 1 proposed	0.95
13-00059-W	CITY OF NORTH MIAMI	10 proposed	7.97
13-00060-W	CITY OF NORTH MIAMI BEACH	3 existing	12.07
06-00054-W	CITY OF MIRAMAR PUBLIC WATER SUPPY	3 proposed	2.67
06-00954-W	GULFSTREAM PARK	1 existing	0.16
06-00038-W	HOLLYWOOD WATER TREATMENT PLANT	6 existing; 17 proposed	8.68
06-00134-W	TOWN OF DAVIE WATER PLANT SYS I, III, AND V	1 existing; 9 proposed	14.83
06-00120-W	CITY OF SUNRISE	2 existing; 6 proposed	10.98
06-00123-W	FORT LAUDERDALE PUBLIC WATER SUPPLY	2 existing; 14 proposed	10
06-00129-W	CITY OF LAUDERHILL	2 proposed	1.02
06-00146-W	BROWARD COUNTY DISTRICT 1	4 proposed	4.7
06-01634-W	BROWARD COUNTY 2A / NORTH REGIONAL PWS	1 existing; 4 proposed	10
06-00082-W	DEERFIELD BEACH PUBLIC WATER SUPPLY	1 existing; 1 proposed	6.5
Site Certification	FPL TURKEY POINT FLORIDAN PRODUCTION WELL	3 existing	14

EXHIBIT 4C

TABLE - A
Description Of Wells.

Application Number: 110511-6

Well ID	217724	217725	217726	217727	217728	217730
Name	RO1 Hialeah	RO2 Hialeah	RO3 Hialeah	RO4 Hialeah	RO5 Hialeah	RO6 Hialeah
Map Designator	Hialeah 1 RO	Hialeah 2 RO	Hialeah 3 RO	Hialeah 4 RO	Hialeah 5 RO	Hialeah 6 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	E	E	E	E	E
Well Diameter(Inches)	17	17	17	17	17	17
Total Depth(feet)	1490	1490	1490	1490	1490	1490
Cased Depth(feet)	1150	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	2009	2011	2011	2011	2011	2011
Planar Location Source	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER	REVIEWER
Feet East	863270	863450	864770	865950	866950	866990
Feet North	578595	574835	574835	574835	584875	583590
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	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	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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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 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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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	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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Water Shortage Monitoring Facility Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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	Monitor	Monitor	Monitor	Monitor
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

Exhibit No: 5

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
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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

Exhibit No: 5

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 - B

Description Of Surface Water Pumps

Application Number: **110511-6**

Pump ID	217932	217933
Name	SWWF recharge	SWWF recharge 2
Map Designator	C-2 recharge	Bird Drive recharge
Facility Group		
Existing/Proposed	E	E
Pump Type	Unspecified	Unspecified
Diameter(Inches)		
Pump Capacity(GPM)	0	0
Pump Horse Power		
Two Way Pump ?	N	N
Elevation (ft. NGVD)		
Planar Location		
Source	REVIEWER	REVIEWER
Feet East	859313	831395
Feet North	500886	499431
Accounting Method	Flow Meter	Flow Meter
Use Status	Proposed But Never Constructed	Proposed But Never Constructed
Water Use Type	Recharge (unspecified)	Recharge (unspecified)
Surface Water Body	MDWASD West District Water Reclamat	MDWASD West District Water Reclamat

Exhibit No: 6

Public Water Supply Demands

Application Number: 110511-6

Service Area: COUNTY WIDE SYSTEM
Treatment Name:
Standard PCUR:

System Efficiency:

Standard Max Monthly Ratio:

Standard Max Day Ratio:

Past Water Use (Table-F)

Year	Population	PCUR	Average Use (MGD)	Max Day Use (MGD)	Ratio	Average Monthly Use(MG)	Max Monthly Use (MG)	Ratio	Basis For Demand	Basis For Ratio
2006	2,225,040	156	348.00			10,579.11	11,170.00	1.06	Y	
2007	2,235,179	144	322.15			9,793.36	10,648.00	1.09	Y	Y
2008	2,213,833	142	314.26			9,553.50	9,931.00	1.04	Y	Y
2009	2,238,700	140	312.47			9,499.09	9,867.90	1.04		Y
2010	2,263,566	124	279.57			8,498.93	8,897.83	1.05		
2011	2,288,432	123	281.56			8,559.42	8,846.78	1.03		

Exhibit No:7

UPDATED TABLE G (6/29/2012)
MDWASD PROJECTED RAW WATER DEMAND BY SOURCE

1	2	3	4	5	6	7	8	9	20	21	22	23	24	25	26	27	28	29	30	31	*
	PROJECTIONS (2009) FOR MDWASD SERVICE AREA									RAW WATER AADD[k] (MGD)											
										Biscayne Aquifer[d]							Floridan Aquifer				
										South Dade[e]											
Year	Population[k]	Finished Water Use (gpcd)	AADD Finished Water Use[a] (MGD)	Water Conservation[b] (MGD) Credit	Reuse/ Reclaimed Water (MGD) Credit	Adjusted Finished Water Demand[d] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	AADD Finished Water "SURPLUS" (Col. 19 - Col. 9 - Col. 7)	Elevated Tank/ LeisureCity/ Naranja	Everglades Labor Camp/ Newton[g]	South Miami Heights (SMH) Membrane Softening WTP[f]	SW Wellfield Increase[i]	Hialeah-Preston/ Alexander-Orr Lime Softening	ASR Losses[i]	Total Biscayne Aquifer[h]	Hialeah RO WTP[g]	South Miami Heights (SMH) RO WTP[g]	Total Floridan Aquifer	Total All Sources	Non-Revenue Potential Water Loss Reduction (MGD) Credit
System-Wide																					
2010	2,263,566	145.4	329.12	2.11	0.00	327.01	144.47	0.50	0.00	3.72	2.65	0.00	0.00	326.69	3.95	337.01	0.00	0.00	0.00	337.01	1.78
2011	2,288,432	145.4	332.74	3.41	0.00	329.33	143.91	1.00	0.00	4.08	3.08	0.00	0.00	329.15	2.15	338.46	0.00	0.00	0.00	338.46	3.56
2012	2,321,552	145.4	337.55	4.71	0.00	332.84	143.37	1.50	0.00	4.25	3.57	0.00	0.00	330.50	4.14	342.46	0.00	0.00	0.00	342.46	5.34
2013	2,347,030	145.4	341.26	6.01	0.00	335.25	142.84	2.00	0.00	4.30	3.80	0.00	0.00	323.49	0.14	331.73	13.30	0.00	13.30	345.03	7.12
2014	2,372,509	145.4	344.96	7.01	0.00	337.95	142.45	2.50	0.00	4.30	4.08	0.00	0.00	325.96	0.14	334.48	13.30	0.00	13.30	347.78	8.90
2015	2,401,028	145.4	349.11	8.01	0.00	341.10	142.06	3.00	0.00	4.30	4.10	0.00	0.00	329.15	0.14	337.69	13.30	0.00	13.30	350.99	10.68
2020	2,529,835	145.4	367.84	12.01	0.00	355.83	140.65	3.00	0.00	0.00	*4.10*	3.00	0.00	335.41	0.14	338.55	13.30	23.27	36.57	375.12	14.25
2025	2,658,643	145.4	386.57	14.41	0.00	372.16	139.98	3.00	0.00	0.00	*4.10*	3.00	21.42	330.64	0.14	355.20	13.30	23.27	36.57	391.77	14.25
2030	2,787,451	145.4	405.30	15.19	0.00	390.11	139.95	3.00	0.00	0.00	*4.10*	3.00	37.74	324.98	0.14	365.86	23.33	23.27	46.60	412.46	14.25

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	19
	PROJECTIONS (2009) FOR MDWASD SERVICE AREA								ADJUSTED FINISHED WATER AADD (MGD)									
									Biscayne Aquifer						Floridan Aquifer			
									South Dade[e]									
Year	Population[k]	Finished Water Use (gpcd)	AADD Finished Water Use[a] (MGD)	Water Conservation[b] (MGD) Credit	Reuse/ Reclaimed Water (MGD) Credit	Adjusted Finished Water Demand[d] (MGD)	Adjusted Finished Water Use (gpcd)	CITY OF HOMESTEAD Finished Water Demand (MGD)	Elevated Tank/ LeisureCity/ Naranja	Everglades Labor Camp/ Newton[g]	South Miami Heights (SMH) Membrane Softening WTP[f]	SW Wellfield Increase[i]	Hialeah-Preston/ Alexander-Orr Lime Softening	Total Biscayne Aquifer[h]	Hialeah RO WTP[g]	South Miami Heights (SMH) RO WTP[g]	Total Floridan Aquifer	Total All Sources
System-Wide																		
2010	2,263,566	145.4	329.12	2.11	0.00	327.01	144.47	0.50	3.72	2.65	0.00	0.00	320.28	327.15	0.00	0.00	0.00	327.15
2011	2,288,432	145.4	332.74	3.41	0.00	329.33	143.91	1.00	4.08	3.08	0.00	0.00	322.70	330.86	0.00	0.00	0.00	330.86
2012	2,321,552	145.4	337.55	4.71	0.00	332.84	143.37	1.50	4.25	3.57	0.00	0.00	324.02	333.34	0.00	0.00	0.00	333.34
2013	2,347,030	145.4	341.26	6.01	0.00	335.25	142.84	2.00	4.30	3.80	0.00	0.00	317.15	327.25	10.00	0.00	10.00	337.25
2014	2,372,509	145.4	344.96	7.01	0.00	337.95	142.45	2.50	4.30	4.08	0.00	0.00	319.57	330.45	10.00	0.00	10.00	340.45
2015	2,401,028	145.4	349.11	8.01	0.00	341.10	142.06	3.00	4.30	4.10	0.00	0.00	322.70	334.10	10.00	0.00	10.00	344.10
2020	2,529,835	145.4	367.84	12.01	0.00	355.83	140.65	3.00	0.00	*4.10*	2.55	0.00	328.83	331.38	10.00	17.45	27.45	358.83
2025	2,658,643	145.4	386.57	14.41	0.00	372.16	139.98	3.00	0.00	*4.10*	2.55	21.00	324.16	347.71	10.00	17.45	27.45	375.16
2030	2,787,451	145.4	405.30	15.19	0.00	390.11	139.95	3.00	0.00	*4.10*	2.55	37.00	318.61	358.16	17.50	17.45	34.95	393.11

EXHIBIT 8A

UPDATED TABLE G (6/29/2012)
MDWASD PROJECTED RAW AND FINISH WATER DEMAND BY SOURCE

Footnotes

(a) Annual Average Daily Demand (AADD) Finished Water Projections between 2009 and 2030 assume 145.4 gpcd total water system demand prior to application of credits (e.g. conservation).

(b) WASD is undertaking the 20-year water use efficiency plan and expects 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).

(c) Not Used (TBD).

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

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

(f) 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).

(g) Floridan Aquifer supplied RO WTP (Raw : Finished) Ratio = 1.33 : 1.00 (75% recovery)

(h) 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) assuming a 1.02 raw-to-finished water ratio for North and Central and a 1.0 raw-to-finished water ratio for South.

(i) Future West District Water Reclamation Plant (WDWRP) for Phases 1 and 2 Canal Recharge as shown in the table below and assuming a gallon-for-gallon raw water offset. The applied (MGD) amounts represents total Biscayne Aquifer withdrawals to apply a gallon-for-gallon offset. AADD assumes Lime Softening WTP (Raw Finished) Ratio = 1.02 : 1.00.

Facility	Phase	Recharge Area	Applied (MGD) Offset	AADD (mgd)	Implement ation Year
WDWRP	1	Alex-Orr	21	20	2020
WDWRP	2	Alex-Orr	16	15	2027
	Total		37	35	

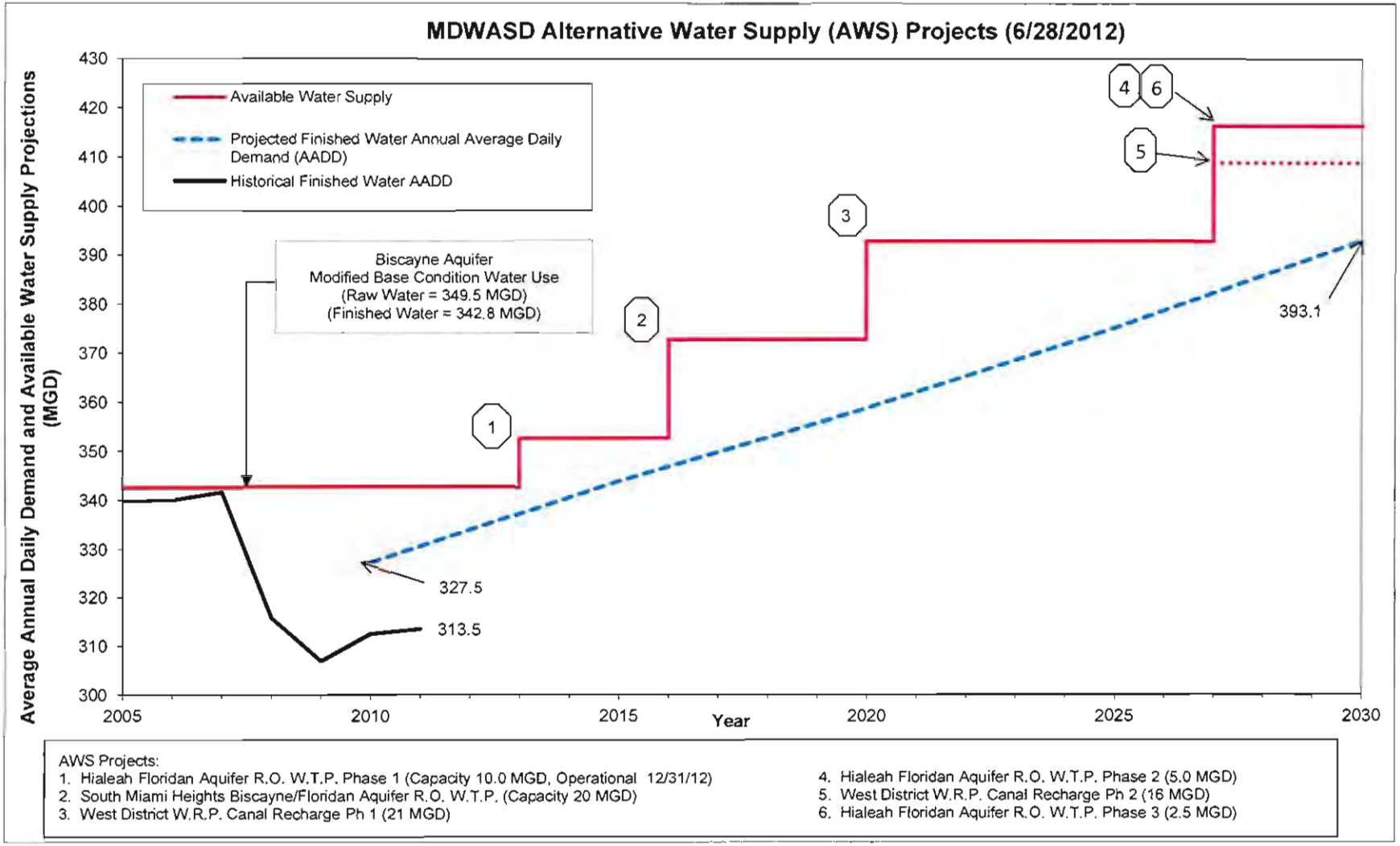
(j) Becomes *stand-by* once SMH WTP starts up. This *stand-by* capacity is not used in the total raw and finished water amounts.

(k) Population Served represent August 2008 updates to MDC DPZ Population Projections.

(l) 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%.

EXHIBIT 8B

EXHIBIT 9



6/28/2012
AWS STEPCHART

EXHIBIT 1-13 - MDWASD Biscayne Aquifer Wellfields Operation Plan Summary (7/12/2012) - Based on Annual Average Pumpage by Wellfield

1	2	3	4		5	6	7	8	9	10	11	12	13
WTP Subarea and Wellfield	Existing Wellfield Data (2011)		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			2012-2015 [c]		2020		2025		2030		
					BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	
Hialeah-Preston [c]													
Hialeah	12.54	3	3.1	70.0	25.550	70.00	25.550	70.00	25.550	70.00	25.550	70.00	Total will not exceed 25.500 BGY
John E. Preston	53.28	7	37.2										
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	62.524	171.30	62.524	171.30	67.825	185.82	72.702	199.18	Alexander Orr reduced to 40 mgd (14 600 BGY), resulting in Southwest increase to 110 mgd (40.150 BGY). Snapper Creek at 21.9 mgd, (7.994 BGY) Phase 1 Recharge = 5.0 mgd (Potential) Phase 2 & 3 Recharge = 37 MGD
Snapper Creek	40.00	4	20.4	21.9									
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**	**73.300**	**200.82**	**78.177**	**214.18**	
South Dade [e]													
Elevated Tank	4.32	2	1.3	1.3	1.570	4.30	-	-	-	-	-	-	Drops out when SMH comes on line Turning off 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.
Leisure City	4.18	4	2.9	2.9									
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 when SMH comes online in 2016. 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**	
Total Not-To-Exceed System Wide Pumpage			**Annual in BGY (mgd)**		**127.567**	**349.50**	**127.567**	**349.50**	**131.123**	**359.24**	**135.944**	**372.45**	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

Table 4 - MDWASD Floridan Aquifer Wellfields Operation Plan Summary (6/29/2012) Pumpage by Wellfield

1	2	3	4	5	8	9	10	11	12	13	14
WTP Subarea and Wellfield	Wellfield Data		Individual Wellfield ANNUAL Pumpage / Allocation								Remarks
	Design Capacity (mgd)	Number of Wells	2012 - 2015		2016 - 2020		2021 - 2025		2026 - 2030		
			BG	(mgd)	BG	(mgd)	BG	(mgd)	BG	(mgd)	See Footnote (a)
Hialeah RO WTP [(a)]	24.00	14	4.855	13.30	4.855	13.30	4.855	13.30	8.517	23.333	
Hialeah - Preston WTP Blending (Project Canceled) (Blending at Alexander Orr WTP Resulted in Distribution System Water Quality Problems - Project Canceled)											
Alexander Orr WTP Blending (Use of Aquifer Storage and Recovery wells for Blending Canceled) (Full Scale Blending Cancelled. Only Minimal Incidental Blending as result of Aquifer Storage and Recovery Well Operation)											
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	73.00	26									
Total Not-To-Exceed Pumpage	Annual Average		4.805	13.30	13.299	36.57	13.299	36.57	16.961	46.60	

Notes

BG = Billion Gallons; MGD = Million Gallons per Day

(a) New Upper Floridan Aquifer RO WTP (Finish water supply of 10.0 mgd, Phase 1 by Dec. 31, 2012, 17.5 mgd Phase 2&3 by Dec. 31, 2027)

(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.

(c) New Upper Floridan Aquifer RO Treatment at South Miami Heights WTP (Finish water supply of 17.45 mgd by Dec. 31, 2016)

Revised 6/29/2012

EXHIBIT 10B

Revised Base Condition Pumping Rates (revised 6/29/2012)

Subarea	Wellfield	Wellfield Base Condition Pumpage [a] (Pre 4/2006) BGY	(mgd)	Base Condition Transfers [b] [c] & [d] BGY	(mgd)	Modeled Transfers (Not inducing additional Regional Water demands) BGY	(mgd)	Modified Base Condition Water Use BGY	(mgd)
North Hialeah-Preston [b] (13-00037-W)	Hialeah	1.132	3.1	-3.322	-9.1			25.550	70.0
	John E. Preston	13.578	37.2						
	Medley								
	Miami Springs	10.841	29.7						
	Northwest	35.332	96.8					32.376	88.70
Permit Base Condition (13-00037-W) [b]		**60.042**	**164.5**	**-3.322**	**-9.1**	**0.000**	**0.0**	**56.720**	**155.4**
Central Alexander Orr [c] (13-00017-W)	Alexander Orr	22.630	62.0	-8.030	-22.0			62.524	171.3
	Snapper Creek	7.446	20.4			0.547	1.5		
	Southwest	30.586	83.8	8.030	22.0	1.314	3.6		
	West	5.475	15.0					5.475	15.0
Permit Base Condition (13-00017-W) [c]		**66.138**	**181.2**	**0.000**	**0.0**	**1.861**	**5.1**	**67.999**	**186.3**
South Dade (13-00040-W)	Elevated Tank [d]	0.475	1.3	-0.475	-1.3			*1.571*	*4.3*
	Leisure City [d]	1.067	2.9	-1.059	-2.9				
	Naranja [d]	0.037	0.1	-0.037	-0.1				
	Everglades Labor Camp [e]	0.256	0.7			0.547	1.5	1.752	4.8
	Newton [e]	0.767	2.1			0.182	0.5		
	South Miami Heights [d]			1.095	3.0			1.095	3.0
Permit Base Condition (13-00040-W)		**2.592**	**7.1**	**-0.475**	**-1.3**	**0.729**	**2.0**	**2.847**	**7.8**
SYSTEM-WIDE TOTAL BASE CONDITION PUMPING RATE [f]		**128.772**	**352.8**	**-3.797**	**-10.4**	**2.590**	**7.1**	**127.566**	**349.5**

Notes:

(a) Numbers were based on 12-month running average; values for individual wellfields are approximate. The sum of individual wellfield pumpages are higher than overall permit base condition due to differences in time period when the individual wellfield base volumes were established.

(b) 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.

(c) 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.

(d) Base Condition Water Use of the South Dade System is 7.1 mgd. Turning off 4.3 mgd at Elevated Tank, Leisure City and Naranja results in a 2.5 mgd reduction in impact on regional canals; therefore 2.5 is available to transfer to SMH wellfield. Increasing from 2.5 mgd to 3.0 mgd was allowed to account for the reduced treatment efficiency of the proposed membrane softening plant, pursuant to Section 3.2.1E(3)(a).

(e) The base condition water use for Newton is 2.1 mgd and for Everglades Labor Camp is 0.7 mgd. It was demonstrated through modeling that an additional withdrawal of 0.5 MGD at Newton and 1.5 MGD at Everglades wellfields 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.

(f) All proposed Biscayne aquifer withdrawals above the revised base condition water use are proposed to be offset through the use of reclaimed water to recharge groundwater and canals in the vicinity of the wellfields.

EXHIBIT 10C

Revised 6/29/2012

Wholesale Customer Treated Water Deliveries

Entity	Treatment Plant	Deliveries in Millions gallons per fiscal year			
		FY 2008	FY 2009	FY 2010	FY 2011
Bal Harbor	Hialeah-Preston	447	466	455	486
Bay Harbor	Hialeah-Preston	358	329	317	302
Hialeah	Hialeah-Preston	8081	8110	9103	9598
Hialeah Gardens	Hialeah-Preston	694	695	654	693
Homestead	Alexander Orr	0	0	0	0
Indian Creek Village	Hialeah-Preston	133	140	121	133
Medley	Hialeah-Preston	398	393	400	328
Miami Beach	Hialeah-Preston	6848	6489	6952	8410
Miami Springs	Hialeah-Preston	771	-	-	-
North Bay Village	Hialeah-Preston	343	365	395	387
North Miami	Hialeah-Preston	2123	1502	1175	1331
North Miami Beach*	Hialeah-Preston	1013	107	100	-
Opa-Locka	Hialeah-Preston	909	845	788	887
Surfside	Hialeah-Preston	327	343	328	317
Virginia Gardens	Hialeah-Preston	63	100	98	91
West Miami	Alexander Orr	266	290	293	275
Water Received from Others		676	386	145	179

(1) Miami Springs water system was purchased by WASD and beginning fiscal year 2009, was no longer a wholesale customer.

* Volumes for North Miami Beach reflect total delivered minus water passed thru for Aventura.

EXHIBIT 11

5/16/2011

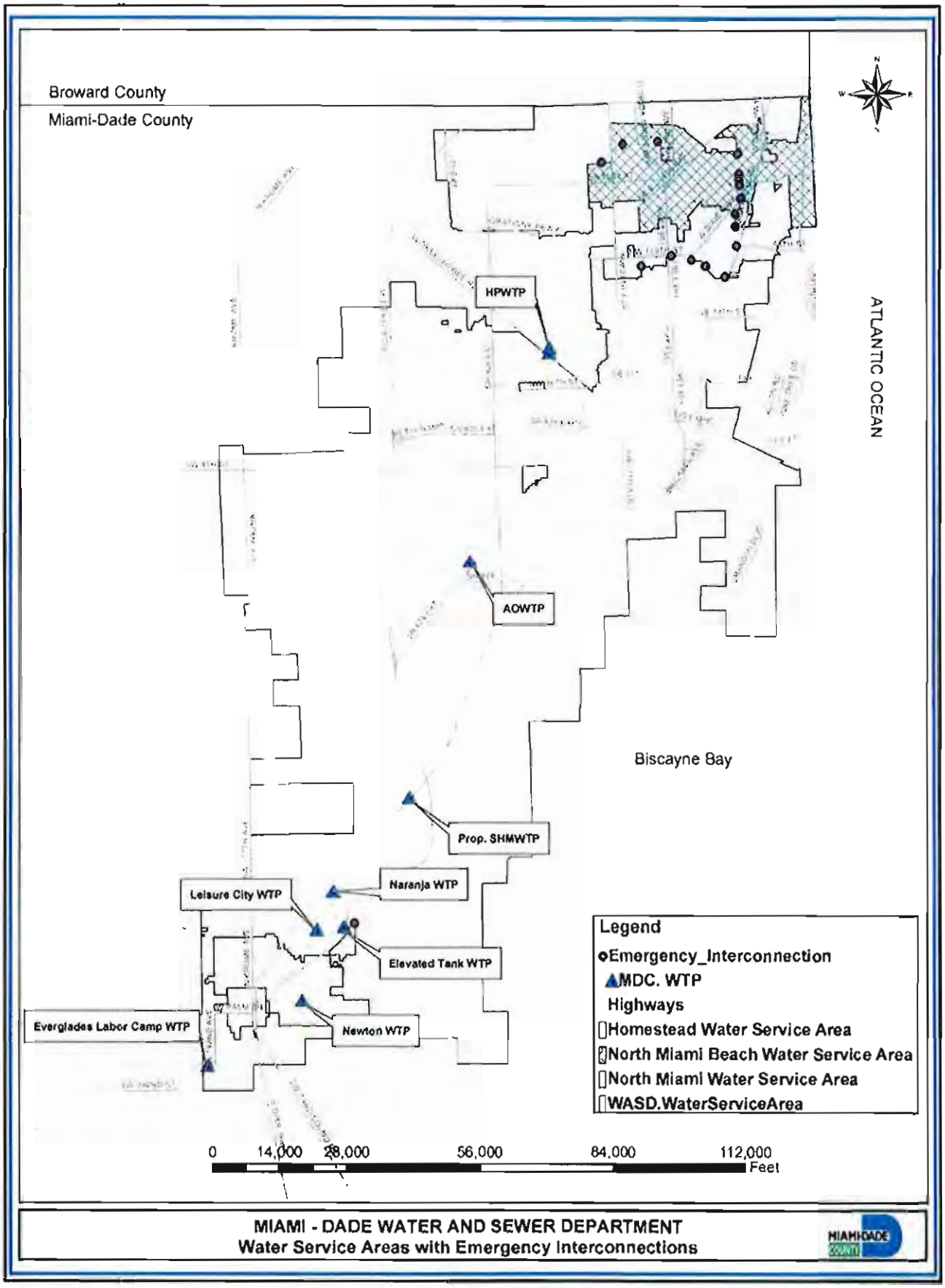
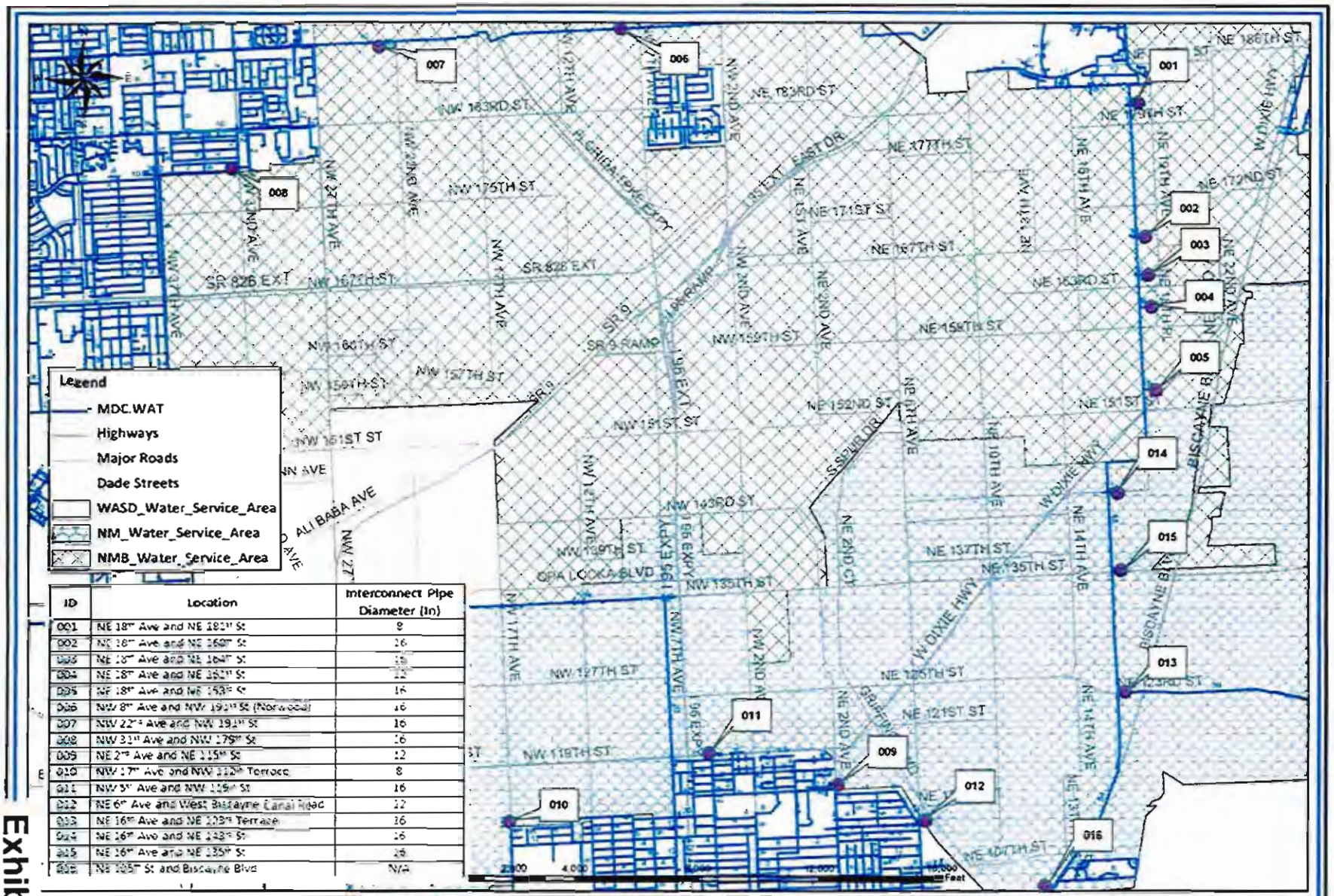

Broward County
Miami-Dade County
HPWTP
AOWTP
Prop. SHMWTP
Naranja WTP
Leisure City WTP
Elevated Tank WTP
Everglades Labor Camp WTP
Newton WTP
ATLANTIC OCEAN
Biscayne Bay
Legend
Emergency_Interconnection
MDC. WTP
Highways
Homestead Water Service Area
North Miami Beach Water Service Area
North Miami Water Service Area
WASD.WaterServiceArea
0
14,000
28,000
56,000
84,000
112,000
Feet
MIAMI - DADE WATER AND SEWER DEPARTMENT
Water Service Areas with Emergency Interconnections

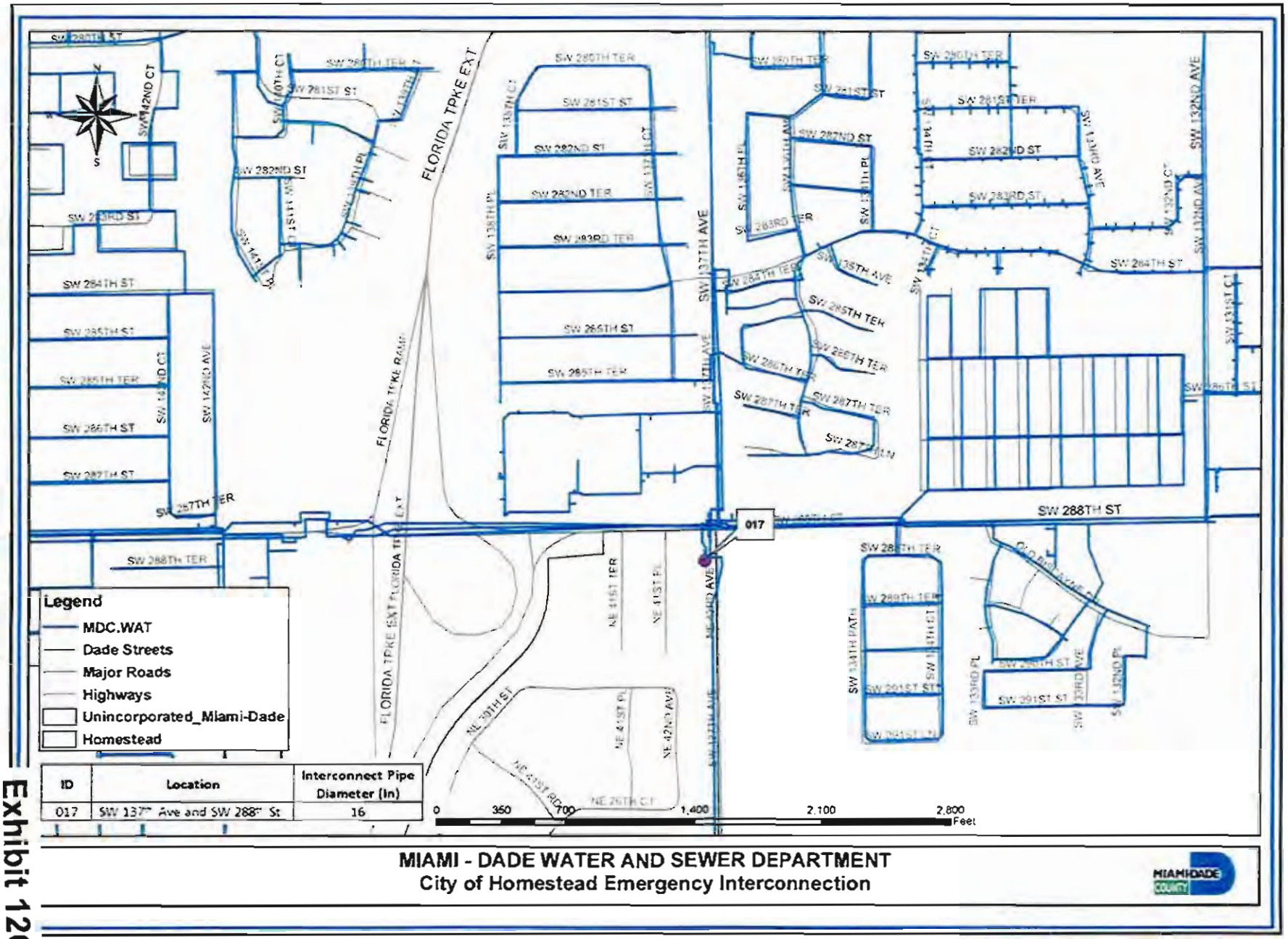
Exhibit 12A



ID	Location	Interconnect Pipe Diameter (In)
001	NE 18th Ave and NE 183rd St	8
002	NE 16th Ave and NE 168th St	16
003	NE 16th Ave and NE 164th St	16
004	NE 18th Ave and NE 162nd St	12
005	NE 18th Ave and NE 153rd St	16
006	NW 8th Ave and NW 191st St (Normoodi)	16
007	NW 22nd Ave and NW 191st St	16
008	NW 31st Ave and NW 179th St	16
009	NE 2nd Ave and NE 115th St	12
010	NW 17th Ave and NW 112th Terrace	8
011	NW 5th Ave and NW 119th St	16
012	NE 6th Ave and West Biscayne Canal Road	12
013	NE 16th Ave and NE 123rd Terrace	16
014	NE 16th Ave and NE 143rd St	16
015	NE 16th Ave and NE 135th St	16
016	NE 105th St and Biscayne Blvd	N/A

MIAMI - DADE WATER AND SEWER DEPARTMENT
North Miami and North Miami Beach Emergency Interconnections

Exhibit 12B



ID	Location	Interconnect Pipe Diameter (In)
017	SW 137th Ave and SW 288th St	16

MIAMI - DADE WATER AND SEWER DEPARTMENT
City of Homestead Emergency Interconnection

MIAMI-DADE COUNTY

Exhibit 12C

Alternative Water Supply Project Development Deadlines Tied to Increased Withdrawal Above the Base Condition Water Use

Project / Milestone	Average daily flow	Milestone Completion Date
Hialeah Floridan Aquifer R.O. WTP Phase 1	(10.0 mgd)	
• Notice To Proceed Design / Permit		Completed
• Notice To Proceed Construction		Completed
• Turnover / Project Completion		12/31/2012
South Miami Heights WTP (R.O. portion)	(17.45 mgd)	
• Notice To Proceed Design / Permit		12/31/2012
• Notice To Proceed Construction		12/31/2013
• Turnover / Project Completion		12/31/2015
Hialeah Floridan Aquifer R.O. WTP Phase 2	(5.0 mgd)	
• Notice To Proceed Design / Permit		1/15/2023
• Notice To Proceed Construction		7/30/2024
• Turnover / Project Completion		12/31/2026
Hialeah Floridan Aquifer R.O. WTP Phase 3	(2.5 mgd)	
• Notice To Proceed Design / Permit		1/15/2023
• Notice To Proceed Construction		7/30/2024
• Turnover / Project Completion		12/31/2026
West District WRP Canal Recharge Phase 1	(21 mgd)	
• Notice To Proceed Design / Permit		1/15/2016
• Notice To Proceed Construction		8/30/2018
• Turnover / Project Completion		12/31/2021
West District WRP Canal Recharge Phase 2	(16 mgd)	
• Notice To Proceed Design / Permit		1/15/2021
• Notice To Proceed Construction		7/30/2023
• Turnover / Project Completion		12/31/2026

EXHIBIT 13

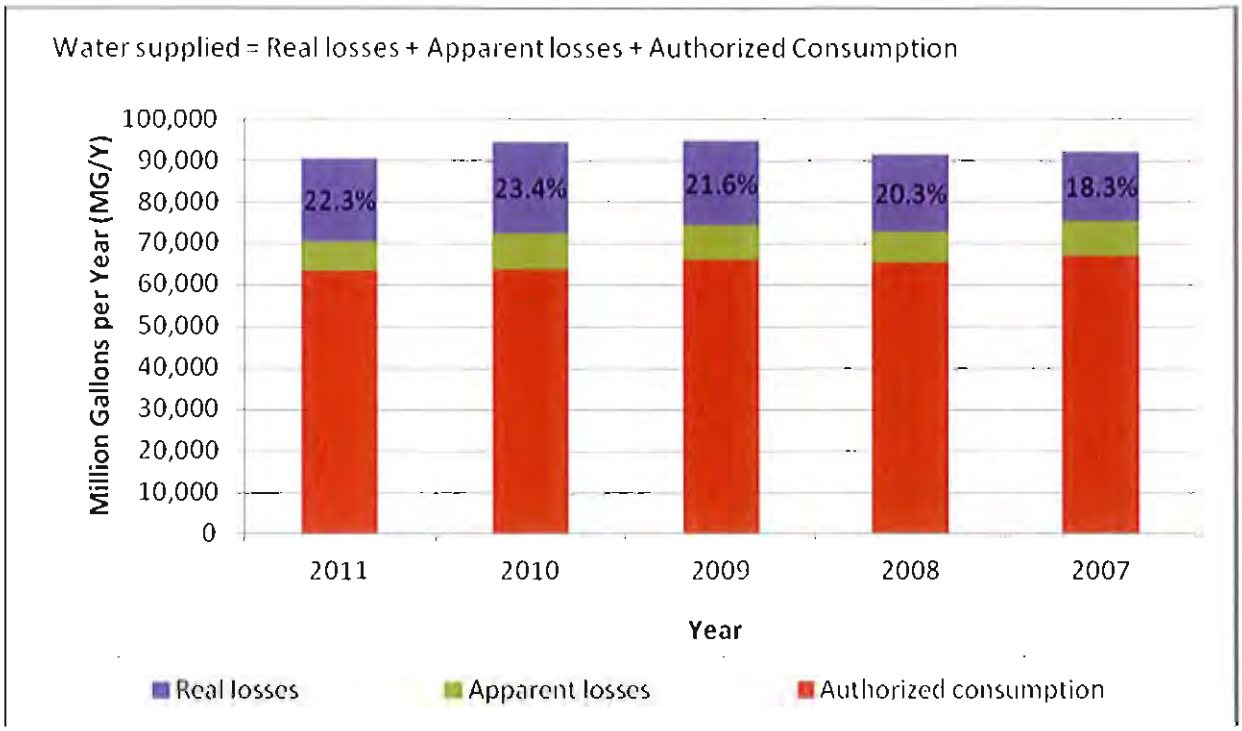
Revised 6/14/2012

Reuse Projects and Deadlines

Project	Reclaimed water generated from and amount to be treated	Quantity of Reclaimed Wastewater Applied	Reclaimed water used for	Implementation Deadline
1.	North District WWTP (Permitted) **4.44 MGD**	4.44 MGD	2.94 MGD Industrial & 1.5 MGD Public Access	Existing
2.	Central District WWTP (Permitted) **7.88 MGD**	7.88 MGD	7.84 MGD Industrial & 0.038 Public Access	Existing
3.	South District WWTP (Permitted) **4.17 MGD**	4.17 MGD	3.73 MGD Industrial & 0.443 Public Access	Existing
	TOTAL EXISTING PROJECTS (PERMITTED) = 16.49 MGD			
4.	South District WWTP **89 MGD** (requires flow diversion from Central District WWTP if project is feasible)	75.7 MGD *Finished reclaimed water assuming 15% treatment loss. The applied volume may vary depending on actual treatment loss.*	The Biscayne Bay Coastal Wetlands rehydration pilot project was completed and it was concluded that a full scale project will not be feasible.	Dec. 31, 2025
5.	West District Water Reclamation Plant **29.5 MGD**	21 MGD	Recharge Alex Orr WTP Wellfields	Dec. 31, 2021
6.	West District Water Reclamation Plant **22.5 MGD**	16 MGD	Recharge Alex Orr WTP Wellfields	Dec. 31, 2026
7.	North District WWTP **7 MGD**	7 MGD	The scope of these projects will be determined as part of the Ocean Outfall legislation implementation plan due to the Secretary of FDEP by July 1, 2013.	Dec 31, 2025
8.	Central District WWTP **27.1+ MGD**	27.1+ MGD		Dec 31, 2025
	TOTAL REQUIRED NEW PROJECTS = 175 MGD			Dec. 31, 2025
9.	South District WWTP **90 MGD**	90 MGD	TPoint Units 5 & 6 cooling TP Unit 7 cooling	Dec 31, 2022 Dec 31, 2023
	OTHER POTENTIAL LARGE-SCALE PROJECTS = 90 MGD			
	GRAND TOTAL = 282 MGD Miami-Dade is committed to reclaiming 191-281 MGD of wastewater, contingent on FP&L receiving authorization to construct units 6 & 7 and the scope of an alternative project will be determined as part of the Ocean Outfall legislation implementation plan due to the Secretary of FDEP by July 1, 2013.			Nov. 3, 2030

EXHIBIT 14

Revised 7/12/2012



Retail Parameters	2011	2010	2009	2008	2007
Water Supplied (MG/Y)	90,626	94,552	94,950	91,515	92,240
Authorized consumption (MG/Y)	63,424	63,875	66,181	65,274	67,062
Apparent losses (MG/Y)	7,036	8,502	8,271	7,623	8,307
Real losses (MG/Y)	20,165	22,144	20,498	18,618	16,872
Water losses (apparent plus real)	27,202	30,647	28,769	26,241	25,179
Non-revenue water (MG/Y)	27,388	30,971	29,007	26,513	25,747
Performance indicators	**2011**	**2010**	**2009**	**2008**	**2007**
Infrastructure Leakage Index (ILI)	8.13	9.2	10.8	9.8	8.9
Real water loss percentage	22.3%	23.4%	21.6%	20.3%	18.3%
Non-revenue water percentage	30.2%	32.8%	30.6%	29.0%	27.9%

EXHIBIT 15

MIAMI-DADE WATER AND SEWER DEPARTMENT

WATER LOSS ACCOUNTING

ESTIMATED ACCOUNTED FOR WATER
(in thousands of gallons)

	1	2	NON-REVENUE ACCOUNT WATER			ADJUSTMENTS										UNACCOUNTED FOR DISTRIBUTION LOSSES		
			3	4		5	6 (a)	7 FLUSHING	8	9	10 DISTRIBUTION	11	12	13 (b)	14	15		
FISCAL YEAR BY QUARTERS	WATER PRODUCED & PURCHASED	WATER SOLD	YOTAL BEFORE ADJUSTMENTS (1 - 2)	PERCENT (3 / 1)	ANNUAL PERCENT (g)	NON-CONSUME USAGE	FIRE DEPT.	(d) CONTRACTS	DONATIONS	FLUSHING	LEAK DETECTION	CLEANING GRAVITY MAINS	UNDER - REGISTRATION OF METERS (f)	WASD FACILITIES NOT INC. IN RETAIL	TOTAL (SUM 5..13)	TOTAL AFTER ADJUSTMENT (3 - 14)	QUARTERLY PERCENT (15/1)	ANNUAL PERCENT (h)
OCT-DEC 2008	28,945,771	21,527,589	7,418,182	25.63	22.73	10,722 (e)	N/A		11,665	92,270	3,673,695	2,044	968,742	612	4,759,750	2,658,432	9.18	4.09
JAN-MAR 2009	28,495,470	21,491,455	7,004,015	24.58	23.80	10,722 (e)	N/A		8,771	42,029	2,749,444	1,195	967,115	642	3,779,918	3,224,097	11.31	7.29
APR-JUN 2009	28,601,800	21,714,720	6,887,080	24.08	24.31	10,722 (e)	N/A		6,971	49,424	2,745,667	1,087	977,162	729	3,791,762	3,095,318	10.82	9.39
JUL-SEP 2009	28,386,997	21,833,660	6,553,337	23.09	24.35	10,722 (e)	N/A		7,238	49,424	3,126,600	2,922	982,515	584	4,180,005	2,373,332	8.36	9.92
OCT-DEC 2009	28,742,443	21,449,154	7,293,289	25.37	24.28	10,722 (e)	N/A		7,130	60,456	3,331,051	1,304	985,212	589	4,378,464	2,916,825	10.15	10.16
JAN-MAR 2010	27,858,874	20,714,393	7,144,481	25.65	24.54	10,722 (e)	N/A		8,270	56,543	3,124,683	1,008	932,148	698	4,134,072	3,010,409	10.81	10.03
APR-JUN 2010	28,495,593	21,121,269	7,374,324	25.88	25.00	10,722 (e)	N/A		9,936	88,567	4,431,872	962	950,457	1,125	5,491,641	1,882,683	6.61	8.97
JUL-SEP 2010	29,257,812	22,681,757	6,576,055	22.48	24.82	10,722 (e)	N/A		5,672	56,067	3,837,787	1,337	1,020,679	1,337	4,933,601	1,642,454	5.61	8.27
OCT-DEC 2010	28,138,887	20,772,308	7,366,579	28.18	25.02	(e)	N/A		1,975	57,605	3,216,967	956	934,754	1,379	4,213,636	3,152,943	11.20	8.52
JAN-MAR 2011	28,008,303	21,396,692	6,611,611	23.61	24.52	(e)	N/A		2,831	45,713	2,833,074	1,450	962,851	2,148	3,848,067	2,763,544	9.87	8.29
APR-JUN 2011	28,828,508	21,765,705	7,062,803	24.50	24.18	(e)	N/A		2,534	39,282	2,262,428	1,851	979,457	2,804	3,268,336	3,774,467	13.09	9.92
JUL-SEP 2011	28,213,664	22,612,877	5,600,787	19.85	23.54	(e)	N/A		1,809	28,825	2,395,438	1,324	1,017,579	3,390	3,448,365	2,152,422	7.63	10.46
OCT-DEC 2011	28,156,898	21,877,682	6,279,218	22.30	22.57	(e)	N/A		1,122	46,624	3,505,750	749	984,496	3,843	4,542,384	1,736,832	6.17	9.21
JAN-MAR 2012	28,337,168	21,466,759	6,870,409	24.25	22.74	(e)	N/A			90,394	4,014,474	5,568	966,004	4,542	5,080,982	1,789,427	6.31	8.33

Notes: October - December 2008 Figures are provisional.
(a) Miami-Dade, City of Coral Gables and City of Miami; includes Key Biscayne
(b) Lejeune Building, Westwood Lake and Distribution
(c) Revised on 8/26/99 to include Non - Consumer Usage Reported by Collections
(d) Starting in October 1998 most of the contract work is PSIP, therefore, not much water was used for flushing
(e) Average from fiscal year (1998 - 1999) fo (2000 - 2001). Eliminated in FY 2010 - 2011.
(f) A 4.5 percent under-registration is used, as conservative figure, en lieu of a 6 percent under-registration which is the 4-year mid-point of the overall average water mater accuracy of 88 percent at the 8-year replacement interval was determined in the Brown and Caldwell, Water Meter Periodic Testing (PT) Program Evaluation, November 1995, because the study did not evaluate meters less than 8 years in service. This percentage will be revised as additional evaluations are performed.
(g) Sum 4Qtrs Col 3/Sum 4Qtrs Col 1
(h) Sum 4Qtrs Col 15/Sum 4Qtrs Col 1

N/A Not available
Coral Gebles Fire Department Only, City of Miami is unable to provide due to oparating system & programing change.
Miami-Dade Fire Rescua has not provided use.
Values from this column are now found in Distribution Flushing.
Values were lost while computer system was being updated.
Eliminated in FY 2010 - 2011.

Exhibit 16A

6/22/2012

AWWA WLCC Free Water Audit Software: Water Balance

WAS v4.1

Water Audit Report For:	Report Yr:
DEPARTMENT	2011

Own Sources (Adjusted for known errors) 114,488.379	Water Exported 24,031.346		Billed Water Exported		
	Water Supplied 90,626.285	Authorized Consumption 63,424.447	Billed Authorized Consumption 63,238.368	Billed Metered Consumption (inc. water exported) 63,238.368	Revenue Water 63,238.368
				Billed Unmetered Consumption 0.000	
			Unbilled Authorized Consumption 186.079	Unbilled Metered Consumption 17.359	Non-Revenue Water (NRW) 27,387.917
				Unbilled Unmetered Consumption 168.720	
		Water Losses 27,201.838	Apparent Losses 7,036.458	Unauthorized Consumption 282.281	
				Customer Metering Inaccuracies 3,927.137	
				Systematic Data Handling Errors 2,827.040	
Water Imported 169.252			Real Losses 20,165.380	Leakage on Transmission and/or Distribution Mains Not broken down	
				Leakage and Overflows at Utility's Storage Tanks Not broken down	
				Leakage on Service Connections Not broken down	

EXHIBIT 16B

Table 5-2: Schedule of Real Water Loss Reduction Activities
January 2007 through December 2026

Activity	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
5.3 Recommendations for Real Loss Reduction										
5.3.1 System Design (Active Review)										
5.3.2 System Management										
5.3.2.3 Asset Maintenance or Replacement										
5.3.2.4 Reduce Maintenance Response Times										
5.3.2.5 Active Leakage Control and Sounding		Pilot								
5.3.2.7 Pressure Management										
5.3.2.8 Speed and Quality of Repairs										
Perform Venturi Comparative Tests-WTPs										
Perform Venturi Comparative Tests-wholesale customers										
Conduct wholesale customer unmetered connection survey										
Pilot Fixed Network AMR		Pilot								
Enhance GIS database										
ANNUAL WATER SAVINGS (Million Gallons)				650	1300	1950	2600	3250	3900	4550
ANNUAL VALUE OF WATER SAVINGS (Million $)				$0.297	$0.595	$0.892	$1.189	$1.487	$1.784	$2.081

Activity	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
5.3 Recommendations for Real Loss Reduction										
5.3.1 System Design (Active Review)										
5.3.2 System Management										
5.3.2.3 Asset Maintenance or Replacement										
5.3.2.4 Reduce Maintenance Response Times										
5.3.2.5 Active Leakage Control and Sounding										
5.3.2.7 Pressure Management										
5.3.2.8 Speed and Quality of Repairs										
Achieve target real loss of 5 billion gallons per year	X									
Achieve target Infrastructure Leakage Index (ILI) of 3.0	X									
ANNUAL WATER SAVINGS (Million Gallons)	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200
ANNUAL VALUE OF WATER SAVINGS (Million $)	$2.378	$2.378	$2.378	$2.378	$2.378	$2.378	$2.378	$2.378	$2.378	$2.378

Exhibit 17A

Updated 11-16-09

Table 6-2: Schedule of Apparent Water Loss Reduction Activities
January 2007 through December 2026

Activity	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
6.3 Recommendations for Apparent Water Loss Reduction										
6.3.1 Reducing Unmetered Supplies										
6.3.2 Improved Meter Accuracy										
6.3.3 Commercial Meter Types and Sizes										
6.3.3.2.1 Compound Meters Usage Compared to Same Size Turbine Meters						Pilot				
6.3.3.3 Looking Forward (setting Economic Meter Testing Goals)										
6.3.4 Improved Calibration of Wholesale Customer Meters										
6.3.5 Wholesale Customer Unmetered Connection Analysis										
Conduct field accuracy testing of commercial meters										
Pilot AMR to improve data handling and reduce labor cost		Pilot								
Characterize residential water demand pattern										
Determine economic optimum for residential meter replacement										
ANNUAL WATER SAVINGS (Million Gallons)				400	800	1200	1600	2000	2400	2800
ANNUAL VALUE OF WATER SAVINGS (Million $)				0.788	1.576	2.364	3.152	3.94	4.728	5.516

Activity	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
6.3 Recommendations for Apparent Water Loss Reduction										
6.3.1 Reducing Unmetered Supplies										
6.3.2 Improved Meter Accuracy										
6.3.3 Commercial Meter Types and Sizes										
6.3.3.2.1 Compound Meters Usage Compared to Same Size Turbine Meters										
6.3.3.3 Looking Forward (setting Economic Meter Testing Goals)										
6.3.4 Improved Calibration of Wholesale Customer Meters										
6.3.5 Wholesale Customer Unmetered Connection Analysis										
Conduct field accuracy testing of commercial meters										
Reduce Apparent Losses to 10 billion gallons per year										X
ANNUAL WATER SAVINGS (Million Gallons)	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800
ANNUAL VALUE OF WATER SAVINGS (Million $)	6.304	7.092	7.88	8.668	9.456	10.244	11.032	11.82	12.608	13.396

Exhibit 17B

Update 11-16-09

WATER CONSERVATION PLAN

A. Limitation of lawn and ornamental irrigation hours. Section 32-8.2 of the Code of Miami-Dade County was amended on April 7, 2009 limiting landscape irrigation to two days a week. The ordinance also includes permanent irrigation restrictions which prohibits landscape irrigation between 9:00 am and 5:00 pm. The ordinance also encourages efficient water use by not restricting hours for low volume irrigation methods or irrigation with treated wastewater effluent.

B. Use of Florida Friendly landscaping principles. The Miami-Dade County Landscape Ordinance, Chapter 18A, was last updated May 5, 2009. Within the Ordinance, use of Florida Friendly landscaping principles is promoted 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 non-potable water supplies and restrictions of the amount of lawn areas. The ordinance is in effect for all landscaping for new construction and includes more efficient water use guidelines.

C. Requirement of ultra-low volume plumbing in new construction. Miami-Dade County Ordinance 91-15 establishing water conservation standards for plumbing fixtures installed in new construction, was adopted on February 5, 1991. Ultra-low volume (ULV) water closets, showerheads and other water conserving plumbing fixtures are mandatory on all new construction.

D. Water conservation based rate structure. Since 1990, MDWASD placed into effect a tiered schedule of water rates to encourage conservation. Additional surcharges apply during formally declared Phase I, II, III or IV water restrictions.

E. Leak Detection - MDWASD maintains an ongoing leak detection program in which crews, using acoustical detection equipment, which includes an aqua-scope with an electronic sound amplifier, working at night when extraneous noise is reduced, find leaks which are recorded and subsequently repaired. A leak Location System or correlator which uses sonar technology to locate leaks has also been in use since December 1993.

A water loss accounting table for 2007 thru 2011 (Exhibit 16A), was compiled using the current water accounting methodology used by MDWASD for determining the unaccounted for distribution system water losses. Also included in Exhibit 16B is the International Water Association (IWA) / American Water Works Association (AWWA) water audit methodology which focuses on determining an Infrastructure Leakage Index (ILI). This water audit methodology categorizes water losses into real losses and apparent losses. Real losses include leaks, breaks, overflows and service connections and these losses impact withdrawals of groundwater. Apparent losses include unauthorized consumption, meter inaccuracies and data handling errors and have a monetary impact on the utility. In 2011, the real losses were 20 BGY (55 mgd) and the apparent losses had a monetary value of $28 million. The County has committed to a Water Loss Reduction Plan (Exhibit 17) which will cost approximately $15 million over the next five years and $2 million each year for the remaining 15 years with the goal of reducing real losses by 50% and apparent losses by 40%. Exhibit 15 shows results of the program from 2007-2011. Limiting Condition 49 requires annual updates on the results of the program.

F. Rain Sensor Device Ordinance - Miami-Dade County's Landscape Ordinance 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 have fallen.

G. Water Conservation Education Program - The MDWASD purchases and publishes a variety of brochures and literature, in both English and Spanish, promoting water conservation that are available to members of the public upon request. A water conservation kit is also available to customers upon request, which includes a washer to reduce water flow in showerheads, a clip that reduces the amount of water used by toilets, a low-flow faucet aerator, and dye-tracing tablets for detecting water leaks in toilets. In addition, the Department sponsors a telephone message center, the Pipeline customer newsletter, posted water conservation messages on Miami-Dade Transit Agency buses, and does a variety of presentations to school-aged children to educate them about water conservation. The MDWASD website(http://www.miamidade.gov/wasd/) includes a Water Conservation page.

H. Reclaimed Water - see Reuse of Reclaimed Water discussion in staff report

EXHIBIT 18

Table 3: Summary of total water savings (MG) across the Water Savings Horizon, and cumulative costs ($ through 2026) by BMP type, with associated percentages.

BMP #	Description	Water Savings Across the 20-Year WSH (Cumulative Water Savings 2007-2026) (MG)	Percent of Total Savings, by BMP Type	Cumulative Costs by BMP Type ($ to date)	Percent of Total Costs, by BMP Type
1	Landscape/Irrigation Eval. + Rain Sensor, No Rebate, SF	6,076	7.3%	$1,773,200	7.0%
2	Landscape/Irrigation Eval. + Rain Sensor, No Rebate, NR	30,405	36.5%	$1,121,400	4.4%
3	Common-area High Efficiency Clothes Washer Rebate, MF	184	0.2%	$300,000	1.2%
4	High Efficiency Toilet + Showerhead & Aerators, SF-Elderly	4,906	5.9%	$5,000,000	19.8%
5	High Efficiency Toilet + Showerhead & Aerators, County MF	4,298	5.2%	$0	0.0%
6	High Efficiency Toilet Rebate, SF	159	0.2%	$75,000	0.3%
7	Toilet Exchange Program, SF	3,278	3.9%	$4,026,100	16.0%
8	Toilet Exchange Program,MF	2,845	3.4%	$4,368,000	17.3%
9	Showerhead Exchange, SF	4,664	5.6%	$56,096	0.2%
10	Showerhead Exchange, MF	4,555	5.5%	$54,656	0.2%
11	Retrofit Kit, SF	1,599	1.9%	$83,443	0.3%
12	Retrofit Kit, MF	1,562	1.9%	$81,301	0.3%
13	ICI, Leak detection & Repair, County NR	2,228	2.7%	$2,796,600	11.1%
14	ICI, Evaluate & Retrofit, County NR	1,035	1.2%	$195,200	0.8%
15	ICI, Evaluate & Retrofit, Commercial NR	13,994	16.8%	$5,112,000	20.3%
16	ICI, Hotel Program, NR	1,487	1.8%	$160,001	0.6%
	Plan Total for WSH (2007-2026)	**84,000**	**100%**	**$25,203,000**	**100%**

Exhibit 19A

Water Savings Projection Report Summary

			Demand (mgd)					Per Capita Demand (gpcd)		
	Water Savings (mgd)		With Conservation			Population		With Conservation		
Year	Planned	Reported	Without Conservation	Planned	Actual	Forecasted	Actual	Without Conservation	Planned	Actual
2007	1.09	1.212308	348.89	347.37865	315.8	2250944	2235179	155	154.33	142.92
2008	2.24	3.476908	345.78	342.732191	295.2	2230895	2213833	155	153.63	133.69
2009	3.53	4.902751	325.51	320.771322	305.8	2238700	2238700	145.4	143.28	136.61
2010	4.82	6.541536	329.12	322.429388	305.3	2263566	2263566*	145.4	142.44	134.90
2011	6.10	8.466445	332.74	324.247924	305.7	2288432	2288432*	145.4	141.69	133.59
2016	11.70		352.86	337.652284	--	2401027	--	145.4	139.14	--
2021	15.67		371.58	352.402364	--	2529835	--	145.4	137.89	--
2026	19.62		390.31	367.177444	--	2658643	--	145.4	136.78	--

*Pending Verification of Census Numbers

Table 1

EXHIBIT 19B

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

BMP	Category	Sector	Cost/ measure[7]	Savings Rate (gallons per meas./ per day)	2010						2011						2016					
					No. of Meas. in 2010	Cumulative No. of Meas.	2010 Cost	Cum. Costs ($ to date)	New Water Savings (GPD)	2010 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 Moisture Sensor Retrofit	Landscape & Irrigation Evaluations plus Moisture Sensor Retrofit (without Rebate)[1]	SF	$360	233	360	1,320	$93,600	$343,200	83,880	307,560	360	1,680	$93,600	$436,800	83,880	391,440	340	3,420	$88,400	$889,200	79,220	796,660
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	20	60	$160,200	$640,800	700,000	2,600,000	20	100	$160,200	$801,000	700,000	3,500,000	0	140	$0	$1,121,400	0	4,900,000
High-Efficiency Clothes Washer Rebate	Common-area Washers[2]	MF with Common-area Clothes Washers	$300	48	50	200	$15,000	$60,000	2,400	9,600	50	250	$15,000	$75,000	2,400	12,000	50	500	$15,000	$150,000	2,400	24,000
High Efficiency Toilet (HET) Retrofit/Rebate	Retrofit (includes showerhead and aerators)[3]	SF - Elderly	$250	64	1,000	4,000	$250,000	$1,000,000	64,000	256,000	1,000	5,000	$250,000	$1,250,000	64,000	320,000	1,000	10,000	$250,000	$2,500,000	64,000	640,000
		County-Owned MF Housing[5]	$0	64	2,500	6,000	$0	$0	160,000	384,000	2,500	8,500	$0	$0	160,000	544,000	0	11,000	$0	$0	0	704,000
	Rebate (toilet only)[4]	SF	$100	29	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750
	Toilet Exchange Program	SF	$130	29	1,630	4,890	$211,900	$635,700	47,270	141,810	1,630	6,520	$211,900	$847,600	47,270	189,080	1,630	14,670	$211,900	$1,907,100	47,270	425,430
	Toilet Exchange Program	MF	$130	29	0	0	$0	$0	0	0	0	0	$0	$0	0	0	2,240	11,200	$291,200	$1,456,000	64,960	324,800
Showerhead Exchange	No Categories	SF	$1.50	35	1,770	6,740	$2,832	$10,784	61,950	235,900	1,770	8,510	$2,832	$13,616	61,950	297,850	1,770	17,360	$2,832	$27,776	61,950	607,600
	No Categories	MF	$1.60	35	1,720	6,640	$2,752	$10,624	60,200	232,400	1,720	8,360	$2,752	$13,376	60,200	292,600	1,720	16,960	$2,752	$27,136	60,200	593,600
Retrofit Kit Give Away	No Categories	SF	$2.36	12	1,770	6,740	$4,213	$16,041	21,240	80,880	1,770	8,510	$4,213	$20,254	21,240	102,120	1,770	17,360	$4,213	$41,317	21,240	208,320
	No Categories	MF	$2.36	12	1,720	6,640	$4,094	$15,803	20,640	79,680	1,720	8,360	$4,094	$19,897	20,640	100,320	1,720	16,960	$4,094	$40,365	20,640	203,520
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	30	110	$142,200	$521,400	30,000	110,000	30	140	$142,200	$663,600	30,000	140,000	30	290	$142,200	$1,374,600	30,000	290,000
	Evaluate and Retrofit County-owned Administrative Buildings[6]	NR	$1,600	1,500	10	52	$16,000	$83,200	15,000	78,000	10	62	$16,000	$99,200	15,000	93,000	10	112	$16,000	$179,200	15,000	168,000
	Evaluate and Retrofit Private Commercial Buildings	NR	$1,600	1,500	0	0	$0	$0	0	0	0	0	$0	$0	0	0	213	1,005	$340,800	$1,704,000	319,500	1,507,500
	Hotel Program[8]	NR	$667	1,617	12	48	$8,000	$32,000	19,404	77,616	12	60	$8,000	$40,000	19,404	97,020	12	120	$8,000	$80,000	19,404	194,040
Plan Total					For 2010		$911,000	$3,446,000	1,288,000	4,816,000	For 2011		$911,000	$4,356,000	1,288,000	6,102,000	For 2016		$1,376,000	$11,674,000	808,000	11,700,000
Sub-total for SF							$583,000	$2,051,000	279,000	1,044,000			$583,000	$2,644,000	279,000	1,323,000			$554,000	$5,441,000	274,000	2,700,000
Sub-total for MF							$22,000	$87,000	244,000	706,000			$22,000	$109,000	244,000	949,000			$314,000	$1,674,000	149,000	1,850,000
Sub-total for NR							$327,000	$1,278,000	765,000	3,066,000			$327,000	$1,604,000	765,000	3,831,000			$508,000	$4,460,000	384,000	7,150,000

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

EXHIBIT 19C

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 Moisture Sensor Retrofit	Landscape & Irrigation Evaluations plus Moisture Sensor Retrofit (without Rebate)[1]	SF	$260	233	340	5,120	$88,400	$1,331,200	79,220	1,192,980	340	6,820	$88,400	$1,773,200	79,220	1,569,060	6,076	6,820
		NR County-Owned (~25 irrigated acres)	$8,010	35,000	0	140	$0	$1,121,400	0	4,900,000	0	140	$0	$1,121,400	0	4,900,000	30,405	140
High-Efficiency Clothes Washer Rebate	Common-area Washers[2]	MF with Common-area Clothes Washers	$300	48	50	750	$15,000	$225,000	2,400	36,000	50	1,000	$15,000	$300,000	2,400	48,000	184	1,000
High Efficiency Toilet (HET) Retrofit/Rebate	Retrofit (includes showerhead and aerators)[3]	SF - Elderly	$250	64	1,000	15,000	$250,000	$3,750,000	64,000	960,000	1,000	20,000	$250,000	$5,000,000	64,000	1,280,000	4,906	20,000
		County-Owned MF Housing[3]	$0	64	0	11,000	$0	$0	0	704,000	0	11,000	$0	$0	0	704,000	4,298	11,000
	Rebate (toilet only)[4]	SF	$100	29	0	750	$0	$75,000	0	21,750	0	750	$0	$75,000	0	21,750	159	750
	Toilet Exchange Program	SF	$130	29	1,630	22,820	$211,900	$2,966,800	47,270	661,780	1,630	30,970	$211,900	$4,026,100	47,270	898,130	3,278	30,970
	Toilet Exchange Program	MF	$130	29	2,240	22,400	$291,200	$2,912,000	64,960	649,600	2,240	33,600	$291,200	$4,368,000	64,960	974,400	2,845	33,600
Showerhead Exchange	No Categories	SF	$1.80	35	1,770	26,210	$2,832	$41,936	61,950	917,350	1,770	35,050	$2,832	$56,096	61,950	1,227,100	4,654	35,050
	No Categories	MF	$1.60	35	1,720	25,560	$2,752	$40,896	60,200	894,600	1,720	34,160	$2,752	$54,656	60,200	1,195,600	4,535	34,160
Retrofit Kit Give Away	No Categories	SF	$2.36	12	1,770	26,210	$4,213	$62,080	21,240	314,520	1,770	35,050	$4,213	$83,443	21,240	420,720	1,588	35,050
	No Categories	MF	$2.38	12	1,720	25,560	$4,094	$60,833	20,640	306,720	1,720	34,160	$4,094	$81,301	20,640	409,920	1,562	34,160
Industrial, Commercial and Institutional Water Use Evaluation/ Implementation	Leak Detection and Repair of County-owned Facilities	NR	$4,740	1,000	30	440	$142,200	$2,085,600	30,000	440,000	30	590	$142,200	$2,796,600	30,000	590,000	2,228	590
	Evaluate and Retrofit County-owned Administrative Buildings[5]	NR	$1,600	1,500	0	122	$0	$195,200	0	183,000	0	122	$0	$195,200	0	183,000	1,035	122
	Evaluate and Retrofit Private Commercial Buildings	NR	$1,600	1,500	213	2,130	$340,800	$3,408,000	319,500	3,195,000	213	3,195	$340,800	$5,112,000	319,500	4,792,500	13,994	3,195
	Hotel Program[6]	NR	$667	1,617	12	180	$8,000	$120,001	19,404	291,060	12	240	$8,000	$160,001	19,404	388,080	1,457	240
Plan Total					For 2021		**$1,362,000**	**$18,947,000**	**791,000**	**10,669,000**	For 2026		**$1,362,000**	**$26,203,000**	**791,000**	**19,523,000**	**84,000**	**346,467**
Sub-total for SF							$556,000	$8,328,000	274,000	4,069,000			$556,000	$11,014,000	274,000	5,437,000	21,000	125,860
Sub-total for MF							$314,000	$3,239,000	149,000	2,591,000			$314,000	$4,604,000	149,000	3,332,000	14,000	113,920
Sub-total for NR							$492,000	$6,831,000	369,000	9,010,000			$492,000	$9,386,000	369,000	10,884,000	80,000	4,287

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

EXHIBIT 19D

Miami-Dade Water and Sewer Department (MDWASD)
20-Year Water Use Efficiency Plan
Water Use Efficiency - Best Management Practices (BMP) Planning Spreadsheet

Prepared by: Malcolm Pirnie, Inc.
Contact: **Brian Klett, (813) 242-7252**
Last Modified: 4/02/2007

Purpose:

This spreadsheet is intended for water use efficiency BMP planning purposes only.
The spreadsheet assists in calculating estimated water savings rates and costs for a specified set of BMPs.
The spreadsheet includes the MDWASD Retail area as well as the 15 wholesale water customers of MDWASD.
Allocation of BMPs among MDWASD Retail Area and 15 wholesalers is calculated in a separate spreadsheet.

Spreadsheet Notes:

* *Throughout Plan, costs do not include County staff labor unless otherwise noted.*

[1] *Cost includes labor to perform evaluation, install a moisture sensor, and provide a report. Assumes 1,400 gpd/acre & 1/6 acre per SF home. Cost and savings for NR Park facilities assumes an average of 25 irrigated acres per facility (using potable water).*
[2] *Savings rate for common area washer is in gallons per day per washer.*
[3] *Cost and savings include 1 toilet, 1 showerhead, and 2 aerators (1 for the bathroom; one for the kitchen), and installation costs.*
[4] *Cost includes a $100 rebate to the customer.*
[5] *Cost is only for intradepartment assistance from WASD to other County departments for retrofit. Assistance may be in the form or a rebate or a credit on water bill.*
[5] *Savings shown are for a hotel with 50 to 100 rooms (SWFWMD Water CHAMP)*
[7] *Costs include equipment and outsourcing, unless otherwise noted costs do not include County staff time.*
[8] *Miami-Dade County Housing Agency is implementing this program through 'performance contracting', with the initial program funded by HUD.*

Exhibit 19E

Summary of 20-Year Water Use Efficiency Plan BMP Implementation 2007-2026

TABLE 1-A: Summary of Miami-Dade County 20-Year Water Use Efficiency Plan (2007-2026), including MDWASD retail & wholesale service areas.

Year	2007	2008	2009	2010	2011	2016	2021	2026
Cost ($/Yr.)	$753,000	$871,000	$911,000	$911,000	$911,000	$1,378,000	$1,362,000	$1,362,000
Cumulative Cost ($ to date)	$753,000	$1,623,000	$2,534,000	$3,445,000	$4,356,000	$11,574,000	$18,397,000	$25,203,000
Additional Water Savings (GPD)	1,086,000	1,158,000	1,286,000	1,286,000	1,286,000	806,000	791,000	791,000
Cumulative Water Savings Rate (GPD)	1,086,000	2,244,000	3,530,000	4,816,000	6,102,000	11,700,000	15,669,000	19,623,000

TABLE 1-B: Annual cost of Water Use Efficiency Plan by sector (Single Family, Multi-Family, Non-residential) ($/Yr.).

Year	2007	2008	2009	2010	2011	2016	2021	2026
Sub-total for SF	$410,000	$547,000	$563,000	$563,000	$563,000	$558,000	$558,000	$558,000
Sub-total for MF	$22,000	$22,000	$22,000	$22,000	$22,000	$314,000	$314,000	$314,000
Sub-total for NR	$322,000	$303,000	$327,000	$327,000	$327,000	$508,000	$492,000	$492,000
TOTALS	$753,000	$871,000	$911,000	$911,000	$911,000	$1,378,000	$1,362,000	$1,362,000

Exhibit 20

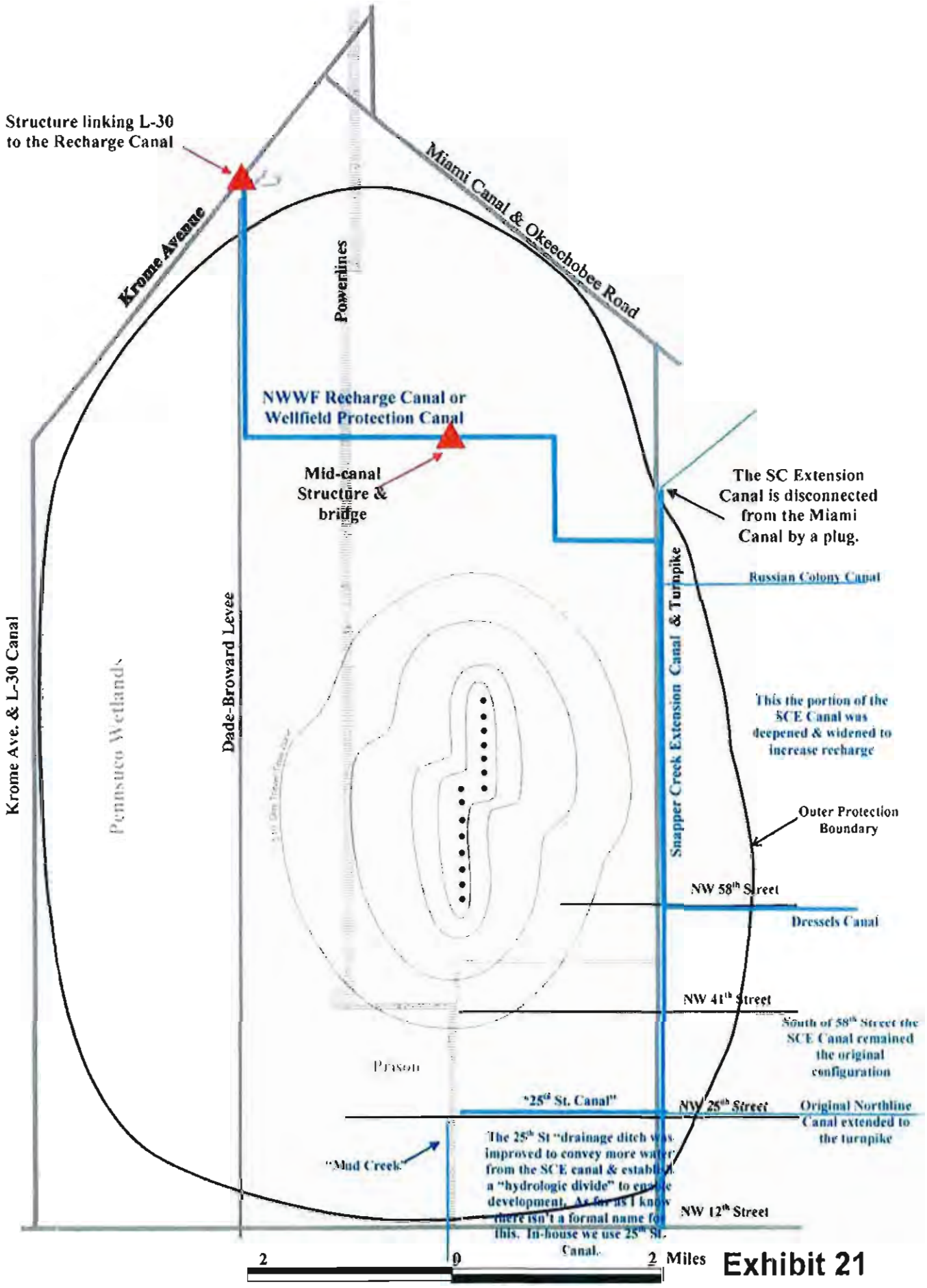

Structure linking L-30 to the Recharge Canal
Krome Avenue
Miami Canal & Okeechobee Road
Powerlines
NWWF Recharge Canal or Wellfield Protection Canal
Mid-canal Structure & bridge
The SC Extension Canal is disconnected from the Miami Canal by a plug.
Russian Colony Canal
Krome Ave. & L-30 Canal
Pennsuco Wetlands
Dade-Broward Levee
Snapper Creek Extension Canal & Turnpike
This the portion of the SCE Canal was deepened & widened to increase recharge
Outer Protection Boundary
NW 58th Street
Dressels Canal
NW 41th Street
South of 58th Street the SCE Canal remained the original configuration
Prison
"25th St. Canal"
NW 25th Street
Original Northline Canal extended to the turnpike
"Mud Creek"
The 25th St "drainage ditch was improved to convey more water from the SCE canal & establish a "hydrologic divide" to enable development. As far as I know there isn't a formal name for this. In-house we use 25th St. Canal.
NW 12th Street
2
0
2 Miles

Exhibit 21

August 14, 2000

CERTIFIED: 7099 3400 0000 5273 9927
RETURN RECEIPT

Mr. Jeff Rosenfeld
Senior Supervising Hydrogeologist
Regulation Department / Water Use Division
South Florida Water Management District
PO Box 24680
West Palm Beach, FL 33416-4680

RE: Miami-Dade Water and Sewer Department
Hialeah / Preston / Miami Springs / Northwest Wellfields
Water Use Permit No. 13-00037-W

Dear Mr. Rosenfeld:

In accordance with limiting condition no.32 of the referenced permit, the following is a description of the schedule for operation of the surface water control structure located on the Northwest wellfield (NWWF) protection canal for District approval.

As per the control authority, Department of Environmental Resources Management (DERM), structures located in the NWWF protection canal are operated according to the specific circumstances. These structures are not automated and therefore would be manually opened or closed at specific canal elevations. Normal operation for the new water control structure is to be closed to induce flow to the west and south. The control structure would remain closed if groundwater stages are high and there is no need for additional water from the L-30 canal. It would be opened if the opposite is the case. The structure would also be closed in anticipation of a hurricane event to prevent additional flow from entering the secondary system canals.

Should you have any questions, please call Ms. Bertha M. Goldenberg, P.E. at (305) 669-5711.

Sincerely,

Jorge Rodriguez
Assistant Director

BMG/dje

c: Harvey Kottke, DERM Isaac Sznol, DERM

Exhibit 22

MDWASD Biscayne Aquifer
Final Modeling Scenarios

SCENARIO	DESCRIPTION OF SCENARIO	WTP SUB-AREA / WELLFIELD PUMPAGE																				MDWASD TOTAL
		Hialeah-Preston					Alexander Orr					South Dade										
		H	JP	MS	NW	TOTAL	AO	SC	SW	W	TOTAL	ELT	LC	NJ	EVLC	NWTN	CP	FP	RHP	RPP	TOTAL	
G	Base Condition	3.1	37.2	29.7	88.7	158.7	62	20.4	83.8	15	181.2	1.3	2.9	0.1	0.7	2.1	0	0	0	0	7.1	347
H	Alternative South Dade	3.1	37.2	29.7	88.7	158.7	62	20.4	88.8	15	186.2	0	0	0	0.7	2.1	0	3	2	0	7.8	352.7
I	Recharge Credit Evaluation	3.1	37.2	29.7	88.7	158.7	62	20.4	88.8	15	186.2	0	0	0	2.2	2.6	3	3	17	0	27.8	372.7
J	Recharge Credit Evaluation	3.1	37.2	29.7	88.7	158.7	62	20.4	88.8	15	186.2	0	0	0	2.2	2.6	3	3	17	0	27.8	372.7
K	Wellfield Ops Plan 2027	3.1	37.2	29.7	88.7	158.7	62	20.4	125.8	15	223.2	0	0	0	2.2	2.6	3	3	17	0	27.8	409 7
L	AO/SWWF Reallocation 2012	3.1	37.2	29.7	88.7	158.7	40	20.4	110	15	185.4	1.3	2.9	0.1	0.7	2.1	0	0	0	0	7.1	351.2
M	SMH Biscayne base 2012	3.1	37.2	29.7	88.7	158.7	62	20.4	83.8	15	181.2	0	0	0	2.2	2.6	0	0	3	0	7.8	347.7

Abbreviations = Wellfield
H = Hialeah
JP = John E Preston
MS = Miami Springs
NW = Northwest
AO = Alexander Orr
SC = Snapper Creek
SW = Southwest
W = West
ELT = Elevated Tank
EVLC = Everglades Labor Camp
LC = Leisure City
NJ = Naranja
NWTN = Newton
CP = Carribean Park
FP = Former Plant
RHP = Roberta Hunter Park
RPP = Rock Pit Park
SMH = South Miami Heights
CNMB = City of North Miami Beach

Purpose of Each Scenario

G - Establish Base Condition Water Use (NWWF at 88.7 because of CNMB shift)

H - Shifting 4.3 MGD from South Dade (ELT, LC, NJ) to SMH (FP & RHP)
Base condition prior to recharge at SMH and increasing from 4.3 to 5 MGD to account for new treatment at SMH WTP

I - Base Condition (South Dade 5 mgd at SMH with increases at NWTN and ELC) plus pumps ON at SMH at 23 MGD prior to SMH recharge.
Increase SW by 5.0 MGD

J - Pumps on at SMH (23 MGD) to determine benefits of 23 MGD Phase 1 SMH recharge offset. Increase SW by 5.0 MGD.

K - Final 20 year permit conditions and determining how much regional impact does 37 MGD increased pumpage at Alex Orr subarea cause, to determine offset by Phases 2 and 3 canal recharge.

L - reallocation of 22 mgd from AO wellfield to SWWF, and an additional 3.6 mgd at SWWF with no modeled impact to regional system

M - SMH at 3 mgd (Turning off 4.3 mgd at ET, LC and NJ results in a 2.5 mgd reduction in impact on regional canals; transferred to SMH wellfield. Increasing from 2.5 mgd to 3.0 mgd for the reduced treatment efficiency of the proposed membrane treatment system)

Notes

Scenario G Base Condition adjustments lowered NW due to CNMB

Above pumpages are annual average values.

The simulated withdrawal for each month will vary based on historic ratios of individual months to the long-term average month withdrawal

Each scenario listed above (G through K) conssited of two runs: MDWASD-alone and cumulative (MDWASD plus adjacent permitted users.

An additional scenario ws run that simulated no public water supply (PWS) withdrawal (used as base case for drawdown evaluation).

MDWASD pumpage rates were as listed in the above table for each scenario (G through M).

Drawdowns were computed as the difference in simulated heads between the no-PWS pumpage scenario and the cumulative for each scenario.

Output consists of maps of head and drawdown, hydrographs, water budgets and vector plots.

EXHIBIT 23

Modified 6/22/2012

West Wellfield Modeled Drawdown - 15 mgd

EXHIBIT 24A

Northwest Wellfield Modeled Drawdown - 88.7 mgd

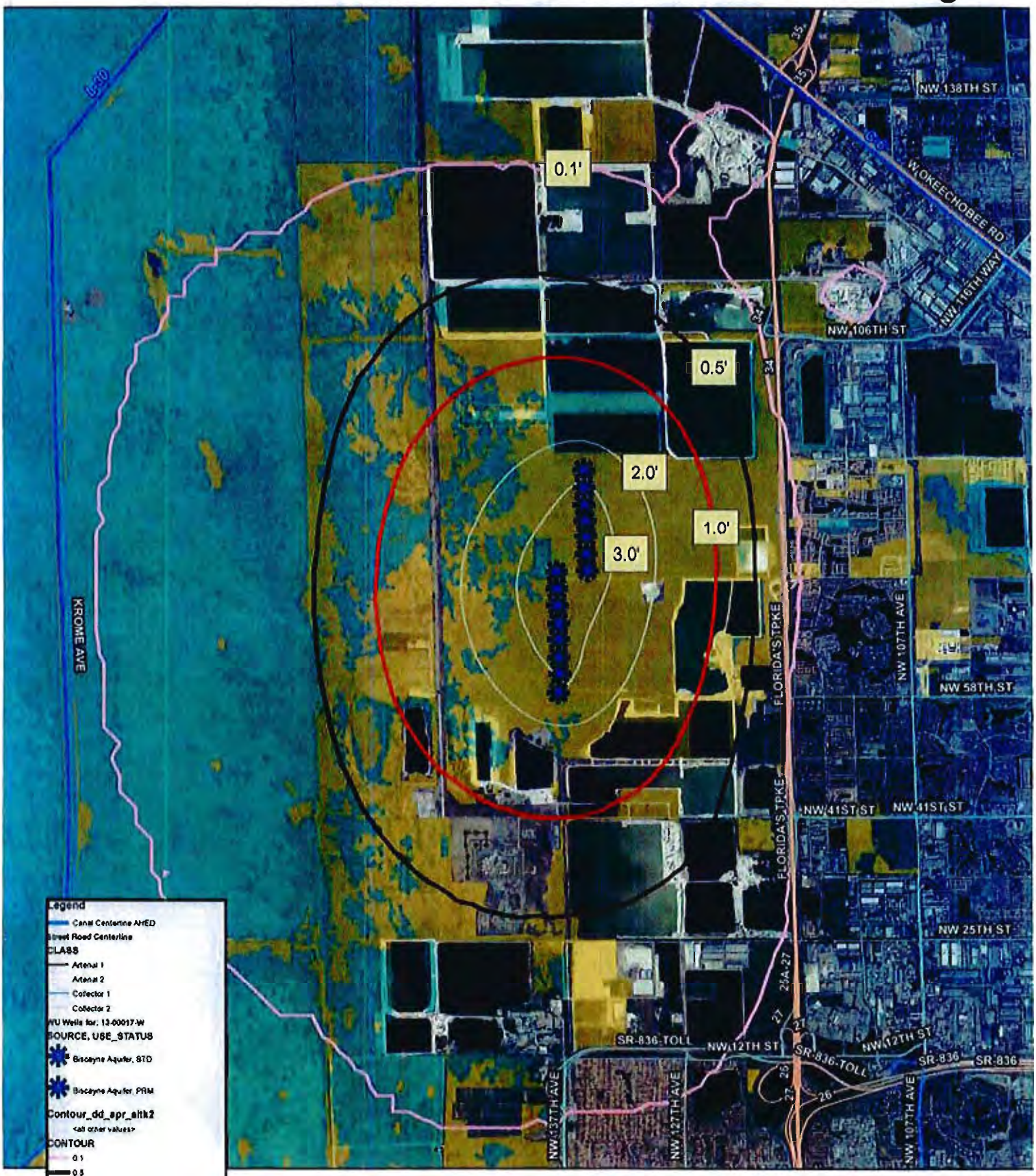
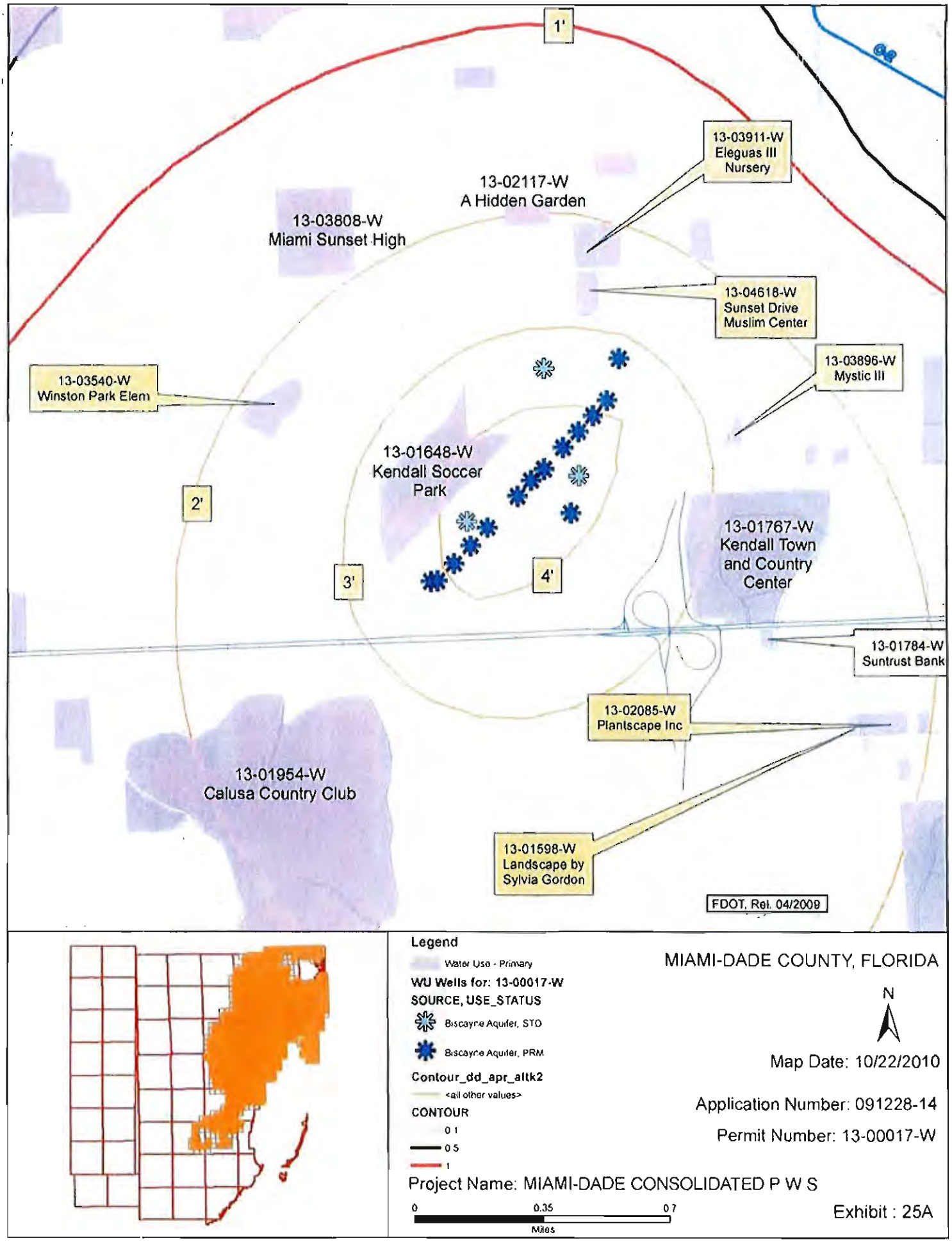


EXHIBIT 24B



Legend

Water Use - Primary

WU Wells for: 13-00017-W

SOURCE, USE_STATUS

Biscayne Aquifer, STO

Biscayne Aquifer, PRM

Contour_dd_apr_altk2

<all other values>

CONTOUR

0.1

0.5

1

MIAMI-DADE COUNTY, FLORIDA

N

Map Date: 10/22/2010

Application Number: 091228-14

Permit Number: 13-00017-W

Project Name: MIAMI-DADE CONSOLIDATED P W S

0 0.35 0.7

Miles

Exhibit : 25A

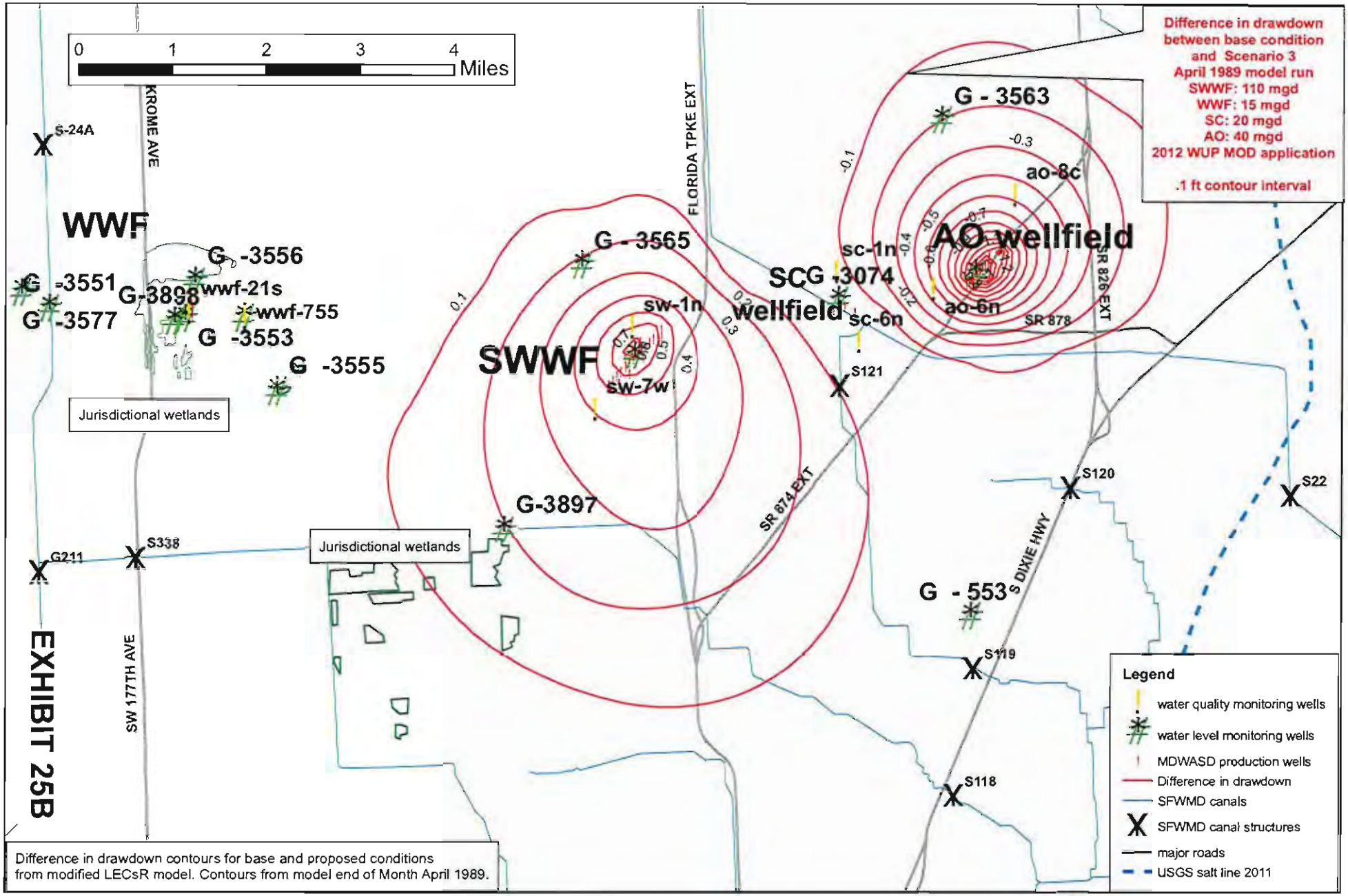
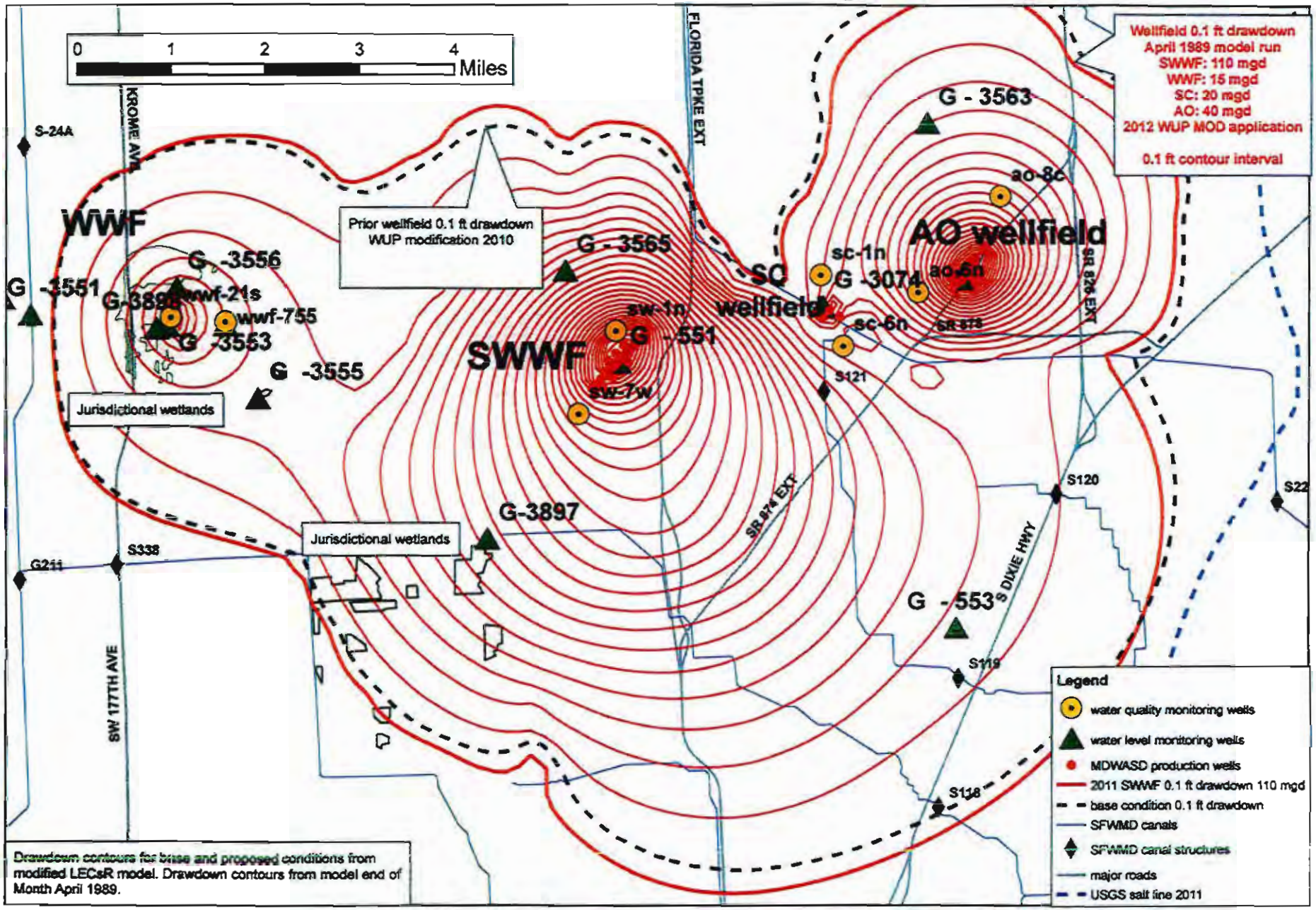


Figure 8c. Southwest, Snapper Creek and Alex Orr Wellfield Groundwater Level and Water Quality Monitoring Drawdown difference

updated 2/27/12

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146



Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

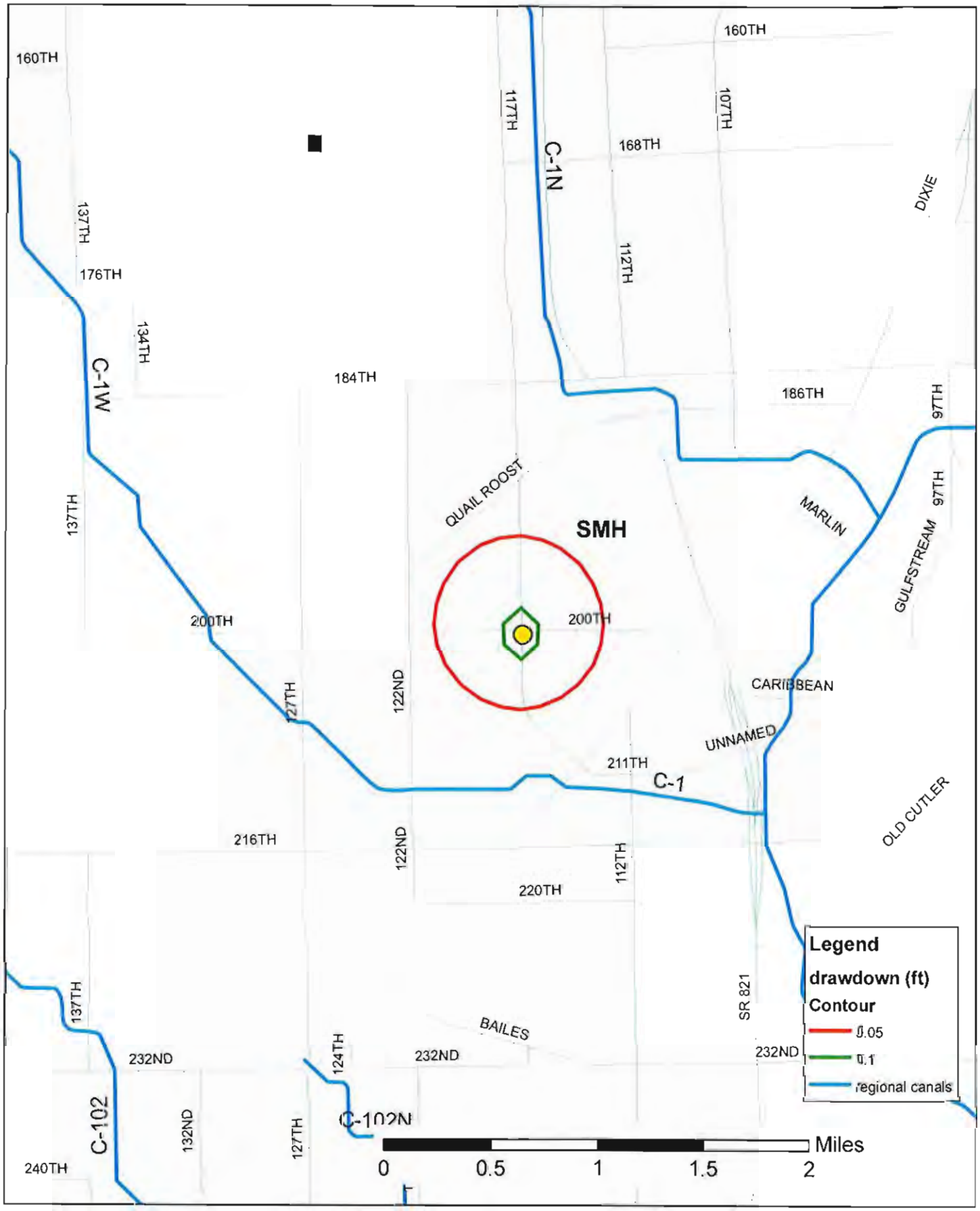
N W E S

Figure 8a. Southwest, Snapper Creek and Alex Orr Wellfield drawdown and Water Quality Monitoring

updated 2/22/12

110511-6

EXHIBIT 25C

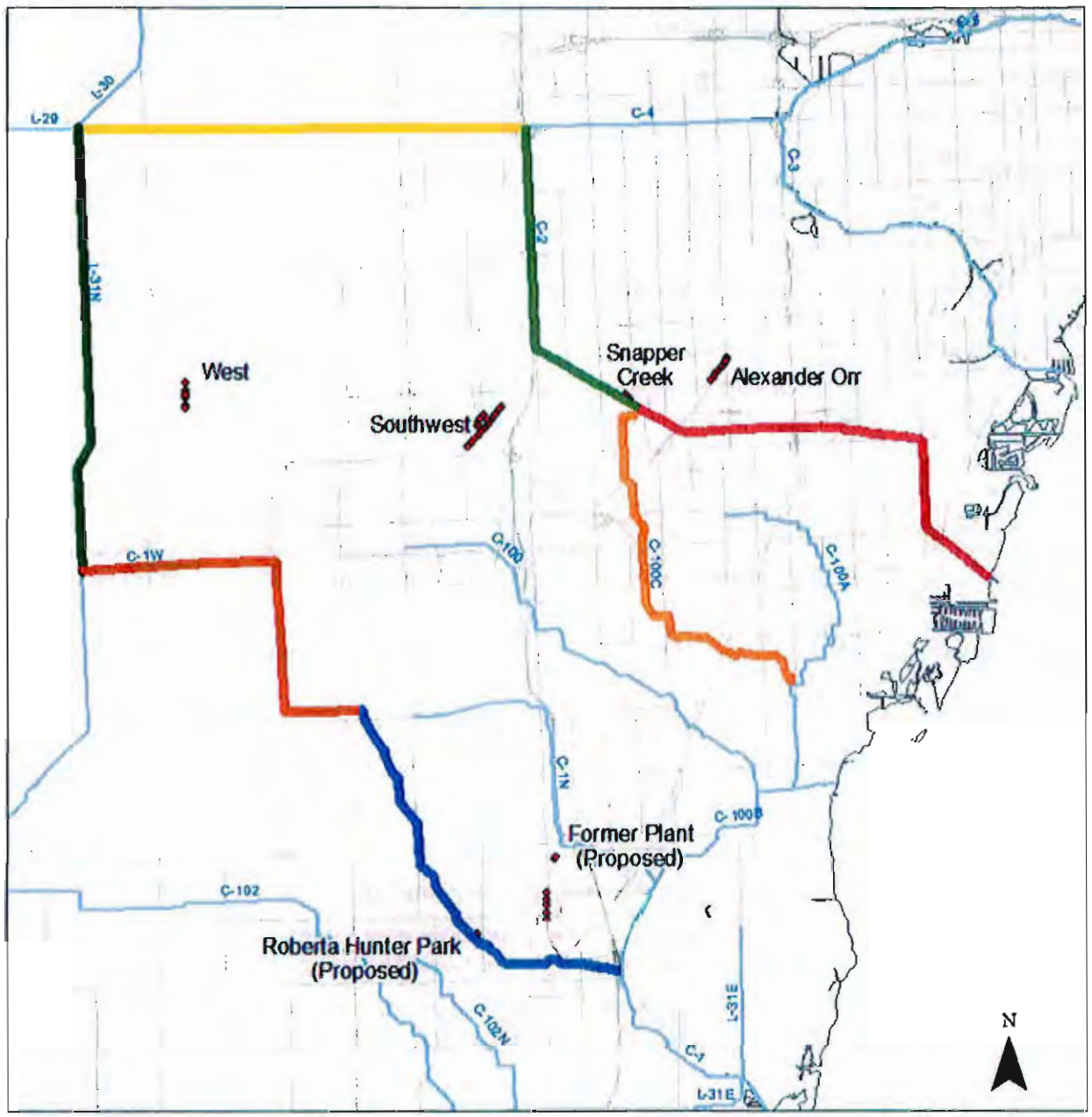


Miami-Dade County
Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

South Miami Heights
Biscayne Aquifer pumpage at 3 mgd
drawdown map

EXHIBIT 25D

FIGURE 1
Locations of Wellfields and Canal Reaches



CH2MHILL

GNV310311581181.DOCX/120240001
WBG012412122127DFB

EXHIBIT 25E

FIGURE 6
Net Additional Canal Seepage Relative to Base Conditions, C-4 Canal

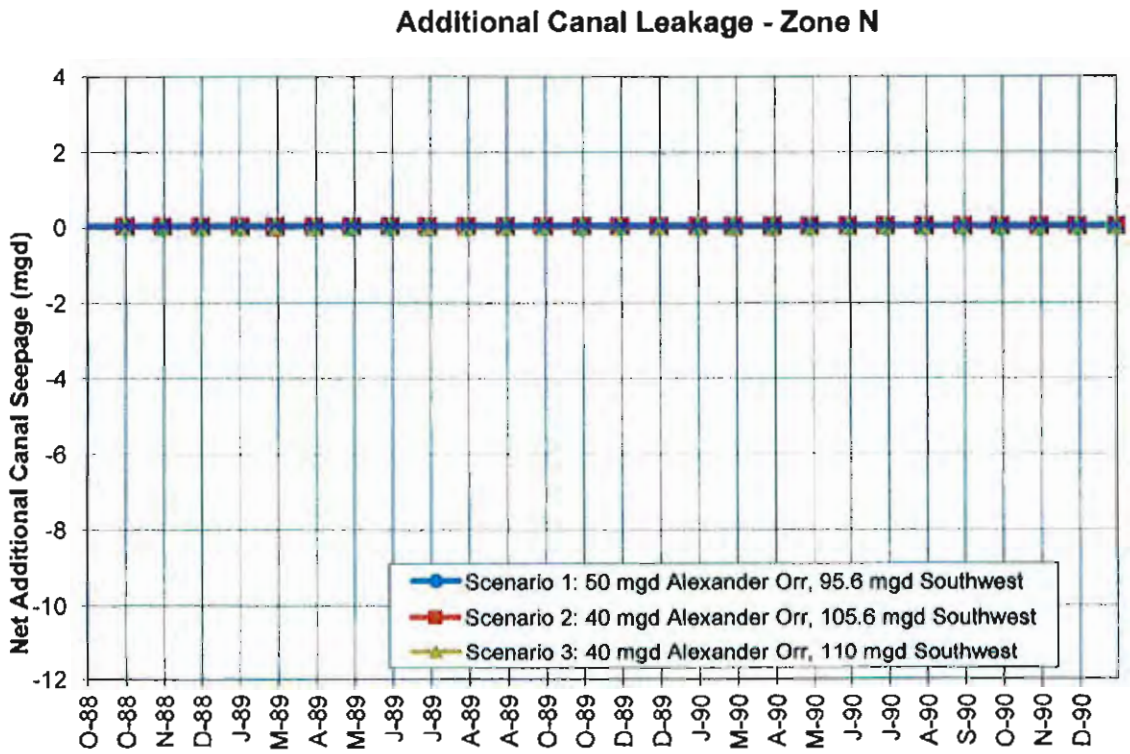


FIGURE 7
Total Net Additional Canal Seepage Relative to Base Conditions

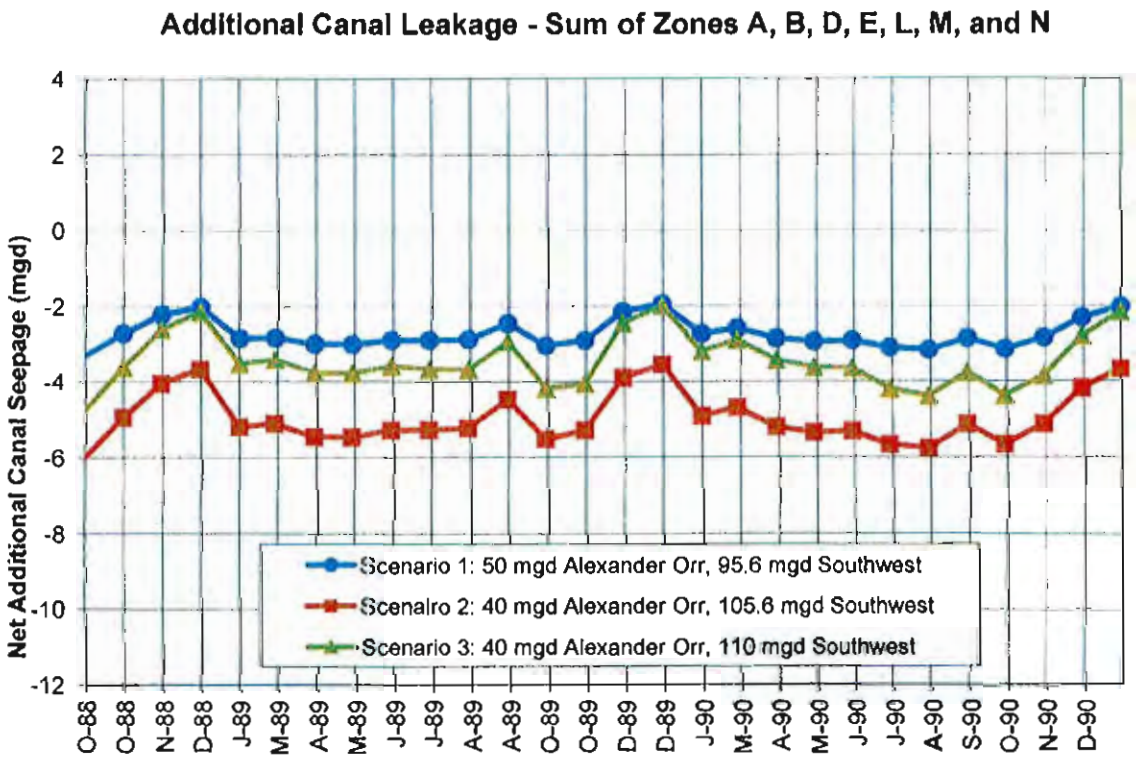


EXHIBIT 25F

Table 5-1 ECFAS Model Structure and Hydraulic Parameters at Proposed Wellfield

Model Layer	Top Elevation (ft, NGVD)	Bottom Elevation (ft, NGVD)	Thickness (ft)	Aquifer	Boundary Conditions	H. Hydraulic conductivity (ft/day)	V. Hydraulic conductivity (ft/day)	Specific storativity (1/ft)	Effective Porosity
1	10	-194	204	SAS	constantHead	10	10	0.00125	0.25
2	-194	-1072	878	ICU	variable	0.006	0.0006	9.00E-07	0.35
3	-1072	-1207	135	UFA	variable	90	9	5.25E-07	0.18
4	-1207	-1341	134	UFA	variable	90	9	5.25E-07	0.18
5	-1341	-1494	153	MCU1	variable	0.01	0.002	9.00E-07	0.35
6	-1494	-1647	153	MCU1	variable	0.01	0.002	9.00E-07	0.35
7	-1647	-1721	74	APPZ	variable	450	45	7.50E-07	0.18
8	-1721	-1795	74	APPZ	variable	450	45	7.50E-07	0.18
9	-1795	-2000	205	MCU2	variable	0.3	0.0015	9.00E-07	0.35
10	-2001	-2207	206	MCU2	variable	0.3	0.0015	9.00E-07	0.35
11	-2207	-2412	205	MCU2	variable	0.3	0.0015	9.00E-07	0.35
12	-2412	-2514	102	LF1	variable	300	30	7.50E-07	0.18
13	-2514	-2977	463	LFCU1	variable	0.002	0.0002	9.00E-07	0.35
14	-2977	-3177	200	BZ	const Head	10000	10000	7.50E-07	0.18

Table 5-3 Revised Hydraulic Parameters at Proposed Wellfield

Layer	Bottom elevation (ft NGVD)	Kx (Ky) (TP1_Zone) (ft/day)	Kz (TP1_Zone) (ft/day)	Kx (ky) (Patch) (ft/day)	Kz (Patch) (ft/day)	Ss (1/ft)	Effective Porosity	Initial Concentration (TDS, mg/l)
1	-196	10	10	10	10	0.00125	0.25	350
2	-1080	0.006	0.0006	0.006	0.0006	9.00E-07	0.35	1520
3	-1210	10	2	32	4	3.00E-06	0.1	3500
4	-1300	10	2	32	4	1.00E-07	0.1	3500
5	-1480	10	10	10	10	1.00E-07	0.1	3500
6	-1550	0.01	0.01	0.01	0.01	1.00E-07	0.1	3900
7	-1721	450	45	450	45	7.50E-07	0.18	4600
8	-1795	450	45	450	45	7.50E-07	0.18	4600
9	-2000	0.3	0.0015	0.3	0.0015	9.00E-07	0.35	18410
10	-2207	0.3	0.0015	0.3	0.0015	9.00E-07	0.35	18410
11	-2412	0.3	0.0015	0.3	0.0015	9.00E-07	0.35	18410
12	-2514	300	30	300	30	7.50E-07	0.18	35000
13	-2977	0.002	0.0002	0.002	0.0002	9.00E-07	0.35	35000
13	-3177	10000	10000	10000	10000	7.50E-07	0.18	35000

Exhibit 26A

Schlumberger WATER SERVICES

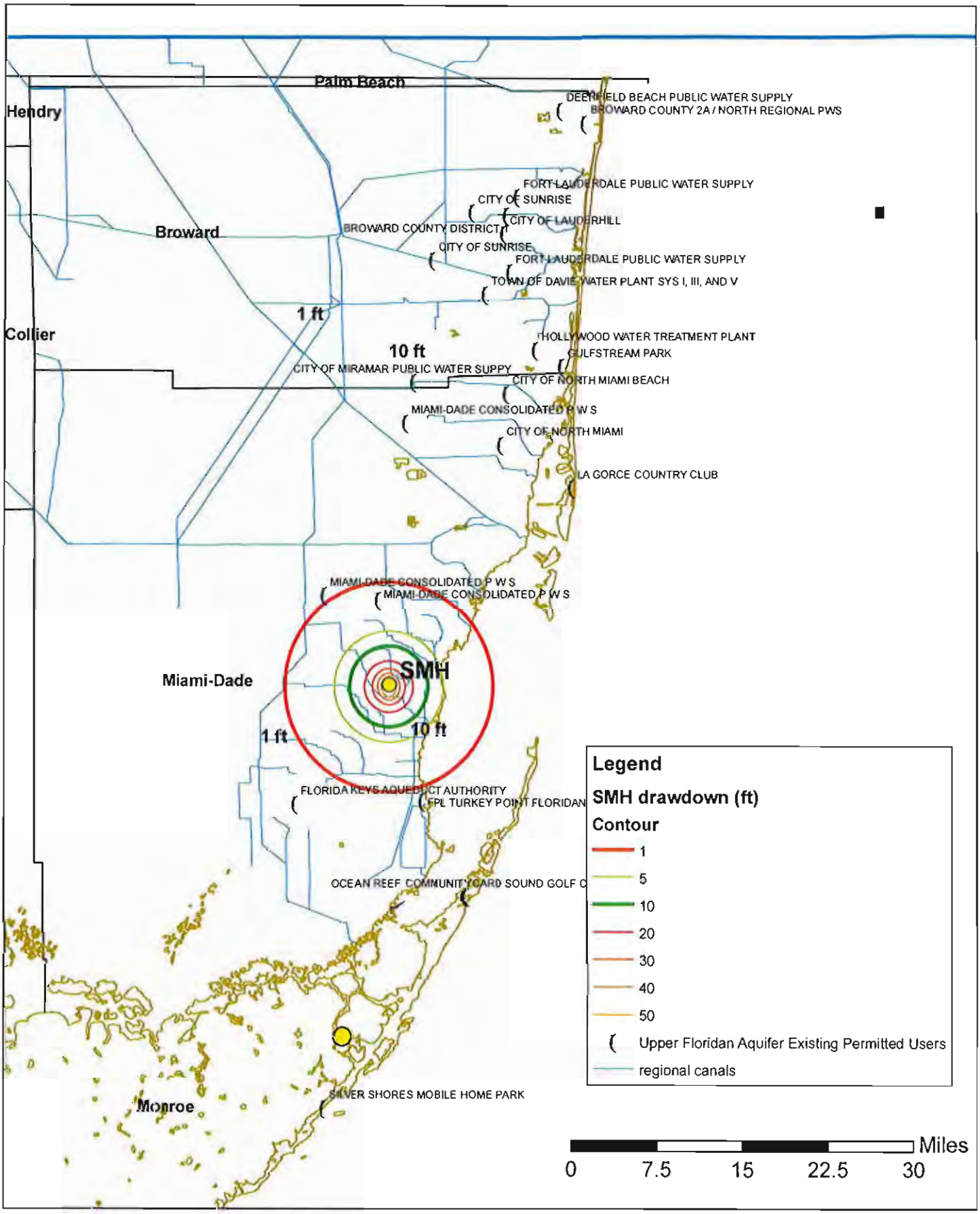
Figure 5-8e: Simulated drawdown (ft) in Model Layer 4 due to Pumpage of 13.33 MGD from the UFA after 30 Years

Exhibit 26B

Schlumberger WATER SERVICES

Figure 5-8b: Simulated drawdown (ft) in Model Layer 4 due to Proposed Pumping up to 23.33mgd from the UFA after 30 Years

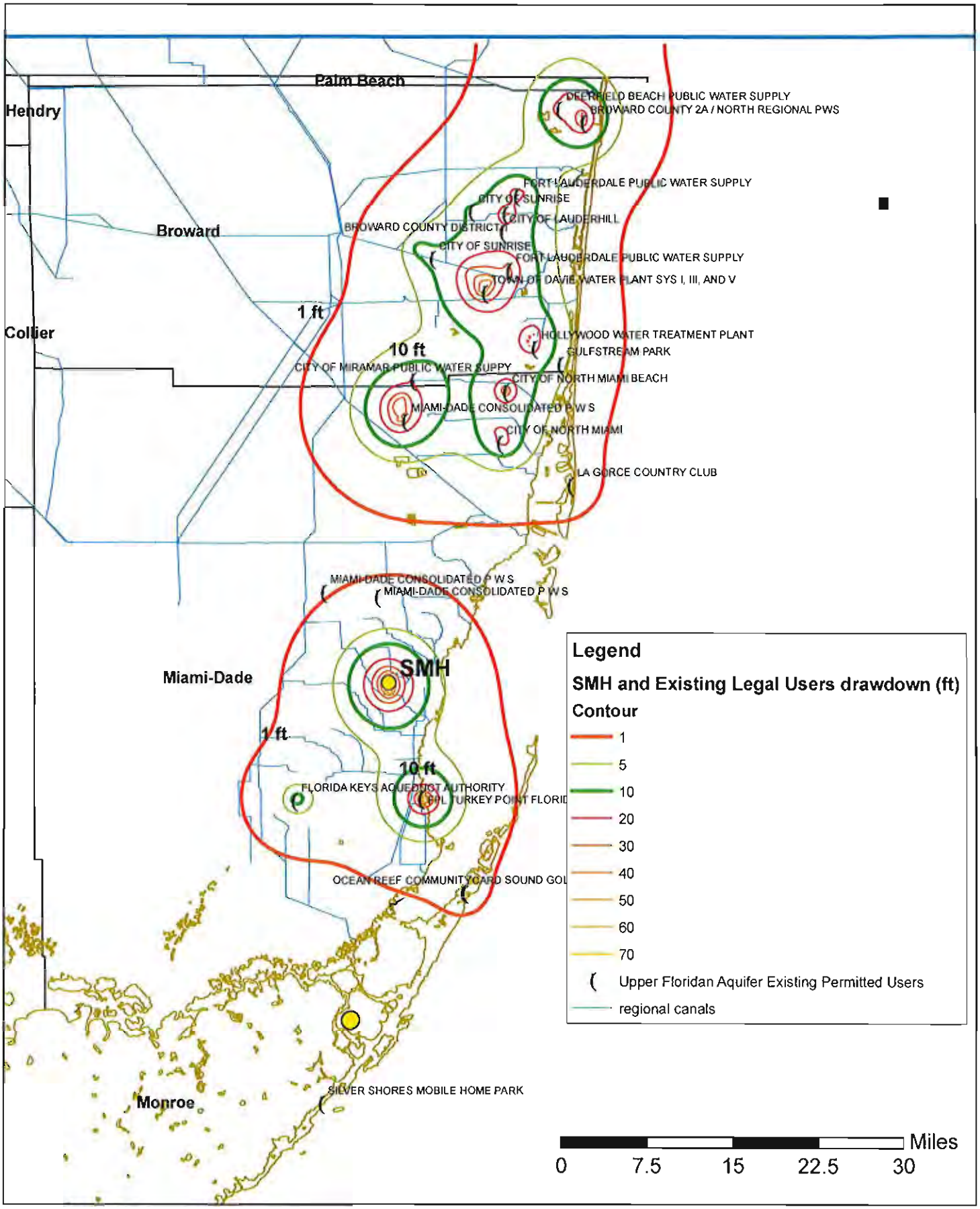
Exhibit 26C



Miami-Dade County
Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Figure 6.
South Miami Heights at 24 mgd drawdown

EXHIBIT 26D



Miami-Dade County
Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Figure 7.

SMH at 24 mgd
and Existing legal users drawdown

EXHIBIT 26E

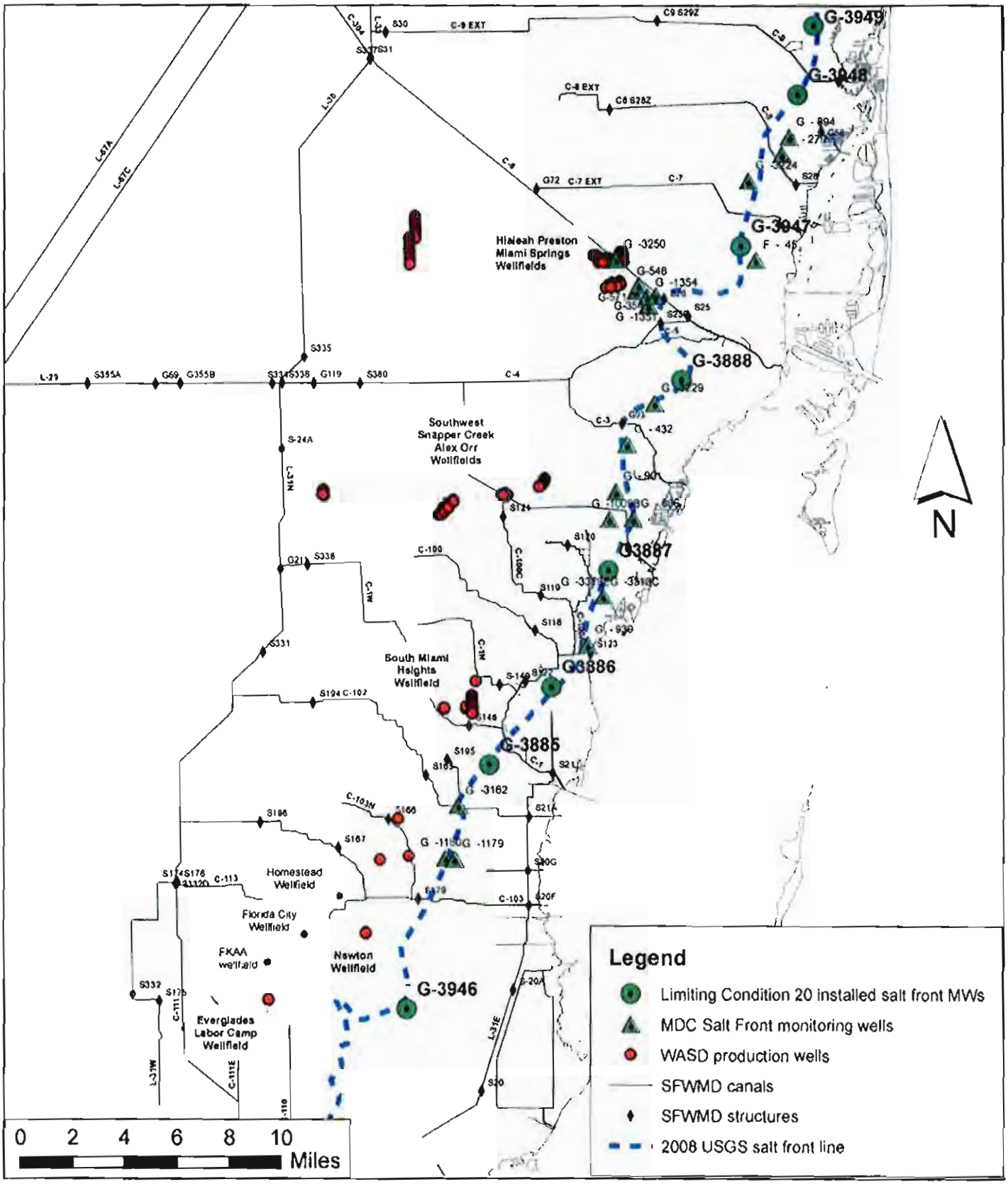


Figure 5. 2010 Miami-Dade County
Salt Front Monitoring Network
9/15/10

Exhibit 27A

MIAMI-DADE COUNTY

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

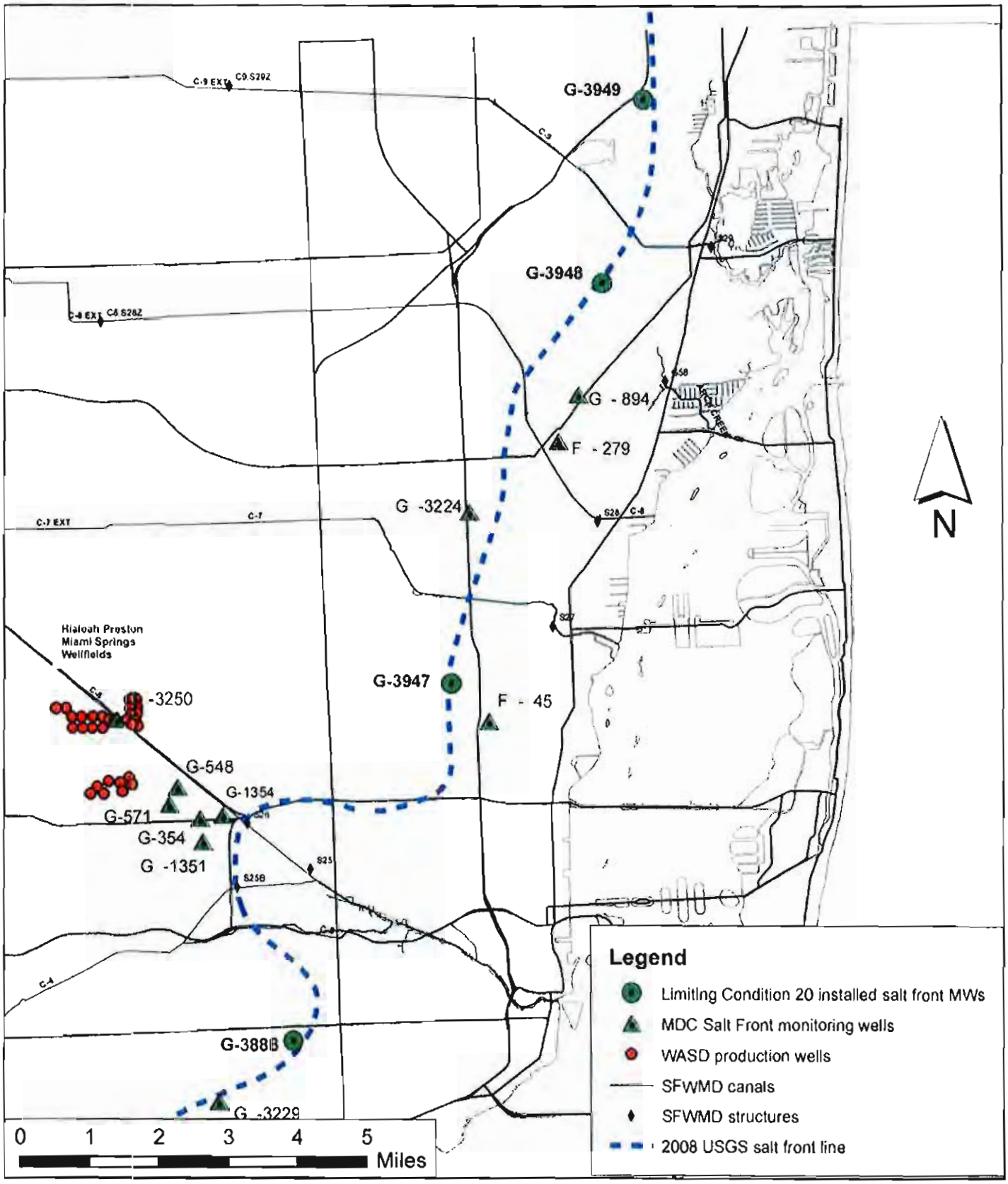


Figure 2. 2010 North Miami-Dade County
Salt Front Monitoring Network
9/15/10

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Exhibit 27B

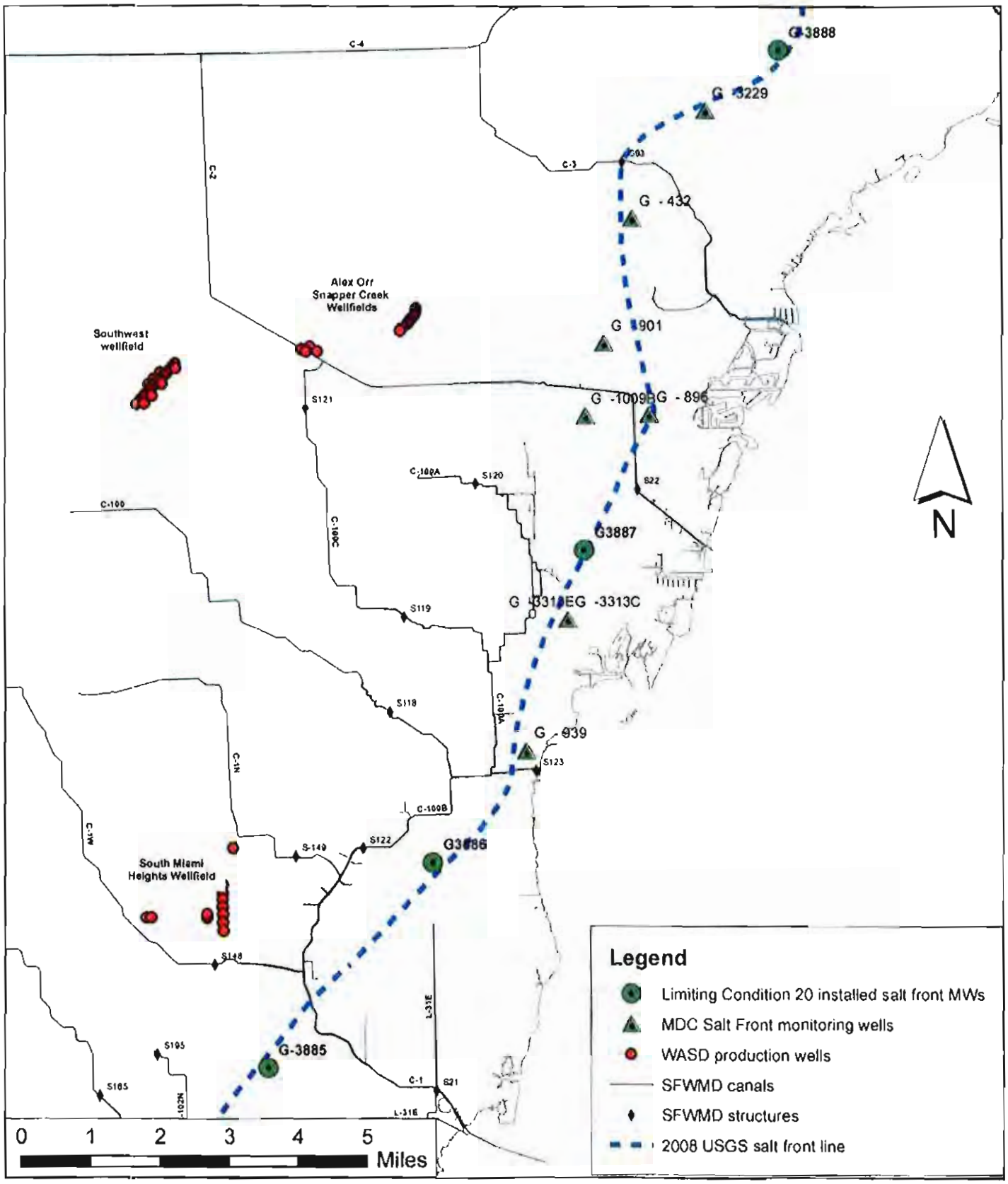


Figure 3. 2010 Central Miami-Dade County
Salt Front Monitoring Network
9/15/10

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Exhibit 27C

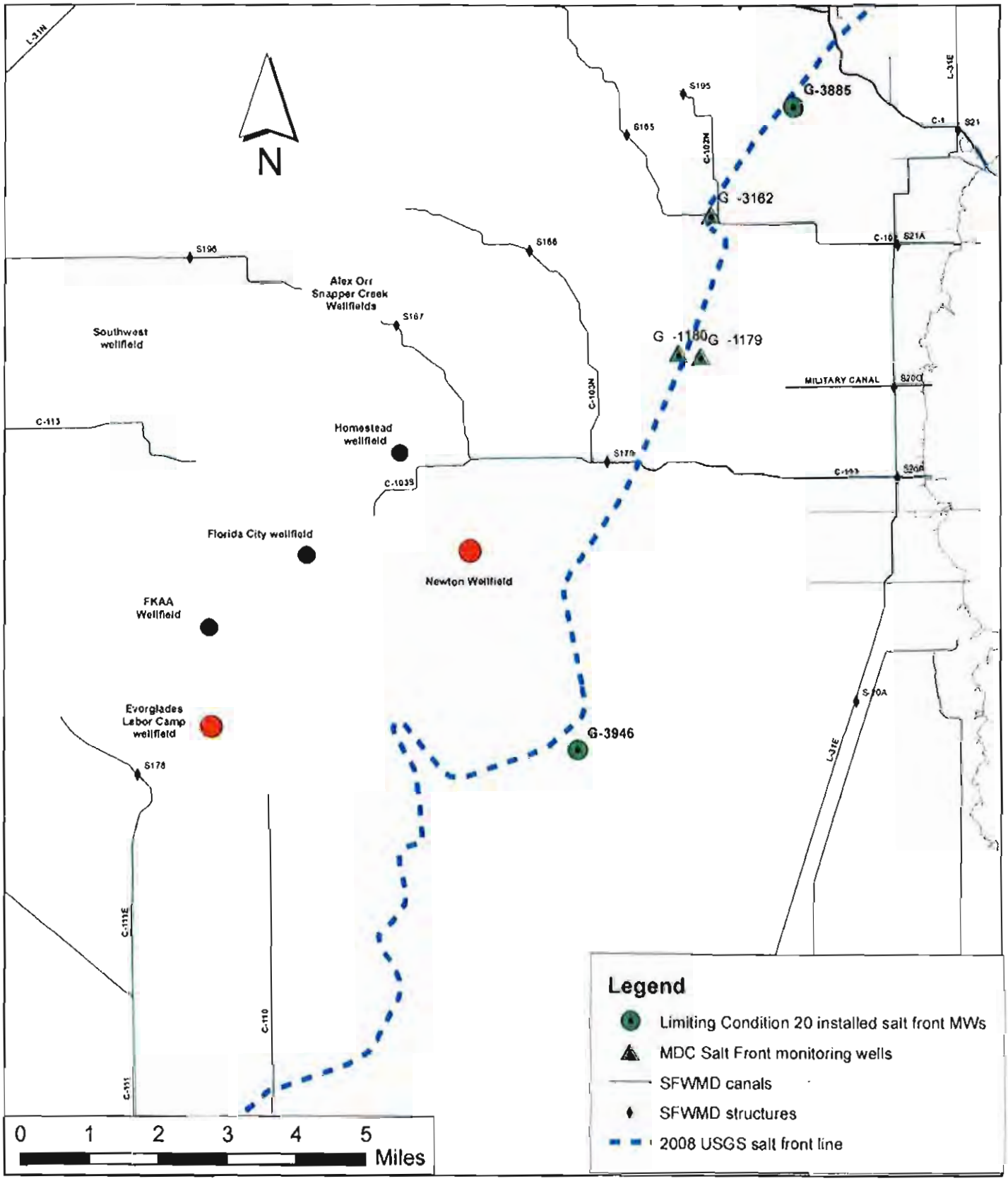


Figure 4. 2010 South Miami-Dade County
Salt Front Monitoring Network
9/15/10

MIAMI-DADE COUNTY

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Exhibit 27D

Table 1. Existing Miami-Dade County Salt Front Monitoring Wells
Updated 04/6/2011

USGS ID	STATION NAME	STATUS	LATITUDE	LONGITUDE	SITE USE	WELL DEPTH (ft)[B]	CASING DEPTH (ft)[B]	Sampling Frequency for WL & Cl	Induction Log Done	2007 Cl Level (mg/l)	2011 Cl Level (mg/l)
253831080180206	G -3313E	needs levels	25 38 31	-080 18 02	test	114	32.0	*Quarterly*	Yes	410	NA
253831080180204	G -3313C	needs levels	25 38 31	-080 18 02	observation/monitoring	110	107.0	*Quarterly*	No	3800	4800
254946080172601	G -3250	needs levels	25 49 46	-080 17 26	test	116	106.0	*Quarterly*	Yes	68	150
254457080160301	G -3229	needs levels	25 44 57	-080 16 03	observation/monitoring	85	[A]	*Quarterly*	No	700	1510
255222080123001	G -3224	operational	25 52 22	-080 12 30	observation/monitoring	95.5	93 5	*Quarterly*	No	44	40
253202080232601	G -3162	obstruction	25 31 32	-080 23 25	observation/monitoring	92	82.0	*Quarterly*	No	1140	1270
254833080155801	G -1354	operational	25 48 33	-080 15 58	observation/monitoring	104	91.0	*Quarterly*	No	56	46
254813080161501	G -1351	needs levels	25 48 13	-080 16 15	observation/monitoring	103	100.0	*Quarterly*	No	540	500
252947080235301	G -1180	needs levels	25 29 47	-080 23 53	observation/monitoring	67	open hole	*Quarterly*	No	32	24
252944080233401	G -1179	needs levels	25 29 44	-080 23 34	observation/monitoring	80	[A]	*Quarterly*	No	2450	2150
254106080174601	G -1009B	special proble	25 41 06	-080 17 46	observation/monitoring	100	[A]	*Quarterly*	No	50	60
253652080183701	G - 939	operational	25 36 52	-080 18 37	withdrawal	60.2	57.0	*Quarterly*	No	3150	3800
254201080173001	G - 901	operational	25 42 01	-080 17 30	observation/monitoring	96	94.8	*Quarterly*	No	2250	2350
254107080165201	G - 896	needs levels	25 41 07	-080 16 52	observation/monitoring	74	60.0	*Quarterly*	No	245	250
255350080105801	G - 894	operational	25 53 50	-080 10 58	observation/monitoring	76	74.5	*Quarterly*	No	24	22
254841080164401	G - 571	needs levels	25 48 41	-080 16 44	observation/monitoring	94.5	94.5	*Quarterly*	No	32	36
254855080163701	G - 548	operational	25 48 55	-080 16 37	observation/monitoring	97.3	91.4	*Quarterly*	No	44	31
254335080170501	G - 432	obstruction	25 43 35	-080 17 05	observation/monitoring	99.5	97.5	*Quarterly*	No	3600	5100
254828080161501	G - 354	operational	25 48 28	-080 16 15	observation/monitoring	90.2	89.2	*Quarterly*	No	54	45
255315080111501	F - 279	needs levels	25 53 15	-080 11 15	withdrawal	117	113.5	*Quarterly*	No	3300	3650
254943080121501	F - 45	obstruction	25 49 43	-080 12 15	observation/monitoring	84.9	83.9	*Quarterly*	No	104	125
253253080221201	G -3885	operational	25 32 53	-080 22 12	observation/monitoring	91	86.0	*Quarterly*	Yes	NA	38
253527080195401	G -3886	operational	25 35 27	-080 19 54	observation/monitoring	109	101.0	*Quarterly*	Yes	NA	50
253924080174601	G -3887	operational	25 39 24	-080 17 46	observation/monitoring	134	130.0	*Quarterly*	Yes	NA	2200
254542080145901	G -3888	operational	25 45 42	-080 14 59	observation/monitoring	149	143.5	*Quarterly*	Yes	NA	5000
252431080261001	G -3946	operational	25 32 53	-080 22 12	observation/monitoring	99	90.0	*Quarterly*	Yes	NA	3550
255011080124501	G -3947	operational	25 50 11	-080 12 45	observation/monitoring	230	200.0	*Quarterly*	Yes	NA	28
255515080103601	G -3948	operational	25 55 14	-080 10 36	observation/monitoring	279	273.0	*Quarterly*	Yes	NA	3950
255733080195601	G -3949	operational	25 57 33	-080 09 56	observation/monitoring	350	325 0	*Quarterly*	Yes	NA	112

A. Per USGS, depth of the casing is not precisely known
B. Feet Below Land Surface (bls)
GWL: groundwater level
Cl: chloride

EXHIBIT 28A

Table 2. Additional USGS Salt Monitoring Wells in Miami-Dade County

updated 9/21/10

USGS ID	STATION NAME	LATITUDE	LONGITUDE	SITE USE	WELL DEPTH (ft)[A]	CASING DEPTH (ft)[A]	Induction Log Done	2005 Chloride (mg/l)	2010 Chloride (mg/l)
255625080094901	G -3705	25 56 25	-080 09 49	observation/monitoring	135	125.0	Yes	1720	1500
254822080125501	G -3704	25 48 22	-080 12 55	observation/monitoring	112	107.0	Yes	4100	5300
253334080213601	G -3702	25 33 34	-080 21 36	observation/monitoring	83	78.0	Yes	980	980
253214080224601	G -3701	25 32 14	-080 22 46	observation/monitoring	83	78.0	Yes	30	465
253027080234701	G -3700	25 30 27	-080 23 47	observation/monitoring	82.5	77.5	Yes	30	26
252652080244301	G -3699	25 26 52	-080 24 43	observation/monitoring	88	83.0	Yes	5700	8800
252814080244101	G -3698	25 28 13.6	-080 24 41	observation/monitoring	85	80.0	Yes	34	26
253024080231001	G -3615	25 30 24	-080 23 10	observation/monitoring	80	75.0	Yes	1120	1640
253457080195501	G -3612	25 34 57	-080 19 55	observation/monitoring	62	56.0	Yes	1380	1220
253710080184701	G -3611	25 37 10	-080 18 47	observation/monitoring	100	95.0	Yes	200	165
254005080171601	G -3609	25 40 05	-080 17 16	observation/monitoring	85	80.0	Yes	940	1300
254108080170601	G -3608	25 41 08	-080 17 06	observation/monitoring	100	95.0	Yes	230	122
254156080172101	G -3607	25 41 56	-080 17 21	observation/monitoring	120	115.0	Yes	70	62
254341080174001	G -3606	25 43 41	-080 17 40	observation/monitoring	120	115.0	No	44	42
254629080143101	G -3605	25 46 29	-080 14 31	observation/monitoring	110	105.0	Yes	1460	1800
254722080152201	G -3604	25 47 22	-080 15 22	observation/monitoring	120	115.0	Yes	2800	5000
254908080125201	G -3603	25 49 08	-080 12 52	observation/monitoring	167	162.0	No	66	78
255116080120601	G -3602	25 51 16	-080 12 06	observation/monitoring	160	155.0	Yes	3100	3800
255358080114101	G -3601	25 53 58	-080 11 41	observation/monitoring	190	185.0	Yes	1100	1300

A. Feet Below Land Surface (bls)

Exhibit 28B

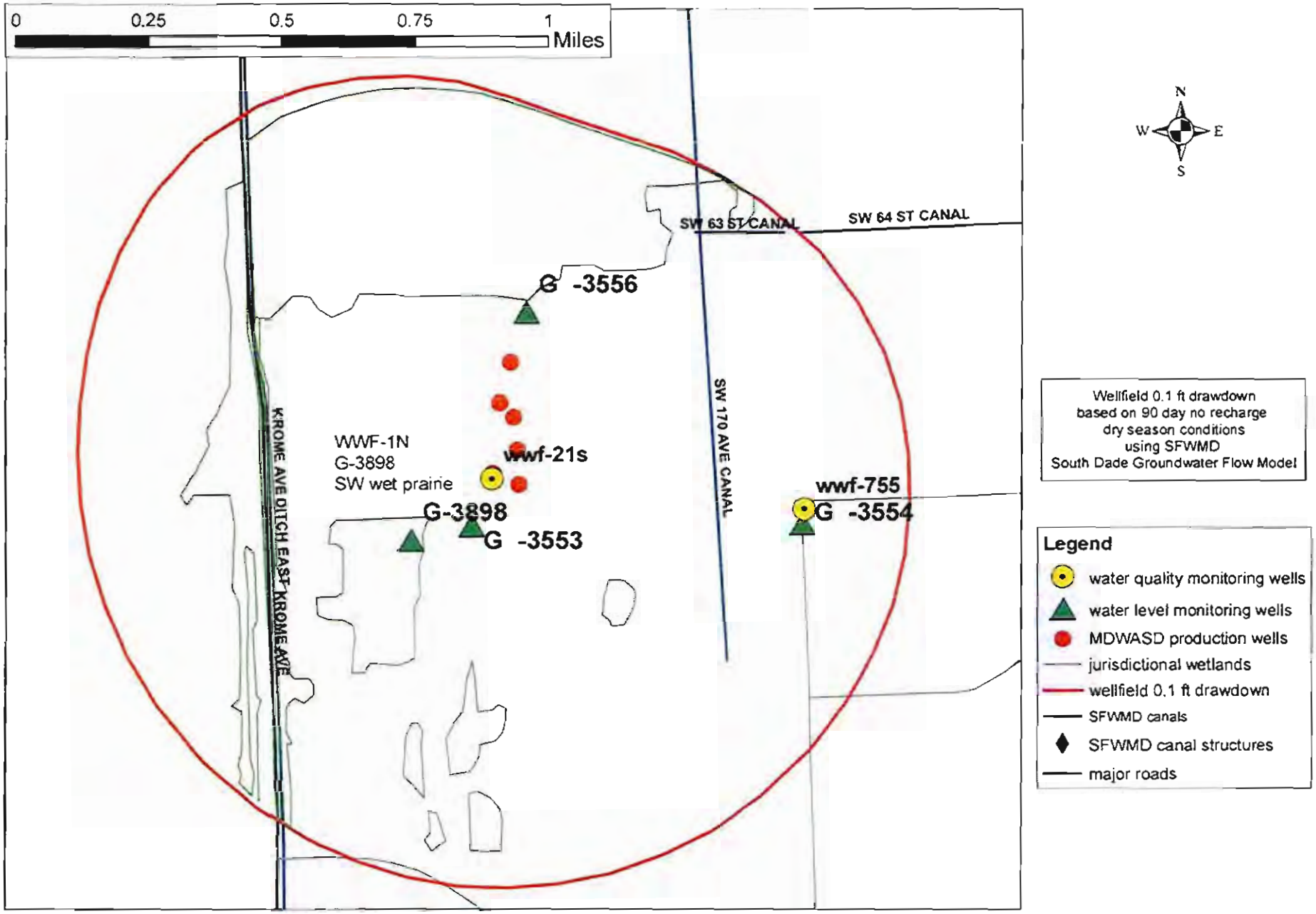


Exhibit 29A

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Figure 7. West Wellfield Groundwater Level and Water Quality Monitoring

updated 9/21/10

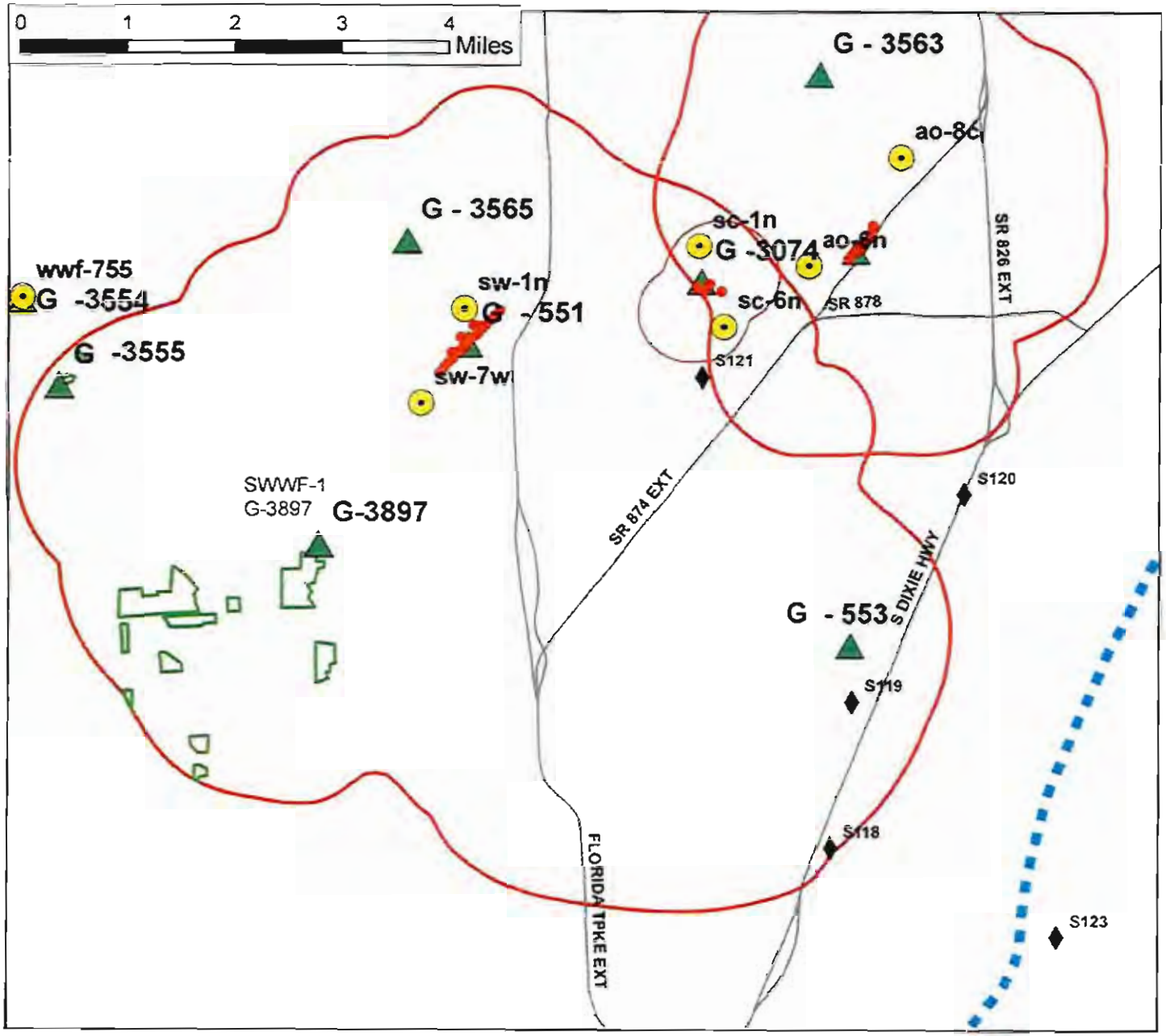


Exhibit 29B

Figure 8. Southwest, Snapper Creek and Alex Orr
Wellfield Groundwater Level
and Water Quality Monitoring

updated 9/21/10

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

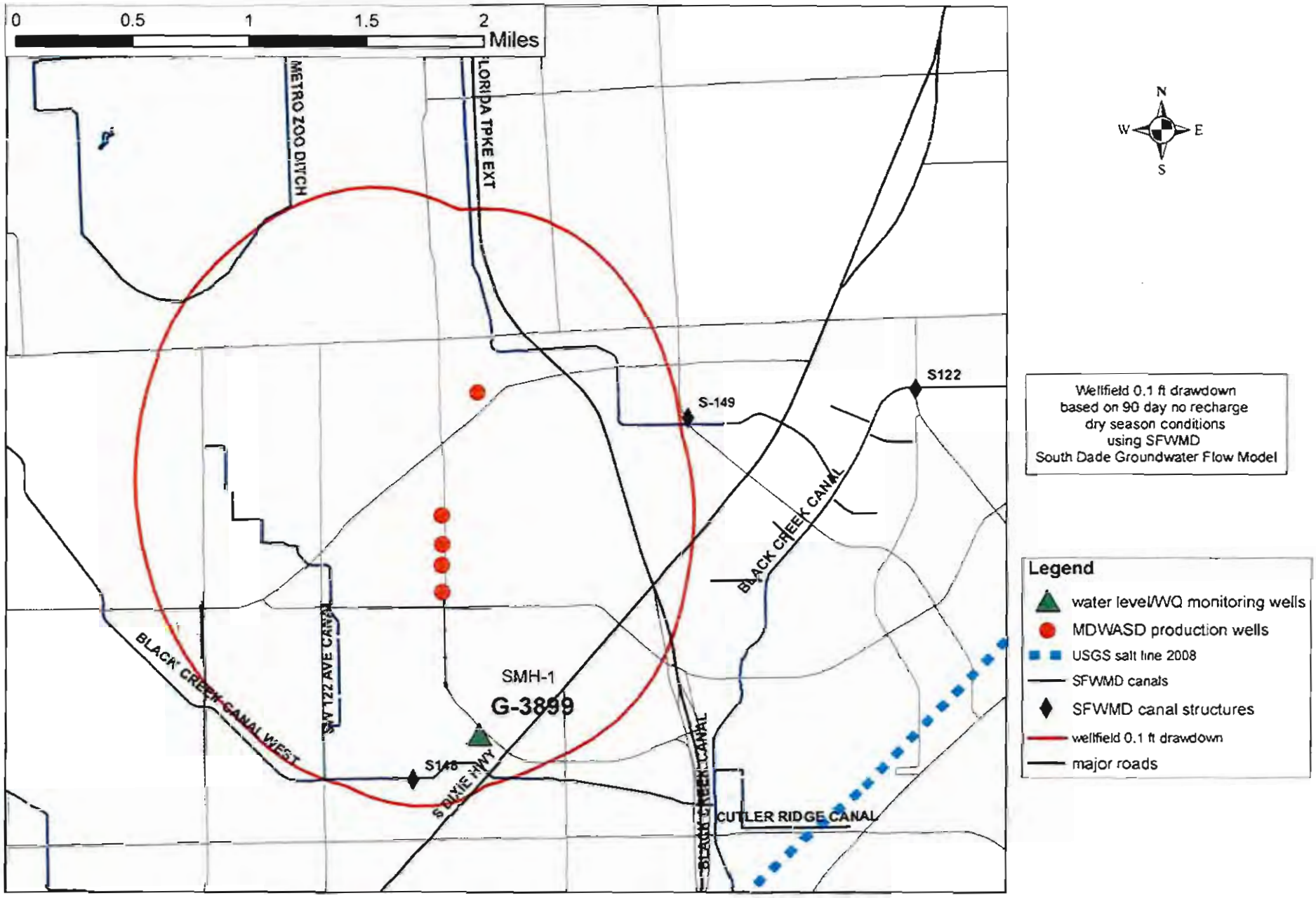


Exhibit 29C

Figure 9. South Miami Heights Wellfield Groundwater Level and Water Quality Monitoring

updated 9/7/10

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

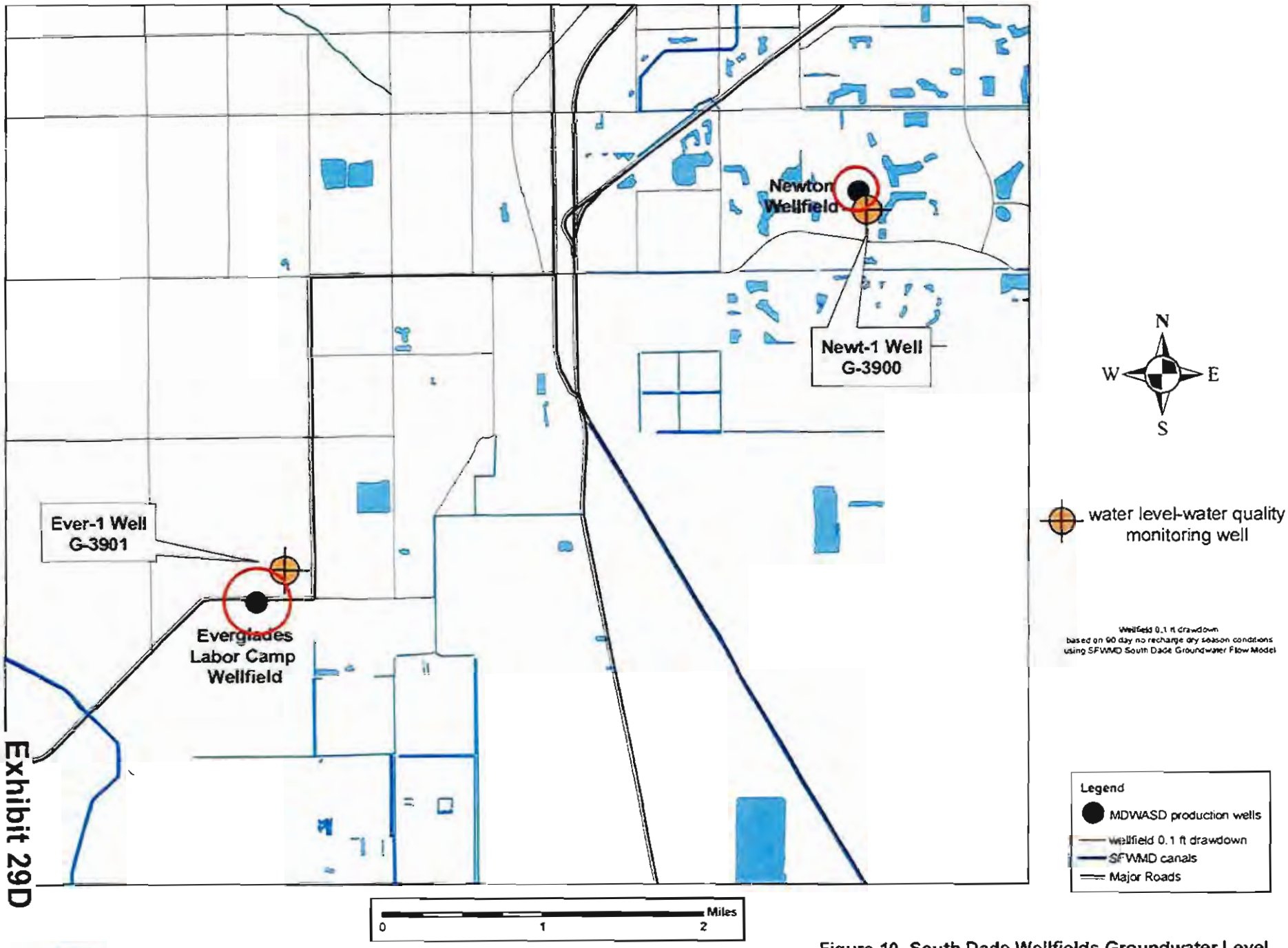
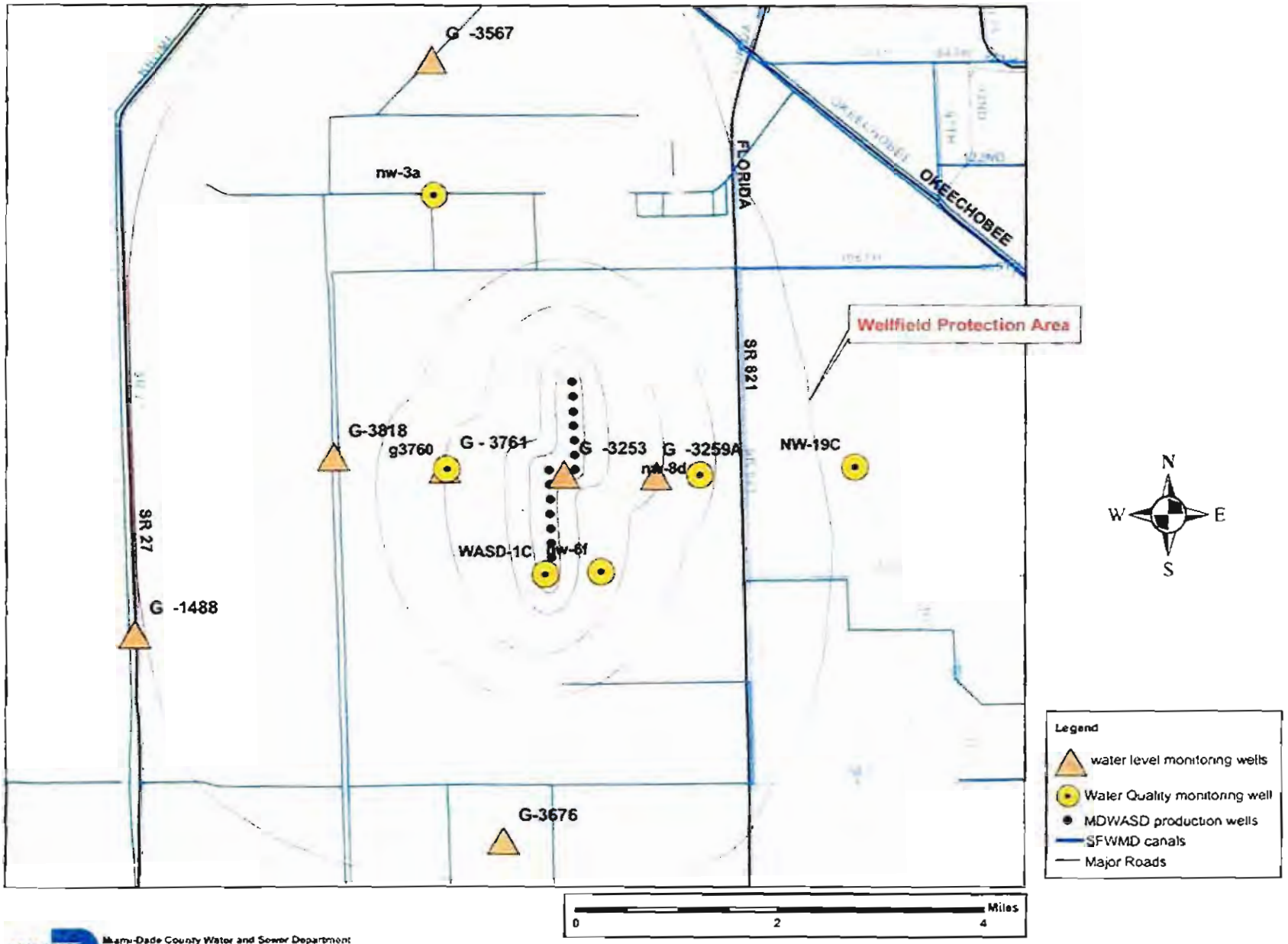


Exhibit 29D

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Figure 10. South Dade Wellfields Groundwater Level and Water Quality Monitoring

Updated 9/7/2010



Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

Figure 11. Northwest Groundwater Level and Water Quality Monitoring 11-8-07

Exhibit 29E

Table 4 Water Quality and Water Level Monitoring Wells by Wellfield.

WELL ID	STATION ID	LATITUDE	LONGITUDE	SITE USE	BORE HOLE DEPTH (ft)[1]	CASING DEPTH (ft)[1]	Screen Interval (ft)[1]	WELLFIELD PUMPAGE INTERVERAL (ft)[1]	GROUND WATER LEVEL MONITOR FREQUENCY	WATER QUALITY MONITORING FREQUENCY	WELLFIELD
254130080234501	G - 551	25 41 30	-080 23 45	standby supply	80 0	71	29-71	33-108	CONTINUOUS		AO SC, SWWF
253902080202501	G - 553	25 39 02	-080 20 19	observation/monitoring	91 0	79	no screen	33-108	CONTINUOUS		AO SC, SWWF
254215080201503	G -1074B	25 42 15	-080 20 15	observation/monitoring	39 0	17.0	no screen	33-108	CONTINUOUS		AO SC, SWWF
254157080214002	G -3074	25 41 57	-080 21 40	observation/monitoring	40.0	40.0	no screen	33-108	CONTINUOUS		AO SC, SWWF
254111080272501	G -3555	25 41 11	-080 27 25	observation/monitoring	19 0	14.0	14-19	33-108	CONTINUOUS		AO SC, SWWF
254340080203601	G -3563	25 43 40	-080 20 36	observation/monitoring	18.1	13	no screen	33-108	CONTINUOUS		AO SC, SWWF
254218080241801	G -3565	25 42 18	-080 24 18	observation/monitoring	19 0	14	no screen	33-108	CONTINUOUS		AO SC, SWWF
253943080250701	G -3897	25 39 47	-080 25 08	observation/monitoring	22 5	17.5	17.5-22.5	33-108	CONTINUOUS		AO, SC, SWWF
DERM Well	AO-6N	25 42 07	-080 20 41	observation/monitoring	60	60	55 - 60	40-100	3xYear	3xYear	AO
DERM Well	AO-8C	25 43 00	-080 19 50	observation/monitoring	60	60	55 - 60	40-100	3xYear	3xYear	AO
DERM Well	SC-1N	25 42 17	-080 21 40	observation/monitoring	60	60	55 - 60	50-108	3xYear	3xYear	SC
DERM Well	SC-6N	25 41 38	-080 21 27	observation/monitoring	60	60	55 - 60	50-108	3xYear	3xYear	SC
DERM Well	SW-2W	25 41 50	-080 24 14	observation/monitoring	60	60	55 - 60	33-104	3xYear	3xYear	SWWF
DERM Well	SW-7W	25 41 01	-080 24 10	observation/monitoring	60	60	55 - 60	33-104	3xYear	3xYear	SWWF
254158080294501	G -3561	25 41 58	-080 29 45	observation/monitoring	18 3	13.3	13 3-18.3	35-70	CONTINUOUS		WWF
254152080282101	G -3553	25 41 52	-080 28 21	observation/monitoring	19 9	14.9	14.9-19.9	35-70	CONTINUOUS		WWF
254152080274501	G -3554	25 41 52	-080 27 45	observation/monitoring	20 0	15 0	15-20	35-70	CONTINUOUS		WWF
254213080281501	G -3556	25 42 13	-080 28 15	observation/monitoring	19 1	14 1	14.1-19.1	35-70	CONTINUOUS		WWF
254207080300201	G -3577	25 42 07	-080 30 02	observation/monitoring	8 0	Open Hole	no screen	35-70	CONTINUOUS		WWF
DERM Well	WWF-21S	25 41 56	-080 26 18	observation/monitoring	48	48	43 - 48	35-70	3xYear	3xYear	WWF
DERM Well	WWF-75S	25 41 53	-080 27 44	observation/monitoring	55	55	50 - 55	35-70	3xYear	3xYear	WWF
254152080282601	G -3898	25 41 52	-080 28 25	observation/monitoring	22 8	17.8	17.8-22.8	35-70	CONTINUOUS		WWF
253419080223701	G -3899	25 34 19	-080 22 37	observation/monitoring	20.6	15 6	15 6-20.6		CONTINUOUS	3xYear	SMH
252506080300601	G -3901	25 25 06	-080 30 06	observation/monitoring	22.3	17.3	17.3-22.3	40-55	CONTINUOUS	3xYear	EVERGLADES
252718080264901	G -3900	25 27 15	80 26 49	observation/monitoring	22	17	17-22	50-66	CONTINUOUS	3xYear	NEWTON
254830080284201	G -1488	25 49 07	-080 28 57	observation/monitoring	20 0	Open Hole	no screen	46-100	CONTINUOUS		NWWF
255027080245501	G -3253	25 50 27	-080 24 55	observation/monitoring	34 5	18 0	no screen	46-100	CONTINUOUS		NWWF
255026080240302	G -3259A	25 50 26	-080 24 03	observation/monitoring	60.0	Open Hole	no screen	46-100	CONTINUOUS		NWWF
255358080260901	G -3567	25 53 58	-080 26 09	observation/monitoring	18.7	13 7	no screen	46-100	CONTINUOUS		NWWF
254720080253002	G - 3676	25 47 20	-080 25 30	observation/monitoring	33 0	23.0	23-33	46-100	CONTINUOUS		NWWF
255036080270501	G -3818	25 50 36	-080 27 05	observation/monitoring	20 0	15 0	15-20	46-100	CONTINUOUS		NWWF
Derm Well	NW-8D	25 50 26	-080 23 38	observation/monitoring	60	60	55 - 60	46-100	3xYear	3xYear	NWWF
Derm Well	NW-6F (replaced NW6D in 2004)	25 49 37	-080 24 30	observation/monitoring	60	60	55 - 60	46-100	3xYear	3xYear	NWWF
Derm Well	WASD-1C[2]	25 51 18	-080 24 49	observation/monitoring	40	40	35 - 40	46-100	3xYear	3xYear	NWWF
Derm Well	G-376C[3]	25 50 29	-080 26 02	observation/monitoring	72.7	70.7	no screen	46-100	CONTINUOUS	3xYear	NWWF
Derm Well	NW-3A	25 52 47	-080 26 06	observation/monitoring	88	88	83 - 88	46-100	3xYear	3xYear	NWWF
Derm Well	NW-19C (replaced NW-19S in 2006)	25 50 31	-080 22 13	observation/monitoring	50	50	45 - 50	46-100	3xYear	3xYear	NWWF

1. Feet Below Land Surface (bls)
2. Located in NWWF compound, just north of pump house #15
3. Located west of NWWF, on FPL easement

Exhibit 30

TABLE 1 DERM Ground Water Quality Monitoring Parameter and Frequency Schedule

Parameter Selection in Water	sampling frequency
NUTRIENTS	
NH3	3x
NOxN	3x
T-P	3x
CATIONS	
Ca^{+}	annual
K^{+}	annual
Mg^{+}	annual
Na^{+}	annual
ANIONS	
Cl^{-}	3x
CN	annual
F	annual
$SO4^{-}$	annual
PHYSICAL PROPERTIES	
Color	3x
Hardness	annual
Turbidity	3x
TDS	3x
TSS	
METALS (TOTAL)	
Al	annual
As	annual
Ag	annual
Ba	annual
Cd	annual
Cr	annual
Cr^{+6} (hexavalent)	annual
Cu	annual
Fe	annual
Hg	annual
Mn	annual
Ni	annual
Pb	annual
Se	annual
Zn	annual
AGGREGATE ORGANICS	
Phenols	annual
TOC	annual
TKN	annual
INDIVIDUAL ORGANICS	
8081 - Chlorinated Pest	annual
- Chlorinated Herbicide	annual
8021B - Volatile Organics	3x
8270 - Semivolatiles	annual
Organophosphorus Pesticides	annual
8151 - Herbicides	annual
547 - Glyphosate	annual
Fecal Coliform	3x
Total Coliform	3x

Exhibit 31

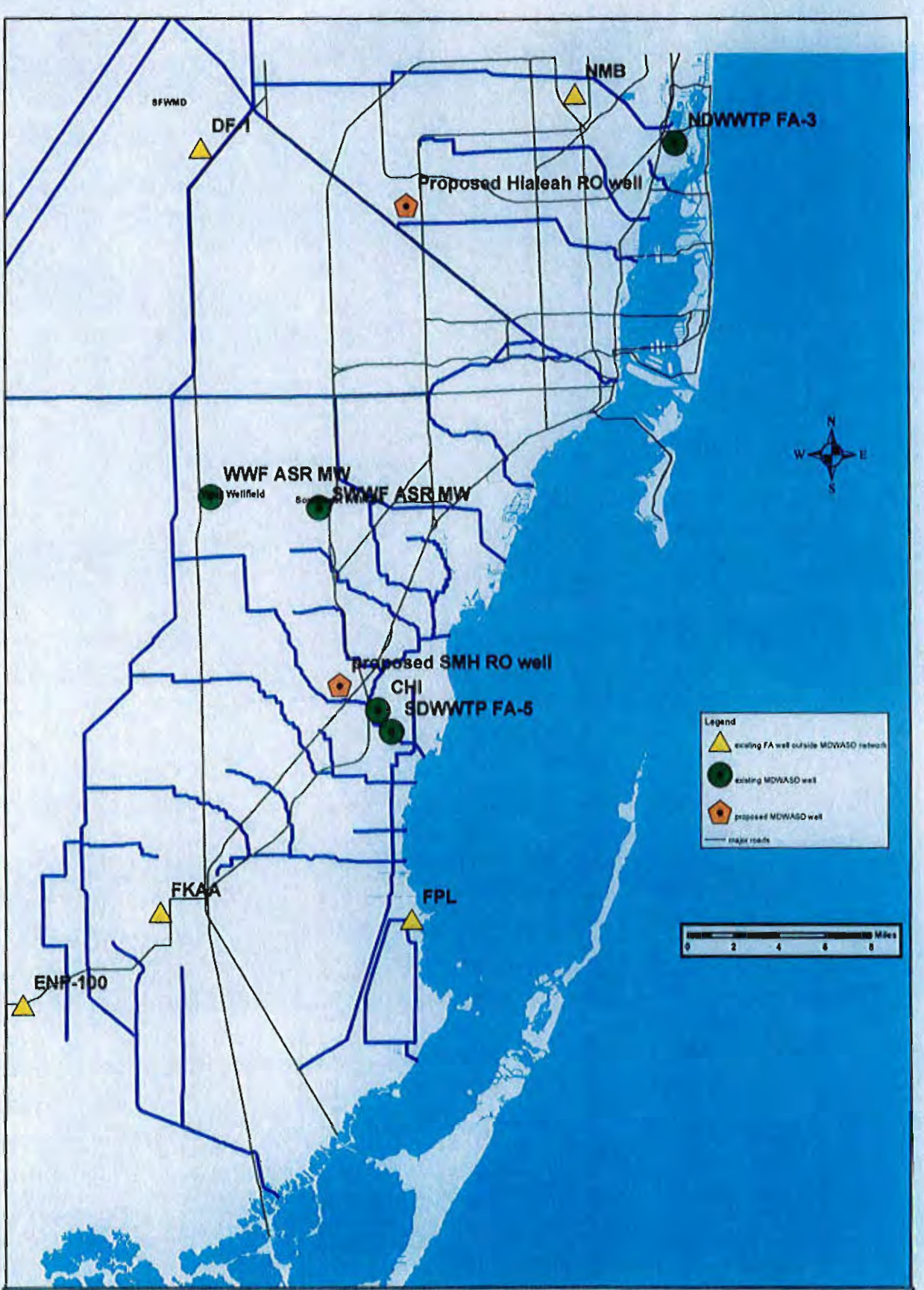


Figure 13. Floridan Aquifer Monitoring Network Design

MIAMI-DADE COUNTY

Miami-Dade County Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

EXHIBIT 32A

Table 5. Floridan Aquifer Monitoring Wells

WELL ID	LOCATION	LATITUDE	LONGITUDE	BORE HOLE DEPTH (ft) [2]	CASING DEPTH (ft) [2]	MONITORING INTERVAL (ft) [2]	PRESSURE LEVEL MONITOR FREQUENCY	WATER QUALITY MONITOR FREQUENCY
DF-1 [1]	N. Krome Ave	25 54 35.831	80 28 06.935	1800	TZ	516-620, 1140-1230, 1700-1800	Maintained by SFWMD	
ENP-100 [1]	Everglades National Park	25 22 57.096	80 36 10.71	1333	620	620-1333	Maintained by USGS	
FKAA [1]	Florida City	25 26 36	80 30 31	1500	1067	880-1353	Maintained by FKAA	
FPL [1]	FPL Property	25 21 01.416	80 24 28.204	2304	TZ	1120-1330, 1535-1920, 2100-2304	Maintained by FPL	
NMB [1]	NMB	25 56 58.44	80 12 54.909	1900	1020		Maintained by NMB	
NDWWTP FA-3N	NDWWTP	25 55 05.037	80 08 49.465	1510	1410	1410-1510	Continuous	Monthly
SDWWTP FA-5	SDWWTP	25 33 04.976	80 20 49.073	1890	DZ	1490-1588, 1790-1890	Continuous	Monthly
ASR MW-1	WWF	25 42 01.374	80 28 29.193	1396	DZ	855-1010, 1350-1396	Continuous	Monthly
SWWF MW-1	SWWF	25 69	80 39	1200	DZ	845-900, 1110-1200	Continuous	Monthly
CHI Monitoring Well	near SDWWTP	25 33 51.64	80 21 23.45	1900	DZ	1000 - 1100, 1400-1500,	Continuous	Monthly
South Miami Heights RO	new SMH RO WTP	Proposed FA Well					Continuous	Monthly
Hialeah RO	New Hialeah RO WTP	Proposed FA Well					Continuous	Monthly

Highlighted wells proposed for MDWASD Floridan Aquifer monitoring network

1. Data for Wells from DBHydro, wells not in MDWASD network.
2. Feet Below Land Surface (bls)

TZ - tri-zone

DZ - dual zone

EXHIBIT 32B

EXHIBIT 32B

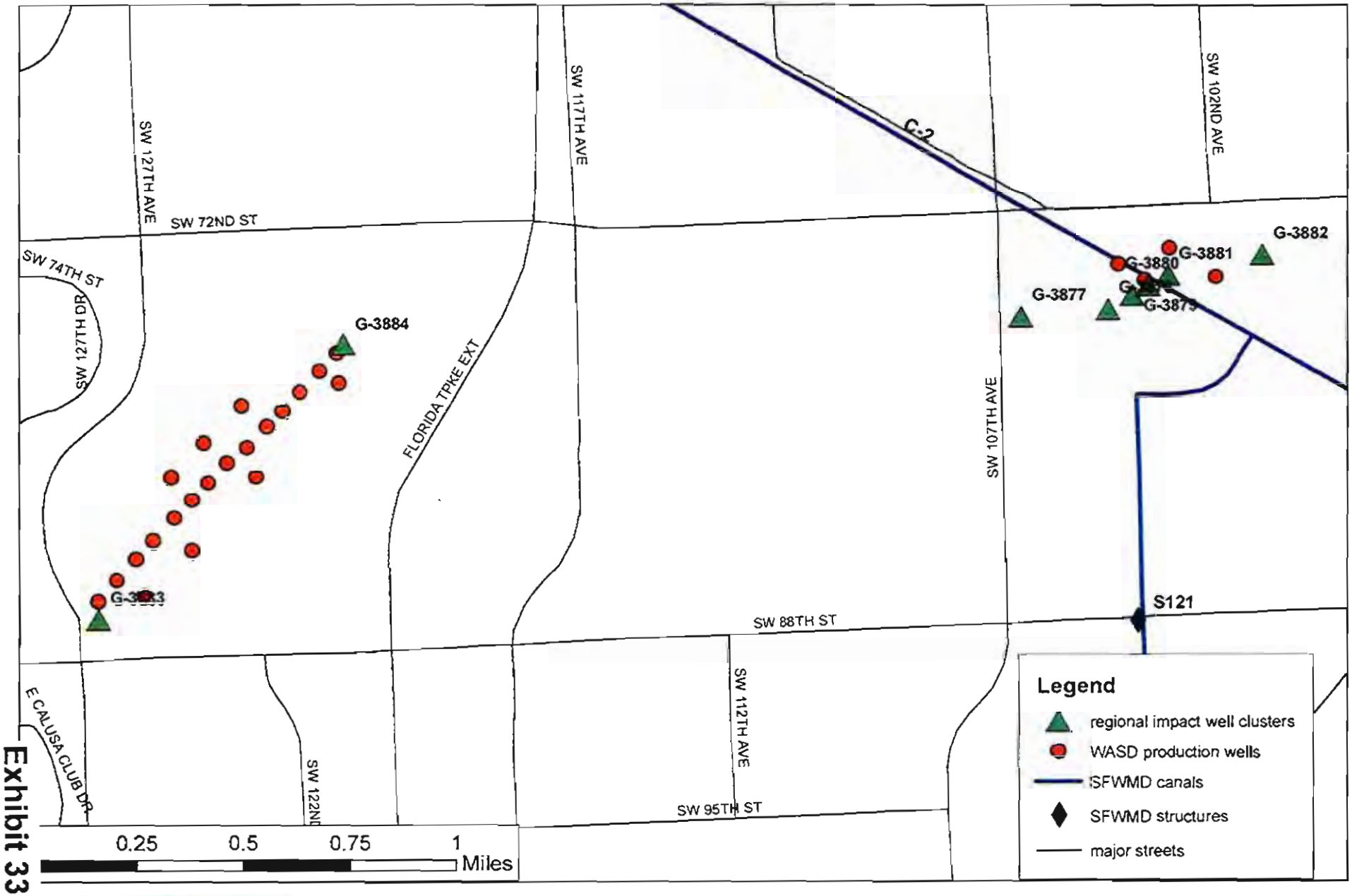


Exhibit 33A

MIAMI-DADE COUNTY

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

N

Figure 12a. Regional Impact well Cluster locations: Southwest and Snapper Creek wellfields

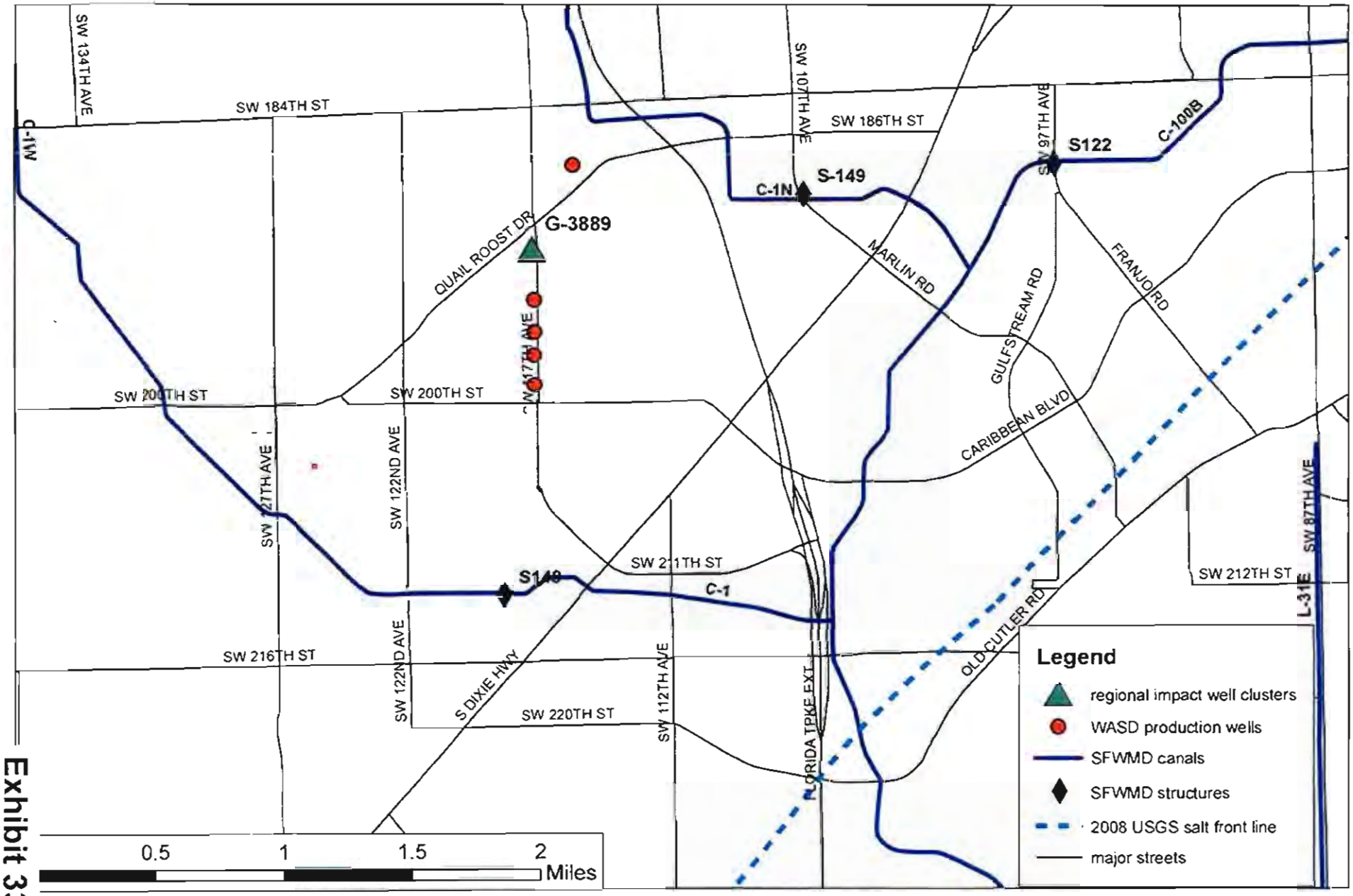


Exhibit 33B

MIAMI-DADE COUNTY

Miami-Dade Water and Sewer Department
3071 SW 38 Ave
Miami FL 33146

N

Figure 12b. Regional Impact well Cluster locations: South Miami Heights wellfield

New Monitoring Well Completion Schedule

WELL ID	SITE USE	NETWORK	DATE WELL INSTALLATION COMPLETION	STATUS
SWWF-1/G-3897	Located near SWWF for water elevation well-wetland monitoring	WQ/WL	Mar-09	Completed
WWF-1N/G-3898	Located NE of West Wellfield for water elevation well-wetland monitoring	WQ/WL	Mar-09	Completed
SMH-1/G-3899	Located near South Miami Heights Wellfield for water elevation well	WQ/WL	Mar-09	Completed
Ever-1/G-3901	Located near Everglades Labor Camp Wellfield for water elevetaion well	WQ/WL	Mar-09	Completed
Newton-1/G-3900	Located near Newton Wellfield for water elevation well	WQ/WL	Mar-09	Completed
Hialeah RO	Located near new City of Hialeah RO Water Treatment Plant	Floridan monitoring	Based on City of Hialeah RO plant construction	Pending
G-3949	North Miami-Dade County near Broward line	Salt Monitoring	Sep-10	Completed
G-3948	North Miami-Dade County	Salt Monitoring	Sep-10	Completed
G-3947	North Miami-Dade County	Salt Monitoring	Jul-10	Completed
G-3888	City of Miami south of C-6 canal	Salt Monitoring	Oct-09	Completed
G-3887	Eastern Miami-Dade County/Pinecrest	Salt Monitoring	Sep-09	Completed
G-3886	Northeast of SMH Wellfield	Salt Monitoring	Oct-09	Completed
G-3885	South of SMH Wellfield	Salt Monitoring	Aug-09	Completed
G-3946	South Miami-Dade County Model Lands	Salt Monitoring	Jul-09	Completed
G-3877	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3878	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3879	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3880	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3881	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3882	Snapper Creek Wellfield	Regional Impact	Mar-10	Completed
G-3889	Located midway between the Proposed SMH Wellfield and the Aquifer Recharge Project	Regional Impact	Mar-10	Completed
G-3884	Southwest Wellfield	Regional Impact	Mar-10	Completed
G-3883	Southwest Wellfield	Regional Impact	Mar-10	Completed
SMH RO	Located near South Miami Heights RO Water Treatment Plant	Floridan monitoring	2014	Pending

EXHIBIT 33C

Exhibit 33C

US Geological Survey Project Timeline
QUANTIFICATION OF GROUND-WATER FLOWS IN SUPPORT OF SIMULATION OF SURFACE- AND GROUNDWATER FLOWS TO BISCAYNE AQUIFER, MIAMI-DADE COUNTY.

Updated 6/21/12

Task	FY08				FY09				FY10				FY11				FY12				FY13			
	ND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS
1 Test and select best flowmeter type suitable for deployment	XX	XXX	XXX	XXX	-	-	-	-																
2 Drill corcholes, log, and construct monitor wells	-	-	-	-	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX												
3. Construct DCPs and install Flowmeters	-	-	-	-	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX											
4. Begin collection of WQ/WL data	--	-	--	-	-	-		XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX						
5. Aquifer Step Testing	-	-	--	-	-	-					XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX		
6. Real-time data collection and dissemination via website	-		-	-	--	-	-		-	-	-		XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	
7. Report preparation and publish report	-	--	-	-	--	-	-		--	-	-		-			XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX

EXHIBIT 33D

CERP Projects

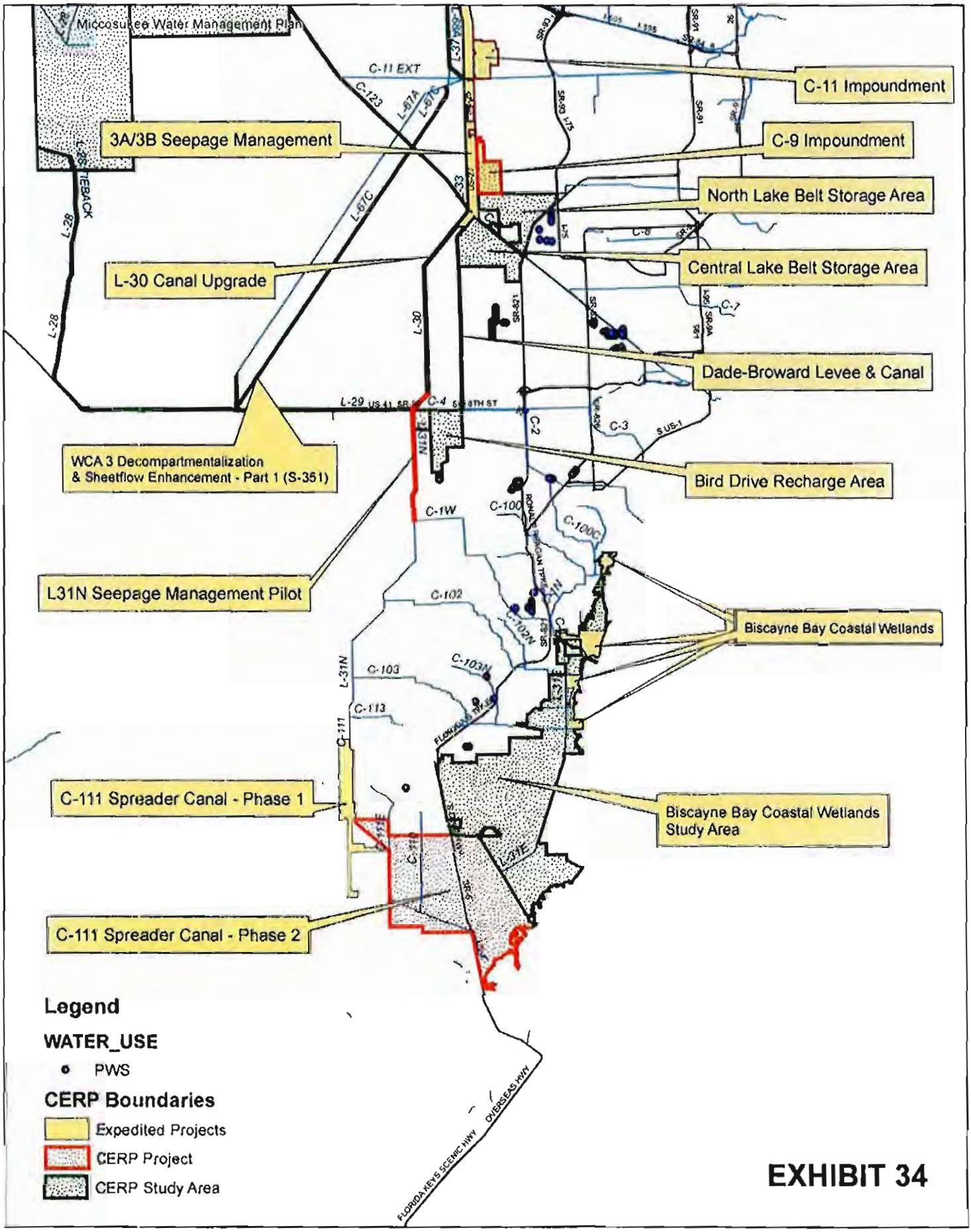


EXHIBIT 34

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE U.S. DEPARTMENT OF INTERIOR,
THE GOVERNOR OF THE STATE OF FLORIDA,
THE SOUTH FLORIDA WATER MANAGEMENT
DISTRICT AND METROPOLITAN DADE COUNTY

This Memorandum of Understanding (hereinafter sometimes referred to as the "Agreement"), made and entered into this _____ day of _____ 1993, by and between the U.S. Department of the Interior, hereinafter called the "SECRETARY", the Governor of the State of Florida, hereinafter called the "GOVERNOR", the South Florida Water Management District, a public corporation of the State of Florida, hereinafter called the "DISTRICT", and Metropolitan Dade County, a political subdivision of the State of Florida, hereinafter referred to as the "COUNTY",

ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, the COUNTY proposes to construct a West Dade Wellfield, hereinafter referred to as the "Wellfield", and has applied to the DISTRICT for a Water Use permit (application 8890731-12), requesting in said application to withdrew up to 40 million gallons per day from the Biscayne Aquifer and an allocation from the Floridan Aquifer System consistent with the Water Use permit, and

EXHIBIT 24

EXHIBIT 35A

WHEREAS, the parties hereto desire to enter into this Agreement in order to provide adequate assurances that, in the event said Water Use permit is issued, withdrawals of water pursuant to said permit shall not cause adverse impacts to the hydrologic resources of the Everglades National Park, and

WHEREAS, the Everglades National Park Protection and Expansion Act of 1989, 16 U.S.C. secs. 410r-5 et seq., hereinafter referred to as the "Act" (Appendix "A"), provides that no Federal license, permit, approval, right of way or assistance shall be granted or issued with respect to the West Dade Wellfield (to be located in the Bird Drive Drainage Basin, as identified in the Comprehensive Development Master Plan for Dade County, Florida) until the SECRETARY, the Governor of the State of Florida, the South Florida Water Management District and Dade County, Florida enter into an agreement providing that any Water Use permit issued by the South Florida Water Management District for the Wellfield must include certain limiting conditions, which limiting conditions are included within this Agreement;

NOW THEREFORE, in consideration of the mutual covenants hereinafter set forth, the parties hereto agree as follows:

EXHIBIT 32

ARTICLE II. TERMS AND CONDITIONS

A. The foregoing recitals are true and correct and are incorporated herein by this reference.

B. Conditions to be Incorporated if Water Use Permit is Issued by DISTRICT.

(1) If the DISTRICT issues any Water Use permit for the Wellfield pursuant to Application #890731-12, the Wellfield's peak pumpage shall not exceed the forty (40) million gallons per day from the Biscayne Aquifer. The appropriate allocation from the Floridan Aquifer System will be addressed in the permit based on DISTRICT Water Use Criteria and demonstrated hydraulic characteristics of the Floridan Aquifer System.

(2) Notwithstanding anything to the contrary herein, if the DISTRICT issues any Water Use permit for the Wellfield, the withdrawals authorized by the permit shall be limited to an amount which meets the applicable water use permitting criteria of the DISTRICT in Chapter 373, Florida Statutes, and Chapter 40E-2, F.A.C., which criteria shall in no event be applied to permit an allocation of water which would allow water withdrawals or pumpage rates which exceed the limitations set forth in the Act;

(3) If the DISTRICT issues a Water Use permit for the Wellfield, the permit shall include the following additional

conditions regarding DISTRICT-declared water shortages:

(a) Reasonable, enforceable measures to limit demand on the Wellfield in times of water shortage, which shortage impacts the South Dade Water Use Basin, as defined in Chapter 40E-21, F.A.C., or the Everglades National Park, hereinafter called the "PARK". During such times of water shortage, the District has been authorized to declare areas of critical water supply pursuant to Chapter 373, Florida Statutes, and Chapter 40E-21, F.A.C.

(b) If, during times of a declared water shortage, the DISTRICT fails to limit demand on the Wellfield pursuant to Article II, Sec. B (3)(a) above, or if the DISTRICT limits demand on the Wellfield pursuant to Article II, Sec. B (3)(a) above, but the SECRETARY or the GOVERNOR certifies that operation of the Wellfield is still causing Adverse Impacts (see Article II, Sec. G herein) on the hydrologic resources of the PARK, as determined by the monitoring program described in Appendix "B", the GOVERNOR shall require the DISTRICT to take necessary actions to alleviate the Adverse Impacts, including temporary reduction or cessation in pumpage from the Biscayne Aquifer from the Wellfield, use of alternative sources of water from the Floridan Aquifer System or additional reductions in demand. This certificate issued

EXHIBIT 35B

by the SECRETARY or the GOVERNOR shall specify what temporary corrective measures shall be required in the event of a disagreement regarding Adverse Impacts. In the event of such a disagreement, the COUNTY agrees to implement the corrective measures specified in the certificate pending outcome of the dispute resolution or correction of the Adverse Impacts, whichever occurs first. In the event that the COUNTY does not agree that Adverse Impacts have occurred in a particular case, the dispute mechanism set forth in Article II, Sec. D of this Agreement shall apply. The term "Adverse Impacts", as used herein, shall have the meaning set forth in Article II, Sec. G of this Agreement.

(c) Nothing herein shall be construed to limit the ability of the SECRETARY or the GOVERNOR to declare that Adverse Impacts to the hydrologic resources of the PARK have occurred when no water shortage has been declared by the DISTRICT.

C. The COUNTY agrees to comply with all conditions contained in any Water Use permit issued by the DISTRICT for the Wellfield.

D. The COUNTY agrees to operate the Wellfield in a manner which will not result in Adverse Impacts to hydrologic resources of

EXHIBIT 35C

the PARK. Upon notification by the SECRETARY or the GOVERNOR of Adverse Impacts to PARK hydrologic resources pursuant to the protocol developed in accordance with Article II, Sec. G herein, the COUNTY shall take necessary actions to alleviate the Adverse Impacts, including temporary reduction or cessation in pumping from the Biscayne Aquifer from the Wellfield, use of alternative sources of water from the Floridan Aquifer System, or additional reductions in demand. In the event that the COUNTY does not agree that Adverse Impacts have occurred, the COUNTY shall only be required to implement the temporary corrective measures indicated in the certificate of Adverse Impacts pending resolution of the dispute pursuant to the dispute resolution procedure set forth in this Section. In the event of such a dispute, the COUNTY shall serve notice of the dispute upon the party which certified the Adverse Impacts. Upon notification of a dispute, the Key Officials indicated in Article IV, shall convene (by whatever communication device is expedient) within seventy-two (72) hours to determine whether Adverse Impacts have occurred. If the Key Officials substantiate that Adverse Impacts have occurred, they shall then decide what final action must be taken to alleviate the Adverse Impacts, and the COUNTY shall be required to take such action. If the Key Officials determine that Adverse Impacts have not occurred, the COUNTY shall not be required to continue corrective actions. If the Key Officials are unable to reach a unanimous resolution of the issue, then the decision of the SECRETARY shall be determinative.

E. If the DISTRICT issues a Water Use permit for the Wellfield, then, prior to the operation of the Wellfield, the COUNTY shall fund development of the following:

(1) the plan entitled, "Hydrologic Monitoring Program for the West Dade Wellfield" (Appendix "B"); and

(2) a stochastic hydrologic model (hereinafter "the model"), which model will be developed in cooperation with the DISTRICT and the PARK, and which will be used to develop an operation schedule for the Wellfield.

F. If the DISTRICT issues a Water Use permit for the Wellfield then, prior to the operation of the Wellfield, the COUNTY shall, with the cooperation of the PARK and the DISTRICT, implement the plan entitled, "Hydrologic Monitoring Program for the West Dade Wellfield" (Appendix "B"). The parties to this Agreement agree that this monitoring plan shall be implemented for a minimum of one (1) calendar year prior to operation of the Wellfield, in order to obtain a sufficient data base to allow for the calibration of the stochastic hydrologic model. All data, models and model output pertaining to the monitoring or determination of impacts related to the planning, development, implementation, or operation of the Wellfield shall be made available to all parties to this Agreement upon request.

G. Upon development and calibration of the model, the SECRETARY shall provide a protocol for timely notification to the GOVERNOR, the DISTRICT and the COUNTY when Adverse Impacts to the hydrologic resources of the PARK have occurred. The term "Adverse Impacts", for purposes of this Agreement, shall be defined as negative changes in water levels or flows in the L-31N canal and shall be equal to (a) specified hydrologic unit(s) of measurement which can reliably be detected by the monitoring network, and which can reasonably be linked by the model as being caused by the Wellfield. After collection of the base data as set forth in Article II, Sec. F herein, said unit(s) of measurement shall be determined by agreement of the parties hereto and incorporated as the standard(s) by which said "Adverse Impacts" shall be determined by inclusion in an appendix hereto (Appendix "C"), which appendix, upon approval of all parties to this Agreement, shall automatically be made a part of this Agreement without need for amendment hereto.

H. Nothing herein shall be construed to restrict the DISTRICT from exercising its authority under Chapter 373 of the Florida Statutes, or its implementing rules and permit conditions, to prevent or mitigate any adverse water resource impacts or impacts to existing legal uses and land uses.

EXHIBIT 35D

I. Nothing herein shall be construed to restrict the COUNTY from applying for any other permit(s), or for modifications to any permit(s), if issued, Provided, however, that this Agreement, unless amended, shall not pertain to any such application(s). If the COUNTY applies for a modification of (a) permit(s), or (an) additional permit(s) for this Wellfield, then this Agreement shall be modified, or a new agreement shall be entered into between the four parties hereto.

J. The DISTRICT agrees that it shall consider the feasibility of a water control structure on the C-4 canal (which structure would be located near the intersection of the C-4 Canal and the Dade-Broward Levee) as part of the revaluation of the Central and Southern Florida Flood Control Project or the first update of the Lower East Coast Regional Water Supply Plan.

K. Notwithstanding anything to the contrary herein, the DISTRICT does not warrant or guarantee in any way that it shall issue any Water Use permit to the COUNTY.

ARTICLE III. TERM OF AGREEMENTS; RENEWAL

A. Initial Term. This Agreement shall become effective upon the issuance of a Water Use permit for the Wellfield and shall have an initial term of fifty (50) years (which is the statutory

maximum period of time for which a consumptive use permit may be issued by the South Florida Water Management District) or that period of time during which the Wellfield remains in operable condition, whichever is less.

B. Renewal Term. In the event that the initial term of this Agreement is fifty (50) years, this Agreement shall be automatically renewed for one (1) additional term of fifty (50) years, unless, prior to ninety (90) days before the expiration of said initial term, any of the parties to this Agreement notifies all other parties of its intent not to renew this Agreement.

C. Effect On Permit(s). Any permit issued by the DISTRICT shall be for the period of time which is stated in the permit, which time period need not coincide with the effective term of this Agreement. Similarly, the failure to renew this Agreement shall not affect the validity of any applicable Water Use permit(s) in existence at the time of said failure to renew.

ARTICLE IV. KEY OFFICIALS

The following key officials (the "Key Officials") are authorized to act on behalf of the parties hereto in all matters undertaken pursuant to the terms of this Agreement:

EXHIBIT 35E

THE U.S. DEPARTMENT OF INTERIOR: The Superintendent of the PARK, or authorized delegate, will provide review and approval of terms of all agreements, will be the authorized representative for service as required herein of all notices on the SECRETARY and participation in the dispute resolution mechanism set forth in Article II, Sec. D herein, and will exercise the authority to approve conduct of cooperative projects with regards to the conditions contained herein. The Assistant Director of the South Florida Research Center shall act as the authorized technical representative for the PARK with regard to the technical scope of this Agreement.

THE GOVERNOR OF THE STATE OF FLORIDA: The Secretary of the State of Florida Department of Environmental Protection (DEP), or authorized delegate, will provide review and approval of terms of all agreements, will be the authorized representative for service as required herein of all notices on the GOVERNOR and participation in the dispute resolution mechanism set forth in Article II, Sec. D herein, and will exercise the authority to approve conduct of cooperative projects with regards to the conditions contained herein. The Chief of the Bureau of Wetland Resource Management shall act as the authorized technical representative for DEP with regard to the technical scope of this Agreement.

EXHIBIT 35F

THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT: The Executive Director, or authorized delegate, will provide review and approval of terms of all agreements, will be the authorized representative for service as required herein of all notices on the DISTRICT and participation in the dispute resolution mechanism set forth in Article II, Sec. D herein, and will exercise the authority to approve conduct of cooperative projects with regards to the conditions contained herein. The Director of the Water Use Division's Regulation Department shall act as the authorized technical representative for the DISTRICT with regard to the technical scope of this Agreement.

METROPOLITAN DADE COUNTY: The Director of the Miami Dade Water and Sewer Authority Department, or authorized delegate, will provide review and approval of terms of all agreements, will be the authorized representative for service as required herein of all notices on the COUNTY and participation in the dispute resolution mechanism set forth in Article II, Sec. D herein, and will exercise the authority to approve conduct of cooperative projects with regards to the conditions contained herein. The Director of DERM, or authorized delegate, shall act as the authorized technical representative for the COUNTY with regard to the technical scope of this Agreement.

Written notice shall be provided to all parties of any change in Key Officials within four (4) weeks of such change.

ARTICLE V. AMENDMENT

This Agreement may be modified by amendment upon mutual written agreement of all parties.

ARTICLE VI. NOTICES

All notices required or permitted to be given under the terms and provisions of this Agreement by a party to the other parties shall be in writing and shall be sent by registered or certified mail, return receipt requested, to the parties as follows:

Department of the Interior
Richard S. Ring, Superintendent (Attn: Robert F. Doren)
Everglades National Park
40001 State Road 9336
Homestead, FL 33034-6733

The Governor of the State of Florida
c/o Secretary of the Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Attn: Chief of the Bureau of Wetland Resource Management

South Florida Water Management District
c/o Executive Director
P.O. Box 24680
West Palm Beach, Florida 33416-4680

Metropolitan Dade County
c/o Director, Miami Dade Water and Sewer Dept.
P.O. Box 330316
Miami, Florida 33133

or to such other address as may hereafter be provided by the parties in writing. Notices by registered or certified mail shall be deemed received on the delivery date indicated by the U.S. Postal Service on the return receipt.

ARTICLE VII. VENUE

Any litigation hereunder shall be brought in the appropriate state or federal court in Dade County, Florida.

ARTICLE VIII. HEADINGS

Captions and headings in this Agreement are for ease of reference only and do not constitute a part of this Agreement and

EXHIBIT 35G

shall not affect the meaning or interpretation of any provisions herein.

ARTICLE IX. RIGHTS OF OTHERS

Nothing in this Agreement express or implied is intended to confer upon any person other than the parties hereto any rights or remedies under or by reason of this Agreement.

ARTICLE X. WAIVER

There shall be no waiver of any right related to this Agreement unless in writing signed by the party waiving such right. No delay or failure to exercise a right under this Agreement shall impair such right or shall be construed to be a waiver thereof. Any waiver shall be limited to the particular right so waived and shall not be deemed a waiver of the same right at a later time, or of any other right under this Agreement.

ARTICLE XI. INVALIDITY OF PROVISIONS

The invalidity of one or more of the phrases, sentences, clauses, or Articles contained in this Agreement shall not affect the validity of the remaining portion of the Agreement, provided that the material purposes of this Agreement can be determined and effectuated.

ARTICLE XII. AUTHORITY OF PARTIES TO ENTER INTO AGREEMENT

A. Authority of the SECRETARY. The SECRETARY represents that (1) this Agreement has been duly authorized, executed and delivered by the Superintendent, Everglades National Park, pursuant to the authority vested in him by 16 U.S.C. secs. 1 and 1a-1 and 16 U.S.C. sec. 410r-8(i), as the duly authorized representative of the U.S. Department of the Interior for purposes of this Agreement, and (2) the U.S. Department of the Interior has the required power and authority to perform this Agreement.

B. Authority of the GOVERNOR. The GOVERNOR represents that (1) this Agreement has been duly authorized, executed and delivered by the Governor of the State of Florida, and (2) he has the required power and authority to perform this Agreement.

C. Authority of the DISTRICT. The DISTRICT represents that (1) this Agreement has been duly authorized, executed and delivered by the Governing Board of the South Florida Water Management District, and (2) it has the required power and authority to perform this Agreement.

D. Authority of the COUNTY. The COUNTY represents that (1) this Agreement has been duly authorized, executed and delivered by

EXHIBIT 35H

the Board of County Commissioners as the governing body of the County, and (3) it has the required power and authority to perform this Agreement.

ARTICLE XIII. ALLOCATION OF NATIONAL PARK SERVICE FUNDS

Nothing in this Agreement shall be construed to require the National Park Service to expend funds that have not been lawfully appropriated and administratively allocated for such purposes.

ARTICLE XIV. NONDISCRIMINATION

During the performance of this Agreement, the participants agree to abide by the terms of Executive Order 11246 on nondiscrimination and will not discriminate against any person because of race, color, religion, sex or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex or national origin.

ARTICLE XV. CONGRESSIONAL PARTICIPATION RESTRICTION

No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Agreement if made with a

corporation for its general benefit.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representative(s) on the latest day and year noted below.

WITNESSES:

_____

_____

DEPARTMENT OF THE INTERIOR

By: _____
Superintendent
Everglades National Park

WITNESSES:

_____

_____

THE STATE OF FLORIDA

By: _____
Governor

WITNESSES:

Assistant Secretary

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

By: _____
Chairman, Governing Board

ATTEST:

By: _____
Clerk

METROPOLITAN DADE COUNTY

By: _____
County Manager

Approved as to form and legal sufficiency: _____

SEAL

Requirement by Limiting Condition Report

App No: 110511-6
Permit No: 13-00017-W
Project Name: MIAMI-DADE CONSOLIDATED P W S

Limiting Condition No: 17 **Limiting Condition Code:** WUSTD021-8

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - RO1 Hialeah	Calibration report for WELL RO1 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO2 Hialeah	Calibration report for WELL RO2 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO3 Hialeah	Calibration report for WELL RO3 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO4 Hialeah	Calibration report for WELL RO4 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO5 Hialeah	Calibration report for WELL RO5 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO6 Hialeah	Calibration report for WELL RO6 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO8 Hialeah	Calibration report for WELL RO8 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO9 Hialeah	Calibration report for WELL RO9 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO10 Hialeah	Calibration report for WELL RO10 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO11 Hialeah	Calibration report for WELL RO11 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO12 Hialeah	Calibration report for WELL RO12 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO13 Hialeah	Calibration report for WELL RO13 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - RO14 Hialeah	Calibration report for WELL RO14 Hialeah	Every Five Years	Every Five Years	30-APR-2013
WELL - 1 NWWF	Calibration report for WELL 1 NWWF	Every Five Years	Every Five Years	07-APR-2013
WELL - 2 NWWF	Calibration report for WELL 2 NWWF	Every Five Years	Every Five Years	07-APR-2013
WELL - 3 NWWF	Calibration report for WELL 3 NWWF	Every Five Years	Every Five Years	07-APR-2013
WELL - 4 NWWF	Calibration report for WELL 4 NWWF	Every Five Years	Every Five Years	07-APR-2013
WELL - 5 NWWF	Calibration report for WELL 5 NWWF	Every Five Years	Every Five Years	07-APR-2013
WELL - 6 NWWF	Calibration report for WELL 6 NWWF	Every Five Years	Every Five Years	30-APR-2013
WELL - 7 NWWF	Calibration report for WELL 7 NWWF	Every Five Years	Every Five Years	30-APR-2013
WELL - 8 NWWF	Calibration report for WELL 8 NWWF	Every Five Years	Every Five Years	29-APR-2013
WELL - 9 NWWF	Calibration report for WELL 9 NWWF	Every Five Years	Every Five Years	30-APR-2013
WELL - 10 NWWF	Calibration report for WELL 10	Every Five Years	Every Five Years	29-APR-2013

Exhibit No: 36A

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	NWWF			
WELL - 11 NWWF	Calibration report for WELL 11 NWWF	Every Five Years	Every Five Years	29-APR-2013
WELL - 12 NWWF	Calibration report for WELL 12 NWWF	Every Five Years	Every Five Years	30-APR-2013
WELL - 13 NWWF	Calibration report for WELL 13 NWWF	Every Five Years	Every Five Years	29-APR-2013
WELL - 14 NWWF	Calibration report for WELL 14 NWWF	Every Five Years	Every Five Years	29-APR-2013
WELL - 15 NWWF	Calibration report for WELL 15 NWWF	Every Five Years	Every Five Years	29-APR-2013
WELL - 1 Medley	Calibration Report for Well 1 Medley	Every Five Years	Every Five Years	04-APR-2013
WELL - 2 Medley	Calibration Report for Well 2 Medley	Every Five Years	Every Five Years	04-APR-2013
WELL - 5 Medley	Calibration Report for Well 5 Medley	Every Five Years	Every Five Years	04-APR-2013
WELL - 6 Medley	Calibration Report for Well 6 Medley	Every Five Years	Every Five Years	04-APR-2013
WELL - 1 MS Lower	Calibration report for WELL 1 MS Lower	Every Five Years	Every Five Years	08-APR-2013
WELL - 2 MS Lower	Calibration report for WELL 2 MS Lower	Every Five Years	Every Five Years	08-APR-2013
WELL - 3 MS Lower	Calibration report for WELL 3 MS Lower	Every Five Years	Every Five Years	10-APR-2013
WELL - 4 MS Lower	Calibration report for WELL 4 MS Lower	Every Five Years	Every Five Years	08-APR-2013
WELL - 5 MS Lower	Calibration report for WELL 5 MS Lower	Every Five Years	Every Five Years	09-APR-2013
WELL - 6 MS Lower	Calibration report for WELL 6 MS Lower	Every Five Years	Every Five Years	08-APR-2013
WELL - 7 MS Lower	Calibration report for WELL 7 MS Lower	Every Five Years	Every Five Years	09-APR-2013
WELL - 8 MS Lower	Calibration report for WELL 8 MS Lower	Every Five Years	Every Five Years	09-APR-2013
WELL - 9 MS Upper	Calibration report for WELL 9 MS Upper	Every Five Years	Every Five Years	10-APR-2013
WELL - 10 MS Upper	Calibration report for WELL 10 MS Upper	Every Five Years	Every Five Years	05-APR-2013
WELL - 14 MS Upper	Calibration report for WELL 14 MS Upper	Every Five Years	Every Five Years	05-APR-2013
WELL - 15 MS Upper	Calibration Report for Well 15 MS Upper	Every Five Years	Every Five Years	09-APR-2013
WELL - 16 MS Upper	Calibration Report for Well 16 MS Upper	Every Five Years	Every Five Years	09-APR-2013
WELL - 17 MS Upper	Calibration report for WELL 17 MS Upper	Every Five Years	Every Five Years	09-APR-2013
WELL - 18 MS Upper	Calibration Report for Well 18 MS Upper	Every Five Years	Every Five Years	10-APR-2013
WELL - 19 MS Upper	Calibration Report for Well 19 MS Upper	Every Five Years	Every Five Years	10-APR-2013

Exhibit No: 36B

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - 20 MS Upper	Calibration report for WELL 20 MS Upper	Every Five Years	Every Five Years	28-APR-2013
WELL - 21 MS Upper	Calibration report for WELL 21 MS Upper	Every Five Years	Every Five Years	28-APR-2013
WELL - 22 MS Upper	Calibration report for WELL 22 MS Upper	Every Five Years	Every Five Years	28-APR-2013
WELL - 23 MS Upper	Calibration report for WELL 23 MS Upper	Every Five Years	Every Five Years	10-APR-2013
WELL - 1 Preston	Calibration report for WELL 1 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 2 Preston	Calibration report for WELL 2 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 3 Preston	Calibration report for WELL 3 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 4 Preston	Calibration report for WELL 4 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 5 Preston	Calibration report for WELL 5 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 6 Preston	Calibration report for WELL 6 Preston	Every Five Years	Every Five Years	01-APR-2013
WELL - 7 Preston	Calibration report for WELL 7 Preston	Every Five Years	Every Five Years	04-APR-2013
WELL - 11 Hialeah	Calibration report for WELL 11 Hialeah	Every Five Years	Every Five Years	04-APR-2013
WELL - 12 Hialeah	Calibration report for WELL 12 Hialeah	Every Five Years	Every Five Years	05-APR-2013
WELL - 13 Hialeah	Calibration report for WELL 13 Hialeah	Every Five Years	Every Five Years	05-APR-2013
WELL - 1 Orr	Calibration report for WELL 1 Orr	Every Five Years	Every Five Years	12-FEB-2013
WELL - 2 Orr	Calibration report for WELL 2 Orr	Every Five Years	Every Five Years	12-FEB-2013
WELL - 3 Orr	Calibration report for WELL 3 Orr	Every Five Years	Every Five Years	13-FEB-2013
WELL - 4 Orr	Calibration report for WELL 4 Orr	Every Five Years	Every Five Years	13-FEB-2013
WELL - 5 Orr	Calibration report for WELL 5 Orr	Every Five Years	Every Five Years	13-FEB-2013
WELL - 6 Orr	Calibration report for WELL 6 Orr	Every Five Years	Every Five Years	13-FEB-2013
WELL - 7 Orr	Calibration report for WELL 7 Orr	Every Five Years	Every Five Years	14-FEB-2013
WELL - 8 Orr	Calibration report for WELL 8 Orr	Every Five Years	Every Five Years	14-FEB-2013
WELL - 9 Orr	Calibration report for WELL 9 Orr	Every Five Years	Every Five Years	01-MAY-2013
WELL - 10 Orr	Calibration report for WELL 10 Orr	Every Five Years	Every Five Years	01-MAY-2013
WELL - 11 SW	Calibration report for WELL 11 SW	Every Five Years	Every Five Years	14-FEB-2013
WELL - 12 SW	Calibration report for WELL 12 SW	Every Five Years	Every Five Years	14-FEB-2013
WELL - 13 SW	Calibration report for WELL 13 SW	Every Five Years	Every Five Years	15-FEB-2013
WELL - 14 SW	Calibration report for WELL 14 SW	Every Five Years	Every Five Years	15-FEB-2013
WELL - 15 SW	Calibration report for WELL 15 SW	Every Five Years	Every Five Years	06-MAR-2013
WELL - 16 SW	Calibration report for WELL 16 SW	Every Five Years	Every Five Years	06-MAR-2013

Exhibit No: 36C

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - 17 SW	Calibration report for WELL 17 SW	Every Five Years	Every Five Years	06-MAR-2013
WELL - 18 SW	Calibration report for WELL 18 SW	Every Five Years	Every Five Years	07-MAR-2013
WELL - 19 SW	Calibration report for WELL 19 SW	Every Five Years	Every Five Years	07-MAR-2013
WELL - 20 SW	Calibration report for WELL 20 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - 21 SC	Calibration report for WELL 21 SC	Every Five Years	Every Five Years	14-APR-2013
WELL - 22 SC	Calibration report for WELL 22 SC	Every Five Years	Every Five Years	14-APR-2013
WELL - 23 SC	Calibration report for WELL 23 SC	Every Five Years	Every Five Years	05-MAR-2013
WELL - 24 SC	Calibration report for WELL 24 SC	Every Five Years	Every Five Years	05-MAR-2013
WELL - 25 SW	Calibration report for WELL 25 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - 26 SW	Calibration report for WELL 26 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - 27 SW	Calibration report for WELL 27 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - 28 SW	Calibration report for WELL 28 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - 29 W	Calibration report for WELL 29 W	Every Five Years	Every Five Years	08-MAY-2013
WELL - 30 W	Calibration report for WELL 30 W	Every Five Years	Every Five Years	07-MAY-2013
WELL - 31 W	Calibration Report for Well 31 W	Every Five Years	Every Five Years	07-MAY-2013
WELL - 32 SW	Calibration Report for Well 32 SW	Every Five Years	Every Five Years	03-APR-2013
WELL - 33 SW	Calibration Report for Well 33 SW	Every Five Years	Every Five Years	03-APR-2013
WELL - 34 SW	Calibration Report for Well 34 SW	Every Five Years	Every Five Years	02-APR-2013
WELL - ASR/Blending 1W	Calibration report for WELL ASR/Blending 1W	Every Five Years	Every Five Years	01-AUG-2012
WELL - ASR/Blending 2W	Calibration report for WELL ASR/Blending 2W	Every Five Years	Every Five Years	01-AUG-2012
WELL - ASR/Blending 3W	Calibration report for WELL ASR/Blending 3W	Every Five Years	Every Five Years	01-AUG-2012
WELL - ASR/Blending 4SW	Calibration Report for Well ASR/Blending 4SW	Every Five Years	Every Five Years	01-AUG-2012
WELL - ASR/Blending 5SW	Calibration Report for Well ASR/Blending 5SW	Every Five Years	Every Five Years	01-AUG-2012
WELL - ET 1	Calibration report for WELL ET 1	Every Five Years	Every Five Years	05-MAR-2013
WELL - ET 2	Calibration Report for Well ET 2	Every Five Years	Every Five Years	05-MAR-2013
WELL - EVRGL 1	Calibration report for WELL EVRGL 1	Every Five Years	Every Five Years	04-MAR-2013
WELL - EVRGL 3	Calibration report for WELL EVRGL 3	Every Five Years	Every Five Years	04-MAR-2013
WELL - EVRGL 3	Calibration Report for Well EVRGL 3	Every Five Years	Every Five Years	04-MAR-2013
WELL - LC 2	Calibration report for WELL LC 2	Every Five Years	Every Five Years	04-MAR-2013
WELL - LC 3	Calibration report for WELL LC 3	Every Five Years	Every Five Years	04-MAR-2013
WELL - LC 4	Calibration report for WELL LC 4	Every Five Years	Every Five Years	04-MAR-2013
WELL - LC 5	Calibration report for WELL LC 5	Every Five Years	Every Five Years	05-MAR-2013
WELL - NWTN 1	Calibration report for WELL	Every Five Years	Every Five Years	03-MAR-2013

Exhibit No: 36 D

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	NWTN 1			
WELL - NWTN 2	Calibration report for WELL NWTN 2	Every Five Years	Every Five Years	03-MAR-2013
WELL - FP 1	Calibration report for WELL FP 1	Every Five Years	Every Five Years	31-DEC-2015
WELL - NJ 1	Calibration report for WELL NJ 1	Every Five Years	Every Five Years	05-MAR-2013
WELL - RHP 1	Calibration report for WELL RHP 1	Every Five Years	Every Five Years	31-DEC-2015
WELL - RHP 2	Calibration report for WELL RHP 2	Every Five Years	Every Five Years	31-DEC-2015
WELL - RHP 3	Calibration report for WELL RHP 3	Every Five Years	Every Five Years	31-DEC-2015
WELL - RHP 4	Calibration report for WELL RHP 4	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F1	Calibration report for WELL SMH-F1	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F3	Calibration report for WELL SMH-F3	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F4	Calibration report for WELL SMH-F4	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F5	Calibration report for WELL SMH-F5	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F6	Calibration report for WELL SMH-F6	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F7	Calibration Report for Well SMH-F7	Every Five Years	Every Five Years	31-DEC-2015
WELL - SMH-F8	Calibration Report for Well SMH-F8	Every Five Years	Every Five Years	31-DEC-2015
PUMP - SWWF recharge	Calibration report for PUMP SWWF recharge	Every Five Years	Every Five Years	30-NOV-2020
PUMP - SWWF recharge 2	Calibration report for PUMP SWWF recharge 2	Every Five Years	Every Five Years	30-NOV-2020

Limiting Condition No: 18 **Limiting Condition Code:** WUSTD022-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - RO1 Hialeah	Monthly withdrawal for WELL RO1 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO2 Hialeah	Monthly withdrawal for WELL RO2 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO3 Hialeah	Monthly withdrawal for WELL RO3 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO4 Hialeah	Monthly withdrawal for WELL RO4 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO5 Hialeah	Monthly withdrawal for WELL RO5 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO6 Hialeah	Monthly withdrawal for WELL RO6 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO7 Hialeah	Monthly withdrawal for WELL RO7 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO8 Hialeah	Monthly withdrawal for WELL RO8 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO9 Hialeah	Monthly withdrawal for WELL RO9 Hialeah	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - RO10 Hialeah	Monthly withdrawal for WELL RO10 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO11 Hialeah	Monthly withdrawal for WELL RO11 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO12 Hialeah	Monthly withdrawal for WELL RO12 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO13 Hialeah	Monthly withdrawal for WELL RO13 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - RO14 Hialeah	Monthly withdrawal for WELL RO14 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - 1 NWWF	Monthly withdrawal for WELL 1 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 2 NWWF	Monthly withdrawal for WELL 2 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 3 NWWF	Monthly withdrawal for WELL 3 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 4 NWWF	Monthly withdrawal for WELL 4 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 5 NWWF	Monthly withdrawal for WELL 5 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 6 NWWF	Monthly withdrawal for WELL 6 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 7 NWWF	Monthly withdrawal for WELL 7 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 8 NWWF	Monthly withdrawal for WELL 8 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 9 NWWF	Monthly withdrawal for WELL 9 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 10 NWWF	Monthly withdrawal for WELL 10 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 11 NWWF	Monthly withdrawal for WELL 11 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 12 NWWF	Monthly withdrawal for WELL 12 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 13 NWWF	Monthly withdrawal for WELL 13 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 14 NWWF	Monthly withdrawal for WELL 14 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 15 NWWF	Monthly withdrawal for WELL 15 NWWF	Monthly	Quarterly	31-OCT-2012
WELL - 1 Medley	Monthly withdrawal for WELL 1 Medley	Monthly	Quarterly	31-OCT-2012
WELL - 1 Medley	Monthly withdrawal for WELL 2 Medley	Monthly	Quarterly	31-OCT-2012
WELL - 1 Medley	Monthly withdrawal for WELL 5 Medley	Monthly	Quarterly	31-OCT-2012
WELL - 1 Medley	Monthly withdrawal for WELL 6 Medley	Monthly	Quarterly	31-OCT-2012
WELL - 1 MS Lower	Monthly withdrawal for WELL 1 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 2 MS Lower	Monthly withdrawal for WELL 2	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36F

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	MS Lower			
WELL - 3 MS Lower	Monthly withdrawal for WELL 3 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 4 MS Lower	Monthly withdrawal for WELL 4 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 5 MS Lower	Monthly withdrawal for WELL 5 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 6 MS Lower	Monthly withdrawal for WELL 6 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 7 MS Lower	Monthly withdrawal for WELL 7 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 8 MS Lower	Monthly withdrawal for WELL 8 MS Lower	Monthly	Quarterly	31-OCT-2012
WELL - 9 MS Upper	Monthly withdrawal for WELL 9 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 10 MS Upper	Monthly withdrawal for WELL 10 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 14 MS Upper	Monthly withdrawal for WELL 14 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 15 MS Upper	Monthly withdrawal for WELL 15 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 16 MS Upper	Monthly withdrawal for WELL 16 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 17 MS Upper	Monthly withdrawal for WELL 17 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 18 MS Upper	Monthly withdrawal for WELL 18 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 19 MS Upper	Monthly withdrawal for WELL 19 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 20 MS Upper	Monthly withdrawal for WELL 20 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 21 MS Upper	Monthly withdrawal for WELL 21 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 22 MS Upper	Monthly withdrawal for WELL 22 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 23 MS Upper	Monthly withdrawal for WELL 23 MS Upper	Monthly	Quarterly	31-OCT-2012
WELL - 1 Preston	Monthly withdrawal for WELL 1 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 2 Preston	Monthly withdrawal for WELL 2 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 3 Preston	Monthly withdrawal for WELL 3 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 4 Preston	Monthly withdrawal for WELL 4 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 5 Preston	Monthly withdrawal for WELL 5 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 6 Preston	Monthly withdrawal for WELL 6 Preston	Monthly	Quarterly	31-OCT-2012
WELL - 7 Preston	Monthly withdrawal for WELL 7 Preston	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36G

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - 11 Hialeah	Monthly withdrawal for WELL 11 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - 12 Hialeah	Monthly withdrawal for WELL 12 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - 13 Hialeah	Monthly withdrawal for WELL 13 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - 1 Orr	Monthly withdrawal for WELL 1 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 2 Orr	Monthly withdrawal for WELL 2 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 3 Orr	Monthly withdrawal for WELL 3 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 4 Orr	Monthly withdrawal for WELL 4 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 5 Orr	Monthly withdrawal for WELL 5 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 6 Orr	Monthly withdrawal for WELL 6 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 7 Orr	Monthly withdrawal for WELL 7 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 8 Orr	Monthly withdrawal for WELL 8 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 9 Orr	Monthly withdrawal for WELL 9 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 10 Orr	Monthly withdrawal for WELL 10 Orr	Monthly	Quarterly	31-OCT-2012
WELL - 11 SW	Monthly withdrawal for WELL 11 SW	Monthly	Quarterly	31-OCT-2012
WELL - 12 SW	Monthly withdrawal for WELL 12 SW	Monthly	Quarterly	31-OCT-2012
WELL - 13 SW	Monthly withdrawal for WELL 13 SW	Monthly	Quarterly	31-OCT-2012
WELL - 14 SW	Monthly withdrawal for WELL 14 SW	Monthly	Quarterly	31-OCT-2012
WELL - 15 SW	Monthly withdrawal for WELL 15 SW	Monthly	Quarterly	31-OCT-2012
WELL - 16 SW	Monthly withdrawal for WELL 16 SW	Monthly	Quarterly	31-OCT-2012
WELL - 17 SW	Monthly withdrawal for WELL 17 SW	Monthly	Quarterly	31-OCT-2012
WELL - 18 SW	Monthly withdrawal for WELL 18 SW	Monthly	Quarterly	31-OCT-2012
WELL - 19 SW	Monthly withdrawal for WELL 19 SW	Monthly	Quarterly	31-OCT-2012
WELL - 20 SW	Monthly withdrawal for WELL 20 SW	Monthly	Quarterly	31-OCT-2012
WELL - 21 SC	Monthly withdrawal for WELL 21 SC	Monthly	Quarterly	31-OCT-2012
WELL - 22 SC	Monthly withdrawal for WELL 22 SC	Monthly	Quarterly	31-OCT-2012
WELL - 23 SC	Monthly withdrawal for WELL 23	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36H

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	SC			
WELL - 24 SC	Monthly withdrawal for WELL 24 SC	Monthly	Quarterly	31-OCT-2012
WELL - 25 SW	Monthly withdrawal for WELL 25 SW	Monthly	Quarterly	31-OCT-2012
WELL - 26 SW	Monthly withdrawal for WELL 26 SW	Monthly	Quarterly	31-OCT-2012
WELL - 27 SW	Monthly withdrawal for WELL 27 SW	Monthly	Quarterly	31-OCT-2012
WELL - 28 SW	Monthly withdrawal for WELL 28 SW	Monthly	Quarterly	31-OCT-2012
WELL - 29 W	Monthly withdrawal for WELL 29 W	Monthly	Quarterly	31-OCT-2012
WELL - 30 W	Monthly withdrawal for WELL 30 W	Monthly	Quarterly	31-OCT-2012
WELL - 31 W	Monthly withdrawal for WELL 31 W	Monthly	Quarterly	31-OCT-2012
WELL - 32 SW	Monthly withdrawal for WELL 32 SW	Monthly	Quarterly	31-OCT-2012
WELL - 33 SW	Monthly withdrawal for WELL 33 SW	Monthly	Quarterly	31-OCT-2012
WELL - 34 SW	Monthly withdrawal for WELL 34 SW	Monthly	Quarterly	31-OCT-2012
WELL - ASR/Blending 1W	Monthly withdrawal for WELL ASR/Blending 1W	Monthly	Quarterly	31-OCT-2012
WELL - ASR/Blending 2W	Monthly withdrawal for WELL ASR/Blending 2W	Monthly	Quarterly	31-OCT-2012
WELL - ASR/Blending 3W	Monthly withdrawal for WELL ASR/Blending 3W	Monthly	Quarterly	31-OCT-2012
WELL - ASR/Blending 4SW	Monthly withdrawal for ASR/Blending 4SW	Monthly	Quarterly	31-OCT-2012
WELL - ASR/Blending 5SW	Monthly withdrawal for ASR/Blending 5SW	Monthly	Quarterly	31-OCT-2012
WELL - ET 1	Monthly withdrawal for WELL ET 1	Monthly	Quarterly	31-OCT-2012
WELL - ET 2	Monthly withdrawal for Well ET 2	Monthly	Quarterly	31-OCT-2012
WELL - EVRGL 1	Monthly withdrawal for WELL EVRGL 1	Monthly	Quarterly	31-OCT-2012
WELL - EVRGL 2	Monthly withdrawal for Well EVERGL 2	Monthly	Quarterly	31-OCT-2012
WELL - EVRGL 3	Monthly withdrawal for WELL EVRGL 3	Monthly	Quarterly	31-OCT-2012
WELL - LC 2	Monthly withdrawal for WELL LC 2	Monthly	Quarterly	31-OCT-2012
WELL - LC 3	Monthly withdrawal for WELL LC 3	Monthly	Quarterly	31-OCT-2012
WELL - LC 4	Monthly withdrawal for WELL LC 4	Monthly	Quarterly	31-OCT-2012
WELL - LC 5	Monthly withdrawal for WELL LC 5	Monthly	Quarterly	31-OCT-2012
WELL - NJ 1	Monthly withdrawal for WELL NJ 1	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - NWTN 1	Monthly withdrawal for WELL NWTN 1	Monthly	Quarterly	31-OCT-2012
WELL - NWTN 2	Monthly withdrawal for WELL NWTN 2	Monthly	Quarterly	31-OCT-2012
WELL - FP 1	Monthly withdrawal for WELL FP 1	Monthly	Quarterly	31-OCT-2012
WELL - RHP 1	Monthly withdrawal for WELL RHP 1	Monthly	Quarterly	31-OCT-2015
WELL - RHP 2	Monthly withdrawal for WELL RHP 2	Monthly	Quarterly	31-OCT-2015
WELL - RHP 3	Monthly withdrawal for WELL RHP 3	Monthly	Quarterly	31-OCT-2015
WELL - RHP 4	Monthly withdrawal for WELL RHP 4	Monthly	Quarterly	31-OCT-2015
WELL - SMH-F1	Monthly withdrawal for WELL SMH-F1	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F2	Monthly withdrawal for WELL SMH-F2	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F4	Monthly withdrawal for WELL SMH-F4	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F5	Monthly withdrawal for WELL SMH-F5	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F6	Monthly withdrawal for WELL SMH-F6	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F7	Monthly withdrawal for PUMP SWWF recharge 2	Monthly	Quarterly	31-DEC-2015
WELL - SMH-F8	Monthly withdrawal for Well SMH-F8	Monthly	Quarterly	31-DEC-2015
PUMP - SWWF recharge 2	Monthly withdrawal for PUMP SWWF recharge 2	Monthly	Quarterly	31-DEC-2020
PUMP - SWWF recharge	Monthly withdrawal for PUMP SWWF recharge	Monthly	Quarterly	31-DEC-2020

Limiting Condition No: 19 **Limiting Condition Code:** WUASR001-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	ASR Operations Report for PERMIT	Yearly	Yearly	15-APR-2013

Limiting Condition No: 21 **Limiting Condition Code:** WUWC004-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - RO8 Hialeah	Updated Table A for WELL RO8 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO9 Hialeah	Updated Table A for WELL RO9 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO10 Hialeah	Updated Table A for WELL RO10 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO11 Hialeah	Updated Table A for WELL RO11 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO12 Hialeah	Updated Table A for WELL RO12 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO13 Hialeah	Updated Table A for WELL RO13 Hialeah	One time Only	One time Only	31-JAN-2013
WELL - RO14 Hialeah	Updated Table A for WELL RO14	One time Only	One time Only	31-JAN-2013

Exhibit No: 36 J

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	Hialeah			
WELL - SMH-F1	Updated Table A for WELL SMH-F1	One time Only	One time Only	31-DEC-2015
WELL - SMH-F2	Updated Table A for WELL SMH-F2	One time Only	One time Only	31-DEC-2015
WELL - SMH-F3	Updated Table A for WELL SMH-F3	One time Only	One time Only	01-DEC-2015
WELL - SMH-F4	Updated Table A for WELL SMH-F4	One time Only	One time Only	01-DEC-2015
WELL - SMH-F5	Updated Table A for WELL SMH-F5	One time Only	One time Only	01-DEC-2015
WELL - SMH-F6	Updated Table A for WELL SMH-F6	One time Only	One time Only	01-DEC-2015
WELL - FP 1	Updated Table A for WELL FP 1	One time Only	One time Only	01-DEC-2015
WELL - RHP 1	Updated Table A for WELL RHP 1	One time Only	One time Only	01-DEC-2015
WELL - RHP 3	Updated Table A for WELL RHP 3	One time Only	One time Only	01-DEC-2015
WELL - RHP 4	Updated Table A for WELL RHP 4	One time Only	One time Only	01-DEC-2015

Limiting Condition No: 23 **Limiting Condition Code:** WUPWS008-2

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	Ten-Year Compliance Report for PERMIT	Every Ten Years	Every Ten Years	30-NOV-2020

Limiting Condition No: 36 **Limiting Condition Code:** WUWLM001-4

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - AO-6N	Ground water level for WELL AO-6N	Monthly	Quarterly	31-OCT-2012
WELL - AO-8C	Ground water level for WELL AO-8C	Monthly	Quarterly	31-OCT-2012
WELL - SC-1N	Ground water level for WELL SC-1N	Monthly	Quarterly	31-OCT-2012
WELL - SC-6N	Ground water level for WELL SC-6N	Monthly	Quarterly	31-OCT-2012
WELL - SW-2W	Ground water level for WELL SW-2W	Monthly	Quarterly	31-OCT-2012
WELL - SW-7W	Ground water level for WELL SW-7W	Monthly	Quarterly	31-OCT-2012
WELL - WWF-21S	Ground water level for WELL WWF-21S	Monthly	Quarterly	31-OCT-2012
WELL - WWF-755	Ground water level for WELL WWF-755	Monthly	Quarterly	31-OCT-2012
WELL - NW-3A	Ground water level for WELL NW-3A	Monthly	Quarterly	31-OCT-2012
WELL - NW-6F	Ground water level for WELL NW-6F	Monthly	Quarterly	31-OCT-2012
WELL - NW-8D	Ground water level for WELL NW-8D	Monthly	Quarterly	31-OCT-2012
WELL - NW-19C	Ground water level for WELL NW-19C	Monthly	Quarterly	31-OCT-2012
WELL - WASD-1C	Ground water level for WELL WASD-1C	Monthly	Quarterly	31-OCT-2012
WELL - G-551	Ground water level for WELL G-	Monthly	Quarterly	31-OCT-2012

Exhibit No: 36K

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
	551			
WELL - G-553	Ground water level for WELL G-553	Monthly	Quarterly	31-OCT-2012
WELL - G-1074B	Ground water level for WELL G-1074B	Monthly	Quarterly	31-OCT-2012
WELL - G-1488	Ground water level for WELL G-1488	Monthly	Quarterly	31-OCT-2012
WELL - G-3074	Ground water level for WELL G-3074	Monthly	Quarterly	31-OCT-2012
WELL - G-3253	Ground water level for WELL G-3253	Monthly	Quarterly	31-OCT-2012
WELL - G-3259A	Ground water level for WELL G-3259A	Monthly	Quarterly	31-OCT-2012
WELL - G-3551	Ground water level for WELL G-3551	Monthly	Quarterly	31-OCT-2012
WELL - G-3553	Ground water level for WELL G-3553	Monthly	Quarterly	31-OCT-2012
WELL - G-3554	Ground water level for WELL G-3554	Monthly	Quarterly	31-OCT-2012
WELL - G-3555	Ground water level for WELL G-3555	Monthly	Quarterly	31-OCT-2012
WELL - G-3556	Ground water level for WELL G-3556	Monthly	Quarterly	31-OCT-2012
WELL - G-3563	Ground water level for WELL G-3563	Monthly	Quarterly	31-OCT-2012
WELL - G-3565	Ground water level for WELL G-3565	Monthly	Quarterly	31-OCT-2012
WELL - G-3567	Ground water level for WELL G-3567	Monthly	Quarterly	31-OCT-2012
WELL - G-3577	Ground water level for WELL G-3577	Monthly	Quarterly	31-OCT-2012
WELL - G-3676	Ground water level for WELL G-3676	Monthly	Quarterly	31-OCT-2012
WELL - G-3760	Ground water level for WELL G-3760	Monthly	Quarterly	31-OCT-2012
WELL - G-3761	Ground water level for WELL G-3761	Monthly	Quarterly	31-OCT-2012
WELL - G-3818	Ground water level for WELL G-3818	Monthly	Quarterly	31-OCT-2012
WELL - G-3897	Ground water level for WELL G-3897	Monthly	Quarterly	31-OCT-2012
WELL - G-3898	Ground water level for WELL G-3898	Monthly	Quarterly	31-OCT-2012
WELL - G-3899	Ground water level for WELL G-3899	Monthly	Quarterly	31-OCT-2012
WELL - G-3900	Ground water level for WELL G-3900	Monthly	Quarterly	31-OCT-2012
WELL - G-3901	Ground water level for WELL G-3901	Monthly	Quarterly	31-OCT-2012
WELL - SMH-F3	Ground water level for SMH-F3	Monthly	Quarterly	31-OCT-2012

Limiting Condition No: 37 **Limiting Condition Code:** WUSAT001-4

Exhibit No: 36 L

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - F-45	Chloride for WELL F-45	Monthly	Quarterly	31-OCT-2012
WELL - F-279	Chloride for WELL F-279	Monthly	Quarterly	31-OCT-2012
WELL - G-354	Chloride for WELL G-354	Monthly	Quarterly	31-OCT-2012
WELL - G-432	Chloride for WELL G-432	Monthly	Quarterly	31-OCT-2012
WELL - G-548	Chloride for WELL G-548	Monthly	Quarterly	31-OCT-2012
WELL - G-571	Chloride for WELL G-571	Monthly	Quarterly	31-OCT-2012
WELL - G-894	Chloride for WELL G-894	Monthly	Quarterly	31-OCT-2012
WELL - G-896	Chloride for WELL G-896	Monthly	Quarterly	31-OCT-2012
WELL - G-901	Chloride for WELL G-901	Monthly	Quarterly	31-OCT-2012
WELL - G-939	Chloride for WELL G-939	Monthly	Quarterly	31-OCT-2012
WELL - G-1009B	Chloride for WELL G-1009B	Monthly	Quarterly	31-OCT-2012
WELL - G-1179	Chloride for WELL G-1179	Monthly	Quarterly	31-OCT-2012
WELL - G-1180	Chloride for WELL G-1180	Monthly	Quarterly	31-OCT-2012
WELL - G-1351	Chloride for WELL G-1351	Monthly	Quarterly	31-OCT-2012
WELL - G-1354	Chloride for WELL G-1354	Monthly	Quarterly	31-OCT-2012
WELL - G-3162	Chloride for WELL G-3162	Monthly	Quarterly	31-OCT-2012
WELL - G-3224	Chloride for WELL G-3224	Monthly	Quarterly	31-OCT-2012
WELL - G-3229	Chloride for WELL G-3229	Monthly	Quarterly	31-OCT-2012
WELL - G-3250	Chloride for WELL G-3250	Monthly	Quarterly	31-OCT-2012
WELL - G-3313C	Chloride for WELL G-3313C	Monthly	Quarterly	31-OCT-2012
WELL - G-3313E	Chloride for WELL G-3313E	Monthly	Quarterly	31-OCT-2012
WELL - G-3885	Chloride for WELL G-3885	Monthly	Quarterly	31-OCT-2012
WELL - G-3886	Chloride for WELL G-3886	Monthly	Quarterly	31-OCT-2012
WELL - G-3887	Chloride for WELL G-3887	Monthly	Quarterly	31-OCT-2012
WELL - G-3888	Chloride for WELL G-3888	Monthly	Quarterly	31-OCT-2012
WELL - G-3946	Chloride for WELL G-3946	Monthly	Quarterly	31-OCT-2012
WELL - G-3947	Chloride for WELL G-3947	Monthly	Quarterly	31-OCT-2012
WELL - G-3948	Chloride for WELL G-3948	Monthly	Quarterly	31-OCT-2012
WELL - G-3949	Chloride for WELL G-3949	Monthly	Quarterly	31-OCT-2012
WELL - FA-3N NDWWTP	Chloride for WELL FA-3N NDWWTP	Monthly	Quarterly	31-OCT-2012
WELL - FA-5 SDWWTP	Chloride for WELL FA-5 SDWWTP	Monthly	Quarterly	31-OCT-2012
WELL - ASR MW-1 (WEST)	Chloride for WELL ASR MW-1 (WEST)	Monthly	Quarterly	31-OCT-2012
WELL - ASR MW-1 (SW)	Chloride for WELL ASR MW-1 (SW)	Monthly	Quarterly	31-OCT-2012
WELL - CHI SDWWTP	Chloride for WELL CHI SDWWTP	Monthly	Quarterly	31-OCT-2012
WELL - RO7 Hialeah	Chloride for WELL RO7 Hialeah	Monthly	Quarterly	31-OCT-2012
WELL - SMH-F3	Chloride for WELL SMH-F3	Monthly	Quarterly	31-OCT-2012

Limiting Condition No: 38 **Limiting Condition Code:** WUZZUD001-2

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	Large User Agreement with Hialeah	One time Only	One time Only	01-FEB-2013

Limiting Condition No: 40 **Limiting Condition Code:** WUZZUD001-4

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	AWS annual report	Yearly	Yearly	15-APR-2013

Exhibit No: 36M

Requirement by Limiting Condition Report

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
Limiting Condition No: 42	**Limiting Condition Code:** WUZZUD001-6			
PERMIT	Reuse Information Update	Yearly	Yearly	15-APR-2013
Limiting Condition No: 44	**Limiting Condition Code:** WUZZUD001-9			
PERMIT	Reuse Projects 5 & 6 Update	One time Only	One time Only	01-JUL-2013
Limiting Condition No: 45	**Limiting Condition Code:** WUZZUD004-1			
PERMIT	BBCW Reuse Project feasibility determination	One time Only	One time Only	15-JAN-2014
PERMIT	Alternate Reuse project proposal	One time Only	One time Only	15-DEC-2014
Limiting Condition No: 47	**Limiting Condition Code:** WUPWS004-1			
South Miami Heights	Raw Water Influent Report for South Miami Heights	Monthly	Quarterly	31-OCT-2012
Hialeah/Preston WTP	Raw Water Influent Report for Hialeah/Preston WTP	Monthly	Quarterly	31-OCT-2012
Alexander Orr WTP	Raw Water Influent Report for Alexander Orr WTP	Monthly	Quarterly	31-OCT-2012
Hialeah RO WTP	Raw Water Influent Report for Hialeah RO WTP	Monthly	Quarterly	31-OCT-2012
South Miami Heights	Treated Water Outflow Report for South Miami Heights	Monthly	Quarterly	31-OCT-2012
Hialeah/Preston WTP	Treated Water Outflow Report for Hialeah/Preston WTP	Monthly	Quarterly	31-OCT-2012
Alexander Orr WTP	Treated Water Outflow Report for Alexander Orr WTP	Monthly	Quarterly	31-OCT-2012
Hialeah RO WTP	Treated Water Outflow Report for Hialeah RO WTP	Monthly	Quarterly	31-OCT-2012
Limiting Condition No: 48	**Limiting Condition Code:** WUPWS006-1			
PERMIT	Water Conservation Plan annual report	Yearly	Yearly	15-APR-2013
Limiting Condition No: 49	**Limiting Condition Code:** WUZZUD004-3			
PERMIT	Unaccounted for Water Loss Plan update	Yearly	Yearly	15-APR-2013
PERMIT	Unaccounted for Water Loss Report for the four calendar quarters	Yearly	Yearly	15-APR-2013

Exhibit No: 36 N

STAFF REPORT DISTRIBUTION LIST

MIAMI-DADE CONSOLIDATED P W S

Application No: 110511-6

Permit No: 13-00017-W

INTERNAL DISTRIBUTION

X John A. Lockwood, P.G.
X R. Karafel
X WU Compliance - C. Thompson

EXTERNAL DISTRIBUTION

X Permittee - Miami-Dade Water And Sewer Department
X Agent - Miami-Dade Water And Sewer Department

GOVERNMENT AGENCIES

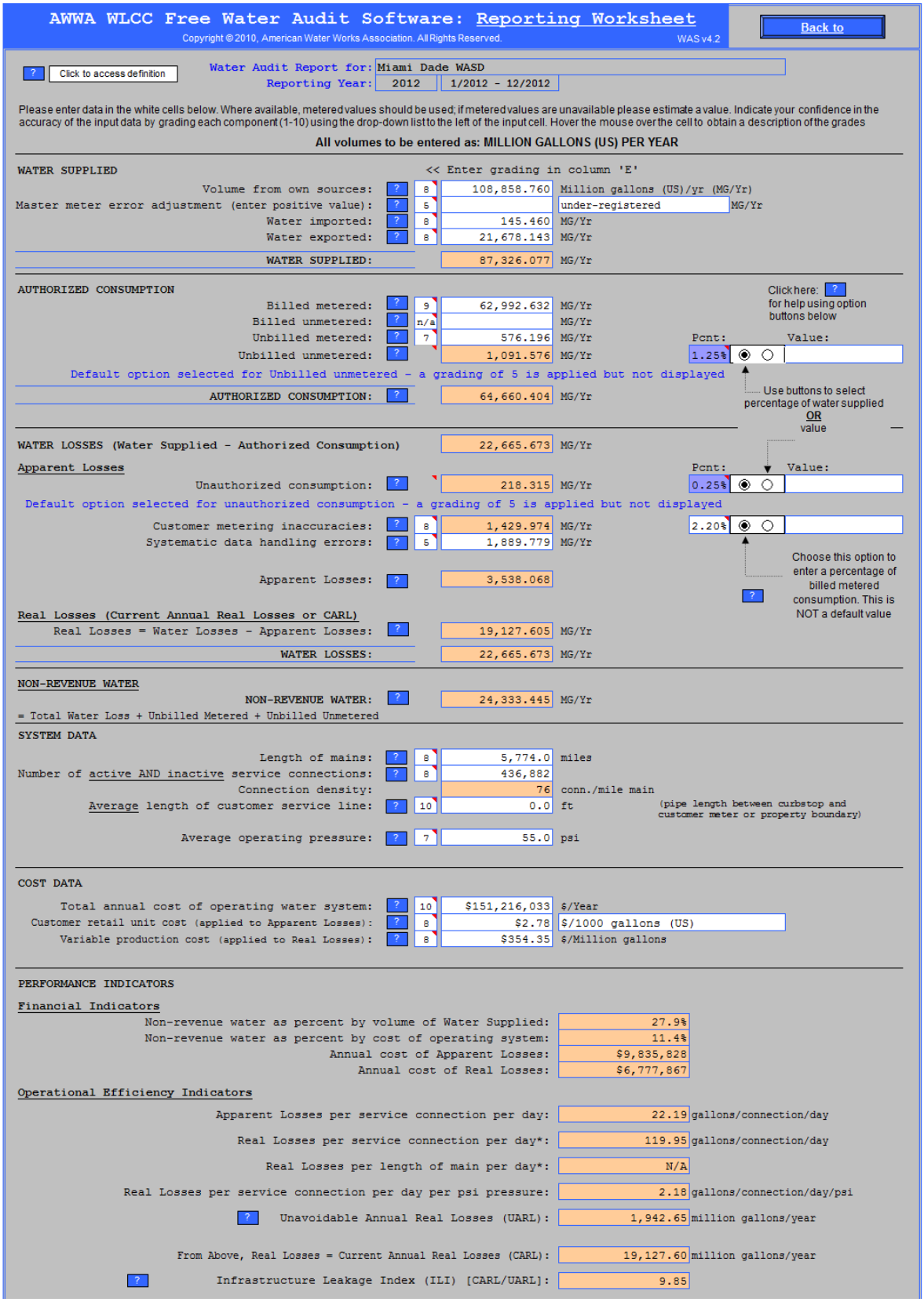
X Dept of Environmental Protection -West Palm Beach
X Miami-Dade County Engineer Public Works Department

OTHER INTERESTED PARTIES

X B.F. Sewell

Exhibit No:37

Appendix B—Water Audit Report



AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.2

Back to

Click to access definition

Water Audit Report for: Miami Dade WASD

Reporting Year: 2012 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED	<< Enter grading in column 'E'			
Volume from own sources:	8	108,858.760	Million gallons (US)/yr (MG/Yr)	
Master meter error adjustment (enter positive value):	5		under-registered	MG/Yr
Water imported:	8	145.460	MG/Yr	
Water exported:	8	21,678.143	MG/Yr	
WATER SUPPLIED:		87,326.077	MG/Yr	

AUTHORIZED CONSUMPTION				Pcnt:	Value:
Billed metered:	9	62,992.632	MG/Yr		
Billed unmetered:	n/a		MG/Yr		
Unbilled metered:	7	576.196	MG/Yr		
Unbilled unmetered:		1,091.576	MG/Yr	1.25%	
Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed					
AUTHORIZED CONSUMPTION:		64,660.404	MG/Yr		

Click here: for help using option buttons below

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)		22,665.673	MG/Yr		
Apparent Losses				Pcnt:	Value:
Unauthorized consumption:		218.315	MG/Yr	0.25%	
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed					
Customer metering inaccuracies:	8	1,429.974	MG/Yr	2.20%	
Systematic data handling errors:	5	1,889.779	MG/Yr		
Apparent Losses:		3,538.068			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)			
Real Losses = Water Losses - Apparent Losses:		19,127.605	MG/Yr
WATER LOSSES:		22,665.673	MG/Yr

NON-REVENUE WATER			
NON-REVENUE WATER:		24,333.445	MG/Yr
= Total Water Loss + Unbilled Metered + Unbilled Unmetered			

SYSTEM DATA				
Length of mains:	8	5,774.0	miles	
Number of active AND inactive service connections:	8	436,882		
Connection density:		76	conn./mile main	
Average length of customer service line:	10	0.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	7	55.0	psi	

COST DATA			
Total annual cost of operating water system:	10	$151,216,033	$/Year
Customer retail unit cost (applied to Apparent Losses):	8	$2.78	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	8	$354.35	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators		
Non-revenue water as percent by volume of Water Supplied:	27.9%	
Non-revenue water as percent by cost of operating system:	11.4%	
Annual cost of Apparent Losses:	$9,835,828	
Annual cost of Real Losses:	$6,777,867	

Operational Efficiency Indicators		
Apparent Losses per service connection per day:	22.19	gallons/connection/day
Real Losses per service connection per day*:	119.95	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	2.18	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	1,942.65	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	19,127.60	million gallons/year
Infrastructure Leakage Index (ILI) [CARL/UARL]:	9.85	

AWWA WLCC Free Water Audit Software: Water Balance

WAS v4.2

Water Audit Report For:	Report Yr:
Miami Dade WASD	2012

Own Sources (Adjusted for known errors) 108,858.760	Water Exported 21,678.143		Billed Water Exported		
		Authorized Consumption 64,660.404	Billed Authorized Consumption 62,992.632	Billed Metered Consumption (inc. water exported) 62,992.632	Revenue Water 62,992.632
				Billed Unmetered Consumption 0.000	
			Unbilled Authorized Consumption 1,667.772	Unbilled Metered Consumption 576.196	Non-Revenue Water (NRW) 24,333.445
				Unbilled Unmetered Consumption 1,091.576	
	Water Supplied 87,326.077	Water Losses 22,665.673	Apparent Losses 3,538.068	Unauthorized Consumption 218.315	
				Customer Metering Inaccuracies 1,429.974	
				Systematic Data Handling Errors 1,889.779	
Water Imported 145.460			Real Losses 19,127.605	Leakage on Transmission and/or Distribution Mains Not broken down	
				Leakage and Overflows at Utility's Storage Tanks Not broken down	
				Leakage on Service Connections Not broken down	

Appendix C—Implementation Plan

(Exhibit 17A and 17B from the Water Use Permit)

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
Real Water Loss Reduction Activities				
1	5.3.1	*System Design*	Completed	None

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
2	5.3.2.3	*Asset Maintenance or Replacement* DEPARTMENT initiated efforts to evaluate and improve the distribution pipe replacements.	In 2010, MDWASD performed an 'Economic Analyses of Leak Detection Program and Pipe Replacement' study, which evaluated historical trends to establish an adaptive strategy for pipe replacement and leak detection programs based on statistical analysis of leak incidences, investments, and economic levels of return. The study proposed a modified approach to align system betterment investments with economic impact assessment of leak incidences. MDWASD has updated distribution system data base with pipe age and pipe material to better correlate pipe breaks with pipe rehabilitation/replacement efforts. In 2010, MDWASD initiated the "Condition Assessment of Prestressed Concrete Cylinder Pipe (PCCP)" program which surveyed the major water transmission pipelines. As a result of the assessment, MDWASD developed a rehabilitation program using Carbon Fiber Reinforced Plastic (CFRP) system and over 40 miles of PCCP were inspected in 2011. In 2012 MDWASD continued the assessment of their PCCP pipes. A total of 19.88 miles was analyzed in 2012 In 2012 MDWASD also completed the “Infrastructure Assessment and Replacement Program for Water Mains 16-in and Larger” study. This study was conducted to assist MDWASD with development of a prioritization program for inspection and condition assessment of all pipelines. To-date, inspections have been focused on prestressed concrete cylinder pipe.	■ Implement the modified approach for leak detection and pipe replacement as recommended by the study. ■ While collecting leak detection data, record the information that integrates the interconnectivity of the system and the relation to other sets of data, such as underground pipe material, size, age, and environment (i.e. soil type, soil corrosivity, etc.) that can help document the basis for pipe failure/causes of leak. ■ Continue the PCCP rehabilitation program, as recommended in the assessment. ■ Monitor and review leaks and stressed pipes within the network. Validate the accuracy of the asset condition assessment through evaluation through field testing. ■ Follow up on the recommendations of this study in order to conduct pipeline condition assessment on those segments of the distribution system found critical.

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
3	5.3.2.4	*Reduce Maintenance Response Times* MDWASD initiated efforts to reduce the time it takes for its maintenance crews to respond to leaks and to improve the speed and quality of its repairs.	MDWASD has increased the sensitivity of its leak detection program by reducing the distance between noise loggers depending on the pipe material and pipeline diameter and reducing the length of main surveyed at one time by leak detection crews, thereby reducing leak duration by reducing the time between leak initiation and detection. MDWASD is also in the process of incorporating leak detection data into the Enterprise Asset Management System (EAMS) to keep track of leak response time and inventory repairs (i.e. new and repatches).	■ Perform a sample leak program, similar to that conducted in the Fall of 2008, every 2 years as a way to gauge the overall field effectiveness of the in-house program and provide oversight. ■ Evaluate awareness times in cases where known issues have run for extended periods of time (but were not associated to leakage until after a leak was found).
4	5.3.2.5	*Active Leakage Control and Sounding* MDWASD initiated an active leakage control and sounding program, including both unmanned (noise logger) and manned leak surveys.	MDWASD has increased the sensitivity of its leak detection program by reducing the distance between noise loggers and reducing the length of main surveyed at one time by leak detection crews, thereby reducing leak duration by reducing the time between leak initiation and detection. In 2010, MDWASD performed an 'Economic Analyses of Leak Detection Program and Pipe Replacement' study, which evaluated historical trends to establish an adaptive strategy for pipe replacement and leak detection programs based on statistical analysis of leak incidences, investments, and economic levels of return. The study proposed a modified approach to align system betterment investments with economic impact assessment of leak incidences. MDWASD is also in the process of incorporating leak detection data into the Enterprise Asset Management System (EAMS) to keep track of leak response time and inventory repairs (i.e. new and repatches).	■ Implement the modified approach for leak detection and pipe replacement as recommended by the study. ■ Update the distribution system data base with pipe age and pipe material to better correlate pipe breaks with pipe rehabilitation/replacement efforts ■ While collecting leak detection data, record the information that integrates the interconnectivity of the system and the relation to other sets of data, such as underground pipe material, size, age, and environment (i.e. soil type, soil corrosivity, etc.) that can help document the basis for pipe failure/causes of leak. ■ Evaluate leaks per mile of main for the total system and per sector to gain information on where real losses are.

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
5	5.3.2.7	*Pressure Management* As part of this, MDWASD plans to complete a Zone Management Pilot.	MDWASD is in the process of developing a pilot study for Pressure and Zone Management that will assess a strategy for timely reducing system-wide real water losses (and attendant non-revenue water) without compromising level of service.	■ Develop pilot study.
6	5.3.2.8	*Speed and Quality of Repairs* MDWASD initiated efforts to improve the speed and quality of its repairs.	In 2010, MDWASD performed an 'Economic Analyses of Leak Detection Program and Pipe Replacement' study, which evaluated historical trends to establish an adaptive strategy for pipe replacement and leak detection programs based on statistical analysis of leak incidences, investments, and economic levels of return. The study proposed a modified approach to align system betterment investments with economic impact assessment of leak incidences. The MDWASD has 10 crews dedicated to fix any leaks as soon as possible including night-shift teams.	■ Update the distribution system data base with pipe age and pipe material to better correlate pipe breaks with pipe rehabilitation/replacement efforts. ■ Create and monitor metrics for quality of fixtures (how often they break, etc.) and the time from awareness to repair.
10	-	*Enhance GIS Database* MDWASD is currently enhancing its GIS database.	MDWASD continues to enhance its GIS database to include more information on its distribution system features (pipe lengths, diameters, materials, age in service, etc.).	■ Plan integrated use of expanded capabilities in asset management program.

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
Apparent Water Loss Reduction Activities				
11	6.3.1	*Reducing Unmetered Supplies* MDWASD initiated efforts to reduce unmetered water supplies.	Fire-fighting and main flushing are the largest unmetered uses in MDWASD's system. Although not metered, main flushing volumes are estimated using industry accepted protocol and are consistently recorded. Usage by fire departments is currently neither estimated nor recorded. In 2010, Fire Departments that receive water from MDWASD were identified and contacted to request their cooperation in developing a methodology to better account for their water usage.	■ Conduct a meeting with the identified Fire Departments to evaluate their water usage. ■ Based on the feedback from the Fire Departments, develop a methodology for appropriately accounting for Fire Department water use.
14	6.3.2	*Improved (Retail) Meter Accuracy* MDWASD is conducting field accuracy testing of commercial meters to begin improving meter accuracy.	Some commercial meter sites have proved to be challenging to test, not because of the sites, but because of circumstances such as Jackson Hospital's inability to shut down an entire line for testing purposes. In 2010, a dedicated testing site was installed to test 4-inch meters. In 2012, two new technologies (ultra sound and electromagnetic meters) continue to be tested. In 2012 a residential meter testing program was initiated. More than 800 meters were tested in 2012.	■ Perform recurring testing of commercial meters to cover entire inventory over time. Determine testing frequency by meter size and configuration based on economical and statistical analyses of commercial meter samples. ■ Install test taps at locations that have been evaluated and inspected where displacement meters and turbine meters were being used in a compound setting. ■ Install new type electromagnetic meters for better accuracy and less maintenance. ■ Monitor and analyze data to direct replacement and maintenance improvements

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
15	6.3.3.2.1	*Compound Meter Usage Compared to Same Size Turbine Meters* MDWASD initiated efforts to compare compound meter usage to similarly-sized turbine meter settings.	MDWASD has obtained a few new style "Omni" meters from Sensus for evaluation that acts as compound meters. These meters were installed by MDWASD at various sites and passed the evaluation process with satisfactory results regarding measurement of ultra low flows with a full range of high flows. The “Omni” meters have now become standard for MDWASD.	■ Continue to document the initial evaluation of "Omni" meters. ■ Develop a data base with testing data results. ■ Continue replacing the obsolete turbine meters with "Omni" or other reliable meters currently under evaluation by MDWASD. ■ Test the turbine meters to determine the meter accuracy and to rank replacements
16	6.3.3.3	*Looking Forward (Setting Economic Meter Testing Goal)*	Completed	■ None
17	6.3.4	*Improved Calibration of Wholesale Customer Meters* MDWASD is currently performing comparative accuracy testing on its wholesale customer venturi, turbine, and positive displacement meters.	MDWASD performs testing of the wholesale turbine meters twice a year Venturi Meter Sites: In 2010, steps were taken to connect these meters to SCADA. However, the meter readings are unavailable. Test tap installations that are required for accuracy testing are pending. Turbine Meter Sites: These meters were all connected to the AMR system.	■ Plan Capital Improvement Program required for testing inaccessible meters. ■ Continue to conduct semi-annual testing of wholesale meters

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
18	6.3.5	*Wholesale Customer Unmetered Connection Analysis* MDWASD initiated unmetered wholesale customer connection survey and analysis.	In 2009, MDWASD found a wholesale meter by-pass that was open allowing unmetered water delivery to the wholesale customer. All by-pass meters have now been locked and evaluation of metering or connection to SCADA will be undertaken in 2011.	■ Complete the evaluation of metering and connection to SCADA of the wholesale meters ■ Continue to monitor all bypasses to make sure that no unmetered wholesale use is occurring. ■ Consider installing bypass meters on any unmetered line

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
7	-	*Perform Venturi Comparative Tests - WTPs* MDWASD is currently performing comparative accuracy testing on the combined raw and finished water meters at its water treatment plants.	Testing was conducted at the Alexander Orr Plant for four raw water Venturi Meters and five finished water meters.. Testing for the raw and finished Venturi water meters at the Preston and Hialeah plants cannot be performed until test taps are installed. Unable to install test taps needed to validate the level of metering accuracy at the Preston/Hialeah plants due to configuration issues. In 2012 MDWASD; ■ Contracted with GE Measurement and Control to conduct flow diagnostics of all the magnetic flow meters currently installed at all the supply wells in the system. The test results presented in the June 3, 2012 report titled "Well Water Flow Meter Verification Report" showed that all the meters are within the manufacturer's normal operating range and are registering flows accurately ■ In 2012 the Department also conducted their biannual calibration of the flow transmitters at all the raw and finished water venturi meters in the three plants. Calibration reports indicated that all transmitters "passed" the calibration tests in both the "as found" and "as left" condition.	■ Continue to flow test and calibrate meters on an annual basis ■ Identify any capital projects that may be required to support meter testing.

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
8	-	*Perform Comparative Tests - Wholesale Customers* MDWASD continues to perform comparative accuracy testing on its wholesale customer venturi, turbine, and positive displacement meters.	Venturi Meter Sites: In 2010, steps were taken to connect these meters to SCADA. However, the meter readings are unavailable. Test tap installations that are required for accuracy testing are pending. Turbine Meter Sites: In 2010, these meters were all connected to the AMR system. Evaluation of other wholesale meters is pending upon installation of additional test taps.	■ Continue to plan Capital Improvement Programs required for testing and monitoring of inaccessible meters.
9	-	*Pilot Fixed Network AMR* MDWASD is currently expanding the AMR network.	In 2010, MDWASD initiated the expansion of the AMI network with the installation of additional AMI meters from Sensus Metering Systems, Inc. To date, a total of 820 AMI meters in the MDWASD service area and 4,000+ AMR meters in the Miami Springs service area have been installed. Currently, MDWASD is working on a joint AMI project with the Parks department. The AMR/AMI pilot program is being extended into the Miami Springs service area and will add 4,300 meters to the AMI system.	■ Continue to expand AMR/AMI network in the MDWASD service area.

LINE ITEM	ACTIVITY NO.	ACTION ITEM	STATUS	RECOMMENDED FOLLOW-UP ACTIVITIES
19	-	*Determine economic optimum for residential meter replacement:* This item requires that MDWASD characterize residential water demand patterns and determine economic optimum for residential meter replacement.	"Meter Master" loggers have been deployed to characterize residential demand since October 2008 and have been rotated through a representative set of meters on a weekly basis. Residential demand data, along with age and meter testing data, will be used to establish an economic optimum for meter replacement. Data collection has been completed. Sensus SR model meter is an old meter design that comprises most of the MDWASD's meter inventory. In 2010, MDWASD investigated different meter models and is considering new meters such as Sensus “iPERL”. In 2011, MDWASD started the implementation of 4,000+ "iPERL" meters which have integral data logging. In 2012 a residential meter testing program was initiated. More than 800 meters were tested in 2012.	■ Continue logging data from new-model meters installed in the system to update the assessment of the economic optimum replacement. ■ Continue the replacement of residential meters with the new "iPERL" meters with integral data logging. ■ Conduct residential demand pattern analysis with new standard meters which can better measure low flows.