Miami-Dade Water and Sewer Department

Ocean Outfall Legislation

Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls
[Section 403.086 (9), Florida Statutes
and Amendment CS/SB 444]

Compliance Plan

June 28, 2013

Miami-Dade
Water and Sewer Department
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Abbreviations

AADF	Annual Average Daily Flow
AWS	Alternative Water Supply
AWT	Advanced Wastewater Treatment
BCC	Board of County Commissioners
CBMYCP	Capital Budget Multi-Year Capital Plan
CDWWTP	Central District Wastewater Treatment Plant
CERP	Comprehensive Everglades Restoration Plan
EPA	Environmental Protection Agency
FA	Floridan Aquifer
FDEP	Florida Department of Environmental Protection
FPL	Florida Power & Light Company
GIS	Geographical Information System
IMP	Integrated Master Plan
MIA	Miami International Airport
Gpd	gallons/day
HLD	High Level Disinfection
LEC	Lower East Coast
mgd	million gallons/day
MBR	membrane bioreactor
MDWASD	Miami-Dade Water and Sewer Department
MF	microfiltration
NOAA	National Oceanic and Atmospheric Administration
NDWWTP	North District Wastewater Treatment Plant
OOL	Ocean Outfall Legislation
RDII	Rainfall Dependent Infiltration/Inflow
RO	Reverse Osmosis
SCADA	Supervisory Control and Data Acquisition
SDWWTP	South District Wastewater Treatment Plant
SFWMD	South Florida Water Management District
SLR	Sea Level Rise
TP	Total Phosphorus
TN	Total Nitrogen
TAZ	Traffic Analysis Zone
UV	Ultraviolet disinfection
WDWWTP	West District Wastewater Treatment Plant
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1.0 Executive Summary

In 2008, the Florida Legislature approved and the Governor signed a law requiring all wastewater utilities in southeast Florida utilizing ocean outfalls for disposal of treated wastewater to reduce nutrient discharges by 2018, cease using the outfalls by 2025, and reuse 60% of the wastewater flows by 2025. The statute was amended in 2013 to provide greater flexibility to meet the reuse requirements and to allow continued use of the outfalls for managing peak sewage flows not to exceed 5% of the annual baseline flows. The statute requires the affected utilities to submit a preliminary compliance plan by July 1, 2013.

The Miami-Dade County Water and Sewer Department (MDWASD) has analyzed several compliance options. Each option includes additional system capacity to meet average daily and peak flow demands anticipated in 2035. Each option includes additional treatment that is required to achieve reuse standards or disposal standards through deep injection wells to the "Boulder Zone" of the lower Floridan Aquifer. One option is to retrofit and expand the existing three treatment plants in their present locations. Two other sets of options involve constructing a new treatment plant in the western part of the County, thereby reducing flows to the North and Central District plants. These options differ in terms of how much of the peak flows are directed to the coastal plants and how the peak flows are treated. The capital cost estimate for using only the existing plants is about $4.4 billion. The other options range in cost from $5.0 billion to $6.5 billion. A preliminary analysis of completely closing the Central District (Virginia Key) plant and moving all of that treatment capacity to a new West District plant revealed a cost in excess of $7.6 billion. The recommended alternative includes a new West District plant with an average daily flow of 102 million gallons per day (MGD), reduced daily flows to North District of 85 MGD and to Central District of 83 MGD, and flows to South District of 131 MGD. The estimated cost of system-wide wastewater facilities upgrades for this alternative is $5.2 billion of which $3.32 billion is directly attributed to Ocean Outfall Legislation compliance. This approach recognizes site constraints at the North District plant location, reduces storm surge risks by moving substantial treatment capacity to the west where storm surges are not an issue while avoiding premature investment in completely replacing treatment capacity at coastal facilities that may not be required in the long term, places treatment closer to locations of flow origin to reduce pumping requirements, and utilizes the ocean outfalls for more cost-effective peak flow management. The law now allows up to 5% diversion of flows to the outfalls for peak

flow management, but this plan only requires 0.4% of flows on an annual basis to be discharged after treatment through the outfalls.
Reduction of nutrient discharges is accomplished by continued use of four deep injection wells at the North District plant, thereby diverting flows from the outfall, and the construction of an industrial injection well at the Central District plant for disposal of nutrient-rich water (centrate) coming from the centrifuge process used to remove water from the sludge. This combination of nutrient diversion will meet the nutrient reduction requirements with the industrial well in service by 2016.

The statute requires reuse of 117.5 million gallons of treated wastewater per day, by far the largest volume of reuse of any utility in Florida. This will be accomplished through a contract with Florida Power and Light to provide up to 90 MGD of reuse water for cooling purposes at their Turkey Point facilities. An additional 27.5 MGD of reuse water will be used to replenish the Floridan aquifer at the Central, South, and West District plants. None of this reuse is needed to meet drinking water supply needs until at least 2035 according to current demand forecasts made by WASD and the South Florida Water Management District, so there is no direct or immediate water supply benefit that will occur. Pursuant to the amended statute, the affected utilities will review the proposed reuse plans with the Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District (SFWMD), and FDEP will provide a report to the Legislature by 2015 recommending any adjustments to the reuse requirements based upon that review. This draft plan was presented to the community at an advertised meeting on June 5, 2013. The recommended compliance option is technically feasible, but very expensive (as are all of the options) in terms of the required treatment and collection system changes. Detailed design and construction is likely to require an 8 to 10 year time period. While provisions were made in the outfall statute to give priority to outfall projects for state project funding, state appropriations to fund water projects have not yet materialized, and the mandate remains unfunded at the state level. Revenue bonds will necessarily be the major funding source for these improvements in the absence of state and federal assistance. A more detailed financial plan will be prepared as part of the Consent Decree requirement for a financial plan as well as the Department's regular updates of the Multi-Year Capital Improvements Plan.

This preliminary plan will be reviewed by the FDEP to determine compliance with the requirements of the statute. An update of the plan is due to FDEP no later than July 1, 2016. A more detailed implementation plan will need to be in place by that time, including actual construction of some plan components, to assure that the 2025 deadline is met.

2.0 Introduction

2.1 Ocean Outfall Legislation

On June 30, 2008, Governor Charlie Crist signed Senate Bill 1302 related to wastewater disposal/ocean outfalls (Section 403.086(9)). Subsequently, on June 24, 2013, present Governor Rick Scott signed a revision to the Ocean Outfall Legislation. Main requirements of the bill, described herein as OOL, as amended follow below. Parameters as described relating to compliance with the OOL for the Miami-Dade Water and Sewer Department (MDWASD) are tabulated in the next section. A copy of the OOL and Amendment are included as Appendices A and B, respectively. Requirements are:

- The elimination of ocean outfalls that are being used for treated wastewater disposal as a primary means of domestic wastewater discharge by December 31, 2025 with the following exceptions:

    - Outfalls serving as a backup to a functioning reuse systems
    - Peak flows may not cumulatively exceed 5 percent a facility's baseline flow, measured on a five year rolling average and are subject to applicable secondary waste treatment and water quality-based effluent limitations specified in department rules. Baseline flow is defined as "the annual average flow of domestic wastewater discharging through the facility's ocean outfall, as determined by the department, using monitoring data available for calendar years 2003 through 2007."

- A functioning reuse system that reuses a minimum of 60 percent of the facility's baseline flow on an annual basis must be installed no later than December 31, 2025 at each domestic wastewater facility that discharges through an ocean outfall. Provision is included for utilities with multiple outfalls (such as MDWASD which operates two) that the 60 percent reuse requirement is applicable to the combined flow of the facilities. The MDWASD outfalls are located at the North and Central District Wastewater Treatment Plants (NDWWTP and CDWWTP). MDWASD wastewater facilities are shown on Figure 1.

All regular domestic wastewater discharged through ocean outfalls must either meet advanced wastewater treatment (AWT) and management by December 31, 2018, or an equivalent reduction in the cumulative outfall loadings of total nitrogen (TN) and total phosphorus (TP), between December 31, 2008 and December 31, 2025 which would be

achieved if the AWT were fully implemented beginning December 31, 2018 and continued through December 31, 2025.

- Submission of a Plan to the Florida Department of Environmental Protection (FDEP) by July 1, 2013, describing how the outfalls will be eliminated from regular use for wastewater disposal. This Compliance Plan is intended to meet this requirement. The Plan must include:

    - Technical, environmental, and economic feasibility of reuse
    - Land acquisition
    - Facilities necessary and costs to meet treatment requirements
    - Cost comparison
    - Financing plan
    - Schedules

- By July 1, 2016 submission of a plan update with refinements in costs, actions, and financing.

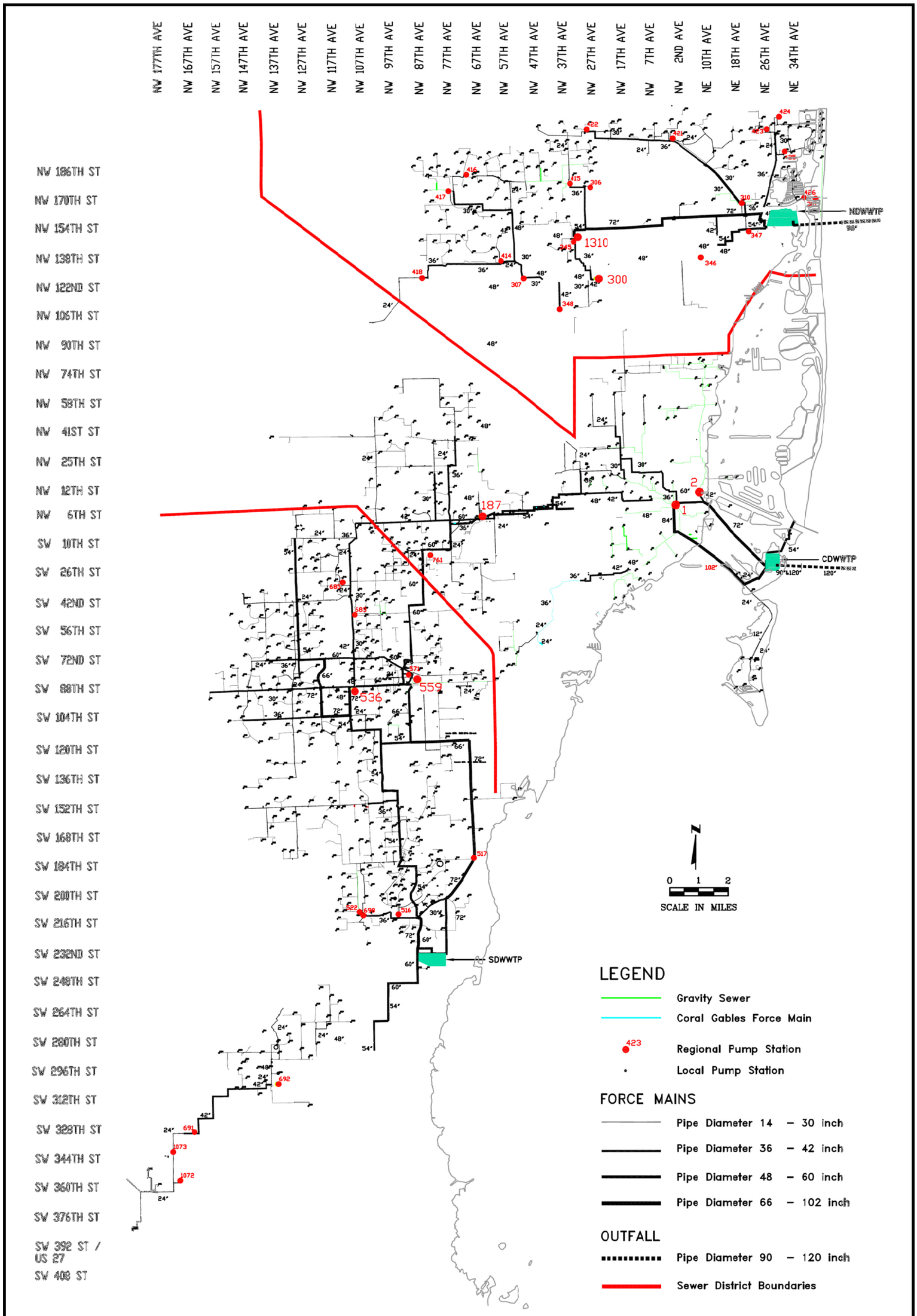
2.2 Miami-Dade Water and Sewer Department (MDWASD) Requirements

Discharges through the existing Ocean Outfalls at the North and Central District plants for the calendar years 2003 through 2007 (baseline flows) and reuse requirements are summarized on Table 1.

Table 1
NDWWTP and CDWWTP Ocean Outfall Flows, Mgd
Calendar Years 2003 through 2007

	NDWWTP	CDWWTP	Total
2003	81.1	114.8	195.9
2004	73.8	113.1	186.9
2005	78.6	122.2	200.8
2006	78.5	109.3	187.8
2007	90.4	114.8	205.2
Average	81.0	114.8	195.8
Reuse Requirement, 60%	48.6	68.9	117.5*

*Reuse at any location within the MDWASD system to meet 117.5 mgd is acceptable.



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	MDWASD Wastewater Facilities	Figure 1

- Note that MDWASD has entered into an Agreement with Florida Power & Light Company (FPL) to provide 90 mgd of reclaimed water to existing unit 5 and proposed units 6 and 7 at the FPL Turkey Point power generating complex. A copy of the Joint Participation Agreement for this in included as Appendix C. The 2013 OOL Amendment allows for the establishment of the required reuse "within the utility's service area" so that based on crediting the 90 mgd reuse for FPL against the 117.5 mgd requirement, an additional 27.5 mgd of reuse is required.

2.3 Plan Development Approach

Due to the extensive nature of the modifications necessary to comply with the OOL, the analysis conducted for this Plan is in the form of a formal facilities master plan which includes the following elements:

- Selection of Planning Horizon (Year 2035)
- Flow Projections
- Alternatives Development and Evaluation
- Plan Selection
- Implementation Plan, including Scheduling
- Financing Plan

The original approach was to develop the OOL Compliance Plan as part of an Integrated Water, Wastewater, Reclaimed Water Master Plan. With recent population projections, issued by the Miami-Dade County Regulatory and Economic Resources Department (RER), Office of Sustainability, Planning and Economic Enhancement (SPEE), derived from the 2010 census, the 2035 projected county population has been reduced from 3,365,791 to 3,172,406. This represents a 5.7% decrease. With this reduction, it is anticipated that water supply projects in addition to those already planned will not be needed over the period through the year 2035. Figures regarding this follow a later section.

Based on the above, it was determined that the reuse component of the Compliance Plan will not provide future water supply and that the integrated approach is not necessary. The Integrated Master Plan (IMP) will proceed, however, in order to have respective water and wastewater planning fully coordinated; based on the updated population projections for both the water and wastewater systems with completion anticipated in mid-2014.

3.0 EPA Consent Decrees

On January 13, 1994 and September 11, 1995 respectively, the First Partial and Second/Final Partial Consent Decrees were entered into with the EPA. MDWASD has complied with all of the provisions of these Consent Decrees.

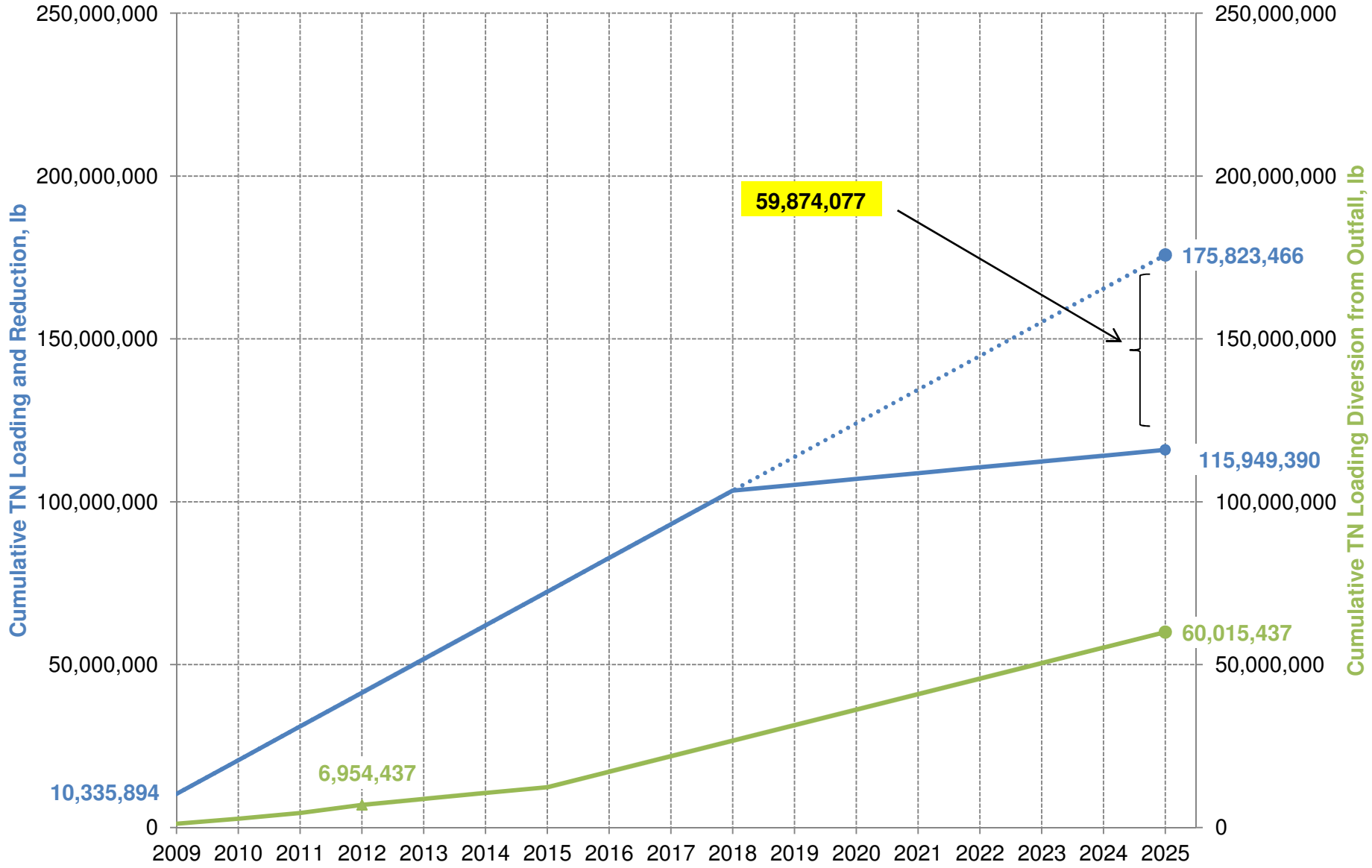
Subsequently, the peak flow criteria prescribed in SFPCD, paragraph 17, were implemented and used to derive peak flow projections for the analyses of the collection and transmission system alternatives including hydraulics computerized modeling to evaluate the ability of each pump station to manage peak flows, identify peak design flow rates for each pump station, and identify pump stations that fail to meet the criteria and propose improvements.

At the end of 2011, EPA and WASD entered into discussions regarding the closing of the remaining items in the original Consent Decrees and replacing them with a new Consent Decree which would emphasize the rehabilitation of the existing system. This Consent Decree was approved by the Miami-Dade Board of County Commissioners on May 21, 2013 and lodged on June 6, 1013. Rehabilitation projects with a total project cost of $1,550,634,370 are part of the obligations under the new Consent Decree. A table from the Consent Decree which enumerates the required projects is included as Appendix D. These projects are separate from those which are required for compliance with the OOL as described in Section 8 of this Compliance Plan.

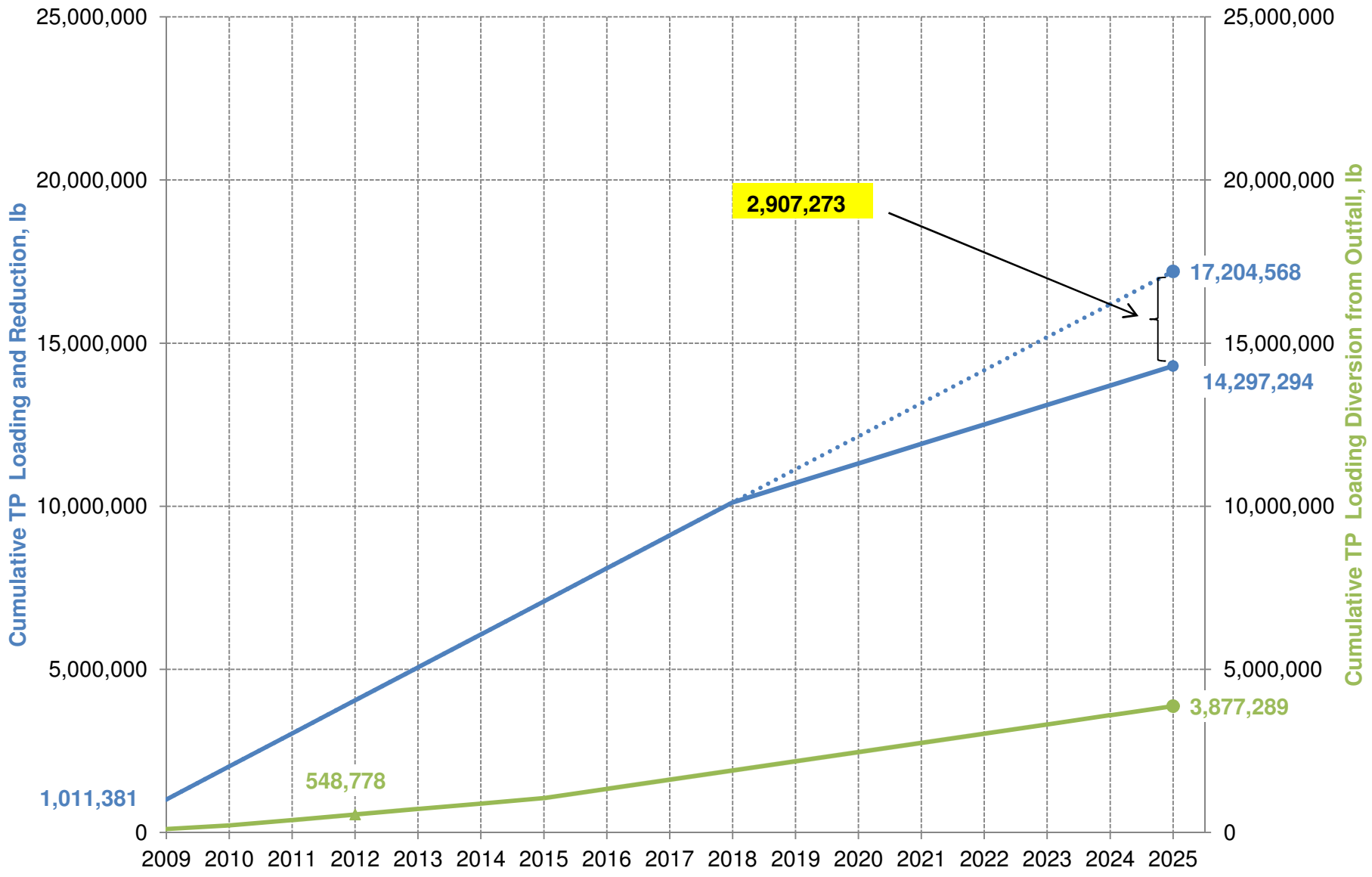
4.0 Nutrient Reduction Plan

As described above, the OOL requires that all regular domestic wastewater discharged through ocean outfalls must either meet advanced wastewater treatment (AWT) and management by December 31, 2018, or an equivalent reduction in the cumulative outfall loadings of total nitrogen and total phosphorus, between December 31, 2008, and December 31, 2025 which would be achieved if the AWT had been implemented by December 31, 2018. MDWASD has opted to meet this requirement by the second of the two possible methods allowed achieving the equivalent reduction of nutrient loading to the outfall.

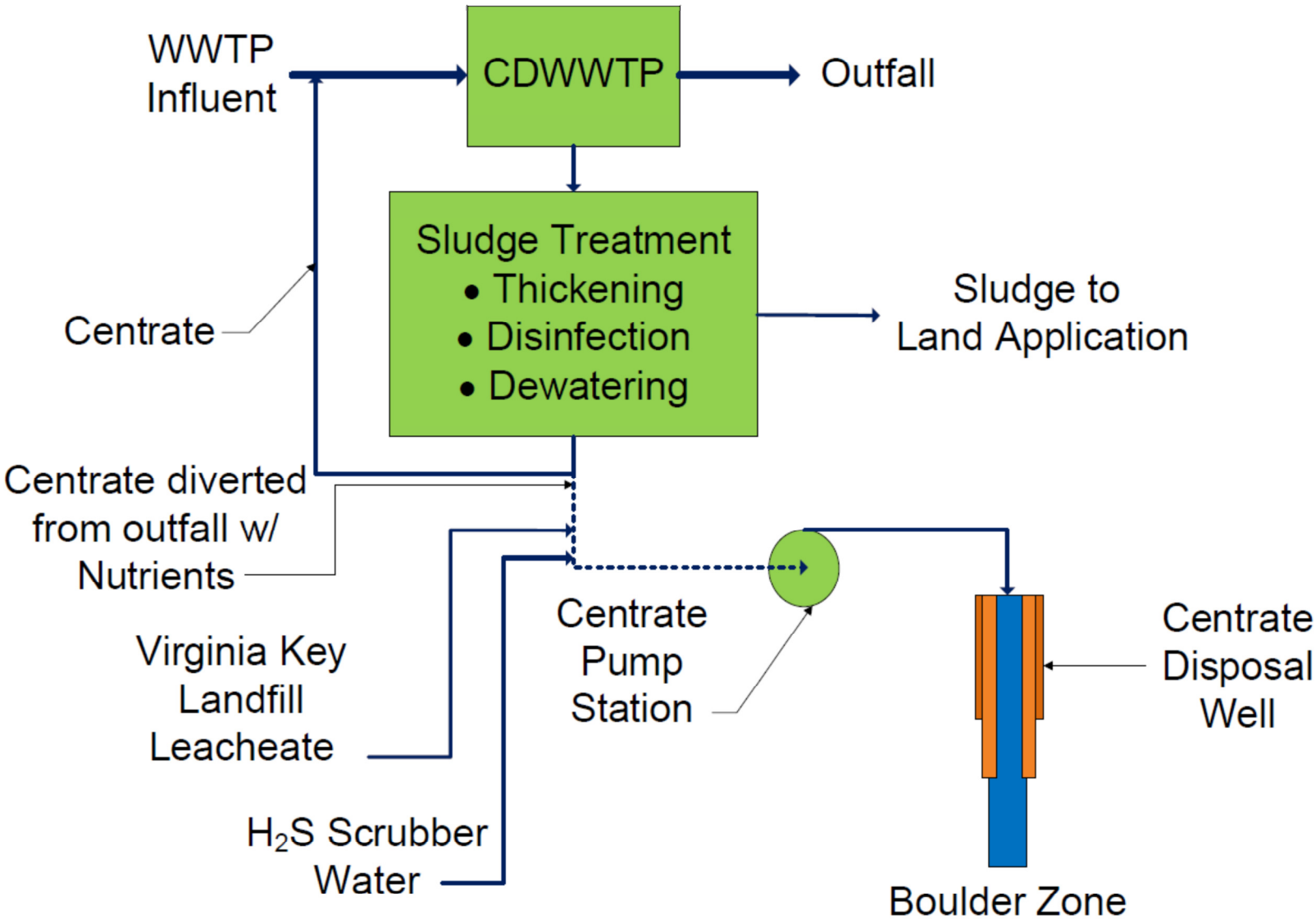
As shown on Figure 2, with the installation of the AWT on December 31, 2018, a total of 59,874,077 lbs of Total Nitrogen would have been diverted from the two MDWASD outfalls from that date until the required December 31, 2025 closing of the outfalls. The analogous information for the required phosphorus reduction is included on Figure 3.



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Nutrient Removal Plan – Total Nitrogen	Figure 2



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Nutrient Removal Plan – Total Phosphorus	Figure 3



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Centrate Disposal System Schematic	Figure 4

The total mass diversion from the outfalls for Total Phosphorus is as shown is 1,661,217 lbs. To obtain the equivalent nutrient diversion, MDWASD will:

- Maximize use of the existing Deep Injection Well system at the NDWWTP. As of December 2012, there have been 6,954,437 lbs of TN and 548,777 lbs of TP diverted from the outfall.

- Construct a disposal system at the CDWWTP for sludge dewatering centrifuge centrate. Disposal will be via a deep injection well and pumping station. Centrate will be combined with leachate from the adjacent landfill owned by the City of Miami and hydrogen sulfide scrubber water from the CDWWTP. Injection of the leachate requires construction of a Class I Industrial type well which does not require the installation of High Level Disinfection treatment upstream. The centrate disposal well and pump station system is scheduled to be in service by January 1, 2016. A schematic of system is shown on Figure 4. The pumping station and disposal well projects are incorporated in the overall project schedule on Figure 26-3 included Section 8.0 below.

5.0 Flow Projections

5.1 Population Projections

The wastewater flow projections as described below are based on the Miami-Dade County Regulatory and Economic Resources Department (RER) Planning Division population projections of 3,365,791 for the year 2035. In February 2013, an updated figure of 3,307,600 for the year 2040 based on the 2010 census was issued by RER Planning Division. Using a straight-line proportion, this corresponds to a 3,172,406 population for the year 2035, a 5.7% decrease. Figures for employment which, as described in the next section were used in forecasting wastewater flows, have not been issued to date. Accordingly the previous value is used in the wastewater flow projections. It is intended to revise the wastewater flow projections for use in the IMP, when the updated employment figures are issued.

5.2 Wastewater

Annual average daily wastewater flows (AADF) were projected for all existing MDWASD pump stations based on the following:

- Miami-Dade County RER Planning Division population and employment projections for year 2035. Projections are distributed spatially around the county by Traffic Analysis Zones (TAZs).
- MDWASD pump station service areas (basins).
- Dry weather flows at existing stations with the use computations using Supervisory Control and Data Acquisition (SCADA) historical influent flow.
- Estimates of population served in each pump station basin using septic tank installation data distributed spatially in Geographic Information System (GIS).
- Estimates of Infiltration/Inflow (I/I) for each pump station basin using 24-hour hydrographs developed from SCADA.
- Estimates of residential and non-residential flow using sewer billing information.
- Relationship between dry weather flows and AADF.

The MDWASD Geographic Information System (GIS) was instrumental in a number of these steps in the development of the flow projections.
The following factors were incorporated into the projections:

- The effect of MDWASD water conservation programs (reduced discharges to wastewater systems).
- Anticipated improvements in sewer design for future systems resulting in lower I/I for new flows.

Flows from presently undeveloped areas were estimated using existing per capita wastewater generation figures and population projections.

Based on the AADF flow projections and the observed system performance during a two-year recurrence rain event from September 28th through September 30th, 2010; for each existing and future pump station, a projected 72-hour hydrograph was developed for each basin for the year 2035. This was accomplished with the following steps:

- Existing station with wet weather hydrograph:
  - Subtracting the dry weather flow hydrograph from the total flow hydrograph to obtain a 72-hour hydrograph of the station rainfall dependent infiltration/inflow (RDII).
  - In order to approximate the worst case with respect to the 2-year storm timing within the diurnal pattern, shifting the RDII hydrograph to the time when the peak flow occurred at the wastewater treatment plants (WWTPs).
  - Adding the RDII hydrograph to the projected dry weather hydrograph.

- Existing stations without a wet weather hydrograph and future stations:

- Grouping existing stations into categories based on flow ranges and averaging flows for each hour over the 72-hour period.

- Unitizing the average wet weather hydrograph for each flow range (dividing by the average flow) and then multiply the projected average dry weather flow for each station to obtain the projected wet weather hydrograph.

With these procedures, a 72-hour wet weather hydrograph was generated for each existing and future station for the year 2035 for input into the hydraulic model. Flows from the MDWASD volume customers were developed using the same methodology described for the MDWASD pump stations using billing history as the starting point. All of the hydrographs were added together on an hour-by-hour basis in order to evaluate the effect on plant flows. The summed hydrograph resulted in a peak hour/AADF ratio of 3.38. A factor of 3.0 was used for the projections to allow for dampening of peak flows occurring on peak events to reflect storage in individual collection systems and major gravity interceptors. This factor will be further evaluated with additional hydraulic modeling which will be undertaken as part of the IMP.

Design capacities for the WWTPs and transmission system have been set so that there is a surplus of capacity at the end of the planning period. This surplus allows for the timely completion of new facilities needed based on the historical design flow increases. Based on these methodologies, the projected system-wide wastewater flows and system capacities for the year 2035 were developed and are shown in Table 2.

Table 2
Projected System-Wide Wastewater Flows
and Design Capacities, Mgd

	Projected Flow	Design Capacity
Annual Average Daily Flow	358	401
Peak Hour Flow	1,077	1,180

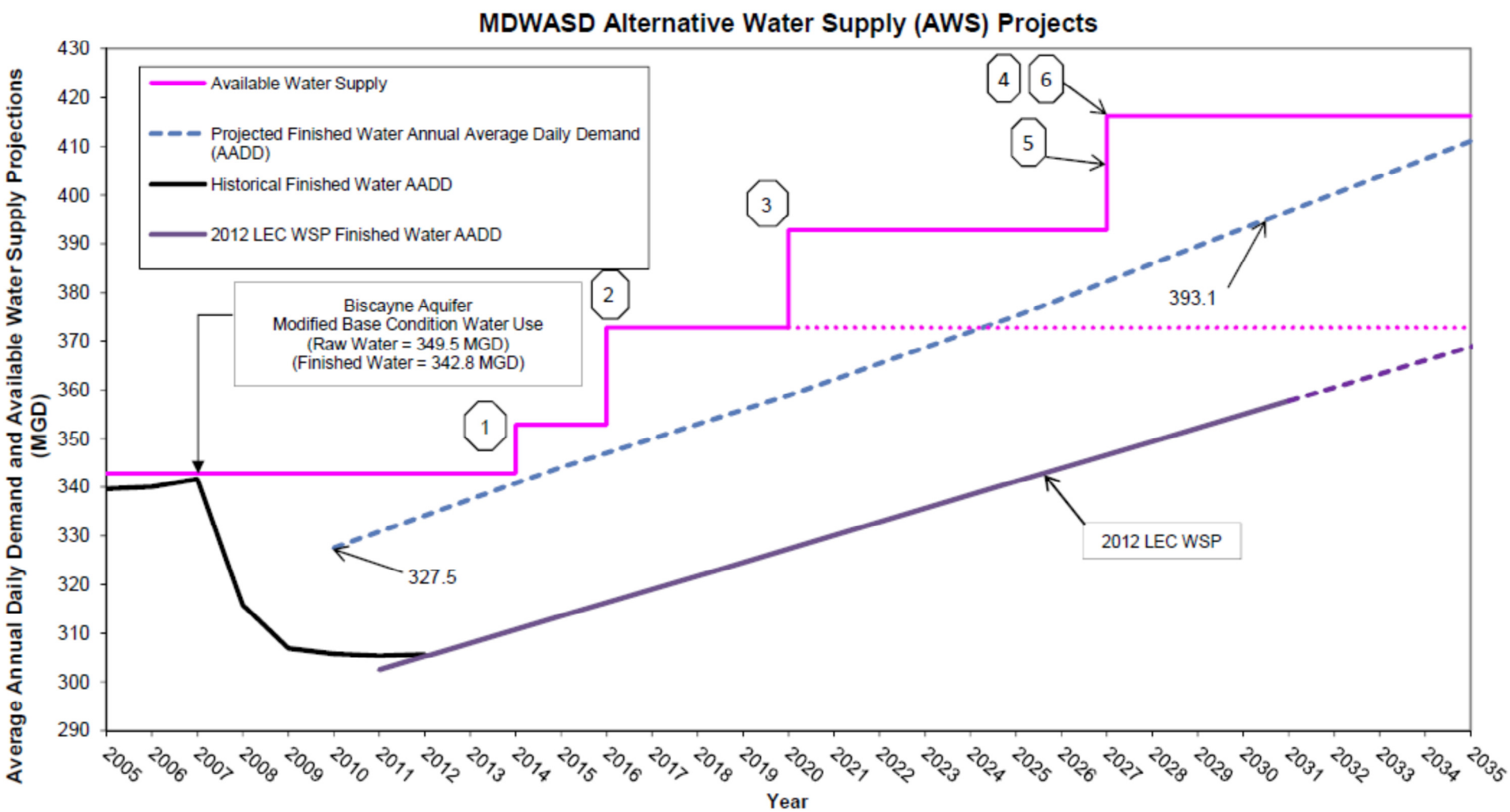
The distribution of these flows to the existing and proposed WWTPs is determined with the use of the MDWASD hydraulic computer model. Flows for each of the MDWASD existing and proposed pump stations, as well as from the MDWASD volume customers generated by the procedures described above are summarized in the table included as Appendix E.

5.3 Water

The current Lower East Coast Water Supply Plan flow projection for Miami-Dade County for the year 2030 is 356 mgd. Projected to the year 2035, the planning horizon of this Plan, this figure becomes 371 mgd. The present 20-year Water Use Permit from the SFWMD includes water supply projects as follows:

Hialeah RO WTP	10 mgd
South Miami Heights WTP	20 mgd

As shown on Figure 5, with the completion of these projects and the 371 mgd flow projection for the year 2035, no additional water supply projects are needed to meet projected demands prior to year 2035. As a result, no reclaimed water projects necessary to meet water supply needs.



AWS Projects:
1. Hialeah Floridan Aquifer R.O. W.T.P. Phase 1 (Capacity 10.0 MGD, Operational 12/31/13)
2. South Miami Heights Biscayne/Floridan Aquifer R.O. W.T.P. (Capacity 20 MGD)
3. West District W.R.P. Canal Recharge Ph 1 (21 MGD)
4. Hialeah Floridan Aquifer R.O. W.T.P. Phase 2 (5.0 MGD)
5. West District W.R.P. Canal Recharge Ph 2 (16 MGD)
6. Hialeah Floridan Aquifer R.O. W.T.P. Phase 3 (2.5 MGD)

MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	MDWASD Alternative Water Supply (AWS) Projects	Figure 5

6.0 Sea Level Rise (SLR), Storm Surge

Cost-effective compliance with the OOL requires consideration of the construction of facilities at the existing MDWASD WWTPs in the east in the vicinities of the Intracoastal Waterway, Atlantic Ocean, and Biscayne Bay. In developing these alternatives, MDWASD considered the potential effects of sea level rise and storm surge at these sites to ensure investments in any new facilities at those locations would be of value in the long term.

In this effort, MDWASD reviewed available information regarding these impacts and retained a consultant to evaluate their effects at the existing WWTP sites.

Miami-Dade County and three other counties in the region (Monroe, Broward, and Palm Beach) have entered into a Compact to address climate change at the regional level. The Compact has developed a Regional Climate Action Plan, which was completed in October 2012. The Compact recognized how critical it was for the region to be planning with the same sea level rise projections. As a result, they developed the Unified Sea Level Rise Projection, which is shown in Figure 6 below. These projections are based on the historical water levels from Key West and the projections from United States Army Corps of Engineers (USACE) 2009 Sea-Level Change Considerations for Civil Works Programs (Circular 1165-2-211); which is modified from a National Research Council (NRC) Report, referred to as the NRC curves. The Unified Projection anticipates a sea level rise of 9-24 inches by the year 2060. The USACE modified High NRC III projection predicts a sea level rise of about 3 ft by 2075. On April 2, 2013, the Miami-Dade County Board of County Commissioners accepted the Southeast Florida Regional Climate Action Plan.

On the basis that facilities would need to be completed by the year 2025 to meet the OOL requirements and the useful life of wastewater treatment plant facilities is 50 years (Source: USEPA Publication, “The Clean Water and Drinking Water Infrastructure Gap Analysis”), 2075 has been set as the year when treatment near the coast must remain viable in consideration of the threats from SLR and storm surge.

As the first step, to determine levels of inundation near the coast at the three MDWASD treatment plant site due to sea level rise, the National Oceanic and Atmospheric Administration (NOAA) Sea Level Rise Viewer was used. Information received is shown for high range ends of 2 feet (2060) and 3 feet (2078) for the three plants on Figures 7 through 12. These figures show the plants to be at a sufficiently high elevation to avoid inundation at the 2 and 3 feet SLR levels, assuming that ground water rises directly to sea

level. Note that 3 FT. SLR has been included in the evaluation of existing outfalls in the alternatives analyses which follow.

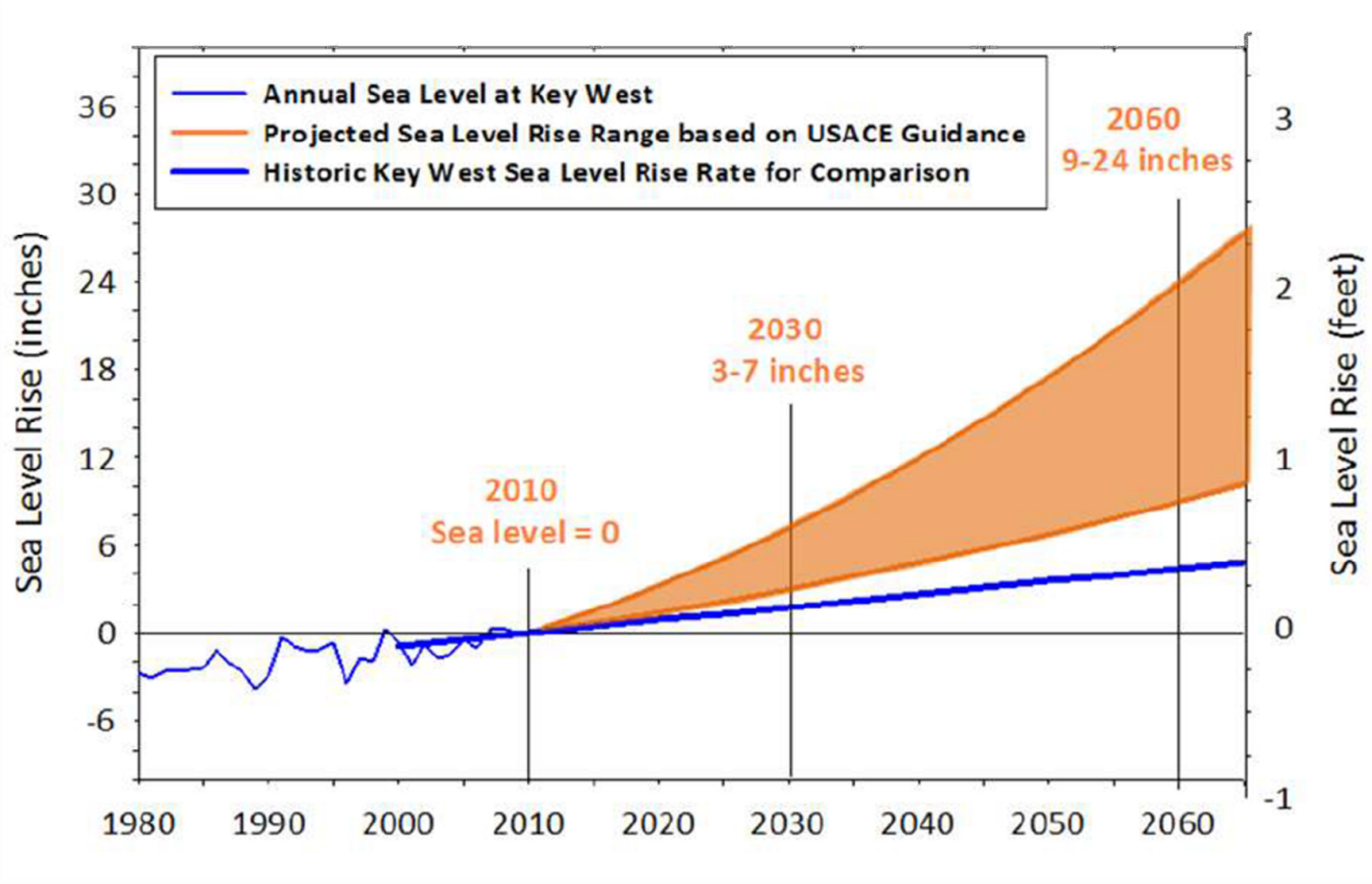
With regard to storm surge, the MDWASD consultant projected the storm surge effects of Hurricane Andrew which made a direct hit on the SDWWTP in August 1992 onto the three MDWASD plants at varying SLR's with estimates of lesser storms also included. The results of these analyses are shown on Figures 13 through 15. The elevations of the treatment units shown at the left of the figures are from survey data and construction drawings. The analysis shows the three existing wastewater treatment plants are already vulnerable to storm surges and that the 3 ft. SLR does not increase this vulnerability substantially. As was the case with Hurricane Andrew and the SDWWTP, and with the experience in the New York area with Hurricane Sandy, storm surge results in damage mostly to electrical and instrumentation/control systems. Structures and mechanical equipment do not generally suffer much damage due to storm surges. The consultant has made estimates of the replacement costs for all electrical and instrumentation equipment at the 3 MDWASD plants as shown on Table 3.

Table 3
Estimated Replacement Costs-MDWASD WWTPs
Electrical and Instrumentation Systems

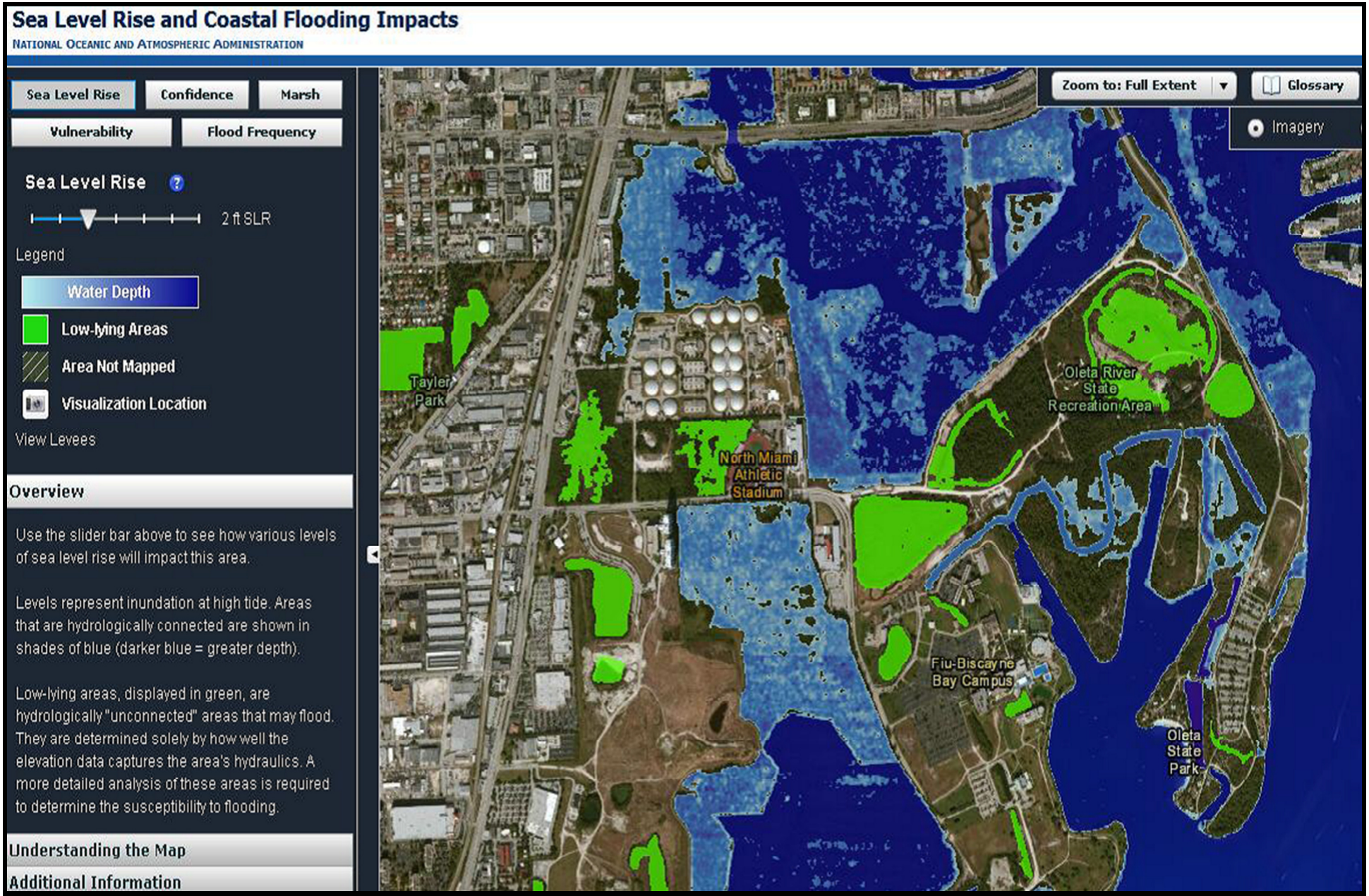
	Electrical	Instrument./Control	Total
NDWWTP	$51,851,000	$24,961,000	$76,812,000
CDWWTP	$109,993,000	$57,596,000	$167,589,000
SDWWTP	$29,753,000	$12,942,000	$42,695,000

The potential for these replacement costs in the event of the storm surges from direct hits from major hurricanes does not warrant plant relocations and the $billions required to replace capacity and redirect flows with major transmission system upgrades.

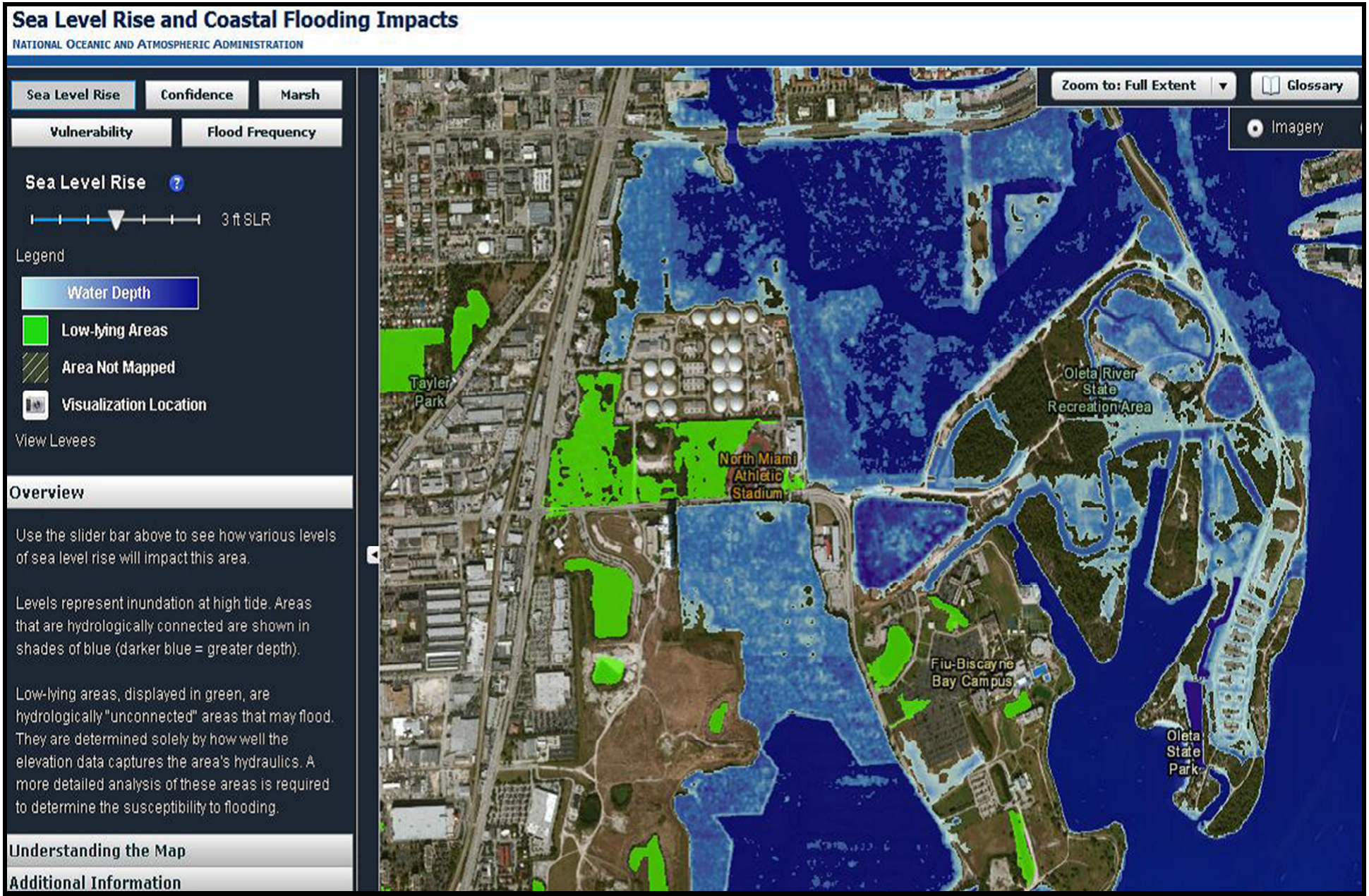
MDWASD has committed to a program to "harden" the existing WWTPs. Design for all of the projects listed in the new Consent Decree will include an examination of existing facilities for inclusion of features such as increasing the elevation of electrical and instrumentation/control equipment and/or providing water tight enclosures to decrease vulnerability to storm surges. In addition, MDWASD will proceed with a program to add concrete walls at strategic plant locations to reduce effects of storm surge, the addition of flood logs which are installed on an approaching storm, and watertight doors. The consultant has estimated a total cost of $30,000,000 to install these items at all three plants.



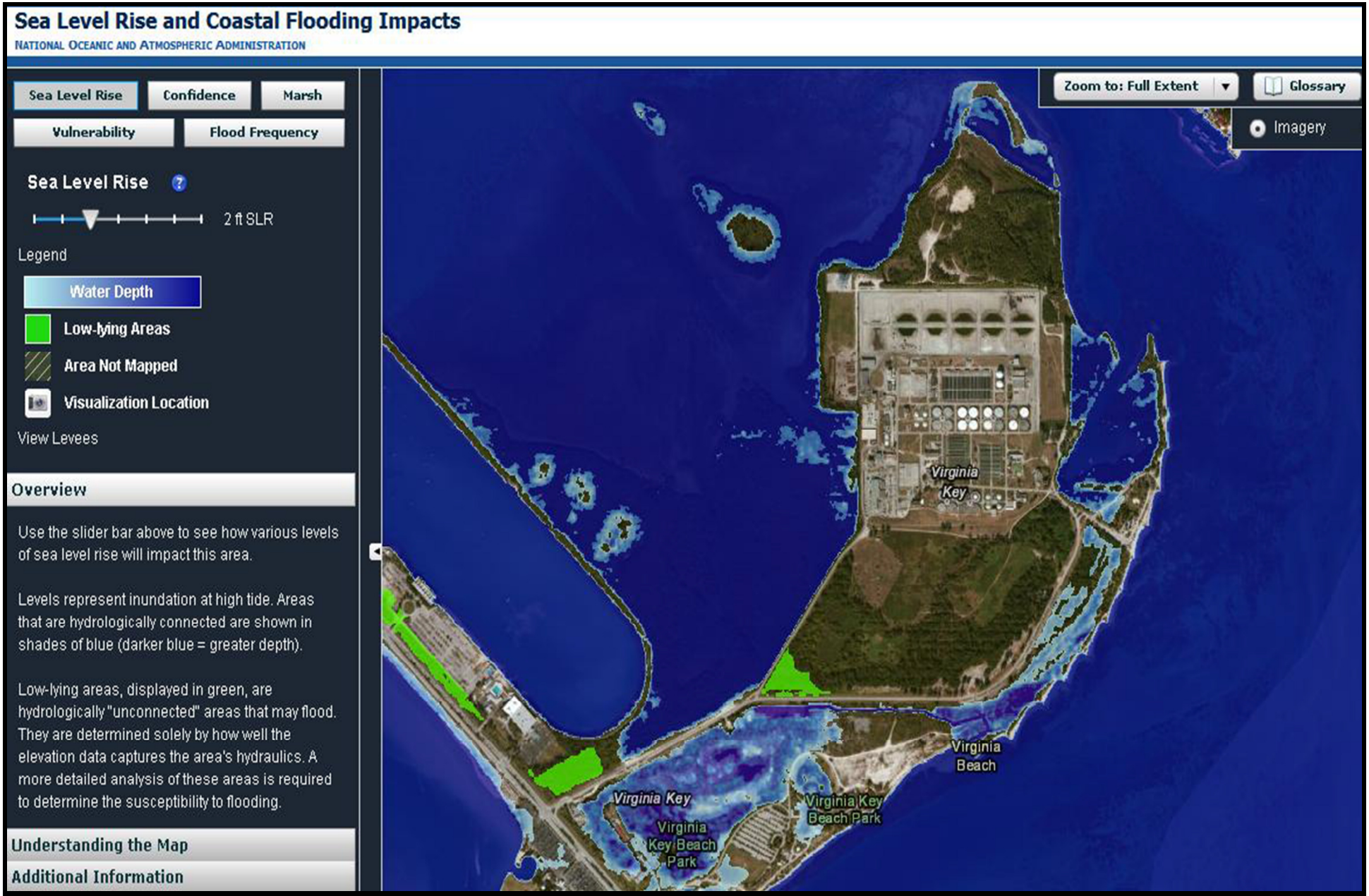
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	SE Florida Regional Climate Change Compact Sea Level Rise Projection	Figure 6



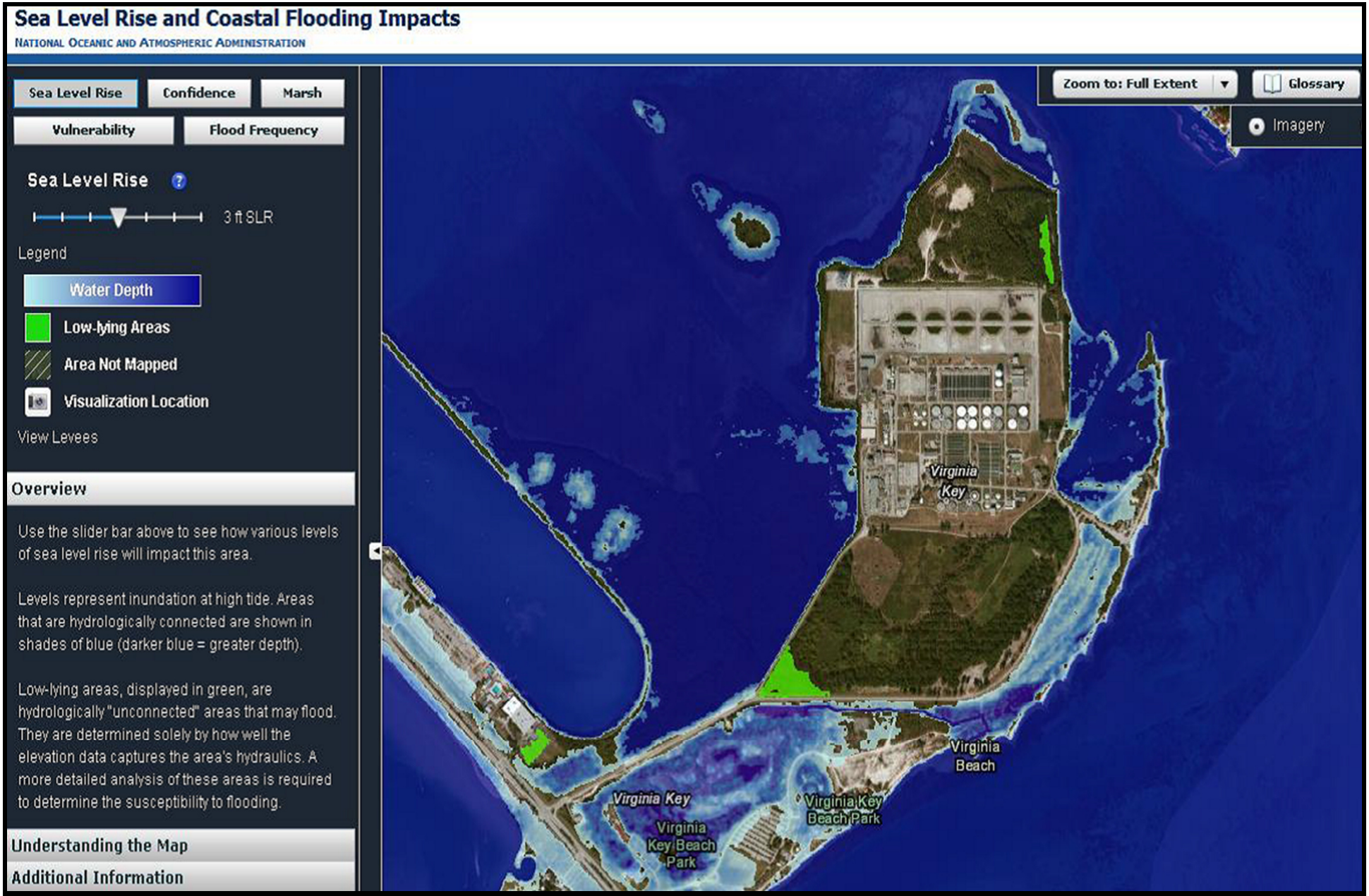
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	NDWWTP 2 ft. Sea Level Rise	Figure 7



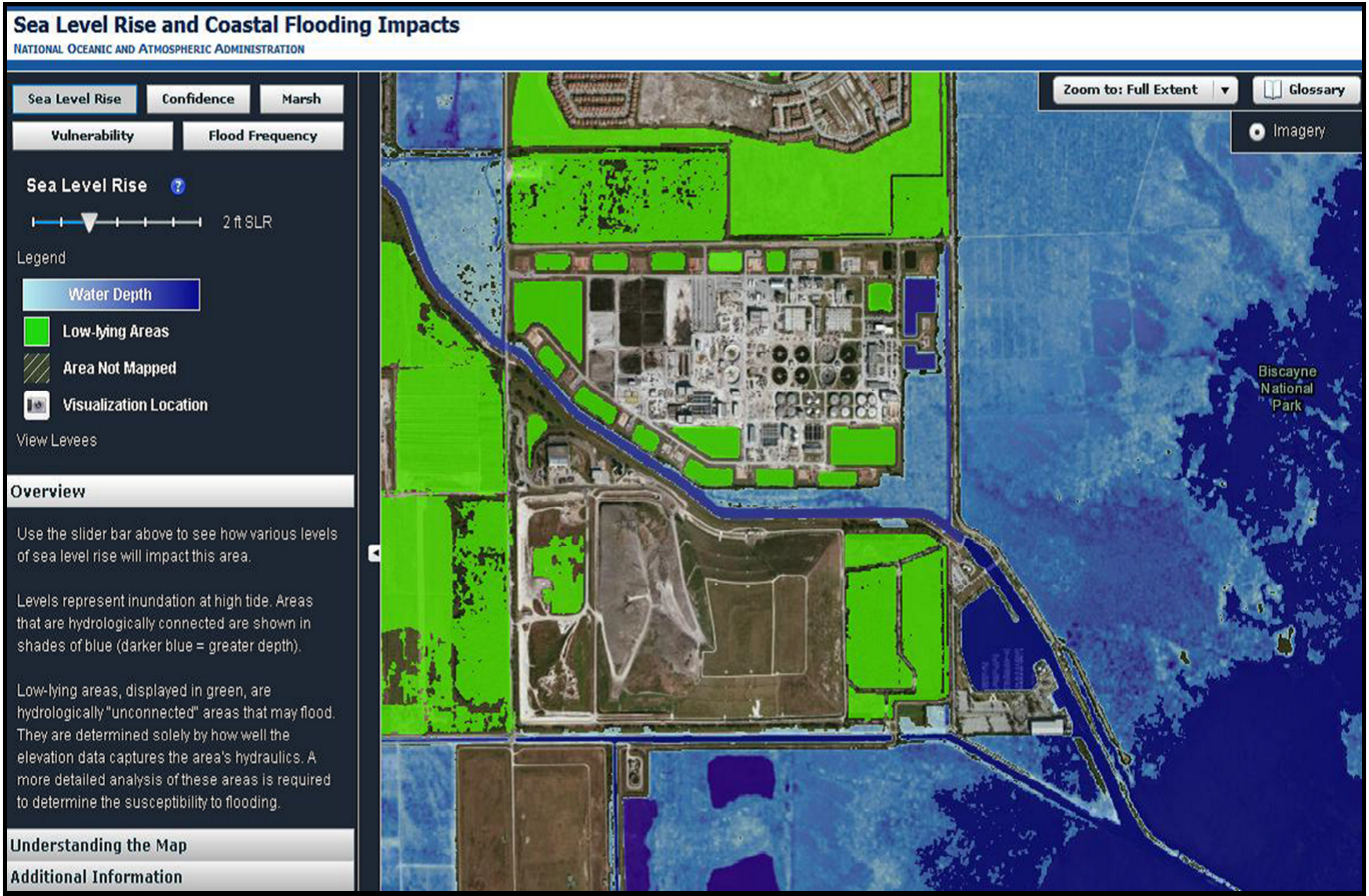
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	NDWWTP 3 ft. Sea Level Rise	Figure 8



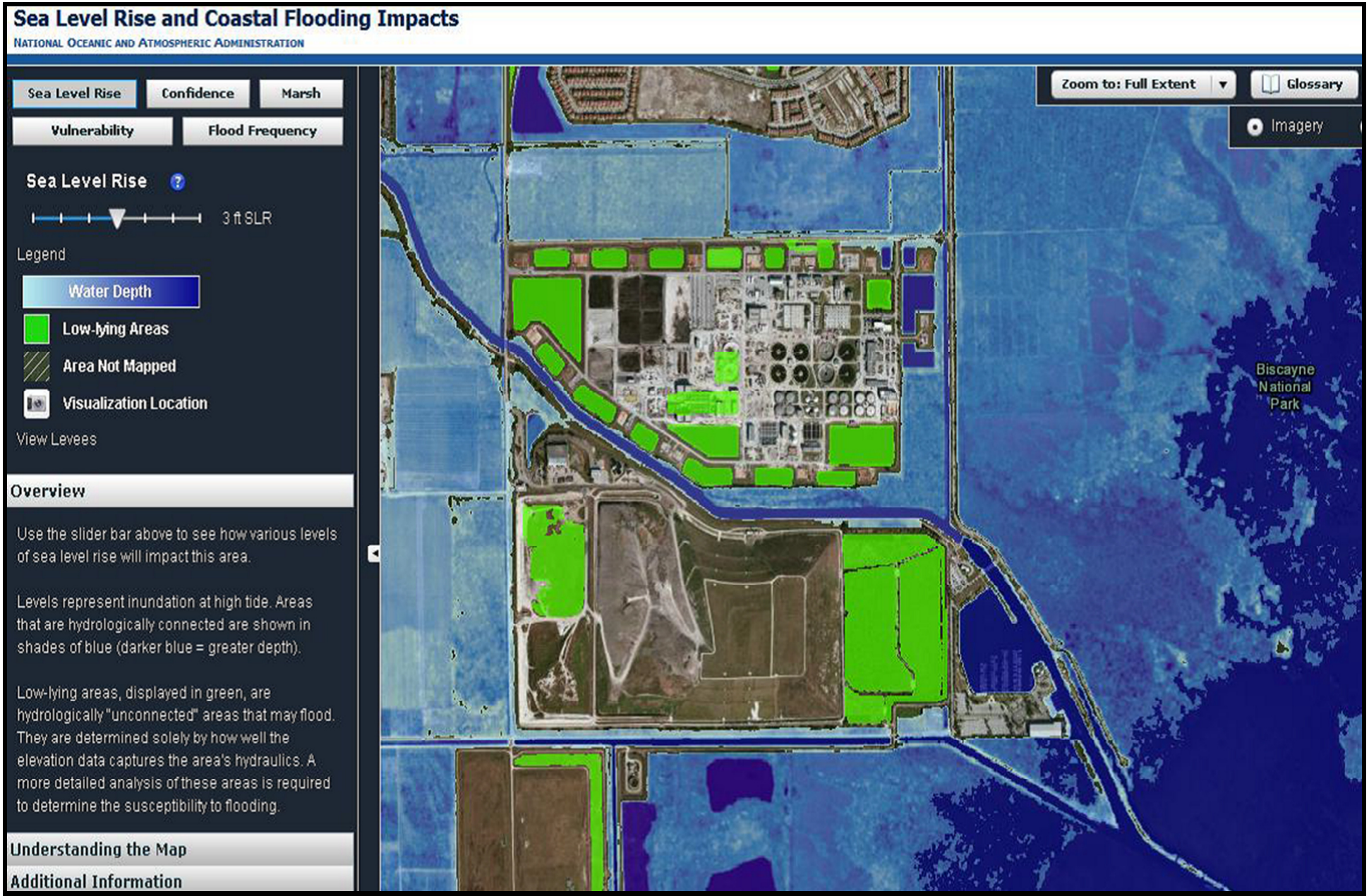
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	CDWWTP 2 ft. Sea Level Rise	Figure 9



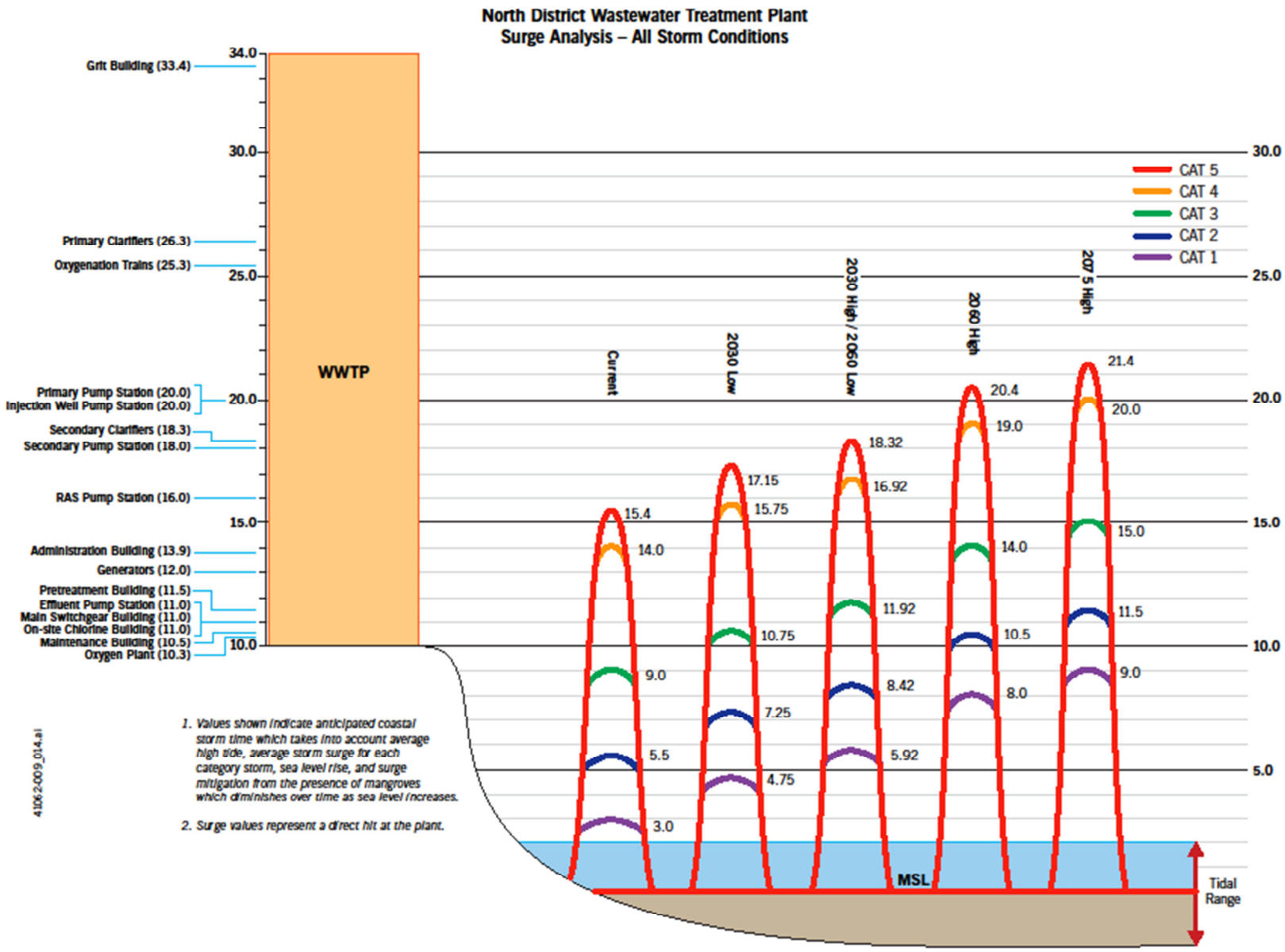
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	CDWWTP 3 ft. Sea Level Rise	Figure 10



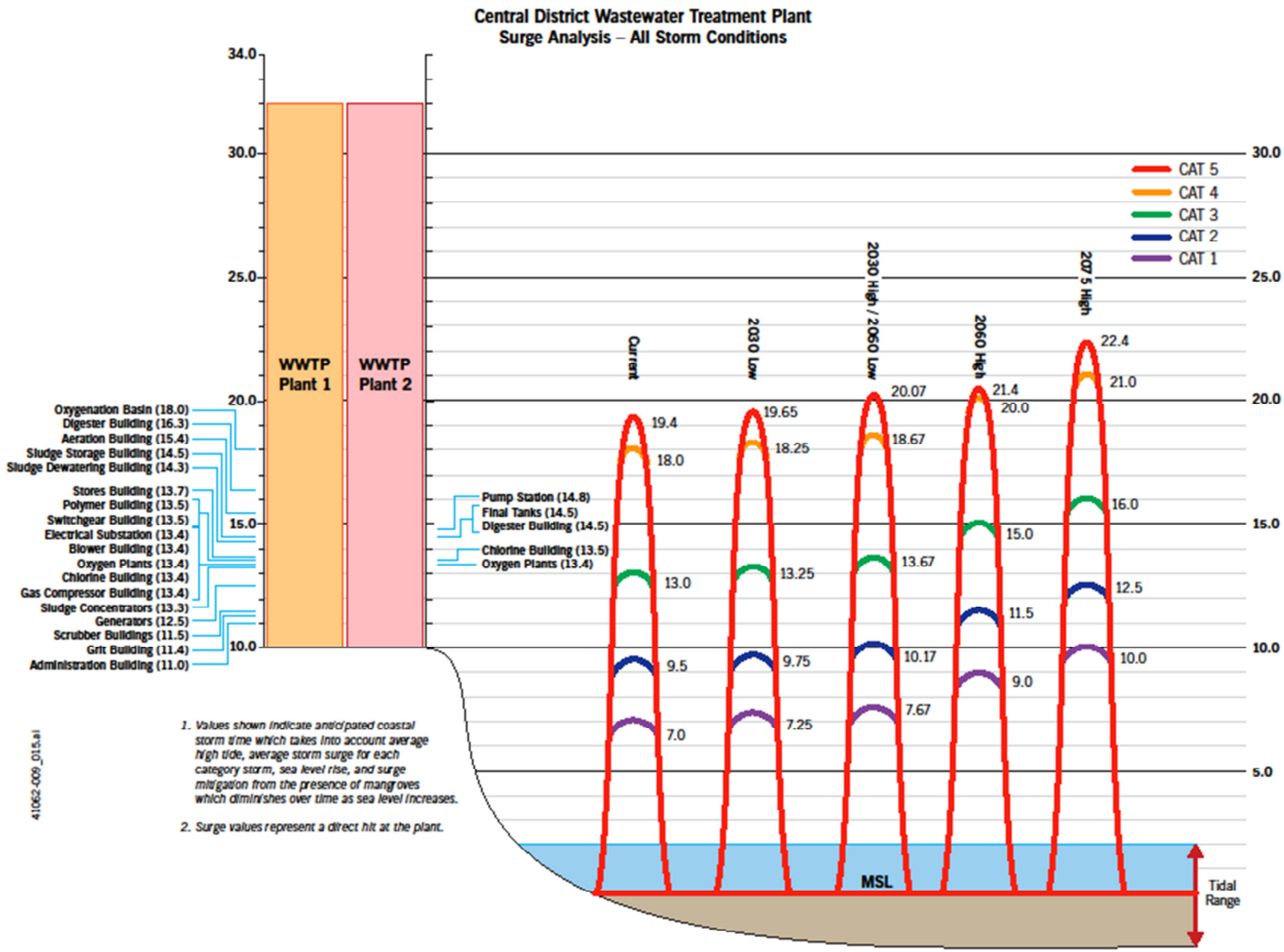
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	SDWWTP 2 ft. Sea Level Rise	Figure 11



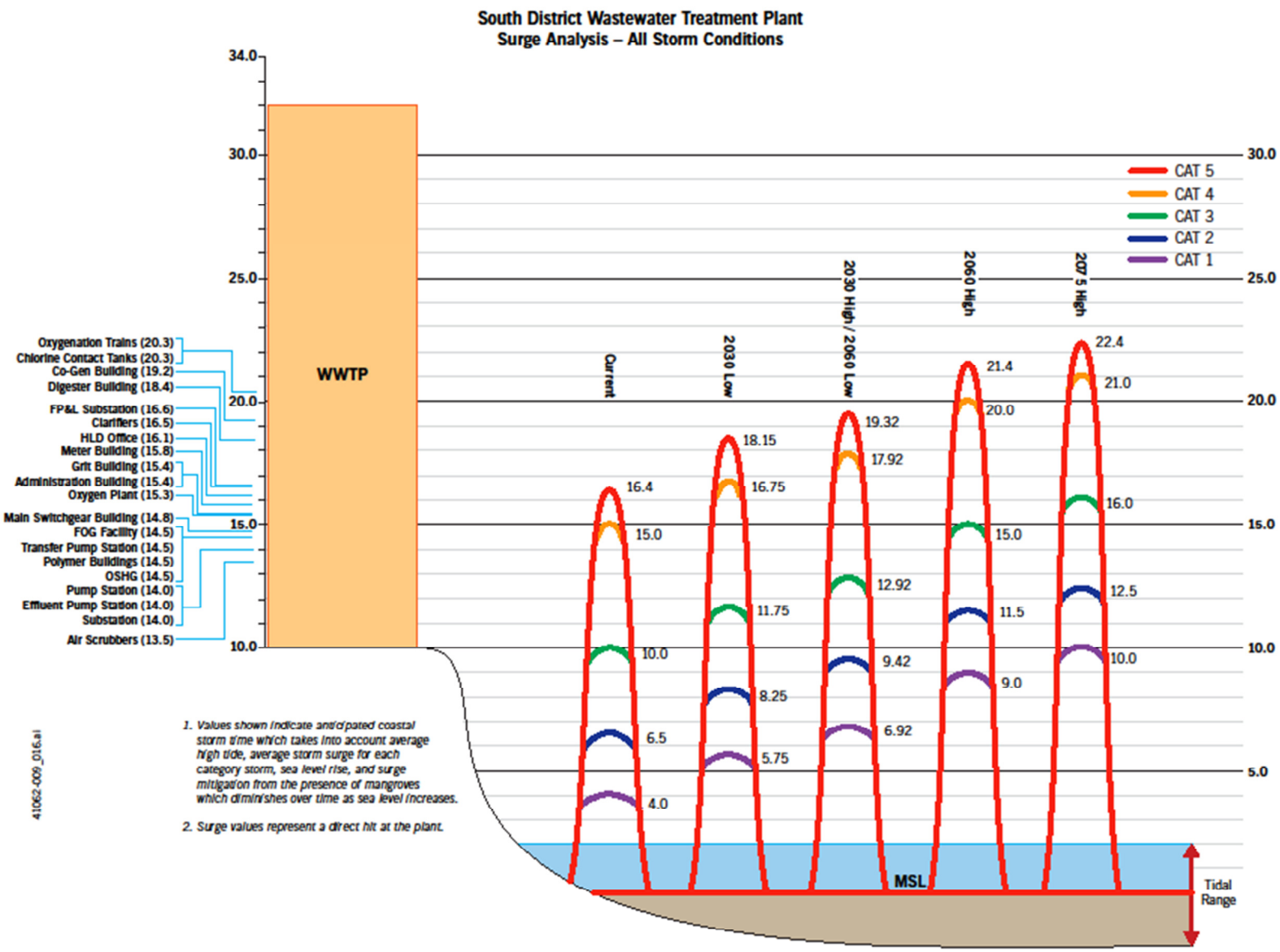
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	SDWWTP 3 ft. Sea Level Rise	Figure 12



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	NDWWTP Storm Surge Analysis	Figure 13



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	CDWWTP Storm Surge Analysis	Figure 14



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	SDWWTP Storm Surge Analysis	Figure 15

7.0 Alternatives Development and Evaluation

7.1 General

Projects for the various alternatives have been designated with project numbers per the system defined in Table 4.

Table 4
Project Designation System

First Letter		Second Letter		Number Suffix	Letter Suffix
WW Collection District		Project Type		Project ID	
N	North	L	Transmission Line	1,2,3,…	E=Upgrade to existing
C	Central	P	Pumping Station		
S	South	T	Treatment Plant Upgrade		
W	West	E	Effluent Disposal		
		R	Reuse		

Costs estimates for facilities identified are based on total project costs for similar facilities where available with suitable contingency factors. Costs for recent similar projects have been escalated using the Engineering News Record Construction Cost Index. Cost estimates for pipeline construction include restoration and lump sum additions for major crossings, such as highways, canals and railways. Also included are costs for site acquisition, where necessary, engineering, legal and administrative costs. Costs for wet weather treatment expansions at the regional wastewater treatment plants are based on estimates provided in consultant preliminary engineering reports for the NDWWTP and from equipment suppliers.

7.2 Reuse

7.2.1 OOL Requirement

As previously indicated in Table 1, the 60% of baseline flow reuse requirement is 117.5 mgd. With flow commitment to FPL of 90 mgd for cooling water makeup to the Turkey Point facility, an additional 27.5 mgd of reuse is required.

7.2.2 Summary of Options

Reuse option examined in the Reuse Feasibility Study of April, 2007 included:

- Urban Irrigation
- Agricultural Irrigation

- Industrial Reuse
- Aquifer Recharge via Rapid Infiltration Trenches (RITs)
- Saltwater Barriers
- Canal Recharge
- Wetland Application
- Satellite Treatment
- Potable Reuse

Recharge of the Floridan Aquifer is another reuse possibility which has been evaluated.

7.2.3 Treatment Requirements

Typical treatment processes needed for the types of reuse described above in order to meet state and local standards are summarized on Table 5.

Table 5
Treatment Levels for Various Types of Reuse

Reuse Option	Treatment Required
Urban Irrigation, Satellite Treatment	Secondary Treatment High Level Disinfection (Filtration); Reverse Osmosis (RO) if needed for chloride reduction
Agricultural Irrigation-Non-Edible Crops	Secondary Treatment; Reverse Osmosis (RO) if needed for chloride reduction
Agricultural Irrigation-Edible Crops	Secondary Treatment; RO if needed for chloride reduction.
Industrial	Secondary Treatment and basic disinfection-additional treatment possible
Biscayne Aquifer Recharge, Salt Water Barrier	HLD, RO treatment for microconstituents, Microfiltration (MF), Ultraviolet (UV) disinfection, advanced oxidation.
Canal Recharge	HLD, RO treatment for microconstituents, Microfiltration (MF), Ultraviolet (UV) disinfection, advanced oxidation, nutrient removal by chemical processes.
Wetland Rehydration	Tertiary MBR followed by RO followed by either UV/Hydrogen Peroxide or Ozone/Hydrogen Peroxide
Potable Reuse	High pH lime treatment, single- or two- recarbonation, pressure infiltration, ion exchange for ammonia removal, granular activated carbon adsorption, ozonation, RO, air stripping, chlorine
Floridan Aquifer Recharge	HLD; Waiver needed for TN limits.

7.2.4 Evaluation

An evaluation of the reuse options described was carried out. The following should be noted with regard to this evaluation:

- MDWASD examined a number of potential reuse projects to determine feasibility and cost. These potential projects were:
  - Crandon Park Golf Course Irrigation
    - Option 1-RO plant at the CDWWTP and piping to the Golf Course
    - Option 2-Satellite membrane bioreactor (MBR) and (RO) plants located at the Golf Course.
  - Satellite Plant-Irrigation of golf courses in Doral area.
  - Satellite Plant-Air conditioning Cooling Water at Miami International Airport.

- In compliance with the 20-year Water Use Permit issued in November, 2007, MDWASD retained a consultant to design a system for recharging the Biscayne Aquifer with highly treated effluent from the SDWWTP. The project was to construct an advanced wastewater treatment plant at a 30-acre site directly to the west of the SDWWTP and piping to convey the reuse water approximately 7 miles north for discharge in the vicinity of Zoo Miami. The project capacity was for 21 mgd of treated effluent (approximately 30 mgd of wastewater). The project was suspended in 2011 with the design work nearly completed on the basis of cost and based on discussions with FDEP regarding the option of meeting OOL reuse requirement by means of recharging the Floridan Aquifer (FA). The Water Use permit was subsequently modified to revise the water source for the proposed South Miami Heights Water Treatment Plant to be from the Floridan and Biscayne Aquifers without the need for Biscayne Aquifer recharge. MDWASD considers other types of reuse which require similar advanced treatment to be economically infeasible at this time. Costs for these projects are summarized on Table 6.

An assessment of the technical, environmental, and economic feasibility of the reuse options tabulated above is given on Table 7. In view of the appreciable cost difference between FA recharge and the other possibilities, all options except the FA recharge are designated as not economically feasible.

Based on this analysis, recharge of the FA at a rate of 27.5 mgd has been selected as the mean to achieve the required 60% reuse flow of 117.5 mgd in addition to the 90 mgd for FPL Turkey Point. In view of the high discharge pressures determined per hydrogeological modeling performed for the FA, the reuse for the alternatives analysis is distributed evenly among the WWTPs included in each alternative, with the exception of the NDWWTP where space constraints make it impractical.

Table 6
Potential Reuse Project Summary

Project	Description	Capacity, 1,000 gpd	Project Cost ($1,000)		Comment
			Total	Cost/gpd	
Crandon Park Golf Course Irrigation-Option 1	Installation of treatment facilities (HLD and RO for chloride reduction) at the CDWWTP and pipeline to the Golf Course	600	$17,100	$28.50	Issue of water quality with respect to possible runoff to Biscayne Bay needs to be addressed.
Crandon Park Golf Course Irrigation-Option 2	Satellite WWTP to treat Key Biscayne wastewater at the Golf Course (MBR and RO for chloride reduction)	600	$11,700	$19.50	Issue of water quality with respect to possible runoff to Biscayne Bay needs to be addressed.
Doral Area Golf Course Irrigation	Satellite MBR WWTP to provide irrigation to 5 golf courses in close proximity in the Doral area	3,888	$41,700	$11.33	Requires land procurement and WWTP siting.
Miami International Airport (MIA) Air Conditioning Makeup Water	Satellite MBR WWTP to provide makeup water to MIA central air conditioning plant	600	$13,900	$23.17	Requires land procurement and WWTP siting. Water quality needed for makeup water could require additional treatment.
Biscayne Aquifer Recharge	30 mgd Advanced Treatment Plant at SDWWTP for recharge of the Biscayne Aquifer to provide water supply for proposed South Miami Heights WTP	30,000	$312,000	$10.40	Actual project which was cancelled. Costs include pipeline for discharge to BA.
Floridan Aquifer Recharge	Cost for pump station, piping to wells and Floridan Aquifer Wells for the 27.5 mgd OOL requirement	27,500	$76,674	$2.78	Cost for HLD treatment not included since it is needed for effluent disposal to injections wells per OOL. Waiver on TN limit from FDEP required.

Table 7
Feasibility for Various Types of Reuse

Reuse Option	Feasibility		
	Technical	Environmental	Economic
Urban Irrigation, Satellite Treatment	Feasible	Feasible	Not Feasible
Agricultural Irrigation-Non-Edible Crops	Not Feasible-Insufficient demand	Feasible	Not Feasible
Agricultural Irrigation-Edible Crops	Feasible	Feasible	Not Feasible
Industrial	Dependent on application	Feasible, depending on application	Feasible, depending on application
Biscayne Aquifer Recharge, Salt Water Barrier	Feasible-EPOCS, Flooding	Feasible	Not Feasible
Canal Recharge	Feasible	Feasible	Not Feasible
Wetland Rehydration	Feasible	Requires Additional Testing	Not Feasible
Potable Reuse	Feasible	Feasible, public perception	Not Feasible
Floridan Aquifer Recharge	Feasible	Feasible	Feasible

7.3 Wastewater

7.3.1 Wastewater Treatment

In the development of treatment processes for alternatives considered, secondary treatment is provided for all flow with further High Level Disinfection (HLD) treatment (per the Florida Administrative Code, FAC, Chapter 62, 600.440(5)) for a portion as described below. For peak wet weather flows, capacities of the biological reactors and final settling tanks are exceeded at the projected flows for a number of the alternatives.

Where the biological reactor capacity is exceeded for peak wet weather flows, parallel aeration tanks are provided. These basins would be activated on peak events and seeded with biomas via return sludge from the normally operating process trains. Where the secondary settling loading rates are exceeded (reflecting standard and conservative loading rates as described below), parallel settling in the form of high-rate clarification is included. Ballasted flocculation is a common system used in this application. This process also would be activated for peak flow wet weather events.

The OOL Compliance Plan approach for managing the projected 1,180 mgd system-wide peak flow is as follows:

Reuse	117.5 mgd
Boulder Zone	Remainder less peak flow discharge through outfalls

With the exception of 71 mgd at the NDWWTP, HLD treatment will be provided for all flow to be discharged into the Boulder Zone as described above. The NDWWTP operating permit allows for discharge of 71 mgd to the Boulder Zone with the existing deep well disposal system with secondary treatment only. Per OOL amendment, that flow which is discharged through outfalls on peak flow events will receive secondary treatment only.

7.3.2 Ocean Outfall Discharges/HLD Capacities

As previously indicated, the OOL Amendment allows for the discharge of peak flows through the existing ND and CD outfalls which do not cumulatively exceed 5 percent of a facility's baseline flow. Based on the baseline flows shown in Table 1 of 81.0 and 114.8 mgd for the NDWWTP and CDWWTP, respectively, the total cumulative volumes (five year rolling average per OOL) which can be discharged through the outfalls are:

NDWWTP	1,478 mg or 4.0 mgd
CDWWTP	2,095 mg or 5.7 mgd

A statistical analysis was performed on hourly flows at the NDWWTP and CDWWTP for the 2003-2012 to set the capacities of HLD at these plants. The analysis indicated that at HLD Design Capacity/AADF ratios of 1.5 for the NDWWTP and 1.7 for the CDWWTP result in discharges out the outfalls of 2% of the annual hours and 0.4% of the accumulated baseline flow. A table summarizing this analysis is given in Appendix F. These factors are used in the development and costing of alternatives described below.

7.3.3 Alternatives Evaluated

Alternatives were developed through evaluation per the matrix shown on Figure 16.

Descriptions of the opposing alternatives and subalternatives are as follows:

- With (Alternative 2-) and without (1-) a proposed West District Wastewater Treatment Plant.

- With (Subalt. A-) and without (B-) the transfer of additional peak wet weather flow to the NDWWTP and CDWWTP. For the A- subalternative, additional secondary treatment in the form of high rate clarification to be installed in parallel with existing final settling tanks is included. Ballasted flocculation has been selected as the basis for the evaluation due to its small footprint and suitability for operation on a standby basis during peak wet weather events. For the B- subalternative, no additional secondary treatment has been considered.

- With (Subalt -2-) and without (-1-) a booster station and force main connections in the Doral area. (-1-, -2- under the A subalternative). This system allows for an increased flow transfer to the NDWWTP and reduced peak flow pressures in the Doral area. It also provides additional system flexibility with regard to flow transfers between WWTPs.

- At the NDWWTP and CDWWTP, conservative loading on all secondary clarification process units (Subalt. -1) or conservative loading only on those process units followed by HLD treatment (Subalt. -2). The conservative loading (855 gpd/ft^2) is used to reduce the possibility of high discharge of solids to filters during a plant upset. Use of this conservative loading for the entire plant increases the need of additional peak flow capacity such as parallel ballasted flocculation for the A subalternatives and reduces overall plant peak flow processing capacity for the B subalternatives. For the -2 subalternatives, secondary clarifiers which are not followed by HLD treatment are loaded with the standard 1,200 gpd/ ft^2 , so that

these subalternatives have dual (855 and 1,200 gpd/ ft^2) settling tank loading rates.

An alternative to decommission the CDWWTP was evaluated and not included in the formal alternatives analysis due to excessive cost. This is described below.

7.3.4 Transmission System Analysis

The transmission system requirements for the five alternatives resulting from the concepts described above were developed using the MDWASD InfoWorks, CS hydraulic model. The model was set up for direct input of flows via 72-hour hydrographs as described previously. For the cases where the system includes repumping, upstream station flows were added to flows generated in a receiving station for input into the transmission system. Flows for receiving pump stations are included in Appendix E as well as a tabulation of upstream stations contributing to their flow. Booster stations were modeled as screw pumps which simulate the operation of a properly-sized station, i.e. the station pumps all influent flow while maintaining its suction pressure at the minimal set point value irrespective of the pump station discharge pressure generated. These pressures were adjusted to be within the standard maximum WASD operating pressures mainly through the addition and size adjustment of additional downstream force mains. In order to determine the adequacy of both the local and booster stations, flows and pressures were taken from the model runs and applied to a separate spreadsheet where the model operating conditions were compared to the station characteristic operating curves. Stations where the model output exceeded the capacity of the station were included in the Plan as an upgrade project.

7.3.5 Analysis Results

Based on the alternatives considered as described above, five transmission system alternatives were developed, two of which are the same for the -1 and -2 subalternatives with the conservative and dual secondary clarifier loading rates, so that a total of 7 overall alternatives have been analyzed.

The transmission system configurations were developed to process the 2035 projected flows included in Table 3 based on projected wastewater flows distributed in MDWASD service area and target average/peak flows at the WWTPs reflecting the following:

- Existing Plant configurations.

OOL Compliance Plan
Alternatives Matrix

1	2					
No West Plant	With West Plant					
	2A				2B	
	New Process Tankage at ND, CD (Actiflo)				No New Process Tankage at ND, CD	
	2A-1		2A-2		2B-1	2B-2
	No Doral Booster ND/WD-317/225 mgd		With Doral Booster ND/WD-327/215 mgd		855 gpd/sq. ft. Loading on all Secondary Clarifiers	855 and 1200 gpd/sq.ft .loading on Secondary Clarifiers
		2A-1-2	2A-2-1	2A-2-2		
	855 gpd/sq. ft. Loading on all Secondary Clarifiers	855 and 1200 gpd/sq.ft. Loading on Secondary Clarifiers	855 gpd/sq. ft. Loading on all Secondary Clarifiers	855 and 1200 gpd/sq.ft. Loading on Secondary Clarifiers		

- Long-range capacity reductions at the NDWWTP and CDWWTP due to proximity to coasts.
- Use of existing outfalls for peak wet weather flows
- Treatment plant operation
- Minimizing of local pressures for optimal operation of local pump stations
- Provision of system flexibility and redundancy.

The transmission systems developed are shown on Figures 17 through 21. Alternative costs including summaries of the flow distribution among the WWTPs are included on Table 8. Appendix G includes a detailed breakdown of the projects which comprise each of the alternatives. Appendix H includes flow diagrams of each of the WWTPs for each alternative. These diagrams show the required treatment units, disposal systems, and reuse with the flows to each under average and peak wet weather flow conditions.

It should be noted that the alternatives evaluated are for the entire MDWASD wastewater system and reflects facilities needs factors including future growth and the processing of wet weather flows which are not part of the OOL requirements. Projects which are needed specifically to meet the OOL are delineated on the Appendix G alternative project costs sheets and are summed on those pages as well as the Table 8 alternatives comparison summary.

7.3.6 Decommissioning of the CDWWTP

The analysis to decommission the CDWWTP was completed and not included in the formal alternatives analysis due to excessive cost. The estimates for the system upgrades including the Ocean Outfall Legislation for the year 2035 are estimated at $7.64 billion without the CDWWTP and $5.18 billion for the selected alternative which keeps the CDWWTP in service as described below. Therefore, relocation of the CDWWTP is estimated to cost an additional $2.46 billion. The following actions would need to be taken for the CDWWTP relocation:

Table 8

Preliminary Opinion of Costs – Ocean Outfall Legislation – Compliance Plan

ALTERNATIVE	1		2A-1-1		2A-1-2		2A-2-1		2A-2-2		2B-1		2B-2	
DESCRIPTION	All Wastewater Treatment at Existing WWTPs		New WDWWTP		New WDWWTP		New WDWWTP		New WDWWTP		New WDWWTP		New WDWWTP	
New Peak Flow Treatment			ND & CD		ND & CD		ND & CD		ND & CD					
NDWWTP Peak Flow	Higher		Lower (No Doral Booster)		Lower (No Doral Booster)		Higher (Doral Booster)		Higher (Doral Booster)		Lower		Lower	
Reuse	FPL Cooling Water from SD FA Recharge at SD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD		FPL Cooling Water from SD FA Recharge at SD, CD & WD	
Sec. Clarifier Loading	Lower		Lower		Dual		Dual		Dual		Lower		Dual	
FACILITY DESIGN FLOW (MGD)	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak	Design Capacity AADF	Wet Weather Peak
ND WWTP	120	372	85	317	85	317	85	327	85	327	85	206	85	262
CD WWTP	150	496	83	333	83	333	83	333	83	333	83	203	83	234
SD WWTP	131	312	131	305	131	305	131	305	131	305	131	384	131	300
WD WWTP	--	--	102	225	102	225	102	215	102	215	102	387	102	384
TOTALS	401	1180	401	1180	401	1180	401	1180	401	1180	401	1180	401	1180
WWTP PROJECTS COSTS														
Wastewater Transmission Mains	$	1,050,810,000	$	778,190,000	$	778,190,000	$	908,450,000	$	908,450,000	$	1,103,210,000	$	882,540,000
Regional Pumping Stations	$	513,000,000	$	280,000,000	$	280,000,000	$	330,000,000	$	330,000,000	$	430,000,000	$	330,000,000
Local PS & FM	$	435,940,000	$	405,500,000	$	405,500,000	$	402,730,000	$	402,730,000	$	423,490,000	$	422,100,000
Existing WWTP Upgrades	$	225,498,271	$	225,498,271	$	225,498,271	$	225,498,271	$	225,498,271	$	225,498,271	$	225,498,271
HLD Treatment	$	446,921,798	$	264,988,378	$	264,988,378	$	264,988,378	$	264,988,378	$	374,662,299	$	258,213,082
Peak Flow Treatment	$	474,480,116	$	162,322,061	$	103,724,471	$	169,057,417	$	110,459,826	$	70,152,794	$	--
Deep Injection Well Systems	$	678,401,362	$	398,301,858	$	398,301,858	$	398,301,858	$	398,301,858	$	536,569,449	$	395,427,405
Biosolids Class AA Improvements	$	437,416,999	$	328,506,077	$	328,506,077	$	328,506,077	$	328,506,077	$	328,506,077	$	328,506,077
Storm Surge Protection	$	30,000,000	$	30,000,000	$	30,000,000	$	30,000,000	$	30,000,000	$	30,000,000	$	30,000,000
New WD WWTP	$	--	$	1,306,538,763	$	1,306,538,763	$	1,303,913,184	$	1,303,913,184	$	1,420,214,970	$	1,418,875,809
Peak Flow Treatment	$	--	$	207,572,177	$	207,572,177	$	182,649,075	$	182,649,075	$	540,184,615	$	533,259,171
Deep Injection Well System	$	--	$	384,044,843	$	384,044,843	$	378,295,936	$	378,295,936	$	662,879,587	$	661,154,915
Biosolids Class AA Improvements	$	--	$	150,731,533	$	150,731,533	$	150,731,533	$	150,731,533	$	150,731,533	$	150,731,533
FACILITIES SUBTOTAL 1	**$**	**4,292,468,545**	**$**	**4,922,193,963**	**$**	**4,863,596,372**	**$**	**5,073,121,729**	**$**	**5,014,524,139**	**$**	**6,296,099,596**	**$**	**5,636,306,264**
REUSE SYSTEM COSTS														
FPL Reclaimed Water Pipeline	$	95,000,000	$	95,000,000	$	95,000,000	$	95,000,000	$	95,000,000	$	95,000,000	$	95,000,000
FA Pump Station, Wells and Piping	$	76,674,149	$	76,674,149	$	76,674,149	$	76,674,149	$	76,674,149	$	76,674,149	$	76,674,149
FACILITIES SUBTOTAL 2	**$**	**171,674,149**	**$**	**171,674,149**	**$**	**171,674,149**	**$**	**171,674,149**	**$**	**171,674,149**	**$**	**171,674,149**	**$**	**171,674,149**
OOL COMPLIANCE COSTS	**$**	**2,301,987,320**	**$**	**3,222,626,227**	**$**	**3,164,028,636**	**$**	**3,265,633,993**	**$**	**3,322,986,402**	**$**	**4,162,311,350**	**$**	**3,923,110,029**
ANNUAL O&M COSTS (1)	**$**	**376,991,611**	**$**	**404,277,177**	**$**	**402,952,582**	**$**	**403,995,827**	**$**	**402,671,232**	**$**	**410,588,772**	**$**	**408,779,731**
TOTAL CAPITAL COSTS (2)	**$**	**4,464,142,695**	**$**	**5,093,868,112**	**$**	**5,035,270,522**	**$**	**5,244,795,878**	**$**	**5,186,198,288**	**$**	**6,467,773,745**	**$**	**5,807,980,413**

1. Annual Operation and Maintenance Costs include 2% inflation increase per year for total capital projects by year 2035.
2. Total Capital Costs include the cost of capacity to year 2035 demand in addition to the Ocean Outfall Legislation (OOL) Compliance Costs. All project costs include land acquisition where necessary, engineering, legal and administrative costs.

ND - North District Wastewater Treatment Plant
CD - Central District Wastewater Treatment Plant
SD - South District Wastewater Treatment Plant
WD - West District Wastewater Treatment Plant

FPL - Florida Power & Light Turkey Point Facility
HLD - High Level Disinfection
OOL - Ocean Outfall Legislation

Low - 855 gpd/sf loading rate on secondary clarification followed by HLD
Dual - 855 gpd/sf loading rate on secondary clarification followed by HLD and 1200 gpd/sf for peak flow to Ocean Outfall

- Construct the New West District Wastewater Treatment Plant, but at a higher capacity than planned (185 MGD average & 425 MGD peak), including all the additional treatment and disposal capacity

- Decommission the Central District WWTP and construct a Booster Station at the site, to move the flows from Miami Beach (includes Bal Harbor, Bay Harbor Islands, Indian Creek, & Surfside), Village of Key Biscayne, and Virginia Key to the mainland.

- Construct a pipeline from the existing 102" pipeline (in Brickell area) to the West District WWTP (about 15 miles of 72" to 84" pipelines)

- Construct intermediate Booster Station at Barnes Park

- New 54" pipeline to reroute Coral Gables flows

- Construct new pipeline to transfer the North District WWTP Sludge from Pump Station No. 2 (located at 390 N. RIVER DR NW, by American Airlines Arena) to West District WWTP

A system map and detailed cost estimated for facilities for this option are included in Appendix I.

7.3.7 Alternative Selection

Project, operation, and maintenance costs for facilities for each of the alternatives, tabulated in Table 8 in the previous section, are listed in ascending order of cost in Table 9 by total project cost.

Alternative 1, which does not include a fourth WWTP in the west, though somewhat less costly overall; is not recommended, primarily to avoid expansion of the existing North District and Central District facilities to obtain treatment capacity for future growth. Alternative 1 also requires substantially more large diameter force mains through highly populated areas of the county.

Table 9
Alternatives Ranked by Project Cost in Ascending Order

Alt.	Total Project Cost	Difference from Lowest	
		Amount	Percent
1	$ 4,464,142,695	$ -	0.0%
2A-1-2	$ 5,035,270,522	$ 571,127,827	12.8%
2A-1-1	$ 5,093,868,112	$ 629,725,418	14.1%
2A-2-2	$ 5,186,198,288	$ 722,055,593	16.2%
2A-2-1	$ 5,244,795,878	$ 780,653,184	17.5%
2B-2	$ 5,807,980,413	$ 1,343,837,718	30.1%
2B-1	$ 6,467,773,745	$ 2,003,631,050	44.9%

The advantages of the establishment of the West District Wastewater Treatment Plant include:

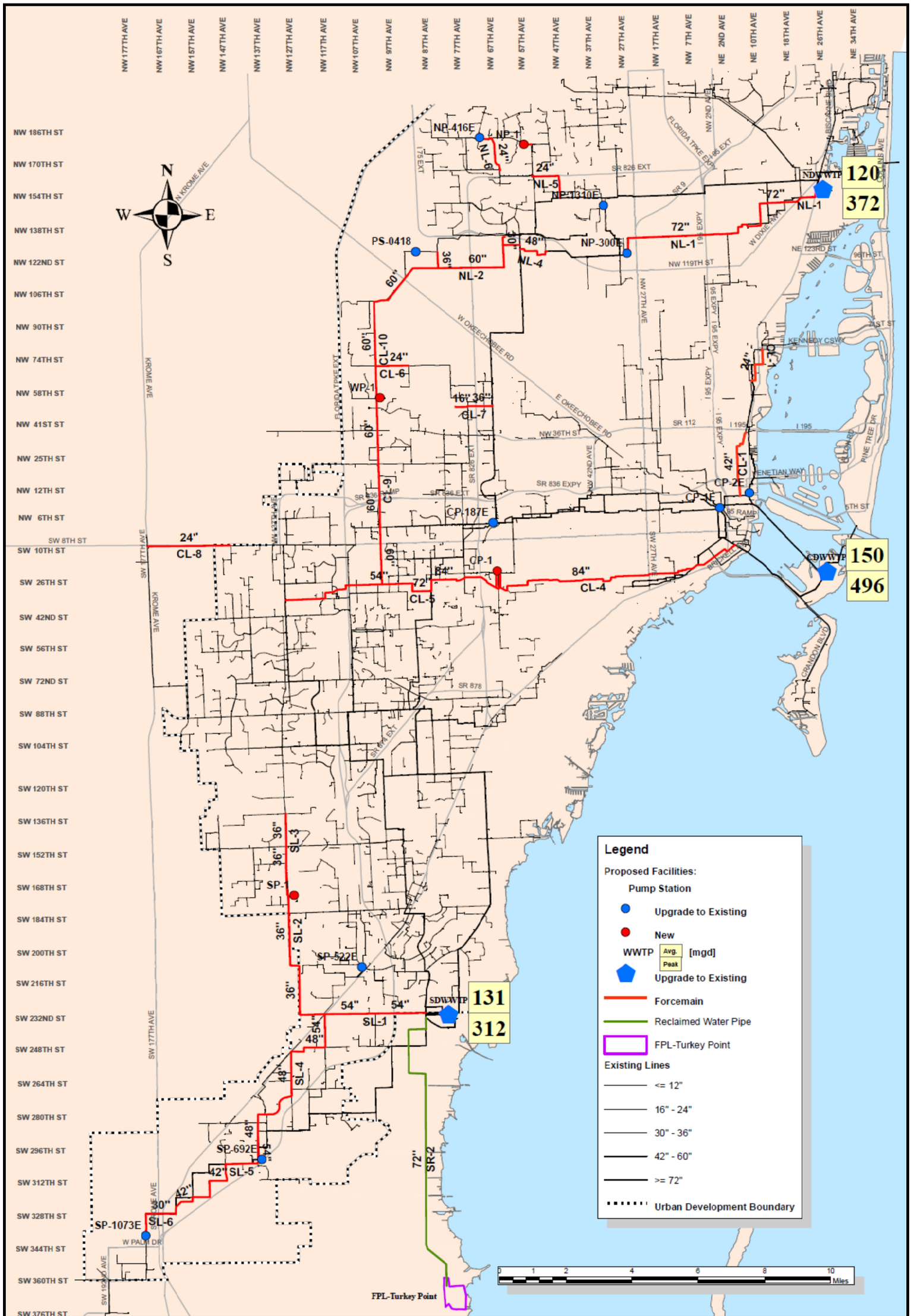
- Allows for use of state-of-the-art treatment technology for capacity needed for future growth and to replace capacity transferred from NDWWTP and CDWWTP. Cost estimates are based on the membrane bioreactor (MBR) process.

- Site location is suitable for possible groundwater recharge for the Alexander Orr Water Treatment plant wellfields in the future.

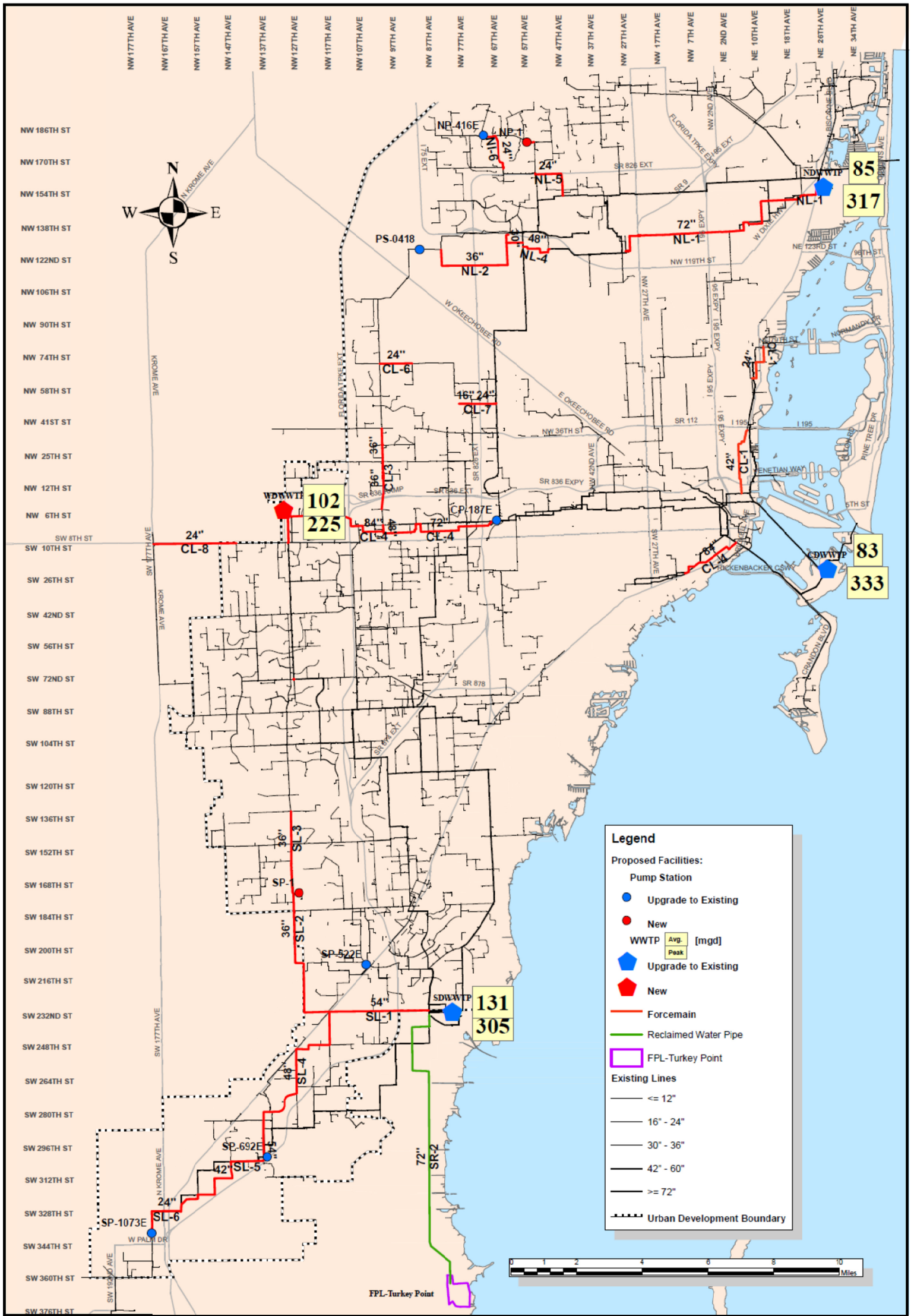
- Site location at the farthest location from the existing WWTPs allows for pressure relief in the transmission system to improve system operation during wet weather events.

- Establishment of a fourth treatment plant away from the coast reduced the overall system vulnerability to storm surge and SLR.

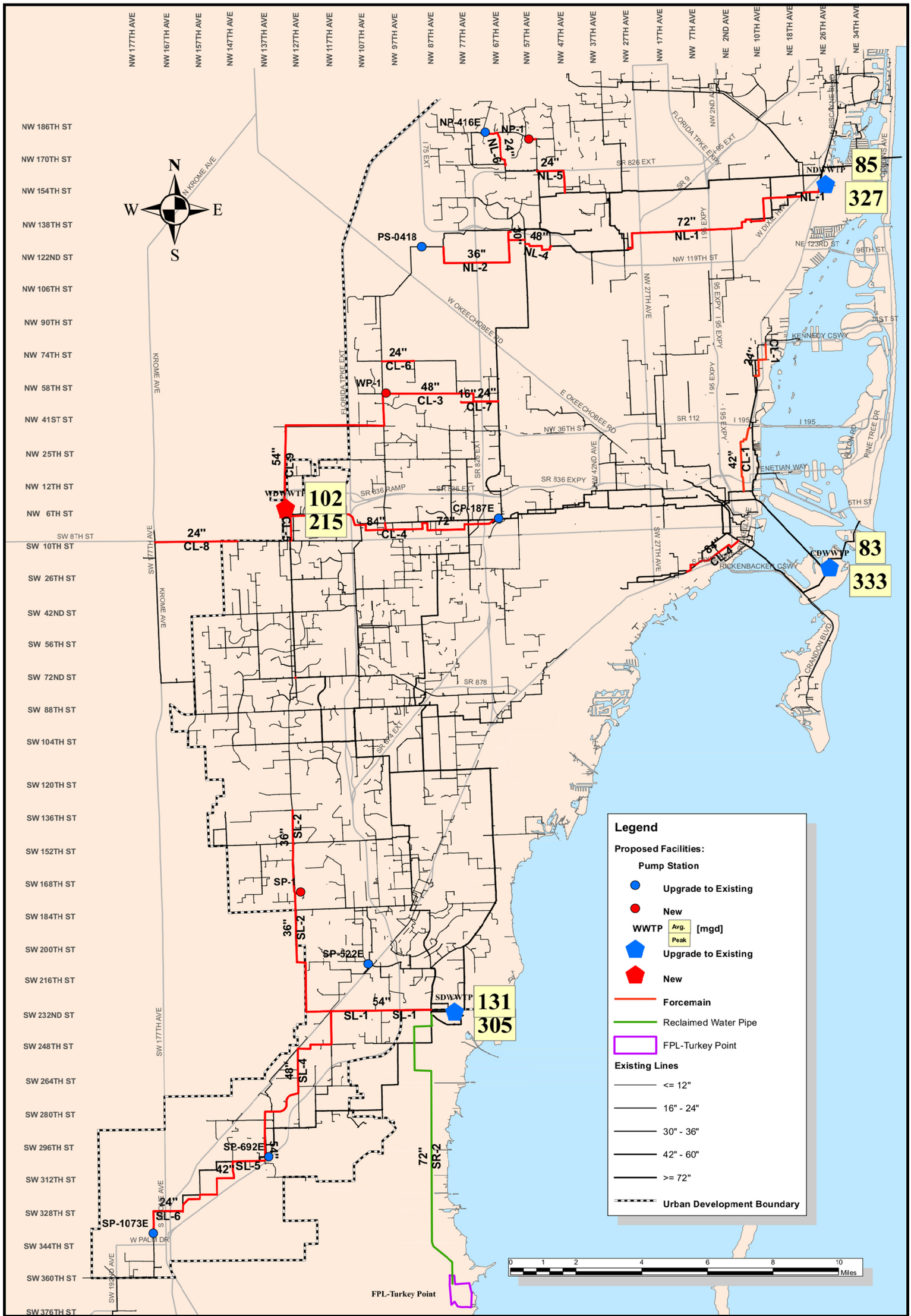
The B alternatives are based on no construction of additional secondary treatment capacity at the NDWWTP and CDWWTP, for treating peak wet weather flows for discharge via the existing outfalls, requires the shifting of higher peak wet weather flows to the proposed West District WWTP. This results in substantially higher costs to provide



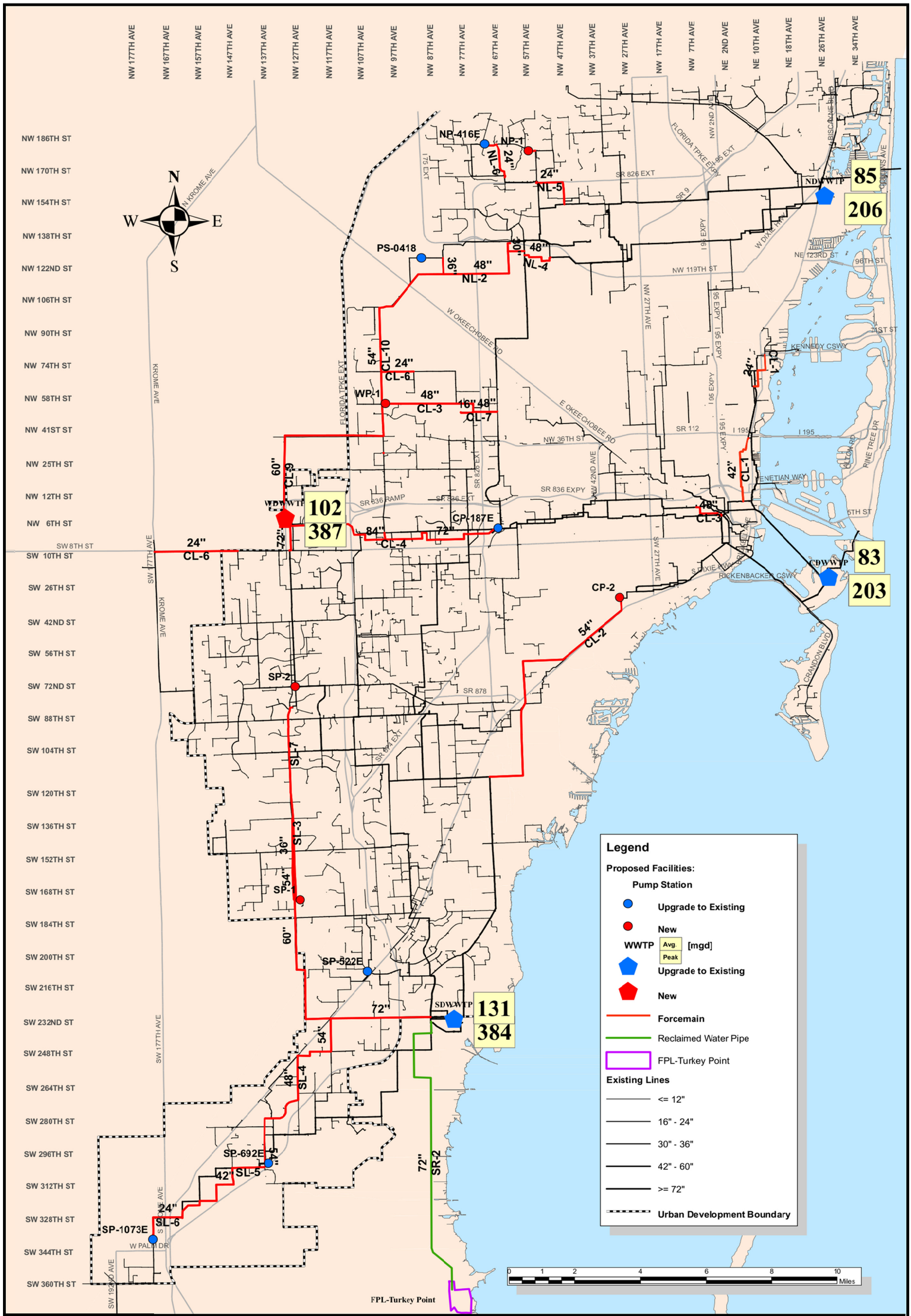
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Alternative 1 Proposed Facilities	Figure 17



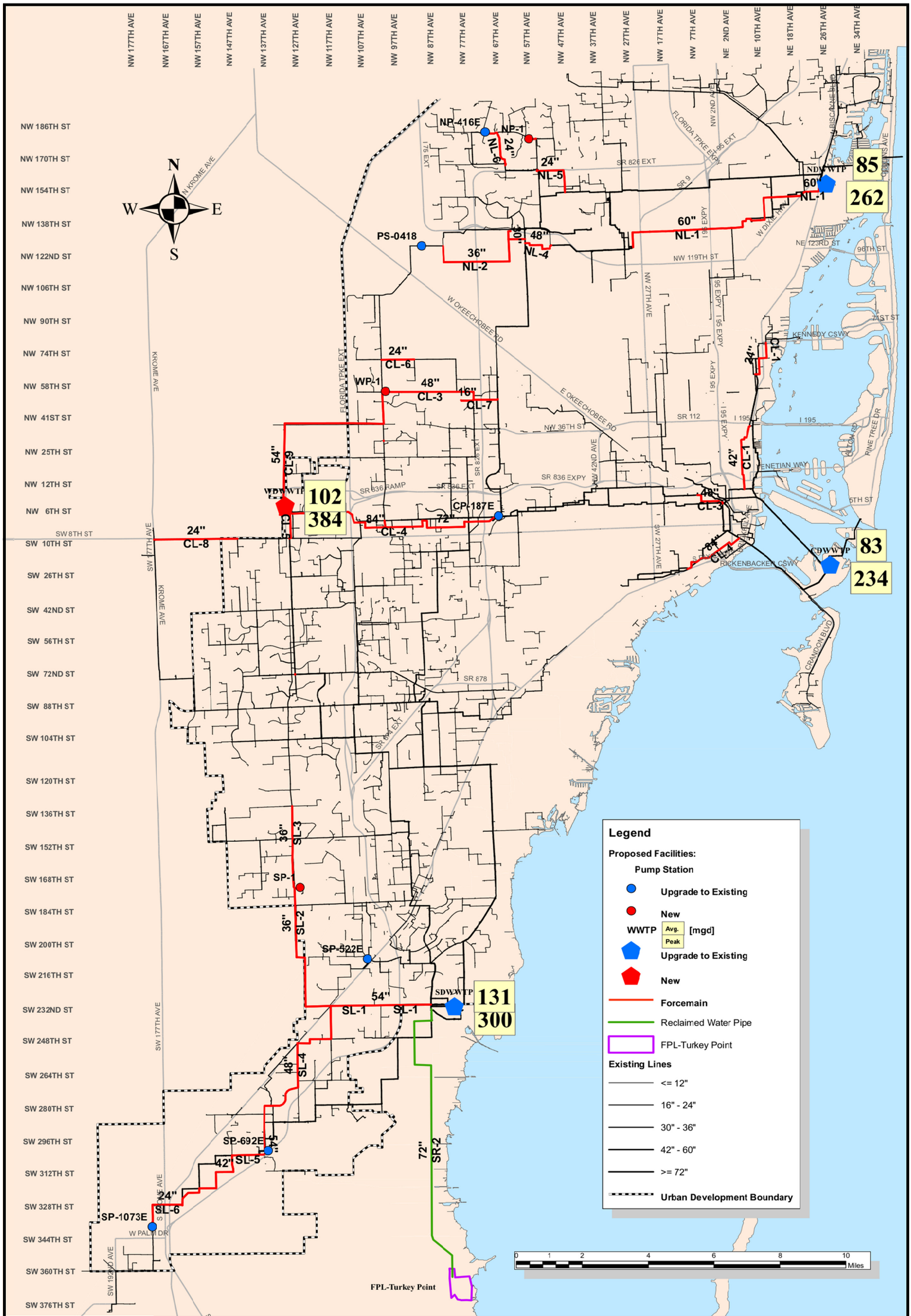
MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Alternative 2A-1-1, -2 Proposed Facilities	Figure 18



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Alternative 2A-2-1, -2 Proposed Facilities	Figure 19



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Alternative 2B-1 Proposed Facilities	Figure 20



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	Alternative 2B-2 Proposed Facilities	Figure 21

deep injection well and HLD treatment at the WDWWTP, which is not necessary with the use of the existing outfalls for the peak flow discharges. Substantially more cost for transmission facilities to effect the flow transfer to the WDWWTP are also included for Alternative 2B-1 which reflects the lower design peak flows at the existing plants due to the conservative treatment unit loadings. Based on cost, the B alternatives are not selected.

Of the remaining A alternatives, A2-2-2 is selected as the Plan for OOL compliance due to the following:

- Its cost is within several percent of the lowest of the A alternatives. This is considered to be within the accuracy of the cost estimates.

- It includes a measure of redundancy and flexibility which is not included in the lowest cost A alternative system (2A-1-2) due to the proposed Doral Pumping Station and associated force mains (Projects WP-1, CL-7, and CL-9). This system can be used to transfer flows to and from North District and provides additional major influent to the WDWWTP (CL-9). The selected alternative includes the cost of oversizing 54-in CL-9 force main to the WDWWTP, which is not included in the Alternative 2A-1-2.

8.0 The Recommended Plan

8.1 General

As described above, Alternative 2A-2-2 is the recommended plan. Projects are as summarized in Table 10.

Site plans with preliminary layouts of proposed facilities for the three existing WWTPs and the proposed WDWWTP are shown on Figures 22 through 25. These site plans have been developed for a preliminary visualization of needed facilities and demonstrating that sufficient space is available. They will be refined and finalized during the design process. The last column in Appendix E shows the hydraulic computer model results for the stations discharging their service area and upstream station flows directly into the manifolded transmission system.

8.2 Descriptions of Facilities

8.2.1 Reuse

Reuse for the recommended Plan is based on equal capacities at the existing CDWWTP and SDWWTP and proposed WDWWTP. For the 27.5 mgd system-wide requirement, this results in 9.2 mgd per plant. For this flow, 4 wells per WWTP, which includes one standby well at each WWTP, are included in the Plan. Hydrogeological modeling of the Floridan Aquifer (FA) was conducted to obtain estimated operating pressures with above flows at the plant locations. A description of the model and the analyses results is included in Appendix J. The equal flow distribution between the WWTPs and well design flows will be refined as hydrogeological information is obtained from test wells and further hydrogeological modeling is done. For the CDWWTP, this information will be obtained during the drilling of the centrate disposal well (Project CE-4). Due to the high pressures which can be developed with the injection of recharge water to the FA, preliminary siting of the wells has been set with maximum separation distances on the various plant sites.

8.2.2 Transmission

- CP-187E-Upgrade to Pump Station 187

  The station will boost local flow and transfer flows between districts as it currently does. The station structure will allow for pumping units to be installed below grade to allow for improved operation in flow transfers during dry weather conditions. The station will be constructed on the site of existing PS 187 if possible. An additional site in the vicinity will be obtained and interconnecting piping provided between it and PS 187 if necessary.

- CL-4-East/West 72/84-Inch Force Main Interconnection from PS 187 to WDWWTP

  Force main will carry the largest flow to the proposed WDWWTP. The route parallels W. Flagler St.

- WP-1 Doral Booster Station

  Station will booster local Doral area flow. For flexibility, the station will be configured to reverse flow direction so as to transfer flows between districts, directing local flow in either or both directions simultaneously. Timing for construction of the station with the CL-7 force main will precede other

Compliance Plan Projects to provide pressure relief in the Doral area. See next bullet. Several potential sites for this station are shown in Appendix K.

Table 10
OOL Compliance Plan Projects

No.	Description	Project Cost
CL-3	48-INCH FM CONNECTION IN NW 58 ST FROM NW 107 AVE TO 87 AVE - DORAL	$ 41,370,000
CL-4	EAST/WEST 72/84-INCH FM CONNECTION FROM PS 187 TO WDWWTP	$ 157,380,000
CL-5	72-INCH FM CONNECTION IN SW 137 AVE TO CL-4 FM IN NW 6TH ST	$ 30,730,000
CL-7	48-INCH FM CONNECTION IN NW 53 ST FROM PS 14 TO NW 72 AVE - DORAL	$ 16,370,000
CL-9	54-INCH FORCE MAIN FROM WP-1 (DORAL) TO WDWWTP	$ 99,580,000
CL-X	FLOW CONTROL - PIPELINE INTERCONNECTIONS	$ 5,000,000
CP-187E	UPGRADE TO PS187	$ 100,000,000
WP-1	DORAL BOOSTER STATION	$ 50,000,000
NT-2	NDWWTP - HLD TREATMENT	$ 63,940,937
NT-3	NDWWTP - PEAK FLOW TREATMENT	$ 43,779,809
CT-2	CDWWTP - HLD TREATMENT	$ 173,321,438
CT-3	CDWWTP - PEAK FLOW TREATMENT	$ 66,680,017
WT-1	WDWWTP - TREATMENT PLANT	$ 1,303,913,184
WT-2	WDWWTP - PEAK FLOW TREATMENT	$ 182,649,075
NE-1	NDWWTP - INJECTION WELL PUMP STATION	$ 37,711,282
NE-2	NDWWTP - INJECTION WELLS	$ 92,851,223
CE-1	CDWWTP - INJECTION WELL PUMP STATION	$ 75,828,087
CE-2	CDWWTP - INJECTION WELLS	$ 167,132,202
CE-3	CDWWTP - CENTRATE DISPOSAL PUMP STATION	$ 20,000,000
CE-4	CDWWTP - CENTRATE DISPOSAL WELL	$ 20,000,000
SE-1	SDWWTP - INJECTION WELL PUMP STATION	$ 6,208,820
SE-2	SDWWTP - INJECTION WELLS	$ 18,570,245
WE-1	WDWWTP - INJECTION WELL PUMP STATION	$ 118,312,512
WE-2	WDWWTP - INJECTION WELLS	$ 259,983,425
CR-1	CDWWTP - FLORIDAN AQUIFER RECHARGE	$ 25,558,050
SR-1	SDWWTP - FLORIDAN AQUIFER RECHARGE	$ 25,558,050
SR-2	SDWWTP - FPL RECLAIMED WATER PIPELINE	$ 95,000,000
WR-1	WDWWTP - FLORIDAN AQUIFER RECHARGE	$ 25,558,050
Total		$ 3,322,986,402

- CL-7, CL-9-Pump Station WP-1 Interconnection Piping

  The CL-7 project coincides with a local Master Planning project to connect the Downtown Doral development to the existing 48-in force in Milam Dairy Road

(NW 72nd Ave. The CL-7 project will be coordinated with this project and advanced to provide pressure relief to the Doral area.

- CL-5-72-Inch Force Main Connection in SW 137th Ave to CL-4 Force Main in NW 6th St.

  This project will connect the existing 54-inch force main in the FPL easement paralleling SW 137th Ave to the WDWWTP. A connection will be made to the 24-in east/west force main in SW 8th St. so that flows from this local area can be discharged to the WDWWTP.

8.2.3 Treatment

Design AADF and peak weather flows with resulting treatment plant design parameters for selected alternative are summarized on Table 11.

General features of the wastewater treatment components of the Compliance Plan are as follows:

- NDWWTP (Figure 22)

  MDWASD owns 27.5 acres of land at the southwest portion of the present WWTP property. The preliminary plan is to locate the Boulder Zone deep injection wells along the periphery of that area. The remaining facilities are shown at the eastern side of the existing plant to minimize transfer of flows back and forth to the available 27.5 acre parcel.

- CDWWTP (Figure 23)

  The plan is to operate Plant 2, the newer of the two process streams for normal operation and to activate Plant 1 with biomass seeding from Plant 1 during peak wet weather events. With this scheme, the filtration system is located in the northeast corner of the site in the decommissioned sludge drying beds in the vicinity of the Plant 2 effluent. The high rate clarification will be located in the location of the decommissioned Plant 1 aeration basins. This will require demolition of a portion of these tanks. This location is optimal for wet weather discharges through the outfall. The deep injections wells are arranged along the periphery of the sludge drying beds and the FA wells sited with maximum spacing as shown.

Table 11
Wastewater Treatment Plant Design Parameters

WWTP		ND	CD	SD	WD
Design Flows (Mgd)	AADF	85	83	131	102
	Peak	327	333	305	215
HLD/AADF Ratio		1.5	1.7	-	-
HLD Capacity	Exist.	5[1]	0	285	-
	Proposed	57	141	20	215[2]
	Total	57	141	305	215
Peak Effluent Flows, Mgd	DIW-HLD	57	132	295.8[3]	205.8
	DIW-No HLD	71	0	0	0
	Outfall	199	192	-	-
	Reuse-FA	0	9.2	9.2	9.2
	Reuse-FPL	-	-	90	-
Number of Deep Injection Wells	Exist.	4	0	17	-
	Proposed	5	9	1	14
	Total	9	9	18	14
Number of FA Wells		0	4	4	4

[1]Existing HLD (filtration) capacity at ND to be replaced.
[2]MBR proposed for HLD at WDWWTP
[3]Includes backup to 90 mgd reuse flow to FPL

- SDWWTP (Figure 24)

  All effluent is discharged to deep injection wells at this plant so that HLD treatment is required for the peak wet weather flow. In order to maintain the conservative 855 gpd/ft^2 loading on the secondary clarifiers at the increased peak flow projected for the plant, an additional two final clarifiers are included. The recently-completed HLD facility at the SDWWTP was laid out for expansion and an additional filter has been added. FA wells are sited with maximum spacing.

- WDWWTP (Figure 25)

  A preliminary site plan is shown. The 245-acre site has been selected via a formal site selection procedure. The site is located west of NW 137th Ave at NW 6th St. Funding is included in the proposed 2013-2019 Capital Budget Multi-Year Capital Plan (CBMYCP) the purchase of the site. A description of the activities completed to date with regard to the site selection process and figures showing candidate sites evaluated and the selected site are included as Appendix L. Also included in Appendix L is a consultant preliminary assessment of site design elevation and site development requirements.

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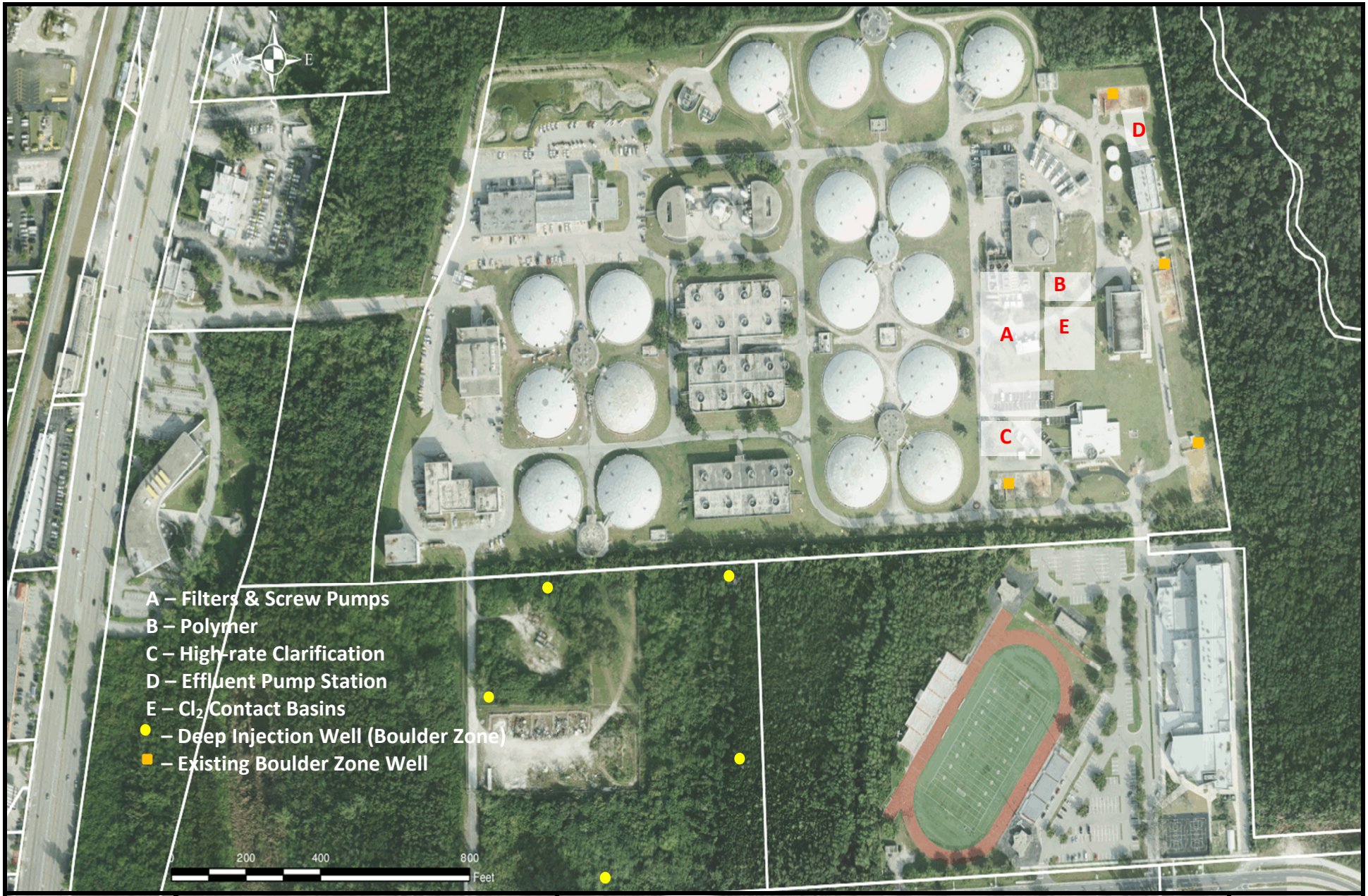
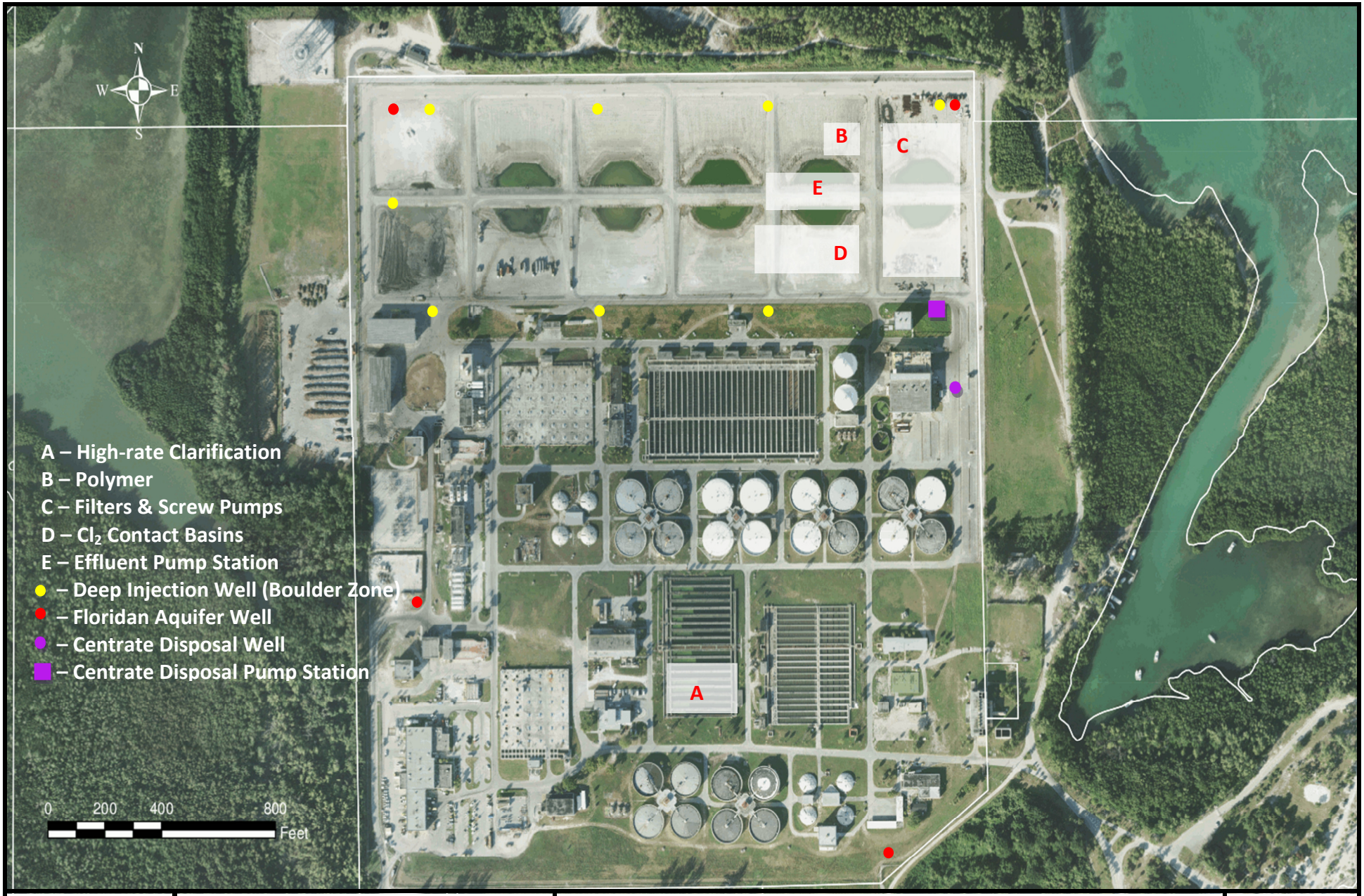
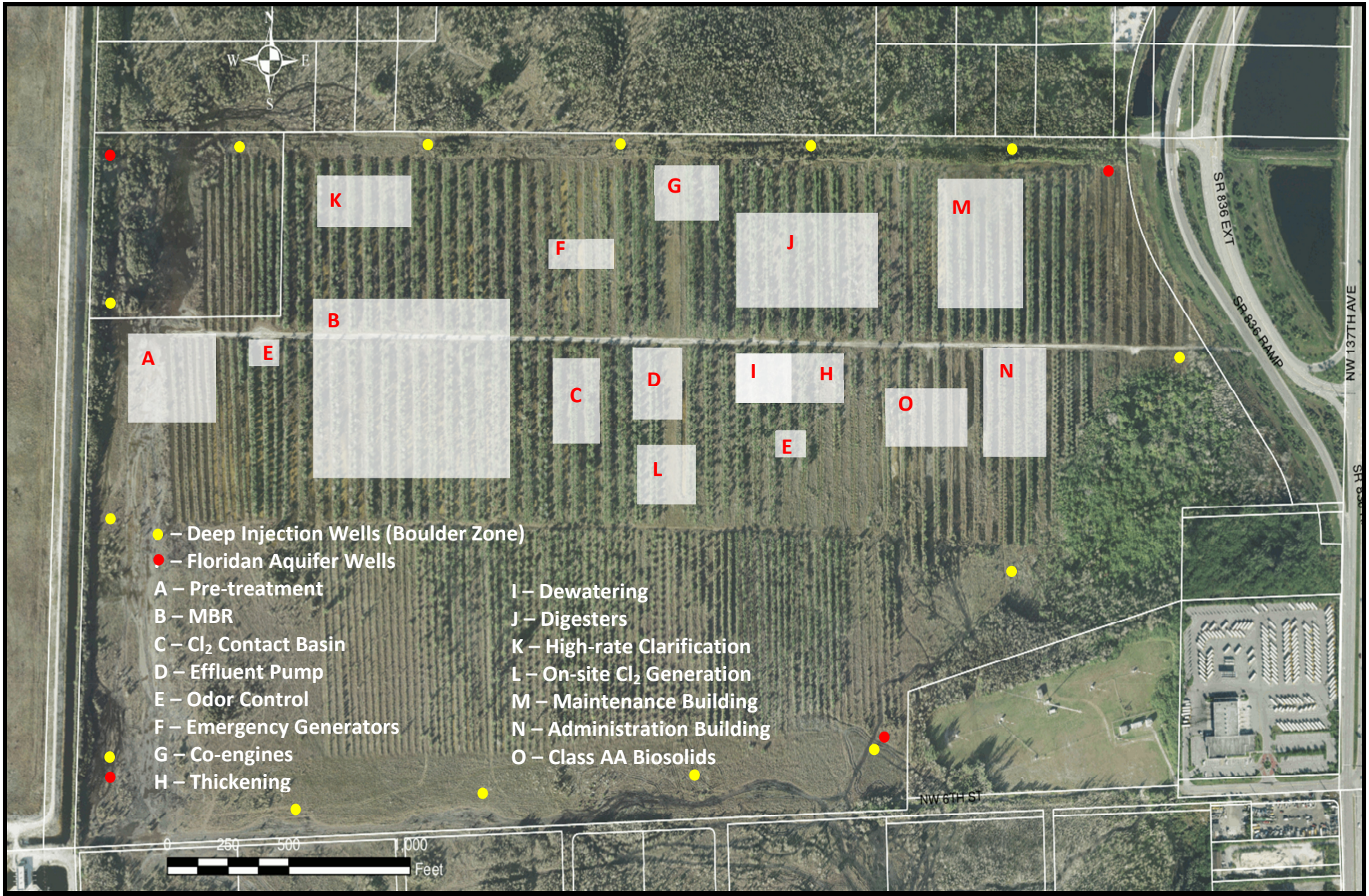


MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	NDWWTP – Proposed Facilities	Figure 22



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	CDWWTP – Proposed Facilities	Figure 23

MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	SDWWTP – Proposed Facilities	Figure 24



MIAMI-DADE COUNTY Water and Sewer Department	OCEAN OUTFALL LEGISLATION COMPLIANCE PLAN	WDWWTP – Proposed Facilities	Figure 25

8.3 Project Schedules

Project schedules are included in Figures 26-1, 26-2, 26-3, and 26-4. As indicated, most of the projects are scheduled to be completed one year before the December 31, 2025 deadline included in the OOL for removal of flow from the outfalls and initiation of reuse projects. Projects for near term initiation are:

- Projects CE-3, CE-4-Centrate Disposal Well and Pump Station-As previously described, these projects are needed to comply with the nutrient reduction requirements of the OOL and need to be in service by December 31, 2015. Hydrogeological data obtained from the drilling of the disposal well will be used in the FA well design.

- Project CP-187E is scheduled for initiation in FY 2013-2014. It will provide hydraulic relief to the central part of the county and improve inter-district flow transfers within the MDWASD system.

- Projects CL-3 and CL-7-As indicated this project is needed for a proposed development in the Doral area. Completion of pump station WP-1 will provide capacity relief in the Doral area. These projects have been advanced to be initiated in FY 2-13-2014.

- The CDWWTP projects for HLD and Peak Flow, including the Deep Injection Well system have been advanced to be initiated in 2015-2016 to provide an additional measure of assurance that the required OOL nutrient reductions have been achieved. These are projects CE-1, CE-2, CT-2 and CT-3.

- For the proposed WDWWTP, in addition to the land acquisition during 2013-2014, steps for procuring engineering assistance to initiate activities such as site permitting and rezoning will proceed following FDEP response to the submission of this Plan.

The schedules are cost-loaded with monthly projected expenditures assigned to each month of the estimated project durations. This information is summarized on Table 12 which shows the annual projected cost for each project and annual totals for all of the projects for each of the project phases.

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Figure 26-1

Figure 26-2

Figure 26-3

Figure 26-4

Table 12

Ocean Outfall Legislation Projects – Compliance plan – Annual Projected Expenditures by Project and Project Phase October 1, 2012 – September 30, 2025

No	Project Name	Project Cost	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
1	CL-3 - 48-Inch FM Connection in NW 58th St from NW 107th Ave to 87 Ave - Doral	$41,370,000							$294	$327,761	$2,863,276	$528,257	$8,674,326	$28,301,016	$675,070
2	CL-4 - East/West 72/84-Inch FM Connection from PS 187 to WDWWTP	$157,380,000							$4,203	$3,460,196	$8,677,151	$1,976,603	$33,001,374	$107,691,681	$2,568,792
3	CL-5 - 72-Inch FM Connection in SW 137 Ave to CL-4 FM in NW 6th St.	$30,730,000							$294	$247,397	$2,125,036	$393,145	$6,443,141	$21,019,603	$501,385
4	CL-7 - 48-Inch FM Connection in NW 53 St from PS 14 to NW 72 Ave - Doral	$16,370,000		$58,901	$1,213,178	$208,698	$10,211,966	$4,677,257							
5	CL-9 - 54-Inch Force Main From CP-2 (Doral) to WDWWTP	$99,580,000								$317,406	$7,402,864	$1,217,574	$20,880,241	$68,136,638	$1,625,278
6	CL-X - Flow Control - Pipeline Interconnections	$5,000,000							$303	$71,255	$329,170	$86,903	$4,071,920	$440,448	
7	CP-187E - Upgrade to PS187	$100,000,000	$917	$1,194,075	$6,520,860	$1,257,903	$14,857,486	$72,942,230	$3,226,529						
8	WP-1 - Doral Booster Station	$50,000,000	$44,759	$865,138	$3,716,300	$618,988	$30,586,306	$14,168,510							
9	NT-2 - NDWWTP - HLD Treatment	$63,940,937							$5,000	$4,110,529	$1,619,479	$610,675	$28,394,801	$28,599,779	$600,675
10	NT-3 - NDWWTP - Peak Flow Treatment	$43,779,809							$5,000	$2,814,150	$1,108,712	$421,232	$19,439,575	$19,579,907	$411,232
11	CT-2 - CDWWTP - HLD Treatment	$173,321,438				$3,295	$2,103,777	$10,804,138	$2,628,223	$1,570,555	$75,923,251	$78,688,531	$1,599,668		
12	CT-3 - CDWWTP - Peak Flow Treatment	$66,680,017				$3,295	$810,303	$4,156,000	$1,011,021	$610,233	$29,205,060	$30,268,767	$615,337		
13	WT-1 - WDWWTP - Treatment Plant	$1,303,913,184	$411,564	$15,323,559	$2,039,781	$1,745,937	$6,325,259	$66,680,522	$24,092,614	$15,868,177	$36,406,123	$348,951,145	$610,423,800	$168,079,740	$7,564,964
14	WT-2 - WDWWTP - Peak Flow Treatment	$182,649,075	$917	$36,614	$509,945	$436,484	$866,930	$9,037,577	$3,265,404	$2,228,947	$5,169,463	$49,527,698	$86,639,308	$23,856,069	$1,073,718
15	NE-1 - NDWWTP - Injection Well Pump Station	$37,711,282							$294	$294,182	$2,612,823	$484,342	$7,907,100	$25,797,196	$615,346
16	NE-2 - NDWWTP - Injection Wells	$92,851,223							$41,141	$6,114,051	$2,171,191	$882,328	$41,236,252	$41,533,931	$872,328
17	CE-1 - CDWWTP - Injection Well Pump Station	$75,828,087					$79,346	$5,290,478	$1,430,785	$692,612	$33,212,707	$34,422,381	$699,776		
18	CE-2 - CDWWTP - Injection Wells	$167,132,202					$168,883	$11,661,922	$3,153,855	$1,514,820	$73,211,829	$75,878,353	$1,542,539		
19	CE-3 - CDWWTP - Centrate Disposal Pump Station	$20,000,000	$805,003	$1,001,039	$17,315,644	$878,314									
20	CE-4 - CDWWTP - Centrate Disposal Well	$20,000,000	$805,003	$1,001,039	$17,315,644	$878,314									
21	SE-1 - SDWWTP - Injection Well Pump Station	$6,208,820									$9,045	$478,186	$82,954	$5,404,813	$233,822
22	SE-2 - SDWWTP - Injection Wells	$18,570,245									$4,938	$1,478,523	$194,739	$16,191,567	$700,477
23	WE-1 - WDWWTP - Injection Well Pump Station	$118,312,512							$1,944	$2,334,689	$6,877,869	$1,402,984	$25,426,787	$80,460,963	$1,807,277
24	WE-2 - WDWWTP - Injection Wells	$259,983,425							$111,000	$17,871,632	$5,324,763	$2,452,667	$115,473,502	$116,307,089	$2,442,771
25	CR-1 - CDWWTP - Floridan Aquifer Recharge	$25,558,050							$294	$204,244	$1,768,526	$329,219	$5,358,594	$17,480,214	$416,959
26	SR-1 - SDWWTP - Floridan Aquifer Recharge	$25,558,050							$294	$204,244	$1,768,526	$329,219	$5,358,594	$17,480,214	$416,959
27	SR-2 - SDWWTP - FPL Reclaimed Water Pipeline	$95,000,000								$95,000,000					
28	WR-1 - WDWWTP - Floridan Aquifer Recharge	$25,558,050							$294	$204,244	$1,768,526	$329,219	$5,358,594	$17,480,214	$416,959
	Total	**$3,322,986,406**	**$2,068,164**	**$19,480,365**	**$48,631,351**	**$6,031,227**	**$66,010,257**	**$199,418,636**	**$38,978,784**	**$156,061,323**	**$299,560,330**	**$631,137,949**	**$1,028,822,923**	**$803,841,082**	**$22,944,014**

No	Phase Name	Project Cost	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025
1	**Land Acquisition**	**$16,350,000**	**$455,406**	**$15,894,594**											
2	Land Acquisition	$16,350,000	$455,406	$15,894,594											
3	**Design**	**$289,439,532**	**$1,612,757**	**$3,566,403**	**$14,000,064**	**$4,248,440**	**$10,354,498**	**$107,630,639**	**$35,751,870**	**$56,658,304**	**$46,431,793**	**$8,927,070**	**$257,694**		
4	Pre-Design, Planning	$5,000,000		$162,654	$2,549,726	$2,182,421	$105,198								
5	A&E Selection	$125,000	$2,751	$22,249		$6,590	$13,410		$28,211	$41,789	$9,938	$62			
6	Design	$245,054,853	$1,610,007	$2,895,381	$11,450,337	$36,350	$10,235,890	$107,630,639	$29,849,733	$38,534,191	$40,764,314	$2,048,011			
7	Dry Run / Permit	$39,259,679		$486,118		$2,023,079			$5,873,926	$18,082,324	$5,657,541	$6,878,998	$257,694		
8	**Construction**	**$3,017,196,874**		**$19,369**	**$34,631,288**	**$1,782,787**	**$55,655,758**	**$91,787,997**	**$3,226,914**	**$99,403,020**	**$253,128,538**	**$622,210,879**	**$1,028,565,230**	**$803,841,082**	**$22,944,014**
9	Contractor Selection	$270,000		$19,369	$631	$26,159	$3,841		$385	$54,414	$5,305	$121,199	$38,697		
10	Construction	$3,016,926,874			$34,630,656	$1,756,628	$55,651,918	$91,787,997	$3,226,529	$99,348,605	$253,123,233	$622,089,680	$1,028,526,533	$803,841,082	$22,944,014
	Total	**$3,322,986,406**	**$2,068,164**	**$19,480,365**	**$48,631,351**	**$6,031,227**	**$66,010,257**	**$199,418,636**	**$38,978,784**	**$156,061,323**	**$299,560,330**	**$631,137,949**	**$1,028,822,923**	**$803,841,082**	**$22,944,014**

NDWWTP - North District Wastewater Treatment Plant
CDWWTP - Central District Wastewater Treatment Plant
SDWWTP - South District Wastewater Treatment Plant
WDWWTP - West District Wastewater Treatment Plant

FPL - Florida Power & Light
HLD - High Level Disinfection
OOL - Ocean Outfall Legislation

8.4 Financial Plan

The MDWASD water and wastewater rates are set annually as part of the County's budgeting process. Each year, the MDWASD prepares a budget that includes estimated water and wastewater flows, expenses, revenues and rates necessary to meet cash flow and debt service requirements. Rates are set on an annual basis as the budget is approved. Future rate requirements are estimated and submitted with the proposed Capital Budget and Multi-Year Capital Plan (CBMYCP) over the 6-year horizon each year, with only the next year's rates approved by the Miami-Dade County Board of County Commissioners (BCC).

The present proposed budget includes the following five year retail rate adjustments:

2013-2014	8% (Approved by BCC on June 4, 2013)
2014-2015	6%
2015-2016	6%
2016-2017	5%
2017-2018	5%

Wholesale rates are computed based on cost recovery. An estimated 4% annual increase is included in the rate computations. These projected retail and wholesale rate increases were based on preliminary estimates for compliance with the Ocean Outfall legislation (OOL) prior to the completion of this report. Table 13 shows the latest proposed CBMYP, submitted to the Office of Management and Budget (OMB) on June 7, 2013, together with adjustments based on the implementation of the selected alternative. Note that the OOL figure for compliance is slightly higher than estimated with a reduction in the overall wastewater total. The CBMYCP and rate adjustments are reviewed for updates and prepared annually for budget submittal.

Table 13
Proposed Wastewater Capital Budget and Multi-Year Capital Plan Adjustments

CBMYCP FY2013-FY2019		OOL Compliance Plan
OOL - Project 1040	$ 2,987,929,371	
OOL - Other related projects	$ 249,729,972	
OOL - Total	$ 3,237,659,343	$ 3,322,986,402
Total CBMYCP	$ 8,559,724,151	$ 8,300,252,126

The primary means of funding the needed projects will be revenue bonds supported through rate adjustments including the rate increases indicated above. Funding via the State of Florida revolving loan fund will also be sought, in addition to any grants that may become available.

8.5 Public Meeting

A public meeting was held at the MDWASD Douglas Road Headquarters on June 5, 2013 to present the draft Plan for public comments. The presentation given at the meeting and sign-in sheet are included as Appendix M.