Memorandum

MIAMI-DADE COUNTY

Date: September 4, 2007

Agenda Item No. 8(R)(1)(B)

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

From: George M. Burgess
County Manager

Subject: Resolution adopting the "Wastewater Facilities Master Plan Including the Interim Peak Flow Management Plan" for the Miami-Dade Water and Sewer Department

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RECOMMENDATION

It is recommended that the Board of County Commissioners (Board) approve the attached resolution adopting the "Wastewater Facilities Master Plan Including the Interim Peak Flow Management Plan" (2007 PLAN) for the Miami-Dade Water and Sewer Department (MDWASD) and authorizing the Mayor or his designee to submit the 2007 PLAN to the Florida Department of Environmental Protection (FDEP).

Total estimated projects costs are approximately $3.8 billion to meet county-wide wastewater demands to the year 2025. Approval of this 2007 PLAN may result in cost savings as a portion of the funding is expected to be provided through the State Revolving Fund (SRF) Water Pollution Control Program which provides low-interest loans, usually 55 to 60 percent of municipal bond rates, for planning, designing, and constructing water pollution control facilities.

SCOPE OF AGENDA ITEM

The impact of this agenda item is county-wide as it will allow the County to provide wastewater facilities to meet demands for the Miami-Dade service area through the year 2025.

FISCAL IMPACT/FUNDING SOURCE

The fiscal impact of this item is $3.8 billion which will be funded by Revenue Bonds, SRF, State Alternative Water Supply Funding and federal funding for the Comprehensive Everglades Restoration Plan (CERP). The capital projects included in the 2007 PLAN will be incorporated into MDWASD's multi-year capital plan.

TRACK RECORD/MONITOR

MDWASD has created a Program Management Division which will be tracking and managing the implementation of the capital projects in the 2007 PLAN. These projects are listed in Table 1-7 of the attached Executive Summary which includes a description of the project, the in-service date of the project and total project costs.

BACKGROUND

On July 22, 2003, the Board adopted Resolution R-811-03 approving and adopting the 2003 Wastewater Facilities Master Plan Including Interim Peak Flow Management Plan (2003 PLAN) with an estimated capital cost of $2.2 billion, to meet the wastewater demands to the year 2020. The 2003 PLAN was submitted to the FDEP for approval to qualify for SRF. The FDEP did not approve the 2003 PLAN because it did not include an evaluation of reuse as part of the wastewater disposal options, as such, MDWASD hired a consultant to conduct a reuse feasibility study, and in April 2007, an updated Reuse Feasibility Study was completed. The Reuse Feasibility Study's recommended alternative has been incorporated into the 2007 PLAN which contains the necessary capital projects to meet the County's wastewater demands to the year 2025. These capital projects include reclaimed water projects at the existing North, Central, and South District Wastewater Treatment Plants; and at a new West District Water Reclamation Plant. These projects are also part of the County's alternative water supply plan and have been developed in order to obtain a 20-year consumptive use permit from the South Florida Water Management District. The proposed West District Water Reclamation Plant will be located in the vicinity of the Bird Drive Basin, which is consistent with the West Miami-Dade Reuse Project included in CERP. The 2007 PLAN also includes updated average and peak flow demand projections based on more recent population projections and actual peak flow conditions and extended the planning period to the year 2025.

An approved Wastewater Facilities Master Plan is the first step in obtaining approval for SRF low-interest loans from the FDEP. FDEP has verbally committed $100 million for the high level disinfection projects, which are included in the 2007 PLAN, to construct a 285 millions gallon per day facility at the South District Wastewater Treatment Plant. The 2007 PLAN has been prepared in accordance with the guidelines established by the State of Florida to qualify for the SRF Program.

Assistant County Manager

MEMORANDUM
(Revised)

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

DATE: September 4, 2007

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

SUBJECT: Agenda Item No. 8(R)(1)(B)

Please note any items checked.

_____ **"4-Day Rule" ("3-Day Rule" for committees) applicable if raised**

_____ **6 weeks required between first reading and public hearing**

_____ **4 weeks notification to municipal officials required prior to public hearing**

_____ **Decreases revenues or increases expenditures without balancing budget**

_____ **Budget required**

_____ **Statement of fiscal impact required**

_____ **Bid waiver requiring County Manager's written recommendation**

_____ **Ordinance creating a new board requires detailed County Manager's report for public hearing**

_____ **Housekeeping item (no policy decision required)**

_____ **No committee review**

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 8(R)(1)(B)

09-04-07

RESOLUTION NO. _____

RESOLUTION APPROVING AND ADOPTING THE WASTEWATER FACILITIES PLAN FOR THE PURPOSE OF OBTAINING STATE REVOLVING LOAN FUNDING (SRF) FOR THE CONSTRUCTION OF MIAMI-DADE WATER AND SEWER DEPARTMENT WATER POLLUTION CONTROL FACILITIES; AND AUTHORIZING THE MAYOR OR HIS DESIGNEE TO SUBMIT PLAN TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

WHEREAS, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that this Board hereby approves and adopts the Wastewater Facilities Master Plan Including Interim Peak Flow Management Plan, in substantially the form attached hereto and made a part hereof, for the purpose of obtaining State Revolving Loan Funding for the construction of Miami-Dade Water and Sewer Department's water pollution control facilities, which facilities have an estimated project cost of approximately $3.7 billion to meet wastewater demands to the year 2025; and authorizes the Mayor or his designee to submit such Plan to the Florida Department of Environmental Protection.

The foregoing resolution was offered by Commissioner , who moved its adoption. The motion was seconded by Commissioner and upon being put to a vote, the vote was as follows:

Bruno A. Barreiro, Chairman
Barbara J. Jordan, Vice-Chairwoman

Jose "Pepe" Diaz	Audrey M. Edmonson
Carlos A. Gimenez	Sally A. Heyman
Joe A. Martinez	Dennis C. Moss
Dorrin D. Rolle	Natacha Seijas
Katy Sorenson	Rebeca Sosa
Sen. Javier D. Souto	

The Chairperson thereupon declared the resolution duly passed and adopted this 4th day of September, 2007. This resolution shall become effective ten (10) days after the date of its adoption unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF COUNTY
COMMISSIONERS

HARVEY RUVIN, CLERK

By:_____
Deputy Clerk

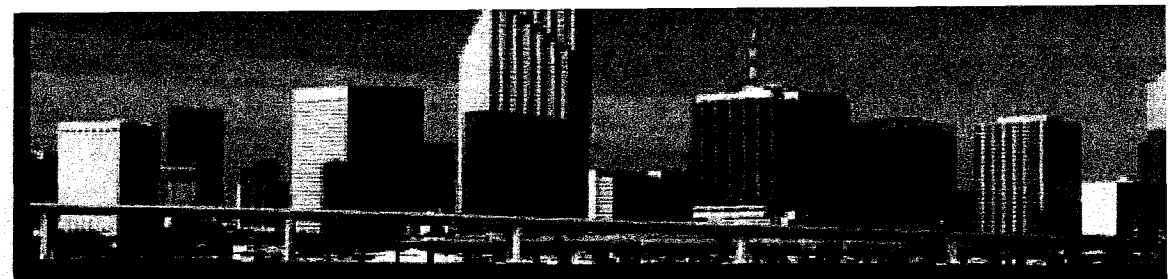
Approved by County Attorney as
to form and legal sufficiency.

Dave Murray

MIAMI-DADE COUNTY

Delivering Excellence Every Day

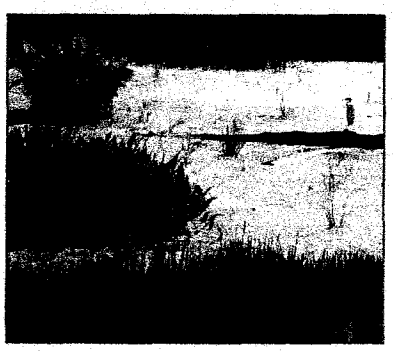
MIAMI-DADE WATER AND SEWER DEPARTMENT



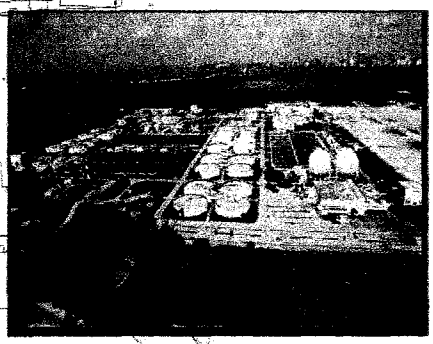
REVISION
JUNE 2007

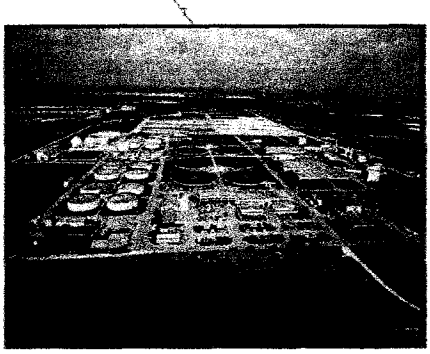
WASTEWATER FACILITIES MASTER PLAN

INCLUDING INTERIM PEAK FLOW MANAGEMENT PLAN



EXECUTIVE SUMMARY





PREPARED BY:

MIAMI-DADE WATER AND SEWER DEPARTMENT

PLANNING DIVISION

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1.0 Executive Summary

1.1 Introduction

The Miami-Dade Water and Sewer Department (MDWASD) is faced with the challenges to continue to provide water and wastewater system capacity for a growing population including the processing of wastewater flows during peak wet weather events. The population in the County has been rising at a rapid rate and the region is subject to high intensity rainfall. Also with regard to water supply, it will no longer be possible to provide for additional future water demands from the Biscayne Aquifer which has long been the sole source of drinking water for Miami-Dade County.

The Florida Department of Environmental Protection (FDEP) in recent years has strongly encouraged the MDWASD to increase the quantity of water reclaimed from wastewater treatment plant effluent as an offset to future water demands. In order to advance the development of reclaimed water supplies, MDWASD completed a Reuse Feasibility Study in April, 2007. In this study, programs of varying levels of reclaimed water implementation were evaluated. Based on the study, a program has been adopted under which facilities will be constructed over the next 20 years to reclaim 40 percent of projected average daily wastewater flows. The estimated total cost for this program is $1.6 billion.

Concurrently to the development of the reclaimed water program, MDWASD is meeting the requirements of an Agreement with the South Florida Water Management District (SFWMD) for the approval of a 20-year consumptive use permit to secure a water supply over that time period. One of its central provisions was the completion of an Alternative Water Supply Plan (AWS) which was submitted to SFWMD on May 10, 2007. The major components of the reclaimed water program are incorporated into the AWS Plan which also includes use of the Floridan Aquifer as a water supply for a new water treatment plant and for blending with Biscayne Aquifer water.

Both of these initiatives are incorporated in this Wastewater Facilities Master Plan. The purpose of this plan is to evaluate and identify capital improvement needs for transmission treatment, storage, and effluent disposal for future population growth and wet weather peak flow requirements for the wastewater system over a 20-year planning period. This document is a revision to the 2003 Wastewater Facilities Master Plan submitted to the Florida Department of Environmental Protection (FDEP) on December 23, 2003. It has been revised to incorporate the reuse and alternative water supply programs as described above together with updated population and flow projection information. The Plan also includes descriptions of draft recommendations for biosolids treatment and disposal per a Biosolids Master Plan which is presently nearing completion.

In order to meet the requirements of the Second and Final Partial Consent Decree (SFPCD) with the United States Environmental Protection Agency (USEPA), it is required to submit a Peak Flow Management Plan by May 2008, which is to include a program of upgrades, including those for individual pumping stations, necessary for the processing of wet weather flows. MDWASD has retained a consultant, Hazen and Sawyer, P.C., for this work.

This Master Plan includes an Interim Peak Flow Management Plan which is based on a methodology to determine the larger regional transmission and treatment facilities needed. The document consists of a two volume set that includes a seven section report and appendices.

1.2 Existing Wastewater Facilities

1.2.1 General

The MDWASD provides sewer service to most of Miami-Dade County. The system consists of over 1,000 gravity sewer collection basins, four major gravity interceptors, over 1,000 pumping stations including five major booster stations, transmission mains and three regional wastewater treatment plants owned and operated by MDWASD. Other public and private entities, called Volume Sewer Customers (VSCs), are interconnected to MDWASD facilities and convey sewage to the regional plants. Figure 1-1 shows the service areas for the three wastewater treatment plants. Table 1-1 provides a summary of the wastewater system facilities.

Table 1-1
MDWASD Summary of Wastewater Facilities

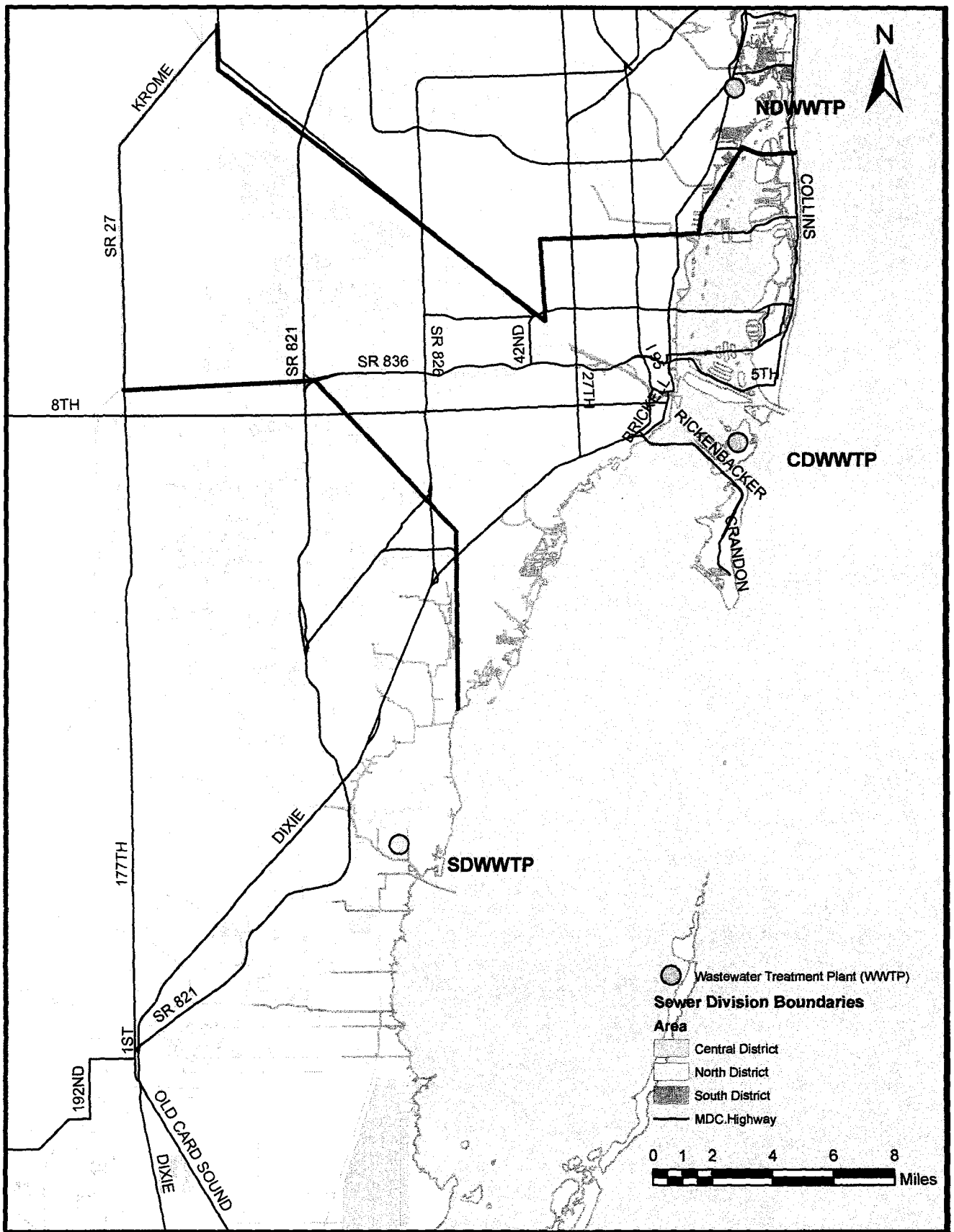
Facilities	Quantity
Collection System	2,914 miles
Pump Stations	942
Regional Pump Stations	39
Force Mains	880 miles
Wastewater Treatment Plants	3
Volume Sewer Customers	13

The wastewater transmission systems for the three treatment plants are interconnected. This provides MDWASD with some capability to direct sewage flows between service areas from one plant to another. MDWASD can exercise this option during storm events, emergencies, and planned shutdowns to balance flows between the three plants to optimize capacity.

1.2.2 Wastewater Treatment Plants and Reclaimed Water Facilities

1.2.2.1 Flows

The rate of sewage flow entering a plant is usually expressed in units of million gallons per day (mgd). The annual average daily flow (AADF) is the total volume of wastewater into a wastewater facility during a consecutive 365 days, divided by 365. The peak daily flow is the highest volume received during a 24-hour day period. A peak hourly flow is the average flow rate during the one-hour period of the day when the flows are at a maximum. Wet weather event flow is the flow that enters a plant in response to a rainfall event. Historically, for the MDWASD system, peak flow rates are sustained for up to 3 to 4 days following major rainfall events.



MIAMI-DADE COUNTY MIAMI-DADE WATER AND SEWER DEPARTMENT	WASTEWATER FACILITIES MASTER PLAN	WWTP Locations and Approximate Service Area Boundaries	Figure 1-1

The permitted capacity is the treatment capacity for wastewater flow for which a wastewater facility is approved to treat and discharge expressed in units of mgd with an associated time frame, as specified in the facilities operating permit approved by the Environmental Protection Agency (EPA) or Florida Department of Environmental Protection (FDEP). MDWASD wastewater facility permits have treatment capacity time frame expressed in annual average daily flow and are based on having one process unit out of service. The rated capacity of a wastewater plant is its calculated physical capacity of all process units. Table 1-2 compares the 2005 annual average daily and peak flows to the wastewater facility treatment capacity and rated capacity.

Table 1-2
Plant Capacities and Actual Flows (MGD)

	Annual Average Flow			Peak Hour Flow	
Treatment Plant	Permitted Capacity	Rated Capacity	2005 Average Daily	Estimated Peak Hour Capacity	2005 Peak Hour
NDWWTP	112.5	120	92.7	250	200.6
CDWWTP	143	143	111.7	320	305.0
SDWWTP	112.5	112.5	91.4	250	238.6
Total	368	375.5	297	820	--

1.2.2.2 North District Wastewater Treatment Plant (NDWWTP)

The NDWWTP, located in the Northeast section of Miami-Dade County at 2575 N.E. 151st Street, serves the northern portion of the County. The plant is permitted to treat an annual average daily wastewater flow of 112.5 mgd to secondary treatment standards with basic disinfection. The pure oxygen activated treatment plant with primary and secondary clarification discharges effluent via ocean outfall and deep injection wells. The ocean outfall is a 90-inch pipe that extends just over 2 miles from the shoreline at a depth of 108 feet. The effluent flows by gravity during low flow periods overnight or via pumping. Four deep injection wells have been constructed to a depth of 2,400 feet.

A portion of the system effluent, up to 2.23 mgd, is reclaimed via further processing through effluent filters and disinfected with chlorine. The majority of the reuse stream is used on-site as process water or irrigation on the facility property. Approximately 100,000 gallons per day is supplied to Florida International University North Campus for irrigation.

The primary and secondary waste sludge removed from the wastewater in the process is pumped off-site through twin 16-inch sludge lines to the Central District Wastewater Treatment Plant (CDWWTP).

1.2.2.3 Central District Wastewater Treatment Plant (CDWWTP)

The CDWWTP is located on Virginia Key and serves the central portion of the County, including Miami Beach and Key Biscayne. The facility has a permitted capacity to treat an annual average daily wastewater flow of 143 mgd. The pure oxygen activated treatment plant has two independently operated process trains that discharge chlorinated effluent to the ocean through a 120/90-inch pipe. Similar to the NDWWTP, effluent is discharged by gravity during low flow periods and pumped the remainder of the time. The outfall extends approximately 3.6 miles from the shoreline and discharges through a 48-inch diameter diffuser system at a depth of approximately 90 feet. The biosolids removed in the treatment process is pumped to gravity sludge thickeners. The concentrated sludge is then pumped to anaerobic sludge digesters. After the digestion process the sludge is dewatered prior to disposal or land application.

Approximately 9.73 mgd of the secondary treated effluent is processed further for onsite reuse. The onsite reuse system consists of sand filters, water transfer pumps, chlorine contact tanks, chlorine injector pumps, and strainers. The filtered reuse water is utilized for plant processes that include odor control scrubbers and flushing water.

1.2.2.4 South District Wastewater Treatment Plant (SDWWTP)

The SDWWTP is located in the Southeast section of Miami-Dade County at 8950 S.W. 232nd Street. The plant serves the southern and southwest portions of the County. It is permitted to treat an annual average daily wastewater flow of 112.5 mgd to secondary treatment standards prior to deep well injection. A total of 17 deep injection wells are installed for the disposal of treated effluent from the plant. The sludge removed in the treatment is processed on-site through gravity thickeners, anaerobic digesters, and dewatered by centrifuge prior to disposal or land application. A portion of the residuals is composted using static pile aeration for agricultural use or land application.

Approximately 4.25 MGD of the plant secondary treated effluent is chlorinated and processed through sand filters of an on-site reuse facility to Public Access Reuse (PAR) standards. This filtered flow is reused for internal plant processes and on-site irrigation.

1.3 System Upgrade Programs

1.3.1 Collection Systems

1.3.1.1 10-Hour NAPOT

The majority of the pump stations now exhibit less than or equal to the ten-hour nominal annual pump operating time (NAPOT) performance standard included in the United States Environmental Protection Agency (USEPA) First Partial Consent Decree (FPCD). The NAPOT is defined as the daily average total pump operating hours for the twelve months divided by one less than the total number of pumps installed in that station. MDWASD has a program administered by in-house personnel to proactively maintain compliance and to upgrade any pump station that does not meet the standard.

1.3.1.2 Infiltration/Inflow Program

Beginning in 1994, MDWASD expanded their infiltration and inflow (I/I) program and implemented a complete gravity system rehabilitation project to reduce the amount of I/I entering their system. The program consisted of inspecting manholes, video television inspection and smoke testing of all lines of the gravity collection systems and the completing of repairs on all sewer line defects. The program was completed for the entire system on December 23, 2002 with a total of 32,194 defects identified and resolved. The effectiveness of the program is monitored by measuring night flows in the collection system. These values approximate the infiltration flow and are measured twice a year, once each during the wet and dry season. MDWASD forces are continuing to evaluate and make any necessary repairs to the system on a ten year cycle (10% per year).

1.3.1.3 Comprehensive Lateral Investigation Program (CLIP)

Though the I/I program was successful, the rainfall dependent infiltration and inflow (RDII) during peak wet weather flows continue to be excessive with an average peaking factor (ratio of peak hour wet weather to annual average flow) equaling 3.5. In an effort to reduce the RDII, in 1999, MDWASD initiated a program to investigate the effectiveness of repairing individual customer laterals in reducing the RDII. These laterals are typically located above the groundwater table, where defects would allow infiltration and inflow to enter collection systems during wet weather events due to increased groundwater elevations direct entry above the groundwater. Under an initial pilot; three collection basins were selected, all laterals were air pressure tested, and identified lateral defects were repaired. Comparing system flows before and after rainfall events indicated that the program was successful.

Based on these results, MDWASD expanded the program to include an additional 30 service areas. The procedure developed consisted of the following:

- Record baseline flows into receiving pump station during two-year rain event (four inches of rainfall in a twenty four hour period).
- Complete main line repairs (to eliminate RDII entering system through main lines as the cause of high basin RDII)
- Record flow, after mainline repairs, during a two-year storm
- Repair laterals
- Record flow, during the next two-year storm event, to determine the effectiveness of lateral repairs

The initial results of the program were very good. It was determined, though on a limited sample size, that the costs per gallon of RDII removed by lateral and main line repairs were approximately 10 times less than the equivalent processing (pumping, treatment and disposal). The costs were $857 per gallon for lateral repair versus $8,645 per gallon for the pump/treat/dispose option. There is not sufficient data at this time to quantify flow reductions and this approach is not considered in this Master Plan.

1.3.1.4 Pump Station Optimization Program (PSOP)

RDII reductions can also be realized by allowing wastewater elevations in the collection basins to rise reducing the driving head of groundwater over sewer piping defects thus reducing the infiltration entering sewers through these defects. MDWASD has initiated a pilot program to investigate the flow reductions which can be obtained with this approach. The pilot study has been expanded from an initial 3 pump stations to 15. Controls were developed and programmed into the Supervisory Control and Data Acquisition (SCADA) remote transmitter units (RTUs) for each of the stations. These controls allow for the increasing of sewage elevations by computing automatic pump start and stop elevations based on groundwater elevation input into the RTU through monitor wells and differentials input into the control system. This approach is used to ensure the sewage levels do not rise above that for groundwater to eliminate the possibility of exfiltration (i.e, sewage flowing through a sewer defect into the groundwater).

Dry weather testing for the 15 stations has been completed. Flow reductions averaged 21 percent for the 15 pump stations with conservative differentials input into the controls programs. With smaller differentials (increased wastewater operating levels), an average flow reduction of 33 percent was attained. With these levels of flow reduction, facilities to pump and treat costing $100 millions necessary to meet provisions of the SFPCD could be eliminated. Based on these initial results, MDWASD has taken the following steps:

- Prepared the 15 stations currently in the program for flow reduction testing for the upcoming wet season.
- Initiated expansion of the system to another 30 pump stations
- Initiated discussions with the SCADA systems supplier to upgrade controls with features to test for use in an expanded deployment of the pump control program.

At this point, as with the CLIP, there is not sufficient data to incorporate anticipated flow reductions into the flow projection developed for this Mater Plan.

1.3.2 Developments from Wastewater Facilities Master Plan including Interim Peak Flow Management Plan, October, 2003

The Wastewater Facilities Maser Plan including Interim Peak Flow Management Plan, October, 2003 included an initial assessment of the necessary facilities needed to meet the requirements of the SFPCD regarding wet weather peak flows. The completion of this document precipitated a number of actions as follows:

- Time Extension: In view of the extensive scope of facilities identified in the Plan, a time extension on the submission of the Peak Flow Management Plan was granted by the USEPA to investigate the reduction of wet weather peak flows by means of the CLIP.
- Implementation of Peak Flow Facilities Program Management: Consultants were retained for the evaluation and implementation of peak flow facilities. Regular

meetings were initiated to review progress on upgrades as well as studies and pilot programs.

- Completion of Pipeline NL-E (Opa-Locka Airport): A 54-inch line identified in the Plan was installed in the North District. The line improved service in the northwest part of the County (including the Hialeah Annexation Area to the west of I-75) and flow transfers from the Central District to the North District.

- Combine a portion of the Pipeline SL-A-1 with the proposed reject water disposal facilities associated with the new membrane water treatment plant to be constructed at South Miami Heights.

- Completion of Preliminary Engineering Design Reports: Reports were developed to identify facilities necessary to process wet weather flows at the three regional wastewater treatment plants. Results from these reports are incorporated into this Master Plan.

1.4 Future Conditions

1.4.1 Population

The Miami-Dade County Department of Planning and Zoning (DP&Z) provides population growth analyses and data by census tract to all agencies of Miami-Dade County including MDWASD. Their analyses are routinely updated and similar to projections made by the University of Florida. Between 1995 and 2005, the County population estimated growth rate was 14.6 percent. The DP&Z reported that the population for the entire County for the year 2005 was 2,402,105. Population is projected to be 3,066,750 by the year 2025.

1.4.2 Flow Projections

Wastewater flows were calculated for each pump station service area using ESRI, Inc. ArcInfo, GIS software and wastewater billing records. The annual average daily flow (AADF) was joined to geo-coded and spatially located service point identifications (SPIDs) of each customer on the MDWASD service area GIS map. The pump station service area layer was placed over the SPIDs and billing flow was summed for each basin. Adjustments to the AADF for each pump station service area were made for outdoor uses. System infiltration was added based on night flow reports.

Water retail consumption billings were reduced by 15 percent for outdoor uses such as residential gardening, car washing, pressure cleaning, swimming pools and other use where the water used does not enter into the sewers. The average of dry and wet season night flow data (assumed infiltration) was added to the AADF flow. For flow projections, the calculated annual average flow for pump station service areas were increased by the appropriate population growth rates obtain from Census data. Areas affected by rapid development included additions for proposed allocated flow for purposes of determining the transmission system requirements.

The annual average wastewater flow for 2025 was projected to be 374 MGD which included a continuing reduction in per capita water demand anticipated over the next several years. Currently, the three wastewater plants are capable of treating 375 MGD but are only permitted to treat and dispose 368 MGD.

Using a peaking factor curve developed from SCADA information of pump stations which cycle on and off, the projected total peak hourly wet weather flow, from a two-year storm, that must be treated and disposed in year 2025 is 1,276 MGD. This flow was utilized for the determination of needed upgrades for the transmission system. For flow capacities at the plants, a reduction factor of 0.9 was developed to reflect the fact that historical records indicate that high-intensity rainfall events do not affect the entire County at the same time. As a result, the plants can be sized for 10 percent less capacity than the sum of wet weather peak flows for the contributing pump stations. The reduction was not applied to the transmission system since localized areas may have to handle the peak flows at the same time. Also, the useful life of the pipelines exceeds the planning horizon of this Plan and the installation of paralleling lines is much more difficult and costly than adding modules to the treatment plants.

The total flow for treatment plant design used is therefore, 1,095 mgd. This represents a wet weather peak to annual average ratio of approximately 3.0.

1.5 Regulatory Agency Requirements

MDWASD must comply with regulations of the USEPA, the FDEP, and the Miami-Dade County Department of Environmental Resources Management (DERM). These agencies have the responsibility of administering and enforcing Federal, State, and local regulations and laws. In addition, MDWASD must obtain permits from the SFWMD for water withdrawals for consumption. The owners of wastewater facilities must obtain the appropriate permits to operate, construct or modify facilities. Permit conditions are based on the effluent and sludge disposal methods. Agencies also require the proper planning, design, operation and maintenance of the entire system. Emphasis has also been placed on addressing alternative water sources by the FDEP and the SFWMD. In recent years, due to various reasons, MDWASD has had to enter into Agreements with a number of the regulatory agencies. The Agreements have been summarized below:

1.5.1 FDEP Consent Order-SDWWTP

On April 29, 2004, Consent Order (CO), OGC File No. 03-1376, was entered into between the State of Florida Department of Environmental Protection and Miami-Dade County to address various issues including the allegation of fluid movement associated with Class I injection wells at the SDWWTP.

Under the provisions of the CO, MDWASD agreed to complete a number of tasks, the primary one being to construct high level disinfection facilities at the South District Wastewater Treatment Plant for the present rated capacity of 112.5 mgd with a peak flow capacity of 285 mgd. The design phase of these facilities is nearing completion and

construction of the first phase is scheduled to begin in June 2008 of next year. The estimated total project cost for this facility is $592 million.

1.5.2 SFMWD Agreement-20-Year Consumptive Use Permit

On May 10, 2006, the MDWASD entered into an Agreement with the SFWMD to complete activities relating to the receipt of a 20-year consumptive use permit. As indicated above, one of its central provisions was the completion of an Alternative Water Supply (AWS) Plan which was submitted to SFWMD on May 10, 2007. The major components of the reclaimed water program (See Paragraph 1.6 below) are incorporated into the AWS Plan which also includes use of the Floridan Aquifer as a water supply for a new water treatment plant and for blending with Biscayne Aquifer water.

1.5.3 Consent Decrees with USEPA

In 1993 MDWASD negotiated the first of two partial Consent Decrees with EPA to resolve a number of issues regarding the wastewater system. The First Partial Consent Decree prescribed corrections and set forth an interim performance standard for all pump stations within Miami-Dade County. Every pump station must have pumps that are sized so that the nominal average pump operating time (NAPOT) is less than or equal to ten hours per day over a twelve-month period with the largest pump out of service. The NAPOT standard applies to actual run times and future projected run times. Building permits are only issued for additional connections to sewer systems in compliance with the NAPOT performance standard. As required by EPA, all Consent Decree requirements, including these performance standards are extended to Volume Sewer Customers. This was accomplished through county ordinances implemented by the Department of Environmental Resources Management (DERM), a Miami-Dade County agency. Currently, all requirements under the FPCD have been completed except for ongoing requirements related to the 10-hour criteria for pump stations.

The FPCD was supplemented with a second Consent Decree signed in 1995. The Second and Final Partial Consent Decree (SFPCD) prescribes requirements for system evaluation to reduce infiltration, exfiltration, and inflow (I/E/I) in the collection system, eliminate illegal stormwater sewer connections, implement pump station inspection and repair schedules, and install remote monitoring for pump stations. In addition, MDWASD is required to develop a computerized collection and transmission system model to optimize transmission capacity and evaluate impacts of I/E/I projects, upgrades, and expansions to the transmission system. The SFPCD also requires a program for pump station upgrades and collection system improvements to achieve long-term adequate transmission capacity.

The SFPCD will replace the NAPOT performance standards, described in the FPCD, with final performance standards according to a Peak Flow Management Plan which is required to be submitted in May 2008. MDWASD has retained a consultant to prepare this study. It will include evaluations for the capacity of every pump station during a design rainfall event, document deficiencies, and if necessary prepare a corrective remedial plan. It requires pump stations to convey all flows received in a design rainfall event without operating the stand-by equipment. Per SFPCD provisions, the gravity sewer systems are allowed to

surcharge up to four feet below the rim of the lowest manhole in the street adjacent to the pump station. This Master Plan includes an interim evaluation of the requirements to meet these provisions. Requirements were determined using a steady-state computer model with estimated peak flows input directly into the model.

1.5.4 Regulatory Agency Impacts to Treatment Plants

A system-wide wet weather average peaking factor of 3.0 for treatment has been projected for the year 2025. At the present time, the USEPA and FDEP require that all treatment plant flows be directed to biological secondary treatment. During a wet weather event, the flows increase but the biological oxygen demand (BOD) and total suspended solids (TSS) influent concentrations decrease because of dilution. Due to this decrease, it is possible for a portion of the flow to be directed to the less expensive physical-chemical type of treatment during rain events, blending the two effluents, biological and physical-chemical and still meet the secondary treatment standards effluent limits. Cost estimates for this Master Plan are based on biological treatment. Appreciable savings could be realized should the regulatory agencies allow the physical chemical treatment.

1.5.5 Regulatory Impacts to Effluent Disposal

MDWASD must dispose of all flow entering the wastewater plants in accordance with its permits. Each wastewater plant has physical piping and pumping limitations on effluent disposal. For ocean outfalls, FDEP stipulates the annual average flow, BOD, and TSS loading concentration for effluent that can be discharged. Presently, there is no peak hour flow discharge limit. For injection wells, FDEP stipulates a maximum discharge rate of 10 feet per second (fps) to control pressure in the well and allows a 12 fps injection rate during emergencies.

To increase disposal capacity, permits must be obtained from USEPA and FDEP. In order to install or expand an ocean outfall, an anti-degradation determination must be completed on the area of the ocean that will be impacted. To reduce impacts, additional treatment could be necessary. Under the terms of the SDWWTP CO and recently-established USEPA regulations, additional injection wells could be allowed with the addition of high level disinfection treatment. For this Master Plan, deep injection well with HLD treatment is included for all alternatives. This is due to the difficulty which would be encountered in the permitting process for outfalls.

1.6 Reuse Feasibility Study

The State of Florida has embraced wastewater reuse as an integral part of the development of water management strategies. Chapter 62-40, FAC, "Water Resource Implementation Rule" requires the water management districts to assess their water resources and to designate "water resource caution areas" (areas that have current or future critical water supply problems). Miami-Dade County has been declared a "caution area". The designated water resource caution areas generally represent areas where traditional water sources may not be adequate to meet expected water needs. Accordingly, Chapter 403, F.S. requires the

preparation of a Reuse Feasibility Study (RFS) for domestic wastewater plants located in water resource caution areas. There are growing concerns that the sole source of potable water from the Biscayne Aquifer in Miami-Dade County will not be adequate to sustain projected population growth without negative impacts to the surrounding natural environment. Among these are the impacts to the Biscayne Aquifer, an EPA designated "sole source aquifer", Biscayne National Park, Everglades National Park, and Biscayne Bay, an "Outstanding Florida Water". There are a number of factors which make reuse in Miami-Dade County a challenge.

MDWASD completed its Reuse Feasibility Study in April, 2007. Five alternatives were evaluated as follows:

- Alternative A-Maximum Reuse
- Alternative B-Medium Reuse
- Alternative C-Low Reuse
- Alternative D-No Action Alternative
- Alternative E- Reformulated Alternative (40% Reuse)

Alternative E was adopted by MDWASD. A summary of the projects included in this alternative is presented in Table 1-3.

Table 1-3
MDWASD Reclaimed Water Program

Project Description	Project Cost
SDWWTP Coastal Wetlands Rehydration Demonstration Project	$19,200,000
Aquifer Recharge Demonstration Project	$2,328,000
NDWWTP-Reuse Projects	$26,800,000
CDWWTP-Reuse Projects	$15,300,000
SDWWTP-Reuse Project-Aquifer Recharge-Phase 1-30 mgd (South Miami Heights Water Treatment Plant)	$357,500,000
SDWWTP-Reuse Project-Aquifer Recharge-Phase 2-28 mgd (Alexander Orr Water Treatment Plant)	$298,000,000
SDWWTP-Reuse Project-Aquifer Recharge-Phase 3-30 mgd (Alexander Orr Water Treatment Plant)	$217,500,000
SDWWTP-Biscayne Bay Coastal Wetlands Rehydration-52 mgd	$621,000,000
Total	$1,557,628,000

In this Master Plan, these projects are included in all of the alternatives developed and evaluated. As described below, as subalternatives to each of the four main alternatives for handling peak wet weather flows, Phases 2 and 3 of the aquifer recharge projects at the SDWWTP were evaluated to be located at a new plant, a water reclamation facility, located in the central west part of the County. This West District Water Reclamation Plant (WDWRP) is consistent with the West Miami-Dade Wastewater Reuse Plant included in the Comprehensive Everglades Restoration Plan (CERP).

As indicated above, these projects as well as others directly relating to water supply and treatment have been incorporated into the Alternative Water Supply Plan required and submitted as part of the Agreement with the SFWMD for a 20-year consumptive use permit.

1.7 Biosolids Master Plan

On the last renewal of the sludge hauling contract in 2002, MDWASD was directed to proceed with addressing the feasibility of treating all biosolids to Class AA level. This upgrade increases the disinfection levels of the biosolids, allowing for additional applications sites, such as use as fertilizer, for disposal. The first step taken by MDWASD was to issue a Request for Information regarding the alternatives available to achieve this goal. On the receipt of the various proposals, MDWASD decided to obtain the assistance of a consultant to evaluate the present biosolids processing and to make recommendations as to the appropriate upgrades to attain the Class AA treatment levels in the form of a Biosolids Master Plan. Camp Dresser & McKee, Inc (CDM) was selected for this assignment.

The consultant, CDM, was retained. A draft Biosolids Master Plan was submitted to the MDWASD on March 31, 2007 and is presently under review. In the Plan preparation, a number of technologies were evaluated on various criteria including technical and cost bases. The final three technologies evaluated are as follows:

- Advanced Digestion utilizing two phases. Higher temperatures would be utilized for the first high-rate phase to achieve the pathogen reductions necessary for Class AA treatment levels.

- Composting. An upgrade to the present system employed at the SDWWTP so that solar drying and composting would take place in enclosed areas so that the effects of rain would not impede the process.

- Rotary Heat Dryers. Biosolids are dried using heat in rotating drums to form pellets.

These alternatives produce different product consistency at solids concentrations of approximately 25, 80, and 95 percent, respectively. These factors affect the numbers and reliability of disposal sites for the processed biosolids.

In view of the uncertainty of the continued sustained use of the various disposal sites for the products for each of these technologies, CDM has proposed that a diversified approach be taken. Under this plan, facilities using each of these technologies would be constructed for designated proportions of the sludge production. Accordingly, for each of the overall wastewater facilities alternatives developed, the same groupings of biosolids processing technologies were included. Taking into account improvements to the present biosolids systems at the CDWWTP and SDWWTP, the project costs for the facilities under the diversified approach are $360,180,000 and $356,670,000 for the alternatives with and without the new plant in the central west part of the County. MDWASD is presently reviewing Biosolids Master Plan draft and the consultant recommendations.

1.8 Alternative Development

1.8.1 Description

The Master Plan includes a study of alternative regional systems to treat and dispose of projected wastewater flows. Four alternatives with subalternatives for each, with and without a proposed West District Water Reclamation Plant (WDWRP) in the central west part of the county were developed (total of eight alternatives) and evaluated to process these flows. For each alternative capital improvement projects are identified for treatment, transmission, disposal, and recommended reuse facilities necessary to process the projected flows for the 20 year planning period. Some of these projects are common to all alternatives. The regional alternatives are summarized on Table 1-4.

Table 1-4
Regional Alternatives

Alternative	Wet Weather Peak Flow Processing Concept	WDWRP Included
A-1	Peak wet weather flow split approximately by District	Yes
A-2		No
B-1	Wet weather flow processing expansion at SDWWTP. CDWWTP capacity held to present effluent disposal capacity (400 mgd).	Yes
B-2		No
C-1	Wet weather flow processing at CDWWTP. SDWWTP capacity held to effluent disposal capacity included in present HLD project (285 mgd)	Yes
C-2		No
D-1	Storage facilities installed at central-west Miami-Dade site.	Yes
D-2		No

The introduction of the new water reclamation plant in the central west County allows for the treatment of wastewater, for the recharging of the Alexander Orr Treatment Plant well fields, to be in the vicinity of the location where the recharge water is discharged for those alternatives (preliminary siting in vicinity of SW 8 St. and 127th Ave). For the alternatives where the expansions would take place at the SDWWTP, the recharge water would be piped from the SDWWTP to this location.

The concept of storage included in alternatives D-1 and D-2 is based on constructing large storage tanks into which a portion of peak flows would be diverted during major events. After the event, the flow would then be pumped back into the transmission system for conveyance to the treatment plants for treatment. The advantage of this method is the reduced transmission, treatment, and corresponding effluent disposal capacity needed. Disadvantages include the needed to clean soiled tanks after use and potential odor problems. In addition, with this approach, wet weather flow processing capacity afforded by the tanks would be lost when

tanks are filled. This would occur during rain events surpassing the intensity of the design two-year storm.

1.8.2 Projects Common to All Alternatives

A number of projects have been identified which are common to all of the regional alternatives developed. This includes the reclaimed water and biosolids processing facilities previously described. These additional projects are improvements due with factors in a local area or facility and are unaffected by variations in regional flow distributions. Descriptions of the major common projects follow. Note that the project identifications shown appear for the selected alternative later in this Chapter in Table 1-7 and on Figure 1-2.

- Pumping Station CP-A and CL-E Interconnecting Piping: Provides additional peak wet weather flow capacity and backup to existing major Pumping Station 1 which serves much of the downtown area.

- CL-B, South P.S. 1 Service Area Reroute: Installation of a 48-in. force main and the upgrading of three pumping stations to remove flow from a major gravity interceptor and pump directly to CDWWTP. Project will also free up capacity in Pumping Station No. 1.

- CL-C, 60-in Force Main from Miami Beach to CDWWTP: Project will serve as a backup line to existing pipe.

- CL-D, 42-in.Force Main in Northeast Miami: Provides additional capacity in existing gravity interceptor in Biscayne Boulevard.

- SL-B, 60-in. Force Main: Provides disposal of process reject water from new water treatment plant in South Miami Heights and increase peak wet weather flow capacity.

- CP-8, Relocation of Pumping Station 8: Existing station serves Brickell Ave. area. It is located in median and there is no space for standby power, additional expansion and it is difficult to maintain.

- CT-A, CDWWTP Wet Weather Treatment Expansion-114 mgd: Increases wet weather processing capacity at the CDWWTP to fully utilize existing outfall capacity. Combines with P.S. CP-A to provide wet weather processing capacity for much of central Miami.

1.9 Comparison of Alternatives

Table 1-5 provides the cost comparison of the alternatives. On this table also are shown the average and peak flows for each of the alternatives. On Table 1-6, the alternatives are shown in ascending order of total project cost.

Table 1-5

ALTERNATIVES	A-1		A-2		B-1		B-2		C-1		C-2		D-1		D-2	
DESCRIPTION	Peak Flow Split by District West District Water Reclamation Plant		Peak Flow Split by District		No additional disposal facilities at CDWWTP. SDWWTP as Peak Facility West District Water Reclamation Plant		No additional disposal facilities at CDWWTP. SDWWTP as Peak Facility		Approx. 285 mgd at SDWWTP West District Water Reclamation Plant		Approx. 285 mgd at SDWWTP		Storage Facilities in West Miami-Dade and West District Water Reclamation Plant		Storage Facilities in West Miami-Dade. No West District Plant	
DESIGN FLOW (MGD)	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak	AADF	Wet Weather Peak
NDWWTP	120	287	120	284	120	287	120	287	120	284	120	282	120	285	120	285
CDWWTP	143	418	143	459	143	400	143	400	143	476	143	528	143	400	143	400
SDWWTP	112.5	341	131.25	352	112.5	359	131.25	408	112.50	285	131.25	285	112.5	285	131.25	285
West District Water Reclamation Plant	50	50	--	--	50	50	--	--	50	50	--	--	50	50	--	--
West Miami-Dade Storage Facilities	--	--	--	--	--	--	--	--	--	--	--	--	--	75	--	125
Addt'l equivalent expansion	--	--	31.25	--	--	--	31.25	--	--	--	31.25	--	--	--	31.25	--
TOTALS	425.50	1,095	425.50	1,095	425.50	1,095	425.50	1,095	425.50	1,095	425.50	1,095	425.50	1,095	425.50	1,095
PROJECT COSTS																
Transmission Mains	$311,600,000		$386,290,000		$312,790,000		$291,680,000		$369,710,000		$377,230,000		$307,630,000		$307,630,000	
Regional Pumping Stations	$169,710,000		$202,460,000		$169,710,000		$169,710,000		$169,710,000		$169,710,000		$169,710,000		$169,710,000	
Local PS & FM	$200,000,000		$200,000,000		$200,000,000		$200,000,000		$200,000,000		$200,000,000		$200,000,000		$200,000,000	
Treatment Plant Upgrades (Exist. WWTP)	$926,570,000		$1,199,760,000		$890,450,000		$1,082,410,000		$1,040,870,000		$1,376,510,000		$810,720,000		$990,720,000	
Effluent Disposal	$167,500,000		$128,250,000		$138,500,000		$89,250,000		$146,250,000		$97,000,000		$69,250,000		--	
Biosolids	$360,180,000		$356,670,000		$360,180,000		$356,670,000		$360,180,000		$356,670,000		$360,180,000		$356,670,000	
Storage Facilities	--		--		--		--		--		--		$68,010,000		$170,510,000	
SUBTOTALS	$2,135,560,000		$2,473,430,000		$2,071,630,000		$2,189,720,000		$2,286,720,000		$2,577,120,000		$1,985,500,000		$2,195,240,000	
Reclaimed Water Facilities	$1,838,050,000		$1,549,440,000		$1,838,050,000		$1,549,440,000		$1,838,050,000		$1,549,440,000		$1,838,050,000		$1,549,440,000	
TOTAL ALTERNATIVE COSTS	**$3,973,610,000**		**$4,022,870,000**		**$3,909,680,000**		**$3,739,160,000**		**$4,124,770,000**		**$4,126,560,000**		**$3,823,550,000**		**$3,744,680,000**	
ANNUALIZED COSTS																
Capital Projects	$265,281,000		$268,570,000		$261,020,000		$249,630,000		$275,380,000		$275,500,000		$255,270,000		$250,000,000	
Operation & Maintenance	$208,549,000		$183,995,000		$208,554,000		$184,060,000		$208,534,000		$184,047,000		$208,602,000		$184,163,000	
TOTAL ANNUALIZED COST for Alternative	$473,830,000		$452,565,000		$469,574,000		$433,690,000		$483,914,000		$459,547,000		$463,872,000		$434,163,000	

Table 1-6
Alternatives Ranked by Project Cost in Ascending Order

Alt.	Description	Total Project Cost	Difference from Lowest	Percent
B-2	Peak Flow Facilities at SDWWTP. No WDWRP	$3,739,160,000	$0	0.0%
D-2	Storage Facilities at west central Miami-Dade site. No WDWRP	$3,744,680,000	$5,520,000	0.1%
D-1	Storage Facilities at proposed WDWRP	$3,823,550,000	$84,390,000	2.2%
B-1	Peak Flow Facilities at SDWWTP. Includes WDWRP	$3,909,680,000	$170,520,000	4.5%
A-1	Peak Flow Split approximately by District. Includes WDWRP	$3,973,610,000	$234,450,000	6.1%
A-2	Peak Flow Split approximately by District. No WDWRP	$4,022,870,000	$283,710,000	7.4%
C-1	Peak Flow Facilities at CDWWTP. Includes WDWRP	$4,124,770,000	$385,610,000	10.1%
C-2	Peak Flow Facilities at CDWWTP. No WDWRP	$4,126,560,000	$387,400,000	10.1%

1.10 Recommended Plan

1.10.1 Selection Criteria

The alternatives were developed to address wet weather peak flows. The following criteria were used to make the final selection.

1. Cost
2. Permitability
3. Implementability
4. Minimum Risk of Future Invalidation
5. Compatibility with other Planning Efforts
6. Flexibility

1.10.2 Plan Selection

Alternative D-1, which is based on the establishment of a West District Water Reclamation Plant (WDWRP) combined with wastewater storage facilities for peak wet weather conditions in the Central West area of the County, is the selected alternative. This selection is based primarily due to the following:

- Third lowest capital cost (2.2 percent more than lowest). Annualized cost is within 7 percent of lowest. Both of these figures are within the accuracy of the estimates.

- Establishes a fourth treatment site which will provide flexibility for long-term expansion of storage facilities and/or treatment facilities to accommodate anticipated continued growth and facilitate water reclamation beyond the planning period of this Master Plan.

- Location of a treatment plant in the central west area of the County is consistent with the long-term Comprehensive Everglades Restoration Plan (CERP) which includes a West Miami-Dade Reuse project to be located in the vicinity of the Bird Drive Basin. The purpose of the project is to meet the water demands for: (1) the Bird Drive Recharge Area; (2) the South Dade conveyance System; and (3) the Northeast Shark River Slough.

- The proposed area for the WDWRP site is also in the vicinity of the recharge areas for the Southwest and West Wellfields of the Alexander Orr Water Treatment Plant.

- Alternative D-1 is one of the alternatives developed for this plan which requires less construction of large diameter piping in densely populated areas in the central eastern part of the County as well as another force main crossing of Biscayne Bay, both of which would cause major disruption.

Additional factors relating to this selection are:

- Establishment of a fourth treatment site will allow for additional capacity for possible coastal wetlands rehydration at the SDWWTP. Utilization of the entire 112.5 mgd capacity at the SDWWTP would increase the countywide percentage for reclaimed water of the total wastewater flows to 48.5 percent.

- Implementation of a new plant will facilitate use of the state-of-the-art treatment technologies, including the membrane bioreactor process (MBR). This should result in reductions in the projected costs developed in this Master Plan for the WDWRP.

- Location of treatment at a fourth site reduces vulnerability to storm damage. Note the introduction of water reclamation plant effluent for the water treatment plant wellfield recharge also reduces vulnerability of damage to water supply systems due to storms.

- Based on the anticipated wet weather peak flow reductions due to the CLIP and PSOP programs, it appears that the construction of storage tanks for wastewater peak flow events in the future can be reduced or avoided. This would reduce operation and maintenance costs. Also, establishment of the site provides the option for future treatment plant expansion.

Based on wastewater flow projections, the additional treatment will be necessary to be in service by the year 2020. The completion date for Phase 2 of the groundwater recharge plant expansion, which per the selected alternative will be located at the WDWRP, is August 2020. Adoption of this alternative at this time will allow sufficient time for land purchase (at today's prices) and to acquire the necessary permits and approvals for this plant.

Transmission facilities with average, peak wet weather, and reclaimed water flow distribution for the selected alternative are shown on Figure 1-2.

1.11 Financing

1.11.1 Bond Program

The majority of the costs for facilities will be by selling bonds which will be funded by retail and wholesale customers.

1.11.2 SDWWTP Water Reclamation Project (CERP)

The U.S. Army Corps of Engineers (USACE) had previously agreed to 50 percent cost sharing between the USACE and a local sponsor for facilities in the Comprehensive Everglades Restoration Plan (CERP). In the FDEP Consent Order for SDWWTP, the County committed to be the local sponsor of South Miami-Dade Wastewater Reuse project as described in the 1999 CERP. The projects included for Reuse and Alternative Water Supply programs, or at least the wetlands rehydration project, meet the intent of the CERP. Accordingly, this funding from the USACE will be pursued.

1.11.3 State Revolving Fund (SRF)

Additional funding sources that are being considered include utility enterprise funds, special assessment bonds, connection fees and developer agreements. Approval of this Master Plan will qualify MDWASD for obtaining State Revolving Funds (SRF) from FDEP. Recent SRF loans had financing rates of approximately 65 percent of the prevailing bond market rate.

1.11.4 Florida Senate Bill 444

In 2005, the State of Florida passed Senate Bill 444 which established a funding source under the Florida Water Protection and Sustainability Program for the construction of alternative water supply projects. MDWASD will apply for the funding for the construction of all of the water reclamation projects.

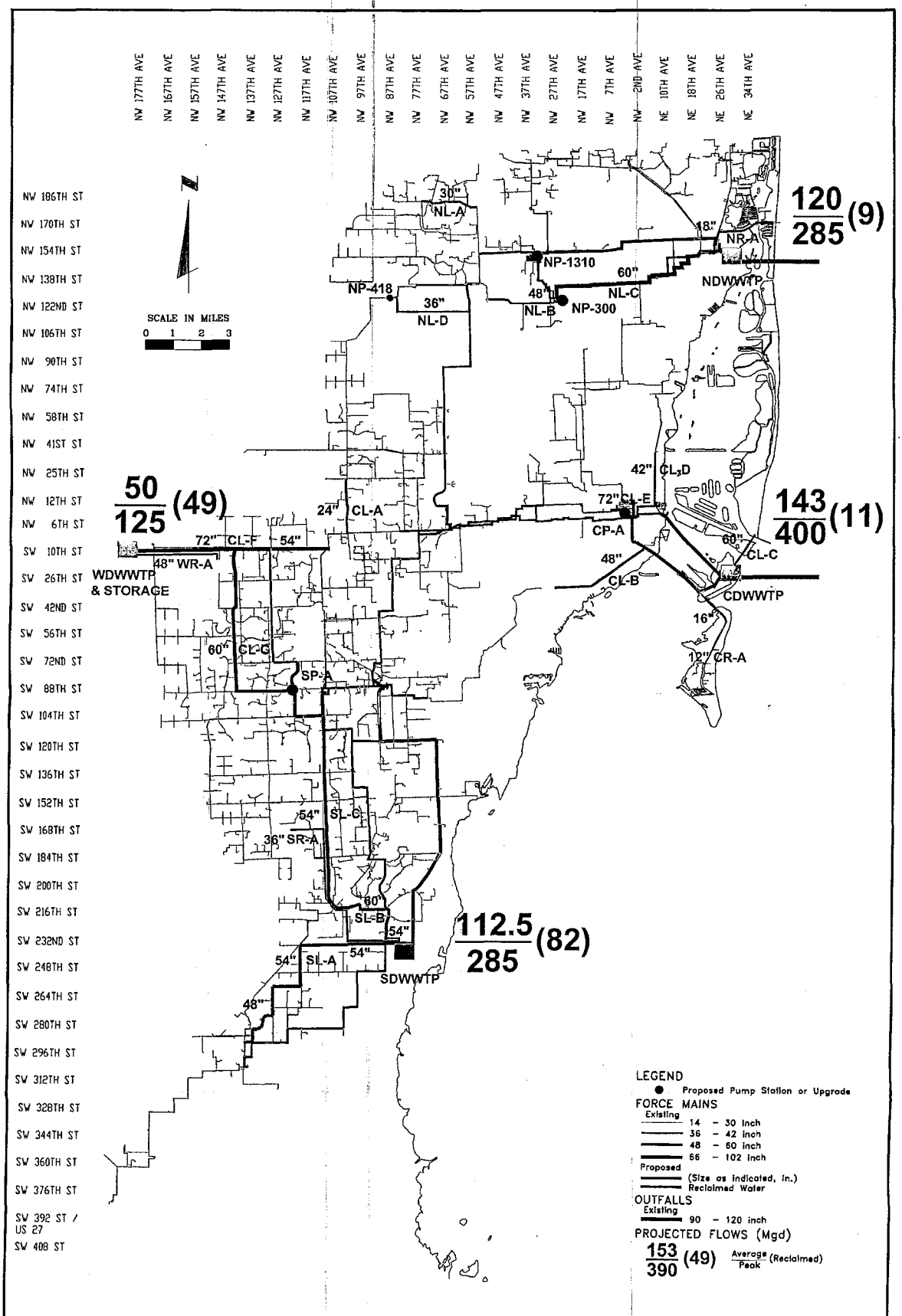
1.11.5 Peak Flow Rates

Finally, "peak flow rates" are being considered for the Volume Sewer Customers. These fees would be prorated based on the amount of peak flows each VSC contributes. These fees will have the added benefit of providing an economic incentive to each VSC to reduce their I/I.

1.12 Implementation

A Master Project Schedule is included in the Master Plan for projects included in the selected D-1 alternative. The Capital Plan is being updated to include projects not previously identified.

The projects associated with selected Alternative D-1 are summarized on Table 1-7. The procedures for retaining consultants for the design of water reclamation projects at the NDWWTP and CDWWTP have been initiated, as well as at the SDWWTP for the groundwater recharge projects for the South Miami Heights (SMH) WTP wellfield. Anticipated completion dates for all of the projects are included on Table 1-7.



MIAMI-DADE COUNTY	WASTEWATER FACILITIES MASTER PLAN	2025 Facilities Selected Alternative D-1	Figure 1-2

Table 1-7
Regional Alternative D-1
Projects Description and Costs

No.	Description	In Service Date	Project Costs
Pipelines:			
NL-A	30-in. - P.S. 416 Connection to existing 24-in. force main in Red Road	Oct 2010	$4,230,000
NL-B	48-in. - Allows P.S. 300 to pump north to P.S. 1310 Discharge.	Sep 2012	$970,000
NL-C	60-in. - Pump Station 300 Discharge Replacement	Oct 2014	$32,310,000
NL-D	36-in. - P.S. 418 Discharge Line	Jun 2010	Donation -Hialeah
CL-A	24-in. - Force main in Doral N.W. 107th Ave.	Oct 2012	$4,620,000
CL-B	48-in. - South P.S. 1 Service Area Flow Re-route incl. assoc. PS upgrades	Sep 2011	$35,000,000
CL-C	60-in. - Miami Beach to CDWWTP Force Main	Sep 2013	$72,780,000
CL-D	42-in. - Biscayne Blvd FM ext. re-route from interceptor to PS 2 discharge	Oct 2011	$8,680,000
CL-E	72/84-in. - Pump Station CP-A Suction and Discharge Lines	Sep 2014	$20,490,000
CL-F	54/72-in. - Influent to proposed West District Water Reclamation Plant.	Jan 2020	$29,040,000
CL-G	60-in. - P.S. SP-A Discharge Line.	Jan 2020	$28,270,000
SL-A	48/54/60-in. - Reinforces area to south of SDWWTP.	Sep 2014	$32,320,000
SL-B	60-in. - P.S. 522, SMH WTP (reject water) to SDWWTP	Jan 2012	$8,420,000
SL-C	54-in. - Pump Station SP-A discharge force main to SDWWTP	Sep 2014	$30,500,000
		Subtotal-Pipelines	**$307,630,000**
Major Pumping Stations:			
NP-300	Upgrade to P.S. 300 to allow station to pump north and east.	Sep 2012	$21,470,000
NP-418	Upgrade to P.S. 418 to allow for relieving Doral area	Sep 2011	$11,500,000
NP-1310	P.S. 1310; Addition of Pump No. 5	Sep 2011	$2,000,000
NP-414	Impeller change due to higher head conditions.	Sep 2008	$120,000
CP-A	Provides backup to P.S. 1 and increase peak flow capacity	Sep 2014	$85,870,000
CP-8	P.S. 8 Relocation	Sep 2011	$16,000,000
SP-A	Southwest Well Field-Pumps flow from Central West to WDWRP.	Jan 2020	$32,750,000
		Subtotal-Major Pumping Stations	**$169,710,000**
Local Pumping Stations and Force Mains			
		Estimated 300 pumping stations and 20 miles of 8-16 inch force mains	**$200,000,000**
Wastewater Treatment			
NT-A	NDWWTP-Wet Weather Treatment-285 mgd Capacity	Oct 2014	$126,900,000
CT-A	CDWWTP-Wet Weather Treatment-Phase 1- 114 mgd	Sep 2014	$91,820,000
ST-A	SDWWTP-HLD Plant-Peak Flow Capacity-285 mgd	Sep 2012	$592,000,000
		Subtotal-Wastewater Treatment	**$810,720,000**

Table 1-7 Cont'd
Regional Alternative D-1
Projects Description and Costs

Effluent Disposal			
WE-A	WDWWTP- Injection Well Pump Station	Jan 2020	$37,250,000
WE-B	WDWWTP- Injection Well (4)	Jan 2020	$32,000,000
		Subtotal-Effluent Disposal	**$69,250,000**
Biosolids			
CB-A	CDWWTP- Interim Improvements	Sep 2011	$173,680,000
CB-B	CDWWTP- Class AA - Advanced Digestion	Sep 2013	$32,340,000
SB-A	SDWWTP- Interim Improvements	Sep 2011	$36,680,000
SB-B	SDWWTP- Class AA -Advanced Digestion-Thermal Drying/Composting	Sep 2015	$78,900,000
WB-A	WDWWTP- Class AA -Advanced Digestion-Thermal Drying/Composting	Jan 2020	$38,580,000
		Subtotal-Biosolids	**$360,180,000**
Reclaimed Water Facilities			
NR-A	NDWWTP-Reclaimed Water Distribution System	Oct 2011	$17,690,000
NR-B	NDWWTP-7 mgd Filtration Plant	Oct 2011	$9,120,000
CR-A	CDWWTP-Reclaimed Water Distribution System	Oct 2011	$14,580,000
CR-B	CDWWTP-1.25 mgd RO Plant	Oct 2011	$14,030,000
SR-A	SMH WTP 36-in. Groundwater Recharge Discharge Pipe	Dec 2013	$18,120,000
SR-C	SDWWTP-Phase 1- Adv. Treat.-SMH WTP Grdwtr Recharge-30 mgd	Dec 2013	$329,580,000
SR-F	SDWWTP-Adv. Treatment-Coastal Wetlands Rehydration-52 mgd	Feb 2021	$621,000,000
WR-A	A. Orr WTP 48-in. Groundwater Recharge Discharge Pipe	Jan 2020	$14,950,000
WR-B	WDWWTP-Ph 2-Sec.& Adv.Treat.-A. Orr WTP Grdwtr Recharge-28 mgd	Jan 2020	$482,290,000
WR-C	WDWWTP-Adv. Treatment-Coastal Wetlands Rehydration-21 mgd	Sep 2025	$316,690,000
		Subtotal-Reclaimed Water Facilities	**$1,838,050,000**
Storage Facilities			
WTF-A	20 Mgal Tanks (4)	Aug 2022	$68,010,000
		Subtotal-Storage Facilities	**$68,010,000**
	Alternative D-1 Total		**$3,823,550,000**