INFRASTRUCTURE ELEMENT
OF THE CITY OF PEMBROKE PINES
COMPREHENSIVE PLAN

RULES 9J-5.011, FAC

City of Pembroke Pines, Florida

ADOPTION DOCUMENT

INFRASTRUCTURE ELEMENT

INFRASTRUCTURE ELEMENT ADOPTION DOCUMENT

IV. GOALS, OBJECTIVES AND POLICIES

GOAL

The goal of the Infrastructure Element of the Comprehensive Plan for the City of Pembroke Pines is to ensure the provision of adequate water and wastewater treatment facilities, solid waste, and drainage facilities, the protection of the natural groundwater aquifer, to promote the conservation and protection of surface and groundwater resources with the purpose of securing future water supplies, and for the preservation and enhancement of the regional ecosystem in order to provide for the health, safety and welfare of the residents of the City of Pembroke Pines and its visitors.

A. SANITARY SEWER

OBJECTIVE I

Insure the adequate treatment of sewage within the community at the time of building permit issuance by maintaining the adopted level of service through the year 2015.

Evaluation Measure Objective I - Record of maintaining the adopted level of service through the year 2015.

Policy 1.1 - Maintain sanitary sewer service capacity through incorporation of any needed improvements into the City's Capital Improvements Program.

Policy 1.2 - Coordinate with the private sector for the extension of facilities as needed to meet future demands through a provision for voluntary contribution for construction of connections to the City sanitary sewer system.

Policy 1.3 - Since sanitary sewer facilities have been determined to be available to serve the future population, monitor service demand and capacity in 2010 and again in 2015 so as to identify any unforeseen facility deficiencies.

Policy 1.4 - Develop a plan for prioritizing needs and correcting deficiencies upon their identification, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

Policy 1.5 - Average design capacities as depicted on Table I, Wastewater Demand, shall not be exceeded.

Policy 1.6 - Continue interlocal agreement with the City of Hollywood for the treatment of sewerage for the area east of Flamingo Road and examine alternative methods of service delivery to improve level of service.

Policy 1.7 - Standards equal 93 gallons/capita/day and 1,000 gallons/acre/day.

OBJECTIVE II

Continue to provide wastewater treatment operations to meet demands within the City in an efficient, economical and environmentally sensitive manner through the year 2015.

Evaluation Measure Objective II - Maintain record of water treatment operations relating to demand and capacity; and update for both the short term and long term planning horizons.

Policy 2.1 - Implement the Five Year Capital Improvement Program for the City to insure coordinating the extension of, capacity increase and other facility improvements to meet future needs.

Policy 2.2 - Every five years, establish priorities for providing for future facility needs to be implemented through the Capital Improvement Program, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

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Policy 2.3 - Continue to require the use of existing sanitary sewer facilities by all new development so as to discourage urban sprawl.

Policy 2.4 - Maximize the use of the City's existing facilities.

Policy 2.5 - All new land use amendments shall be consistent with existing and programmed sanitary sewer facilities.

Policy 2.6 - All new development permits may be issued only when determined to be consistent with existing and programmed sanitary sewer facilities.

Policy 2.7 - LDR's will be updated by 2008 to reflect criteria in reviewing land use plan amendments for consistency with existing and programmed sanitary sewer facilities.

Policy 2.8 - Coordinate with the Broward County Department of Planning and Environmental Protection in conducting wastewater treatment and disposal operations which consider environmental quality impacts for commercial and industrial uses.

Policy 2.9 - Continue to coordinate with the Broward County Department of Planning and Environmental Protection in maintaining an inventory of commercial and industrial uses which utilize, produce, or dispose of hazardous chemicals as a means to track potential sources of water contaminants.

Policy 2.10 – Utilize inventory of septic tank locations in the City (see FLU-Appendix) in the preparation of a report to be submitted with the next EAR on the feasibility of converting from septic tanks to sanitary sewer as an alternative means to protect ground water quality.

Policy 2.11 - The City shall require existing development using septic tanks to hook up to centralized sewer facilities as they become available in order to phase out septic tank systems in an economically feasible and environmentally sound manner.

Policy 2.12 - New septic tank systems shall only be permitted in accordance with the criteria and requirements of the Florida Department of Health.

Policy 2.13 - The City shall coordinate with the Broward County Department of Planning and Environmental Protection to encourage the use of reclaimed water as part of the City's wastewater management strategies where economically, environmentally and technically feasible.

Policy 2.14 - The City will incorporate all updated Infrastructure Element objectives and policies which require coordination with other governmental entities in the City's Intergovernmental Coordination Element (ICE).

Policy 2.15 - The City will continue to update on an as needed basis, the infrastructure map which shows potable water, sanitary sewer, groundwater, floodplains, and solid waste facilities.

B. SOLID WASTE

OBJECTIVE III

Ensure that adequate solid waste facilities are provided to meet current and future demands of all the residents of the City though the year 2015.

Evaluation Measure Objective III - Maintain record of solid waste facility operations relating to demand and capacity; and update for both the short term and long term planning horizons.

Policy 3.1 - Continue to recognize Reuter, Inc. in its role as a transfer site for solid waste disposal outside Broward County and its role in providing recycling services for the residents of the City.

Policy 3.2 - Ensure that the recycling facility is designed to protect the environment and the residents of the community through a review of its design and an annual review of its operations.

Policy 3.3 - Continue to coordinate with the solid waste service providers to monitor service demand and capacity on an annual basis so as to identify any facility deficiencies.

Policy 3.4 - In coordination with private solid waste service providers, develop a plan for prioritizing needs and correcting deficiencies upon their identification, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

OBJECTIVE IV

Insure that an adequate level of service is maintained by the solid waste facility operators contracted by the City through an annual review which addresses needed increases in capacities of facilities to meet future needs.

Evaluation Measure Objective IV - Maintain record of solid waste facility operations relating to demand and capacity; and update on a yearly basis.

Policy 4.1 - Continue to coordinate with contracted solid waste facility operators on an annual basis to monitor the solid waste demands of the community, and to provide for the extension of, capacity increase, and other facility improvements to meet future needs.

Policy 4.2 - By 2010, the City will establish and implement a citywide education program for commercial and residential recycling activities to achieve the state's 30 percent waste reduction target.

Policy 4.3 - The City shall continue its newspaper recycling program and continue to request grant funds to initiate recycling of aluminum, glass and plastics.

Policy 4.4 - On an annual basis, priorities for meeting future facility needs will be updated and reviewed, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

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Policy 4.5 - Standard equals 5.0 lbs./capita/day.

Policy 4.6 - Continue to require the use of existing and programmed solid waste facilities so as to discourage urban sprawl.

Policy 4.7 - All new land use amendments shall continue to be consistent with existing and programmed solid waste facilities.

Policy 4.8 - All new development permits shall continue to be issued only when determined to be consistent with existing and programmed solid waste facilities.

Policy 4.9 - LDR's will be updated by 2008 to reflect criteria in reviewing land use plan amendments for consistency with existing and programmed solid waste facilities.

C. DRAINAGE

OBJECTIVE V

Continue to coordinate with appropriate drainage service facilities and agencies to maintain and provide for an adequate level of service, and to ensure that drainage facilities are designed to protect the health, safety and welfare of the residents.

Evaluation Measure Objective V - Record of review of site plans by the City's Development Review Committee to insure adequate drainage by all applicable regulating agencies.

Policy 5.1 - All development shall comply with the design criteria of the South Florida Water Management District (SFWMD), the South Broward Drainage District (SBDD), the Central Broward Drainage District (CBDD), the Broward County Water Resources Management Division (BCWRMD), the Broward County Department of Planning and Environmental Protection (BCDPEP) and the City's Environmental Services Division.

Policy 5.2 - Continue to implement a plan to protect the natural groundwater aquifer through implementation of Best Management Practices.

Policy 5.3 - Comply with the following level of service standards:

Facility Type	Level of Service Standard
Road Protection	Residential streets not greater than fifty feet wide rights-of-way to have crown elevations no lower than the elevation for the respective area depicted on the Broward County "Flood Criteria Map." Rights-of-way greater than fifty feet wide to have an ultimate edge of pavement no lower than the elevation for the respective area depicted on the "Flood Criteria Map." In all cases, residential streets shall be designed in accordance with the Broward County flood maps.
Buildings	"The minimum lowest floor elevation" shall be the highest of the following: 1. Minimum floor elevation as set forth in the South Florida Water Management District's Surface Water Management Permit. 2. The elevation shown on the "100 Year Floor Elevation" Map, Latest Revision, prepared by Broward County Transportation Department. 3. Twelve (12") inches above the highest point of the paved roadway/drive-lane nearest to the building.

Off-Site Discharge	Not to exceed the inflow limit of SFWMD primary receiving canal or the local conveyance system, whichever is less. Within the SBDD pumped basins, the allowable discharge is not applicable. The discharge for the entire basin is controlled by the District's pump station.
Storm Sewers	Design frequency minimum to be three year rainfall intensity of the State Department of Transportation Zone 10, rainfall chart as shown on the attached exhibit. SBDD requires that an initial time of concentration of 10 minutes be used or calculations be provided to justify a time of concentration greater than 10 minutes. The time of overland flow is dependent on the slope of the ground and the nature of the ground cover, for example, whether the surface is paved, rocky or grassed.
Flood Plain	Calculated flood elevations routing based on the ten-year and one hundred-year return frequency rainfall of the three-day duration shall not exceed the corresponding elevations of the Broward County "Flood Criteria Map" and the "100 Year Floor Elevation" Map, or in accordance with SBDD permits.
Antecedent Water	The control elevation for each of the District's basins are set by SFWMD permits.
Water Quality Pretreatment Standards and On-Site Storage	a. Retention and/or detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof: 1. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater. 2. Dry detention volume shall be provided equal to 75 percent of the above amounts computed for wet detention.

3. Retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention.

b. Commercial or industrial zoned projects shall provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system.

c. Systems with inlets in greased areas will be credited with up to 0.2 inches of the contributing areas. Full credit will be based on a ratio of 10:1 impervious area runoff to pervious area with proportional credit granted for greater ratios.

d. Storage requirements for each SBDD basin are in accordance with SBDD's Public Facility Report.

Best Management Practices (BMP'S)	Prior to discharge to surface or ground water BMP's will be used to reduce pollutant discharge.

Policy 5.4 - By 2008, update LDR's to reflect the drainage level of service standards as amended.

Policy 5.5 - Continue to coordinate with South Broward Drainage District and Central Broward Drainage District on an annual basis to prioritize replacement needs, and correct existing facility deficiencies, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

Policy 5.6 - The City will continue to update the map series for the drainage facilities on an as needed basis in accordance with the Broward County and applicable Drainage District and South Florida Water Management maps as an amendment to the Infrastructure Element.

Policy 5.7 - The City will incorporate all updated Infrastructure Element objectives and policies which require coordination with other governmental entities in the City's Intergovernmental Coordination Element (ICE) during the amendment cycle following the update.

Policy 5.8 - The City establishes water quality standards for stormwater discharge in accordance with Chapter 60-25, F.A.C.

OBJECTIVE VI

Continue to coordinate with the SFWMD, SBDD, and CBDD to coordinate the extension of, capacity increases and other facility improvements to meet future needs.

Evaluation Measure Objective VI - The City's Environmental Services Division in coordination with the appropriate drainage facility agencies shall maintain a record of drainage facility operations relating to demand and capacity; and update the record for both the short term and long term planning horizons.

Policy 6.1 - Continue to coordinate with appropriate drainage facility agencies on an annual basis to review the status of the drainage system to meet future needs.

Policy 6.2 - Continue to coordinate with appropriate drainage facility agencies to maximize the use of existing facilities by all new development so as to discourage urban sprawl.

Policy 6.3 - All new land use amendments shall be consistent with existing and programmed drainage facilities.

Policy 6.4 - All new development permits shall be issued only when determined to be consistent with existing and programmed drainage facilities.

Policy 6.5 - LDR's will be updated by 2008 to reflect criteria in reviewing land use plan amendments for consistency with existing and programmed drainage facilities.

D. POTABLE WATER SUPPLY AND WATER RESOURCE MANAGEMENT COORDINATION

OBJECTIVE VII

Insure the adequate provision of potable water services within the community at the time of building permit issuance by maintaining the adopted level of service.

Evaluation Measure Objective VII - Continue to maintain the adopted level of service through the year 2015.

Policy 7.1 - Maintain potable water service capacity through incorporation of any needed improvements into the City's Capital Improvements Program *(cross- reference CE Updated Policy 2.15 and CIE Policy 2.7)*.

Policy 7.2 - Since potable water facilities have been determined to be available to serve the future population, monitor service demand and capacity in 2010 and again in 2015 so as to identify any unforeseen facility deficiencies.

Policy 7.3 - Develop a plan for prioritizing needs and correcting deficiencies upon their identification, and that decisions regarding the location of infrastructure investments are made with priority for the lowest income neighborhoods.

Policy 7.4 - Peak and average flow design capacities shall not be exceeded.

Policy 7.5 - Continue to ensure that water supply and distribution mains provide adequate flow for both fire fighting and consumer needs.

Policy 7.6 - Level of service standard of 84.8 gallons/capita/day will be monitored through the building permit process.

Policy 7.7 - The City will adopt the 10-Year Water Supply Facilities Work Plan to increase the coordination between land use and future water supply planning within 18 months of the adoption of the regional water supply plan as required by Chapter 163, State Statutes.

OBJECTIVE VIII

Continue to provide potable water services to meet demands within the City in an efficient, economical and environmentally sensitive manner through the year 2015.

Evaluation Measures Objective VIII - Maintain record of water treatment operations relating to demand and capacity. Update both for the short term and long term planning horizons. Increase education efforts in the practices of water conservation through the year 2015.

Policy 8.1 - Continue to encourage the use of water conservation devices in new construction.

Policy 8.2 - The City's Utility Division will increase water conservation education programs for the residents of the City through the year 2015.

Policy 8.3 - Coordinate with the private sector for the extension or expansion of capacity to meet future demand.

Policy 8.4 - Continue to implement City of Pembroke Pines Code of Ordinances No. 996 which creates a water conservation plan for the City that is consistent with SFWMD's Chapter 40E-21(Water Shortage Plan).

Policy 8.5 - Continue to require the use of existing and programmed potable water facilities by all new development so as to discourage urban sprawl.

Policy 8.6 - Maximize utilization of existing potable water facilities by requiring hook-ups if water lines are within 1/4 mile from proposed subdivision or 100 ft. from a single family unit.

Policy 8.7 - All new land use amendments shall be consistent with existing and programmed potable water facilities *(cross-reference ICE Policy 2.11).*

Policy 8.8 - All new development permits shall be issued only when determined to be consistent with existing and programmed potable water facilities.

Policy 8.9 - LDR's will be updated by 2008 to reflect criteria in reviewing land use plan amendments for consistency with existing and programmed potable water facilities.

Policy 8.10 - The City will continue to update the infrastructure map on an as needed basis which shows potable water, sanitary sewer, groundwater and solid waste facilities.

OBJECTIVE IX

To ensure that the City of Pembroke Pines addresses the availability and appropriate use of regional water supplies as well as the impacts of development upon water resource management programs and planning efforts of the South Florida Water Management District, and those of other local, regional, state and federal agencies *(cross-reference update to existing FLU Objective X).*

Evaluation Measure Objective IX – Record of water use permits consistent with the City's adopted WSFP, South Florida Water Management District's (SFWMD) Lower East Coast Water Supply Plan, and the Broward County Integrated Water Resource Plan.

Policy 9.1 – The City will maintain a Water Supply Facilities Work Plan (WSFP) for at least a 10 year planning period addressing water supply facilities necessary to serve existing and future development within the City's water service area, consistent with the City's consumptive use permit.

Policy 9.2 – The City's WSFP is provided in Appendix VI of this element.

Policy 9.3 – The City's adopted WSFP will be updated at a minimum every five years within 18 months of updates of the SFWMD's Lower East Coast Water Supply plan that affect the City *(cross-reference FLU Policy 10.6, Updated IE Policy 10.6, CE Policy 2.18, and ICE Policy 1.9)*.

Policy 9.4 – The WSFP will be used to prioritize and coordinate the replacement, expansion and/or upgrade of existing facilities used to withdraw, treat, transmit, store and distribute water to meet future needs.

Policy 9.5 – The City's WSFP identifies alternative sources of water that can be used to meet existing and future needs as well as the alternative water supply project or projects selected by the city, approved by the SFWMD, and identified in the Lower East Coast Water Supply Plan to supplement traditional sources of groundwater and surface water supplies.

Policy 9.6 – The City will provide annual progress reports to the SFWMD on the water supply development project(s) identified in the WSFP by November 15th of each year.

Policy 9.7 – the City's will conserve potable water resources, including the implementation of reuse programs and potable water conservation strategies and techniques as identified in the WSFP.

Policy 9.8 – The City will continue to ensure coordination among the Planning, Environmental Services and Utilities Divisions with SFWMD, Broward County Water Wastewater Services (BCWWS), and other agencies in the implementation of alternative water supply projects, establishment of level of service stands and resource allocations, changes in service areas, potential for annexation, and the sharing and updating of information to meet ongoing water supply needs *(cross-reference FLU Policy 11.13, and ICE Policies 1.9 & 2.12)*.

Policy 9.9 - The City shall apply conservation strategies as identified by the Water Conservation Plan submitted with the City's consumptive use permit including but not limited to xeriscape landscaping, leak detection program, water conserving rate structure, permanent irrigation ordinance and installation of rain sensor devices, and amend the Land Development Regulations accordingly during the next amendment cycle

E. NATURAL GROUND WATER AQUIFER RECHARGE

OBJECTIVE X

Ensure the quality of the City's water supply and protect aquifer recharge through the incorporation of Best Management Practices.

Evaluation Measure Objective IX - Record of land use amendments and development permits within wellfield protection zones.

Policy 10.1 - Continue to coordinate with the Broward County Water Resources Management Division and the Broward County Department of Planning and Environmental Protection in ensuring development permits are in compliance with the Broward County Wellfield Protection Ordinance through the monitoring of development permits.

Policy 10.2 - The City will update the LDR's by 2008 to provide that no land use amendments will be approved which violate the Broward County Wellfield Protection Ordinance.

Policy 10.3 - Continue to coordinate natural groundwater aquifer recharge systems of existing developments with future development through the use of master agreements.

Policy 10.4 - The City will incorporate all updated Infrastructure Element objectives and policies which require coordination with other governmental entities in the City's Intergovernmental Coordination Element (ICE) during the amendment cycle following the update.

Policy 10.5 - In recognition that the City's role regarding the protection of the natural groundwater aquifer recharge system is limited to coordinating with Broward County agencies, data on the status of water quality in the City's wellfields along with effects of saltwater intrusion on groundwater resources will be collected, and existing data and analyses will be updated in the adopted WSFP.

Policy 10.6 - The City's adopted Water Supply Facilities Work Plan will be updated at a minimum every five years to increase the coordination between land use and future water supply planning within 18 months of updates of the SFWMD's Lower East Coast Water Supply Plan that affect the City. *(cross-reference FLU Policy 10.6, IE Policy 9.3, CE Policy 2.18, and ICE Policy 1.9)*.

Policy 10.7 – The City's water quality will be protected in the traditional and new alternative water supply sources *(cross reference CE Policy 2.17)*.

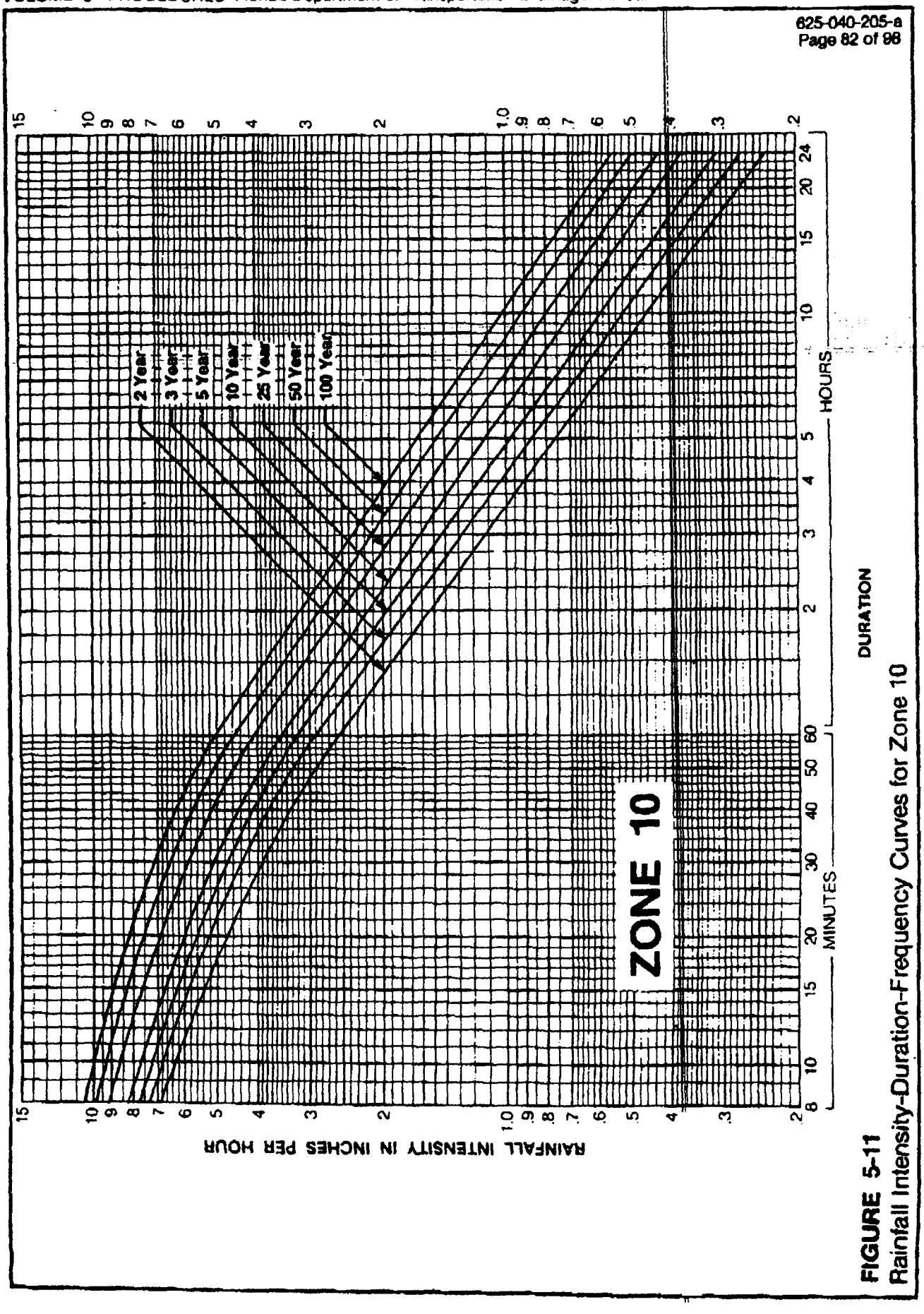

FIGURE 5-11
Rainfall Intensity-Duration-Frequency Curves for Zone 10

V. INFRASTRUCTURE ELEMENT - APPENDIX - ADOPTED 10 YEAR WATER SUPPLY FACILITY WORK PLAN

CITY OF PEMBROKE PINES, FLORIDA

10 YEAR WATER SUPPLY FACILITIES WORK PLAN

Prepared by:

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS

January 5, 2009

CGA Project No. 02-2491

CITY OF PEMBROKE PINES, FLORIDA

10 YEAR WATER SUPPLY FACILITIES WORK PLAN

Prepared by:

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January 5, 2009

CGA Project No. 02-2491

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Signature

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INTRODUCTION

1.01 PURPOSE & SCOPE

As a result of new State of Florida legislation concerning comprehensive plans, specifically FS 163.3177 and FS 163.3191, the City of Pembroke Pines must prepare a Long Range Water Supply Facilities Work Plan (Work Plan). This Work Plan reviews current and future water supply options over a ten (10) year planning period. Water supply options will be developed based upon withdrawals from the Biscayne Aquifer and Alternative Water Supplies. Also, the Eastern and Western wellfields will be reviewed as potential water supply resources. Water demands and flow projections will be developed by using population projections and actual per capita water demands.

This Work Plan considers the interaction of the City's water supply plan with the South Florida Water Management District's (SFWMD's) Lower East Coast Water Supply Plan (LECWSP).

The City has committed to pursuing Alternative Water Supplies and it is in the design phase of a project that will provide for Biscayne Aquifer recharge. This project is that one described in the LECWSP. A summary with budgetary costs and an implementation schedule is provided. Our calculations do not show a deficit in the 10 year planning period if the current water allocation of approximately 15.01 MGD is allowed. A deficit, however, is shown in 2009 if the SFWMD steps back the City's legally permitted allocation to approximately 13.25 MGD.

SECTION TWO

TEN - YEAR PROJECTIONS

2.01 POPULATION PROJECTIONS

Projections of population growth are essential for estimating future water demands. Anticipated population growth within the City of Pembroke Pines is projected on the basis of historical trends and expected land use development. Population projections developed in this Section are used to estimate future water demands.

Historical population and growth trends are available from the U.S. Census Bureau, the City's Planning Department, Broward County, South Florida Water Management District (SFWMD), and the University of Florida Bureau of Economic and Business Research (BEBR) medium range population projections. We have used the 2007 Broward County population forecasting model results for population estimates which uses Traffic Analysis Zones (TAZ). This is the model used by the SFWMD in the Lower East Coast Water Supply Plan to estimate population data.

The following is an excerpt from the 2005–2006 Lower East Coast Water Supply Plan Update Appendix D:

"For Palm Beach, Broward and Miami-Dade counties, the projected share of total county population for each utility service area was based on the projected traffic analysis zone (TAZ) population growth in each county. Traffic analysis zones are useful in projecting the distribution of population because they analyze relatively small geographic areas and are integrated into each county's transportation planning process.

In addition, GIS information about the areas that each utility expects to serve in the future was obtained from the utilities. The two layers were overlaid to determine if TAZs were inside or outside the area served by each utility. Population estimates were then calculated for each utility by deciding which polygons were inside or outside of utility-served boundaries. The populations

for each utility-served area were then totaled.

The projections used in this plan update are believed to represent a reasonable balance of long- and short-term factors affecting the development of the LEC Planning Area."

Since our plan is required to conform to the local water management district's Water Supply Plan, we believe the Broward County Planning Department has the most accurate and up to date population figures. Historical and projected population figures for the City of Pembroke Pines are presented in Table 2-1. The 1980, 1990, and 2000 population figures are based upon the official U.S. Government Census. Estimates from 1991 through 1996 and 2001 are based upon the BEBR. The Ten-Year (10-Yr.) population projections from 2006 through 2018 are based upon the 2007 Broward County Planning Department calculations. A graphical illustration of the Historical and Projected Population is presented in Figure 2-1. The projected population for the City of Pembroke Pines in 2018 is 170,191.

2.02 WATER DEMANDS AND FUTURE RAW WATER SUPPLIES

Before facilities can be sized, the future demands for water within the City served by the facilities must be determined. To project future water demands, past consumption and future expected consumption must be analyzed. A thorough review of the City's past and present water consumption and demands was performed, which included the Water Treatment Plant Monthly Operation Reports from January 1999 through December 2007. The past three years of data was analyzed and are presented in Table 2-2. The January 2007 to December 2007 data indicates the Average Daily Demand (ADD) for Raw Water was 12.527 Million Gallons per Day (MGD). Total raw water pumped from the Biscayne Aquifer was 4777.25 MG. Maximum day pumpage was 15.89 MGD and occurred in May 2007. The average peak factor ratio of Maximum Day pumpage to Average Day pumpage over the past three years was 1.19. Historical and Past Water Usage was also analyzed from 1987 through 2007 and the results are shown in Table 2-3. The City is a largely year round residential community with no seasonal demand peaks. Water use is relatively constant over the entire year. The City does not allow irrigation with potable water so there is no effect due to increased or decreased irrigation demand. The Past Water Usage in

Pembroke Pines has shown that over the last fifteen years the average gallons per capita day (gpcd) usage was 94.2 gallons per day and has decreased significantly over the past six years.(see figure 2-2a) Due to water restrictions imposed as a result of draught conditions, and the permanent water restrictions in place as mandated by the SFWMD, the average gallons per capita day for the past three years has been used for forecasting future water usage and it is projected that the population will continue to use less water than previously due to

a. A conservation rate structure and,
b. public awareness of the need to conserve water.

Projected water use for the City of Pembroke Pines was calculated and is presented in Table 2-4. Projected water use was calculated from 2008 through 2018, the ten-year planning period. The ADD was calculated based upon a per capita water usage of 84.8 gallons per capita per day (gpcd). The Maximum Day Demand was calculated based upon a three-year average peak factor of 1.19 times the ADD. For the year 2018 the estimated Average Day Demand and Maximum Day Demand would be 14.43 and 17.08 MGD respectively. Historical and projected average day demands are shown graphically in Figure 2-2b. This data indicates a short fall to develop between 2016 and 2017.

2.03 WELLFIELDS INFORMATION

Figure 2-3 is a map of the City's two wellfields that are both located on Johnson Street. The wellfields are approximately one mile apart. The City's only water use withdrawal facilities are the nine (9) wells located in these two wellfields. Table 2-5 describes wells 1 through 5, which are located at the water treatment plant (Central Wellfield), and wells 6, 9, 10, and 11, which are located on the corner of N.W. 72 Avenue and Johnson Street (Eastern Wellfield). The nine wells are owned and operated by the City of Pembroke Pines.

The current water use permit expires on October 14, 2009. The current permitted withdrawal amount is 5479 million gallons(MG) per year which equates to approximately 15.01 mgd. The current permitted withdrawal amount in a maximum month is 492.799 million gallons per month

which equates to approximately 16.2 mgd. Based on the 2005–2006 Lower East Coast Water Supply Plan Update the SFWMD is expected to roll back the City's permitted withdrawal from its currently permitted amount of approximately 15.01 mgd to 13.25 mgd at the expiration of the current permit if the City does not pursue an alternative water supply.

The City's intent is to continue to use the Biscayne Aquifer for potable water supply through Buildout and supplement the water supply through aquifer recharge. Two options were considered for alternative water supplies, reuse of wastewater for irrigation and reuse of wastewater for recharge of the aquifer. Both options have the effect of decreasing the need for water flow from the Everglades to recharge the Biscayne Aquifer and hence are in general compliance with the Lower East Coast Water Supply Plan (LECWSP). Either of these alternative water supplies could allow the City to continue to use the shallow Biscayne Aquifer for its future water needs, estimated by the SFWMD to be 2.7 MGD in 2025 in excess of that currently permitted but stepped back to the 2005 actual water withdrawal volume.

The recharge option is listed in the updated LECWSP as the alternative water supply project of choice for the City Pembroke Pines WTP. The aquifer recharge project is the preferred project as it would likely cause less construction problems and would be less expensive if an agreement can be worked out with Broward County Environmental Protection Department (EPD) to consider discharge limits in line with State of Florida Standards. The City intends to pursue this recharge project as its alternative water source.

An evaluation of shallow Biscayne Aquifer was done. As the City does not allow irrigation with potable water, no potable water savings would be seen by reusing wastewater effluent. If reuse was applied on the potential reuse sites the irrigation water would previously have come from the shallow Biscayne Aquifer or surface water and hence this would essentially add that same amount of water back in to the aquifer. The SFWMD should transfer this amount of raw water to the City's Consumptive Use Permit (CUP) thereby increasing the City's permitted withdrawal amount. An economic evaluation has been performed and both options are viable.

2.04 SERVICE AREA and OTHER SERVICE PROVIDERS

The City of Pembroke Pines current and future water service area with interconnects is presented as Figure 2-4. The City currently has four (4) emergency interconnects with neighboring municipal water systems, which include one (1) with Cooper City, two (2) with the City of Miramar, and one (1) with the City of Sunrise but does not provide water to these or other surrounding municipalities. The Town of Southwest Ranches in not serviced by the City of Pembroke Pines nor are there plans to provide water service to the Town of Southwest Ranches. There are, however, 5 individual homes (population of approximately 12 people total) in the Town that requested and were allowed to connect to the City's water system. The City intends to continue to provide service to these accounts but has no plans to make additional connections.

Broward County Water and Wastewater Services (BCWWS) does provide water to a small portion of the Southeastern section of the City. Broward County intends to continue to provide service to these homes and has accounted for this area in its Work Plan. Broward County's estimated water distribution to the City of Pembroke Pines is as follows:

Broward County Water Services for Pembroke Pines			
Year	**2008**	**2013**	**2018**
Population	2754	2869	2984
Water Projected (MGD)	.24	.24	.25

Source: Table 25 - Broward County 10 year Water Supply Facilities Work Plan

Please see the table on the following page which is from the Broward County Water Supply Facilities Work Plan (WSP). Broward County has taken into consideration the City of Pembroke Pines' customers in its WSP and additional coordination between the two governmental entities will occur.

Broward County Water Supply Facilities Work Plan - Table 25

City	Year 2000		Year 2005		Year 2010		Year 2015		Year 2020		Year 2025		Year 2030	
	Population	Flow	Population	Flow	Population	Flow	Population	Flow	Population	Flow	Population	Flow	Population	Flow
Regional County Facility	0	1.12	0	1.47	0	1.54	0	1.76	0	1.95	0	2.18	0	2.44
Dania Beach	10515	1.73	12145	1.97	13136	2.10	14188	2.28	15182	2.41	15876	2.50	16524	2.60
Davie	376	0.10	648	0.14	686	0.14	722	0.15	756	0.16	788	0.16	814	0.17
Deerfield Beach	21196	2.93	22443	3.10	23848	3.17	24900	3.30	25965	3.44	27145	3.58	28202	3.69
Fort Lauderdale	6909	1.79	7401	1.90	8031	1.99	9463	2.24	10770	2.43	11726	2.59	12462	2.71
Hollywood	5266	0.60	5461	0.63	5750	0.66	6237	0.72	6834	0.77	7749	0.85	8441	0.90
Indian Reservation	86	0.01	94	0.01	110	0.01	133	0.02	151	0.02	157	0.02	164	0.02
Lauderdale Lakes	28514	3.56	29143	3.63	33543	4.02	38814	4.49	43214	4.88	45736	5.15	47529	5.36
Lauderhill	6285	0.75	6469	0.77	6947	0.81	7279	0.85	7772	0.90	8327	0.96	8698	1.00
Lighthouse Point	9745	2.82	10053	2.84	10441	2.87	10740	2.95	11059	3.05	11398	3.15	11680	3.23
Miramar	5423	0.50	5530	0.51	5811	0.53	6160	0.56	6624	0.60	7354	0.66	7932	0.71
North Lauderdale	6199	0.61	6515	0.63	6972	0.66	7347	0.70	7694	0.73	8256	0.78	8752	0.82
Oakland Park	8589	1.30	8801	1.34	12232	1.78	12701	1.86	13196	1.92	13846	2.01	14411	2.08
Pembroke Park	5989	1.45	6598	1.41	6938	1.47	7238	1.59	7543	1.66	7864	1.74	8147	1.80
Pembroke Pines	***2696***	***0.23***	***2739***	***0.23***	***2800***	***0.23***	***2915***	***0.24***	***3034***	***0.25***	***3172***	***0.26***	***3256***	***0.27***
Plantation	1131	0.13	1417	0.17	1492	0.18	1647	0.19	1838	0.21	1951	0.22	2011	0.23
Pompano Beach	23772	4.06	24448	4.18	25838	4.25	27563	4.56	29443	4.85	31959	5.18	34153	5.46
Tamarac	1650	0.22	1677	0.23	1770	0.24	1883	0.25	1997	0.27	2164	0.28	2314	0.30
West Park	12848	1.21	13428	1.25	14257	1.32	15426	1.42	16799	1.52	18562	1.65	19971	1.75
Unincorporated	3135	0.36	9437	1.23	10009	1.27	10375	1.31	10995	1.35	11838	1.44	12443	1.50
Note: Based on year 2007 city boundaries. Flow is finished water average day demand potential.														

2.05 FACILITIES

A. WATER TREATMENT PLANT

The existing water treatment plant has a rated capacity of 18.0 million gallons per day (MGD) and is currently undergoing an expansion for a total treatment capacity of 24 MGD. The facility is located at the intersection of Johnson Street and University Drive in the City of Pembroke Pines. The City has two (2) 2.0 million gallons (MG) and one (1) 1.0 million gallons (MG) finished water storage tanks located at the water treatment plant. The method of treatment is by lime softening, filtration, ion exchange, and disinfection. Figure 2-5 shows the layout of the water treatment plant and various components of the water treatment process, and Table 2-6 details the predominant features of the water treatment plant. The water treatment plant is supplied by a total of nine (9) wells.

In addition to the water treatment plant the City has two (2) water booster pumping stations. The first is located in the north central part of the City at Academic Village, and the second is located in the extreme western end of the City at Holly Lakes. The Academic Village booster pump station is rated at 5,200 gallons per minute (GPM) and includes one (1) 2.5 million gallon (MG) finished water storage tank, a high service pump building, and a Sodium Hypochlorite re-chlorination facility. The Holly Lakes booster pump station is rated at 10,000 gallons per minute (GPM) and includes two (2) 2.5 million gallons (MG) finished water storage tanks, a high service pump building, and a re-chlorination facility. Figures 2-6 and 2-7 show the layout of Academic Village and Holly Lakes booster stations respectively.

The City has three large Mag-Meters for raw water flow on the incoming or influent end of the Water Treatment Plant. These meters register all raw water entering the plant from both wellfields. The City has installed individual Mag-Meters for metering flow from all wells. The City also meters finished (treated) water leaving the plant with two large (24" and 16") water meters. Each customer receiving water has a water meter to register and total the amount of water consumed.

The shallow Biscayne Aquifer is the sole source of water for the City of Pembroke Pines as well

as most of Broward County. The Floridan Aquifer, which lies some 1,500 feet below the surface, is another potential source of water, but is still being investigated for full potential. The Biscayne Aquifer lies just below the surface. The City's wellfield draws from a portion of the Biscayne Aquifer approximately 112 feet deep. Private irrigation wells are reported to draw from a shallower portion of the aquifer.

The City of Pembroke Pines has the highest municipal fire fighting rating available with an ISO rating of 1. Hydrants are available throughout the City and are tested annually. The City's high service pumps at the water treatment plant, Academic Village, and at the Holly Lake site provide the City with up to 34,055 GPM pumping capacity. Emergency power for the pumps is provided at each site. The total water storage tank capacity is 12.5 MG and provides the City with more than a 10-hour fire fighting duration.

B. WASTEWATER TREATMENT PLANT

The City is separated into two wastewater collection and treatment zones, the eastern and western zones. Each serves approximately ½ of the City. The average daily wastewater effluent flow production for the western zone of the City is shown in Table 2-7. The western portion of the City is considered to be the area west of Flamingo Road. Flows are presented from readings of the effluent meter at the Pembroke Pines WWTP from injection wells 1 and 2. The average Pembroke Pines sewage effluent production for the western portion of the City amounted to approximately 6.4 mgd in 2007.

In addition, the City of Pembroke Pines owns and operates a wastewater collection and transmission system east of Flamingo Road. The wastewater generated by this area is transmitted to the City of Hollywood regional wastewater treatment facility and is governed by a Large User Agreement. The wastewater from this area averages (years2004-2006) approximately 7.5 mgd. Therefore, the total amount of wastewater generated the eastern and western portions of the City is approximately 13.9 MGD.

TABLE 2-1
CITY OF PEMBROKE PINES
HISTORICAL AND PROJECTED POPULATION

	YEAR	HISTORICAL POPULATION
*	1980	35,776
	1981	40,070
	1982	41,784
	1983	42,062
	1984	43,104
	1985	47,087
	1986	49,352
	1987	53,706
	1988	57,536
	1989	60,838
*	1990	65,452
**	1991	67,693
**	1992	70,336
**	1993	73,899
**	1994	80,685
**	1995	88,497
**	1996	94,544
**	1997	104,143
**	1998	112,692
**	1999	120,091
*	2000	137,427
**	2001	140,162
	2002	142,898
	2003	145,633
	2004	148,368
	2005	151,104
***	2006	153,839
	2007	155,583

	YEAR	PROJECTED POPULATION
***	2008	157,328
***	2009	159,072
***	2010	160,816
***	2015	167,080
***	2016	168,117
***	2017	169,154
***	2018	170,191

(*) U.S. Census Bureau Figure
(**) Population per University of Florida
Bureau of Economic and Business Research (BEBR)
(***) 2007 Broward County Population estimates using TAZ zones

TABLE 2-2
CITY OF PEMBROKE PINES
WATER USE FOR 3 YEAR PERIOD

FROM: January 2007 TO: December 2007

DATE	RAW WATER PUMPAGE AVERAGE DAY (MG)	RAW WATER PUMPAGE MAXIMUM DAY (MG)	TOTAL RAW WATER PUMPAGE (MGM)	TOTAL WATER TREATED (MGM)	TMADF
Jan-07	13.68	15.54	424.02	403.70	
Feb-07	13.53	14.78	378.89	359.77	
Mar-07	13.98	15.89	433.24	417.92	**13.73**
Apr-07	13.39	14.47	401.65	387.84	
May-07	13.08	13.75	405.37	392.25	
Jun-07	12.45	13.63	373.52	357.46	**12.97**
Jul-07	12.44	13.40	385.54	365.88	
Aug-07	12.97	15.61	402.17	385.71	
Sep-07	12.72	14.05	381.58	363.25	**12.71**
Oct-07	12.53	13.23	388.39	371.28	
Nov-07	12.93	14.67	387.83	368.97	
Dec-07	13.39	14.60	415.05	398.27	**12.95**
TOTAL			**4777.25**	**4572.31**	
AVERAGE	**13.09**		**398.10**	**381.03**	
MAX PUMPED	**15.89**				
PEAK FACTOR	**1.21**		ADF	12.527	mgd
PUMPING RATIO	**1.04**				

Three Year Average Peaking Factor was 1.19

TABLE 2-2 CONT.
CITY OF PEMBROKE PINES
WATER USE FOR 3 YEAR PERIOD

FROM: January 2006 TO: December 2006

DATE	RAW WATER PUMPAGE AVERAGE DAY (MG)	RAW WATER PUMPAGE MAXIMUM DAY (MG)	TOTAL RAW WATER PUMPAGE (MGM)	TOTAL WATER TREATED (MGM)	TMADF
Jan-06	14.04	15.72	437.11	430.03	
Feb-06	13.80	14.91	386.31	367.25	
Mar-06	14.45	15.69	448.01	429.01	**14.10**
Apr-06	13.80	15.68	446.65	427.68	
May-06	14.40	16.15	446.28	426.20	
Jun-06	13.33	14.47	399.87	382.64	**13.84**
Jul-06	12.99	13.96	402.70	304.30	
Aug-06	14.40	14.63	415.46	393.91	
Sep-06	13.05	13.92	391.48	374.52	**13.48**
Oct-06	13.62	13.07	422.19	405.04	
Nov-06	13.36	12.81	400.67	384.17	
Dec-06	13.56	12.93	420.38	400.71	13.51
TOTAL			**5017.12**	**4725.45**	
AVERAGE	**13.73**		**418.09**	**393.79**	
MAX PUMPED	**16.15**				
PEAK FACTOR	**1.18**		ADF	12.946	mgd
PUMPING RATIO	**1.06**				

TABLE 2-2 CONT.
CITY OF PEMBROKE PINES
WATER USE FOR 3 YEAR PERIOD

FROM: January 2005 TO: December 2005

DATE	RAW WATER PUMPAGE AVERAGE DAY (MG)	RAW WATER PUMPAGE MAXIMUM DAY (MG)	TOTAL RAW WATER PUMPAGE (MGM)	TOTAL WATER TREATED (MGM)	TMADF
Jan-05	13.26	14.53	411.00	399.72	
Feb-05	13.84	13.19	387.38	369.29	
Mar-05	13.49	13.02	418.09	403.70	**13.53**
Apr-05	14.26	16.11	446.65	427.68	
May-05	13.84	15.64	429.08	413.96	
Jun-05	12.98	14.26	389.50	379.14	**13.69**
Jul-05	13.48	15.31	417.81	418.00	
Aug-05	13.77	15.12	426.85	418.91	
Sep-05	13.50	14.62	404.70	427.70	**13.58**
Oct-05	13.45	15.34	417.01	402.30	
Nov-05	13.76	15.25	421.98	395.29	
Dec-05	13.67	14.86	423.82	409.04	**13.63**
TOTAL			**4993.86**	**4864.73**	
AVERAGE	**13.61**		**416.16**	**405.39**	
MAX PUMPED	**16.11**				
PEAK FACTOR	**1.18**		ADF	13.328	mgd
PUMPING RATIO	**1.03**				

TABLE 2-3
CITY OF PEMBROKE PINES
PAST WATER USE

	YEAR	PAST POPULATION	PER CAPITA USAGE (1)	TOTAL WATER LEAVING PLANT (MGD)
**	1992	70,336	104.08	7.321
**	1993	73,899	107.98	7.980
**	1994	80,685	104.28	8.414
**	1995	88,497	103.36	9.147
**	1996	94,544	94.42	8.927
**	1997	104,143	96.40	10.039
**	1998	112,692	97.78	11.019
**	1999	120,091	98.81	11.866
*	2000	137,427	91.00	12.506
**	2001	140,162	84.73	11.876
	2002	142,898	91.56	13.084
	2003	145,633	90.17	13.132
	2004	148,368	89.05	13.212
***	2005	151,104	88.20	13.328
	2006	153,839	85.58	13.166
	2007	155,583	80.52	12.527

gpcd= 84.8 avg. of years 2005, 2006, 2007

(1) Per Capita Usage (gpcd) is based upon Average Day Demand/Population Served.

(*) U.S. Census Figure

(**) Population per UF - BEBR

(*) 2007 Broward County Population estimates using TAZ zones**

TABLE 2-4
CITY OF PEMBROKE PINES
PROJECTED WATER USE

YEAR	PROJECTED POPULATION	(1) AVERAGE DAY DEMAND (MG)	(2) MAXIMUM DAY DEMAND (MG)
2008	157,328	13.34	15.89
2009	159,072	13.48	16.06
2010	160,816	13.63	16.24
2015	167,080	14.16	16.87
2016	168,117	14.25	16.98
2017	169,154	14.34	17.08
2018	170,191	14.43	17.19

(1) Based on a 2005 to 2007 yr per capita (gpcd) usage of 84.8

(2) Based upon a three year average peak factor of 1.19

TABLE 2-5

CITY OF PEMBROKE PINES
CENTRAL WELLFIELD DESCRIPTION

DESCRIPTION	WELL No. 1	WELL No. 2	WELL No. 3	WELL No. 4	WELL No. 5
Map Designation	WEST	WEST	WEST	WEST	WEST
Existing or Proposed	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING
Diameter (inches)	12	12	12	16	16
Total Depth (feet)	112.5	112	111	144	115
Cased Depth (feet)	105	105	105	114	103
Screened Interval	NONE	NONE	NONE	NONE	NONE
Pumped or Flowing	PUMPED	PUMPED	PUMPED	PUMPED	PUMPED
Working Valve, If Artesian (yes or no)	NO	NO	NO	NO	NO
Pump Manufacturer and Model Number	B.JACKSON 12 HQR	INGERSOLLRAND 10 NKH	FAIRBANKS MORSE11M-7000	PEERLESS12 HXB	PEERLESS14 HXB
Pump Type (Centrifugal, Jet, Deep Jet, Turbine, etc.)	TURBINE	TURBINE	TURBINE	TRUBINE	TURBINE
Intake Depth (NGVD)	39'	23'	23'	23'	30'
Pump or Flow Capacity (GPM at Ft. of Head)	2000 GPM@ 45'	1000 GPM@ 32'	825 GPM@ 58'	2100 GPM@ 43'	2350 GPM@ 57'
Active (yes or no)	YES	YES	YES	YES	YES
Year Drilled	1963	1963	1963	1973	1973
Type of Meter	MAG	MAG	MAG	MAG	MAG

TABLE 2-5 CONT.

CITY OF PEMBROKE PINES
EASTERN WELLFIELD DESCRIPTION

DESCRIPTION	WELL No. 6	WELL No. 9	WELL No. 10	WELL No. 11
Map Designation	EAST	EAST	EAST	EAST
Existing or Proposed	EXISTING	EXISTING	EXISTING	EXISTING
Diameter (inches)	10	18"	18"	18"
Total Depth (feet)	94	125'	123'	125'
Cased Depth (feet)	90	102'	100'	102'
Screened Interval	NONE	NONE	NONE	NONE
Pumped or Flowing	PUMPED	PUMPED	PUMPED	PUMPED
Working Valve, If Artesian (yes or no)	NO	NO	NO	NO
Pump Manufacturer and Model Number	FLOWAY16MKL	FLOWAY16MKL	B. JACKSON15HQ	B. JACKSON15HQ
Pump Type (Centrifugal, Jet, Deep Jet, Turbine, etc.)	TURBINE	TURBINE	TURBINE	TURBINE
Intake Depth (NGVD)	39'	47'	49'	49'
Pump or Flow Capacity (GPM at Ft. of Head)	1580 GPM@ 52'	3000 GPM@ 60'	3000 GPM@ 60'	3000 GPM@ 60'
Active (yes or no)	YES	YES	YES	YES
Year Drilled	2000	1994	1995	1995
Type of Meter	MAG	MAG	MAG	MAG

TABLE 2-6

CITY OF PEMBROKE PINES
WATER TREATMENT PLANT FEATURES

COMPONENT	DESCRIPTION
RAW WATER WELLS:	The City has nine (9) raw water wells. Five are located on the water treatment plant site (Central Wellfield) and four (4) are located one mile east of the water treatment plant at the eastern wellfield site. The total rated capacity of the wellfields is 18,855-gpm.
WATER TREATMENT UNITS:	There are three (3) steel pre-engineered Accelator treating units (softeners) each rated at 6.0 MGD.
GRAVITY SAND FILTERS:	There are three (3) Greenleaf multi-media four cell filter units.
LIME SILOS:	There are three (3) lime silos for storing and mixing the lime.
CLEARWELL AND TRANSFER PUMPS:	Pumps transfer water from the clearwell to the storage tanks and to the Ion Exchange filters and the clearwell as needed.
GROUND STORAGE TANKS:	The City has three (3) large pre-stressed concrete ground storage tanks.
HIGH SERVICE PUMP STATION:	Nine (9) motors range from 40 hp to 125 hp; pumps are 4" through 8" size and are capable of pumping a total of 18,120 gallons per minute (GPM).
BACKWASH BASIN AND TRANSFER PUMPS:	Recovers filter backwash water and transfers water to the head of the plant.
SLUDGE POND:	Provides for a discharge of lime softening sludge.
MAINTENANCE BUILDING:	Houses the office of maintenance supervisors and equipment for both the distribution system and the treatment system.
CONTROL BUILDING:	Houses the plant laboratory, water quality testing equipment, and the controls and monitoring equipment used by the chief water plant operator.
CHEMICAL FEED BUILDING:	Houses the plant chemical feed processing equipment.
ELECTRICAL BUILDING:	Houses the FPL transformer and the emergency diesel generator set including switchgear.

TABLE 2-7

CITY OF PEMBROKE PINES
WASTEWATER FLOW PROJECTIONS

Service Agency	Year	Population	Average (mgd)	Allowed Capacity
City of Hollywood	2000	80,865	7.1	10
Pembroke Pines	2000	57,925	5.43	9.5
City of Hollywood	2005	85,763	7.53	10
Pembroke Pines	2005	75,075	6.65	9.5
City of Hollywood	2010	88,838	7.8	10
Pembroke Pines	2010	79,301	6.96	9.5
City of Hollywood	2018	92,255	8.1	10
Pembroke Pines	2018	80,606	7.07	9.5

5 year Per Capita Flow = 87.8 gpcd
City of Hollywood Service Area (East of Flamingo Road)
Pembroke Pines Service Area (West of Flamingo Road)

FIGURE 2-1
CITY OF PEMBROKE PINES
HISTORICAL AND PROJECTED POPULATION

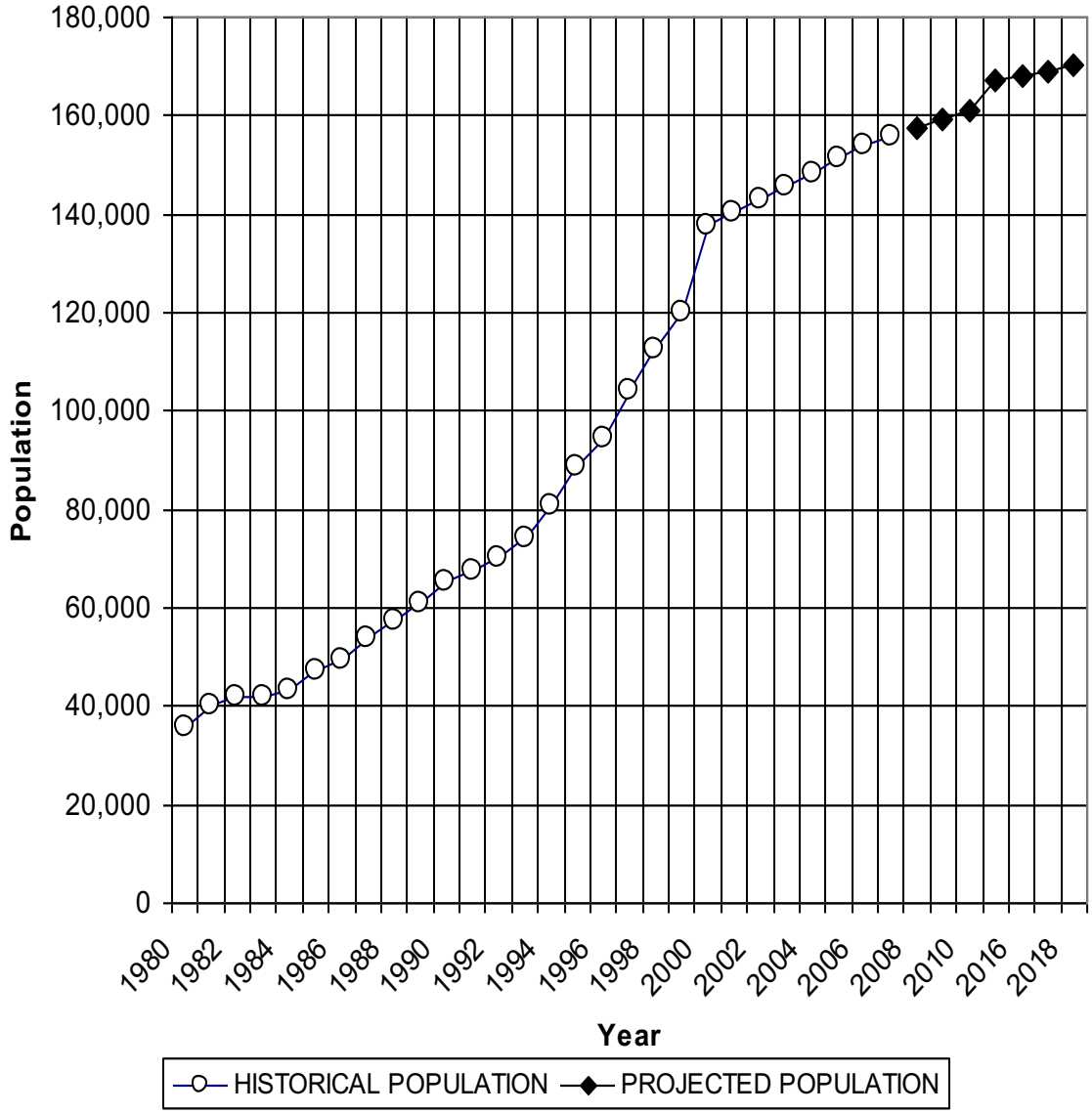

FIGURE 2-2a
CITY OF PEMBROKE PINES
gpcd and FLOW DATA

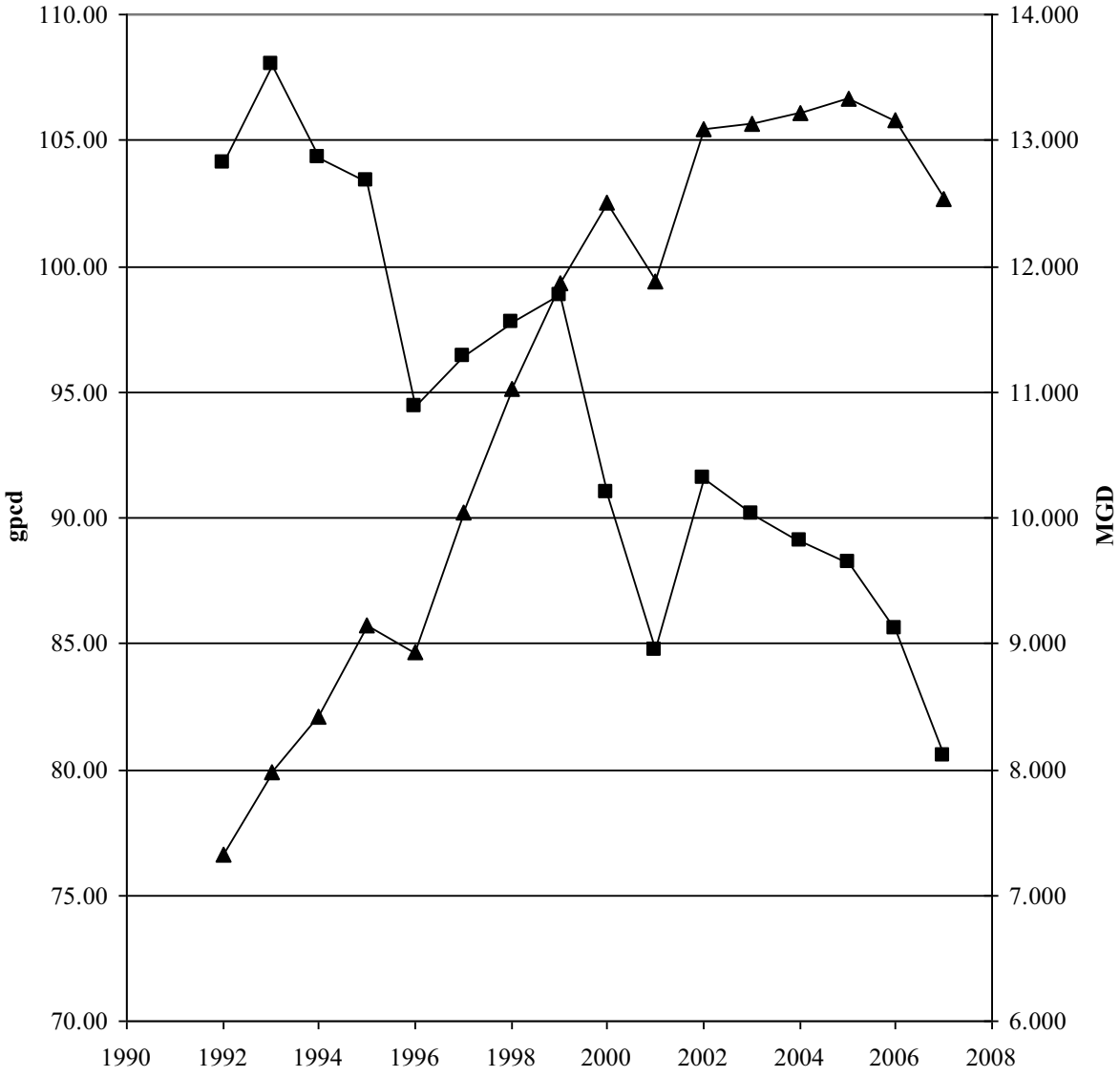

FIGURE 2-2b
CITY OF PEMBROKE PINES
HISTORICAL & PROJECTED DEMAND

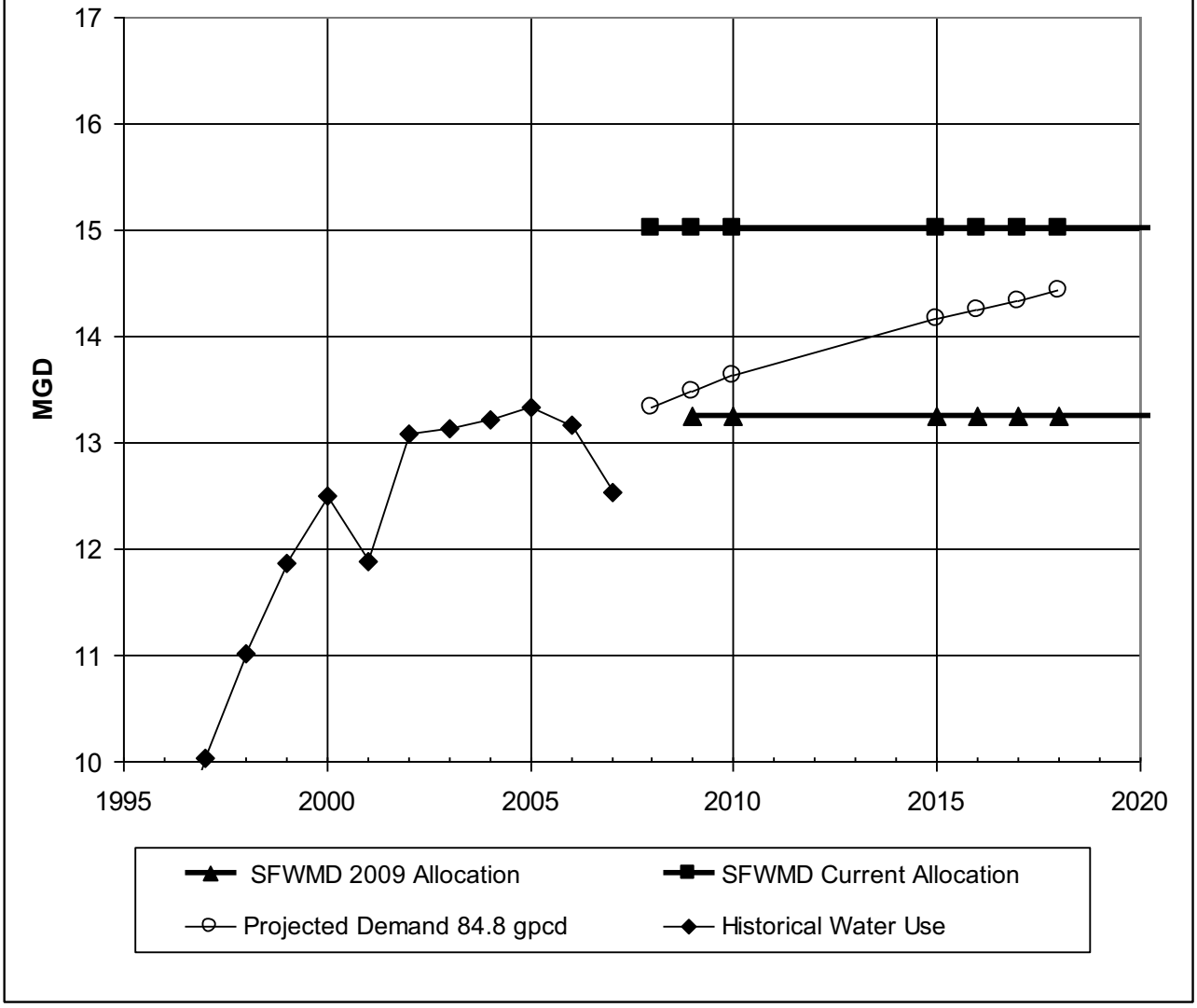

FIGURE 2-3

CITY OF PEMBROKE PINES
CENTRAL AND EASTERN WELLFIELD

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Engineers Surveyors Planners

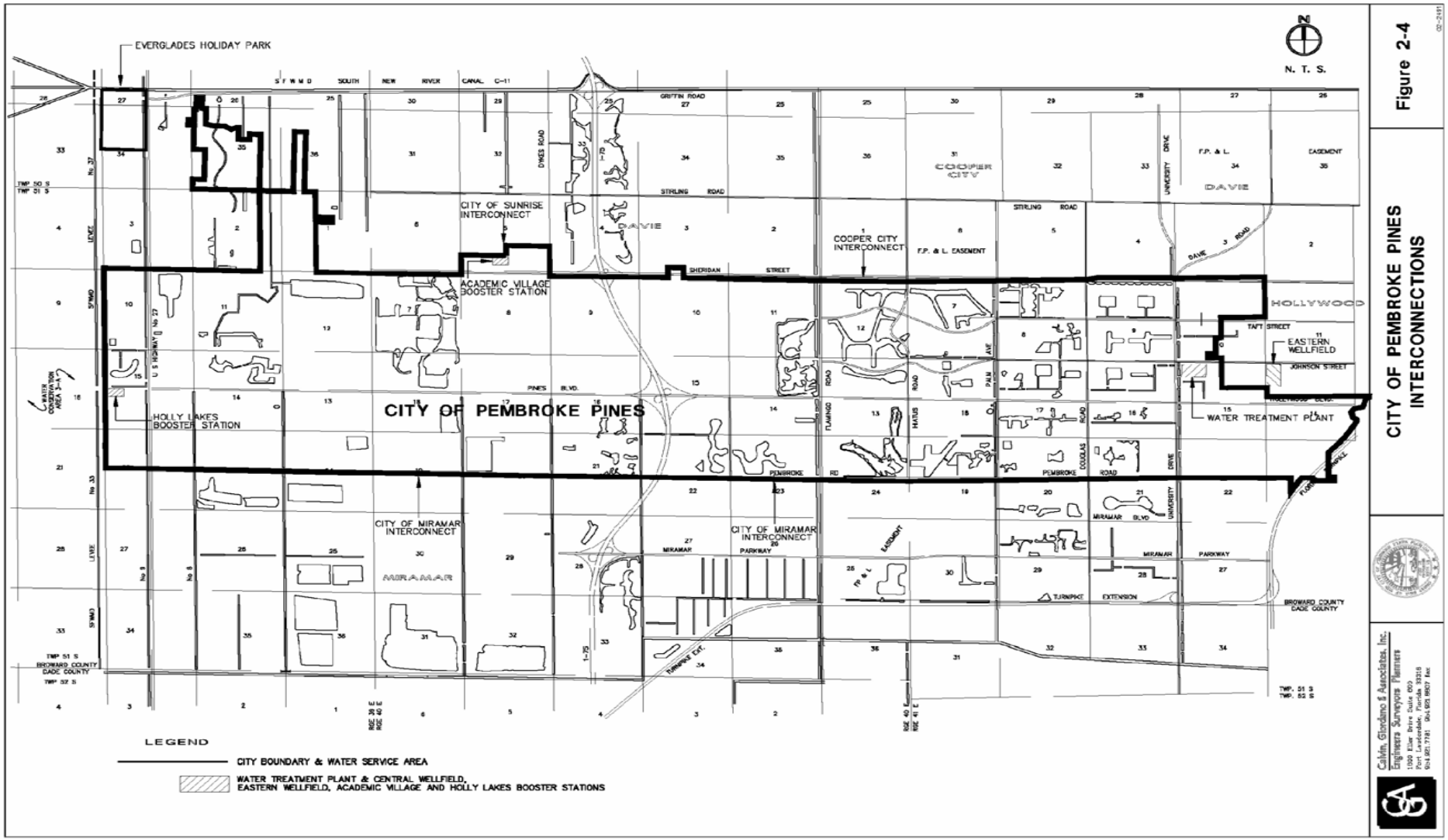
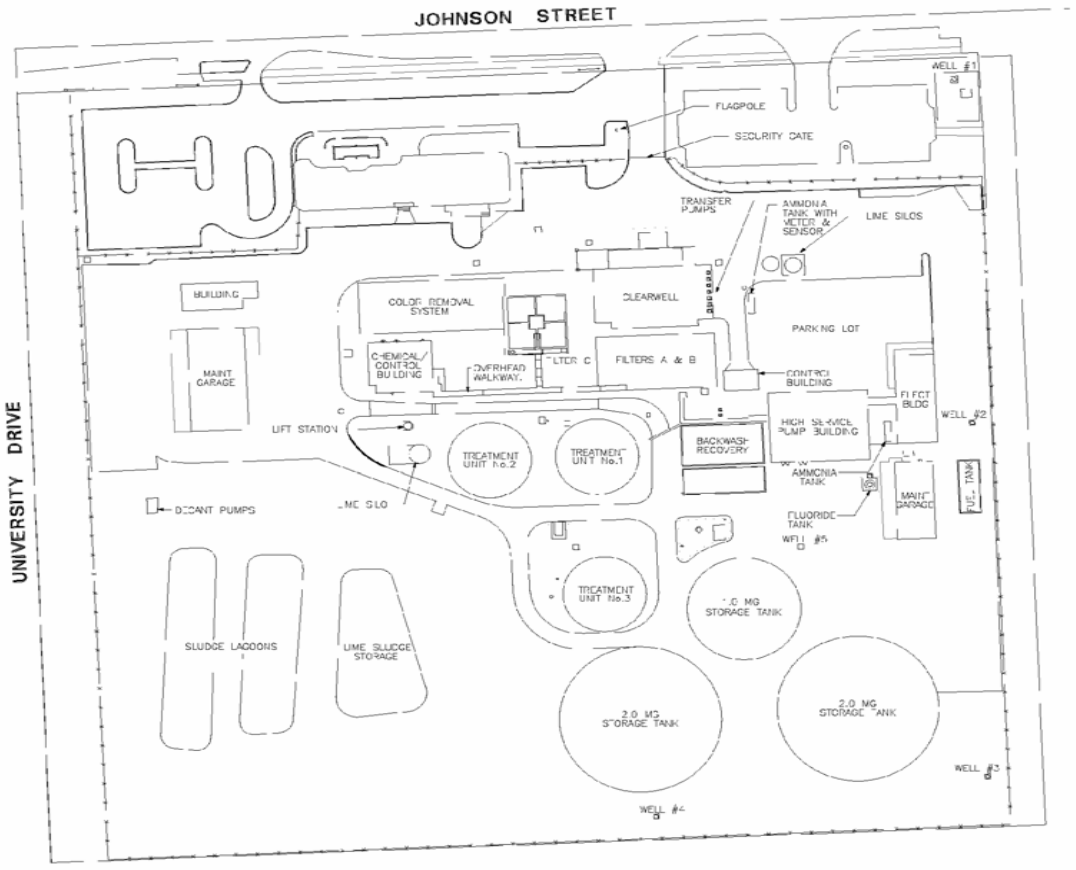


Figure 2-4

CITY OF PEMBROKE PINES
INTERCONNECTIONS

02-2491

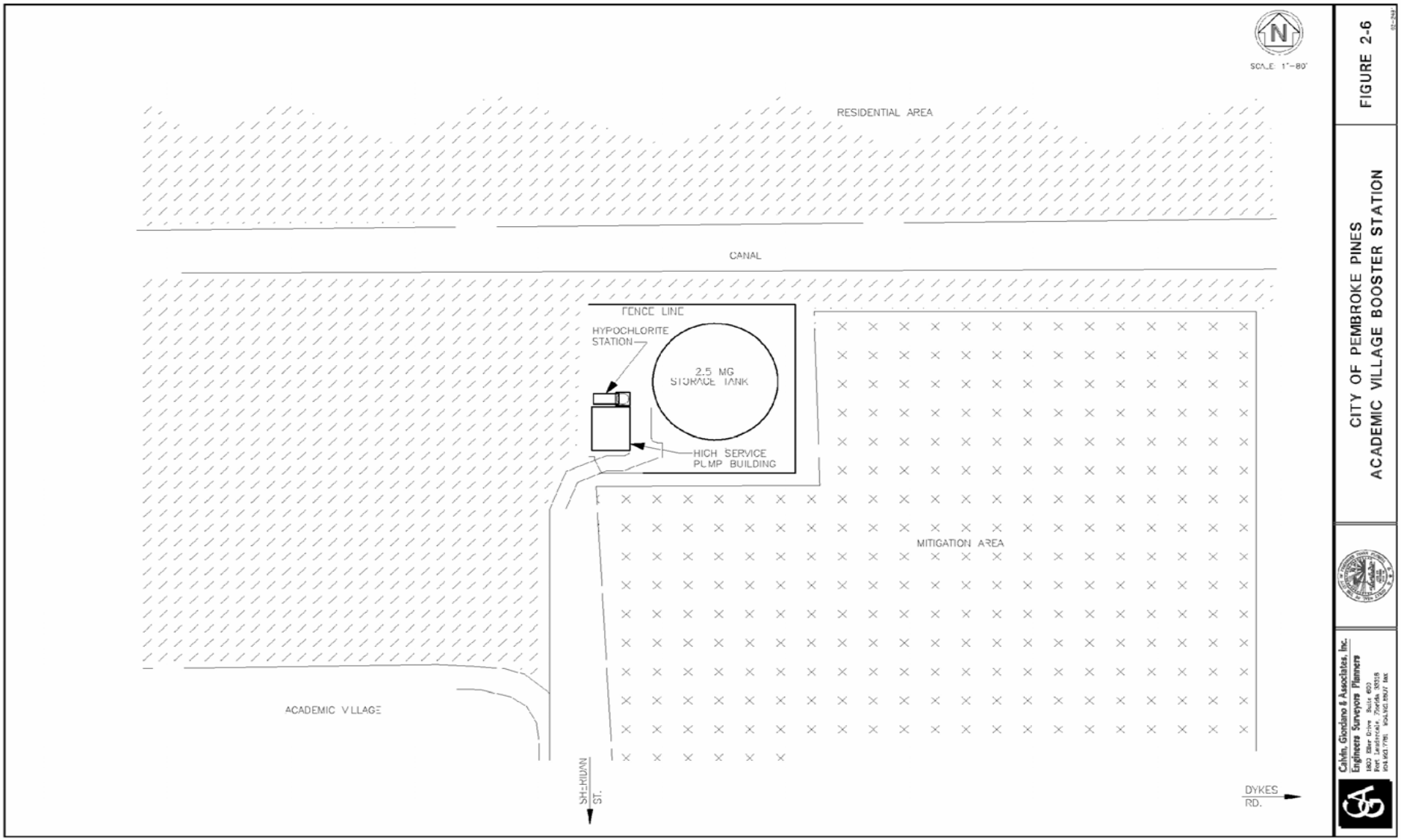
Calvin, Giordano & Associates, Inc.
Engineers Surveyors Planners
1800 Eller Drive Suite 600
Fort Lauderdale, Florida 33316
954.921.7781 954.921.8807 Fax

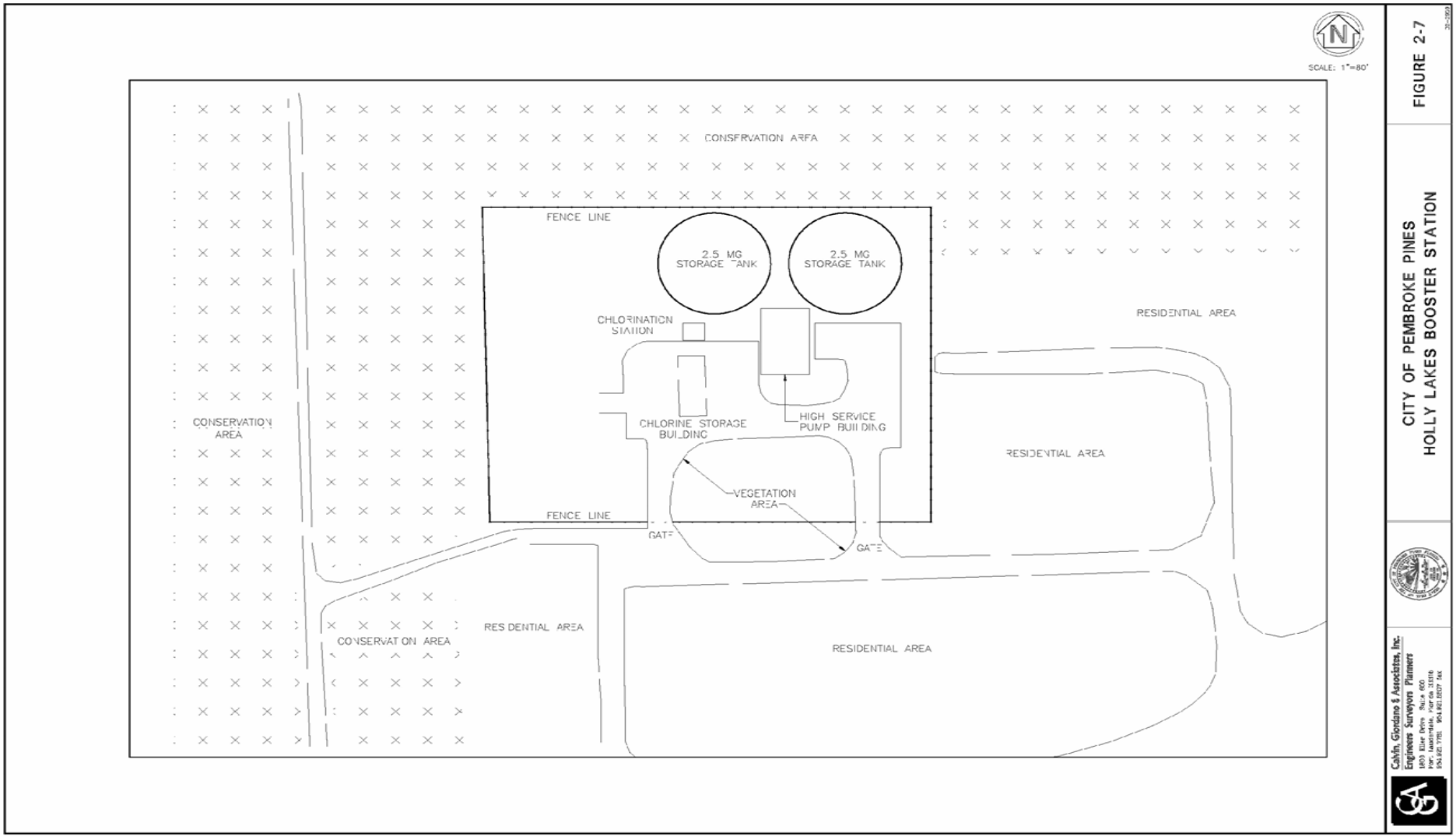


CITY OF PEMBROKE PINES
EXISTING WATER TREATMENT PLANT
AND CENTRAL WELLFIELD

FIGURE 2-5

Calvin, Giordano & Associates, Inc.
Engineers Surveyors Planners


N
SCALE 1"=80'
RESIDENTIAL AREA
CANAL
FENCE LINE
HYPOCHLORITE STATION
2.5 MG STORAGE TANK
HIGH SERVICE PUMP BUILDING
MITIGATION AREA
ACADEMIC VILLAGE
SHERIDAN ST.
DYKES RD.
FIGURE 2-6
CITY OF PEMBROKE PINES
ACADEMIC VILLAGE BOOSTER STATION
Calvin, Giordano & Associates, Inc.
Engineers Surveyors Planners


SCALE: 1"=80'
CONSERVATION AREA
FENCE LINE
2.5 MG STORAGE TANK
2.5 MG STORAGE TANK
CHLORINATION STATION
RESIDENTIAL AREA
CONSERVATION AREA
CHLORINE STORAGE BUILDING
HIGH SERVICE PUMP BUILDING
RESIDENTIAL AREA
VEGETATION AREA
FENCE LINE
GATE
GATE
RESIDENTIAL AREA
CONSERVATION AREA
RESIDENTIAL AREA
FIGURE 2-7
CITY OF PEMBROKE PINES
HOLLY LAKES BOOSTER STATION
Calvin, Giordano & Associates, Inc.
Engineers Surveyors Planners

SECTION THREE

ALTERNATIVE WATER SUPPLY OPTIONS

3.01 GENERAL

Water supply options were developed herein outlining the City of Pembroke Pines plan to supply potable water for the next ten years. The South Florida Water Management District (SFWMD) has concerns regarding saline intrusion, pollution sites, and other municipal neighbor users and their impact on the Biscayne Aquifer. A description of options the City of Pembroke Pines has considered for a long-term water supply plan follows. Two options were considered the most feasible; irrigation reuse and aquifer recharge. The City has decided to pursue the aquifer recharge option.

The City boundary is not anticipated to change unless future annexation occurs. If boundary expansions take place in the future, the only areas likely to expand are the northwestern or northeastern portions of the City. The northwestern area is comprised of estate type homes, ranches and agricultural type land uses, and is therefore not anticipated to have a significant impact on future water demands and wastewater flows.

Land use revisions are usually difficult to get approved since the City, County, Regional Planning Council and Department of Community Affairs must approve revisions to the current approved land uses. Land use revisions are particularly difficult to accomplish in Broward County. It is therefore believed that the current land uses will remain unchanged.

Table 2-1 shows the projected population for the entire City of Pembroke Pines. Build-out is expected to occur in next few years with infill occurring after build-out, based upon the City Planning Department's current estimations. Figure 2-1 shows the historical population growth of the City and the estimated population growth through the build-out period.

3.02 WASTEWATER MANAGEMENT

Projected wastewater flows for the City of Pembroke Pines were calculated. The Average Daily Flow (ADF) was calculated based upon a five-year average per capita wastewater usage of 87.8 gallons per capita per day (GPCD). The Maximum Day Flow was calculated based upon a three-year average peak factor of 1.72 times the ADF. The current WWTP is rated at 9.5 MGD and is therefore estimated to be large enough for the future flows ten year planning period. Currently there are no anticipated changes in the character of the influent wastewater over the planning period. No industrial users are anticipated to connect to the system. The vast majority of the wastewater will continue to be from domestic sources. This is also true for the eastern wastewater collection system.

3.03 WATER SUPPLY

The projected average and maximum municipal water demands are shown on Table 2-4 and graphically in Figure 2-2b. The table and graph show the projected average daily demand (ADD) and the maximum daily demand (MDD) from 2008 through a ten-year planning period of 2018. Note, the water demand reflects the demand for the entire City of Pembroke Pines. Refer to the water service area shown. The current source of water is the Biscayne Aquifer and it is anticipated to be the sole source of water for the City. The SFWMD adopted the Lower East Coast Regional Water Supply Plan (LECWSP) 2005 Update that identified specific projects to meet future water needs in Monroe, Miami-Dade, Broward and Palm Beach counties. The District's Governing Board has authorized publication of a Regional Water Availability Rule limiting water use allocations in the southeast Florida area that could directly or indirectly impact water for Everglades restoration. As a result of the rule, cities needing additional water supplies will be required to seek sources that are not dependent upon the Everglades for recharge. These alternative water supply solutions include recycling water, using reclaimed water to recharge the Biscayne Aquifer, or drawing water from the deeper Floridan Aquifer, which also would require treatment before being deemed safe to drink. As a result of this rule, the City is committed to seek alternative water supply solutions even though Pembroke Pines may have the lowest water

consumption per capita in the entire county. The innovative ion exchange color removal technology used by the City's water plant enables it to waste far less water than conventional softening membranes that must reject up to 15% of the water drawn from the aquifer. The estimated 8.2% increase, or 1.09 MGD, in average water demand over the ten-year planning period is small when compared to other municipalities, because the City is mostly built out, and does not expect a significant increase in population. However, the City is committed to diminishing the stress on the Everglades through decreasing withdrawal from the Biscayne Aquifer which is recharged from the Everglades. This can be accomplished in several ways.

a. If the City provides direct reuse for irrigation, the withdrawal from the shallow Biscayne Aquifer could be diminished in a one for one fashion by as much as those volumes used for irrigation.

b. If the City provided recharge of the aquifer by discharging properly treated wastewater to surface or ground waters, this could make more water available from the Biscayne Aquifer for potable or irrigation uses without requiring recharge from the Everglades.

c. If the City builds membrane treatment equipment and uses the Floridan Aquifer to supplement the raw water need, this again, this could make more water available from the Biscayne Aquifer for potable or irrigation uses without requiring recharge from the Everglades if Biscayne withdrawal is diminished.

As part of the LECWSP Update, the City would be pursuing a Highly Treated Wastewater Reuse/Recharge project at their wastewater treatment facility. This project is discussed further in Section 4.

SECTION FOUR

DESCRIPTION OF THE ALTERNATIVES CONSIDERED and OTHER CONSIDERATIONS

4.01 ASSESSMENT OF CONTINUED AND INCREASED WATER WITHDRAWALS FROM THE BISCAYNE AQUIFER

A. Saline Intrusion of Wellfields

The City's eastern wellfield is located approximately 2 miles from the C-10 spur canal, the closest possible source of saline water. The potential for saline intrusion into the eastern wellfield was evaluated in the detailed model prepared for the eastern wellfield by Blasland, Bouck and Lee, Inc. for the latest Consumptive Water Use Permit (CUP). The model indicated that the City of Hollywood's wellfield restricted the City of Pembroke Pines eastern wellfields cone of influence and prevents possible saline intrusion from the C-10 spur canal. Therefore, the potential for adverse impacts from saline waster intrusion as a result of the proposed maximum daily withdrawal rate is considered minimal.

B. County Wellfield Protection Ordinance

The City has complied with the County Wellfield Protection Ordinance, and there are no current or anticipated wellfield protection ordinance problems with the City and their wellfields. Increased withdrawals over the last ten (10) years have shown no major changes in draw down in the area of the City wellfields and therefore no problems are anticipated with saltwater intrusion or from any other potential problems.

4.02 PLANS FOR WATER SHORTAGES DUE TO WELLFIELD FAILURES

The City has had no wellfield failures in the past and does not anticipate failures in the future. Both the east and the central wellfields have emergency power provisions. The City currently

has sufficient backup well capacity and also has sufficient finished water storage capacity to handle peak hour demands and fire flow demands in its current system. If a well or pump goes down, the City is prepared to make immediate repairs as necessary to provide sufficient water to its customers. The City's water transmission and distribution system is also interconnected with several neighboring municipal water systems.

4.03 CONSERVATION MEASURES TO HELP REDUCE AQUIFER STRESS

The City's Water Conservation Plan was submitted with the full Consumptive Water Use Permit Application. The City does not allow irrigation with potable water and this is codified. The City has implemented a water conservation plan with elements such as xeriscape landscaping, a leak detection program, water conserving rate structure, and a permanent irrigation ordinance and rain sensor devices. These items contribute to the overall plan for water conservation and help reduce stress on the aquifer and allow the City to maintain one of the lowest per capita water use values in the county.

4.04 DESCRIPTION OF THE ALTERNATIVES CONSIDERED

4.04.1 ALTERNATIVE REUSE SYSTEMS

An alternative reuse system was considered. In this system wastewater is highly treated to greater than secondary standards and it is discharged to either surface water or surficial aquifer ground water. The system that is being pursued discharges below ground surface through a series of perforated pipe exfiltration trenches on the wastewater treatment facility site or directly into the Biscayne Aquifer. As described previously in Chapter 1, the Broward County Environmental Protection Department (EPD) has some of the most stringent effluent requirements in the State of Florida. At this time is appears that reverse osmosis membrane technology may be the only technology that may meet these regulations. Traditional Advanced Waste Treatment (AWT) technologies will not meet the stringent nutrient limitations for phosphorous and nitrogen and we would expect that these stringent regulations will stifle

reuse/recharge project development in Broward County. We would welcome assistance from the SFWMD in opening discussions with Broward County EPD on re-evaluating the current regulations with respect to nutrient discharges.

As stated previously, reverse osmosis membrane technology was considered for this process. Pretreatment processes are also required and this option may use UV light in place of chlorine for disinfection. Two capacities were also examined for this alternative reuse system, a 6.0 MGD and a 2.7 MGD advanced wastewater treatment system. The effluent will be treated and discharged to the exfiltration trenches or directly into the Biscayne Aquifer. Unsuccessfully treated water i.e., reject water, will either be retreated or pumped down the existing deep disposal well. A distribution piping system of varying lengths is required based on the desired flow rate. The system is a 1.25 foot diameter perforated pipe centered in an approximately 8 foot by 4 foot prepared trench. The total estimated length of piping system is 1956, or 1304 linear feet respectively. The trenches are to be placed on the perimeter of the plant site and the adjacent City Public Services facility. Alternatively the reclaimed water could be directly injected into a Biscayne Aquifer well approximately 100 feet below ground surface.

For the proposed effluent reuse system secondary treated effluent from the existing effluent basin flows through proposed strainers, ultrafiltration membrane or other advanced treatment system, reverse osmosis membrane system and disinfection system into the exfiltration system. The water will be continuously pumped to the exfiltration trenches or into the aquifer recharge wells. The reuse water will be continuously monitored for contaminants to determine if it passes the water quality requirements. If it does not pass the monitoring tests, the reuse water will be rejected and diverted to the head of the plant or to the effluent disposal pump station (deep well pump station).

Different numbers of strainers and membrane skids are required based on the flow desired. The strainers remove any large particles. The ultra filtration skids or other treatment systems remove possible reverse osmosis (RO) filter membrane foulants. The RO membranes remove the nutrients to below 5-5-3-1 standards and below 0.01 mg/l phosphorous for Broward County

discharge. Sufficient units will be installed to be able to treat the design flow with one unit down for repairs as required by the State to maintain a Class 1 treatment facility.

Reuse water storage tanks should not be required as there is no diurnal customer demands and effluent not meeting standards would be re-treated or disposed of through the deep well system. The system is continuously monitored and it can be stopped immediately upon effluent being out of specification.

This water, however, would be suitable for reuse irrigation and the system could be configured to provide irrigation if desired.

The reuse distribution pumping will occur from the residual pressure from the membrane treatment equipment. Flow is by gravity in the exfiltration trench system or via residual pressure into the recharge wells. Finally, the system will require a flow meter to record and quantify the amount of total reuse water distributed as required by State Regulations.

A membrane treatment building will be needed to house the various strainers, filters, disinfection equipment and ancillary equipment. This includes the membrane pumps and booster pumps, and motor control center, reuse water monitoring station and disinfection equipment.

SECTION 5
EVALUATION OF ALTERNATIVES

5.01 GENERAL

The alternative water supply aquifer recharges system was evaluated by present values analysis. An evaluation of the impact on rates and fees will need to be completed for each alternative and an evaluation of the technical feasibility of each alternative must be included prior to implementation.

5.02 ECONOMIC CONSIDERATIONS – ALTERNATIVE REUSE

The City of Pembroke Pines only serves the western half of the City with wastewater service – the rest is served by the City of Hollywood, over which the City of Pembroke Pines has no control. As a result, the customers affected by a reuse program initiated by the City of Pembroke Pines would likely be confined to those residents in the western half of the City. This may create disparity in rates charged to the City's residents. However, if Aquifer Recharge is practiced, water customers throughout the City would benefit because they will be receiving value from this reuse system by being allowed to use Biscayne Aquifer water for the entire potable water source and being spared the cost of an R/O system to treat Floridan water.

This chapter focuses on the cost of improvements, and the economic impacts to customers. This cost analysis was conducted using present value analysis.

5.03 MARKET ISSUES – ALTERNATIVE REUSE

The wastewater treatment plant customers are the ones who pay the majority of the cost for treatment. While the cost of creating systems to use reclaimed water is greater than systems for disposal via ocean outfalls or deep injection wells, the latter options provide for no beneficial use of the water. The benefit for potable water customers is a reduction in competition for the water

resource and possible recharge of the aquifer. A cost-benefit analysis should be conducted to determine the proper cost allocations between wastewater customers and water customers.

Again, present value analysis would normally include an evaluation of water saved by implementing the reuse alternatives, however, the City of Pembroke Pines does not allow the use of potable water to be used for irrigation. City Ordinance No. 50.01.35 approved in 1982 forbids the use of the City's municipal water for irrigation purposes. When implemented, the City's proposed alternative reuse system will not actually be saving potable water, therefore, the "benefit of water savings analysis" was not performed. While it is recognized that there is a benefit to the environment by not having to withdraw groundwater to irrigate lawns and golf courses, the use of private, un-metered wells make it impossible to quantify and qualify a value or cost for groundwater as can be done with potable water.

The minimum reuse system, 2.7 MGD, has the least cost of the two as would be expected due to the smaller amount of equipment installed. The 2.7 MGD reuse/recharge system is the approximate amount of the water shortfall at buildout stated by SFWMD in the latest update to the LECWSP. If the SFWMD would allow the City to withdrawal the same amount from its drinking water supply wells as that recharged into the Biscayne Aquifer, then this is the preferable option for the City's rate payers. This 2.7 MGD shortfall may be even less as the City has received a letter(attached at end of this report) from the Deputy Executive Director of the SFWMD indicating that the District may not roll back the City's permitted withdrawal to the 2005 volumes. "Due to the small increase and distance from a regional system canal, it is unlikely that any of the 0.49 MGD would be affected by this rule." This may decrease the infrastructure requirements the City may be required to install if less reuse is needed.

5.04 TECHNICAL FEASIBILITY – ALTERNATIVE REUSE

A proposed City of Pembroke Pines Alternative Reuse/Recharge System should not have any technical problems in the design, construction and operation that would render it "technically infeasible." The design of an advanced type wastewater treatment plant and ancillary equipment are within the capabilities of most Professional Consulting Civil/Environmental Engineering

firms in the State of Florida. The City's wastewater effluent can be transformed into usable aquifer recharge quality water using today's technology. The level of technology required in Broward County may be higher than other parts of the State due to the stringent pollutant levels placed on dischargers by the Broward County EPD.

The construction of a proposed reuse facility for Pembroke Pines should not pose any severe technical problems nor be any problem for a qualified contractor. The exfiltration trenches would be installed on adjacent City property.

A reuse plant could be located on the existing City Wastewater Treatment Plant on Pembroke Road. New WWTP Operators will run the reuse treatment plant as it is a technically advanced membrane treatment system.

5.05 ENVIRONMENTAL ASSESSMENT – ALTERNATIVE REUSE

Although the City of Pembroke Pines may not be able to conserve potable water by implementing reuse because its citizens are not allowed to use potable water for irrigation, there would be benefits of additional Biscayne Aquifer water available for potable uses and possibly irrigation The Biscayne Aquifer is the City's sole source of raw drinking water.

Another environmental advantage to reusing wastewater is that the City would reduce the quantity of discharge effluent pumped down into the boulder zone.

The physical impact on the environment due to the implementation of the reuse system should be minimal. The pipelines will run inside the City's rights of way and on the treatment plant site. The reuse plant would be on the existing WWTP site. Complaints from neighboring communities (Century Village) due to noise and dust may occur.

The socioeconomic impact due to the reuse project again should be minimal as no impact to the surrounding community would be made. All treatment and disposal will take place on site.

The negative biological impact due to the reuse project will be insignificant. Actually, the impact should be positive as the effluent will help re-hydrate the surficial aquifer. Plant effluent would be filtered and be disinfected before being discharged into the environment. Safety features in the treatment system would provide immediate shutdown of the system and transfer of reject water if the monitoring system detects insufficient treatment. Therefore, untreated reuse water would not leave the plant site.

5.06 EVALUATION OF RATES AND FEES – ALTERNATIVE REUSE

Again, the City has split areas for wastewater service. The wastewater east of Flamingo Road is treated by the City of Hollywood under a partnering agreement. Therefore reuse may apply only to those customers located west of Flamingo Road. This is approximately half of the City's sewer customer base.

TABLE 5-1
CITY OF PEMBROKE PINES
PRESENT WORTH ANALYSIS ALTERNATIVE REUSE

Options	2.7 MGD	6 MGD
Item		
Maintenance	$902,750	$1,565,000
Growth Rate	1.043	1.043
Present Worth	$9,280,270	$16,088,200
Assume 6.125% Infl		
Infrastructure	$ 31,600,000	$ 44,700,000
TOTAL PW	$ 40,880,270	$ 60,788,200

SECTION SIX

SUMMARY AND CONCLUSIONS

AQUIFER RECHARGE ALTERNATIVES

6.01 SUMMARY OF ALTERNATIVES

Alternative One - Maximum Reuse System (6.0 MGD)

The construction of the maximum alternative reuse system will fulfill the State Mandate of providing a wastewater reuse facility, and offers very little need for plant or distribution system expansions over the 10-Year planning period. The first down side of Alternative One is that it is the most costly option with a total Present Worth Value of $60.8 million. The maximum reuse system could however be used immediately and could provide additional water to the Biscayne Aquifer thereby decreasing demands on water from the Everglades and allowing additional raw water withdrawal for potable or irrigation purposes for uses east of WCA-3. It would provide more water than is needed to make up for the SFWMD stated water supply shortfall of 2.7 MGD.

Alternative Two – SFWMD Shortfall Reuse System (2.7 MGD)

This option is the least costly of all the alternatives with a total Present Worth Value of $40.9 million. The construction of the minimum reuse system will again fulfill the State Mandate of providing a wastewater reuse facility and would have the least fiscal effect on the City. The Shortfall reuse system could be used immediately and could provide additional water to the Biscayne Aquifer thereby decreasing demands on water from the Everglades and allowing additional raw water withdrawal for potable or irrigation purposes for uses east of WCA-3. It would also provide exactly the water needed to make up for the SFWMD stated water supply shortfall of 2.7 MGD.

6.02 SUMMARY OF CAPITOL COSTS and IMPLAMENTATION SCHEDULE – ALTERNATIVE REUSE

A Present Worth Value analysis was performed on each of the alternatives (Table 5-1). Alternative Two is the least costly of the alternatives in terms of Present Worth Value and capital cost. Money is currently available in the Utility Reserves Fund to begin construction of Alternate Two.

ALT. ONE ESTIMATED CAPITOL COST(6.0 MGD REUSE SYSTEM) $44,700,000

ALT. TWO ESTIMATED CAPITOL COST(2.7 MGD REUSE SYSTEM) $31,600,000

Installation schedule – 2.7 MGD system

	Completion Date	Cost
Design and Permitting	December 2009	$3,000,000
Bidding and Construction	June 2011	$28,600,000

6.03 SUMMARY OF THE EVALUATION OF RATES AND ALLOCATIONS – ALTERNATIVE REUSE

There is little incentive to reclaim water, except due to a water shortage or harming the Everglades restoration project, when much cheaper options exist, therefore the City would not be generally be in favor of incurring the additional expense associated with treating reuse water for aquifer recharge due to the increases on the rate payers.

Pembroke Pines currently has 9.5 MGD of deep well injection capacity that has already been permitted, bonded, and paid for and based on flow projections this capacity is sufficient to meet the City's needs well into the future. The City also has an 18 MGD lime softening water treatment plant with inovative ion exchange color removal technology that has already been

permitted, bonded, and paid for and based on flow projections this capacity is sufficient to meet the City's needs well into the future. While the environmental considerations associated with not drawing groundwater and surface water for irrigation and avoiding injection are certainly attractive, a system of this size would generally not be financially defensible to the ratepayers, however the City has agreed to pursue a reuse system.

In an alternative reuse scenario where there are no paying reuse customers so the sewer customers may pay for majority of the costs and the remaining amount would be paid for by the water customers because they will be receiving value from this reuse system. They are being allowed to use Biscayne Aquifer water for the entire potable water source and are spared the cost of an R/O system to treat Floridan water.

Generally, for the above financial reasons illustrated above, the alternative reuse/recharge system would be deemed to not be financially feasible at the present time. However, the City is committed to implementing a reuse system.

6.04 CONCLUSIONS

A. The project is technically feasible. The equipment and facilities needed to implement a reuse system for the City of Pembroke Pines are available. The recharge system can be readily designed. The land for the Reuse Facilities would be located at the City's wastewater treatment plant site.

B. Present value analysis shows us that the Minimum Reuse System is the least costly and is the foundation of all the reuse options. For the recharge system the cost increases substantially as the size increases so the economies of scale are not as pronounced as with a standard irrigation reuse system. The construction of the reuse facility and the exfiltration system could be traditional design/bid/build or acquired through the design-build process.

C. The recharge project should improve the biological environment by recharging the surficial aquifer. It will not have a major adverse impact on the physical or socioeconomic environment.

E. Although the project appears to be technically feasible, it would, in the recent past, appear to not be financially feasible from an economic standpoint. The residents of Pembroke Pines are currently paying for several important infrastructure type projects to increase water treatment and wastewater disposal capacity. It is felt that an added financial burden of the irrigation reuse project may not be well received. However, due to the stress on the Biscayne Aquifer and the potential harm to the Everglades, a reuse project is necessary if the City is to grow through build-out. Most utility providers in South Florida will be increasing rates to pay for these types of projects so the residents may not be as opposed to the required rate increases as they would have been in the past.

F. The Eastern portion of the City (approximately half the City's sewage flows) already pumps its wastewater to the Southern Regional WWTP at Hollywood. Hollywood has already developed a reuse system with portions of Pembroke Pines wastewater and treated effluent from other cities. Therefore, a portion of the City's effluent is already slated for reuse.

The City of Pembroke Pines, like a select few municipalities in the state, already has reduced ground water withdrawal and consumption by not allowing residents to use treated potable water to irrigate their lawns and gardens. The City enjoys smaller than normal infrastructures. Those few residents that draw groundwater and lake/canal water for irrigation do not add a significant stress to the Biscayne Aquifer because the irrigation water is returned to the surficial aquifer immediately. It is for these reasons the City believes it already has a powerful water conservation program. However, it is committed to using some sort of alternative water supply by building a reuse/recharge system or other system at this time. If Broward County EPD can be convinced to loosen certain discharge limits to mirror those in the State of Florida F.A.C. and F.S., we estimate the costs for a recharge reuse system could shrink as much 35%.

TABLE 6-1
CITY OF PEMBROKE PINES
PROJECTS AND PROGRAMS - WATER SUPPLY FACILITIES WORK PLAN

ALL UTILITY PROJECTS SERVING PEMBROKE PINES

UTILITY SERVING LOCAL GOVERNMENT'S JURISDICTION	FUTURE PROJECT PROVIDING WATER TO JURISDICTION	FINISHED WATER (MGD)	WATER SOURCE FOR PROJECT	DATE PROJECT ONLINE	CAPITAL COST	POPULATION SERVED WITHIN JURISDICTION (1)
Pembroke Pines	2.7 MGD Aquifer Recharge	2.7	Biscayne Aquifer Recharge	6/1/11	$31,600,000	160,816
TOTAL		**2.7**			**$31,600,000**	**160,816**

(1) – Population estimated in Pembroke Pines @ year 2010

The City of Pembroke Pines is pursuing the maximum reuse aquifer recharge option. On December 3, 2008 the Pembroke Pines City Commission approved an agenda item giving the staff direction to pursue the aquifer recharge option. In this system wastewater is highly treated to greater than secondary standards and it is discharged to surficial aquifer ground water. The system that is being pursued discharges below ground surface directly into the Biscayne Aquifer at the wastewater treatment facility site. The City has added this project to its Capital Improvement Plan with the relevant section excerpted and included in the following table. The system is proposed to be installed in phases as the system proposed is modular and can be expanded in 2 to 3 MGD increments if desired.

City of Pembroke Pines – Utility Fund Capital Improvement Plan

UTILITY FUND

	SOURCE OF FUNDING	IN PRESENT VALUE AS REVISED BY DEPT DIRECTORS					
		2009-2010	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**	**Total**
Wastewater System							
Wastewater Treatment Plant Odor Control	Sewer Connect	250,000	250,000	250,000	250,000	250,000	1,250,000
Lift Station Replacement	Revenues	250,000	250,000	250,000	250,000	250,000	1,250,000
Forcemain Replacement	Revenues	-	-	50,000	100,000	100,000	250,000
Sewer Replacement	Revenues	150,000	150,000	150,000	100,000	150,000	700,000
Wastewater Master Plan	Sewer Connect	-	-	-	-	-	-
SCADA Upgrade	Revenues	-	-	100,000	50,000	100,000	250,000
Heavy Equipment/Vehicles	Revenues	75,000	75,000	75,000	75,000	75,000	375,000
Alternative Water Supply	Rates	12,500,000	12,500,000	12,500,000	-	-	37,500,000
					-	-	
Sub Total for Wastewater		13,225,000	13,225,000	13,375,000	825,000	925,000	41,575,000

The City's reuse project intends to allow direct Biscayne Aquifer recharge with highly treated wastewater. Injection of the highly treated wastewater directly into Biscayne Aquifer prevents water flow from Water Conservation Areas 2A and 3B to the east and will help maintain minimum flows and levels. This will be protective of the water resources and ecology of the area. This project supports the goals of the Comprehensive Everglades Restoration Plan by recharging the Biscayne Aquifer thereby preventing water withdrawal from the Everglades. Aquifer recharge should result in the availability of additional Biscayne Aquifer water for withdrawal and treatment in the City's existing facilities. The City will coordinate with the District during renewal of its water use permit to determine the specific offset for an increased allocation. Permitting is expected to begin in January 2009. This project was suggested to the City by the District during the 2005-2006 Lower East Coast Water Supply Plan Update process and is contained in that update.

Following is a letter from SFWMD concerning possible future Biscayne withdrawals and is attached for informational purposes.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

January 2, 2007

07 JAN -4 PM 1:30

cc: Charles Dodge

Mr. Frank C. Ortis
Mayor, City of Pembroke Pines
10100 Pines Boulevard
Pembroke Pines, FL 33026

Dear Mayor Ortis:

I am in receipt of your letter expressing your concerns regarding the proposed amendments to the South Florida Water Management District's (District) Basis of Review for Water Use Permit Applications known as the Regional Water Availability rule. I appreciate your interest in this matter and I know that, as a leader, you have a responsibility to your constituents to ensure that their best interests are protected. It may be helpful initially to explain the basis for this rule development and from there, to evaluate how the rule, as proposed, could affect Pembroke Pines.

The State of Florida and the Federal government entered into a partnership in 2000 for the restoration of the Everglades. As part of this agreement, the State has made a commitment not to allocate water for consumptive uses that will be needed for the Everglades restoration. This District is responsible for allocating water as well as restoring the Everglades. To achieve both objectives, District staff has been directed to curtail new and increased allocations of water from the Everglades until the restoration projects are constructed and can provide added supply. The Regional Water Availability rule is being developed to implement that directive.

In order to assess how this rule would affect Pembroke Pines, it is important to consider the following factors:

1. The rule only would restrict increases in water from the Everglades. However it is important to note that the Biscayne aquifer receives some recharge from the Everglades during dry times and the proposed rule would limit increased withdrawals from the Biscayne aquifer only to the extent that they require additional Everglades water for recharge. Most of the water produced from Pembroke Pines' wellfields comes from local groundwater storage while a small portion is provided from the Everglades via the C-11 canal.

2. The rule would not affect existing permits until the permit is renewed or modified for an increase in water. Even then, the rule would only apply to the increase over the historic use and then, only if the proposed increase would include additional Everglades water. The City's current permit is not scheduled for renewal until October 2009. Based on our records, the City pumped an average

of approximately 13.6 million gallons per day (mgd) during 2005 which is representative of the baseline period in the proposed rule. Based on the estimated rate of growth in your permit, the City's average daily pumpage would increase by 0.42 mgd by the 2009 renewal date. Due to the small increase and distance from a regional system canal, it is unlikely that much if any of the 0.49 mgd would be affected by this rule.

3. Should the City seek to increase demands from the Biscayne Aquifer beyond what is allowed under the proposed rule upon renewal of the permit and before additional water is available for allocation from the Everglades, it will be necessary to consider some additional offsets and or alternative sources to account for that portion that comes from the Everglades. I understand the City has proposed a 6 mgd advanced wastewater treatment project to provide recharge to the Biscayne aquifer. This project, which is being incorporated into the District's regional water supply plan for the lower east coast, will provide more than enough recharge to accommodate the City's projected growth through 2025. Such projects also qualify for alternative water supply grant funding from the District. The City's proposed approach to managing both their wastewater while providing for future growth is to be commended.

I understand that some of the concepts of the proposed rule are complex and it is extremely important that local government decision makers have the knowledge to assess the implications of the rule and plan accordingly. To that end, District staff are available to meet with you and your staff to discuss this matter further. Please feel free to contact Mr. Scott Burns, Director of Water Supply Policy Implementation at 561-682-6817 at your convenience to set up a meeting.

Thank you again for your participation in this process.

Sincerely,

Chip Merriam
Deputy Executive Director
Water Resources
South Florida Water Management District

CM/le