Public Facilities

I. INTRODUCTION

DATA, INVENTORY, AND ANALYSIS

Infrastructure facilities and services are provided by the Village including, sanitary sewer, potable water, roads, street lighting, and parks and recreation. The service area is bounded by Southern Boulevard (north) State Road 7 (east) Lantana Road (south) and the western boundary of Wellington (west). However, prior to incorporation of the Village, Palm Beach County had established an urban services boundary which envisioned that water and sewer services would not be provided to the area which is now the southwestern portion of the Village.

The Utility Service Area (USA) is separate and distinct from the Village Municipal Boundary and the Acme Improvement District (AID) Service Area. The USA is authorized to serve all areas in the Village Municipal Boundary, areas within the Village of Royal Palm Beach and areas in Unincorporated Palm Beach County. The USA Boundary is shown in the “Utility Service Area” map. The Utility is operated as an Enterprise Fund which is financed from Utility Revenues. No Ad Valorem Taxes fund the Utility.

The AID Service Area contains 19,833 acres divided into “Units of Development”. The purpose of the division into Units of Development is to facilitate equitable allocation of tax burdens for non-Utility related expenses. Water control and other improvements in Units 1, 2, and 5 were constructed partially utilizing AID improvement bonds.

II. SANITARY SEWER SERVICE

A. Existing Capacity and Projected Need

The existing wastewater treatment facility is located at 11860 Pierson Road. It has a capacity of 6.5 million gallons per day (mgd) on a three month average daily flow (TMADF) basis. A Master Plan was developed in 2019 which used an average daily flow of 3.6 mgd for the time period of 2014-2017. The Master Plan projected increases to 6.8 mgd TMADF by the year 2035. If the increased flow projections materialize, the existing capacity will not be exceeded until approximately 2029. Per Florida Administrative Code (F.A.C.) 17-600.405, if it is anticipated that the plant will exceed rated capacity within a five-year timeframe, it is required to communicate a construction schedule to the FDEP for plant expansion, or indicate that a re-rating study will be completed. Therefore, planning and design for a theoretical expansion would commence in 2024 to satisfy permit requirements, if flow projections are indeed realized.

Average per capita utilization was approximately 69 gallons per day (gpd) based on a 2014-2017 average daily flow of 3.60 mgd and a 2018 population of 52,422. When including anticipated population in Equestrian Overlay Zoning District (EOZD) and additional commercial use, potential future per capita usage ranges from 81 gpd/capita to 84 gpd/capita in 2035.

B. Wastewater Treatment Plant

The existing Water Reclamation Facility (WRF) is an oxidation ditch aeration type activated sludge wastewater treatment plant originally constructed in 1973. The WRF consists of the following main wastewater treatment process facilities:

- Raw sewage entering the plant passes through the headworks structure. Two mechanically cleaned bar screens remove larger debris and solids, and one grit forced vortex chamber removes grit.
- Raw sewage then combines with return activated sludge (RAS) to form "mixed liquor", which then enters the aeration basins where air is supplied by surface mechanical aerators. The air is used as an oxygen source by microorganisms that consume carbonaceous material and nutrients in the raw sewage. The aeration basins comprise three "Carousel" oxidation ditch basins, with aeration basin No. 1 and No. 3 being similar in size (1.5 million gallons (MG)), and aeration basin No. 2 being 0.75 MG in size.
- Treated mixed liquor exiting the aeration basins enters one of four secondary clarifiers. The secondary clarifiers comprise one 65-foot diameter, one 70-foot diameter, and two 90-foot diameter circular tanks. The clarifiers provide a quiescent zone where the biomass contained in the mixed liquor comes to a standstill, slowly settles to the bottom of the tank, and is then collected by the rotating clarifier rake arms and either wasted to the aerobic digesters as Waste Activated Sludge (WAS), or returned to the headworks as RAS to again combine with influent raw sewage. Relatively clean secondary effluent overflowing the weirs of the clarifiers flows downstream for further treatment.
- Four deep bed continuously backwashing effluent filters receive secondary effluent from the clarifiers, and provide filtration for production of reuse water. Three high level chlorine contact tanks receive filtered effluent and provide high level disinfection of the reuse water.
- The reuse wet well receives highly treated reuse water and pumps it to a pressurized reuse pipeline system. One deep injection well currently receives a majority of highly treated reuse water, and injects it into the boulder zone approximately ¾ of a mile beneath the ground surface. The remainder of the reuse water is beneficially reused by the Peaceful Waters Wetland or by various Village parks or road medians.
- Seven aerobic digester tanks receive WAS sludge, where it is stored and aerated by four blowers contained in the blower building. Following a solids retention time of 5 to 6 days, the partially stabilized sludge is discharged to one of two belt filter press units and dewatered to approximately 15% solids content. The dewatered sludge is then transferred to a thermal sludge dryer facility for production of dry class AA fertilizer product which is hauled offsite for sale or land application.

- Multiple odor control units exist throughout the plant to remove and treat odors produced from the wastewater treatment process. The odor control units utilize sodium hypochlorite and sodium hydroxide as treatment chemicals that are stored at and pumped from the chemical storage area.

C. Wastewater Collection System

Gravity collection systems collect domestic waste throughout the USA and discharge into lift stations. The lift stations in turn pump the sewage via force mains to the Water Reclamation Facility on Pierson Road. There is approximately 194 miles of gravity pipelines with 4,200 manholes. There are 105 lift stations with 20 miles of sanitary sewer and 23 miles of force main.

D. Provision for Future Needs

The AID has established a financing plan that is intended to ensure adequate financing for all future upgrades and expansions of the wastewater collection and treatment system. This financing plan utilizes a capacity charge which is collected from customers installing new meters. Capacity Charge revenue is used to fund system capacity constructed for use by new and expected future customers. The revenue generated by the Capacity Charge together with cash reserves presently on hand are sufficient to ensure that adequate funds will be available to construct future treatment plant capacity when it is needed to accommodate expected future population growth. Capacity Charge revenue is earmarked for expansion of the wastewater reuse system. The AID has also initiated a capacity reservation policy that requires that all new development reserve system capacity for future use. Incorporated in the agreement with each Developer is a requirement to fund their pro-rata share of wastewater system capacity and to entirely fund their dedicated, on-site wastewater facilities.

III. POTABLE WATER

A. Potable Water Source

The Village is permitted by the South Florida Water Management District (SFWMD) Water Use Permit No. 50-00464-W to withdraw up to 3,784 MG per year, or approximately 10.37 million gallons per day (MGD), of raw water from the surficial aquifer system to supply its water treatment facilities. The total maximum monthly allocation is 359.50 MG. The raw water is sourced from one of three wellfields: The North, the South, or the East wellfield, which each have an individual permit-specified annual allocation. The annual allocations are as follows:

- North Wellfield: 1,617 MG (4.43 MGD)
- South Wellfield: 1,789 MG (4.90 MGD)
- East Wellfield: 573 MG (1.57 MGD)

As of 2020, there are currently 17 active wells supplying the treatment facilities, including nine in the North wellfield, six in the South wellfield, and two in the East wellfield. In addition, there are 12 proposed wells, including five proposed wells in the North wellfield, six proposed wells in the South wellfield, and one proposed well in the East wellfield. The South wellfield also contains one well that is out of service and three wells designated as standby, which were constructed in 2004, but were not outfitted with pumps or appurtenances.

The existing wells were designed to produce a combined total of 20.54 MGD (14,265 gallons per min (gpm)). The surficial aquifer system beneath the North wellfield is on average less productive than beneath the South or East wellfields. The nine existing North wellfield wells have a combined design capacity of 9.60 MGD (6,665 gpm). The design capacity of the six active South wells totals 6.6 MGD (4,600 gpm). The aquifer is the most prolific in the East, where the two existing wells produce a combined design rate of 4.32 MGD (3,000 gpm).

All of the Village's wells have screened completion intervals. The wells in the North wellfield typically have shallower casing setting depths and screened intervals when compared to the East or South wellfield. The screened intervals for the North wellfield range from 55 to 120 feet below land surface (bls), whereas wells in the South wellfield have screen intervals from 61.5 to 130 feet bls. The wells within the East wellfield have the deepest completion intervals, ranging from 75 to 150 feet bls.

Water quality also varies amongst the wellfields. Water extracted from the North wellfield has higher total dissolved solids and chloride concentrations than raw water from either the South or East wellfields. The chloride concentration from recent raw water samples collected from the North wellfield's wells ranged from 104 to 224 mg/L. Water quality from the North wellfield has improved over time, as higher salinity water is mined from the aquifer and recharged by fresh surface water from the AID canal system. The chloride concentration of recent water samples collected from the South wellfield range from 65 to 111 mg/L, whereas recent chloride concentrations taken from the East wellfield averages approximately 30 mg/L.

Groundwater elevations and water quality are routinely monitored throughout the Village's wellfields to identify both long-term and seasonal trends and identify the need for well rehabilitation or maintenance. As mentioned above, chloride concentrations in the North wellfield have been decreasing over time, whereas chloride concentrations collected from wells in the South and East wellfields have remained stable. Chloride concentrations are not expected to increase significantly in the future.

C. Potable Water Treatment

The Village's existing water treatment plant consists of two separate processes: membrane filtration, and lime softening that treats raw water withdrawn from the surficial aquifer. Each of the processes is permitted by the Florida Department of Environmental Protection (FDEP) (Permit No. 138260, Facility No. 4500014) and have rated treatment capacities of 4.0 mgd for membrane plant 1; 3.6 mgd for membrane plant 2; and 4.7 mgd for the lime softening plant;

for a combined total of 12.3 mgd. Water treated by the lime and membrane treatment facilities is blended to produce a high quality, stabilized finished product.

D. Potable Water Storage and Pumping

The Utility has six finished water storage reservoirs, four at the water treatment plant and two remote. Capacities for the four onsite tanks are 0.25, 1.0, 1.0 and 2.0 million gallons (MG), for a total of 4.25 MG. The two remote tanks each have a capacity of 2.0 MG for a total of 4.0 MG. The 11 existing high service pumps provide a firm capacity of 26.1 million gallons per day (MGD) to meet peak hour demands.

The two remote Booster Stations are connected to the distribution system and help meet peak hour and fire flow demands. Booster Station No. 1 is located at Ousley Farms Road and has a storage capacity of 2.0 MG and a peak hour pumping capacity of 8.9 MGD. Booster Station No. 2 is located at Lake Worth Road has a storage capacity of 2.0 MG and a Peak Hour pumping capacity of 7.4 MGD.

E. Potable Water Distribution

The Water Distribution network delivers treated water from the Water Treatment Plant to all customers and connects to the two remote Booster Stations. The water distribution networks consists of approximately 300 miles of pipe from 2” to 24” in diameter. The system has approximately 3,200 isolation valves and 2,300 fire hydrants. The fire hydrants and valves are maintained on a biannual basis. A hydraulic model of the system has been developed and is updated every five years to ensure adequate system pressure is maintained and fire flow design requirements are achieved.

F. Current and Projected Potable Water Consumption

In 2014-2018, average potable water usage was 5.81 mgd and the maximum day demand was 7.6 mgd. Average consumption was about 105 gpd/capita based on a 2014-2018 average potable water usage of 5.81 million gallons and an average population of 55,223 over that time period. Peak day consumption was about 142 gpd/capita based on 7.6 mgd maximum day demand experienced in 2014, and the 2014 population of 53,603.

Based on the results of the 2014-2018 analysis, the potable water minimum level of service was determined to be 105 gallons per capita per day, which agrees with the 10-Year Water Supply Facilities Work Plan - 2020 Update (Work Plan update), and recently approved SFWMD Consumptive Use Permit (CUP) 50-00464-W.

G. Provision For Future Needs

The AID has established a financing plan that is intended to ensure adequate financing for all future upgrades and expansions of the potable water system. This financing plan utilizes a

Capacity Charge which is collected from customers installing each new meter. Capacity Charge revenue is used to fund system capacity constructed for use by new and expected future customers. The revenue generated by the capacity charge together with cash reserves presently on hand are sufficient to ensure that adequate funds will be available to construct future treatment plant capacity when it is needed to accommodate expected future population growth. The AID has also initiated a capacity reservation policy that requires that all new development reserve system capacity for future use. Incorporated in the agreement with each developer is a requirement to fund their pro-rata share of potable water system capacity and to entirely fund their dedicated, on-site potable water facilities.

IV. SOLID WASTE

A. Role and Capacity Of Palm Beach County Solid Waste Authority

Solid waste services for the Village of Wellington are provided by the Palm Beach County Solid Waste Authority.

V. DRAINAGE

A. AID Drainage Facilities

The water management facilities of the AID consist of more than 100 miles of interconnecting canals and 250 acres of lakes with 140 associated culverts for roadway crossings, 20 water control structures for water level regulation, dikes around the perimeter of the AID to prevent outside water from flowing into the AID's facilities and 4 pumping stations for the purpose of removing surplus stormwater from the system during heavy rainfall periods. The AID's pumps are capable of removing an average of approximately 1.2 inches per day of runoff with increases in that removal rate on a standby basis subject to permission from the SFWMD. The permitted discharge rate for Basin A is 0.71 inch per day and 1.27 inch per day for Basin B. The AID is divided into Basin A (8,990 acres lying north of Pierson Road) and Basin B (9,230 acres lying south of Pierson Road). The two basins function separately during moderate storm events, but during extreme events structures located under Pierson Road enable the two basins to equalize and act as one unit; this entails flow from Basin A to Basin B. A 1993 UNET computer simulation revealed that stages throughout the AID exceed top-of-bank elevations of the canals for the more extreme events, namely the three-day, 25-year and three-day, 100-year storms. The lack of topographic input data into the UNET model precludes output of precise flood patterns but it appears that almost all of Basin A could be flooded during both the 25-year and 100-year events and that most of Basin B could be flooded during these events.

B. Basin A

The surface water management system serving Basin A consists of a series of roadside swales and inlets which convey runoff to the network of interconnecting lakes and canals and into the

C-51 canal via two pump stations on Canals C-2 and C-7 and two gravity connections on Canals C-8 and C-14. There are over 100 culverts. The water level in Basin A is maintained in the dry season at 12.0 feet NGVD and in the wet season at 11.0 feet NGVD. When stages in the lakes and canals rise 1.0 feet above the control elevation the outfall culvert is blocked and two pump stations are activated, pumping water into the C-51 canal. These pump stations have a total discharge of capacity 120,000 GPM (60,000 each). There is an additional 60,000 GPM of standby capacity is a backup pump that can only be used when the primary pump is not operating. The two gravity connections consist of twin 60-inch diameter metal culverts with flashboard risers C-14 and one 84-inch diameter metal culvert with a flashboard and riser.

C. Basin A'S C-17 Sub-Basin

Within Basin A, there is a 270-acre sub-basin that is denoted as the Acme C-17 sub-basin. This sub-basin is served by one 48-inch riser and one 10,000 GPM discharge pump. When stages rise 0.5 feet above the control elevation in Basin A, boards are placed in the riser and the 10,000 GPM pump is activated, pumping water into the Basin A primary water management system. When stages in Basin A return to within 0.5 feet of the control elevation, the pump is turned off and the boards removed so the sub-basin stage is equalized with the stage in the rest of Basin A.

D. Basin B

The surface water management system serving Basin B consists of a series of roadside swales and inlets which convey runoff to the network of interconnecting lakes and canals and into the L-40 canal and the Conservation Area via two pump stations. These pump stations have a total discharge of capacity 220,000 GPM (120,000 for one and 100,000 for the other) There is an additional 125,000 GPM of standby capacity.

E. Withdrawal from C-51 Canal and Conservation Area 1

The AID has approval from the South Florida Water Management District (SFWMD) to withdraw water from both the C-51 Canal and from Conservation Area Number 1 in order to maintain water levels in its lake and canal system during dry periods. This serves the irrigation needs for golf courses, landscape areas and agriculture. The most current allocation is 2.89 billion gallons per year.

F. South Florida Water Management District Water Control Permits

The AID was created and partially developed prior to the water resource permitting authority of the South Florida Water Management District. However, as plans for residential development in the District were advanced, surface water management permits were applied for and received. Permits to operate existing facilities were issued on several occasions, culminating in a comprehensive permit issued in February of 1978. Numerous minor modifications to this comprehensive permit were issued over time to accommodate new development outside the Wellington PUD.

G. 5/94 AID Master Water Control Plan

An AID Master Water Control Plan was prepared by the District Engineer in May of 1994. The plan incorporated existing improvements plus proposed new improvements derived from computer analysis of previous storm events. The 1994 proposals included:

1) improve the connection between C-9 and C-14 by excavating a connecting channel and culvert crossing ($65,000);
2) replace four culverts ($45,000);
3) equip the connecting culverts between Basin "A" and Basin "B" along Pierson Road with vertical lift gates operated by remote electrical sensing and electric drive motors ($156,000);
4) equip the C-17 Canal with a vertical lift pump ($30,000); and
5) rebuild four existing pumping stations, install new pumping equipment and install remote sensing operational capabilities ($1,649,000).

The total cost of this plan with contingencies, engineering, permitting and project management was estimated at $2,529,000. The Twelfth Fairway Drainage Study by Mock-Roos indicates a much higher cost for item "4." According to this 1996 study, the two analyzed options could cost $778,194 and $622,080, respectively.

H. SFWMD East Coast Buffer / Water Preserve Areas

In 1993, the South Florida Water Management District (the District), as part of the *Lower East Coast Regional Water Supply Plan,* undertook an analysis of the potential benefits of a series of wetlands, water storage areas, and aquifer recharge areas immediately to the east of the Water Conservation areas. The purpose of such areas was to create a buffer between the conservation areas and urbanization, to reduce seepage losses from the conservation areas, and to provide additional opportunities for the capture of "excess stormwater currently lost to tide, and water storage, treatment and recharge." In the judgment of the SFWMD, the "results of this analysis were favorable." In 1994 the SFWMD adopted a resolution indicating its intention to object to proposals to intensify land uses within the East Coast Buffer which would make its implementation more difficult. Subsequent to the East Coast Buffer designation, the SFWMD and the Army Corps of Engineers conducted further studies which indicated that the East Coast Buffer as initially designated "is not extensive enough." Additional buffer areas are being designated as "Water Preserve Areas" as of the mid 1997 the proposed Water Preserve Area included Section 34 in the Village. Additionally, in 1994 the US Army Corps of Engineers endorsed the East Coast Buffer concept as "Water Preserve Areas" (WPAs). The timely implementation of the WPAs has been identified as an early action item for the Everglades Restoration, which is part of Central and South Florida Project

Comprehensive Review Study. In July 1995, the US Army Corps of Engineers proposed and the SFWMD Governing Board approved the Water Preserve Areas Feasibility Study.

I. Drainage Water Quality

Stormwater that does not evaporate or percolate into the ground enters water bodies and watercourses, either by natural flow or by designed stormwater management systems. It is desirable that stormwater systems that discharge into surface water bodies and watercourses not degrade the ambient quality of the receiving water. Sources of contamination that are influenced by storm water run-off include petroleum products dropped by motor vehicles on roads over which storm water flows and fertilizers used for agriculture and landscaping. A typical measure of contamination is total phosphorus concentrations.

J. Drainage Management Responsibilities of the Village

Local drainage and stormwater management regulations must be consistent with applicable standards promulgated by the South Florida Water Management District, the Treasure Coast Regional Planning Council, the Palm Beach County Department of Environmental Resource Management, the Florida Department of Environmental Protection, and/or other agencies with relevant jurisdiction. The Village can meet such standards in part by regulating development and in part by proper design of its own drainage system components. The Village's own discharge is subject to National Pollution Discharge Elimination System (NPDES) standards or other related standards. Such water quality standards are subject to change from time to time.

K. Comprehensive Plan Drainage Standard

Chapter 163, Part III, F.S. requires that local comprehensive plans incorporate stormwater standards. Local governments shall consider Chapter 62, F.A.C. in formulating water quality standards and may adopt by reference Chapter 62, F.A.C., as standards for water quality." It also states that local governments are not required to retrofit to meet existing standards and provides other restrictions on the burden which can be imposed on local governments under the rule.

L. Methods Of Improving The Quality Of Discharge *Into* AID Drainage System

The Village of Wellington will be required to review and possibly revise its drainage and stormwater management regulations to ensure that:

1) new development will occur at topographic elevations sufficient to minimize flood impact;
2) there is one inch of on-site drainage detention;

3) post development runoff will be equal to or less than pre- development runoff;
4) erosion will be controlled during and after construction;
5) there will be at least a minimum percentage of pervious open space;
6) swales will receive proper maintenance, and
7) drainage level of service standards are met.

M. Methods Of Improving Quality Of Discharge *From* AID Drainage System

Storm water treatment areas (*i.e.,* constructed wetlands) are the technology being considered to achieve acceptable concentrations of total phosphorus. Consultations have taken place between the Village, the Village's consulting engineers, the South Florida Management District, and the District's consulting engineers. The South Florida Water Management District's consulting engineers have prepared an analysis of ways in which this technology could be employed.

N. Basin B BMP Regulatory Program

As of the end of 1996, there was no established program for the reduction of total phosphorus in runoff from Basin B. Regulatory requirements were limited to normal South Florida Water Management District and AID stormwater permitting. There may be a potential for some improvement in the quality of Basin B runoff through the widespread implementation of Best Management Practices (BMPs) by rule, similar to that required in the Everglades Agricultural Area (EAA), Chapter 40E-63 of the rules of the South Florida Water Management District. The development of such a rule, including identification of achievable reductions of total phosphorus, would require extensive analysis and a prolonged rule-making process. Preliminary assessments made by the South Florida Water Management District's consulting engineers concluded that Best Management Practices would reduce the amount of land needed for treatment by constructed wetlands.

O. Special Considerations For Basin B BMP Program

On February 28, 1997, three environmental scientists from the Florida Center for Environmental Studies at Florida Atlantic University and a representative of the Palm Beach County Agricultural Extension Service toured the Basin B area with one of the authors of this comprehensive plan and two members of the Equestrian Subcommittee of the Village of Wellington Comprehensive Plan Task Force. The tour was arranged in order to determine if the Center for Environmental Studies could participate in research to help identify the most appropriate Best Management Practices. It was the consensus of the group that such a study might be feasible. It was also the consensus of the group that the area is different from most other agricultural areas in South Florida since horses rather than cows constitute most of the animal population. Horses generate wastes high in nitrites rather than waste high in phosphorus, which is characteristic of cows and agricultural fertilizers. Because of the distinctive chemical content of equine waste, the environmental scientists believed that Best

Management Practices might consist of normally engineered on-site retention of runoff coupled with special vegetation in retention areas. They also suggested that areas where manure is stored should be paved, have masonry walls on three side walls, have a lip at the open front and have a roof. Such a design could prevent the material stored from being permeated by rainwater and carried off as the rainwater flows into the drainage system. They noted also that it would be appropriate to identify the destination of equestrian waste hauled by contractors, saying that one possible destination is the composting site of the Palm Beach County Solid Waste Authority.

P. Alternatives For Treating Basin B Runoff With Constructed Wetlands

Consulting engineers for the South Florida Water Management District have produced a study of possibilities for creating constructed wetlands to treat Basin B runoff. The study notes that the constructed wetland technique requires large contiguous areas of land. It identifies the potential availability of Section 24-44-40, which is directly south of the Rustic Ranches Subdivision and just west of the Village of Wellington, and Section 34-44-41, which is part of the Orange Point Planned Unit Development. Given these site possibilities for constructed wetlands, the engineering analysis led to a focus on four alternatives, one of which was selected for more detailed study. The selected alternative involves construction of two wetlands providing a total effective treatment area of 804 acres, with all discharges from the two wetlands delivered to Water Conservation Area Number 1. The constructed wetlands would occupy all of Section 34-44-41 (Orange Point) and available lands in Section 24-44-40 (south of Rustic Ranches). The selected alternative must be evaluated for the means by which Basin B stormwater is to be conducted to the headworks and the means by which treated water would be discharged into the Water Conservation Area. The target long-term flow-weighted mean concentration of total phosphorus in discharges would be 50 parts per billion. As of December 1996, a cost estimate of $16.3 million had been prepared for the selected alternative.

VI. NATURAL GROUNDWATER AQUIFER RECHARGE

A. Aquifer Recharge

Aquifer recharge occurs on a regional basis. According to the Palm Beach County 1996 EAR, the County's prime aquifer recharge area is in the eastern portion of the county, particularly in the area of the Turnpike Aquifer. High permeability and water table elevations characterize this prime recharge area. Recharge to the system is through infiltration from rainfall, canals, the Conservation Areas and Lake Okeechobee. Water levels in the Surficial Aquifer System are largely controlled by the canal network. Lake Okeechobee and the canals are particularly important during dry periods when water is moved from the lake to canals and then into the aquifer through infiltration. The 1980 withdrawal rate was 45 billion gallons for public supply and 224 billion gallons for agricultural irrigation.[1] The County EAR also notes that "With 50 to

[1] This rate is cited in the 1996 Palm Beach County Evaluation and Appraisal Report which credits it to a 1988 U.S.G.S. study.

70 inches of rainfall annually, U.S.G.S. investigations suggest that the County's aquifer will receive *enough recharge to provide for the foreseeable future*." Average annual rainfall in Palm Beach County varies from about 50 to 62 inches depending on location within the County (with greater rainfall in the vicinity of the aquifer and less over major water bodies such as Water Conservation Area 1) according to one South Florida Water Management District Study.[2] However, the quantity and quality of the surficial aquifer supply varies from place to place.

B. Protection of Aquifer Recharge Areas

Aquifer recharge protection is a responsibility of local governments, county governments, water management districts, and other agencies. At the local government level, land development regulations, which control drainage and runoff, tend to protect aquifer recharge areas from contamination. Development requirements typically include the use of open retention and swale areas for removal of soluble and suspended materials and for reducing runoff contaminants. Drainage system designs are encouraged to maximize treatment by infiltration and percolation, and vegetative uptake of nutrients. Detention and runoff-quantity requirements provide some "holding" of water and allow time for infiltration. Counties in south Florida protect groundwater with various regulations. Palm Beach County has enacted a wellfield protection ordinance that prohibits the use of certain substances in areas where they might seep into the cone of influence of wells and another ordinance that protects the Turnpike Aquifer recharge areas. A high rate of ground water withdrawal relative to rainfall creates a risk to the quality of the remaining groundwater due to the flow of brackish water from coastal areas toward well fields and the flow of lower quality water from western areas toward well fields. The SFWMD requires water use permits for all uses, except single-family homes and firefighting.

C. Wetland Considerations in Surficial Aquifer Wellfield Selection

The lowering of the water table in environmentally sensitive wetlands due to well-field pumpage should be avoided to the extent possible. Wellfields should be selected to avoid or minimize wetland water table impacts. Canals can provide a buffer between wells and wetlands and the extensive network of canals in the AID may be helpful. As part of their water use permitting program, the South Florida Water Management District requires reasonable assurances that wellfield withdrawals will not cause adverse wetland impacts. Other agencies with environmental concerns pertaining to wellfields include the Palm Beach County Department of Environmental Resource Management (DERM) and the Florida Department of Environmental Protection (FDEP).

D. Contamination Considerations In Surficial Aquifer Wellfield Selection

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[2] MacVicar, Thomas K., *Rainfall Averages and Selected Extremes for Central and South Florida,* South Florida Water Management District Technical Publication Number 83-2, March 1983.

Wellfields should be located where there is low risk of contamination from toxic materials. Palm Beach County has enacted a well-field protection ordinance which provides criteria for regulating and prohibiting the use of substances which may impair present and future public potable water supply wells and well fields. Prohibitions and restrictions apply to designated future well sites as specified in the Wellfield Protection Map. This ordinance also requires that new production wells avoid areas of known contamination.

E. Impacts to Existing Surficial Aquifer Users

New wellfields should be located where they will have the least negative impact on existing water users. There are no major competitors for well water within the AID. The large landscape irrigation and agricultural permit holders derive most of their irrigation water from surface waters.

F. Surface Water for Irrigation and Wellfield Buffering

Surface water is suitable for irrigation. The canal system affords an opportunity to isolate wells from wetlands, which is desirable. Recharge lakes or trenches, fed by the canal system, also could be constructed near well fields for the purpose of recharging the aquifer or to buffer potential impacts to environmentally-sensitive wetlands.