Village of Wellington
10-Year Water Supply Facilities Work Plan
2020 Update

Prepared by:

Village of Wellington Utilities Department

in association with

Hazen

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Table of Contents

1. Introduction

Chapter 163, Part II, (F.S.), requires local governments to prepare and adopt 10-Year Water Supply Facilities Work Plans into their comprehensive plans within 18 months after the South Florida Water Management District (SFWMD) approves a regional water supply plan or its update. The 2018 Lower East Coast Water Supply Plan Update (2018 LECWSP Update) was adopted by the SFWMD Governing Board on November 9, 2018. Therefore, local governments within the Lower East Coast Region are required to amend their comprehensive plans and include an updated 10-Year Water Supply Facilities Work Plan and related planning elements by May 9, 2020.

The Village of Wellington is located in southeast Florida within Palm Beach County. **Figure 1-1** illustrates a location map of the Village's Acme Improvement District (AID) service area. This 2020 Village of Wellington 10-Year Water Supply Facilities Work Plan identifies water supply sources, availability and facilities needed to serve existing and new development within the local government's jurisdiction.

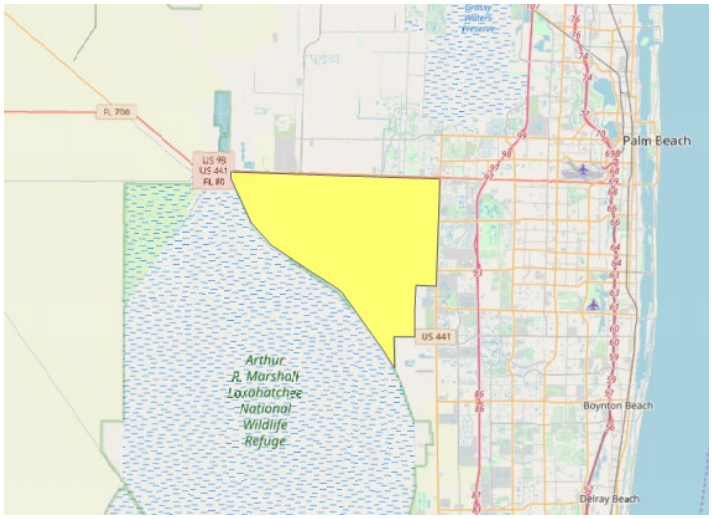

Figure 1-1: Location Map

The State of Florida requires that the 10-Year Water Supply Facilities Work Plan - 2020 Update address the development of traditional and alternative water supplies and management strategies, including conservation and reuse. The data and analyses, including population projections, water demands, and service areas must cover at least a 10-Year planning period and be consistent to the LECWSP and the updated comprehensive plan amendment.

The Village of Wellington's 10-Year Water Supply Facilities Work Plan - 2020 Update is divided into five sections:

1. Introduction
2. Background Information
3. Data and Analysis
4. Capital Improvements
5. Goals, Objectives, and Policies

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1.1 Statutory History

The Florida Legislature enacted bills in the 2002, 2004, 2005, 2011, 2012, and 2016 sessions to address the state's water supply needs. These bills, in particular Senate Bills 360 and 444 (2005 legislative session), significantly changed Chapters 163 and 373, F.S., by strengthening the statutory links between the regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments. In addition, these bills established the basis for improving coordination between local land use and water supply planning.

1.2 Statutory Requirements

The Village of Wellington has considered the following statutory requirements in updates to this 10-Year Water Supply Facilities Work Plan.

1. Coordinate appropriate aspects of the Comprehensive Plan with the 2018 LECWSP [163.3177(4)(a), F.S.].

2. Ensure the future land use plan is based upon availability of adequate water supplies and public facilities and services [s.163.3177 (6) (a), F.S.]. Data and analyses demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany proposed Future Land Use Plan and Plan amendments submitted for review.

3. In consultation with the water supplier, ensure that adequate water supplies and potable water facilities are available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent [s.163.3180 (2), F.S.].

4. Revision of the related comprehensive planning elements within 18 months after the water management district approves an updated regional water supply plan, to:

    a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the 2018 LECWSP, or alternative project(s) proposed by the local government under s. 373.709(8)(b), F.S. [s. 163.3177(6)(c), F.S.];

    b. Identify the traditional and alternative water supply projects and the conservation and reuse programs necessary to meet water needs identified in the 2018 LECWSP [s. 163.3177(6)(c)3, F.S.]; and

    c. Update the 10-Year Water Supply Facilities Work Plan for at least a 10-Year planning period for constructing the public, private, and regional water supply facilities identified in the element as necessary to serve existing and new development [s. 163.3177(6)(c)3. and (5), F.S.].

5. Revise the Five-Year Schedule of Capital Improvements to include water supply, reuse, and conservation projects and programs to be implemented during the five-year period [s. 163.3177(3)(a)4, F.S.].

6. To the extent necessary to maintain internal consistency after making changes described in Paragraph 1 through 5 above, revise the Conservation element to assess projected water needs and sources for at least a 10-Year planning period, considering the 2018 LECWSP, as well as applicable Consumptive Use Permits (CUPs) [s.163.3177 (6) (d), F.S.]. The plan must address the water supply sources necessary to meet and achieve the existing and projected water use demand for the established planning period, considering the applicable regional water supply plan [s.163.3167(9), F.S.].

7. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 5 above, revise the Intergovernmental Coordination element to ensure coordination of the comprehensive plan with the 2018 LECWSP [s.163.3177 (6) (h) 1., F.S.].

While an Evaluation and Appraisal Report is not required, local governments are required to comprehensively evaluate, and as necessary, update the Comprehensive Plan to reflect changes in local conditions. The evaluation could address the extent to which the local government has implemented its 10-Year Water Supply Facilities Work Plan or the need to update the 10-Year Water Supply Facilities Work Plan, including the development of alternative water supplies, and determine whether the identified alternative water supply projects, traditional water supply projects, and conservation and reuse programs are meeting local water use demands [s.163.3191 (3), F.S.].

2. Background Information

This section includes a description of regional water supply planning issues that impact the Village of Wellington, including Village policies related to those issues:

- Master Planning for Expanded Use of Reclaimed Water
- Excess Surface Water for Aquifer Recharge
- Upgrade of Membrane Plants With Higher Efficiency Membranes To Reduce Raw Water Withdrawal
- Created Wetland System

2.1 Regional Water Supply Issues

The 2018 LECWSP Update identified five key regional water supply issues that impact the municipalities within the SFWMD jurisdiction:

1. Fresh surface water and groundwater are limited; further withdrawals could have impacts on the regional system, wetlands, existing legal uses, and saltwater intrusion. As a result, additional alternative water supplies need to be developed.

2. Surface water allocations from Lake Okeechobee and the Water Conservation Areas are limited in accordance with the Lake Okeechobee Service Area restricted allocation area (RAA) criteria.

3. Construction of additional storage systems (e.g., reservoirs, aquifer storage and recovery systems) to capture wet season flow volumes will be necessary to increase water availability during dry conditions and attenuate damaging peak flow events from Lake Okeechobee (NOT APPLICABLE).

4. Expanded use of reclaimed water is necessary to meet future water supply demands and the Ocean Outfall Law (NOT APPLICABLE).

5. Expanded use of brackish groundwater from the Floridan Aquifer System requires careful planning and wellfield management to prevent undesirable changes in water quality (NOT APPLICABLE)

The following sections describe the Village's policies addressing these regional issues.

2.1.1 Master Planning for Expanded Use of Reclaimed Water

The Village currently utilizes reuse water as an alternative water supply. The Village of Wellington Water Reclamation Facility (Wellington WRF) has a reuse water production capacity of 4.5 million gallons per day (mgd) and plans to expand to 6.0 mgd by 2021. As of 2018, the Wellington WRF produced and average of 3.58 mgd of reuse water. Of the total 3.58 mgd produced, 0.425 mgd was distributed as reuse water utilized as irrigation at local recreational facilities and landscaped street medians.

The Village is currently developing a Reuse Master Plan to evaluate opportunities to expand its distribution of reuse water. The Reuse Master Plan has identified potential reuse sites ideal for expansion. Sites were identified on the basis that they are current users of irrigation water from either surface water canals or groundwater wells and the sites are located within reasonable distance to existing reclaimed water distribution piping. These sites could potentially increase the reuse demand by 2.6 mgd. The increased production and distribution of reuse water will reduce the reliance on freshwater withdrawals within the Village's service area. At the time of this writing, the master plan is still under development, therefore no concrete plans for expansion of reclaimed water distribution are included in this Work Plan. The Village currently has no rate structure to support he expansion and sale of additional reuse water. Expansion of the system is limited to capital funding priorities and availability.

2.1.2 Excess Surface Water Storage

The Acme Improvement District (AID) is a dependent district of the Village encompassing 32 square miles that includes the Village as well as some parts of unincorporated Palm Beach County and incorporated Royal Palm Beach. The AID provides drainage, water management, and infrastructure development within its service area. The AID has a water use permit (Permit No. 50-00548-W) for its canal system that allows for withdrawals from the SFWMD C-51 and L-40 canals for the purpose of diversion and impoundment. The diverted water is used to maintain water levels in the Surficial Aquifer System (SAS), wellfield recharge, and a source for irrigation water. The AID's permitted annual and maximum month withdrawal is 413 million gallons per year (MGY) and 253.8 million gallons per month (MGM), respectively. However, between 2007 and 2017 the AID released an average of 14.8 billion gallons per year of mostly excess

precipitation to the C-51 Canal. The AID canal system provides for additional water storage to help meet water demands within the Village's service area.

The Village is anticipating an increase in public water supply demand, and recently received an increase in permitted water allocation in their approved CUP application (Permit No 50-00464-W). Modeling analysis performed to support the recently issued CUP demonstrates that the additional water allocation will be provided through the excess surface water storage available in the AID through canal recharge (seepage) from the AID canal system. The additional allocation will be supported simply by reducing AID discharge to the C-51 canal, while maintaining historic AID canal stages.

2.1.3 Upgrade of RO Plant with Higher Efficiency Membranes to Reduce Raw Water Withdrawal

The Village plans to further improve the membrane treatment process at the Village of Wellington Water Treatment Plant (Wellington WTP) by replacing the current reverse osmosis (RO) membranes used with higher efficiency nanofiltration (NF) membranes in 2020. The RO process has been in operation since 1988, and consists of two separate plants, Membrane Plant 1 and 2, and consisting of six (6) treatment trains. All membrane trains will be receiving new higher-efficiency NF membranes in this project. This is expected to increase the recovery rate of the membrane process by approximately 10 percent, bringing the membrane treatment efficiency to 85 percent.

2.1.4 Created Wetland Systems

The Village of Wellington operates the 30-acre Peaceful Waters Sanctuary (PWS) Wetland system. The wetland system receives reuse water from the Wellington WRF. The wetlands further reduce nutrients, especially nitrogen, in the reuse water. Treated water from the wetlands percolates into the SAS, where it recharges the local surficial aquifer. The wetlands are valuable in providing vegetated and open water habitat for migratory birds and waterfowl in this region. The benefit to the SAS in the AID area due to implementation of the created wetland systems was determined based upon modeling of the system.

The PWS wetland has historically been permitted and operated to receive 0.23 mgd average daily flow (ADF), or 3 inches per week over 20 acres, of secondary effluent or highly treated reuse water from the Wellington WRF. Infiltration testing was completed at the PWS wetland as part of a recent study, and determined that the wetland could operate at a higher hydraulic loading of approximately 0.5 to 0.75 mgd. Minor modifications to improve hydraulic loading of the wetland were determined. Although a request for matching funding submitted to the SFWMD under the Alternative Water Supply Project category of the Cooperative Funding Program was not approved, the Village decided to move forward and the project is currently in design phase.

3. Data and Analysis

This section provides information related to the population forecast and water demand forecast within the Village's water service area. The planning horizon for the Water Supply Facilities Work Plan - 2020 Update spans 20 years, covering 2020 to 2040.

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3.1 Population Information

Population forecasts have been prepared using available information published by the Palm Beach County Planning Department and the University of Florida Bureau of Economic and Business Research (BEBR) population estimates and forecasts, as divided into Traffic Analysis Zones (TAZs) within the Village's service area. Population projections were available through 2035 and were extrapolated through 2040 to incorporate a 20-year planning horizon. The Village water service area population was calculated by adding the population from each TAZ or percent area of the TAZ that lies within the service area boundary.

Growth within as well as redevelopment of existing service areas further increases the population forecast. Population growth within the existing service area is based on the Palm Beach County and University of Florida BEBR population estimates. The additional population from future expansion areas is based on current and future population from the Palm Beach County 2015 Annual Allocation Model within TAZ where service will be expanded to. The additional population from future redevelopment is based on the estimated dwelling units to be constructed as part of known residential and commercial redevelopment projects within areas that currently are within the Village's water service area and assuming 3 people per dwelling unit as determined by the Village Planning Department. **Table 3-1** presents the population forecast for the Village's water service area from 2020 through 2040, starting with the 2018 population forecast.

Table 3-1: Village of Wellington Water Service Area – Population Projections

Year	Existing Customer Population Growth	Future Expansion Area Population Growth	Future Redevelopment Area Additional Population	Total Population
2019	58,045	-	-	58,045
2020	393	-	-	58,438
2025	1,245	616	6,629	66,929
2030	1,520	2,964	8,457	79,870
2035	1,715	826	-	82,411
2040	1,746	155	-	84,312

A recent Response to RAI letter provided by the Village to the SFWMD on September 26, 2019 during recent CUP efforts documented the justification of the population estimates shown in **Table 3-1,** and accepted by the SFWMD. The Village has compared the projection data provided in the water use permit modification application with the Shimberg Center for Housing Studies population projections, the Palm Beach County Allocation Model (2015), BEBR population estimates, and the Housing & Economic Development Strategic Pion - Report Ill, Priority Development Strategies prepared by Florida International University and presented to the Village Council and found all of the data to be consistent with the Village's supplied projections. The population associated with the estimated new residential units is reflected in the Shimberg Center for Housing Studies (Florida Housing Data Clearinghouse) population projections for Wellington. Further information is available in the Response to RAI letter within the CUP permitting files.

3.2 Current and Future Service Area

The Village's Utility Service Area consists of the majority of the Village along with portions of the Village of Royal Palm Beach and parts of Unincorporated Palm Beach County. **Figure 3-1** shows the areas currently served water by the Village. Planned expansions of areas to be served water as well as redevelopment within the existing service areas are also shown in **Figure 3-1**. Currently, the Village only provides water service to approximately 50% of the utility service area as many residents have private wells. The Village's Water Utility service area is a mix of residential neighborhoods, large equestrian areas and commercial and light industrial uses. Most of the residential neighborhoods, commercial and light industrial uses are served by the Village's potable water system. The equestrian areas largely are served by private potable wells. As of October 2018, the Village's water utility services approximately 20,800 service connections (residential and commercial). The predominant users serviced by the central system are residential customers within Village's limits.

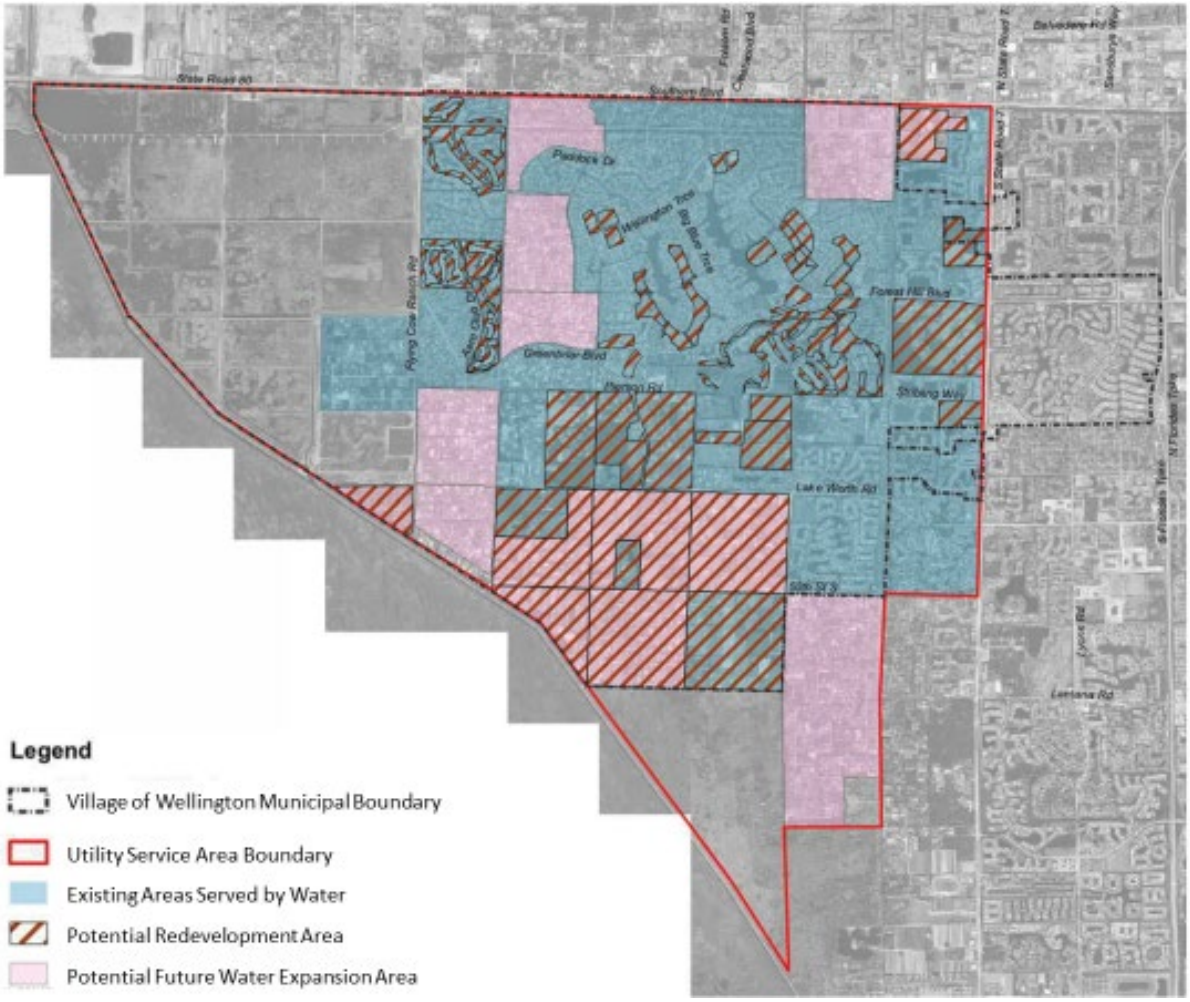

Figure 3-1: Village of Wellington – Current and Future Water Service Area

3.3 Domestic Self-Supply Systems

Domestic Self-Supply is water used by households served by small utilities (less than 0.1 mgd) and/or private wells. Currently, the Village only provides water service to approximately 50% of the utility service area by geographic area, but many of the unserved areas are large lot, equestrian, or rural areas where many residents have private wells. As utility service is extended to these areas, the amount of residents serviced by private wells is expected to decrease. **Table 3-2** show the rough estimated number of residents and water usage on self-supply systems through 2040. The reduction in domestic self-supply customers in **Table 3-2** do not match the increase in future expansion areas shown in **Table 3-1** due to variations in population over time within the TAZs. Projects for expanding service to future expansion areas would be assessment projects paid for by new benefiting property owners, and are thus not included in the Capital Improvements plan.

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Table 3-2: Domestic Self-Supply

Year	2020	2025	2030	2035	2040
Population[1] (capita)	4,812	4,196	2,154	1,360	1,407
Domestic Self-Supply (mgd)[2]	0.51	0.38	0.23	0.14	0.15

1. Based on Palm Beach County TAZ population estimates for unserved areas through 2035, values are reduced over time as future expansion areas are served, values to 2040 extrapolated

2. Based on 105 gpcd

3.4 Potable Water Level of Service Standards

Wellington's current treated water Level of Service (LOS) standard is 105 Gallons Per Capita per Day (GPCD). This LOS represents the ADF per capita per use for the five (5) year period from 2014 to 2018, used for the SFWMD CUP process. **Table 3-3** presents historical Annual Average Daily Flow (AADF) pumping data from the Village's WTPs and wellfields along with the estimated populations from 2014 to 2018. The historical per capita water demand during this time frame is also presented.

Table 3-3: Village of Wellington Water Service Area
Historical AADF Finished and Raw Water Pumping Data

Year	Water Service Area Population [1]	AADF Finished Water Pumped		AADF Raw Water Pumped	
		Pumping Rate (mgd) [2]	Per Capita (gallons per person per day)	Pumping Rate (mgd) [2]	Per Capita (gallons per person per day)
2014	53,603	5.83	109	6.75	126
2015	54,429	5.91	109	6.86	126
2016	55,256	5.65	102	6.74	122
2017	56,082	5.63	100	6.78	121
2018	56,475	6.02	107	6.96	123
2014 to 2018 Average:		**5.81**	**105**	**6.79**	**124**

Notes:

[1] Water service area population forecast Palm Beach County Planning and Zoning Dept.

[2] Data provided by Village Utilities Department

3.5 Potable Water Demand Projections

Table 3-4 presents the water demand forecast for the Village's water service area from 2020 through the year 2040, based on population projections and redevelopment presented in previous sections. Forecasts are presented for the raw water and finished water demands on an AADF basis. Additionally, the maximum day water demand is provided based upon the historical maximum day to annual average day ratio of 1.4 (based upon water pumping data from 2011 to 2017). In the near term, the per capita use rate increases as a result of anticipated higher ratios of commercial redevelopment. As residential expansion occurs in later years, the per capita use rate decreases.

Table 3-4: Village of Wellington Water Service Area
Potable Water Demand Projections

Year	Population	Raw Water Per Capita (gpcd)[1]	Finished Water Per Capita (gpcd)	Raw Water Demand AADF (mgd)	AADF Finished Water Demand (mgd)	Max Day Finished Water Demand (mgd)[2]
2019	58,045	115	105	6.69	6.09	8.53
2020	58,438	115	105	6.72	6.13	8.60
2025	66,929	118	105	7.88	7.03	9.84
2030	79,870	124	105	9.87	8.39	11.75
2035	82,411	124	105	10.18	8.65	12.11
2040	84,312	124	105	10.45	8.85	12.39

Notes:

[1] *Increasing raw water per capita rate over time reflects the planned gradual shift away from lime treatment (96% recovery rate) to 100% Membrane treatment (85% recovery rate) by 2028.*

[2] *Calculated using a historical maximum day to annual average day ratio of 1.4 based on flow data from 2011 through 2017.*

3.6 Water Supply from Local Governments

This section briefly describes the water supply, treatment, storage and distribution infrastructure that is owned and operated by the Village. Additionally, the Wellington WRF reuse water program is briefly described as it relates to water supply planning. The following information is addressed:

- CUP Information and Number and Raw Water Allocation Information
- Existing Water Facilities
  - Water Treatment Plant
  - Wellfields
  - WTP Water Storage Facilities

  - Distribution System Storage and Repump Facilities
  - Finished Water Distribution System
  - Deep Injection Wells
- Interlocal Agreements and Bulk Sales
- Distribution System Interconnects
- Treatment Losses
- Distribution System Losses
- Required Upgrades or Expansion
- Deep Injection Wells

3.6.1 Consumptive Use Permit and Raw Water Allocation Information

Withdrawal of ground water from the SAS is regulated by the SFWMD, by the issuance of a CUP. Currently, the Village is permitted to withdraw 3,784 million gallons per year (MGY) and a maximum of 359.5 million gallons per month (MGM) through its recently approved CUP (Permit No. 50-00464-W). The permitted raw water allocations under the recent approved CUP are summarized in **Table 3-5.**

Table 3-5: Annual Surficial Aquifer Withdrawal Limits

Category	North Wellfield	South Wellfield	East Wellfield	Total
Annual Allocation (MG)	1,617	1,789	573	3,784[1]
Maximum Month Allocation (MG)	--	--	--	359.5

Note:

[1] *The total allowable annual withdrawal rate is less than the sum of the total annual allowable withdrawal rates from each separate wellfield, which allows for operational flexibility.*

3.6.2 Village of Wellington Water Treatment Plant

The Village's existing water treatment plant consists of two separate processes: membrane filtration, and lime softening that treat raw water withdrawn from the SAS. 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 as shown in **Table 3-6.**

Table 3-6: Existing Rated Plant Capacities

Facility	FDEP Permitted Treatment Capacity (mgd)
Membrane Plant 1	4.0
Membrane Plant 2	3.6
Lime Plant	4.7
Total	**12.3**

The Village recently submitted an application to the Palm Beach County Health Department to increase the rated capacity of the WTP to 12.3 MGD. Modifications to the existing membrane plants are currently under construction. When complete in the fall of 2020, the two plants will be rated at 7.6 MGD with six (6) nanofiltration treatment trains. The permeate is delivered to degasifiers to remove the hydrogen sulfide before discharging into storage reservoir numbers 3 and 4.

The lime softening treatment process is capable of producing 4.7 mgd of finished water with a historical average 96% recovery rate. The lime plant receives water through a cascade aerator atop the softening unit for removal of hydrogen sulfide and carbon dioxide. Lime is added to reduce the hardness, color and alkalinity. Polymer is added to enhance the process. The water flows through five rapid sand filters and into a clear well, then is pumped into storage numbers 3 and 4 before being blended with the membrane product water.

3.6.3 Village of Wellington Wellfields

The Village currently obtains its water from SAS production wells located in three wellfields: the North, the South, and the East Wellfields. The North Wellfield has nine (9) active wells, the South Wellfield has seven (7) active wells, and the East Wellfield has two (2) active wells. Well depths vary but are generally screened between approximately 75 feet and 150 feet. A total of 18 potable water wells are used. Currently, the Village has three (3) wells in the South Wellfield (25, 26, and 27) which are installed but are not connected to the raw water main. These wells are also not outfitted with a well pump. The total pumping capacity of the three wellfields is 19,340 gallons per minute (gpm) (27.8 mgd). The wells are adequately spaced (1,000 to 1,500 feet apart) to reduce possible interference between wells. Groundwater elevations are routinely monitored to identify seasonal trends and predict maintenance requirements. Chloride concentrations are low and range from 30 mg/L to 216 mg/L and are not expected to increase significantly, allowing the membrane treatment plant to convert from RO to NF. The current capacities for the combined existing wells are identified in **Table 3-7**.

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Table 3-7: Inventory of Existing Wells

Well Number	Well ID Number	Wellfield	Diameter (inch)	Total Depth (feet)	Casing Depth (feet)	Capacity (gpm)	Status
18	23682	South	12	90	70	1,150	Existing
19	23683	South	12	90	70	1,150	Existing
20	23684	South	12	90	70	1,150	Existing
21	23685	South	12	118	68	750	Existing
22	23686	South	12	125	75	1,150	Existing
23	23687	South	12	120	75	1,150	Existing
24	23688	South	12	125	75	1,150	Existing
25	23894	South	12	125	80	500	Existing/Standby
26	23895	South	12	130	80	500	Existing/Standby
27	23896	South	12	125	75	500	Existing/Standby
29	118413	East	16	150	90	1,500	Existing
30	118414	East	16	150	90	1,500	Existing
R-1	23692	North	12	120	70	415	Existing
R-2	23689	North	12	115	75	415	Existing
R-3	23690	North	12	125	75	830	Existing/To be Abandoned
R-4	23691	North	12	120	75	830	Existing
R-6	23693	North	12	120	70	940	Existing
R-7	23921	North	12	120	55	940	Existing
R-8	23922	North	12	115	55	940	Existing
R-9	23923	North	12	120	55	940	Existing
R-10	23924	North	12	120	55	940	Existing

Connate, or relict seawater, is known to exist at depth in the SAS in western portions of Palm Beach County. The chloride concentration of Wells 18 through 30 range between 30 to 111 mg/L. Recent chloride concentrations for wells R-1 through R-10 range from 145 and 216 mg/L, necessitating the use of reverse-osmosis treatment for water derived from this wellfield. Historical chloride concentration data, collected since 1995, shows no upward trend in chloride concentrations. The small amount of predicted drawdown in the North Wellfield (approximately 6 feet) is minor, with most of this drawdown from historical use of this wellfield with no upward trend in chlorides noted. Therefore, due the large distance from a surface saline water source and historical data showing stable chloride concentrations in the SAS, the potential for saline water intrusion or upconing to occur as a result of the withdrawal of the recommended allocation is considered minimal.

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Model scenarios evaluated allocations for the current CUP, projected future needs, and the proposed new wellfield configuration (using existing and proposed wells). Model scenarios included a proposed allocation (EP4P Scenario), representing an average daily yield of 10.9 MGD. Model scenarios were designed to provide assurances that harmful impacts do not occur to the resource or violate Regional Water Availability and Minimum Flow and Level criteria.

Modeling indicated that a recharge (seepage) increase of 2.78 MGD occurred from the AID canal system under the 10.9 MGD withdrawal scenario, but that no additional recharge is induced from LWDD or Regional Canals. Furthermore, modeling indicated that drawdown does not extend beyond the AID boundary in Model Layer 1, where the LWDD and Regional Canals are located, and the proposed increased withdrawals do not induce additional seepage from the LWDD or Regional Canals. The model results from the impact evaluation scenario performed in support of the recently obtained CUP permit is shown in **Figure 3-2**.

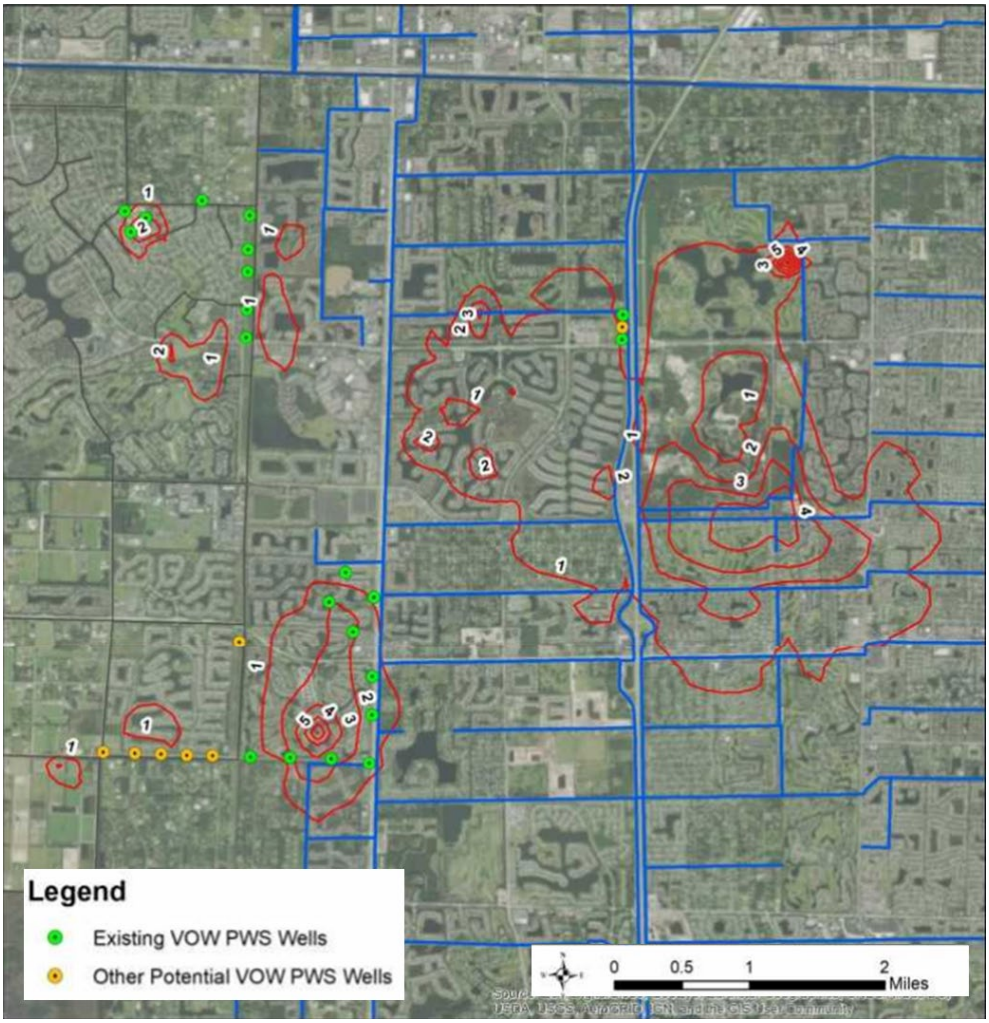

Figure 3-2: Village of Wellington – Cumulative Drawdown (ft) for Model Layer 1 – 10.9 MGD EP4P Scenario

The model results showed that the majority of the requested increase from the SAS was being provided by induced seepage from the AID's canal system. Consequently, the Village performed a water budget analysis and a comprehensive evaluation of the AID surface water system demonstrating that the AID canals could be maintained at historic stages to offset the induced seepage resulting from the increased withdrawals, without an increase in allocation to its D&I permit (50-00548-W).

3.6.4 WTP Water Storage Facilities

Treated water is stored on site in four (4) above-ground storage reservoirs. The reservoirs are listed in **Table 3-8**.

Table 3-8: Inventory of Existing WTP Storage

Tank	Storage Volume (MG)
Storage Tank No. 1	0.25
Storage Tank No. 2	1.0
Storage Tank No. 3	1.0
Storage Tank No. 4	2.0
Total	4.25

3.6.5 Finished Water Distribution System

The Village's water distribution system consists of over 300 miles of 2-inch to 24-inch diameter ductile iron, PVC, and HDPE water mains that convey the finished water from the treatment facilities to the individual customers. The Village has two booster pump stations, listed below:

- Booster Pump Station 1, located at 2901 Ousley Sod Farm Road
- Booster Pump Station 2, located at 11011 Lake Worth Road

3.6.6 Distribution System Water Storage and Repump Facilities

The Village has two (2) ground storage tank/repump facilities in the distribution system. The capacity of storage tanks and pumps is identified in **Table 3-9**.

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Table 3-9: Distribution System Water Storage and Repump Facilities

Location	Capacity (gallons)	Pump Capacity
No. 1 Booster Station at Osley Farm Road	1.0 mg	2 pumps @ 3100 gpm each, VFD (4.4 MGD "Firm" Pumping Capacity)
No. 2 Booster Station at Lake Worth Road	2.0 mg	2 pumps @ 2000 gpm, VFD 1 pump @ 1000 gpm, VFD (4.3 MGD "Firm" Pumping Capacity)

3.6.7 Injection Wells

The Village currently operates a tubing-and-packer Class I injection well at the WTP site for disposal of membrane concentrate generated during the treatment process. The well is permitted for a maximum flow of 5.05 mgd and has a well completion depth of 3,450 feet below land surface. The Operation Permit (Permit No. 202658-005-UO/1X) expires October 19, 2020. The Village plans to renew the Operation Permit with no modifications.

3.6.8 Interlocal Agreements and Bulk Sales

The Village currently has the following key interlocal agreements in place:

- Emergency water interconnect with Palm Beach County Water Utilities Department (PBCWUD)
- Interlocal agreement with Palm Beach County to provide water within unincorporated areas within Palm Beach County within the AID boundaries
- Interlocal agreement with Village of Royal Palm Beach to provide water within Village of Royal Palm Beach also within the AID boundaries

The Village has no bulk water customers. Currently, the Village does not have any plans for any future agreements.

3.6.9 Distribution System Interconnects

The Village maintains an emergency interconnect with Palm Beach County Water Utilities Department, located just south of Isla Verde on the east side of State Road 441.

3.6.10 Treatment Losses

The Village of Wellington WTP finished water to raw water treatment loss averaged 14% from 2011 to 2017. The current treatment loss is expected to change due to planned improvements to the WTP. The Village plans to replace the lime softening process with additional membrane treatment trains by 2029 and will be utilizing higher efficiency nanofiltration membranes in the RO trains. The anticipated future treatment loss of the WTP is 15 percent with the planned modifications.

3.6.11 Distribution System Losses

Distribution system losses are presented in **Table 3-11**. The percent distribution system loss refers to the percent of finished water pumped. The distribution system losses have averaged 5 percent over the timeframe from 2016 through 2018.

Table 3-11: Historical Distribution System Losses

Water Use Category	Annual Total Production (mg)		
	Nov 15 to Oct 16	Nov 16 to Oct 17	Nov 17 to Oct 18
Raw Water Withdrawn (MG)	2,440	2,515	2,516
Finished Water Pumped from WTPs (MG)	2,052	2,078	2,165
Billed Authorized Consumption (MG)	1,887	1,936	2,041
Unmetered Authorized Consumption (MG)	26	33	39
Total Authorized Consumption (MG)	1,913	1,970	2,080
Distribution System Loss (MG)	139	109	86
% Distribution System Loss	7%	5%	4%

3.6.12 Required Upgrades or Expansions

Projected water demands within the Village service area are greater than previously anticipated. The Village has planned to expand and improve its WTP and wellfields to meet these higher demands.

3.6.12.1 Ongoing WTP Renewal and Replacement Project

The Village is actively investing in their WTP infrastructure. A $18 million dollar major renewal and replacement project for the WTP is currently under construction and planned for completion by 2020. The first phase of the project will include installation of a 1.8 mgd membrane treatment train (Train 7) in Membrane Plant 2. The addition of the train is required to allow the existing RO Trains 1-5 to be taken out of service for complete reconditioning. Trains 2-5 will be repurposed for an increase in rated capacity of 1.0 mgd to allow Train 1 to be abandoned. New NF membranes will be installed in Trains 2- 6. Train header and manifold piping will be modified to provide enhancement to cleaning and process control systems. Pressure vessels on Train 2 will be replaced and those on Trains 3-5 will be reused. Additionally, the existing high pressure pumps for Trains 2-5 will be equipped with new variable frequency drive units and new electrical and control wiring will be installed. A new control room and laboratory will also be constructed and complete reprogramming of the Village's SCADA system will be included as part of the project. After this project is complete, the Village will no longer use RO membranes. Because this project will be completed by 2020 and was funded in previous fiscal years, it is not included in the 5-year Capital Improvements plan.

3.6.12.2 WTP Membrane Replacement

The Village plans to further improve the Membrane treatment process by replacing the current membranes used with higher efficiency nanofiltration membranes. This is expected to increase the recovery rate of the membrane process by approximately 10 percent, bringing the Membrane treatment efficiency to 85 percent. Because this project will be completed by 2020 and was funded in previous fiscal years, it is not included in the 5-year Capital Improvements plan.

3.6.12.3 WTP Expansion

The Village is planning a phased expansion of the WTP. The expansion is broken into a sequence of three phases. Planning for each phase of expansion will begin before the maximum day demands exceed 75% of the total plant capacity. Design will then begin before water demand exceeds 80% of the total plant capacity. Finally, construction will begin before water demand exceeds 90% of the total plant capacity.

- Phase 1 – The WTP is currently under construction to add Membrane Train 7 for an additional 1.3 mgd of capacity. This will increase the total plant capacity from 11.0 mgd to 12.3 mgd. Construction is anticipated to be completed by 2020.

- Phase 2 – The second phase will add a new Membrane Train 8, which will provide an additional 1.8 mgd of capacity, bringing the plant total from 12.3 mgd to 14.1 mgd. Planning and construction will be based on actual demands.

- Phase 3 – The final planned phase of expansion consists of a phased replacement of the 4.7 mgd lime softening process with membrane treatment. This will increase the total capacity by 5.4 mgd, bringing the plant total from 14.1 mgd to 14.8 mgd with a firm capacity of 13.0 mgd with one unit out of service. Planning and construction will be based on actual demands.

Note that the recently approved CUP indicated four phases of expansion, with the first phase expanding from 11.0 mgd to 11.4 mgd, and the second phase expanding from 11.4 mgd to 12.3 mgd. However, the Village recently accelerated the expansion to 12.3 mgd to be combined into the first phase (which is under construction at the time of this writing).

3.6.12.4 Wellington Wellfield Expansion

Expansion of the Village's wellfields are necessary to provide the raw water supply needed to meet the increased projected demands. From 2020 to 2024, the Village will construct seven (7) new SAS wells in the South Wellfield (wells 32-37) and extend and replace the raw watermains in the area.

The proposed wells and standby wells to be constructed are shown in in **Table 3-12**.

Table 3-12: Inventory of Proposed Wells

Well Number	Well ID Number	Wellfield	Diameter (inch)	Total Depth (feet)	Casing Depth (feet)	Capacity (gpm)	Status
31	283145	East	24	150	80	1500	Proposed/Standby
32	283026	South	16	120	70	1150	Proposed
33	283027	South	16	120	70	1150	Proposed
34	283028	South	16	120	70	1150	Proposed
35	283029	South	16	120	70	1150	Proposed
36	283030	South	16	120	70	1150	Proposed
37	283031	South	16	120	70	1150	Proposed
R-3R	283220	North	20	116	56	940	Proposed
R-11	23757	North	12	120	70	670	Proposed
R-12	23758	North	12	120	70	670	Proposed
R-13	23759	North	12	120	70	670	Proposed
R-14	23760	North	12	120	70	670	Proposed
R-15	23761	North	12	120	70	670	Proposed

3.6.12.5 Wellington Transmission System Replacement

The Village has budgeted for several transmission system replacement projects over the next ten years. These transmission system expansion projects are listed in the Capital Improvements section.

3.7 Water Supply Provided by Others

Small areas within the Village municipal boundary, but not within the Village's water utility service boundary exist to the east of State Road 441. These areas are shown in previously presented **Figure 3-1** and are served by PBCWUD. **Table 3-13** demonstrates the current and future water supply to this area by PBCWUD.

Hazen

Table 3-13: Water Supplied By PBCWUD

Year	2018	2020	2025	2030
Population[1] (capita)	9,362	9,461	9,575	9,698
Water Supplied (mgd)[2]	0.98	0.99	1.01	1.02

Notes:

[1] Information taken from Palm beach County 10-Year Water Supply Facilities work plan, Table 5.2, which only includes projection through 2030

[2] Based on 105 gpcd

3.8 Conservation

The Village currently implements a water conservation plan that addresses the elements of a Standard Water Conservation Plan as defined in the Applicant's Handbook for Water Use Permit Applications. The following Section details the Village's water conservation initiatives.

3.8.1 Water Conservation Education Program

Water Conservation Education Program: Wellington's website includes information on water conservation. Water conservation materials are displayed at the Utilities Department and are periodically sent to Village of Wellington customers with utility bills.

3.8.2 Permanent Irrigation Ordinances

Permanent Irrigation Ordinance: Wellington's Unified Land Development Code (ULDC) Section 7.3.12,D specifies that landscape irrigation is restricted to the hours of 5:00 P.M. to 9:00 A.M. (or as established by SFWMD). Daytime irrigation is prohibited. Wellington's Part II Code of Ordinances (Code), CH30 Environment, Article IV Water Conservation, Sec 30-144, (a), references the requirement to comply with the SFWMD daily schedule for irrigation (even addresses, systems serving both even and odd addresses, or no addresses irrigated on Tuesday, Thursday, Saturday; odd addresses irrigated on Monday, Wednesday, or Saturday).

3.8.3 Florida Friendly Landscape Ordinances

Florida Friendly Landscape Ordinance: Currently, the Village of Wellington's ULDC includes elements throughout which comply with the Florida Friendly Landscape (FFL) Requirements. FFL requirements for landscape design, installation, and maintenance standards that result in water conservation and water quality protection or restoration are addressed in ULDC Section 7.3 and Code Section 30-153. Identification of prohibited invasive exotic plant species are included in ULDC Section 7.3.6,Q. Identification of controlled plant species, accompanied by the conditions under which such plants may be used are identified in UDLC Section 7.3.6,R. Provisions for specifying the maximum percentage of irrigated turf and impervious surfaces allowed in a FFL area and addressing the practical selection and installation of turf are included in

UDLC Sections 6.5.19 E-12, 7.3.6,G, 7.3.8-Table 7.4.6, and 7.3.9, B, 6. Specific standards for land clearing and requirements for the preservation of existing native vegetation are included in UDLC Section 7.4. A monitoring program for FFL ordinance implementation and compliance is included in Code, Chapter 2 Article IV.

3.8.4 Rain Sensor Ordinance

Wellington's UDLC requires irrigation systems to be equipped with a rain sensor switch, which will override the irrigation cycle of the sprinkler system when adequate rainfall has occurred.

3.8.5 Water Conservation Rate Structure

The Village of Wellington has a water conservation based rate structure. This rate structure includes increasing block rates as their means for reducing water demands.

3.8.6 Leak Detection Program

Wellington has a leak detection program. Water production wells, influent raw water and treated water pumped from the treatment plant, are metered (and calibrated regularly). Key process elements internal to the water plant are also metered (including concentrate disposal down deep injection well). Process water and concentrate water used/lost during production is monitored closely. If outside target range, investigation and correction of source is conducted immediately. Other uses (hydrant flushing, sewer cleaning, etc.) are monitored and recorded daily. Service connections to the potable water system are metered. A representative sample of water meters are tested each year to determine accuracy trends.

Unaccounted for water is monitored monthly. If unaccounted for water begins to trend upward or exceeds 10% investigation and correction of source(s) is conducted immediately. Currently, Wellington's unaccounted for water is below 10% and remains relatively steady.

3.8.7 Ultra-Low Volume Plumbing Fixture Requirements

The Village of Wellington is required to follow the Florida Building Code and more specifically, Florida Plumbing Code with reference to plumbing fixtures. The City does comply with the Florida Plumbing Code which requires toilets of 1.6 gallons per flush, shower heads at 2.5 gallons per minute, and faucets at 2.0 gallons per minute.

3.8.8 Reclaimed Water

The Village currently utilizes reuse water as an alternative water supply. The Wellington WRF has a reuse water production capacity of 4.5 mgd, being expanded to 6.0 mgd operation by 2021. The WRF distributes reuse water to 8 existing reuse sites consisting mostly of recreational facilities and roadway landscaped areas where reuse is utilized for irrigation. In addition to irrigation, the WRF is permitted to divert up to 023 mgd average daily flow of reuse water to the PWS wetland located within the Village Park. As of 2018, the Wellington WRF distributed 0.425 mgd as reuse water.

The Village is currently developing a Reuse Master Plan to evaluate opportunities to expand its distribution of reuse water. The Reuse Master Plan has identified potential reuse sites ideal for expansion. Sites were identified on the basis that they are current users of irrigation water from either surface water canals or groundwater wells and the sites are located within reasonable distance to existing reclaimed water distribution piping. The sites identified are utilized as golf courses and horse fields. These sites could potentially increase the reuse demand by 2.6 mgd.

In addition, the Village completed a master plan for the PWS. Data collected for the master plan indicate that the hydraulic loading to the wetland could be increased without significant ecological or hydrological impacts to the wetland. The observed average and maximum infiltration rate during hydraulic infiltration testing performed in September through October 2018 was 0.37 mgd and 0.43 mgd respectively. The Village intends to increase the permitted reuse flow to the wetland to these rates. The increased production and distribution of reuse water will reduce the reliance on freshwater withdrawals within the Village's service area.

3.8.9 Local Financial Responsibilities

The Village does not have any financial responsibilities relative to reuse. Hence, this section is not applicable to the Village.

3.9 Sector Plans

This section is not applicable to the Village.

4. Capital Improvements

This section provides a brief description of the Village's Capital Improvements Program.

4.1 Work Plan Projects

This section identifies projects required to augment and/or diversify water supply to meet demand in the Village's water service area. The projects listed in the following section are funded by the Utilities enterprise fund.

4.1.1 Water Supply / Treatment Projects Needed

Based upon the raw water demand forecast, further development of traditional water supply and reuse projects are required to meet the demand within the Village's water service area over the period from 2020 to 2024.

The Village has planned for expansion of its SAS wellfield to meet projected raw water demands. The Village plans to construct seven (7) additional SAS wells in the South Wellfield and extend the raw water main to these new wells. In addition to the new wells, the Village will complete Phase III of its wellfield rehabilitation program and replacement of existing raw water mains in the South Wellfield.

The Village will address the required expansion of the WTP in three phases. Phase 1 will add an additional Membrane Train 7 to the facility. Phase 2 of the expansion will add a new Membrane Train 8. The final phase consists of the replacement of the existing lime softening treatment facility with three new membrane treatment trains. Within the next 5 years the Village will perform the necessary mechanical integrity testing on the injection well utilized for disposal of membrane concentrate.

4.1.2 Transmission System Projects Needed

No new potable water transmission network projects are planned through 2024, as the bulk of the increase in customer base is expected in existing areas and redevelopment areas. However, the Village has planned many projects to improve its existing transmission system for renewal and replacement, and also to serve increased population in existing service areas and redevelopment areas. Projects for expanding service to future expansion areas would be assessment projects paid for by new benefiting property owners, and are thus not included in the Capital Improvements plan.

4.1.3 Projects Needed to Supply Water Outside of the Village's Water Service Area

The Village has no plans to supply water outside of its existing water service area over the next 10 years. Hence, this section is not applicable to the Village. Projects for expanding service to future expansion areas would be assessment projects paid for by new benefiting property owners, and are thus not included in the Capital Improvements plan.

4.2 Capital Improvements Element/Schedule

Table 4-1 presents the Five-Year (Fiscal Year 2020 – 2024) Schedule of Capital Improvements for traditional water supply, treatment, storage, and distribution system infrastructure. Additionally, alternative water supply projects (if any) that have been identified to start within the next five years are included. Costs include engineering services along with construction costs. The projects presented herein are based upon the Village's Long-Term Capital Improvement Plan for Fiscal Year 2020 – 2024.

Hazen

Table 4-1: Village of Wellington Water System
Ten-Year (FY 2020-2024) Community Investment Plan

Project Number and Title	FY 2020-2024 CIP Total
General Facilities	$500,000
Water Supply	$12,235,000
Water Treatment	$6,915,000
Water Distribution Repump	$200,000
Water Distribution	$14,850,000
Reuse	$300,000
Total	**$35,000,000**

Note: Values are for planning purposes only. Actual CIP expenditures are reviewed and approved annual during the budget process.

5. Goals, Objectives and Policies

The Village of Wellington Comprehensive Plan addresses the needs and aspirations of the community. The Comprehensive Plan also plays a significant role within Florida's growth management system. The Comprehensive Plan is required to be consistent with the State Comprehensive Plan (Chapter 187, Florida Statutes), and to be consistent with the Regional and County Comprehensive Plans. In short, the Comprehensive Plan provides a critical link between the Village of Wellington Jupiter, State of Florida, Regional, and Palm Beach County plans. The Comprehensive Plan focuses on those issues facing the Village of Wellington over a twenty-year time horizon. The Comprehensive Plan establishes long-term direction of goals as well as short-term objectives and policies to guide implementation efforts.

To maintain consistency within the Village's Comprehensive Plan, data, analysis, goals, objectives, and policies were reviewed to determine if they need to be updated or revised based on information and updates in this Work Plan Update. Conflicts were identified, and will be rectified by the Village of Wellington by amending the Comprehensive Plan Elements, including Land Use, Infrastructure, Conservation, Parks and Recreation, Capital Improvements and Intergovernmental Coordination.