July 2019

City of Wildwood
Utility System
MASTER PLAN

Prepared by

Kimley»Horn

Prepared for

EST. 1877
WILDWOOD
FLORIDA

UTILITY SYSTEM

CITY OF WILDWOOD

MASTER PLAN

Prepared for:

City of Wildwood

Prepared by:

Kimley-Horn and Associates, Inc.

142173233
July 2019

101 E Silver Springs Boulevard, Suite 400
Ocala, FL 34470
352 438 3000

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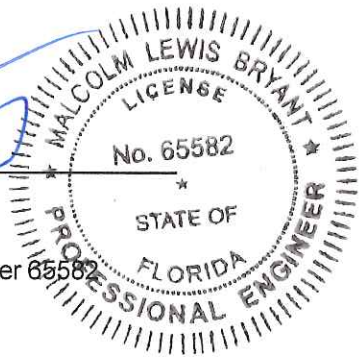

Malcolm Lewis Bryant, PE

Florida Registration Number 65582

CA No. 00000696

Date: 7/17/19

EXECUTIVE SUMMARY

Due to the increased growth and changes in the residential development pattern, the City of Wildwood (City) requested Kimley-Horn to update the City's 2015 Utility System Master Plan to identify potential system deficiencies and to prioritize the capital improvement projects (CIP) needed to meet future system demands. This master plan update and accompanying hydraulic modeling was assembled to assist the City in identifying and selecting the CIP's needed to efficiently and cost-effectively meet the demands of current and future residents.

WATER SYSTEM ANALYSIS

The City currently operates six water treatment plants (WTP) and has two additional under construction (the Oxford WTP and Southern Oaks WTP). Both WTP's under construction are expected to be online in the winter of 2019. All six of the existing water treatment plants are operating within their respective FDEP permitted capacities based on average and maximum daily flows.

The 2015 hydraulic model was updated and re-calibrated to reflect the City's existing water system and present-day demands. Calibration of the model was done using hydrant flow data recorded in the field.

PRESENT DAY SYSTEM DEMANDS (2018) – This scenario consisted of a present day (2018) analysis of the water distribution system. The existing system scenario was used to calibrate the model to within 10% of observed system flows and pressures. Based on the present-day hydraulic analysis and discussions with the City staff, no system improvements are required.

3-YEAR DEMANDS (2020) – The 3-year demand scenario analysis modeled the City's water distribution system with the projected 2020 (3-year) water demands. The hydraulic model results demonstrated that construction of the Oxford WTP (**PWS Improvement No. 1**) and Phase I and II of the CR 209 WM extensions (**PWS Improvement No. 2** and **No. 3**) are required to meet the projected 2020 water system demands of the City's service territory.

5-YEAR DEMANDS (2022) – The 5-year demand scenario analysis modeled the City's water distribution system with the projected 2022 (5-year) water demands. To meet the projected demands the City will need to modify their existing water use permit (WUP) to reallocate withdrawal capacities to the Oxford WTP (**PWS Improvement No. 4)** The hydraulic model results demonstrated that in addition to the 3-year demand improvements, construction of Phase III of the CR 209 WM extension (**PWS Improvement No. 5**) is required to meet the projected 2022 water demands of the City's service territory.

20-YEAR DEMANDS – The 20-year demand scenario analysis modeled the City's water distribution system with the projected 2037 (20-year) water demands. To meet the projected demands the City will need to request for an increase in their permitted groundwater withdrawal capacities which will require a new water WUP (**PWS Improvement No. 6**). The hydraulic model results demonstrated that in addition to the 3-year and 5-year demand improvements, expansion of the CR 501 WTP (**PWS Improvement No. 7)**, Ashley WTP (**PWS Improvement No. 8**)**,** and the Oxford WTP (**PWS Improvement No. 9**), along with the CR 214 water main interconnection (**PWS Improvement No. 10**) are required to meet the projected 2037 water demands of the City's service territory.

WASTEWATER SYSTEM ANALYSIS

The City currently operates two wastewater treatment facilities (WWTF) – the City of Wildwood WWTF and the Continental Country Club WWTF. Both of the City's WWTF's are currently operating within the FDEP permitted capacity.

For the 2015 utility master plan, a hydraulic model was originally developed and calibrated for the City's wastewater collection system. Calibration of the model was done using lift station (LS) drawdown tests recorded in the field. The 2015 model was updated to reflect the present day (2018) system geometry and demands. The model results were used to identify capital improvement projects (i.e. force main extensions, lift station improvements, and wastewater treatment facility expansions) needed to meet the present day and the 3-year, 5-year, and 20-year projected demands

PRESENT DAY SYSTEM DEMANDS (2018) – This scenario consisted of a present day (2018) analysis of the wastewater collection system. The present-day system scenario was used to calibrate the model to within 10% of observed system flows and pressures. Based on the present-day model analysis and discussions with the City staff, no system improvements are required.

3-YEAR DEMANDS (2020) – The 3-year demand scenario analysis modeled the City's wastewater collection system with the projected 2020 (3-year) wastewater system flows. The model results, along with discussions with City staff demonstrated that the following improvements are recommended or required to meet the projected 2020 wastewater flows for the City's service territory: The decommissioning of the CCC WWTF and construction of a force main from the CCC master LS to the City's WRF (**WW Improvement No. 1**), redirection of the Providence LS flows through the Trailwinds force main (**WW Improvement No. 2**), an infiltration and inflow study (**WW Improvement No. 3**), and hydraulic and process modifications to the City's WRF (**WW Improvement No. 4**).

WW Improvement No. 2 is required to meet the projected flows and **WW Improvement No. 1, No. 3, and No. 4** are recommended to improve the operational efficiency of the overall wastewater collection and treatment system.

5-YEAR DEMANDS (2022) – The 5-year demand scenario analysis modeled the City's wastewater collection system with the projected 2022 (5-year) wastewater system flows. The model results, along with discussions with City staff demonstrated that the only recommended improvement to meet the 2022 demands is the annual gravity system renewal and replacement projects (**WW Improvement No. 5**).

20-YEAR DEMANDS - The 20-year demand scenario analysis modeled the City's wastewater collection system with the projected 2037 (20-year) wastewater system flows. The model results demonstrated that, with the recommended improvements for the 3-year and 5-year scenarios implemented, rehabilitation of the Main St North LS (**WW Improvement No. 6**) and expansion of the City's WRF from 3.55 MGD to 5.50 MGD (**WW Improvement No. 7**) are required to meet the projected wastewater flows of the City's service territory.

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LIST OF ACRONYMS

3MRADF	Three-Month Rolling Average Daily Flow
AADF	Annual Average Daily Flow
AAFF	Average Available Fire Flow
ALF	Assisted Living Facility
ARD	Age-Restricted Development
AWS	Alternative Water Supply
BEBR	Bureau of Economic and Business Research
BOD	Biological Oxygen Demand
CAR	Capacity Analysis Report
CIP	Cast Iron Pipe
CR	County Road
DIP	Ductile Iron Pipe
DMR	Discharge Monitoring Report
ERU	Equivalent Residential Unit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FLUM	Future Land Use Map
fps	Feet Per Second
FM	Force Main
Ft	Feet
GIS	Geographic Information System
gpcd	Gallons per Capita Day
GPD	Gallons per Day
gpm	Gallons per Minutes
GST	Ground Storage Tank
HGL	Hydraulic Grade Line
HOA	Homeowners Association
hp	Horsepower
HSP	High Service Pump(s)
HSPS	High Service Pump Station(s)
ILF	Independent Living Facility
ISO	Insurance Services Office
LDC	Land Development Code
LFA	Lower Floridan Aquifer
LOS	Level of Service

LOSS	Level of Service Standard
LS	Lift Station
LSSA	Lift Station Service Area
MFLs	Minimum Flows and Levels
MG	Million Gallons
mg/L	Milligram per Liter
MGD	Million Gallons per Day
MOR	Monthly Operating Report
NE	Northeast
NW	Northwest
PAR	Public Access Reuse
psi	Pounds per square inch
PVC	Polyvinyl Chloride
PWS	Potable Water System
PS	Pump Station
RAS	Return Activated Sludge
RIB	Rapid Infiltration Basin
SCADA	Supervisory Control and Data Acquisition
SE	Southeast
SW	Southwest
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
TMADF	Three Month Average Daily Flow
TN	Total Nitrogen
TP	Total Sulfur
VFD	Variable Frequency Drive
VTP	Vertical Turbine Pump
WM	Water Main
WMD	Water Management District
WRAMS	Water Resources Assessment and Management Study
WRF	Water Reclamation Facility
WSEL	Water Surface Elevation
WTP	Water Treatment Plant
WUP	Water Use Permit
WRF	Water Reclamation Facility
WWTF	Wastewater Treatment Facility

INTRODUCTION

BACKGROUND

The City of Wildwood (City) is experiencing increased population growth as well as changes to the residential development pattern which have subsequently increased the water and sanitary sewer (wastewater) demands within the City's service area. In response to anticipated future demands, the City requested an update the *2015 Utility System Master Plan* to identify potential system deficiencies and to prioritize the capital improvement projects (CIP) needed to meet future system demands.

SCOPE AND OBJECTIVES

The primary objective of this utility system master plan update is to identify potable water and sanitary sewer CIP's that are needed to meet the 3-year, 5-year, and 20-year demands of the City's utility service area.

Water System Objectives:

- Identify the water supply, treatment, and storage capacity of the City's existing water system.
- Develop potable water demand projections (3-year, 5-year, and 20-year).
- Evaluate the water distribution system under present day conditions and for 3-year, 5-year, and 20-year growth projections.
- Identify necessary improvements to the City's water supply, treatment and storage capacity under the present day, 3-year, 5-year, and 20-year demand projections.

Wastewater System Objectives:

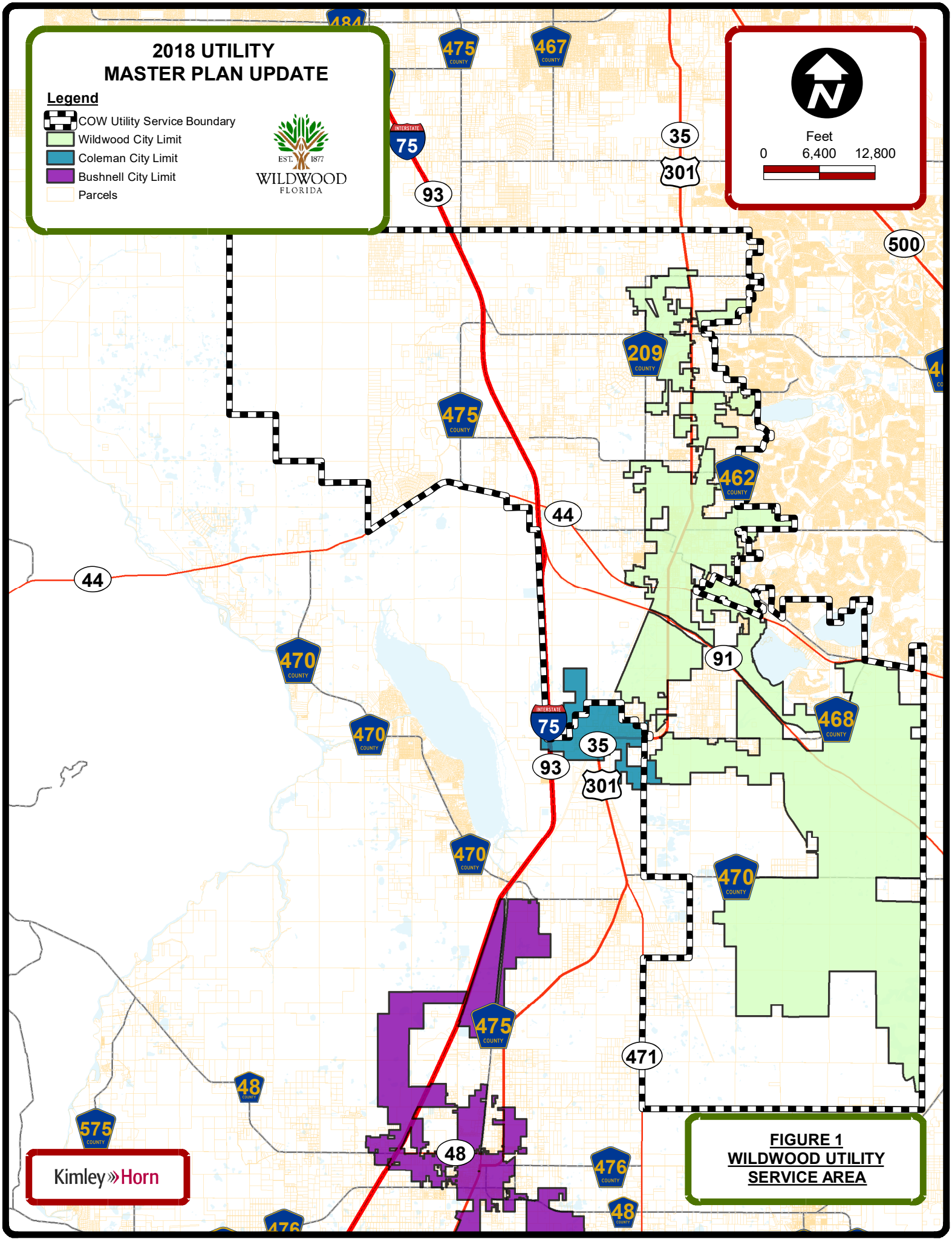
- Identify the wastewater treatment and collection system capacity of the City's existing wastewater system.
- Develop wastewater flow projections (3-year, 5-year, and 20-year).
- Evaluate the wastewater treatment and collection system under present day conditions and for 3-year, 5-year, and 20-year growth projections.
- Identify necessary improvements to the City's wastewater treatment and collection system under the present day, 3-year, 5-year, and 20-year demand projections.
- The necessary improvements to the City's effluent disposal system are referenced in the *2015 Utility System Master Plan.*

SERVICE AREA DESCRIPTION

The City of Wildwood and Sumter County entered into a Interlocal Service Boundary (ISB) and Joint Planning Area (JPA) Agreement pursuant to F.S. § 171, Part II. The City adopted the agreement by ordinance (Ordinance 02009-5) on April 13, 2009, and the City and County amended their respective comprehensive plans to include the JPA.

F.S. § 171.203(11) requires the City to amend the Comprehensive Plan to include a boundary map of the municipal service area, establish population projections, and demonstrate the ability to provide the area with public facilities and services. The amendments to the City's Comprehensive Plan include incorporation of the municipal service area boundary, the JPA Land Use Map and text amendments to the Future Land Use Element concerning urban sprawl, land uses within the JPA, annexation, and provisions of services. The State land planning agency is required to review the amendment under F.S. § 163, Part II.

The City’s municipal service area boundary is shown on **Figure 1.**


2018 UTILITY
MASTER PLAN UPDATE
Legend
COW Utility Service Boundary
Wildwood City Limit
Coleman City Limit
Bushnell City Limit
Parcels
EST. 1877
WILDWOOD
FLORIDA
Feet
0
6,400
12,800
Kimley»Horn
FIGURE 1
WILDWOOD UTILITY
SERVICE AREA
\\ocafp01\FL_OCA\OCA_Utilities\Wildwood\Projects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\mxd\Figure 1 - Service Area_1.mxd - 11/12/2018 5:24:01 PM - trey.clayton

DEMAND PROJECTIONS

This section presents a discussion of the projected population growth within the City's utility service area. The future utility demands must first be estimated to properly determine whether the current utility system can support said demands and which improvements are necessary for a successful system in the future. Identifying, quantifying, and locating these demands allows for proper analysis and planning of capital improvements that are necessary to efficiently and cost-effectively serve existing and new customers.

Increases in demands within the City's utility system are anticipated to occur in three ways: (1) fluctuating demands within the areas currently served by the City resulting from population changes and new connections in areas where infrastructure exists (infill demands), (2) increased demands from the physical expansion of the utility system to bring existing non-served customers onto the network (expansion demands), and (3) demand increases driven by new development (development demands).

METHODOLOGY FOR DETERMINING POPULATION GROWTH

The basis for determining the future population growth was a model developed by the Southwest Florida Water Management District (SWFWMD). SWFWMD's growth model is based in ArcGIS and is a combination of the population projections made by the University of Florida's Bureau of Economic and Business Research (BEBR) and the US Census block-level data. The SWFWMD model has population data at the parcel level for all of Sumter County, which allows for projecting populations for any service area. The populations are projected by SWFWMD for the following years: 2015, 2020, 2025, 2030, 2037, and 2040. For a further discussion of the methodologies used by SWFWMD in developing the parcel level growth projections, see **Appendix A**.

EXISTING DEMANDS

To establish the basic demand growth, no physical expansion of the City's network or connection of new customers was assumed (meaning that only current customers would be considered). For this classification, the parcel level data provided by SWFWMD was reduced to the parcels that had billing data associated with the parcel during 2017. The growth rate for the 3-year, 5-year and 20-year periods are based on these parcels. The existing number of ERUs being served was estimated using the total number of existing meters that were connected to the system in July of 2017 (4,225). The ERUs for 3-year, 5-year, and 20-year were then estimated by multiplying the existing ERUs by the resulting growth rate calculated from the SWFWMD population model.

INFILL DEMANDS

To establish the infill demands, unoccupied parcels that were within 200 feet of existing utility infrastructure were selected and considered infill parcels. To calculate full build-out demand, the maximum density for a parcel (in terms of ERUs) allowed by the City was used to determine the build-out ERUs. The calculated ERU was then multiplied by the City's level of service standard of 300 gpd/ERU for water service and 250 gpd/ERU for sewer service. The 3-year, 5-year, and 20-year demands were estimated by multiplying the existing (present day) demands by the growth rates determined by the SWFWMD population model. See **Appendix B** for the complete ERU allocation and calculation summary. **Table 1** summarizes the projected infill ERUs from **Appendix B**. See **Figure 2** for a map showing the City's infill and expansion parcels

Table 1: Existing Service Area ERU Projections				
Service Area	Present (2018)	3-year (2020)	5-year (2022)	20-year (2037)
Existing Service Area	4,225	4,301	4,365	4,431
FCC Coleman	2,197	2,500	2,500	2,500
Infill Demands	-	179	200	569
Subtotal	**6,422**	**6,980**	**7,065**	**7,500**

EXPANSION DEMANDS

A second important contributor to increased demands can be realized through physically expanding the system and connecting parcels that are not currently connected. The City coordinated with Kimley-Horn to develop a plan for how and when to expand their utility system to provide water and wastewater service to presently non-served properties. A total of four areas were identified for possible expansion in the future: 1) CR 209/West Expansion Area, 2) North/Brown Expansion Area, 3) Central Service Area, and 4) Southern Service Area. See **Figure 2** for a map showing the City's infill and expansion parcels. The expansion areas exclude any known future developments. For a discussion of known future developments see the next section.

The expansion parcels are classified in one of two categories: parcels with a City designated future land use (as documented by the City's FLUM from the Comprehensive Plan) and parcels without a City designated future land use.

- For the parcels that have a City designated future land use, the City FLUM was used to estimate the number of ERUs per parcel. The allowable density and/or maximum floor area ratio (FAR) was then used to calculate the number of units allowed on the parcel. If a density and FAR were given in the land use, the number of ERUs was calculated for both, and then the maximum of the two was selected to represent the future condition of the parcel.
- For the expansion parcels without a City designated future land use, the SWFWMD model was used to estimate the present, 3-year, 5-year, and 20-year population projections for the four areas. The ERUs within the expansion area was then estimated by dividing the population by the persons per household (2.37) from the U.S. Census Bureau (2014).

See **Appendix B** for the complete future expansion ERU allocation and calculation summary. **Table 2** summarizes the projected expansion ERUs from **Appendix B**.

Table 2: Expansion Area ERU Projections				
Expansion Area	2018	3-year (2020)	5-year (2022)	20-year (2037)
CR 209/West Expansion Area	-	16	17	1,560
North/Brown Expansion Area	-	-	-	2,860
Central Service Area	-	10	11	32
Southern Service Area	-	5	5	15
Subtotal	**0**	**31**	**33**	**4,467**

DEVELOPMENT DEMANDS

A third contributor to increased demands is planned developments. The City developed a list of residential and non-residential projections based on known project entitlements anticipated to start within the next twenty years. These demands were classified in two categories: 1) Villages and 2) non-Villages. Villages demands were classified as any water and wastewater demands that are associated with any Villages future developments. All other developments were categorized as non-Villages developments. A total of sixteen future non-Villages developments were identified within the City's service area. The City's service area was broken down into three future development sub-areas consisting of the North Service Area, Central Service Area, and the Villages Service Area.

The City provided the estimated number of anticipated units for each development category for the 3-year, 5-year, and 20-year timelines. The development entitlements were given in units of ERUs for single family and multi-family units, bed counts for the ALF/ILF, and square feet for commercial, industrial, and institutional facilities. ERUs were estimated by using the ERU factors from the City's Land Development Code. See **Appendix B** for the future development entitlement allocation matrix, narrative for the residential and non-residential unit projections, population projections, ERU projections, and the calculation summary. **Tables 3** through **5** summarize the projected ERUs to be served in the respective time frame from **Appendix B.**

NORTHERN SERVICE AREA DEVELOPMENTS

The Northern Service Area is defined as the City's service area north of CR 472 and consists of seven known future developments. The Northern Service Area developments are shown in **Figure 3.**

Table 3: ERU Projections – Future Developments in the Northern Service Area

	DEVELOPMENTS	2018	3-YEAR (2020)	5-YEAR (2022)	20-YEAR (2037)
NORTHERN SERVICE DEVELOPMENTS	Lakeside Landings	-	173	173	173
	Oxford Oaks Phase II	-	422	422	422
	Oxford Crossings	-	-	117	117
	Oxford Crossings Apartments	-	-	483	483
	Grand Oaks Manor	-	50	200	390
	Lake Andrews Preserve	-	-	203	203
	Brown Property	-	-	-	875
	Subtotal	**0**	**645**	**1,598**	**2,663**

CENTRAL SERVICE AREA DEVELOPMENTS

The Central Service Area is defined as the City's service area south of CR 472 and north of the Turnpike and includes the SR-44 corridor. The Central Service Area consists of ten known future developments. The Central Service Area developments are summarized in **Table 4** and shown in **Figure 4.**

Table 4: ERU Projections – Future Developments in the Central Service Area

	Developments	2018	3-year (2020)	5-year (2022)	20-year (2037)
CENTRAL SERVICE DEVELOPMENTS	O'Dell Planned Development	-	125	125	1,377
	Monarch Ranch	-	180	360	1,259
	Lee Capital (Pike 75)	-	70	140	500
	Panasoffkee Preserve	-	-	-	3,109
	Triumph South	-	-	-	130
	Pepper Tree Plaza	-	34	34	34
	Providence	-	85	85	85
	Turkey Run	-	-	295	295
	Trailwinds Village/Beaumont (Word Property)	-	225	450	450
	Sumter, LLC	-	-	-	2,835
	Subtotal	**0**	**719**	**1,489**	**10,074**

THE VILLAGES SERVICE AREA DEVELOPMENTS

The Villages Service Area is defined as the City's service territory south of SR-44 and east of US-301. The known Villages developments and their most recent ERU projections that lie within the City's utility service boundary are listed below in **Table 5**. The Villages service area is shown in **Figure 5.**

Table 5: ERU Projections – Villages Future Developments

Developments	2018	3-year (2020)	5-year (2022)	20-year (2037)
Village of Fenney	2,594	2,594	2,594	2,594
West Fenney	-	2,500	2,500	2,500
Village of Southern Oaks			786	3,561
River Birch Plaza	-	-	706	706
Subtotal	**2,594**	**5,094**	**6,586**	**9,361**

Per the agreement, the City will provide bulk wholesale potable water to South Sumter Utilities (SSU) to meet the demands of the Villages ARDs. SSU is an entity of the Villages and will provide the Villages with

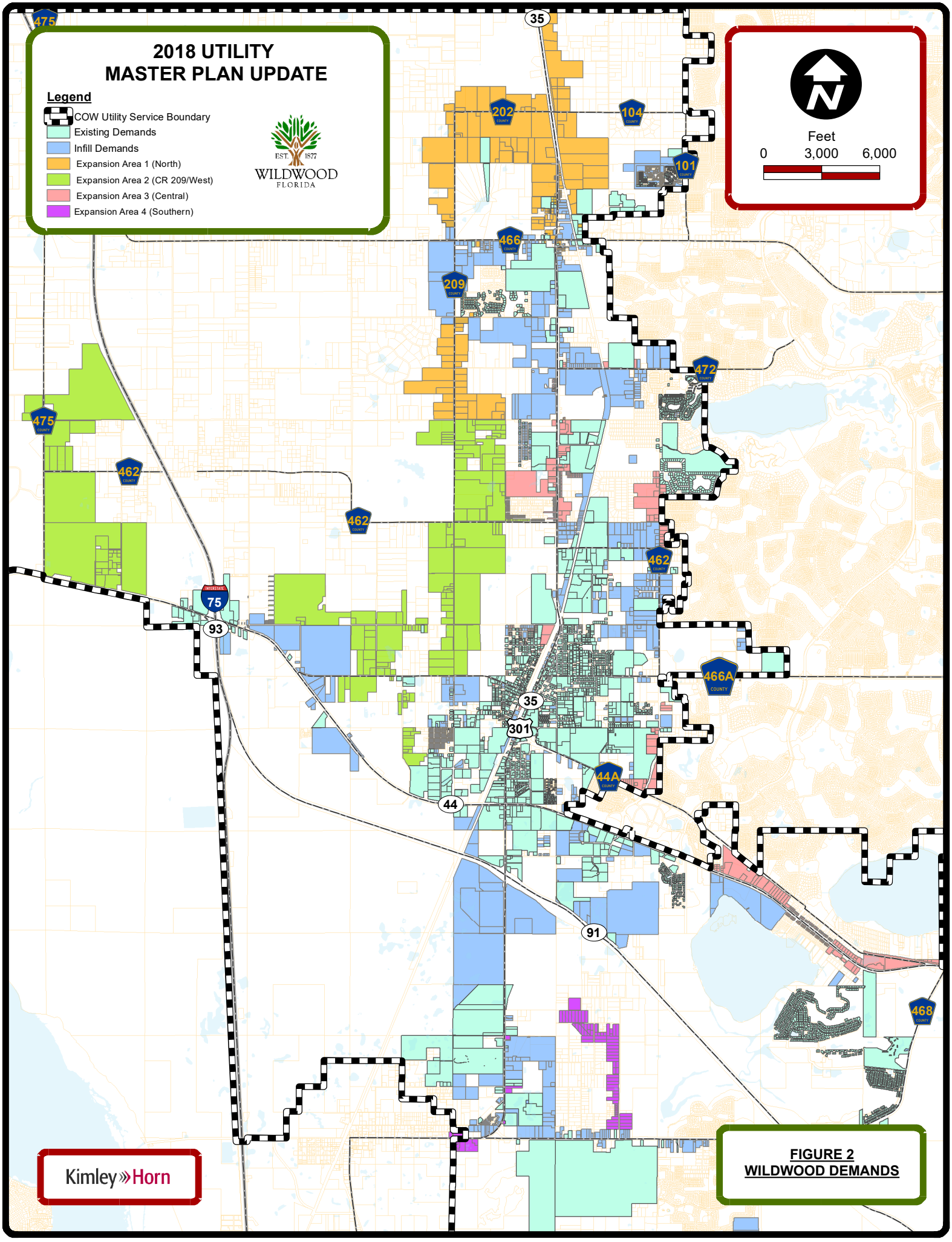
potable water. SSU will be permitted through FDEP and operate under a separate operating PWS permit. The two PWSs (City and SSU) will be permitted through FDEP to operate as a "consecutive systems". A "consecutive system" as defined by FDEP FAC 62-550.200 (23) is a *"public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connect or through the distribution system of one or more consecutive systems."* The Southern Oaks WTP, owned and operated by the City (PWS 6600331), will meter and distribute bulk wholesale potable water to SSU through one master meter. All water system infrastructure downstream of the City's bulk master meter will be maintained by SSU. A series of five additional metered connection points, closed under normal operations, will provide emergency water system connection points between the City's and SSU's potable water systems.

SUMMARY OF GROWTH PROJECTIONS

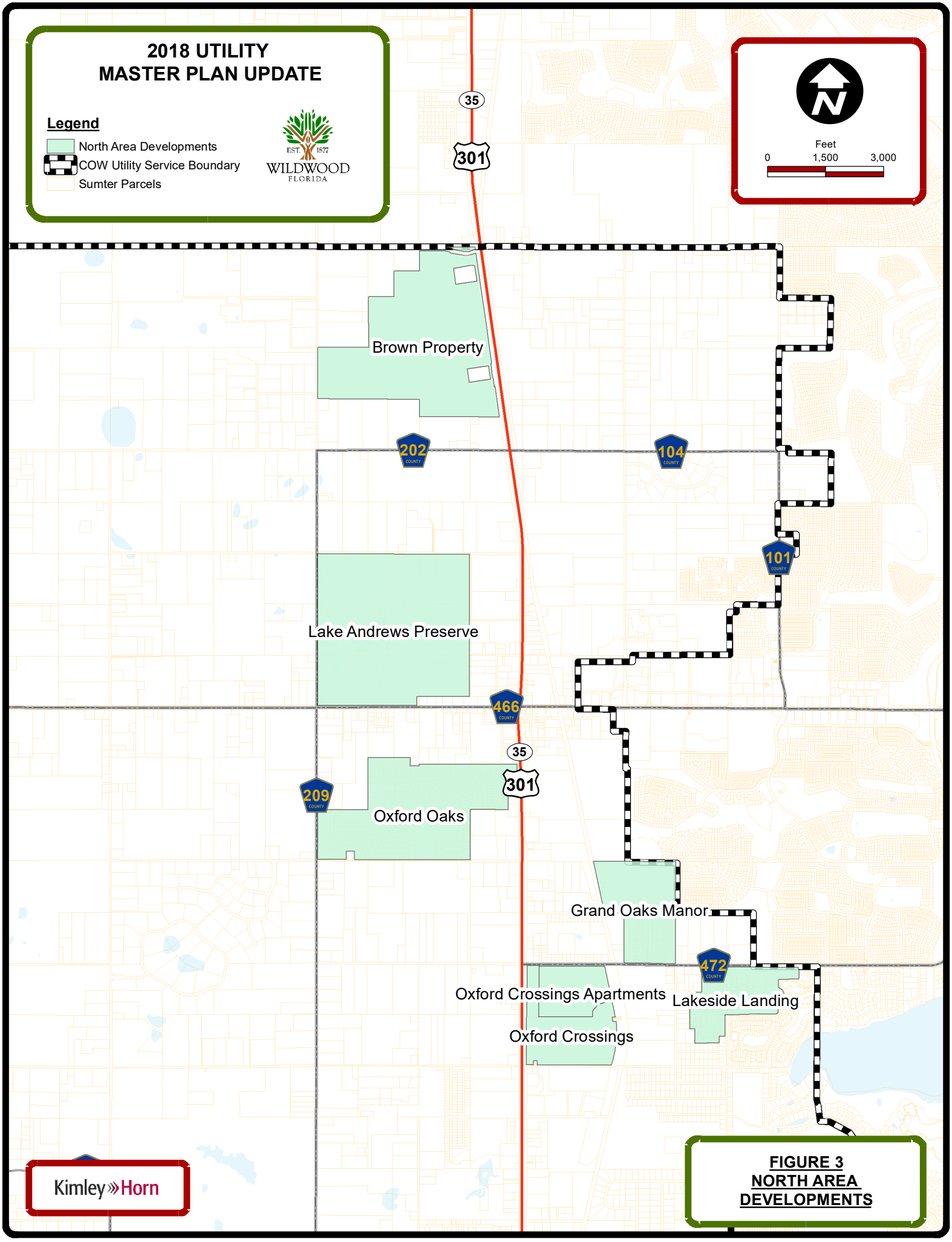
Table 6 below is a summary of the projected City utility system growth over the next 20 years. See **Appendix B** for the comprehensive future demand projections for the City.

Table 6: Summary of ERU Projections

Service Area	2018	3-year (2020)	5-year (2022)	20-year (2037)
Existing Service Area	4,225	4,301	4,365	4,431
FCC Coleman	2,197	2,500	2,500	2,500
Infill	-	179	200	569
Expansion	-	31	33	4,467
Developments	-	1,364	3,087	12,737
Villages Developments	2,594	6,594	-	-
Total	**9,016**	**14,969**	**10,185**	**24,704**



\\ocafp01\FL_OCA\OCA_Utilities\WildwoodProjects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\mxd\Figure 2 - Infill & Expansion Areas.mxd - 7/15/2019 10:11:55 AM - stacy.boney



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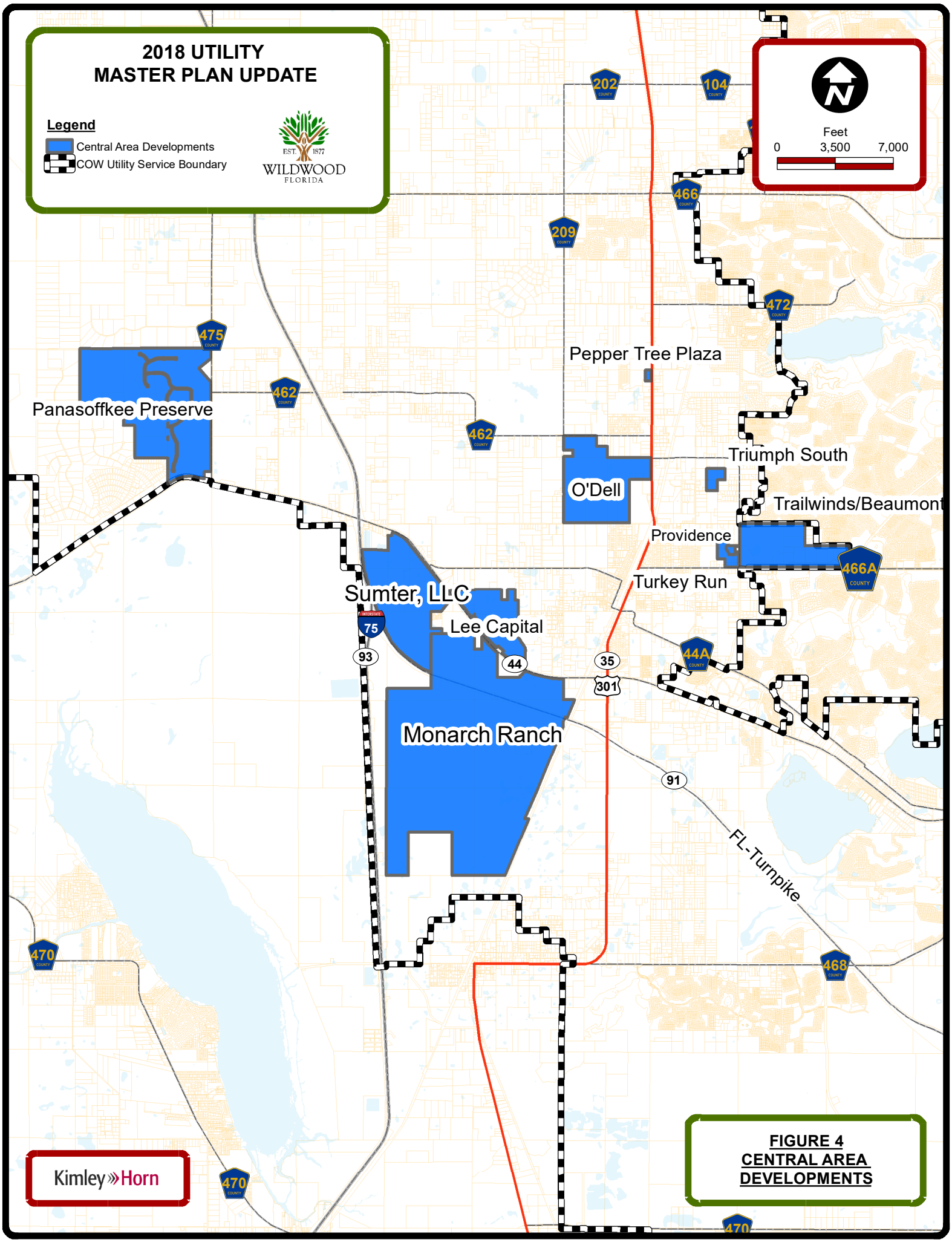

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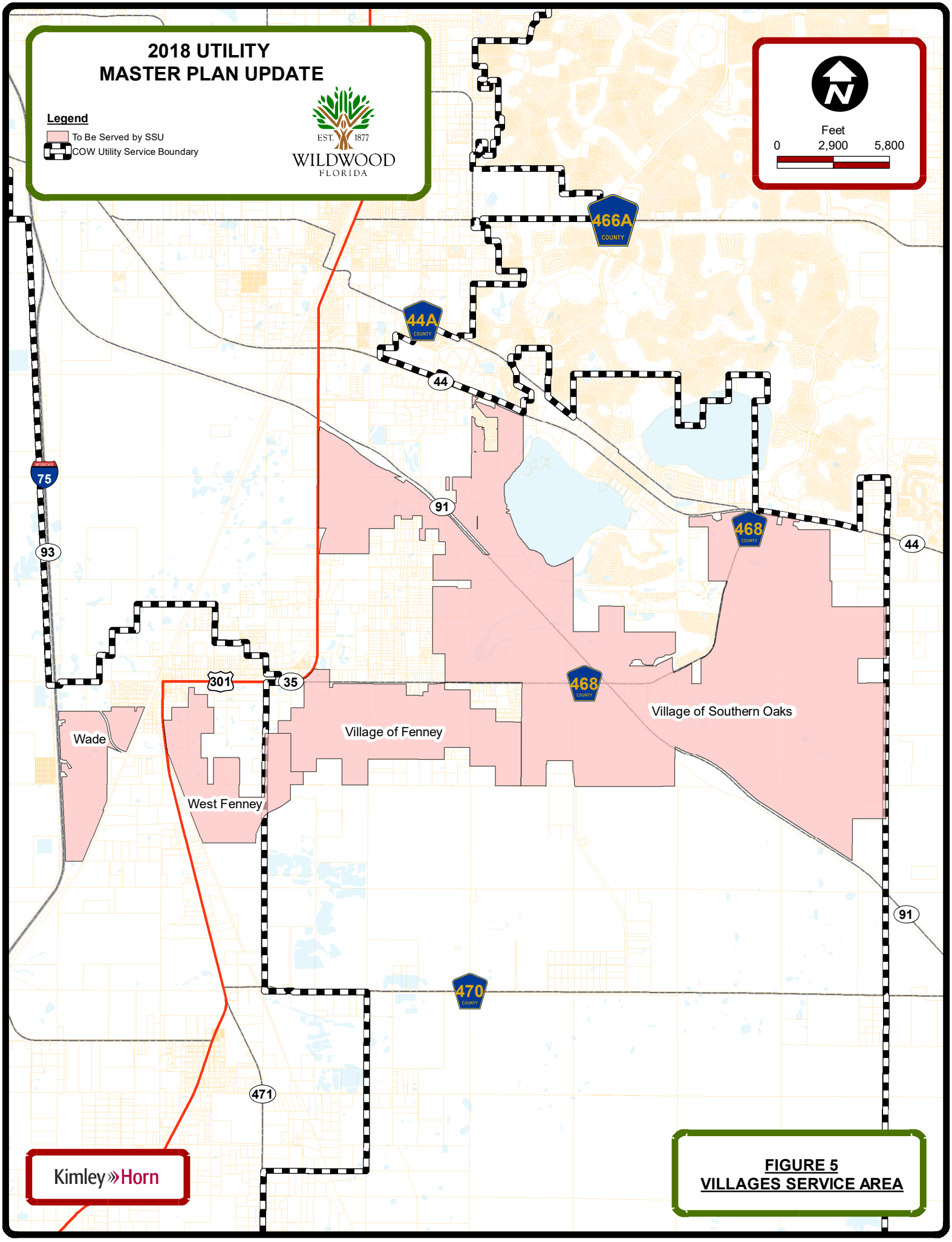

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EXISTING WATER SYSTEM

This section discusses the location, condition, and capacity of the existing potable water systems owned and operated by the City. Also included is a summary of the current permitting status and regulatory issues affecting the water systems, including treatment limitations and regulatory concerns.

WATER SUPPLY PERMITTING AGENCIES

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP)

The Florida Department of Environmental Protection is responsible for permitting the design and construction of new potable water supply systems that provide water to 25 or more people for at least 60 days each year or serves 15 or more service connections. Very small water systems that do not fit the above description are regulated by the Florida Department of Health and individual county health departments. The construction of water wells, both public and private, and the quantities of water that may be extracted, are regulated by the Water Management Districts.

After water treatment plants have been built, FDEP is responsible for enforcing compliance with drinking water standards. Most notably, the FDEP reviews routine reports submitted by the City and inspects the plants at regular intervals to generate a “Sanitary Survey Report”. All the components of the plant are inspected during the sanitary survey, including the well heads, disinfection systems, storage facilities, high service pumps, treatment components (i.e. - aeration equipment), and the records that are required on-site. Any deficiencies observed during the inspection are noted and included in the Sanitary Survey Report.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT (SWFWMD)

SWFWMD is responsible for permitting and monitoring the quantities of groundwater pumped to potable water supply systems. The City has two water use permits (WUP) issued by SWFWMD. All the City’s active wells and facilities are permitted under these two WUPs. None of the wells owned and operated by the City fall within the SWFWMD Water Use Caution Area (WUCA). Water Use Caution Areas are defined by SWFWMD as “a geographic region within the District which exhibits resource problems or is predicted to exhibit resource problems, and for which special regulations are enacted by the Governing Board.”

Table 7 below summarizes information regarding the City’s water use permit issued by SWFWMD.

Table 7: Water Use Permit

Permit Number	Permit Type	Issuing Agency	No. of Wells	Date of Issue	Date of Expiration	Annual Average Permitted Withdraw	Peak Month Permitted Withdraw
20008135.012	Individual Water Use Permit	SWFWMD	13	3/12/18	3/31/35	6,444,800	9,345,900
20020597.000	Individual Water Use Permit	SWFWMD	2	6/15/16	6/17/26	238,400	524,500

EXISTING WATER DISTRIBUTION SYSTEM

The City's water distribution system is identified by the FDEP as PWS-ID No. 6600331. According to the March 2018 monthly operating report (MOR), the total population served by the system is 21,188 with approximately 6,949 connections to the distribution system. The overall permitted design treatment capacity of the system is 5.082 MGD maximum day demand (MDD).

The existing distribution system covers a large area measuring approximately 7.0 miles wide (east to west) and 15 miles long (north to south). Due to anticipated future development, the distribution system will increase to approximately 9.5 miles wide (east to west) and 17.5 miles long (north to south). The existing system consists of three separate pressure zones: South, North, and the Continental Country Club (CCC). The North and South system are separated by an isolation valve located at the CR 214 Pump Station. The CR-214 Pump Station maintains system pressure and supplies the North service area with potable water. The City and the CCC distribution system are separated by a pressure reducing/pressure sustaining valve that allows the CCC system to operate at a lower system pressure than the City's system. The pressure reducing/pressure sustaining valve reduces also allows for flow reversal back to the City during times of high demand.

Table 8 is a summary of the existing distribution system's pipe sizes (diameter) and lengths. The pipe materials include PVC, galvanized, asbestos-cement, and ductile iron pipe.

Table 8: Existing Pipe Lengths

Pipe Size (diameter)	Total Length of Pipe (feet)
16 – inch	5,322
12 –inch	165,320
5 – inch	44,200
8 – inch	308,409
8 – inch (dry)	6,200
6 – inch	127,618
4 – inch	9,200
2 - inch	60,500

EXISTING WATER TREATMENT AND STORAGE FACILITIES

This section contains a detailed discussion of the City's existing water treatment plants. The discussion includes a capacity analysis of each plant as well as a capacity analysis of the individual plant component systems (wells, storage systems, disinfection systems, and high service pumps).

The City's water system currently operates with six water treatment plants and one re-pump station. However, the Oxford WTP and the Southern Oaks WTP are under construction and scheduled to be operational by the winter of 2019. The Oxford WTP is located at the intersection of US 301 and C466-W and will have an initial permitted capacity of 2.35 MGD MDD with the ability to expand to 6.74 MGD MDD. The Southern Oaks WTP is located at the southwest corner of C468 and the Florida Turnpike. The Southern Oaks WTP will have a permitted capacity of 4.05 MGD MDD.

The permitted capacity of the City PWS was rerated in March 2018. To rerate the hydraulic capacity of the entire system, the individual plant capacities were calculated using the rules established by the FDEP FAC Section 62-555. The rerated permitted capacity of the entire system is 5.083 MGD MDD. See **Appendix C** for the updated capacity analysis and FDEP rerating summary.

The City's water treatment plants and pump station are discussed in the following sections.

CR-501 (COLEMAN) WTP

The CR 501 WTP is located along CR 501 a half mile north of C-470 near the FCC Coleman. According to the MOR data from Jan 2017 to May 2018, the plant produced an average of 1.08 MGD for the system. The maximum daily production during this time is 1.89 MGD. The current FDEP permitted MDD capacity is 2.16 MGD MDD. Improvements to the CR 501 WTP are currently in construction and are scheduled to be complete by November 2018. After completion of the improvements, the capacity of the CR 501 WTP will increase to 2.66 MGD MDD.

The raw water source for the CR 501 WTP is ground water from the upper Floridan aquifer (UFA). Ground water is currently pumped into the plant using two ground water wells. The current improvements in construction include a new UFA well and two new well pumps. The existing SE-2 well will serve as a stand-by well.

See **Table 9** for a summary of the wells and well pumps after the improvements are completed.

Table 9: CR 501 WTP Wells after Improvements

Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Pump Type	Pump Horse-power	Pump Capacity (gpm)	Pump Capacity (gpd)
SE 1	12	360	128	Vertical Turbine	50	1,100	1,584,000
SE 2 (Standby)	12	360	176	Vertical Turbine	25	600	864,000
SE 3	12	250	53	Vertical Turbine	50	1,100	1,584,000

The raw ground water is treated by a cascading tray aeration system for hydrogen sulfide removal and disinfection using liquid chlorination. This plant is equipped with two aerators (one mounted on each of the ground storage tanks) with a combined treatment capacity of 4,900 gpm (7.05 MGD). The treatment capacity of the first unit is 3,000 gpm. The second aerator has a treatment capacity of 1,900 gpm.

Finished water storage is provided by two on-site concrete ground storage tanks. The first storage tank is a 500,000-gallon circular concrete tank equipped with a cascading tray aeration system. The second tank is a 1,000,000-gallon circular tank equipped with a cascading tray aeration system.

Disinfection is provided by flow proportional sodium hypochlorite injection. Storage of the liquid chlorine is provided on-site. A stand-alone chlorine storage/dosing room pre-chlorinates the water before it enters the high service pump room. In addition to chlorine, polyphosphate is injected into the water system for iron sequestration and corrosion control within the distribution system.

High service pumps provide final delivery of water into the distribution. The plant is equipped with three high service pumps plus a jockey pump. See **Table 10** for a summary of the pump capacities.

Table 10: 501 WTP Pump Capacities			
Pump Number	Pump Type	Horsepower	Capacity (gpm)
HSP 1	Horizontal Split Case	60	1,050
HSP 2	Horizontal Split Case	60	1,050
HSP 3	Horizontal Split Case	60	1,500
Jockey	Horizontal Split Case	20	400

Using the data above, a capacity evaluation of the CR 501 WTP was performed to rerate the capacity of the City PWS. The evaluation is shown in **Appendix C**. As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). The calculated firm capacity of this plant is 1.55 MGD. The current limiting component of this plant is the well pumping capability. Once the current improvements are complete, the high service pumping capacity will be the limiting capability of the plant.

HUEY STREET WTP

The Huey Street WTP is located at 801 Huey Street, Wildwood. According to the MOR's from Jan 2017 - May 2018 the plant produces an average of 0.38 MGD. The maximum daily production during this time is 0.645 MGD. The FDEP permitted MDD capacity is 0.720 MGD MDD.

The raw water source for the Huey Street WTP is ground water from the UFA. Ground water is pumped into the plant using a single ground water well. See **Table 11** for a summary of the well and well pump capacity. No redundant pumping system is provided at this site.

Table 11: Huey WTP Well							
Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Pump Type	Pump Horse-power	Pump Capacity (gpm)	Pump Capacity (gpd)
11	12	202	168	Vertical Turbine	40	500	720,000

The quality of the ground water at the Huey Street WTP is such that no treatment, other than disinfection, is required. Disinfection for this plant is provided by flow proportional sodium hypochlorite liquid injection. On-site chemical storage consists of a 500-gallon storage tank. In addition to chlorine, polyphosphate is injected into water system for iron sequestration and corrosion control within the distribution system.

The on-site storage for this plant is provided by a 500,000-gallon elevated storage tank (EST). It contains fully treated water and floats on the distribution system to help maintain pressure and support local fire flows.

A capacity evaluation of Huey WTP was performed using the data above. The evaluation was conducted with Huey WTP as a stand-alone facility. The evaluation is shown in **Appendix C**. As required by FAC 62-

555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). With this assumption, the Huey WTP has an individually rated capacity of 0.0 MGD. However, FDEP allows plants that provide onsite elevated storage and provide adequate max day demand plus fire flow storage to be rated based on the full capacity of the well pump. Therefore, the rated capacity of the Huey WTP is 720,000 gpd. With only one source for raw water for the plant, the limiting capacity factor for this plant is the well production.

FAIRWAYS WTP

The Fairways WTP is located at 5124 CR 125B-1, Wildwood. According to MOR's from January 2017-May 2018, the plant produces an average of 0.37 MGD. The maximum daily production during this time is 0.861 MGD. The FDEP permitted MDD capacity is 0.504 MGD.

The plant is equipped with one ground water well that pumps raw groundwater from the UFA into a 5,000-gallon hydropneumatic tank. See **Table 12** for a summary of the well and well pump.

Table 12: Fairways WTP Well

Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Pump Type	Pump Horse-power	Pump Capacity (gpm)
FW 1	5	160	70	Vertical Turbine	50	700

On-site storage for this plant is provided by a 5,000-gallon hydropneumatic tank. Disinfection for this plant is provided by a flow proportional sodium hypochlorite liquid injection.

A capacity evaluation of Fairways WTP was performed using the data above. The evaluation was conducted with Fairways WTP as a stand-alone facility. The evaluation is shown in **Appendix C**. As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). With this assumption, the Fairways WTP has a rated capacity of 0.0 MGD. However, FDEP allows plants with hydropneumatic tanks to be rated for half of their well pumping capacity and the entire system (PWS) to be rated with only one of the largest pumps on the entire system out of service. Therefore, the rated capacity of the Fairways WTP is 504,000 gpd. With only one source for raw water for the plant, the limiting capacity factor for this plant is well production.

ASHLEY WTP

The Ashley WTP is located near the northwest corner of the intersection of SR 44 and CR 231. The current FDEP permitted capacity is 0.360 MGD MDD.

The plant is equipped with one ground water well that pumps raw groundwater from the UFA into two 5,000-gallon hydropneumatic tanks. See **Table 13** for a summary of the well and well pump.

Table 13: Ashley WTP Well

Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Pump Type	Pump Horse-power	Pump Capacity (gpm)
Ashley 1	5	133	114	Vertical Turbine	40	500

On-site storage for this plant is provided by two 5,000-gallon hydropneumatic tanks. Disinfection for this plant is provided by a flow proportional sodium hypochlorite liquid injection.

A capacity evaluation of the Ashley WTP was performed using the data above. The evaluation was conducted with Ashley WTP as a stand-alone facility. The evaluation is shown in **Appendix C**. As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). With this assumption, the Ashley WTP has a rated capacity of 0.0 MGD. However, FDEP allows plants with hydropneumatic tanks to be rated for half of their well pumping capacity and the entire system (PWS) to be rated with only one of the largest pumps on the entire system out of service. Therefore, the rated capacity of the Ashley WTP is 360,000 gpd. With only one source for raw water for the plant, the limiting capacity factor for this plant is the well production.

CCC WTP NO. 1

Continental Country Club WTP No. 1 is located at the intersection of Timber Way and South Timber Trail in CCC. According to the MORs from Jan 2017 - May 2018, the plant produced an average daily flow of 67,147 gpd. The maximum daily production during this time is 138,000 gpd. The FDEP permitted MDD capacity is 0.835 MGD.

The plant is directly connected to the water distribution system and has one ground water well that pumps from the UFA. See **Table 14** for a summary of the well and well pump.

Table 14: CCC WTP No. 1 Well No. 1 (AAC3478)

Well Number	Dia. (in.)	Total Depth (ft.)	Pump Type	Pump Horse-power	Pump Capacity (gpm)
CCC No.1	8	500	Vertical Turbine	25	750

Disinfection for this plant is provided by a flow proportional sodium hypochlorite liquid injection. On-site storage for this plant is provided by a 100,000-gallon elevated storage tank (EST). The EST is hydraulically connected to the distribution system and the volume of water in the tank tends to maintain system pressures at a uniform level (i.e. the elevated storage tank “floats” on the system).

A capacity evaluation of the CCC WTP No.1 was performed using the data above. The evaluation was conducted with CCC WTP 1 as a stand-alone facility. The evaluation is shown in **Appendix C**. As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). With this assumption, the CCC No.1 WTP has a rated capacity of 0.00 MGD. However, FDEP allows plants that provide onsite elevated storage and provide adequate max day demand plus fire flow storage to be rated based on the full capacity of the well pump. Therefore, the permitted capacity of the CCC WTP No.1 is 0.835 MGD. With only one source for raw water for the plant, the limiting capacity factor for this plant is the well production.

CCC WTP NO. 2

Continental Country Club WTP No. 2 is located on Grove Trail between Hester Trail and West Quail Run. According to the MORs from Jan 2017- May 2018, the plant produced an average of 60,873 gpd. The maximum daily production during this time is 71,000 gpd. The FDEP permitted MDD capacity is 0.504 MGD.

The plant is equipped with one hydropneumatic tank and one ground water well that pumps from the UFA. See **Table 15** for a summary of the well and well pump.

Table 15: CCC WTP No. 2 Well No. 6						
Well Number	Dia. (in.)	Total Depth (ft.)	Well Yield (gpm)	Pump Type	Pump Horse-power	Pump Capacity (gpm)
CCC No.2	8	500	750	Vertical Turbine	30	750

On-site storage for this plant is provided by one 15,000-gallon hydropneumatic tank. Disinfection for this plant will be provided by a flow proportional sodium hypochlorite liquid injection.

A capacity evaluation of the CCC WTP No.1 was performed using the data above. The evaluation was conducted with CCC WTP 2 as a stand-alone facility. The evaluation is shown in **Appendix C**. As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the well pumps is out of service (firm capacity). With this assumption, the CCC WTP No. 2 has a rated capacity of 0.00 MGD. However, FDEP allows plants with hydropneumatic tanks to be rated for half of their well pumping capacity and the entire system (PWS) to be rated with only one of the largest pumps on the entire system out of service. Therefore, the rated capacity of the CCC WTP No. 2 is 360,000 gpd. With only one source for raw water for the plant, the limiting capacity factor for this plant is the well production.

CR-214 RE-PUMP STATION

The CR 214 re-pump station consists of a ground storage tank and high service pumps. All water that enters this re-pump facility comes from a 12-inch water main from the City's water system. The on-site storage for this plant is provided by a 500,000-gallon concrete ground storage tank. The ground storage tank is equipped with a top mounted cascade tray aerator. **Table 16** shows a summary of the pumps for the CR-214 re-pump station.

Table 16: CR 214 Re-Pump Station Pump Capacities			
Pump Number	Pump Type	Horsepower	Capacity (gpm)
HSP 1	Horizontal Split Case	40	750
HSP 2	Horizontal Split Case	60	1,500
HSP 3	Horizontal Split Case	60	1,500

The CR-214 station was designed to increase the system pressure in the northern section of the City's distribution system. An isolation valve is located at the CR 214 station to create two separate pressure zones (North and South) within the City's system. The six existing WTPs provide water supply and system pressure for the southern system. The isolation valve is equipped with a motor operator that will open the valve if system pressure falls below the set point in the south pressure zone and will allow the CR 214 station to pump water back to the south. Once the Oxford WTP is complete, the isolation valve will remain open to allow the Oxford WTP to supply water to the north and south systems.

OXFORD WTP

The Oxford WTP is located near the Southwest corner of the intersection of US 301 and C466-West. The water treatment plant will have a FDEP permitted capacity of 2.35 MGD MDD with the designed expansion capacity of 6.74 MGD MDD.

The raw water source for the Oxford WTP is ground water from the Lower Floridan Aquifer (LFA). Ground water will be pumped into the plant using two vertical turbine ground water well pumps. See **Table 17** for a summary for the wells and future well pumps.

Table 17: Oxford WTP Wells

Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Well Yield (gpm)	Pump Type	Pump Horse-power	Pump Capacity (gpm)	Pump Capacity (gpd)
NW-51	16	1,50	600	2,600	Vertical Turbine	125	2,600	3,744,000
NW-52	16	1,50	600	2,600	Vertical Turbine	125	2,600	3,744,000

Treatment of the raw ground water for total sulfides is provided by pH adjustment, two 1,650 gpm packed tower aeration systems, two odor control systems, one finished water transfer tank, and two 1,650 gpm vertical turbine transfer pumps. The treated water will be temporarily stored in a transfer tank where it will then be pumped to the GST. The odors released through the aeration process will be treated by the odor control system. The odor control system utilizes a biotrickling filter system to remove high levels of hydrogen sulfide (H2S) gas.

Disinfection is provided by flow proportional sodium hypochlorite injection. Storage of the liquid chlorine is provided on-site. A stand-alone chlorine storage/dosing room pre-chlorinates the water in the finished water transfer tank. A summary of the transfer pumps and their capacity can be found in **Table 18**. The finished water is then pumped from the transfer tank to a 1.00 MG concrete GST using two vertical turbine pumps.

Table 18: Oxford WTP Transfer Pumps

Pump Number	Pump Type	Horsepower	Capacity (gpm)
Transfer 1	Vertical	25	1,650
Transfer 2	Vertical	25	1,650
Transfer 3 (Future)	Vertical	25	1,650

High service pumps provide final delivery of water into the distribution. The plant is equipped with three high service pumps plus a jockey pump. See **Table 19** below for a summary of the pump capacities.

Table 19: Oxford WTP HSP Pump Capacities			
Pump Number	Pump Type	Horsepower	Capacity (gpm)
HSP 1	Horizontal Split Case	50	1,650
HSP 2	Horizontal Split Case	50	1,650
HSP 3	Horizontal Split Case	50	1,650
Jockey	Horizontal Split Case	40	500
Jockey	Horizontal Split Case	40	500

Using the data above, a capacity evaluation of the Oxford WTP was performed to rerate the capacity of the City PWS. The FDEP designated rating is shown in **Appendix C**.

As required by FAC 62-555.320 (15)(c), the capacity evaluation must be performed with the assumption that one of the pumps is out of service (firm capacity). The calculated firm capacity of this plant is 2.35 MGD MDD. The current limiting component of this plant is the high service pumping capability.

SOUTHERN OAKS WTP

The Southern Oaks WTP is located at the southeast corner of C468 and the Florida Turnpike. The future water treatment plant will have a FDEP permitted capacity of 4.05 MGD MDD. The Southern Oaks WTP will be owned and operated by the City (PWS No.6600331) and will distribute wholesale water to SSU (PWS No.3600008). The City PWS and SSU PWS will operate as consecutive water systems through a bulk water meter connection located at the perimeter of the Southern Oaks WTP. The two systems will also be interconnected at five other locations with a master meter at each location to meter flow between the City and SSU. During normal operations, these five interconnection points will be closed and serve as emergency interconnection points for both the City and SSU. The Southern Oaks WTP will not supply the City PWS with any water under normal operating conditions.

The raw water source for the Southern Oaks WTP is ground water from the LFA. Ground water will be pumped into the plant using two vertical turbine ground water well pumps. See **Table 20** for a summary for the wells and future well pumps.

Table 20: Southern Oaks WTP Wells								
Well Number	Dia. (in.)	Total Depth (ft.)	Casing Depth (ft.)	Well Yield (gpm)	Pump Type	Pump Horse-power	Pump Capacity (gpm)	Pump Capacity (gpd)
NW-51	16	1,100	599	2,000	Vertical Turbine	50	2,000	2,880,000
NW-52	16	990	592	2,000	Vertical Turbine	50	2,000	2,880,000

Treatment of the raw ground water for total sulfides is provided by pH adjustment, one 4,000 gpm packed tower aeration system, an odor control system, one finished water transfer tank, and two 2,250 gpm vertical turbine transfer pumps. The treated water will be temporarily stored in a transfer tank where it will then be pumped to the GST. The odors released through the aeration process will be treated by the odor control

system. The odor control system utilizes a biotrickling filter system to remove high levels of hydrogen sulfide (H2S) gas.

Disinfection is provided by flow proportional sodium hypochlorite injection. Storage of the liquid chlorine is provided on-site. A stand-alone chlorine storage/dosing room pre-chlorinates the water in the finished water transfer tank. A summary of the transfer pumps and their capacity can be found in **Table 21**. The finished water is then pumped from the transfer tank by two vertical turbine pumps to a 1.00 MG concrete GST.

Table 21: Southern Oaks WTP Transfer Pumps

Pump Number	Pump Type	Horsepower	Capacity (gpm)
Transfer 1	Vertical Turbine	25	2,250
Transfer 2	Vertical Turbine	25	2,250

High service pumps provide final delivery of water into the distribution. The plant is equipped with three high service pumps plus a jockey pump. See **Table 22** below for a summary of the pump capacities.

Table 22: Southern Oaks WTP HSP Pump Capacities

Pump Number	Pump Type	Horsepower	Capacity (gpm)
HSP 1	Vertical Turbine	150	2,000
HSP 2	Vertical Turbine	150	2,000
HSP 3	Vertical Turbine	150	2,000
HSP 4	Vertical Turbine	150	2,000

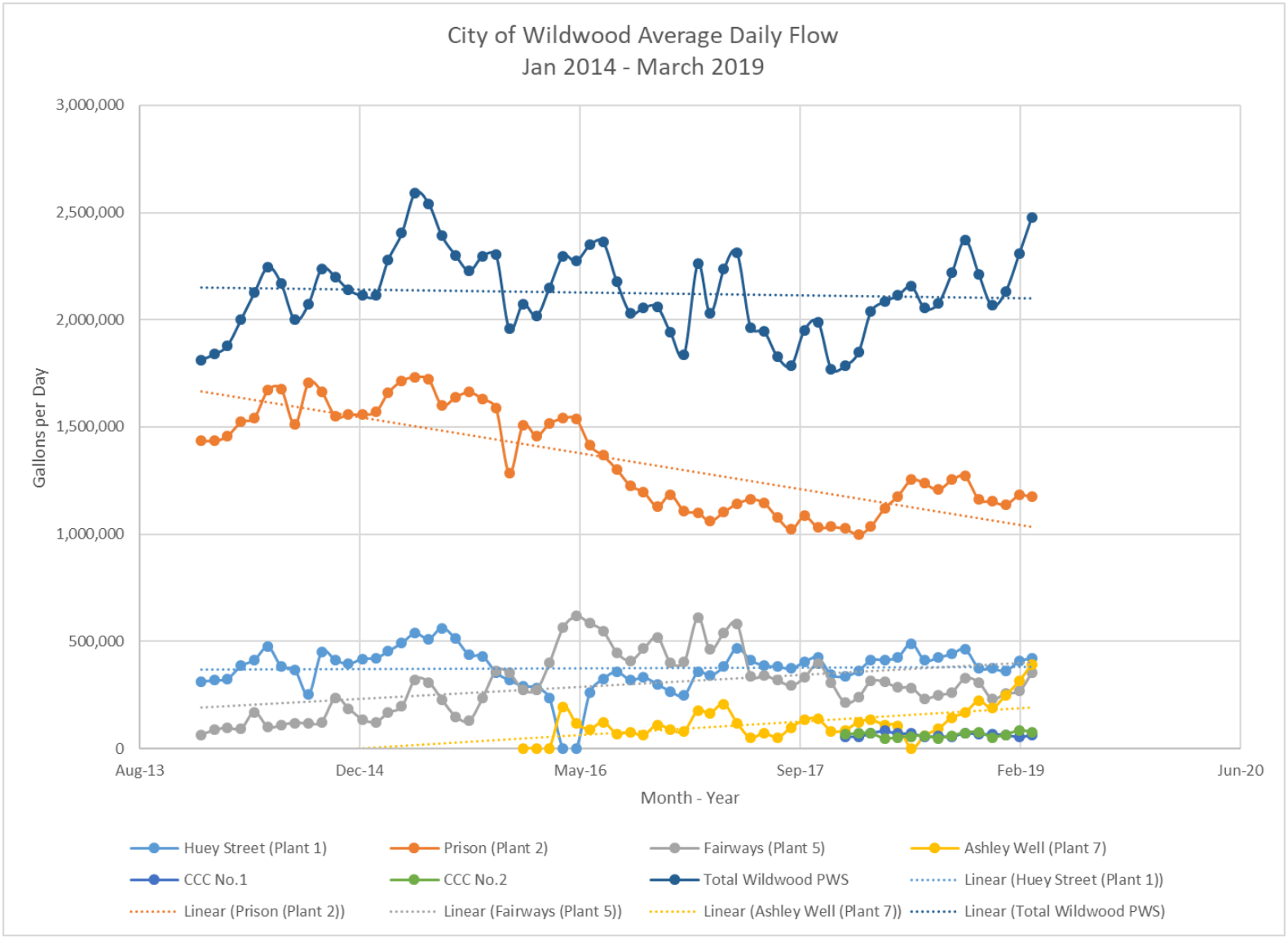
FLOW DATA

The water demands for each of the existing water treatment plants were determined from the MOR data submitted to the FDEP from June 2017 to May 2018. See **Table 23** below and **Graph 1** on the following page for a summary of the City's average daily flow and maximum daily flow.

Table 23: Existing Potable Water Flows

WTP	Base Flows (gpd)		Permitted Flows (gpd)	Percentage of Permitted Capacity	Percent of Average System Flow
	Average	Maximum	Maximum		
Huey Street	378,368	645,000	720,000	89.58%	18.24%
CR-501	1,084,904	1,892,000	2,160,000	87.59%	52.30%
Fairways	369,995	861,000	504,000	170.83%	17.84%
Ashley Well	112,994	545,000	360,000	151.39%	5.45%
CCC No.1	67,147	138,000	835,230	16.52%	3.24%
CCC No.2	60,873	132,000	504,000	26.19%	2.93%
Total	**2,074,282**	**2,664,000**	**5,083,230**	**52.41%**	**-**

Graph 1: City of Wildwood Average Flow



WATER SYSTEM ANALYSIS AND METHODOLOGY

This section provides an overview of the methodologies that were used in developing the hydraulic model. An analysis of the distribution system was performed to assess the improvements that will be needed during the existing, 3-year, 5-year, and 20-year planning timelines. Analyzing the system over time allows improvements to be prioritized and will help the City utilize funds for capital improvements in the most efficient manner possible.

HYDRAULIC MODEL DEVELOPMENT

The software used for the model development was Bentley WaterCAD V8i (SELECTseries 1). WaterCAD is a computer-based program that, with user input, calculates a wide variety of system parameters. The most useful output from the calculations is the pressure and available fire flow results. These results assist designers in identifying locations in the system where the pressures or available fire flows are below minimum acceptable values. The model can be used to assess the existing system and how the system will respond to future increases in demand. It also allows the designer to modify or add/remove system components and establish how the water system responds to these changes. This feature is very useful for identifying capital improvement projects that will help the system's hydraulic performance.

The model operates primarily based on user input. All the elements of the existing system (i.e. pipes, valves, junctions, water treatment plants, demands, etc.) must be input into the model. The water treatment plants provide the water sources for the model and the piping network distributes the water throughout the system to meet the demands. Calibration of the model is accomplished using fire hydrant flows and pressure information gathered in the field. The fire flow demands are input into the model and the corresponding pressures are checked to ensure that the model is reasonably predicting what was observed in the field. During the calibration process, elements within the model (i.e. pipe frictional coefficients) may be adjusted to tune the model against field observations.

To develop the model, the following steps were taken:

1. The existing pipe network layout for each of the public water supply systems was determined using previously developed GIS mapping.
2. The existing demand distribution was determined in the following manner:
    - The City provided approximately one year of billing information.
    - The existing billing data provided the demands per active water service. To avoid over complicating the model, groups of individual demands within the vicinity of a junction node were assigned to that junction.
3. The operating pressures were obtained from City Utility Staff and actual plant data and are shown in **Table 24** were used in the model.

Table 24: Existing System Operating Pressures			
WTP/EST	Operating Pressures		Model Pressure/HGL
	On/High	Off/Low	
CR-501*	57 psi	62 psi	57 psi
Huey Street	56.4 psi	56.6 psi	56.4 psi
Huey EST	57 psi	54	56.3/208 ft.
Fairways	56 psi	70 psi	57 psi
Ashley WTP	65 psi	70 psi	68 psi
CR-214 Re-Pump Station*	57 psi	57 psi	57 psi
CCC No.1 WTP	38 psi	45 psi	45 psi
CCC No.2 WTP	40 psi	60 psi	45 psi
CCC EST	45 psi	38 psi	45 psi/176 ft.
Oxford WTP*	60.6 psi	N/A	60.6 psi
Southern Oaks WTP*	53 psi	N/A	53 psi

**HSP operate on a VFD to maintain an operator preset pressure*

HYDRAULIC MODEL CALIBRATION

Before proposed improvements could be evaluated for the system, the hydraulic model had to be calibrated to ensure that it accurately reflected the conditions of the system in the field. The following steps were taken to calibrate the model:

DATA COLLECTION

- City staff along with Kimley-Horn staff conducted fire hydrant flow/pressure tests at 12 locations throughout the City on March 12, 2017. Kimley-Horn staff recorded the pressures and flow readings for each of the tests. Each test used two hydrants (one pressure hydrant, one flow hydrant). Three readings were recorded for each pair of hydrants. First, the flow hydrant was completely closed and a static pressure reading was taken at the pressure hydrant. Second, the flow hydrant was opened partially. A flow reading and the residual pressure measurement were recorded for the partial flow condition. Finally, the flow hydrant was opened fully and the corresponding flow rate and residual pressure was recorded.
- Following the completion of the fire hydrant tests, the City provided Kimley-Horn with pressure and flow data in Excel format from each of the water treatment plants and pump stations from the day of testing. This data was used to analyze how the plants reacted to the fire flow testing. This analysis allowed for a more reliable and accurate model.

MODEL CALIBRATION

- The fire hydrant flow data were input into the model and simulated one at a time. The corresponding pressures were checked at the corresponding pressure hydrants to ensure that the model is reasonably predicting what was observed in the field. During the calibration process, elements within the model (i.e. demands, operating pressure, C value) may be adjusted to tune the model

against field observations. For the City's model, a C value of 130 was used for all piping infrastructure. All water treatment plants and elevated storage tanks (ESTs) were set to the operating pressures that were recorded in the data provided by the City. For each separate hydrant test that was run in the model, a separate demand set was created based on the recorded flow from the plants to accurately reflect the demand on the City's system during each specific hydrant test. A model is generally considered calibrated when it can simulate a pressure drop and flow within 15% of those measured in the field.

WATER DEMAND PROJECTIONS

The population projections described in the "Population Growth Projections" section served as the basis for projecting future water demands. The future demands were estimated based on one of the methodologies described below. The resulting demand projections are presented in **Appendix B**.

- **Parcels with existing water usage –** For parcels with existing water usage, the demands were determined by the water billing data that was provided by the City. The calculated average day demand from the billing data was then multiplied by the projected growth rates as determined by SWFWMD population projections for 2020, 2022, and 2037 to estimate the future demands.
- **Parcels without existing water usage –** First, equivalent residential unit (ERU) determinations were made for each parcel using one of the methodologies described below. Then, the ERU estimate for each parcel was multiplied by the City's water level of service standard of 300 gpd/ERU to determine the resulting water demand.
  - **Parcels with a future land use designation in the 2037 Comprehensive Plan -** ERU values were assigned to a parcel based on the appropriate residential density or a maximum FAR that corresponds to the future land use shown in the 2037 Comprehensive Plan. For residential land uses with a density range (i.e. 3-6 units per acre), the maximum density was used for the demand calculations. Demands were calculated from the FAR by assigning an appropriate demand per allowable unit area of development.
  - **Parcels without a future land use designation in the 2037 Comprehensive Plan -** The SWFWMD parcel level population projections were divided by 2.37 residents per ERU then multiplied by the City's 300 gpd/ERU to determine the future demands.
  - **New large-scale developments -** The City provided a list of known developments with a buildout timeline. The projected development ERUs were then multiplied by 300 gpd/ERU to determine the development's demands based on the given development schedule provided by the City.

PEAKING FACTORS

The demands calculated above represent ADF conditions. For the modeling analysis MDD and PHF conditions needed to be approximated. It is common practice to approximate the MDD and PHF conditions by multiplying the ADF demands by a factor. The FDEP estimates these factors as 2.25 for the ADF to MDD conversion and 2.0 for the MDD to PHF conversion when historical data is not available. The FDEP allows alternative factors to be used provided sufficient historical information is available to accurately determine more appropriate factors. These factors have a significant impact on the modeling results and on the sizing of future components. For the purposes of this analysis and report, a review of the historic MOR data was used to approximate the ADF to MDD factor. Kimley-Horn reviewed MOR data for 2015 thru 2018 (4 years) to compare historic MDD flows to ADF flows. The calculated historical ADF to MDD ratio was 1.44. For the purposes of the hydraulic analysis, the MDD peak factor was rounded to 1.50. The FDEP MDD to PHF factor used in the model was 2.0. The resulting PHF used in the model was 3.0.

MDD Peaking Factor (ADD:MDD) = 1.50

PHF Peaking Factor (ADD:PHF) = 3.00

SYSTEM HYDRAULIC STANDARDS

Before identifying system deficiencies, system hydraulic standards needed to be established. The following hydraulic standards were used to evaluate the hydraulic model for deficiencies:

- Minimum System Pressure with Max Day plus Fire Flow Demand: 20 psi
- Minimum System Pressure with Peak Hour Demand: 35 psi
- Maximum System Pressure: 80 psi
- Typical Network Operating Pressure Range: 45-70 psi
- Fire Flow Demand: 1,000 gpm (minimum)

METHODOLOGY

One of the primary objectives of this report is to identify the water treatment plant and distribution system improvements needed to meet future potable water demands. To ensure future distribution system and water treatment improvements are made with the future system in mind, the analysis first establishes the 20-year (2037) demands. Then, the hydraulic model was used to identify the distribution and treatment improvements required to meet the 20-year (2037) demands. After establishing the required improvement sizes (i.e. water mains and plants), the immediate and intermediate demands for the 3-year (2020) and 5-year (2022) scenarios were modeled. The required system improvements for each time step were then identified using the hydraulic model while taking future needs into account.

The approach for modeling the system was to consider as many reasonable system configurations as possible for the 20-year (2037) demand scenario and evaluate the required improvements. This evaluation included the plant capacities and distribution line sizes. The minimum system pressures and available fire flows for each scenario were compared to the hydraulic standards presented above to determine adequacy of the system components and sizes. Once the optimal 20-year (2037) system configuration was decided, the model was then loaded with the 3-year and 5-year demands to evaluate the intermediate system performance.

In the model analysis, special attention was paid to the net flows coming from each plant in the various scenarios. Since each plant has a fixed existing capacity, the model results were checked against those capacities to ensure the scenario stayed within those limits. Any scenario allowing flow greater than the existing capacity represented a situation where the plant would need to be expanded to accommodate the additional demand. The model was used to assess the required plant expansions and/or capacities of new facilities. In addition, the impacts of water main sizes on plant capacities were reviewed to ensure that water mains were sized as efficiently as possible given the treatment plants that were online.

A total of 16 physical scenarios were modeled to evaluate the impact of adding water treatment plants, various proposed system improvements, and the physical expansion and growth of the City. The relevant model scenarios are discussed in the following sections. The discussions are organized chronologically for the present; 3-year, 5-year, and 20-year design time frames. A summary is included at the end to summarize the results of the analysis and how it may impact the water distribution system.

PRESENT DAY (2017-2018) ANALYSIS

This section includes the results of scenarios for the present system configuration as well as scenarios that include improvements made in 2016/2017. All scenario results are reported for the MDD conditions unless otherwise noted. The scenario analyses are described in detail below:

Scenario 1: Present Day Existing System

Scenario 1 modeled the existing conditions of the City's PWS at MDD and PHF. In this scenario, all existing WTPs were connected to the distribution system and were operating at the normal operating pressures. This scenario was used for calibration and is the basis for system pressure and fire flow analysis. **Table 25** summarizes the results of Scenario 1.

Table 25: Model Results for Scenario 1

Demands	Avg. System Pressure (psi)	Min. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	60	43	780
PHF	56	41	-

Overall, the system is operating within the minimum system pressure standards established by FDEP. The average system pressure is well above the typical operating pressure of 55 psi. The minimum pressure is also well above the 20-psi minimum. Available fire flow coverage is good overall. However, the minimum fire flow is below the 1,000 gpm hydraulic standard. There are several locations in the present-day scenario that have fire flows below the minimum of 1,000 gpm. Primarily, the low available fire flows are located in the Wildwood County Estates neighborhood, Continental Country Club, Okahumpka Service Plaza, and the Lakeside Landings area.

Scenario 2: Present Day System with Village of Fenney (2,594 ERUs)

Scenario 2 modeled the existing conditions of the City's PWS at MDD, and PHF. In this scenario, all existing WTPs were connected to the distribution system and were operating at the normal operating pressures. The Village of Fenney development was assumed to be constructed for a total of 2,594 ERUs. This scenario was used to determine whether the City's existing system could meet the Villages' standard level of service prior to the Southern Oaks WTP being constructed. **Table 26** summarizes the results of Scenario 2.

Table 26: City of Wildwood Model Results for Scenario 2

Demands	Avg. System Pressure (psi)	Min. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	60	41	768
PHF	56	41	-

Overall, the City's system is operating within the minimum system pressure standard established by FDEP. The average system pressure is well above the typical operating pressure of 55 psi. The minimum pressure is also well above the 20-psi minimum. Available fire flow coverage is good overall. However, the minimum fire flow is below the 1,000 gpm hydraulic standard. There are several locations in the present-day scenario that have fire flows below the 1,000 gpm minimum. Primarily, the low available fire flows are in the Wildwood County Estates neighborhood, Continental Country Club, Okahumpka Service Plaza, and Lakeside Landings.

Table 27 demonstrates that the Village of Fenney development is within the minimum system pressure standards of the Villages' level of service. The average system pressure is well above the typical operating pressure of 55 psi and the minimum fire flow available is above the minimum of 1,000 gpm.

Table 27: Village of Fenney Results			
Demands	Avg. System Pressure (psi)	Min. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	58	54	1,290
PHF	52	48	-

3-YEAR (2020) ANALYSIS

This section provides an analysis of the 3-year planning horizon for the City's PWS. Significant growth within infill areas and new developments are anticipated throughout the water system within the next 3-years. Most of the growth is spurred from developments in the Central and North service areas. The following developments are anticipated to be completed or started prior to 2020:

- Lakeside Landings
- Oxford Oaks Phase II
- Grand Oaks Manor
- O'Dell
- Monarch Ranch
- Lee Capital
- Pepper Tree Village
- Providence
- Trailwinds Village/Beaumont

The demands from the above developments were added to the model for the 3-year analysis based on the demand projections located in **Appendix B.** Separate scenarios were modeled to determine which scenario triggers the need for each improvement to be constructed. It was assumed, for all the following scenarios, that the Village of Fenney and Village of Southern Oaks demands are not being served by the City.

Scenario 3: 3-Year (2020) without Improvements

Scenario 3 models the City's PWS from Scenario 1 with the projected 3-year demands including the Central and North developments. The demands at MDD, MDD+FF, and PHF were analyzed without additional improvements and the Oxford WTP is not in service.

The resulting system performance for this scenario is summarized in **Table 28** on the following page.

Table 28: Model Results for Scenario 3			
Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	43	62	505
PHF	34	60	-

The existing system does not have sufficient "firm" pumping capacity to meet the projected 3-year (2020) demands. The results demonstrate that the existing system with the projected 3-year demands operates below the City's average system operating pressure of 55 psi. The minimum pressure is below 35 psi during peak hour demands. Available fire flow coverage is poor overall with 83 of the hydrants below 1,000 gpm.

Scenario 4: 3-Year (2020) with Improvements

Scenario 4 models the City's PWS from Scenario 1 with the projected 3-year demands including the Central and North developments. The demands at MDD, MDD+FF, and PHF were analyzed. The improvements needed to meet the minimum hydraulic standards are summarized below:

- **PWS Improvement No. 1:** Oxford WTP with a 2.35 MGD MDD capacity.
- **PWS Improvement No. 2 and No. 3**: CR 209 WM Extension Phase I and Phase II (14,500 LF of 12-inch PVC WM and 5,400 LF of 16-inch PVC WM).
- Construct 12-inch developer driven water main expansions as required by each new development to meet the projected expansion and infill growth. See **Figure 6** and **Figure 7**.

With the above improvements, the resulting system performance for this scenario is summarized in **Table 29** below.

Table 29: Model Results for Scenario 4			
Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	43	62	773
PHF	41	60	-

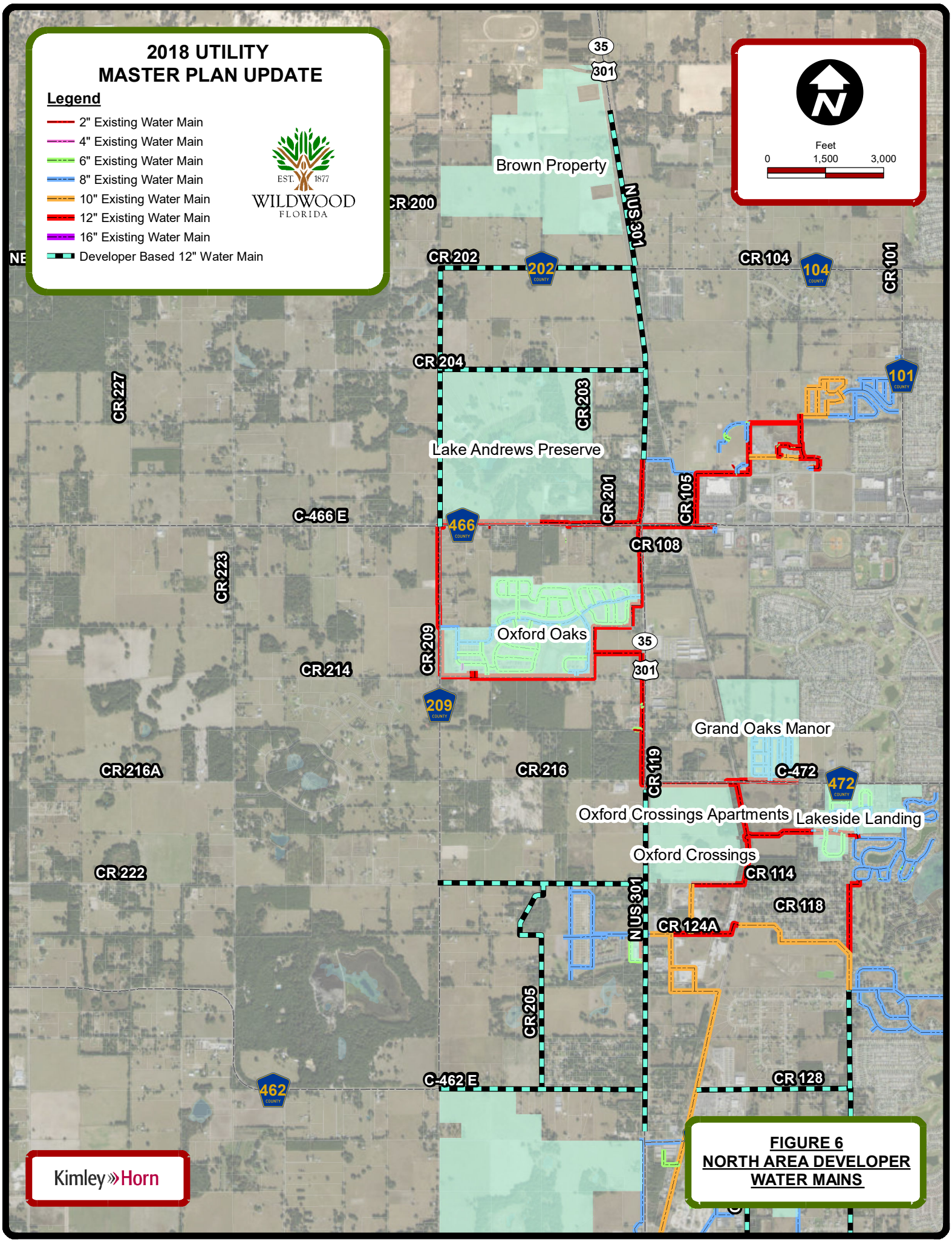
The results demonstrate that with the above improvements the system will operate within the minimum system pressure standards established by FDEP. The average system pressure is well above the typical operating pressure of 55 psi. The minimum pressure is also well above the 20-psi minimum and above 35 psi during peak hour demands. Available fire flow coverage is good overall with only 13 of the hydrants below 1,000 gpm. Primarily, the low available fire flows are in the Wildwood County Estates neighborhood, Continental Country Club, and the Okahumpka Service Plaza

SCENARIOS: 5-YEAR (2022) ANALYSIS

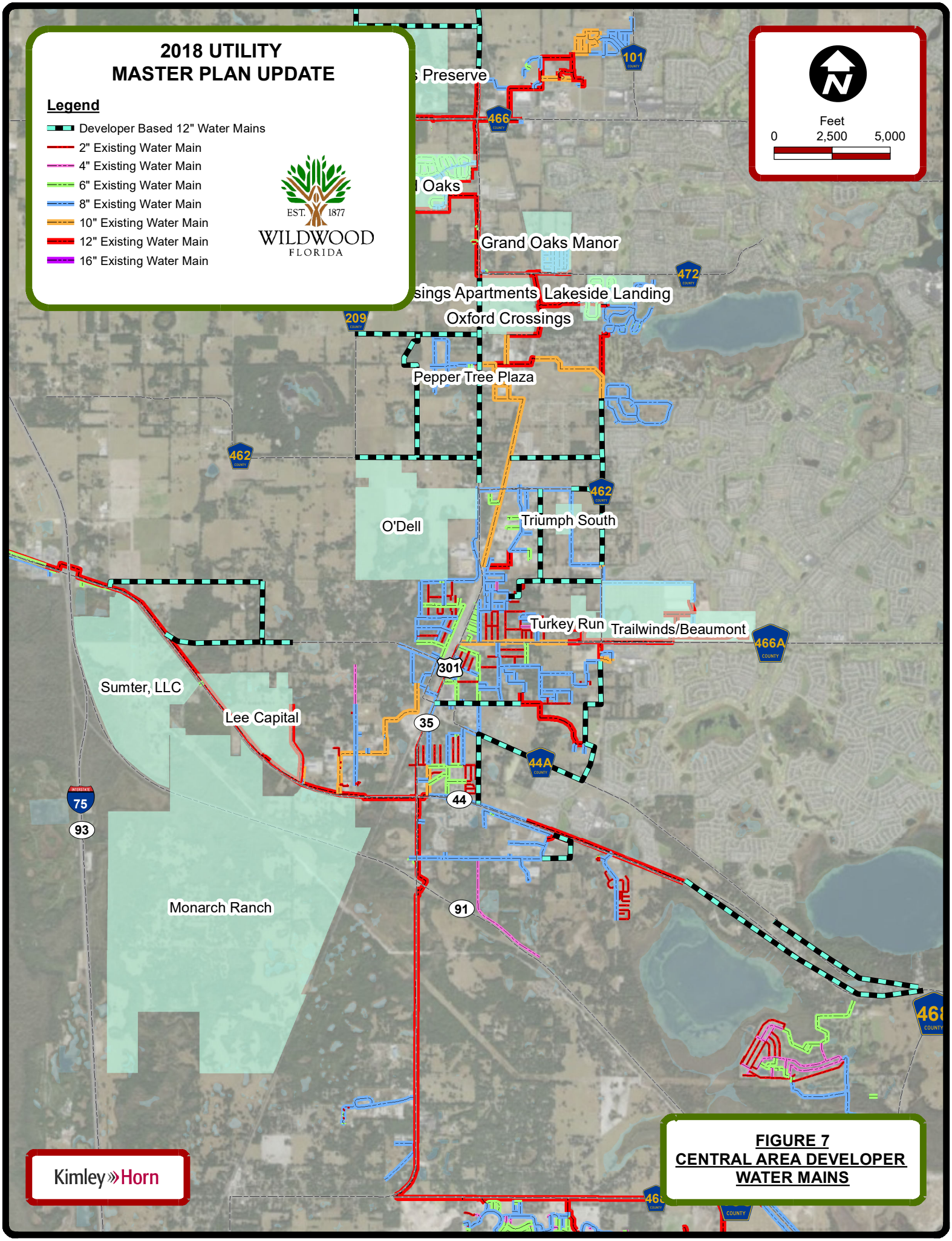
These scenarios include the anticipated additional demands from the existing service area, infill areas, and new developments from the 5-year growth projections. The increase in total demands from the 3-year to 5-year timeline is estimated to be 0.375 MGD. Continued activity in the North and Central service areas are ultimately driving the increased water system demands between the 3-year and 5-year planning horizons. Separate scenarios were modeled to determine which scenario triggers the need for each improvement to

be constructed between 2020 and 2022. The following developments are anticipated to be completed or started prior to 2020:

- Lakeside Landings
- Oxford Oaks Phase II
- Oxford Crossings
- Grand Oaks Manor
- Lake Andrews Preserve
- O'Dell
- Monarch Ranch
- Lee Capital
- Pepper Tree Village
- Providence
- Turkey Run
- Trailwinds Village/Beaumont



K:\OCA_Utilities\Wildwood\Projects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\Figure 6 - Northern Area Developer WMs.mxd - 10/17/2018 7:56:59 AM - trey.clayton



K:\OCA_Utilities\Wildwood\Projects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\mxd\Figure 7 - Central Area Developer WMs.mxd - 6/13/2019 10:34:40 AM - Trey.Clayton

Scenario 5: 5-Year (2022) without Improvements

Scenario 5 models the City's PWS from Scenario 4 with the projected 5-year demands. The demands at MDD, MDD+FF, and PHF were analyzed assuming the Scenario 4 improvements are in place.

The resulting system performance for this scenario is summarized in **Table 30** below.

Table 30: Model Results for Scenario 5

Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	43	62	773
PHF	28	60	-

The results demonstrate that the system with the projected 5-year demands does not meet the City's level of service and has a minimum pressure below 35 psi during peak hour demands. Available fire flow coverage is poor overall with 18 of the hydrants below 1,000 gpm.

Scenario 6: 5-year (2022) with Improvements

Scenario 6 models the City's PWS from Scenario 4 with the projected 5-year demands. The demands at MDD and PHF were analyzed. The improvements needed to meet the minimum hydraulic standards are summarized below:

- **PWS Improvement No. 4:** Reallocate withdrawal capacity to the Oxford WTP and increase the City's permitted withdrawal capacity from 6.68 MGD to 8.00 MGD to meet the 20-year projected demands.
- **PWS Improvement No. 5:** CR 209 WM Extension Phase III (10,500 LF of 16-inch PVC WM).
- Construct 12-inch, developer driven, water main expansions as required by each new development to meet the projected expansion and infill growth. See **Figure 6** and **Figure 7**.

With the above improvements, the resulting system performance for this scenario is summarized in **Table 31** below.

Table 31: Model Results for Scenario 6

Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	43	64	820
PHF	40	60	

The results demonstrate that the system will operate within the minimum system pressure standards established by FDEP. The average system pressure is well above the typical operating pressure of 55 psi. The minimum pressure is also well above the 20-psi minimum and above 35 psi during peak hour demand. Available fire flow coverage is good overall with only 10 of the hydrants below 1,000 gpm.

SCENARIOS: 20-YEAR (2037) ANALYSIS

Significant demand increases are anticipated in the next 20 years and substantial infrastructure improvements will be needed to support the additional demand to the City's distribution system. Much of the scenarios were performed for the 20-year timeline. The resulting water main and WTP capacity requirements were considered in the 3-year and 5-year analysis. Significant demand increases are anticipated within the next 20 years and substantial infrastructure improvements will be needed to support the additional demand. All the known developments listed in **Appendix B** are anticipated to be completed before 2037, excluding Panasoffkee Preserve.

Scenario 7: 20-Year (2037) without Improvements

Scenario 7 models the City's PWS from Scenario 6 with the projected 20-year demands. The demands at MDD, MDD+FF, and PHF were analyzed assuming the Scenario 4 and 6 improvements are in place.

The resulting system performance for this scenario is summarized in **Table 32** below.

Table 32: Model Results for Scenario 7

Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	43	62	691
PHF	18	60	-

The results demonstrate that the system with the projected 20-year demands does not meet the minimum system pressure standards established by FDEP and the average system pressure is below the City's typical operating pressure of 55 psi. The system is not able to provide firm pumping capacity during peak hour demand and the minimum pressure is below 20 psi (FDEP minimum threshold).

Scenario 8: 20-Year (2037) with Improvements

Scenario 8 models the City's PWS from Scenario 6 with the projected 20-year demands, excluding Panasoffkee Preserve. The demands at MDD and PHF were analyzed. The improvements needed to meet the minimum hydraulic standards are summarized below:

- **PWS Improvement No. 7:** CR 501 WTP Expansion to 3.20 MGD MDD (Well Pump Capacity Limiting)
- **PWS Improvement No. 8:** Ashley WTP Expansion to 0.720 MGD.
- **PWS Improvement No. 9:** Oxford WTP Expansion to 6.73 MGD.
- **PWS Improvement No. 10:** Interconnect the two 12-inch water mains along US 301 N.
- Construct 12-inch developer driven water main expansions as required by each new development to meet the projected expansion and infill growth. See **Figure 6** and **Figure 7**.

With the above improvements, the resulting system performance for this scenario is summarized in **Table 33** on the following page.

Table 33: Model Results for Scenario 8			
Demands	Min. System Pressure (psi)	Avg. System Pressure (psi)	Min. Available Fire Flow (gpm)
MDD	42	56	691
PHF	40	54	

The results demonstrate that the system will operate within the minimum system pressure standards established by FDEP. The average system pressure is well above the typical operating pressure of 55 psi. The minimum pressure is also well above the 20-psi minimum and above 35 psi during peak hour demand. Available fire flow coverage is good overall with only 19 of the hydrants below 1,000 gpm. Primarily, the low available fire flows are in the Wildwood County Estates neighborhood and Continental Country Club and are the result of small diameter water mains and dead-end water mains. Fire flows in these areas can be improved through individual water main improvement projects.

Scenario 9: Panasoffkee Preserve 20-Year (2037)

The Panasoffkee Preserve development is located on approximately 1,000 acres near the northwest corner of the CR 475 and SR 44 intersection. The project is planned for 3,000 ERUs. The complete build-out utility demand projections are 932,700 gpd for water and 699,664 gpd for wastewater. At the time of the update, the development timeline for Panasoffkee Preserve is unknown; therefore, it was modeled separately from the City's 2037 model scenario but assumed to be constructed between 2027 and 2037. Scenario 9 models the City's PWS from Scenario 8 and assumes **PWS Improvements No. 9** and **No. 10** have been implemented. Scenario 9 was broken down into three separate phases. Each phase was sized appropriately to meet the build-out demand of Panasoffkee Preserve but were phased based on the development timeline (i.e. rate of ERUs constructed) within Panasoffkee Preserve. The Panasoffkee Preserve developer will be responsible for the design, permitting, and construction costs associated with constructing the improvements shown in **Figure 8** and discussed below.

Phase 1: Construct 7,900 LF of 12-inch PVC Water Main from SR 44 to Panasoffkee Preserve

Phase 1 of the Panasoffkee Preserve potable water utility expansion would consist of constructing a 12-inch water main extension from the City's existing water main along SR-44 to the Panasoffkee Preserve development. With the construction of Phase 1 of the Panasoffkee potable water utility improvements, the City's PWS can support 644 ERUs.

Phase 2: Construct 24,000 LF of 16-inch PVC Water Main along C-462W from CR 209 to Panasoffkee Preserve.

Phase 2 of the Panasoffkee Preserve potable water utility expansion would consist of constructing a 16-inch water main extension along C-462W from the City's water main on CR 209 to the Panasoffkee Preserve development. This water main would allow the City to loop the western portions of their PWS and provide potable water to 1,835 ERUs within Panasoffkee Preserve.

Phase 3: Construct a 1.35 MGD MDD WTP to serve Panasoffkee Preserve

To serve the remaining 1,165 ERUs for Panasoffkee Preserve, the developer will construct a WTP sized to service the water demands of the entire development with an emergency interconnection to the City's PWS.

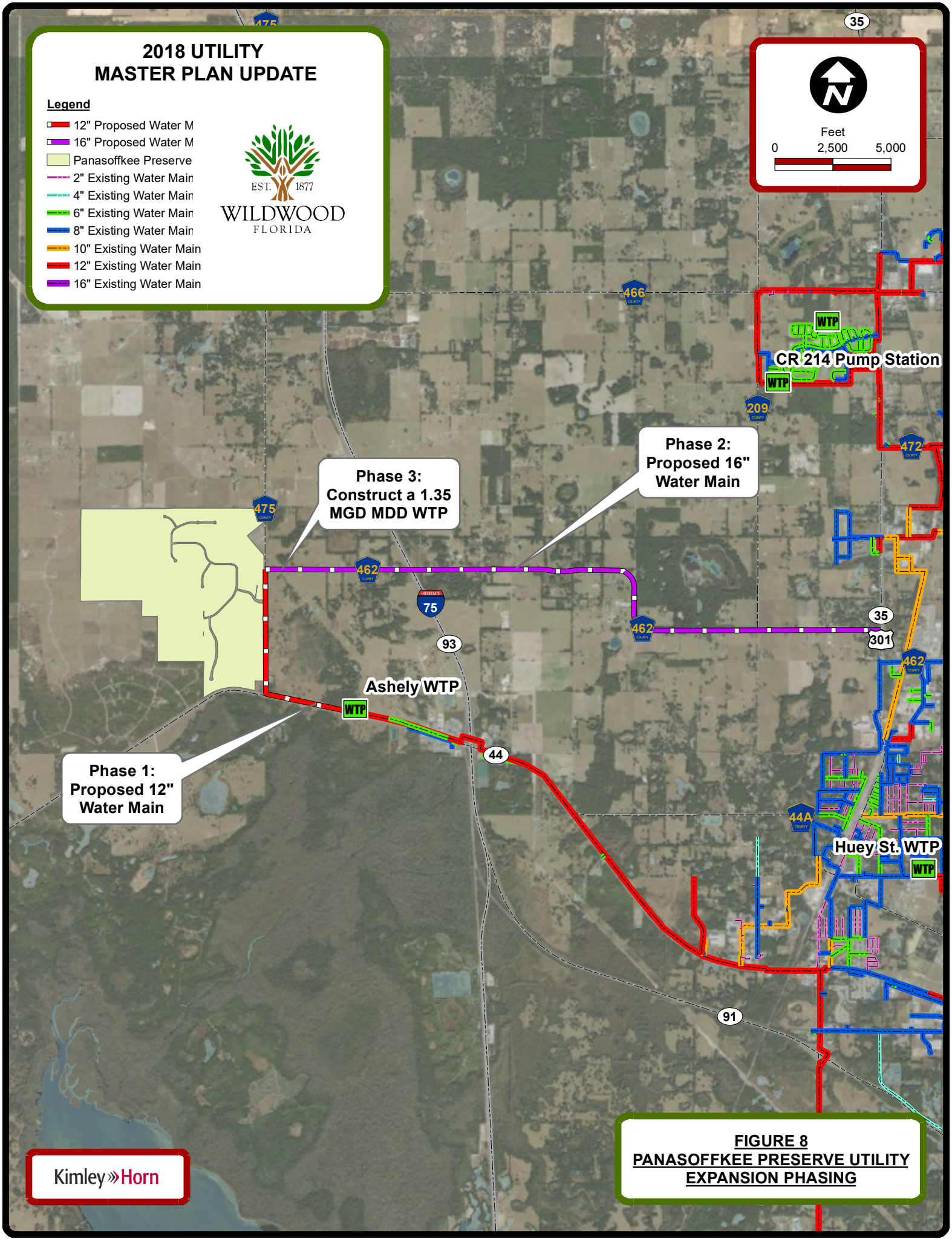


FIGURE 8
PANASOFFKEE PRESERVE UTILITY
EXPANSION PHASING

Kimley»Horn

\\ocafp01\FL_OCA\OCA_Utilities\WildwoodProjects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\mxd\Figure 8 - Panasoffkee Preserve Utility Expansion Phasing.mxd - 7/15/2019 10:58:10 AM - stacy.boney

RECOMMENDED WATER SYSTEM CAPITAL IMPROVEMENT PROJECTS

This section provides a discussion of the capital improvement projects developed to address current deficiencies and meet future potable water demands. Included in this section is a project list with probable costs of construction for recommended projects at the present year, 3-year, 5-year, and 20-year planning projections. Many of the projects are large enough to be constructed in phases; so, they are included in more than one of the time periods. The proposed capital improvement projects were discussed with City staff and prioritized. See **Appendix D** for the overall list with budget years and the detailed breakdown of the estimated construction costs for each of the capital improvement projects and a preliminary timeline for project implementation. See **Figure 9** for an overall map of the capital projects.

WATER SYSTEM IMPROVEMENTS

WITHIN THE NEXT 3 YEARS

PWS Improvement No. 1:

Oxford WTP 2.35 MGD MDD Permitted Capacity – The Oxford WTP is currently under construction and has a contract price of $6,637,777.

PWS Improvement No. 2:

CR 209 WM Phase I – Construction of 7,500 LF of 12-inch PVC WM and 850 LF of 6-inch PVC WM. The estimated design and construction cost for this project is approximately $1,116,000 See **Figure 10** for a project map.

PWS Improvement No. 3:

CR 209 WM Phase II – Construction of 7,000 LF of 12-inch PVC WM and 5,400 LF of 16-inch PVC WM. The estimated design and construction cost for this project is approximately $1,965,600. See **Figure 10** for a project map.

WITHIN THE NEXT 5 YEARS

PWS Improvement No. 4:

Water Use Permit Modification: Modify the City's existing SWFWMD water use permitted withdrawal – This project consists of coordinating with the SWFWMD and submitting a permit modification application package to modify the existing permit. The permit modification would reallocate the permitted withdrawal quantities from the Fairways, Ashley, CR501, and Huey WTP to the Oxford WTP to meet the anticipated demands and increase the permitted withdrawal capacity to 8.00 MGD. The estimated cost for this project is approximately $50,000.

PWS Improvement No. 5:

CR 209 WM Phase III – Construction of 10,500 LF of 16-inch PVC WM. The estimated design and construction cost for this project is approximately $1,980,000. See **Figure 10** for a project map.

PWS Improvement No. 6:

CR 501 WTP Iron Treatment Improvements: Construction and installation of Iron Filters for the removal of elemental Iron to replace the existing Iron sequestration system at the CR 501 WTP. The estimated cost for the design and construction of this project is approximately $1,300,000.

WITHIN THE NEXT 20 YEARS

PWS Improvement No. 7:

CR 501 WTP Expansion to 3.20 MGD MDD (Well Pump Limiting) – Modifications to the existing electrical system, mechanical piping improvements, and installation of two new high service pumps for a total of four high service pumps (three duty, one standby). The estimated design and construction cost for this project is approximately $1,150,000.

PWS Improvement No. 8:

Ashley WTP Expansion to 0.720 MGD – Construction of new UFA well and installation of 500 gpm vertical turbine pump to increase the permitted capacity of the Ashley WTP to 0.720 MGD. The estimated design and construction cost for this project is approximately $580,000.

PWS Improvement No. 9:

Oxford WTP Expansion to 6.73 MGD – Construction and Installation of a new 1.00 MG GST, a new 1,650 gpm packed tower aerator and odor control system, a new 1,650 gpm vertical turbine transfer pump, and five new 2,400 gpm horizontal split-case high service pumps (four duty, one standby). The estimated design and construction cost for this project is approximately $3,950,000.

PWS Improvement No. 10:

US 301 N and CR 214 WM Interconnect – Interconnect the north and south 12-inch water mains along US 301 N. The project would involve the construction of 100 LF of 12-inch water main. The estimated design and construction cost for this project is approximately $54,000. See **Figure 11** for a project map.

ADDITIONAL PROJECTS

PWS Option No. 1 - Decommission Fairways WTP:

The City has the flexibility to decommission the Fairways WTP upon the completion of **PWS Improvement No. 9.** Once the Oxford WTP is expanded to 6.73 MGD, the Fairways WTP is no longer hydraulically beneficial to the City's PWS and does not provide additional flow to the water system. The estimated design and construction cost for this project is approximately $165,000.

PWS Option No. 2 - Decommission CR 214 WTP:

The City has the flexibility to decommission the CR 214 Pump Station upon the completion of **PWS Improvements No. 9** and **No. 10.** Once the Oxford WTP is expanded to 6.73 MGD and the CR 214 WM is upsized, the CR 214 Pump Station is no longer hydraulically beneficial to the City's PWS and does not provide additional flow to the water system. The City has the option to maintain and operate the CR 214 pump station and storage tank to provide additional storage and peak hour pumping capacity, but it is not

required to meet the 20-year (2037) demands. The estimated design and construction cost for this project is approximately $340,000.

PWS Option No. 3 - Continental Country Club Northern Interconnect and Decommissioning:

and interconnecting the City and PWS systems with a pressure reducing/sustaining valve. The existing pressure reducing/sustaining valve at the southern interconnection point of the City and CCC PWS will stay in service. This interconnect would loop the eastern portion of the City's PWS through the CCC distribution system and provide the City with the flexibility to decommission CCC WTP No. 1 and CCC WTP No. 2. The CCC EST would remain in service to provide additional storage for fire flow and peak hour demands. Decommissioning of the two CCC WTPs would reduce operation and maintenance costs, along with mandatory operator attendance (5 visits/week/WTP and 1 visit/weekend/WTP). The estimated design and construction cost for this project is approximately $1,822,500. See **Figure 12** for a project map.

2018 UTILITY MASTER PLAN UPDATE

Legend

- 2" Existing Water Main
- 4" Existing Water Main
- 6" Existing Water Main
- 8" Existing Water Main
- 10" Existing Water Main
- 12" Existing Water Main
- 16" Existing Water Main

WILDWOOD FLORIDA EST. 1877

Improvement No.1: Oxford WTP 2.35 MGD MDD Permitted Capacity

Improvement No.2: CR 209 WM Phase I

Improvement No.3: CR 209 WM Phase II

Improvement No.5: CR 209 WM Phase III

Improvement No.6: CR 501 WTP Expansion to 3.20 MGD

Improvement No.7: Ashley WTP Expansion to 0.720 MGD

Improvement No.8: Oxford WTP Expansion to 6.73 MGD

Improvement No.9: CR 214WM Interconnect

WTP

N

Feet

0 3,500 7,000

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FIGURE 9
OVERALL WATER CIP

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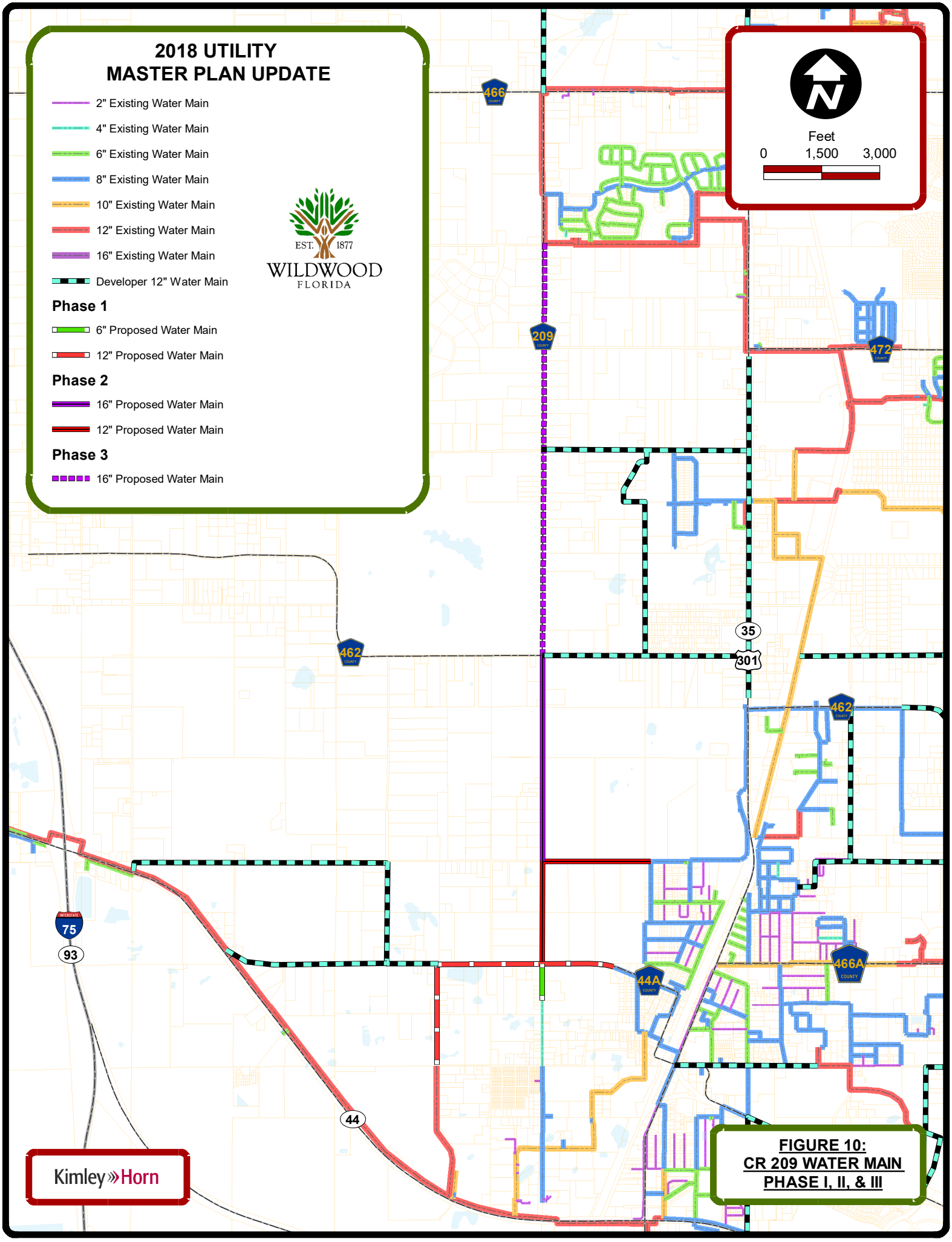
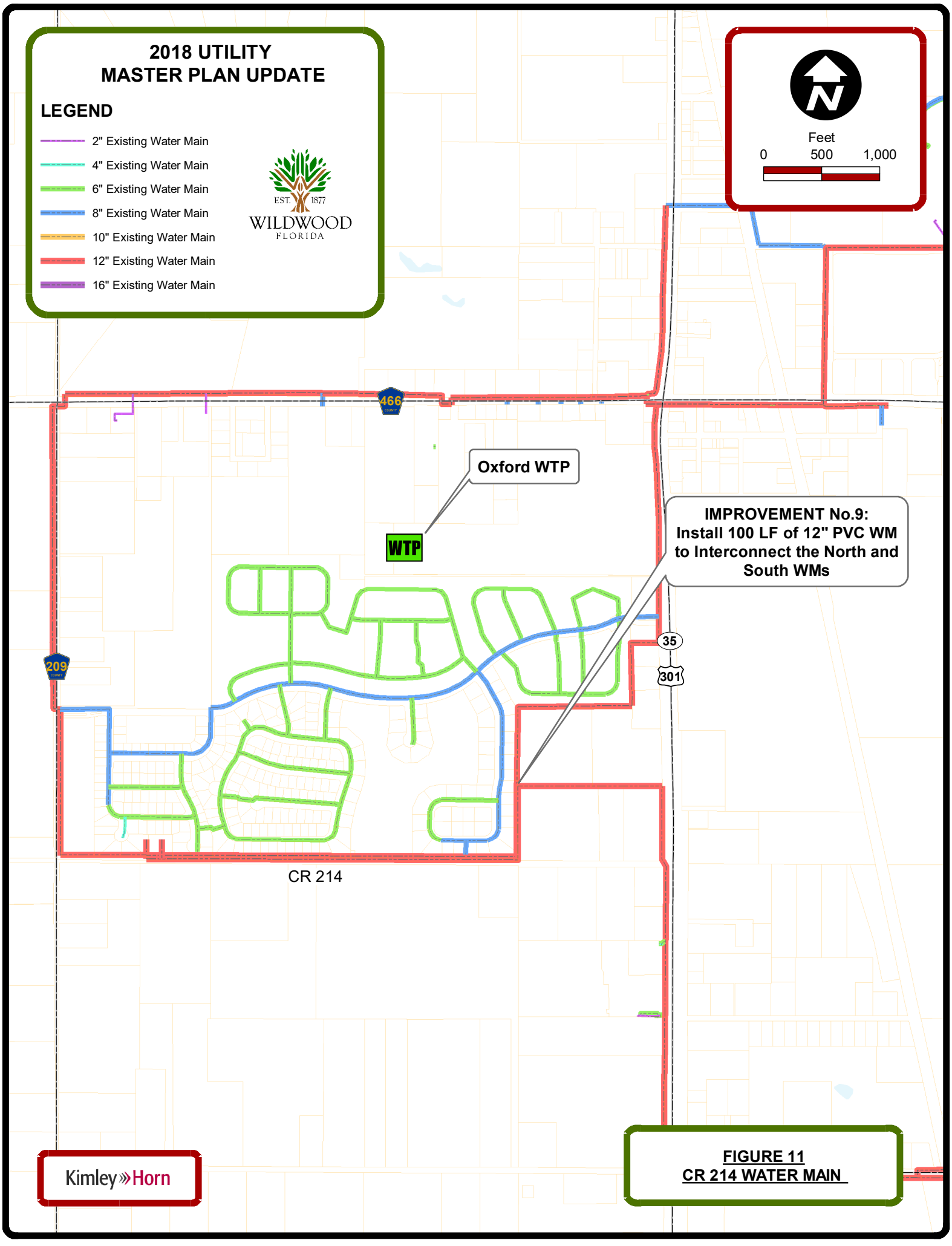
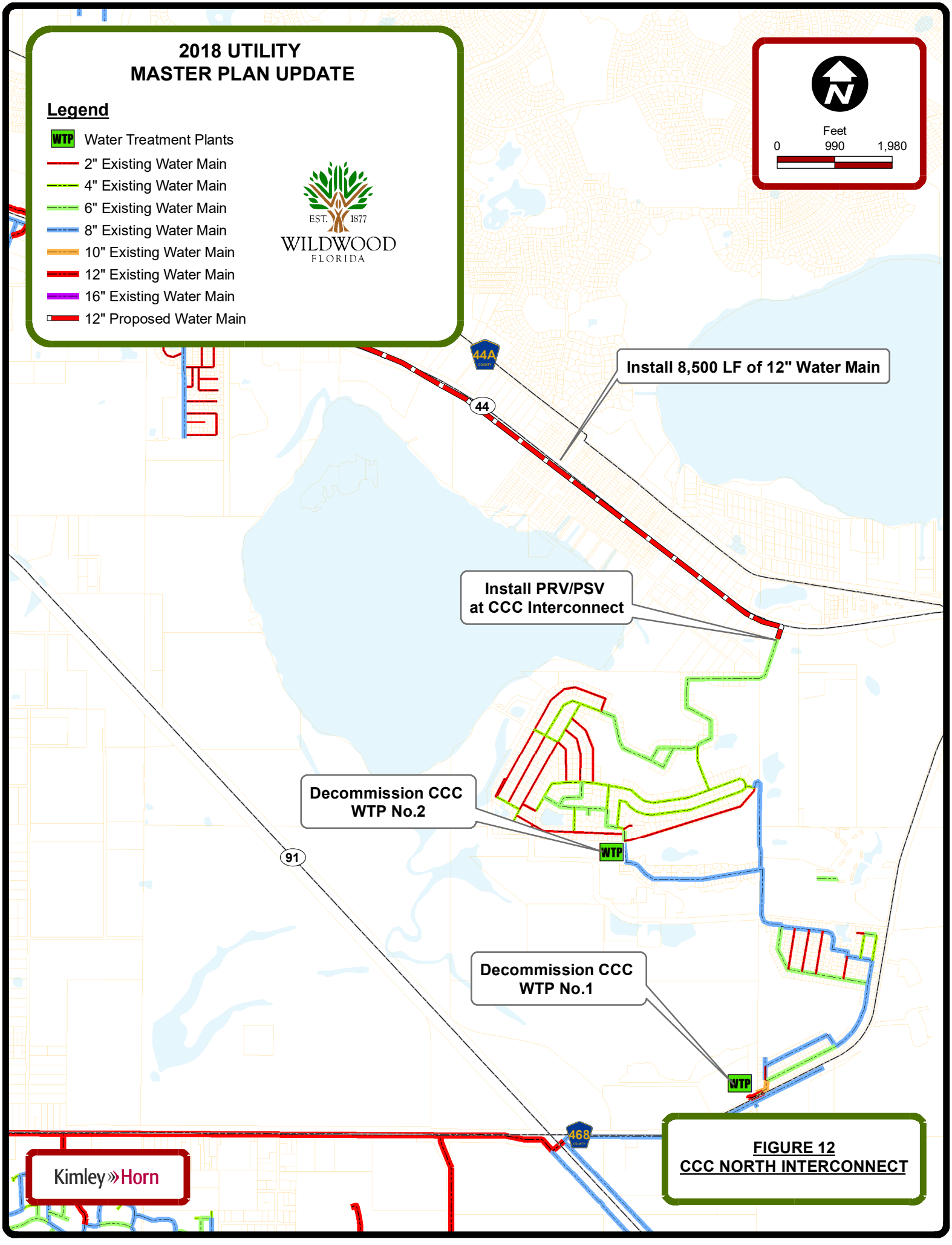


K:\OCA_Utilities\Wildwood\Projects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\mxd\Figure 10 - CR 209 WM.mxd - 11/13/2018 9:02:14 AM - trey.clayton





CAPACITY ANALYSIS

As part of the analysis of the City Utility System Master Plan, a capacity analysis of the system was performed. Typically, where multiple treatment facilities are connected to a single water system, the FDEP assumes the total system capacity is the sum of the individual treatment facility capacities. Using this methodology, the combined system capacity is 1,550,000 gpd. See **Appendix C** for the capacity analysis calculations and summary. However, the above system capacity evaluation is very conservative because it assumes all connected treatment facilities must provide individual firm capacity at each treatment plant. Projected future demands well exceed the consolidated City PWS capacity based on the above method. Therefore, additional model scenarios were performed to demonstrate that the City can provide internal firm system capacity. These scenarios were performed using the same conditions as Scenario No. 1 but with the assumption that only one WTP will have the largest well pump or HSP out of service at any given time. The consolidated system capacity based on this method is 6,720,000 gpd (See **Table 34**). The consolidated system capacity is sufficient to meet the projected 5–year demands.

Table 34: City of Wildwood PWS 6600331 Capacity Evaluation

WTP	Evaluated Design Capacity (MGD)
Well Pump Capacity	6.72
Storage Capacity	9.92
High Service Pump Capacity	7.30
Limiting Component Capacity	**6.72**

The City requested to reevaluate and rerate the capacity of the existing system and future system, upon completion of the planned improvements; the Oxford WTP and the upgrades at the CR 501 WTP. FDEP rerates the system capacity as the sum of individual WTP capacity as the overall permitted design capacity. Where WTPs are hydropneumatic tank treatment plants and would have a design capacity of 0.00 MGD per 62-555, FDEP assumes that the permitted capacity is half of the total well pump capacity. **Table 35** on the following page summarizes the existing FDEP permitted capacity as well as the future permitted capacity of the City's PWS and compares it to the projected water system demands (see the FDEP rerating summary in **Appendix C**). Based on the capacity analysis performed in **Appendix C** and the FDEP permitted capacity, the City PWS, including planned improvements and expansions, will have sufficient capacity to meet the projected demands.

Table 35: City of Wildwood PWS 6600331 (Rated Capacity)				
WTP	MDD Rated Capacity by Year			
	2018	2020	2022	2037
Huey St.	720,000	720,000	720,000	720,000
Ashley WTP	360,000	720,000	720,000	720,000
Fairways	504,000	504,000	504,000	-
Oxford WTP	-	2,350,000	2,350,000	6,730,000
CR 501 WTP	2,664,000	2,664,000	2,664,000	3,200,000
CCC No.1	835,230	835,230	835,230	-
CCC No.1	504,000	504,000	504,000	-
Permitted Capacity (MDD)	**5,587,230**	**5,947,230**	**8,297,230**	**11,370,000**
Total Water System Demand (MDD)	**3,494,352**	**4,038,259**	**4,853,164**	**10,110,781**
Projected Remaining Permitted Capacity	**2,092,878**	**1,908,971**	**3,444,066**	**1,259,219**

WASTEWATER SYSTEM

This section discusses the existing wastewater collection and treatment system owned and operated by the City of Wildwood. The information includes an evaluation of the collection systems and wastewater treatment systems.

EXISTING WASTEWATER TREATMENT AND COLLECTION SYSTEM OVERVIEW

The City's wastewater collection system consists of the following components (approximately):

- 67 City Lift Stations and 73 private lift stations with monitoring of 15 private lift stations
- 1,081 manholes
- 2,467 feet of 6-inch PVC gravity sewer mains
- 291,313 feet of 8-inch PVC gravity sewer mains
- 9,426 feet of 10-inch PVC gravity sewer mains
- 34,137 feet of 4-inch diameter force mains
- 65,997 feet of 6-inch diameter force mains
- 19,556 feet of 6-inch diameter "dry" force main
- 77,324 feet of 8-inch diameter force mains
- 12,921 feet of 8-inch diameter "dry" force main
- 18,457 feet of 10-inch diameter force main
- 31,564 feet of 12-inch diameter force main
- 39,283 feet of 14-inch diameter force main
- 15,074 feet of 16-inch diameter force main

The City's WRF is a Category III, Class C facility that is permitted for 3.55 MGD annual average daily flow (AADF). The effluent disposal includes slow-rate public access reuse (R-001), Part IV rapid-rate land application (R-002), and a slow-rate public access (R-003) interconnection with the North Sumter Utilities WWTF. According to the June 2018 DMR data, the City's current three month rolling average daily flow (3MRADF) is 1.29 MGD. At this average flow rate, the City has approximately 2.25 MGD ADF of available capacity.

CCC WASTEWATER SYSTEM

The City also owns, maintains, and operates the CCC wastewater treatment and collection system. The CCC wastewater collection system consists of the following components (approximately).

- 7 lift stations
- 135 manholes
- 20,415 feet of 6-inch gravity sewer mains

- 19,632 feet of 8-inch gravity sewer mains
- 7,487 feet of 10-inch gravity sewer mains
- 7,020 feet of 3-inch diameter force mains
- 550 feet of 6-inch diameter force mains

The CCC WWTF is a Category II, Class C facility that is permitted for 0.200 MGD on a three-month rolling average basis. The effluent disposal is a Part II slow-rate restricted access reuse system (R-001). R-001 consists of one lined holding pond of 279,000 gallons, one spray field of 27.82 acres, and one wet weather storage pond of 5.8 MG. Per DMR data from May 2018, the 3MRADF for the CCC WWTF was 0.113 MGD.

WASTEWATER SYSTEM ANALYSIS AND METHODOLOGY

This section provides an overview of City's wastewater collection system, wastewater system modeling and scenario analysis, wastewater treatment capacities, and wastewater system infrastructure improvements. The wastewater system analysis described in this section is based upon a strategy of providing wastewater service for future population growth combined with effective operations of the existing wastewater infrastructure within the city's service area.

HYDRAULIC MODEL DEVELOPMENT

The City's system-wide pressurized (lift stations and force mains) hydraulic model that was previously created for the 2015 Utility Master Plan was used to evaluate the performance of the wastewater collection system under current and future wastewater flow conditions. The system-wide model was used to (1) evaluate the available capacity in the existing wastewater collection system under future flow scenarios and (2) evaluate short-term and long-term system improvements.

SYSTEM HYDRAULIC STANDARDS

The wastewater system hydraulic standards and operating guidelines were developed from past experience along with information provided by the City. The wastewater system hydraulic standards are described below.

- Minimum force main design velocity: 2 fps
- Maximum force main design velocity: 7 fps
- Maximum gravity pipe capacity: 80% full flow
- Peak Hour Factors:
  - Flows less than 50,000 gpd: 4.0
  - Flows from 50,000 gpd to 250,000 gpd: 3.5
  - Flows from 250,000 gpd to 1,000,000 gpd: 3.0
  - Flows greater than 1,000,000 gpd: 2.5

METHODOLOGY

The wastewater system hydraulic model was used to analyze and aid in sizing various elements of the collection system to meet the existing, 3-year, 5-year, and 20-year projected demands. Existing, infill, expansion, and future development flow scenarios were analyzed by steady-state modeling of the pressurized wastewater collection system. Two different methods of steady-state modeling were used: the "pump model" method and the "flow model" method.

PUMP MODEL

The pump model option was used to simulate the pressurized collection system by incorporating the actual pump curves for the pumps at each lift station. The steady-state model simulation was performed with either a portion or all of the lift stations in a manifold force main running simultaneously. Kimley-Horn used the pump model to flag existing and future lift stations that could not pump against the "all pump on" system head. These lift stations received closer scrutiny in the flow model for both existing and future conditions.

FLOW MODEL

The flow model option was used for evaluation of the lift stations and pressurized collection system. The flow model ignores pump curve information and instead adds the projected flow for each sewershed to the appropriate lift station location. Parcel level flow estimates were developed and assigned to specific "sewer sheds" created for each lift station. The lift stations that do not pump directly to the WWTF were added to the flows of the appropriate downstream lift station. Peak flows within each system were determined and then used for force main sizing in accordance with the system hydraulic standards presented above.

WASTEWATER DEMAND PROJECTIONS

The population projections described in the "Population Growth Projections" section served as the basis for projecting future water demands. The future demands were estimated based on one of the methodologies described below. The resulting demand projections are presented in **Appendix B**.

- **Parcels with existing wastewater usage -** Wastewater demands were based on the water service demand calculations multiplied by the wastewater/water (WW/W) flow ratio of 0.76. This ratio was calculated by dividing the 2018 annual average WWTF flows by the 2018 annual average WTP demands.
- **Parcels without existing wastewater usage -** First, ERU determinations were made for each parcel using one of the methodologies described below. Then, the ERU estimate for each parcel was multiplied by the City wastewater level of service standard of 250 gpd/ERU to determine the resulting wastewater demand.
    - **Parcels with a future land use designation in the 2037 Comprehensive Plan** - ERU values were assigned to a parcel based on the appropriate residential density or a maximum FAR that corresponds to the future land use shown in the 2037 Comprehensive Plan. For residential land uses with a range density range (i.e. 3-6 units per acre), the maximum density was used for the demand calculations. Demands were calculated from the FAR by assigning an appropriate demand per allowable unit area of development.
    - **Parcels without a future land use designation in the 2037 Comprehensive Plan** - The SWFWMD parcel level population projections were divided by 2.37 residents per ERU then multiplied by the City's 250 gpd/ERU to determine the future demands.
    - **New large-scale developments -** The City provided a list of known developments with a buildout timeline. The projected development ERUs were then multiplied by 250 gpd/ERU to determine the development's demands based on the given development schedule provided by the City. These demands are summarized in **Appendix B**.

COLLECTION SYSTEM

The entire Wildwood pressurized wastewater collection system was divided into eight sewer sheds: North Area (CR 209), West SR 44 Area, Trailwinds Area, Peter's Street Area, North Main Street Area, South Main Street Area, East SR 44 Area, and Continental Country Club. See **Figure 13** for a map of the sewer sheds. A description for each of these areas are also shown in the next sections.

NORTH AREA (CR 209 LS)

Flows north of CR 462 W and west of US 301 and all flows north of CR 114 make up the North Area (CR 209) sewer shed of the collection system. The modeled collection system for the North Area (CR 209) is shown in in **Figure 13**.

Lift Stations

All the sewer flows in this area outfall to the CR 209 LS. The CR 209 LS conveys flows through a 12-inch diameter force main to the City's WRF. The CR 209 LS receives most of its flows from the Lakeside Landings LS through a single 8-inch force main and the developments north of CR 214 through a 12-inch force main. Several lift stations manifold into both the 8-inch and 12-inch force main flowing into the CR 209 LS (including Mission Oaks LS, Grand Oaks Manor, several grinder pumps stations, and two private lift stations).

Force Mains

A 12-inch diameter and 16-inch diameter force main acts as the "backbone" for North Area. A 12-inch diameter force main conveys all the flows from the service area south on CR 209 and manifolds into the Trailwinds 12-inch force main at the intersection of CR 209 and CR 232. From the intersection of CR 232 and CR 209 the force main upsizes to a 16-inch force main and conveys the flows from the Trailwinds LS and CR 209 LS directly to the City's WWTF. Given the anticipated development and demand projections north of CR 214 and CR 114, the existing 12-inch and 16-inch force main have sufficient capacity.

Gravity Sewer

The existing gravity sewer systems for the North Area convey the flows from developments and subdivisions. The entire gravity system consists of 8-inch pipes running at a minimum slope of 0.4%. The gravity sewer system in the North Area has sufficient capacity to meet existing and future demands.

Future Development and Growth

The North Area has numerous projected developments anticipated. The existing sanitary system has sufficient capacity to meet these developments and other projected future demands. The development of the Brown and Lake Andrews Preserve Developments will trigger the need for their own lift stations and force mains (**WW Improvement No. 12** and **WW Improvement No. 13**).

WEST SR 44 AREA

Flows west of US 301 along SR 44 make up the West SR 44 Area sewer shed of the collection system. The modeled collection system for the SR 44 West Area is shown in in **Figure 13.**

Lift Stations

All sewer flows in this sewer shed ultimately outfall to one lift station (CR 219 LS) that conveys the flows east through a single 10-inch diameter force main directly to the City WRF. The 10-inch force main receives flows from several lift stations, including six private lift stations. The CR 219 LS can be by-passed to allow for the lift stations west of CR 219 to pump directly to the City WRF. The existing lift stations in this area have sufficient capacity to meet the projected future flows, excluding the Monarch Ranch Development.

Force Mains

A 10-inch diameter force main acts as the "backbone" for the SR 44 West Area and flows directly to the City WRF. Excluding the Monarch Ranch Development, this force main has sufficient capacity to handle the future flows. The Monarch Ranch Development will require a force main to be constructed directly to the City WRF.

Gravity Sewer

There are City and privately-owned 8-inch diameter gravity sewers are located west of I-75. Given the anticipated development in the sewer shed, there is sufficient capacity to handle the future flows.

Future Development and Growth

Multiple developments are planned in this sewer shed along with the associated expansion and infill. The Monarch Ranch and Sumter, LLC development, will each trigger a new lift station and force main to meet the projected flows (**WW Improvement No. 9a** and **9b**). Each force main will pump directly to the City WRF. The development of Lee Capital and other developments will trigger improvements, such as pump upgrades, to the CR 219 LS (**WW Improvement No. 11**).

PANASOFFKEE PRESERVE

The Panasoffkee Preserve development is located within in the West SR-44 sewer shed on approximately 1,000 acres near the northwest corner of the CR 475 and SR 44 intersection. The project is planned for 3,000 ERUs. The complete build-out utility demand projections are 932,700 gpd for water and 699,664 gpd for wastewater. At the time of this update, the development timeline for Panasoffkee Preserve is unknown; therefore, it was modeled separately from the City's 2037 model scenario but assumed to be constructed between 2027 and 2037.

Phase 1: Construct A Lift Station and Force Main

Phase 1 of the Panasoffkee Preserve utility expansion would consist of constructing a 6-inch force main extension from the City's existing force main along SR-44 to the Panasoffkee Preserve development. With the construction of Phase 1 of the Panasoffkee Utility improvements the City's sanitary sewer collection system can support 644 ERUs.

Phase 2: Sanitary Sewer

Phase 2 of the Panasoffkee Preserve sanitary sewer expansion would allow the City to provide sanitary sewer service to the remaining 2,356 ERUs within Panasoffkee Preserve. There are two options to serve the build out capacity of the development. Option 1 constructs a 3.00 MGD PHF lift station and 28,000 LF of 16-inch PVC force main from Panasoffkee Preserve to the City's WRF. Option 2 constructs a 1.00 MGD AADF WWTF within Panasoffkee Preserve to solely serve the development. The two options are summarized below.

Option 1: A 16" force main and a 3.00 MGD PHF lift station is required to serve the proposed Panasoffkee Preserve development. The Panasoffkee Preserve developer will be responsible for the design and construction costs associated with constructing a 28,000 LF of 16" PVC force main from the Panasoffkee Preserve development to the City WRF and the associated 3.00 MGD PHF lift station. To accommodate the additional 3.0 MGD PHF from the Panasoffkee Preserve development, the City WRF headworks and associated piping will be upgraded to provide additional capacity. Assuming the headworks is at capacity, the screening capacity will be increased by approximately 3.0 MGD (2,083 gpm) and the influent piping will be increased from 16" diameter to 20" diameter. The Panasoffkee Preserve developer will be responsible for the design and construction costs associated with upgrading the City WRF to handle the additional 3.0 MGD PHF. The total approximate cost of design, permitting, and construction is $8,000,000.

Option 2: The average daily wastewater flow from the proposed Panasoffkee Preserve development is 0.755 MGD. The Panasoffkee Preserve developer will be responsible for the design and construction costs associated with a new 1.00 MGD AADF WWTF located inside Panasoffkee Preserve development. The total approximate cost of design, permitting, and construction is $15,600,000.

TRAILWINDS AREA

The 12-inch force main from the Trailwinds development makes up the Trailwinds Area sewer shed collection system. The 12-inch force main runs from the Trailwinds development along CR 134 and CR 232 and manifolds into the CR 209 12-inch force main. The Trailwinds Area is shown in in **Figure 13**.

Lift Stations

The Trailwinds LS conveys flows directly to the City WRF. The Trailwinds lift station has sufficient capacity to meet the demands of the Trailwinds development. The future Beaumont development will trigger the need for a new lift station that will pump through the existing 12-inch Trailwinds force main. The development of the O'Dell property will trigger the need for a lift station that will pump into the existing 12-inch Trailwinds force main and discharge directly to the City WRF and/or have the ability to accept the Trailwinds Area and O'Dell development wastewater flows and then pump (re-pump Trailwinds Area flows) into the existing 12-inch Trailwinds force main and discharge directly to the City WRF.

Force Mains

A 12-inch diameter and 16-inch diameter force main acts as the "backbone" for Trailwinds Area. The force main flows directly to the WWTF. The 12-inch force main from Trailwinds manifolds into the CR 209 12-inch force main and CR 209 LS. The force main was sized to have sufficient capacity to handle the North Area sewer shed flows from the CR 209 LS, the Trailwinds Area sewer shed flows, and the Charlotte LS flows.

Gravity Sewer

There is sufficient capacity in the existing gravity system to meet the projected future flows.

Future Development and Growth

The Trailwinds, Beaumont, O'Dell, Providence II, Turkey Run, and Triumph South developments will trigger the need for the O'Dell property re-pump station (**WW Improvement No. 8**).

PETER'S STREET LS AREA

The Peter's Street LS Area includes the existing gravity system inflows near the Peter's Street LS and all flows from the Charlotte LS and the Charlotte LS force main as seen **Figure 13**. The 6-inch force main from the Charlotte LS also conveys the flows from numerous grinder stations including the proposed new Police Station. The Charlotte St. force main is also connected to the 12-inch Trailwinds force main near US 301 which gives the City the ability to bypass the Peter's Street LS and pump directly to the City's WRF.

Lift Stations

Both the Charlotte LS and Peter's St. LS were rehabilitated, and the pumps were upsized in 2017. Both lift stations have sufficient capacity to support the projected flows for both lift station sewer sheds.

Force Mains

The Peter's Street LS force main is 8-inch diameter and outfalls directly to the City's WRF. This force main has sufficient capacity to handle future flow rates from the Peter's Street LS Area sewer shed.

Gravity Sewer

Based on the projected flows within the Peter's Street LS sewer area, there is sufficient capacity to handle the future flows.

Future Development and Growth

No large developments are anticipated to trigger wastewater collection system infrastructure improvements within the Peters Street LS area. The projected flow increases are the result of projected growth, system infill, and sanitary sewer expansion.

NORTH MAIN STREET AREA

Flows east of US 301, north of the turnpike, and south of the Trailwinds force main make up the North Main Street Area sewer shed. The collection system for the Main Street North Area is shown in in **Figure 13**.

Lift Stations

All flows in this sewer shed ultimately outfall to one lift station (Main Street North) which conveys the flows west through a single 8-inch diameter force main directly to the WWTF.

Multiple lift stations outfall to the Main Street North lift station including Dublin, Commons, Osceola, Magnolia, St. Clair, and Providence. Currently the Providence LS conveys flows through an 8-inch force main that out falls to the Dublin LS.

To meet the projected future flows, minimize the required improvements, and increase the efficiency of the overall collection system; the flows from the Providence LS should be redirected to pump though the existing 12-inch Trailwinds force main (**WW Improvement No. 2**) in the next 5-years. This improvement reduces the flow to the Main St. North LS thereby reducing the impacts to the downstream lift stations and sanitary sewer infrastructure.

Once **WW Improvement No. 2** is complete, then the Main St. North LS would need to be rehabilitated and upgraded to meet the 20-year projected flows (**WW Improvement No. 6**).

Force Mains

An 8-inch diameter force main acts as the "backbone" for Main Street North Area. This force main flows directly to the WWTF. Given the anticipated development in the sewer shed, the force main has sufficient capacity to handle the projected future flows.

Gravity Sewer

A 10-inch diameter gravity sewer conveys combined flows from multiple LS in the sewer shed to the Main St North LS. Given the anticipated development in the sewer shed, there is sufficient capacity in the existing gravity system.

Future Development and Growth

No large developments are planned in this sewer shed since the area is mostly built out. The projected flow increases are the result of existing growth, system infill, and gravity sewer expansion.

SOUTH MAIN ST. AREA

The South Main Street Area is defined as the area east of US 301, north of the Florida Turnpike, south of SR-44, and west of Wildwood Estates. The collection system for the South Main Street Area is shown in in **Figure 13**.

Lift Stations

All flows in this sewer shed ultimately outfall to one lift station (Main Street South) that conveys the flows north directly to the City's WRF through a 16-inch diameter force main. The Main Street South LS receives combined gravity flows from several lift stations.

Force Mains

Flows from this service area are pumped to the City's WRF through a 16-inch force main. The 16-inch force main also conveys the flows from the FCC Coleman Master LS, the Turnpike LS, and the Wildwood Estates LS. The 16-inch force main has sufficient capacity to meet the projected future sanitary sewer demands of the service area.

Gravity Sewer

Based on the projected flows within the Main Street South sewer area, there is sufficient capacity to handle the projected future flows.

Future Development and Growth

No large developments are planned in this sewer shed. The projected flow increases are the result of existing growth, system infill, and sanitary sewer infrastructure expansion. These projected flows will trigger the construction of the Adamsville low pressure forcemain system (**WW Improvement No. 14**) to provide wastewater collection services to the Adamsville corridor of CR-468 (area between US-301 and the Florida Turnpike along CR-468). This project would consist of 13,000 LF of 3-inch force main that would manifold into the City's 16-inch force main at the intersection of CR 501 and CR 468. Growth along US 301 (south of the turnpike) will trigger the Wildwood Entertainment Park LS and force main (**WW Improvement No. 10**).

SR 44 EAST AREA

Flows east of Wildwood Estates along SR 44 make up the SR 44 East Area sewer shed of the collection system. The modeled collection system for the SR 44 East Area is shown in in **Figure 13**.

Lift Stations

All sewer flows in this sewer shed ultimately outfall to one lift station (Wildwood Estates SW LS) that conveys the flows east through a single 8-inch diameter force main and pumps directly to the City's WRF. The 8-inch force main manifolds into the FCC Coleman 14-inch force main and then transitions to a 16-inch force main at the Main Street South LS. The existing lift stations in this area have sufficient capacity to meet the projected future flows.

Force Mains

An 8-inch diameter force main acts as the "backbone" for the SR 44 East Area and flows directly to the WWTF. This force main has sufficient capacity to meet the projected sanitary sewer flows for the SR 44 East Area.

Gravity Sewer

Given the anticipated development in the sewer shed, there is sufficient capacity to handle the future flows.

Future Development and Growth

No large developments are planned in this sewer shed since the area is mostly built out. The projected flow increases are the result of existing growth, system infill, and sanitary sewer infrastructure expansion. To provide wastewater collection services along the SR-44A corridor will require the construction of the SR-44A low pressure forcemain system (**WW Improvement No. 15**). This project would consist of the 7,000 linear feet of 3-inch force main which would manifold to the existing Wildwood Estates 8-inch forcemain.

CONTINENTAL COUNTRY CLUB AREA

The CCC wastewater collection and treatment system is currently not connected to the City's wastewater collection and treatment system and acts as a standalone wastewater collection and treatment system. The modeled collection system for CCC is shown in **Figure 13**.

Force Mains

A 6-inch diameter force main acts as the “backbone” for CCC. The 6-inch force main conveys flows directly to the WWTF. This force main has sufficient capacity to meet the project sanitary sewer flows for the CCC Area.

Gravity Sewer

Given the CCC development is considered mostly built out, the existing gravity system has sufficient capacity to handle the future flows.

Future Development and Growth

The Continental Country Club is considered built out, therefore there are no projected increases in sanitary sewer flows.

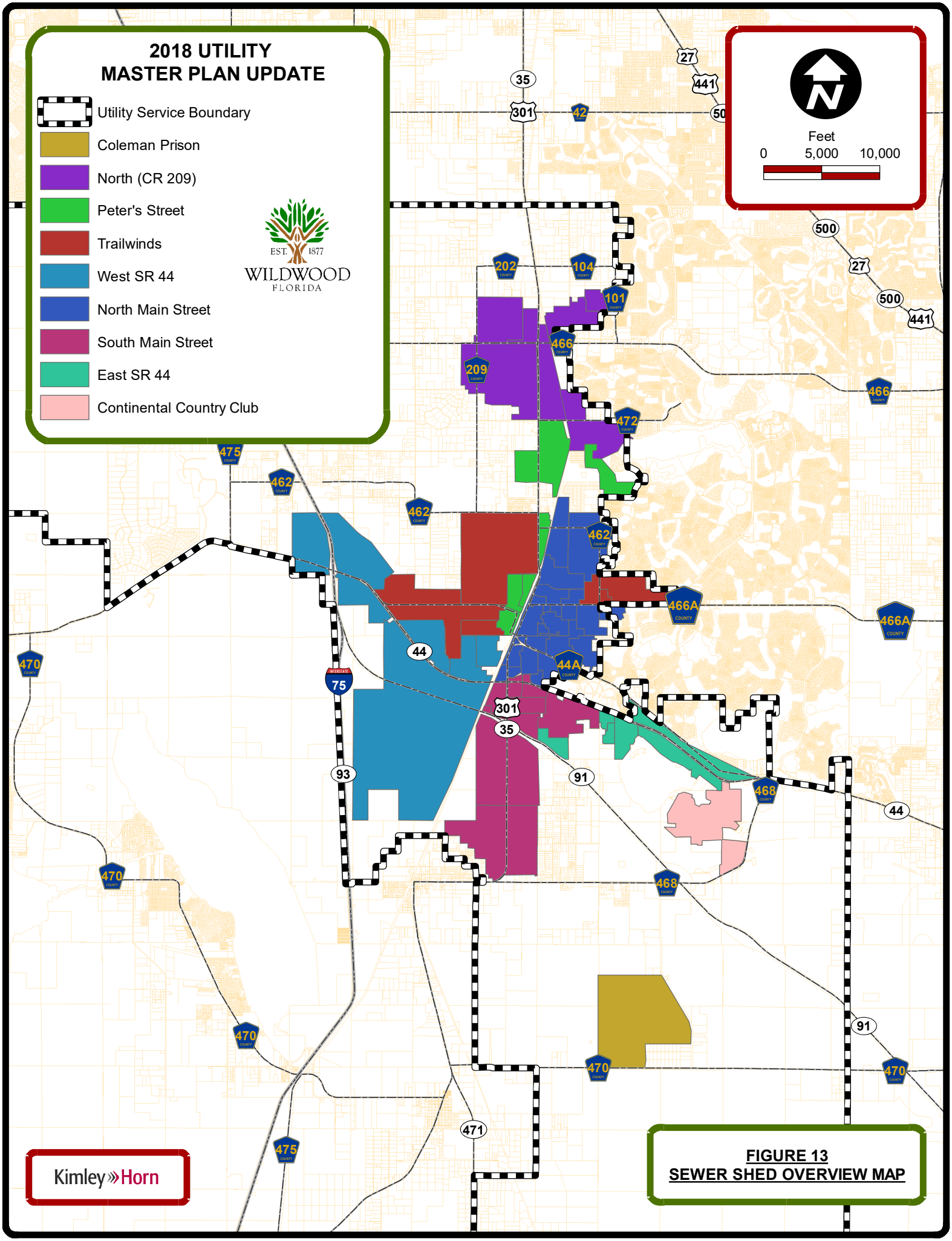
WASTEWATER TREATMENT PLANT

The CCC WWTF is a Category II, Class C facility that is permitted for 0.200 MGD on a three-month rolling average basis. The effluent disposal is a Part II slow-rate restricted access reuse system (R-001). R-001 consists of one lined holding pond of 279,000 gallons, one spray field of 27.82 acres, and one wet weather storage pond of 5.8 MG.

FDEP DMR data from April 2017 to March 2018 was evaluated to determine the average plant flow rates and the current treatment efficiency. Based on the DMR data from FDEP, the three-month rolling average daily flow (3MRADF) is currently 0.113 MGD or 56.8% of the permitted capacity.

Though the CCC WWTF has additional capacity, the WWTF is in poor condition overall, and requires substantial improvements to maintain operational reliability and continue to meet required treatment standards. The operational permit for the CCC WWTF requires operator attendance for 3 hours a day for 5 days a week and one weekend visit. The City currently reallocates staff to fulfill these requirements. Additionally, the City is experiencing rapid growth in the eastern SR-44 service area, which is defined as the area along SR-44 from Powell Road to CR 468. Though the City has water service available in the area, they are currently not able to serve this area with sanitary sewer services, which limits the potential development of the area.

In discussions with City staff, instead of rehabilitating the existing CCC WWTF, the City prefers to decommission the CCC WWTF and route the flows to the City WRF. Additionally, this will sanitary sewer service to currently unserved properties within the eastern SR-44 service area. This proposed project is listed as **WW Improvement No. 1.**


2018 UTILITY
MASTER PLAN UPDATE
Utility Service Boundary
Coleman Prison
North (CR 209)
Peter's Street
Trailwinds
West SR 44
North Main Street
South Main Street
East SR 44
Continental Country Club
EST. 1877
WILDWOOD
FLORIDA
Feet
0
5,000
10,000
Kimley»Horn
FIGURE 13
SEWER SHED OVERVIEW MAP
\\ocafp01\FL_OCA\OCA_Utilities\Wildwood\Projects\142173233 - 2017 Utility Master Plan Update\Doc\Report\Figures\Figure 13 - Sewer Sheds.mxd - 10/8/2018 2:12:36 PM - trey.clayton

WASTEWATER TREATMENT CAPACITY EVALUATION

The City currently operates its WRF as permitted and regulated by the FDEP under permit number FLA013497. The permitted capacity of the City's WRF is 3.55 MGD annual average day flow (AADF). The operating permit was renewed on January 23, 2017 and expires on January 22, 2027.

One of the conditions of the WRF operating permit is that the City must stay in compliance with the FAC, Section 62-600.405 "Planning for Wastewater Facilities Expansion". This section requires that the City report the three-month average daily flows for the most recent three consecutive months. If the flow exceeds 50 percent of the permitted capacity of the treatment plant or reuse and disposal systems, the City is required to submit a capacity analysis report (CAR) signed and sealed by a professional engineer registered in Florida. Based on when the projected flows will exceed the WRF capacity in the CAR, the City is required to take different actions. **Table 36** below is a summary of the required actions:

Table 36: FDEP WRF Requirements

Projected WRF Flow	Action Required
Will not exceed capacity in 5 years	Submit CAR every 5 years
Will exceed capacity in 5 years	Submit CAR annually
Will exceed capacity in 5 years	Start planning and preliminary design to expand WRF
Will exceed capacity in 4 years	Prepare plans and specifications for the expanded WRF
Will exceed capacity in 3 years	Submit construction permit for the expanded facility within 30 days of CAR
Will exceed capacity in 6 months	Submit an operation permit for the expanded WRF

To meet the 20-year demand projection of 5.70 MGD, the City will need to expand the existing WRF capacity between the year 2032 and 2037. Based on the FDEP requirements, the City will need to start the planning and preliminary design phase to expand the WRF by the year 2032.

RECOMMENDED WASTEWATER SYSTEM CAPITAL IMPROVEMENT PROJECTS

This section provides a discussion of capital improvement projects for addressing current deficiencies and meeting future demands. Included in this chapter is a project list with probable costs of construction for recommended projects. See **Appendix D** for the detailed breakdown of the estimated construction costs for each of the capital improvement projects and a preliminary timeline for project implementation. Many of the capital improvement projects are large and will require implementation over several years that may overlap the 3-year, 5-year, and 20-year planning time periods. See **Figure 14** for an overall map of the wastewater capital improvement projects.

WASTEWATER SYSTEM IMPROVEMENTS

The following capital improvement projects were separated between two categories based on the variables that triggered the requirement for each improvement. First, there are improvements that are driven by existing system growth and infill. These improvements are time sensitive and must be completed to meet the projected system demands. Second, there are developer-driven improvements. These improvements must be completed to serve and meet the projected flows of known developments. These improvements should be considered for improving the sanitary sewer system for the safety and reliability of the sanitary sewer service throughout the City.

WITHIN THE NEXT 3 YEARS:

WW Improvement No. 1

CCC WWTF Decommission and FM – Decommission the CCC WWTF, rehabilitate the CCC master lift station and replace the existing pumps with higher head pumps. Construct 16,500 LF of an 8-inch force main to direct flows from CCC to the City's WRF. See **Figure 15** for a project map. The estimated design and construction cost for this improvement is approximately $2,726,000.

WW Improvement No. 2

Providence LS – Redirect the flows from the Providence LS through the Trailwinds FM. This improvement will reduce the flows to the North Main Street LS sewer shed, which minimizes the required system improvements and will increase the overall system efficiency. The existing Providence LS pumps are sufficiently sized to meet the flow and head requirements of this improvement. There is no cost associated with this project.

WW Improvement No. 3:

Wastewater Treatment Facility Planning Document – The purpose of this planning document would be to identify the process modifications and improvements needed to meet the future demands and develop budgetary construction cost opinions for each alternative. The estimated cost for this document is approximately $75,000.

WW Improvement No. 4:

Infiltration and Inflow (I&I) study – I&I is the intrusion of clean storm and/or groundwater into the sanitary sewer system through holes, breaks, joint failures, connection failures, illegal connections (sump pumps, down spouts/gutters, and footing drains), and though cross-connections with storm sewers. Historical

WWTF influent flow records indicate significant I&I contributions during rain events. This project is the implementation of a program to identify and document locations where the collection system is allowing infiltration and inflow. The study would be limited to isolated areas within that City that are historically more susceptible to infiltration and inflow. The approximate cost associated with this study is $250,000.

WITHIN THE NEXT 5 YEARS:

WW Improvement No. 5:

Infiltration and Inflow (I&I) repairs – This project is the implementation of the corrective measures and repairs identified by the I&I study (**WW Improvement No. 4**). It is assumed that $100,000 will budgeted annually to address the repairs and improvements identified in the I&I study (**WW Improvement No. 4**)

WITHIN THE NEXT 20 YEARS:

WW Improvement No. 6:

Main Street North LS Upgrade – This improvement consists of upsizing the pumps in the Main Street North LS to meet the projected 20-year demands. The project will also include the complete rehabilitation of the existing wet well, valve vault, and expansion of the lift station site. As well as installing a standby generator equipped with an automatic transfer switch for redundancy. The estimated design and construction cost for this project is approximately $505,000.

WW Improvement No. 7:

City WRF Expansion to 6.00 MGD – The 6.00 MGD expansion will enable the City's wastewater system to meet the projected 20-year wastewater flows for the future developments, infill, and expansion areas. The project includes a new headworks, aeration basins, clarifiers, advanced treatment, disinfection expansion, filtration expansion, reclaimed water transfer system expansion, and a biosolids processing facility expansion. The estimated design and construction cost for this project is approximately $35,525,000.

DEVELOPMENT DRIVEN WASTEWATER SYSTEM IMPROVEMENTS:

WW Improvement No. 8

O'Dell Lift Station and/or Re-Pump Station – This project would be triggered by the O'Dell development. This project would consist of a new lift station on the south side of the O'Dell property. This lift station would be sized to meet the projected flows from the O'Dell development and re-pump the flows from the Trailwinds LS. The flows would be conveyed through the 12-inch and 16-inch Trailwinds FM. See **Figure 16** for a map of this improvement. The estimated design and construction cost for this project is approximately $810,000.

WW Improvement No. 9A

Monarch Ranch FM and LS - This project will be triggered by the Monarch Ranch development and would consist of a 12-inch diameter force main from the center of the Monarch Ranch development directly to the City WRF. See **Figure 17** for a map of this improvement. The LS will enable the Monarch Ranch development to meet the projected peak wastewater flows. The development of the Monarch Ranch property will trigger the project. The total length of pipe required to make this connection is approximately 22,000 LF. The estimated design and construction cost for this project is approximately $4,550,000.

WW Improvement No. 9B

Sumter, LLC FM and LS - This project will be triggered by the Sumter, LLC development and would consist of a 12-inch diameter force main from the development to the City's WRF. See **Figure 17** for a map of this improvement. The LS will enable the Sumter LLC development to meet the projected peak wastewater flows. The total length of pipe required to make this connection is approximately 17,000 LF. The estimated design and construction cost for this project is approximately $3,680,000.

WW Improvement No. 10

Wildwood Entertainment Park FM and LS – This project consists of an 8-inch diameter force main from just past the northeast corner of the Wildwood Entertainment Park south along US 301 to the South Main Street 16-inch force main. See **Figure 17** for a map of this improvement. The force main will enable the Wildwood Entertainment Park along with the projected expansion, infill, and southern area developments to meet the projected peak wastewater flows. The development of the Wildwood Entertainment Park will trigger the project. The total length of pipe required to make this connection is approximately 11,000 LF. The estimated design and construction cost for this project is approximately $1,735,000.

WW Improvement No. 11:

CR 219 LS Upgrades – This improvement will be triggered by the Lee Capital development and other developments along West SR 44. The CR 219 LS pumps will be upgraded, and the lift station will be rehabilitated to meet project future demands. The lift station upgrades will enable the CR 219 to meet the projected wastewater peak flows from the projected expansion, infill, and SR 44 West Area sewer shed. The estimated design and construction cost for this project is approximately $580,000.

WW Improvement No. 12

Lake Andrews Preserve LS and FM **–** This project consists of a 6-inch diameter force main from Lake Andrews Preserve to the northeast corner of the intersection of C-466 and CR 209. See **Figure 18** for a map of this improvement. The development of the Lake Andrews development will trigger the project. The total length of pipe required to make this connection is approximately 1,000 LF. The estimated design and construction cost for this project is approximately $550,000.

WW Improvement No. 13

Brown Property LS and FM - This project consist of an 8-inch diameter force main from the Brown property south on US 301 to the intersection of US 301 and C-466. See **Figure 18** for a map of this improvement. The development of the Brown development will trigger the project. The total length of pipe required to make this connection is approximately 6,000 LF. The estimated design and construction cost for this project is approximately $1,260,000.

WW Improvement No. 14A:

Adamsville Low Pressure Force Main System – Construct 14,500 LF of 2-inch, 3-inch, and 4-inch force main from the intersection of US-301 to CR 501 and manifold into the City's existing force main to provide the Adamsville corridor of CR-468 with wastewater collection services. See **Figure 19** for a project map. The estimated design and construction cost for this improvement is approximately $485,875.

WW Improvement No. 14B:

Adamsville Low Pressure Force Main System – Construct 25,000 LF of 2-inch, 3-inch, and 4-inch force main from CR 468 to the future Wildwood Entertainment Park LS **(WW Improvement No. 10)** to provide the Adamsville corridor of CR-468 with wastewater collection services. See **Figure 19** for a project map. The estimated design and construction cost for this improvement is approximately $560,625.

WW Improvement No. 15:

SR 44A Low Pressure Force Main System – Construct 7,000 LF of 2-inch and 3-inch force main from the along SR 44A and connect to the future 8-inch force main from Continental Country Club **(WW Improvement No. 15)** to provide the SR 44A corridor with wastewater collection services. See **Figure 19** for a project map. The estimated design and construction cost for this improvement is approximately $261,625.

RECLAIMED WATER SYSTEMS IMPROVEMENTS

The City's *2015 Utility System Master Plan* included recommended improvements to the City's reclaimed water and effluent disposal system. For completeness, this section presents the recommended reclaimed water system improvements from the *2015 Utility System Master Plan* since the reclaimed water system was not part of this update. Reference the *2015 Utility System Master Plan* for reclaimed water system hydraulic model development and scenario analysis.

RCW Improvement No. 1:

Expand Reclaim Storage for NSU – This project expands lined disposal ponds at the reclaimed storage site (R-12). The estimated design and construction cost for this project is approximately $585,000.

RCW Improvement No. 2:

Effluent Disposal Expansion – This project will expand the RIBs to meet the projected effluent disposal requirements at the reclaimed storage site (R-12). The estimated design and construction cost for this project is approximately $630,000.

RCW Improvement No. 3:

Millennium Park Reclaim Main Extension – This project consists of extending the existing 10-inch reclaim water main to the City's Millennium Park. The estimated design and construction cost for this project is approximately $1,435,500.

2018 UTILITY MASTER PLAN UPDATE

Legend

- WTP — Wastewater Treatment Plant
- PS — Public Lift Station
- PS — Future LS
- 3" Future FM
- 6" Future FM
- 8" Future FM
- 12" Future FM
- 16" Force Main
- 14" Force Main
- 12" Force Main
- 10" Force Main
- 8" Force Main
- 8" Force Main (Dry)
- 6" Force Main
- 6" Force Main (Dry)
- 4" Force Main
- 4" Force Main (Dry)

EST. 1877 WILDWOOD FLORIDA

Feet
0 3,500 7,000

Improvement No.13:
Brown Property LS and FM

Improvement No.12:
Lake Andrews Preserve LS and FM

Improvement No.8:
Trailwinds Re-Pump Station

Improvement No.2:
Redirect flows from the Providence LS through the Trailwinds FM

Improvement No.9b:
Sumter, LLC LS and FM

Improvement No.6:
Main St. North LS Upgrades

Improvement No.11:
CR 2019 LS Upgrades

City of Wildwood WWTF

Improvement No.1:
Decommission CCC WWTF
Construct 16,500 LF of 8" FM
to the existing WW Estates 8" FM

Improvement No.7:
WWTF Expansion to 6.00 MGD

Improvement No.15:
SR-44A Low Pressure System

Improvement No.9a:
Monarch Ranch LS and FM

Continental Country Club WWTF

Improvement No.10:
Wildwood Entertainment/US 301
LS and FM

Improvement No.14:
Warm Springs Ave Low Pressure System

Kimley»Horn

FIGURE 14
OVERALL WASTEWATER CIP

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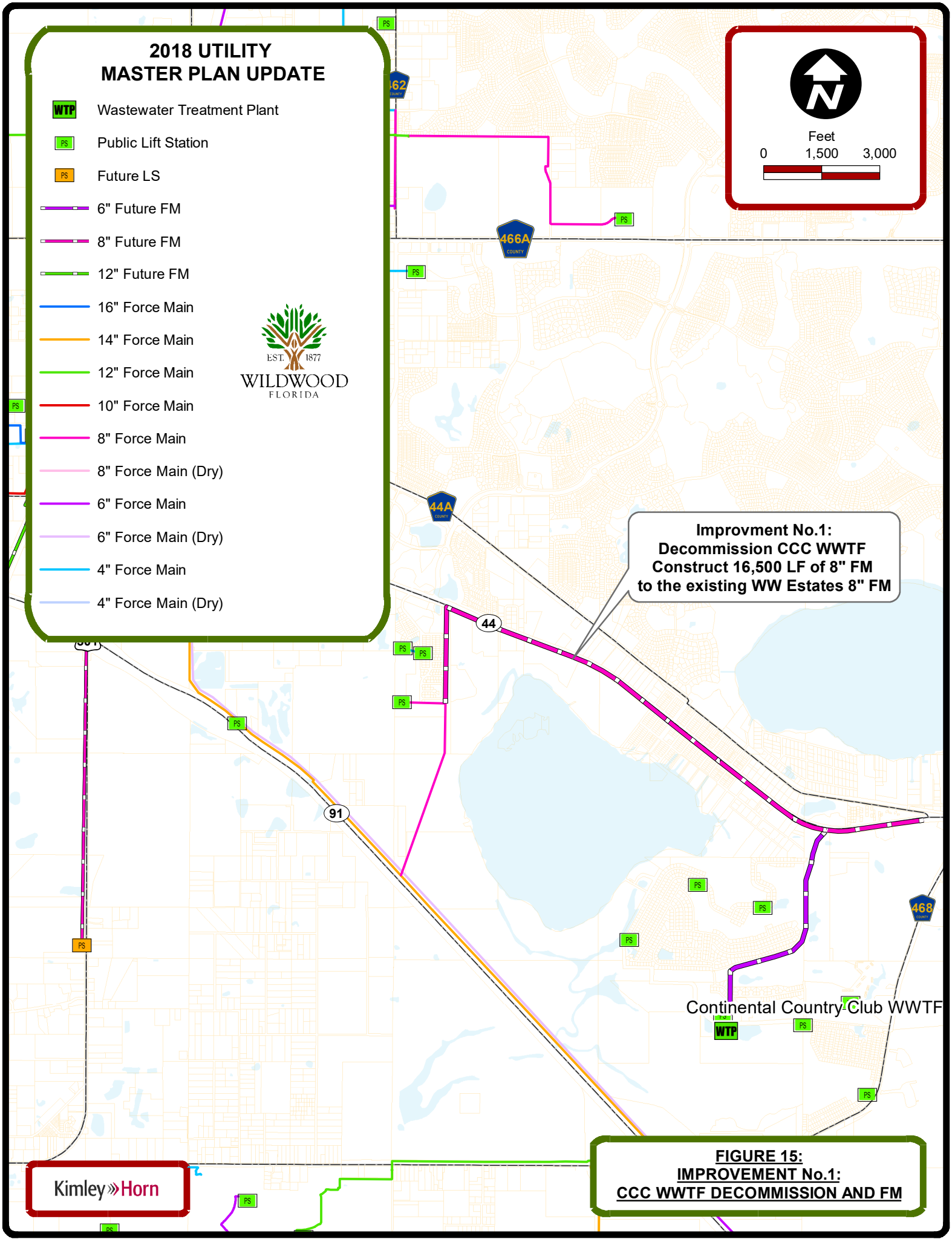

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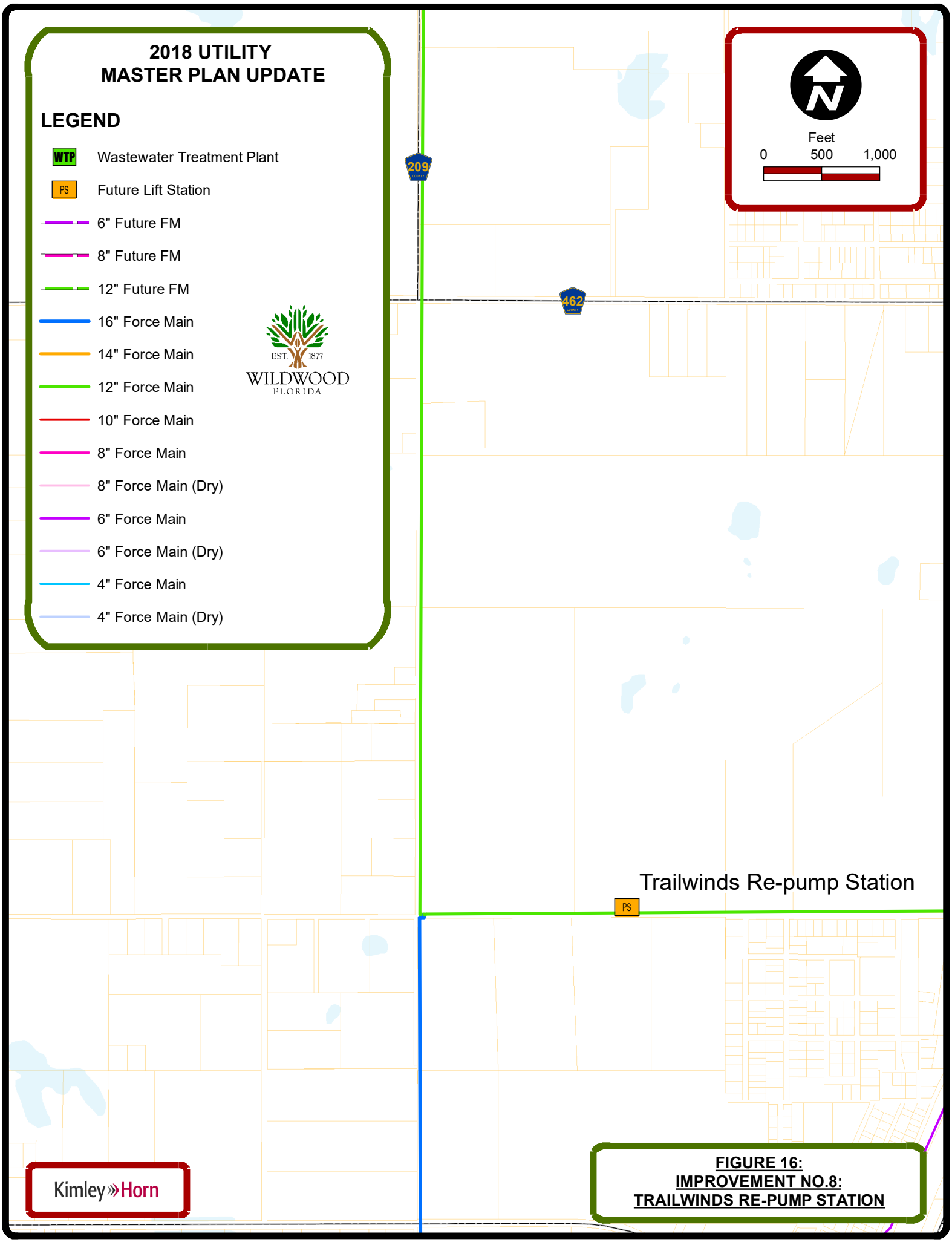

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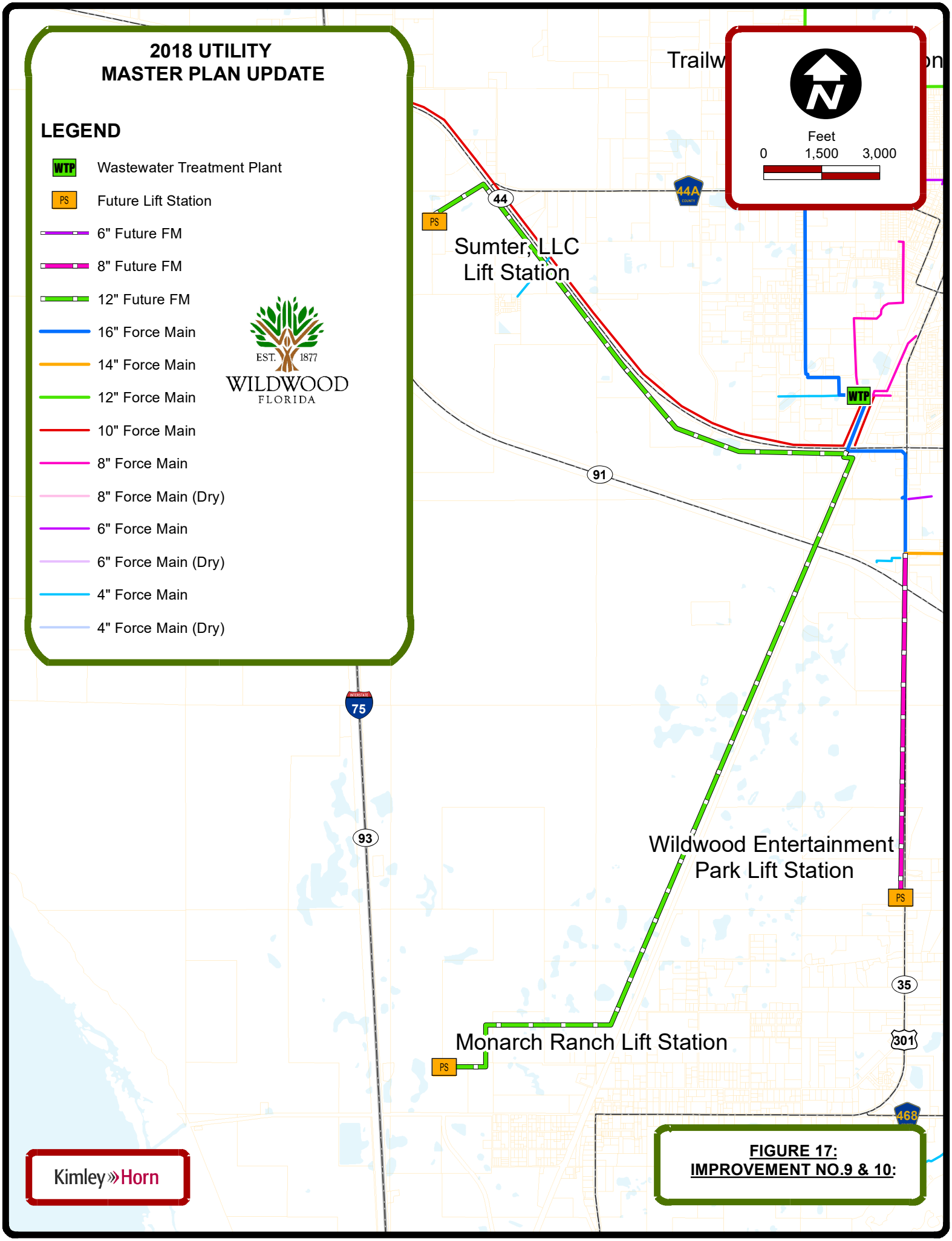

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2018 UTILITY MASTER PLAN UPDATE

LEGEND

- WTP — Wastewater Treatment Plant
- PS — Future Lift Station
- 6" Future FM
- 8" Future FM
- 12" Future FM
- 16" Force Main
- 14" Force Main
- 12" Force Main
- 10" Force Main
- 8" Force Main
- 8" Force Main (Dry)
- 6" Force Main
- 6" Force Main (Dry)
- 4" Force Main
- 4" Force Main (Dry)

EST. 1877 WILDWOOD FLORIDA

Feet
0 1,500 3,000

Brown Development Lift Station

Lake Andrews Preserve Lift Station

35 301 202 104 466 209 472

Kimley»Horn

FIGURE 18:
IMPROVEMENT NO.12 & 13:

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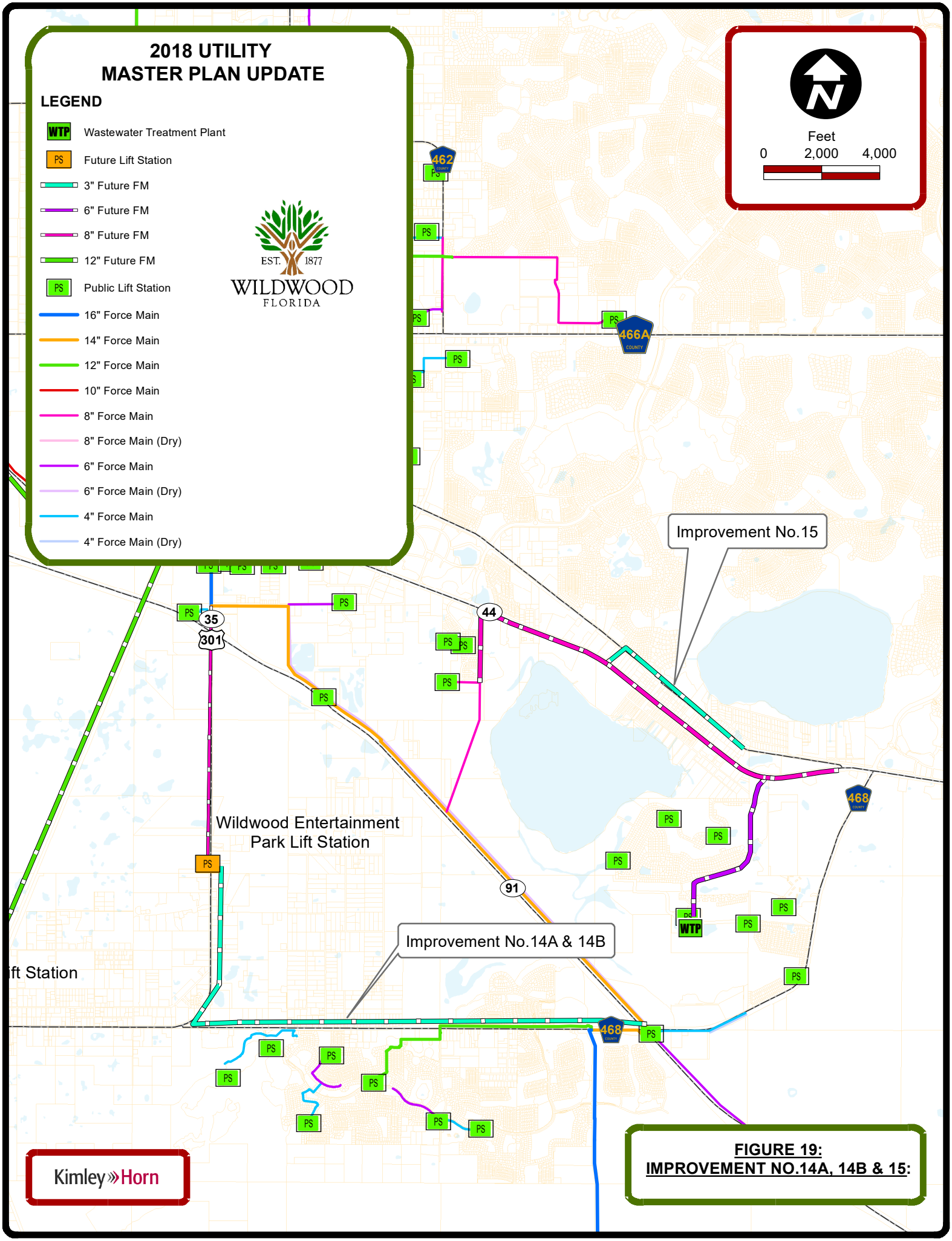
2018 UTILITY
MASTER PLAN UPDATE
LEGEND
WTP Wastewater Treatment Plant
PS Future Lift Station
3" Future FM
6" Future FM
8" Future FM
12" Future FM
PS Public Lift Station
16" Force Main
14" Force Main
12" Force Main
10" Force Main
8" Force Main
8" Force Main (Dry)
6" Force Main
6" Force Main (Dry)
4" Force Main
4" Force Main (Dry)
EST. 1877
WILDWOOD
FLORIDA
N
Feet
0 2,000 4,000
Improvement No.15
Improvement No.14A & 14B
Wildwood Entertainment
Park Lift Station
ft Station
462
466A
468
35
301
44
91
WTP
Kimley»Horn
FIGURE 19:
IMPROVEMENT NO.14A, 14B & 15:
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REVENUE SUFFICIENCY ANALYSIS

Kimley-Horn utilized a municipal financial advisor (Stantec) to conduct a utility revenue sufficiency analysis. The revenue sufficiency analysis consisted of the input of all financial, statistical, capital, and operational data and assumptions into Stantec's financial model, preparation of a comparative rate survey, two interactive work sessions with City staff to review the results of the analysis and develop scenarios, participation in public workshops, and preparation of a report documenting the results of the analysis. The analysis was conducted in conjunction with the master plan and used to refine the City's 5-year capital improvement program. Additionally, the revenue sufficiency analysis was used to assist the City with the following elements. A copy of the final report is included in **Appendix E**.

- Evaluating the impact of key capital improvement projects (in terms of both cost and timing) under various scenarios as appropriate during the master plan process.
- Understanding the future impacts of its current FY 18/19 and proposed FY 19/20 operating and capital improvement budgetary requirements.
- Quantifying the rate impacts of alternative renewal and replacement, operation and maintenance, and system expansion programs.
- Quantifying the amount of renewal and replacement, operation and maintenance, and system expansion funding provided under various rate adjustment options.
- Developing alternative growth forecasts, inclusive of revenue, operating cost, and capital improvement plan requirements.
- Evaluating the impact of alternative borrowing scenarios, including refinancing and/or new borrowings required for future capital improvement requirements.
- Evaluation of the impacts of potential utility acquisition scenarios.
- Establishing financial policies relative to reserves, debt service coverage, and rate adjustments that provide for sustainable services over a multi-year planning period.

APPENDICES

APPENDIX A:
Small Area Population Projection Methodology (SWFWMD)

The Small Area Population Projection Methodology Used by the Southwest Florida Water Management District

Prepared for

Southwest Florida Water Management District
Contract 10CC0000002
Work Order Number 1

Prepared by

GIS Associates, Inc.
806 NW 16th Avenue, Suite A
Gainesville, Florida 32601

October 3, 2013

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INTRODUCTION

The purpose of this document is to describe the methodologies used by the Southwest Florida Water Management District (SWFWMD) to develop small area population projections in support of water supply planning and water use permitting. Accurately projecting future water demand for water utility potable service areas requires more precision than is offered by the county level projections available from the Bureau of Economic and Business Research (BEBR) at the University of Florida, the generally accepted standard throughout the State of Florida. In addition, the Census Population Cohort projected by BEBR does not include important non-permanent populations, such as seasonal residents, tourists or commuters. For these reasons, SWFWMD contracted with GIS Associates, Inc. (GISA), to provide small area population projections for the 16 counties located partly or entirely within SWFWMD. This was achieved by implementing GIS Associates' Small Area Population Projection Model (GISA Projection Model), which makes Census Population Cohort projections at the 2010 Census Tract level, and distributes those projections to individual land parcels to facilitate aggregation by utility or other boundaries. In addition, GISA applied SWFWMD methods for projecting non-permanent population to the Census Population Cohort projections derived from the GISA Projection Model. This document describes these projection methodologies and their use to project future populations. Ultimately, these small area population projections were used as a basis for making future water demand projections for SWFWMD.

SMALL AREA POPULATION PROJECTION MODEL OVERVIEW

The geographic information system (GIS) based small area population projection model used by SWFWMD projected future Census Population Cohort population growth at the parcel level, and normalized those projections to BEBR's latest county level forecasts. Figure 1 on the following page shows a process flow chart of the population projection and distribution methodology. First, a County Build-out Model was developed by GISA from the base parcel data. The purpose of the County Build-out Model is to develop maximum residential development potential at the parcel level. A detailed description of this model is included in the chapter titled County Build-out Models. Current permanent population was estimated and then the maximum population to which a county can grow was modeled by the County Build-out Models. Areas which cannot physically or lawfully sustain residential development (built-out areas, water bodies, public lands, commercial areas, etc.) were excluded from the County Build-out Model. Conversely, the model identified areas where growth is more likely to occur based on proximity to existing infrastructure. This is discussed in detail in chapter titled Growth Drivers Model.

Next, population growth was modeled between the current estimated population and the build-out population. Projections are based on a combination of historic growth trends (using an approach similar to that used by BEBR for its county level projections), and spatial constraints and influences, which restrict or direct growth. This process is described in detail in the chapter titled Population Projection Model. Population growth calculations were limited by

BEBR's 2013 medium projections, which are BEBR's latest population forecasts for the years 2015 through 2040, which were available in five-year increments. The source of this data is the BEBR publication *Projections of Florida Population by County, 2015-2040, with Estimates for 2012.* (Florida Population Studies, Bulletin 165, March 2013). The process for limiting growth is described in the chapter titled Population Projection Model.

The launch year for the version of the model described in this document was 2012, which was calibrated to the 2012 BEBR estimates of county population. Projections were made through the year 2040 in the following increments:

1. April 2, 2012 through April 1, 2015
2. April 2, 2015 through April 1, 2020
3. April 2, 2020 through April 1, 2025
4. April 2, 2025 through April 1, 2030
5. April 2, 2030 through April 1, 2035
6. April 2, 2035 through April 1, 2040

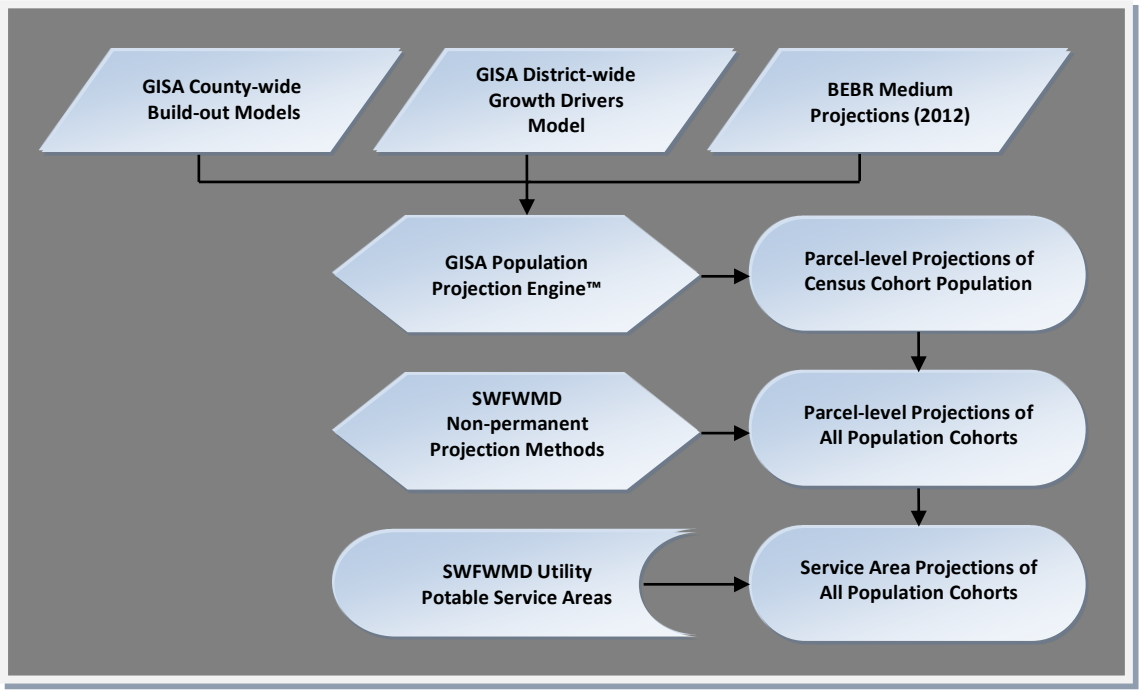

Figure 1. SWFWMD population projection process flowchart

Finally, the parcel level projections are summarized by any set of boundaries desired (utility service areas, municipalities, watersheds, etc.). For SWFWMD planning efforts, parcel projections were summarized by water utility service area boundaries that SWFWMD maintains in a spatial (GIS) database. These summaries were exported to a Microsoft Excel spreadsheet with separate tabs for each county to facilitate the review and distribution of the results.

COUNTY BUILD-OUT MODELS

The County Build-out Models are composed of multiple GIS data elements. Each model is based on each county property appraiser's GIS parcel database, including the associated tax roll information. Other elements incorporated into each build-out model include the 2010 US Census data, SWFWMD wetland data, local government future land use maps, and Development of Regional Impact (DRI) plans for the county of interest.

Parcels

GIS parcel layers and county tax roll databases were obtained from each county property appraiser's office. Parcel geometry was checked for irregular topology, particularly overlaps and fragments. Parcel tables were checked for errors, particularly non-unique parcel identifiers and missing values. Required tax roll table fields include actual year built, Florida Department of Revenue (DOR) land use code, and the total number of existing residential units for each parcel. In cases where values or fields were missing, other relevant information was extrapolated and used as a surrogate. For example, when data identifying the number of housing units per multi-family parcel were absent, multi-family unit totals for each parcel were determined using other data from the county property appraisers.

2010 US Census Data

Some of the essential attribute information to translate parcels to population in the County Build-out Models was derived from data from the 2010 Census. Average population per housing unit by census tract was calculated and then transferred to each county's parcel data. No adjustment for vacant units was required, as the calculation was made using total housing units (not limited to occupied units). This average population per housing unit enabled parcel level estimation of population from parcel based housing unit estimates. In cases where property appraiser data were missing or incomplete, other data were used. For example, because mobile home parks with units not individually platted typically do not contain the number of units within the property appraiser data, the number of residential units for parks larger than five acres was estimated using a hand count from recent imagery.

Water Management District Boundaries

Each parcel in the County Build-out Models was also attributed with water management district boundaries (from SWFWMD), which enabled the county models for any counties split between two or more water management districts to be summarized for the respective district.

Wetlands

Wetlands (including surface water) are an important consideration when modeling a county's build-out. SWFWMD maintains a detailed GIS database of wetlands within its boundaries. This database contains the location and spatial extent of the wetlands, as well as the specific types of wetlands as defined by SWFWMD land cover classifications. Certain wetland types were identified that would be difficult and expensive to convert to residential development. These areas were identified in the SWFWMD wetland database and applied to the appropriate County Build-out Model. The wetland types are listed in Table 1.

Table 1. Wetland land cover codes and descriptions used in the County Build-out Models

Code	Description	Code	Description
5100	Streams and waterways	5600	Slough waters
5200	Lakes	6110	Wetland Hardwood Forests
5250	Marshy Lakes	6120	Mangrove swamp
5300	Reservoirs	6170	Mixed wetland hardwoods
5400	Bays and estuaries	6180	Cabbage palm wetland
6181	Cabbage palm hammock	6410	Freshwater marshes
6200	Wetland Coniferous Forest	6420	Saltwater marshes
6210	Cypress	6430	Wet prairies
6220	Pond pine	6440	Emergent aquatic vegetation
6250	Hydric pine flatwoods	6460	Mixed scrub-shrub wetland
6300	Wetland Forested Mixed	6500	Non-vegetated Wetland

Wetland GIS data (using the above classifications) were overlaid with a county's land parcels. The area of wetlands within parcels were calculated and recorded as the water area for that parcel. If the area covered by water within a parcel exceeded 0.5 acres, it was subtracted from the total area of the parcel feature to determine the relative developable area in that parcel. There were exceptions to this rule. In some cases, parcels with little or no developable area after wetlands were removed were already developed, thus the estimated unit total was not reduced by the wetland acreage. In other cases, inaccurate wetland delineations were overridden, such as when a newly platted residential parcel was shown to be covered by a wetland (Figure 2). In such a case, the parcel was considered developable by the model.

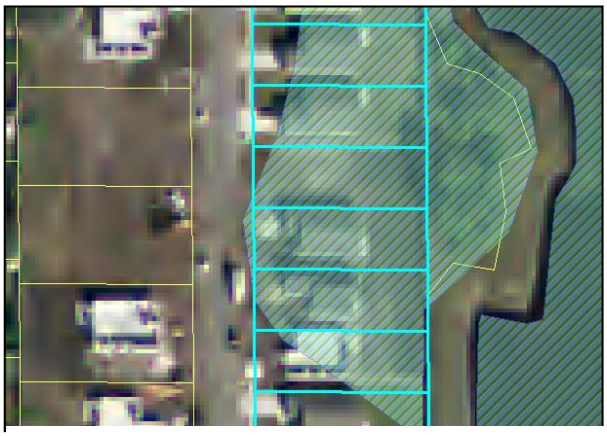

Figure 2. Example of inconsistencies between wetland delineation and residential parcels (outlined here in light blue)

Future Land Use

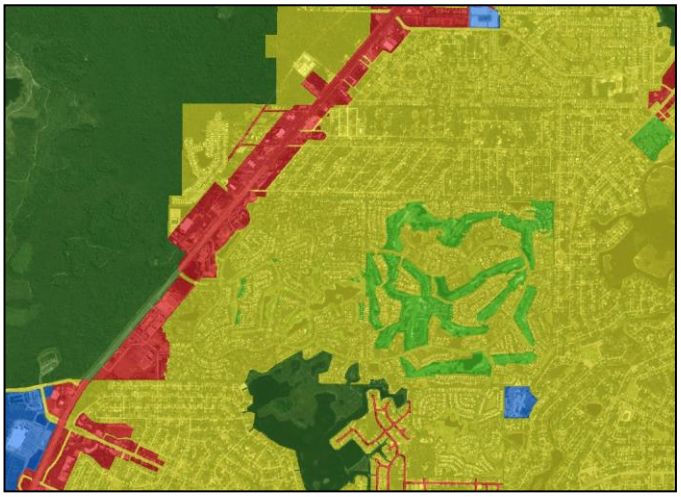

Figure 3. Future land use helps identify future residential areas (here shaded in yellow)

Future land use maps were essential elements of the County Build-out Models. These maps helped guide where and at what density residential development could occur within a county (Figure 3). Future land use maps are a part of the local government comprehensive plans required for all local governments by Chapter 163, Part II, F S. They are typically developed by the local government's planning department, or, in some cases, a regional planning council. The latest available future land use maps were obtained and applied to the build-out model. The planning horizons for these are a minimum of 10 years, and they often extend for 15 to 20 years into the future. Table 2 shows which future land use map classes were assigned residential densities in the County Build-out Models. Future land use map classifications for residential land uses are assigned maximum housing unit densities (per acre) or density ranges. These ranges were intended to guide the type and density of development. However, development does not always occur at densities consistent with future land use maps.

Table 2. Generalized future land use classes allowed by the County Build-out Model to project future residential development

Generalized Future Land Use Classes	Whether Residential Development Is Allowed by the Model
Agricultural	Yes
Low Density Residential	Yes
Medium Density Residential	Yes
High Density Residential	Yes
Mixed Use	Yes
Commercial	No
Recreation / Open Space	No
Conservation / Preservation	No
Industrial	No
Institutional	No
Right of Way	No
Water	No

For this reason, County Build-out Models reflect the current average density for each future land use category in the specific incorporated place instead of the maximum density allowed by the future land use designation. It was assumed that densities of recent development are a better indicator of future densities than the maximum allowable density. For example, if a city's

medium density residential future land use designation allows up to 8 housing units per acre, but the average density of units built is 5.7 housing units per acre, the model assumed future densities at 5.7 housing units per acre for that future land use designation in that city.

As an exception, some future land use categories had insufficient sample size to create average density values. In such cases, countywide average density was applied for that future land use class. Vacant or open parcels less than one acre in size were considered single family residential, with 1 housing unit as the maximum allowable density.

Each land parcel in the County Build-out Models received a future land use designation. In places where parcels overlapped multiple future land use areas, the parcel was assigned the future land use class within which its center fell. Build-out population was modeled only for future land use classes designated to allow residential development (which include agriculture and mixed use).

Build-out Density Calculation

Using GIS overlay techniques, attributes of the census, political boundary, wetlands, and future land use data were attributed to each county's parcel data to develop the County Build-out Models. These models forecast the maximum residential population by parcel at build-out (Figure 4).

Figure 4. Example of Build-out Density Model shaded by housing units per acre

Census tracts where the 2010 population was zero, and therefore the average persons per housing unit was zero, were assigned the county's average persons per housing unit. Also, if there were tracts with 2010 census values for persons per housing unit greater than zero that were based on a small number of homes with greater than five persons per housing unit, the county's average persons per housing unit was typically used.

Developments of Regional Impact

Developments of Regional Impact (DRI) are defined by Section 380.06(1), F.S., as "any development that, because of its character, magnitude or location, would have a substantial effect on the health, safety or welfare of citizens in more than one county." DRI plans are another component of Florida's growth management legislation required by Chapter 380, F.S. The final step in the development of the County Build-out Models was adjusting build-out densities to correspond with approved DRIs, or other large development plans (where

available). The state annually updates population-based thresholds by county to determine when a development must undergo the DRI review process. For residential DRIs, housing unit thresholds range from 250 units (in counties with fewer than 25,000 people) to 3,000 units (in counties with more than 500,000 people). A DRI plan delineates the boundaries of a DRI, the number of housing units within the boundaries, and the projected timing of when these units will be built. Figure 7 shows an example of a DRI with the planned units at build-out. Although DRIs often do not develop as originally planned by the developer, the total number of units planned (regardless of timing) is likely to be a better forecast of the units at build-out than the average historic densities. Therefore, in each of the build-out models, parcels that were within a DRI were attributed with the name of the DRI. The build-out densities for parcels within a particular DRI were adjusted, if necessary, to be consistent with the DRI development plan, and the build-out population for that area was recalculated.

GROWTH DRIVERS MODEL

The Growth Drivers Model is a district-wide, raster (cell-based) GIS model representing development potential. The model is a continuous surface of 10-meter cells containing values of 0-100, with '100' having the highest development potential and '0' having the lowest development potential. It influences the GISA Projection Model by factoring in the attraction of certain spatial features, or growth drivers on development. These drivers were identified from transportation and land use/land cover data. They included the following:

1. Proximity to roads and interchanges prioritized by level of use (with each road type modeled separately, but then combined into a single model)
2. Proximity to existing residential development
3. Proximity to existing commercial development (based on parcels with commercial land use codes deemed attractors to residential growth)
4. Proximity to coastal and inland waters
5. Proximity to active Developments of Regional Impact and Planned Units Developments

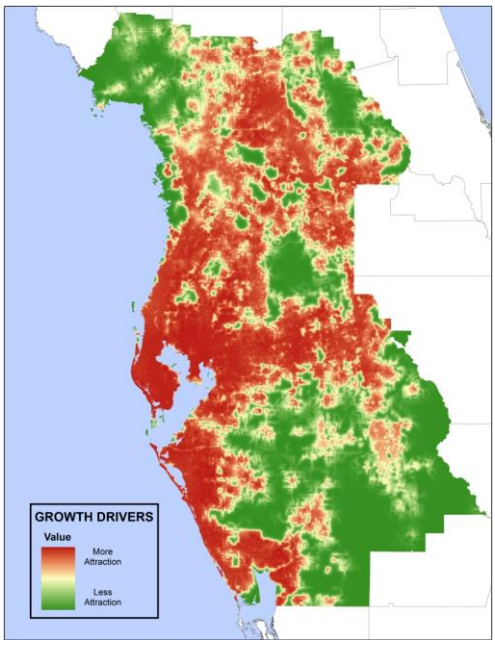

Figure 5. Growth Drivers Model

Figure 5 depicts the Growth Drivers Model for SWFWMD, with high development potential in red, moderate development potential in white and low development potential in green. Data used for generating the Growth Drivers Model and their sources are listed in Table 3 on the following page.

Table 3. GIS datasets used in the Growth Drivers Model

Growth Driver	Data Source
Roads and Limited Access Road Interchanges	Florida Department of Transportation (FDOT) Major Roads: Functional Classification (FUNCLASS), and FDOT Limited Access Road Interchanges
Existing Residential Land Uses	County Property Appraiser Parcel Data
Selected Existing Commercial Land Uses	County Property Appraiser Parcel Data
Coastal and Inland Waters	SWFWMD Land Cover Data, and Florida Geographic Data Library (FGDL) Coastline Data
Active DRIs and PUDs	Multiple sources, including Regional Planning Councils, local governments, and GIS Associates

Each of the drivers listed in Table 3 were used as independent variables in a logistic regression equation. Dependent variables included existing residential units built during or after 1995 as the measure of "presence", and large undeveloped vacant parcels outside of DRIs or PUDs were used to measure "absence". The resulting equation could then be applied back to each of the regional grids resulting in a single regional grid with values 0 through 100, for which a value of 0 represented the lowest relative likelihood of development, and a value of 100 represented the highest relative likelihood of development.

This seamless, "regional" model covers all the counties all or partially within the Southwest Florida Water Management District, plus a one-county buffer to eliminate "edge effects". In this case, the edge effects refer to the presence or absence of growth drivers outside the District that could influence growth within the District. This model was then used by the GISA Projection Model to rank undeveloped parcels based on their development potential, which is explained in the Growth Calculation Methodology section.

SMALL AREA POPULATION PROJECTION MODEL

The GISA Small Area Population Projection Model (GISA Projection Model) integrates the County Build-out Models and the Growth Drivers Model with the GISA Population Projection Engine™, which makes the projection calculations using a combination of those models with the historic growth trends and county level population controls from BEBR.

Historic Growth Trends

The historic growth trends were derived from historic census population estimates for 1990, 2000, and 2010. For 1990 and 2000, census tract population estimates from the Florida House of Representatives Redistricting Data website (http://www.floridaredistricting.org/FredsData.html, 2002) were summarized at the 2010 tract level, and combined with the 2010 tract population estimates. These estimates were used to produce seven tract level projections using five different methods. The minimum and maximum calculations were discarded to moderate the effects of extreme projections (Smith and Rayer 2004). The remaining projections were then averaged.

The five statistical methods for population projection utilized by the model were:

1. Linear
2. Exponential
3. Share-of-Growth
4. Shift-Share
5. Constant Population

The Linear, Exponential, and Constant Population techniques employ a bottom-up approach, extrapolating the historic growth trends or population of each census tract with no consideration for the county's overall growth. The Share-of-Growth and Shift-Share techniques employ a ratio allocation, or top-down approach, allocating a portion of the total projected county growth to each census tract based on that census tract's percentage of county growth over the historical period. Each of the five methods is a good predictor of growth in different situations and growth patterns, so using a combination of all five was the best way to avoid the largest possible errors resulting from the least appropriate techniques for each census tract within the 16-county area (Sipe and Hopkins 1984). This methodology is based on BEBR's population projection methodology and is well suited for small area population projections.

The calculations associated with the five statistical methods are described below.

1. **Linear Projection Method:** The Linear Projection Method assumes that future population change for each census tract will be the same as over the base period (Smith and Rayer, 2013). Two linear growth rate calculations were made, one from 1990 through 2010 (20-year period), and one from 2000 through 2010 (10-year period). In the two Linear methods (LIN), population growth was calculated using the following formulas:

$$LIN_1 = \frac{(TractPop2010 - TractPop1990)}{20} * 5$$

$$LIN_2 = \frac{(TractPop2010 - TractPop2000)}{10} * 5$$

2. **Exponential Projection Method:** The Exponential Projection Method assumes that population will continue to change at the same annual growth rate as over the historic period. In the Exponential method (EXP), population growth was calculated using the following formula:

$$EXP = (TractPop2010 * e^{5r}) - TractPop2010$$

where,

$$r = \frac{\ln \frac{TractPop2010}{TractPop2000}}{10}$$

3. **Share-of-Growth Projection Method:** The Share-of-Growth Projection Method assumes that each census tract's percentage of the county's total growth will be the same as over the base period (Smith and Rayer, 2013). Two Share-of-Growth calculations were made, one from 1990 through 2010 (20-year period), and one from 2000 through 2010 (10-year period). In the two Share-of-Growth calculations (SOG), population growth was calculated using the following formulas (using the five years from 2015–2020 as an example):

$$SOG_1 = \frac{(TractPop2010 - TractPop1990)}{(CountyPop2010 - CountyPop1990)} * (CountyPop2020 - CountyPop2015)$$

$$SOG_2 = \frac{(TractPop2010 - TractPop2000)}{(CountyPop2010 - CountyPop2000)} * (CountyPop2020 - CountyPop2015)$$

4. **Shift-Share Projection Method:** The Shift-Share Projection Method assumes that each census tract's percentage of the county's total annual growth will change by the same annual amount as over the base period (Smith and Rayer, 2013). In the Shift-Share Projection Method (SSH), population growth was calculated with the following formula (using the five years from 2015–2020 as an example):

$$SSH = \left[\begin{array}{l} \frac{(TractPop2010 - TractPop2000)}{(CountyPop2010 - CountyPop2000)} \\ + \\ \left[\frac{(TractPop2010 - TractPop2000)}{(CountyPop2010 - CountyPop2000)} \right] \\ - \\ \left[\frac{(TractPop2000 - TractPop1990)}{(CountyPop2000 - CountyPop1990)} \right] \\ /10*5 \end{array} \right] * (CountyPop2020 - CountyPop2015)$$

The Shift-Share Method is an appropriate method when the historic growth trend at the tract and county levels are consistent (both are positive, or both are negative). If the growth trend at the tract level is negative and the growth trend at the county level is positive (or vice versa), the Shift-Share method is <u>not</u> an appropriate technique according to BEBR (Stanley Smith, Ph.D., personal communication, 2011). For any tracts where the historic growth trend was the opposite of the county's growth trend, the Shift-Share Method was replaced with the Constant Population Method, which a technique that has been newly adopted by BEBR.

5. **Constant Population Method:** The Constant Population Method assumes that future population will remain constant at its 2010 value (Smith and Rayer, 2013). This technique was only used as a substitute for the Shift-Share Method for tracts with a historic growth trend that was inconsistent with the county growth trend over the same period. In the Constant Population (CON), population was held to its 2010 value, so there was no growth calculated.

6. **Average of the Projection Extrapolations:** The minimum and maximum of the six calculations for each census tract were dropped to reduce errors resulting from the least appropriate techniques. The four remaining calculations were averaged to account for the considerable variation in growth rates and patterns over all of the census tracts within the 16-county area (Sipe and Hopkins 1984). All four remaining methods were weighted equally. The average was calculated using the following formula:

$$AVG = \frac{(LIN_1 + LIN_2 + EXP + SOG_1 + SOG_2 + SSH - MIN - MAX)}{4}$$

where,

MIN = method resulting in minimum growth for each tract

and,

MAX = method resulting in maximum growth for each tract

and,

CON was used in place of SSH for tracts with historical growth trends that were inconsistent with the historic county growth trends

Growth Calculation Methodology

After the development of the County Build-out Models and the Growth Drivers Model, the GISA Population Projection Engine™ was used to make the growth calculations. The methodology for calculating growth for each projection increment included the following steps:

1. Applying census tract level average historical growth rate to parcels within a particular tract.
2. Checking growth projections against build-out population, and reducing any projections exceeding build-out to the build-out numbers.
3. After projecting growth for all census tracts within a particular county, summarizing the resulting growth and comparing it against countywide BEBR target growth. This step led to two scenarios:
    a. If the Small Area Population projection model's projections exceeded the BEBR target, projected growth for all tracts was reduced by the percentage that the projections exceeded the BEBR target.
    b. If the Small Area Population projection model's projections were less than the BEBR target (which is more common due to high growth areas building out), the model would continue growing the county using the Growth Drivers Model until

the BEBR target growth for each five-year increment was reached. This process involved developing parcels in undeveloped census tracts with the highest growth driver values.

4. Summarizing growth and checking against build-out.
5. Continuing this process until the county growth target was met. (Note that this BEBR-based target growth was a countywide number. Counties that are partially within another water management district were processed in their entirety and controlled to the BEBR-based target growth. The proportion of the county population within SWFWMD was dictated by the Small Area Population projection model, not by BEBR.)

NON-PERMANENT POPULATION PROJECTIONS

In addition to the Census Population Cohort projections generated by the GISA Projection Model, projections of non-permanent population were also made. Those projections include peak seasonal population, functionalized seasonal population, tourist population and net commuter population. The methods derived by SWFWMD and implemented by GIS Associates for projecting those population types are described in this section.

Peak Seasonal Population Cohort

Seasonal population was estimated using a combination of 2010 census data and emergency room admissions data, both at the Zip Code Tabulation Area (ZCTA) level. Average 2009 - 2011 emergency room admissions data was utilized for a population cohort typical of seasonal residents (between the ages of 55 and 84).

A “Seasonal Resident Ratio” was calculated by ZCTA to estimate the proportion of peak (including seasonal) to permanent population. The ratio was derived using the following steps:

1. Subtract total 2009 - 2011 total third quarter (Q3, or July, August and September) hospital admissions from first quarter (Q1, or January, February and March) admissions.
2. Calculate the average annual difference between Q1 and Q3 by dividing above result by three.
3. Calculate a seasonal population estimate for ZCTA by dividing above difference by the probability of the population in the 45-74 age cohort of being admitted to the emergency room (approximately 2.23%). [Note that the selection of 45-74 age cohort probability (instead of 55-84 age cohort probability) is based on literature indicating that seasonal residents are generally healthier that their year-round counterparts.]
4. Calculate the Seasonal Resident Ratio by adding the seasonal population to the permanent population and dividing that total by the permanent population.

The number of seasonal households was then estimated using the following steps:

1. Multiply the permanent population in households (from the 2010 census) by the Seasonal Resident Ratio.
2. Subtract the permanent population in households from above result.

3. Divide above result by the lesser of SWFWMD's seasonal persons per household (1.95) or the census permanent persons per household for each ZCTA.

The ratio of seasonal to total households was then calculated by dividing seasonal households by the sum of seasonal and permanent households. Seasonal peak population was then calculated using the following steps:

1. Subtract vacant housing units for reasons other than seasonal, recreational, or occasional use from total housing units (from the 2010 census).
2. Multiply above result times the seasonal to total household ratio.
3. Multiply above result times the lesser of SWFWMD's seasonal persons per household (1.95) or the census permanent persons per household for each ZCTA.

Because the Census Population Cohort contains some non-permanent residents who complete the census forms in Florida but reside for part of the year outside of Florida, it was also necessary to calculate the permanent population. Permanent population was calculated using the following steps:

1. Subtract vacant housing units for reasons other than seasonal, recreational, or occasional use from total housing units (from the 2010 census).
2. Multiply above result times one minus the seasonal to total household ratio.
3. Multiply above result times the census permanent persons per household for each ZCTA.

The ratio of total unadjusted peak population to total census population was then calculated by dividing the sum of the seasonal peak population, the permanent population, and the group quarters population (from the 2010 census) by the total census population. This ratio was then applied to the future projections of the Census Population Cohort from the GISA Projection Model to derive parcel level peak population projections.

Functionalized Seasonal Population Cohort

The functional population is the peak seasonal resident population reduced to account for the percentage of the year seasonal residents typically reside elsewhere, and the lack of indoor water use during that time. It was calculated using the following generalized steps:

1. Utilize the following metrics previously derived by SWFWMD:
    a. The appropriate proportion of the year seasonal residents spend in Florida, which varies from beach destination counties (44.2%) to non-beach destination counties (56.7%).
    b. The seasonal resident adjustment based on average per capita water use.
        i. The five-year District-wide average per capita use is 132 gallons per person per day, and 69.3 gallons is estimated indoor use and 62.7 gallons for outdoor use.
        ii. The adjustment factor is calculated using the following equation for "beach destination" counties (Charlotte, Manatee, Pinellas and Sarasota):
        ((0.442 x 132 gpd) + ((1 – 0.442) x 62.7 gpd)) / 132 gpd = 0.707

iii. The adjustment factor is calculated using the following equation for "non-beach destination counties":
((0.567 x 132 gpd) + ((1 – 0.567) x 62.7 gpd)) / 132 gpd = 0.773

2. Calculate "functionalized" seasonal population by multiplying the seasonal peak population by the appropriate seasonal resident adjustment factor for the particular county (0.707 or 0.773).

The ratio of total functional to total census population was then calculated by dividing the sum of the functionalized seasonal population, the permanent population, and the group quarters population (from the 2010 census) by the total census population. This ratio was then applied to the future projections of the Census Population Cohort from the GISA Projection Model to derive parcel level functional population projections.

Tourist Population Cohort

The tourist population projections were based on 17 years (1996-2012) of county level lodging room data from the Florida Department of Business and Professional Regulation (DBPR). The SWFWMD methodology for projecting future tourist rooms by county utilizes two different methods and averages the two results for each county.

The first method projects the increase in rooms by county by extrapolating the linear trend using the least squares method derived from the last 17 years of county total room estimates. This was the method used by the District for the past several years.

A second method projects future rooms based on projections of employment in the Accommodation and Food Services industries (from 2013 data from Woods and Poole). This is also an extrapolation of a linear trend using the least squares method, but rooms by county are projected as a function of a county's employment projections rather than time.

SWFWMD staff tested both methods by projecting values for the years 2007-2012 using room estimates from 1996-2006. Based on the differences between actual room estimates and projected values for 2007-2012, neither method was clearly superior to the other. For that reason, SWFWMD staff opted to use both methods. The results of both methods were averaged, but only after adjusting for the average 2007-2012 error for each projection in each county.

These projections of future rooms were then converted to "functionalized" tourist population by applying various county level average unit occupancy and party size ratios. These ratios were provided by SWFWMD, who also updated the values associated with locations identified as short term rentals for this projection set based on SWFWMD research.

These projections of tourist population were joined to the existing lodging facility locations. No attempt was made to project future locations of lodging facilities, as:

1. The precise locations would be highly speculative.
2. It was assumed that lodging facilities often are built in the general vicinity of existing lodging facilities, or at least in close enough proximity to be within the same utility service area.

Net Commuter Population Cohort

The net commuter population projections were based on net commuter data provided by SWFWMD. A census tract ratio was developed of net commuters to total census population. This ratio was then applied to the future projections of the Census Population Cohort from the GISA Projection Model to derive parcel level projections for net commuter population. That population was then "functionalized" with the following ratios:

1. 8 / 24 (typical working hours per day)
2. 5 / 7 (typical working days per week)

By applying both of these ratios to the net commuter population, the resulting functional net commuter population is 23.8% of the actual net commuter population. This functional number better reflects the water use that is expected for net commuters.

Note that the net commuter population projection summaries by utility service area were often negative, as many utilities serve "bedroom communities" and other areas where more residents work outside the utility service area than the population (residents and non-residents) employed within it. Only positive net commuter populations were included in the SWFWMD service area population totals.

UTILITY SERVICE AREA POPULATION SUMMARIES

The parcel level population projections for all population cohorts discussed above were then summarized by water utility service area boundaries for all utilities in SWFWMD that averaged more than 0.1 million gallons per day (mgd) of total water use. These service areas, maintained by SWFWMD, were overlain with each county's parcel level results, and each parcel within a service area was assigned a unique identifier for that service area. The projected population was then summarized by that identifier and joined to SWFWMD's public service area boundary database to produce tabular and spatial output. Note that these service areas change over time, so it is important to match this projection set only with the service areas included in the GIS deliverables for this project.

Spatial Incongruity of Boundaries

Due to mapping errors, the service area boundaries often bisect parcel boundaries (Figure 6). In the present modeling activity, parcels were deemed to be within a given service area if their center points (or "centroids") fell inside the service area boundaries. The error associated with this spatial incongruity at the parcel level was much smaller than would be the case with census tract level data. This is one of the main reasons for disaggregating census tract level data to the parcel level. The percentage of parcels erroneously attributed or excluded from a service area by this process is insignificant.

Figure 6. Parcel centroids (yellow points) used in summarizing parcels (yellow) to utility service area boundaries (blue)

PROJECTION DELIVERABLES

The final population projections were delivered in multiple formats, including:

1. GIS – Esri's file geodatabase, with feature classes for both parcel level results and utility service area summaries.
2. Tabular – Excel spreadsheet summaries by utility service area

The GIS outputs are useful for quality assuring the results and inputs, for maintaining the projection inputs over time, and for graphically depicting projected patterns of future population growth (Figure 7).

The tabular deliverables were parcel summaries at the utility level. Figure 8 on the next page shows the service area population projection summaries table for Manatee County.

The population summaries for "OUTSIDE SERVICE AREAS" include population considered to be domestic self supply (DSS) or small utilities without a service area boundary in SWFWMD's database. Small utilities are generally defined as those utilities permitted for less than 100,000

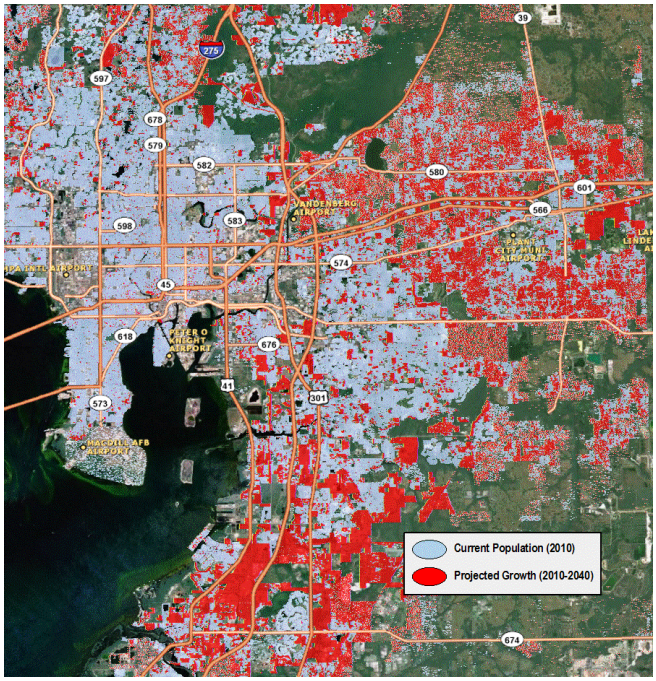

Figure 7. Dot density symbolization of GIS data reflecting parcel level population growth in Hillsborough County. The 2010 population is in gray, and the 2010-2040 growth is in red.

gallons per day (gpd). However, there are some small utilities in that category that are included here because their service area boundary is in SWFWMD's database.

Note that these service area population summaries may include some self-supplied populations (or populations with private wells) that reside within the service areas. In some cases, the population projections utilized for SWFWMD's Regional Water Supply Plan (RWSP) may vary from the raw functional population projections developed with the model due to service area boundary changes after raw model output, DSS identified after raw model output, 2012 population served reported by utility using the required population estimation methodology in Part D of the Water Use Permitting Manual, etc.

BEBR / Census Population Cohort							
Utility Name	POP12	POP15	POP20	POP25	POP30	POP35	POP40
OUTSIDE SERVICE AREAS	9,663	10,161	11,342	12,543	13,791	14,991	16,041
CITY OF BRADENTON PUBLIC WORKS	48,531	48,735	49,144	49,252	49,427	49,629	49,858
CITY OF PALMETTO PUBLIC WORKS	14,056	14,155	14,400	14,695	15,070	15,462	15,888
MANATEE CO PUBLIC WORKS DPT	255,476	269,072	297,537	324,028	347,116	367,206	385,376
TOWN OF LONGBOAT KEY	2,576	2,576	2,577	2,582	2,595	2,613	2,636

Peak Seasonal Population Cohort (Includes BEBR / Census Cohort)							
Utility Name	POP12_P	POP15_P	POP20_P	POP25_P	POP30_P	POP35_P	POP40_P
OUTSIDE SERVICE AREAS	9,872	10,385	11,599	12,834	14,114	15,342	16,407
CITY OF BRADENTON PUBLIC WORKS	51,499	51,715	52,143	52,256	52,440	52,652	52,893
CITY OF PALMETTO PUBLIC WORKS	15,641	15,750	16,023	16,352	16,769	17,204	17,678
MANATEE CO PUBLIC WORKS DPT	285,242	299,891	330,347	358,597	383,276	404,844	424,431
TOWN OF LONGBOAT KEY	5,493	5,493	5,495	5,506	5,534	5,571	5,622

Functionalized Seasonal Population Cohort (Includes BEBR / Census Cohort)							
Utility Name	POP12_F	POP15_F	POP20_F	POP25_F	POP30_F	POP35_F	POP40_F
OUTSIDE SERVICE AREAS	9,798	10,306	11,511	12,736	14,007	15,225	16,283
CITY OF BRADENTON PUBLIC WORKS	50,520	50,732	51,152	51,263	51,443	51,651	51,888
CITY OF PALMETTO PUBLIC WORKS	15,203	15,310	15,575	15,894	16,300	16,723	17,184
MANATEE CO PUBLIC WORKS DPT	278,779	293,158	323,057	350,790	374,983	396,123	415,300
TOWN OF LONGBOAT KEY	5,106	5,106	5,108	5,118	5,144	5,178	5,226

Functionalized Tourist Population Cohort							
Utility Name	POP12_T	POP15_T	POP20_T	POP25_T	POP30_T	POP35_T	POP40_T
OUTSIDE SERVICE AREAS	-	-	-	-	-	-	-
CITY OF BRADENTON PUBLIC WORKS	755	792	861	935	1,012	1,093	1,178
CITY OF PALMETTO PUBLIC WORKS	10	10	11	12	13	14	15
MANATEE CO PUBLIC WORKS DPT	13,876	14,560	15,824	17,155	18,556	20,030	21,583
TOWN OF LONGBOAT KEY	1,270	1,331	1,448	1,572	1,701	1,838	1,982

Functionalized Net Commuter Population Cohort							
Utility Name	POP12_NC	POP15_NC	POP20_NC	POP25_NC	POP30_NC	POP35_NC	POP40_NC
OUTSIDE SERVICE AREAS	(627)	(652)	(709)	(771)	(841)	(913)	(989)
CITY OF BRADENTON PUBLIC WORKS	1,572	1,568	1,561	1,565	1,580	1,601	1,632
CITY OF PALMETTO PUBLIC WORKS	(351)	(358)	(375)	(394)	(416)	(438)	(461)
MANATEE CO PUBLIC WORKS DPT	(6,051)	(6,445)	(7,302)	(8,078)	(8,557)	(8,888)	(9,323)
TOWN OF LONGBOAT KEY	120	120	120	121	121	122	123

Total Functional Population Cohort (Functionalized Seasonal + Tourist + Positive Net Commuter)							
Utility Name	POP12_TF	POP15_TF	POP20_TF	POP25_TF	POP30_TF	POP35_TF	POP40_TF
OUTSIDE SERVICE AREAS	9,798	10,306	11,511	12,736	14,007	15,225	16,283
CITY OF BRADENTON PUBLIC WORKS	52,847	53,092	53,574	53,762	54,035	54,345	54,699
CITY OF PALMETTO PUBLIC WORKS	15,213	15,320	15,587	15,906	16,313	16,737	17,199
MANATEE CO PUBLIC WORKS DPT	292,655	307,718	338,881	367,945	393,539	416,153	436,883
TOWN OF LONGBOAT KEY	6,496	6,558	6,677	6,810	6,966	7,138	7,330

Figure 8. Utility service area population projection summaries table for Manatee County

CONCLUSIONS

Small area population projections have become increasingly important for various regional planning efforts. With ever changing population dynamics and requirements for water supply planning and permitting, it is critical for SWFWMD to be able to accurately forecast population and water demand at a much finer resolution than at the county level, and to be able to update these projections regularly and in an efficient, cost-effective manner. To achieve this, SWFWMD again utilized GIS Associates' Small Area Population Projection Model and GISA's implementation of SWFWMD methods for projecting seasonal, tourist and net commuter populations. The model was updated with current data to project population in an efficient and consistent manner throughout the entire 16-county region. Controlling the projections to BEBR's county level forecasts provided consistency with other projections made by state and local governments, while at the same time providing the spatial precision needed for water supply planning and permitting.

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APPENDIX B:
Growth Allocation and Calculation Summary

CITY OF WILDWOOD
UTILITY MASTER PLAN
ERU, WATER, WASTEWATER DEMAND PROJECTIONS

	AREA	2018			2020			2022			2037		
		ERUs	Water (GPD)	Wastewater (GPD)	ERUs	Water (GPD)	Wastewater (GPD)	ERUs	Water (GPD)	Wastewater (GPD)	ERUs	Water (GPD)	Wastewater (GPD)
EXISTING SERVICE AREA	**Existing Served Area based on Billing Data**	4,225	1,490,468	845,000	4,301	1,290,174	860,116	4,365	1,309,527	873,018	4,431	1,329,169	886,113
	Coleman Prison based on Billing Data	2,197	659,100	494,325	2,500	749,900	562,425	2,500	749,900	562,425	2,500	749,900	562,425
	Subtotal	**6,422**	**2,149,568**	**1,339,325**	**6,801**	**2,040,074**	**1,422,541**	**6,865**	**2,059,427**	**1,435,443**	**6,931**	**2,079,069**	**1,448,538**
INFILL AREA	**Infill**	-	-	-	116	34,948	23,299	137	41,149	27,433	506	151,719	126,433
	Subtotal				**116**	**34,948**	**23,299**	**137**	**41,149**	**27,433**	**506**	**151,719**	**126,433**
EXPANSION AREA	**CR 209 Expansion Area**	-	-	-	16	4,800	3,200	17	5,100	3,400	1,560	468,000	312,000
	North/Brown Expansion Area	-	-	-	-	-	-	-	-	-	2,860	858,000	572,000
	Central Service Area	-	-	-	10	3,000	2,000	11	3,300	2,200	32	9,600	6,400
	Southern Service Area	-	-	-	5	1,500	1,000	5	1,500	1,000	15	4,500	3,000
	Subtotal				**31**	**9,300**	**6,200**	**33**	**9,900**	**6,600**	**4,467**	**1,340,100**	**893,400**
NORTHERN SERVICE DEVELOPMENTS	**Lakeside Landings**	-	-	-	173	51,900	43,250	173	51,900	43,250	173	51,900	43,250
	Oxford Oaks Phase II	-	-	-	422	126,600	105,500	422	126,600	105,500	422	126,600	105,500
	Oxford Crossings Partnership	-	-	-	-	-	-	117	35,100	29,250	117	35,100	29,250
	Oxford Crossings Apartments (Amprop Corners, Inc)	-	-	-	-	-	-	483	144,900	120,750	483	144,900	120,750
	Grand Oaks Manor	-	-	-	50	15,000	12,500	200	60,000	50,000	390	117,000	97,500
	Lake Andrews Preserve	-	-	-	-	-	-	203	60,900	50,750	203	60,900	50,750
	Brown Property	-	-	-	-	-	-	-	-	-	875	262,500	218,750
	Subtotal				**645**	**193,500**	**161,250**	**1,598**	**479,400**	**399,500**	**2,663**	**798,900**	**665,750**
CENTRAL SERVICE DEVELOPMENTS	**O'Dell Planned Development**	-	-	-	125	37,515	31,263	125	37,515	31,263	1,377	413,100	344,250
	Monarch Ranch	-	-	-	180	53,976	44,980	360	107,952	89,960	1,259	377,832	314,860
	Lee Capital (Pike 75)	-	-	-	70	20,760	17,300	140	42,000	35,000	500	150,000	125,000
	Panasoffkee Preserve	-	-	-	-	-	-	-	-	-	3,109	932,700	699,664
	Sumter, LLC	-	-	-	-	-	-	-	-	-	2,835	850,500	708,750
	Triumph South	-	-	-	-	-	-	-	-	-	130	39,000	32,500
	Pepper Tree Village (Advanced Holdings LLC)	-	-	-	34	10,200	8,500	34	10,200	8,500	34	10,200	8,500
	Providence Independence Investors 2 LLC	-	-	-	85	25,500	21,250	85	25,500	21,250	85	25,500	21,250
	Turkey Run	-	-	-	-	-	-	295	88,500	73,750	295	88,500	73,750
	Trailwinds Village/Beaumont (Word Property)	-	-	-	225	67,500	56,250	450	135,000	112,500	450	135,000	112,500
	Subtotal				**719**	**215,451**	**179,543**	**1,489**	**446,667**	**372,223**	**10,074**	**3,022,332**	**2,441,024**
CCC	**Subtotal**	**600**	**180,000**	**150,000**	**600**	**180,000**	**150,000**	**600**	**180,000**	**150,000**	**600**	**180,000**	**150,000**
	Total	**7,022**	**2,329,568**	**1,489,325**	**8,912**	**2,673,273**	**1,942,832**	**10,722**	**3,216,543**	**2,391,198**	**25,241**	**7,572,121**	**5,725,145**

1 Existing serviced area uses 300 gpd/ERU (water) and 250 gpd/ERU (sewer) per City of Wildwood level of service standard
2 Future Infill and Expansion use the City of Wildwood Level of Service 300 gpd/ERU (water) and 250 gpd/ERU (sewer)
3 Person per Household (2.37) from U.S. Census (2009-2013)
4 Existing prison demands based on 2017-2018 billing data. Demand projections for the prison assumes the maximum prison population of 7,499 and 100 gpd/inmate. Calculation: Total of 749,900 gpd divided by City LOS of 300 gpd/ERU = 2,500 ERUs.
5 Wastewater to Water ratio based on DMR/MOR data (0.76) is used for the existing users.
6 Wastewater to Water ratio based on LOS (250 GPD/300 GPD = 0.83) is used for all infill and future developments
7 Villages DRI uses 100 gpd/ERU for Water and 86 gpd/ERU for WW.

Known Future Developments without Existing Developer's Agreement
Existing Developer's Agreement

APPENDIX C:
Capacity Analysis Criteria and Calculations Summary

CAPACITY ANALYSIS SUMMARY AND CALCULATIONS

Introduction

The capacity analysis evaluates the capacity of source, treatment and storage facilities connected to a water system. This capacity analysis evaluates the existing capacity of the individual City of Wildwood PWS WTP and the consolidated City of Wildwood PWS. Operating data from 2018 was utilized in the analysis. Specific WTP information was obtained from the latest Sanitary Survey and in coordination with City staff. The FAC Chapter 62-555 (Permitting, Construction, Operation, and Maintenance of Public Water Systems) was used in evaluating the capacity of the wells, finished water storage, and pumping capacity.

Capacity Evaluation Criteria

The individual plant capacities were determined by applying strict conformance with FDEP Rule 62-555. The following assumptions were used in the capacity evaluation calculations:

1. For all individual WTP capacity analyses, it was assumed that the standby pump requirement of 62-555.320 (15) (c) was met by an installed standby pump at each WTP.
2. The FDEP peaking factors of 1.50 MDD, 3.00 PHF were used.
3. The combined system capacity was determined by the sum of the active individual WTP capacities.
4. Hydropneumatic tank WTPs were determined to have “0” capacity because they were not able to provide maximum day plus fire flow demands or peak hour flow for 4 consecutive hour demands.

Well Capacity

Criteria #1

According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system’s design maximum day water demand (including design fire flow demand if fire protection is being provided).

In the case of a well providing source water for a ground storage tank system, the required fire flow demand is the fire flow replenishment rate (flow required to replenish the required fire storage volume in a 24-hour period).

Criteria #2

In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Finished Water Storage Capacity

Criteria #1

According to FDEP Rule 62-555.320 (19), the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire flow demand.

The assumed fire flow rate is 1,000 gpm and the design fire flow duration is two hours. Therefore, the fire flow rate multiplied by fire flow duration is 120,000 gallons.

Criteria #2

FDEP Rule 62-555.320 (19) also requires additional finished water storage capacity to meet the design fire flow rate for the design fire flow duration.

Pumping Capacity

Criteria #1 – Without Elevated Storage Tank

FDEP Rule 62-555.320 (a) provides HSP requirements for systems that do not have elevated storage capacity. Since the City of Wildwood PWS doesn't have an elevated storage tank (EST), the requirements of 62-555.320 (a) apply.

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water systems, or booster station services areas, peak-hour water demand (and if fire protection is being provided, meet at least the water systems, or booster station service areas, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2 and #3 – With Elevated Storage Tank

FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, combined with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

Calculations

See the next section containing the capacity analysis calculations for the individual WTP and the consolidated City PWS.

Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

March 29, 2018

ELECTRONIC CORRESPONDENCE

Chris Picardi, Utility Director
City of Wildwood
1290 Industrial Drive
Wildwood, FL 34785
cpicardi@wildwood-fl.gov

County: Sumter
PWS Name: City of Wildwood
PWS ID: 6600331
Re: Design Capacity Rerating

Dear Mr. Picardi:

The Department received a request to rerate the design capacity of the City of Wildwood Public Water System (PWS) when the following projects have been constructed and cleared for service:

1. Proposed improvements for CR 501 Water Treatment Plant (WTP) (AKA Prison Plant) under Permit No. 0124846-199-WC
2. New Oxford Water Treatment Plant under Permit No. 0124846-200-WC.

The current rated design capacity of the City of Wildwood considering the capacity of the existing installed WTP components is 5,083,230 gallons per day (GPD). The Department's database will be updated to reflect the correct design capacity of each plant and the design capacity of all the existing plant components.

Summary: Rated Design Capacity for the City of Wildwood PWS considering the installed components of the existing WTPs:

Name of WTP	Rated Design Capacity (GPD)
CR 501 (Wells limiting)	2,160,000
Huey Street	720,000
Fairways	504,000
Ashley	360,000
Continental Country Club WTP No. 1	835,230
Continental Country Club WTP No. 2	504,000
Rated Design Capacity of the City of Wildwood PWS	**5,083,230**

The rated design capacity of the City of Wildwood will increase to 5,688,030 GPD when the improvements in CR 501 WTP, as permitted in Permit Number 0124846-199-WC, have been cleared for service by the Department. This will be due to the increase in the rated design capacity of CR 501 WTP from 2,160,000 GPD to 2,764,800 GPD, when the improvements have been constructed and cleared for use. The clearance letter for Permit Number 0124846-199-WC when issued will contain the updated rated design capacity of CR 501 WTP and the City of Wildwood PWS.

Summary: Rated Design Capacity for the City of Wildwood PWS considering the improvements in CR 501 WTP

Name of WTP	Rated Design Capacity (GPD)
CR 501 (HSP limiting)	2,764,800
Huey Street	720,000
Fairways	504,000
Ashley	360,000
Continental Country Club WTP No. 1	835,230
Continental Country Club WTP No. 2	504,000
Rated Design Capacity of the City of Wildwood PWS	**5,688,030**

The rated design capacity of the City of Wildwood will increase to 8,038,030 GPD when both the improvements in CR 501, as permitted in Permit Number 0124846-199-WC, and the construction of the new Oxford WTP, as permitted in Permit No. 0124846-200-WC, have been completed and cleared for service. The new Oxford WTP when cleared for service by the Department will have a rated design capacity of 2,350,000 GPD. The clearance letter for Permit Number 0124846-199-WC and Permit No. 0124846-200-WC when issued will contain the updated rated design capacity of CR 501 WTP, Oxford WTP and the City of Wildwood PWS.

Summary: Rated Design Capacity for the City of Wildwood PWS considering the improvements in CR 501 and the capacity of the new Oxford WTP

Name of WTP	Rated Design Capacity (GPD)
CR 501 (HSP limiting)	2,764,800
Huey Street	720,000
Fairways	504,000
Ashley	360,000
Continental Country Club WTP No. 1	835,230
Continental Country Club WTP No. 2	504,000
Oxford WTP (HSP limiting)	**2,350,000**
Rated Design Capacity of the City of Wildwood PWS	**8,038,030**

Please direct all questions regarding this rerating letter to Daissan A. Villareal at (407) 897-4129 or by email at daissan.a.villareal@dep.state.fl.us .

Sincerely,

Lu Burson.
Environmental Administrator
Permitting and Waste Cleanup

cc: Malcolm Lewis Bryant, P.E., Kimley-Horn and Associates [lewis.bryant@kimley-horn.com]
Trey Clayton, Kimley-Horn and Associates [trey.clayton@kimley-horn.com]
Michael T. Stanley, Kimley-Horn and Associates [Michael.Stanley@kimley-horn.com]
Reggie Phillips, Daissan A. Villareal, FDEP

CITY OF WILDWODD PWS CONSOLIDATED CAPACITY ANALYSIS

Facility Type - Well Pumps, High Service Pump, Ground Storage, Elevated Storage, and Hydropneumatic tanks

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (From 2018 MOR Reports)	2,067,689	gpd
Average Day Demand	1,771,717	gpm
Maximum Day Demand (Calculated)	3,101,534	gpd
Maximum Day Demand (From 2018 MOR Reports)	2,639,000	gpd
Maximum Day Demand	2,154	gpm
Max Day Factor (MDF/ADF)	1.50	
Peak Hour Factor	3.00	
Peak Hour Demand (PHF x ADF)	5,315,151	gpm
Number of Connections (total system)	4,985	connections
Population Served (total system)	16,436	capita
Is Elevated Storage Available?	yes	"yes" or "no"
Total EST Storage Available to WTP's Service Area	500,000	gallons

NOTE:

Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.

Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1 According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2 In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name	Location	Pumping Capacity (gpm)
SE 1	CR-501 WTP	900
SE 2	CR-501 WTP	600
FW 1	Fairways WTP	500
11	Huey WTP	750
AW 1	Ashley WTP	500
Well No.1	CCC	750
Welll No.2	CCC	750

Criteria #1

Total Available Well Capacity	4,750	gpm
Fire-flow Demand (EST replenishment rate)	83	gpm
Net Available Total Well Capacity	4,667	gpm
Available Max Day Demand	6,720,000	gpd
Rated Capacity (MDF)	4,667	gpm
Rated Capacity (MDF)	6,720,000	gpd

Criteria #2

Total Well Capacity	4,750	gpm
Largest Well	900	gpm
Well Capacity w/ Largest Well Out of Service	3,850	gpm
Rated Capacity (ADF or MDF)	3,850	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	8,316,000	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	5,544,000	GPD

FINISHED WATER STORAGE CAPACITY

Criteria #1 According to FDEP Rule 62-555.320 (19), the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire-flow demand.

Criteria #2 FDEP Rule 62-555.320 (19) also requires additional finished water storage capacity to meet the design fire flow rate for the design fire flow duration.

Storage Tank Name	Location	Type of Storage	Capacity (gallons)
CR 501	CR 501	Ground Storage	500,000
CR 501	CR 501	Ground Storage	1,000,000
Huey Street	HUEY	Elevated Storage	500,000
214 Re-Pump	CR 214	Ground Storage	500,000
CCC WTP No.1	CCC No.1	EST	100,000

Criteria #1

Total Finished Water Storage Available	2,600,000	gallons
Fire Flow Storage Required	120,000	gallons
Useful Finished Water Storage Capacity	2,480,000	gallons
Rated Capacity (Based on 25% of MDF)	9,920,000	gpd

Criteria #2

Fire-flow Demand (Rate x Duration)	120,000	gallons
Total Storage Capacity	2,600,000	gallons
Net Available Storage Capacity	2,480,000	gallons
Rated Capacity (MDF)	9,920,000	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

HSP Name	Location	Capacity (gpm)
1	Coleman	1,050
2	Coleman	1,050
3	Coleman	1,200
FW 1	Fairways	500
11	Huey St	750
CR 214 HSP #1	CR 214	500
CR 214 HSP #2	CR 214	1,100
CR 214 HSP #3	CR 214	1,100
AW 1	Ashley	500
CCC No.1	CCC	750
CCC No.2	CCC	750

Criteria #1

Total HSP Pumping Capacity	N/A	gpm
HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
Fire Flow Rate	N/A	gpm
Max Day Factor	N/A	
Peak Hour Factor	N/A	
Capacity Based on Meeting Peak Hour Demand (MDF)	N/A	gpm
Capacity Based on Meeting Fire Flow @ Max Day Demand	N/A	gpm

Criteria #2

Total HSP Pumping Capacity	9,250	gpm
HSP Pumping Capacity with Largest Unit Out of Service	8,050	gpm
Fire Flow Demand (Replenishment Rate)	83	gpm
Net Available Pumping Capacity	7,967	gpm
Potential Rated Capacity (MDF)	11,472,000	gpd

Criteria #3a

Total HSP Pumping Capacity	9,250	gpm
HSP Pumping Capacity with Largest Unit Out of Service	8,050	gpm
Useful EST Storage Capacity (Total)	500,000	gallons
Useful EST Storage Capacity (gpm for 4 hours)	2,083	gpm
Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	10,133	gpm
Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	7,296,000	gpd

Criteria #3b

Total HSP Pumping Capacity	9,250	gpm
HSP Pumping Capacity with Largest Unit Out of Service	8,050	gpm
Elevated Storage Available to WTP's Service Area	500,000	gallons
Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	4,167	gpm
Combined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	12,217	gpm
Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	17,592,000	gpd

CR 501 WTP
Facility Type - High Service Pump w/ Ground Storage

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand[1]	120,000	gallons
Fire Flow Replenishment Rate[2]	83	gpm
Average Day Demand from 2016-2017 MORs	1,187,467	gpd
Average Day Demand	825	gpm
Maximum Day Demand (Design Capacity)[3]	2,137,441	gpd
Max Day Demand from 2016-2017 MORs	1,892,000	gpd
Maximum Day Demand (Design Capacity)[3]	1,484	gpm
Max Day Factor (MDF/ADF)[4]	1.8	
Peak Hour Factor[4]	3.6	
Peak Hour Demand (Calculated from Peaking Factors)	4,274,881	
Peak Hour Demand (Calculated from Peaking Factors)	2,969	gpm
Is Elevated Storage Available?	no	"yes" or "no"
Total EST Storage Available to WTP's Service Area	0	gallons

NOTES:
[1] Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
[2] Fire replenishment rate is the fire-flow demand divided by 24 hours.
[3] Maxium day demands were taken from the 2017 MORs
[4] FDEP peaking factors 1.8 ADD/MDD, 3.6 ADD/PHF were used based on MORs

WELL CAPACITY

Criteria #1 According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2 In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name	Location	Pumping Capacity (gpm)
#1 AAC0383	CR 501 WTP	900
#2 AAC0384	CR 501 WTP	600

Criteria #1

Total Available Well Capacity	1,500	gpm
Fire-flow Demand (replenishment rate)	83	gpm
Net Available Total Well Capacity	1,417	gpm
Available Max Day Demand	2,040,000	gpd
Rated Capacity (MDF)	1,417	gpm
Rated Capacity (MDF)	2,040,000	gpd

Criteria #2

Total Well Capacity	1,500	gpm
Largest Well	900	gpm
Well Capacity w/ Largest Well Out of Service	600	gpm
Rated Capacity (ADF or MDF)	600	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	1,555,200	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	864,000	GPD

used. WTP's are

FINISHED WATER STORAGE CAPACITY

According to FDEP Rule 62-555.320 (19) - Finished-Drinking-Water Storage Capacity. This subsection addresses finished-water storage capacity necessary for operational equalization to meet peak water demand. (If fire protection is being provided, additional finished-water storage capacity shall be provided as necessary to meet the design fire-flow rate for the design fire-flow duration.) The finished-water storage capacity necessary to meet the peak water demand for a consecutive system may be provided by the consecutive system or by a wholesale system delivering water to the consecutive system.

(a) Except as noted in paragraph (b) below, the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire-flow demand.
(b) A total useful finished-water storage capacity less than that specified in paragraph (a) above is acceptable if the supplier of water or construction permit applicant makes one of the following demonstrations:

Criteria #1

1. A demonstration consistent with Section 10.6.3 in Water Distribution Systems Handbook as incorporated into Rule 62-555.330, F.A.C., showing that the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient for operational equalization.
2. A demonstration showing that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient to meet the water system's peak-hour water demand for at least four consecutive hours. For small water systems with hydropneumatic tanks that are installed under a construction permit for which the Department receives a complete application on or after August 28, 2003, the supplier of water or construction permit applicant also shall demonstrate that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (i.e., the water system's total effective hydropneumatic tank volume) is sufficient to meet the water system's peak instantaneous water demand for at least 20 consecutive minutes.

Storage Tank Name	Location	Type of Storage	Capacity (gallons)
GST-1	CR 501 WTP	GST	500,000
GST-2	CR 501 WTP	GST	1,000,000

Criteria #1 (a)

Total Finished Water Storage Avaliable	1,500,000	gallons
Additional Storage Required for Fire Flow Rate x Duration	120,000	gallons
Additional Storage Required for Vortex Prevention	150,394	
Total Useful Finished Water Storage Capacity	1,229,606	gallons
Rated Capacity (Based on 25% of MDF)	4,918,423	gpd

Criteria #1 (b)

Total Finished Water Storage Avaliable	1,500,000	gallons
Fire Flow Storage Required	120,000	gallons
Additional Storage Required for Vortex Prevention	75,197	
Useful Finished Water Storage Capacity	1,304,803	gallons
Firm Well Pump Capacity	600	gpm
Combined pump and useful storage capacity for 4 hours	1,448,803	gallons
Combined pump and useful storage capacity for 4 hours	6,037	gpm
Peak Hour Demand	2,969	gpm
Peak Hour Demand for 4 Hours	712,480	gallons
MDF Rated Capacity (Based on meeting PHD for 4 hours)	8,692,817.03	gpd

PUMPING CAPACITY

Criteria #1 — According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2 — According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3 — In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

Pump Name	Location	
HSP-1	CR 501 WTP	1,050
HSP-2	CR 501 WTP	1,050
HSP-3	CR 501 WTP	1,200

0

Criteria #1	Total HSP Pumping Capacity	3,300	gpm
	Fire Flow Rate	1,000	gpm
	Max Day Factor	1.80	
	Peak Hour Factor	3.6	
	Capacity Based on Meeting Peak Hour Demand (MDF)	2,376,000	gpd
	Capacity Based on Meeting Fire Flow @ Max Day Demand (MDF)	3,312,000	gpd
Criteria #2	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Fire Flow Demand (Replenishment Rate)	N/A	gpm
	Net Available Pumping Capacity	N/A	gpm
	Potentinal Rated Capacity (MDF)	N/A	gpd
Criteria #3a	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Useful EST Storage Capacity (Total)	N/A	gallons
	Useful EST Storage Capacity (gpm for 4 hours)	N/A	gpm
	Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	N/A	gpm
	Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	N/A	gpd
Criteria #3b	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	N/A	gpm
	Combined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	N/A	gpm
	Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	N/A	gpd

NOTE: At each high-service or booster pumping station that is constructed or altered under a construction permit for which the Department receives a complete application on or after August 28, 2003, and that is connected to a community water system (CWS) serving, or designed to serve, 350 or more persons or 150 or more service connections, the supplier of water shall provide an installed or uninstalled standby pump of sufficient capacity to replace the largest pump. However, for CWSs that have multiple interconnected pumping stations subject to this requirement, the supplier of water may provide one uninstalled standby pump for each size of high-service or booster pump installed in the water system instead of providing a standby pump on site at each high-service or booster pumping station; and for water systems that have only one pumping station subject to this requirement and that are designed to serve 10,000 or fewer persons, as many as three water systems located in the same county, or within 50 miles of one another, may enter into a mutual aid agreement to share one appropriately sized, uninstalled standby pump instead of providing a standby pump on site at each water system's high-service or booster pumping station.

Ashley WTP Capacity Analysis
Facility Type - Well and Hydropneumatic Tank

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (from 2016-2017 MORs)	106,089	gpd
Average Day Demand	74	gpm
Maximum Day Demand (Calculated)	190,960	gpd
Maximum Day Demand (from 2016-2017 MORs)	463,000	gpd
Maximum Day Demand	133	gpm
Max Day Factor (MDF/ADF)	1.80	
Peak Hour Factor	3.60	
Peak Hour Demand (PHF x ADF)	265	gpm
Peak Instantaneous Factor	7	
Peak Instantaneous Demand (PIF x ADF)	516	gpm
Tank Low Pressure (Well Pump On)	50	psi
Tank High Pressure (Well Pump Off)	65	psi
Number of Connections (total system)	unknown	connections
Population Served (total system)	unknown	capita
Is Elevated Storage Available?	no	"yes" or "no"
Total EST Storage Available to WTP's Service Area	0	gallons

NOTE:
Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1

According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2

In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name	Pumping Capacity (gpm)
AW 1	500

Criteria #1

Total Available Well Capacity	500	gpm
Fire-flow Demand	1,000	gpm
Net Available Total Well Capacity	(500)	gpm
Available Max Day Demand	(720,000)	gpd
Rated Capacity (MDF)	(500)	gpm
Rated Capacity (MDF)	(720,000)	gpd

Criteria #2

Total Well Capacity	500	gpm
Largest Well	500	gpm
Well Capacity w/ Largest Well Out of Service	0	gpm
Rated Capacity (ADF or MDF)	0	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	0	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	0	GPD

FINISHED WATER STORAGE CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (19)(b)2, A demonstration showing that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient to meet the water system's peak-hour water demand for at least four consecutive hours. For small water systems with hydropneumatic tanks that are installed under a construction permit for which the Department receives a complete application on or after August 28, 2003, the supplier of water or construction permit applicant also shall demonstrate that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (i.e., the water system's total effective hydropneumatic tank volume) is sufficient to meet the water system's peak instantaneous water demand for at least 20 consecutive minutes.

Criteria #2

According to FDEP Rule 62-555.320 (20), hydropneumatic tanks shall be designed and constructed in accordance with Section 7.2 of the 10 States Standards.

Section 7.2 of the 10 States Standards requires the gross volume of a hydropneumatic tank to be 10 times the capacity of the largest pump, rated in gallons per minute. For example, a 250 gpm pump should have a 2,500 gallon pressure tank.

Hydro Tank Name	Type of Storage	Total Volume (gallons)	Useable Volume (gallons)
H1	Hydro Tank	10,000	1,882
H2	Hydro Tank	10,000	1,882

Criteria #1

Well Pumping Capacity	500	gpm
Hydropneumatic Tank Useful Storage Volume	3,764	gallons
Useful Hydropneumatic Tank Storage Capacity (gpm for 4 hours)	16	gpm
Total Combined Capacity Available for Peak Hour Flow (4 hours) Excluding Fire Flow	(484)	gpm
Useful Hydropneumatic Tank Storage Capacity (gpm for 20 minutes)	1,255	gpm
Total Combined Capacity Available for Peak Instantaneous Flow (20 minutes)	1,755	gpm
Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	(348,708)	gpd
Capacity Based on Meeting Peak Instantaneous Demand for 20 Minutes (MDF)	649,742	gpd

Criteria #2

Total Gross Hydropneumatic Tank Volume	20,000	gallons
Allowable Pumping Rate Based on Hydropneumatic Tank Gross Volume	2,000	gpm
Largest Well Pump	500	gpm
Controlling Pumping Rate	500	gpm
Capacity Based on Hydropneumatic Tank Gross Volume Limitations (MDF)	720,000	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

HSP Name		Pumping Capacity (gpm)
AW 1		500

Criteria #1	Total HSP Pumping Capacity	500	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	0	gpm
	Fire Flow Rate	1,000	gpm
	Max Day Factor	1.80	
	Peak Hour Factor	3.6	
	Capacity Based on Meeting Peak Hour Demand (MDF)	0	gpm
	Capacity Based on Meeting Fire Flow @ Max Day Demand	0	gpm
Criteria #2	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Fire Flow Demand (Replenishment Rate)	N/A	gpm
	Net Available Pumping Capacity	N/A	gpm
	Potential Rated Capacity (MDF)	N/A	gpd
Criteria #3a	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity (gpm for 4 hours)	N/A	gpm
	Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	N/A	gpm
	Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	N/A	gpd
Criteria #3b	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	N/A	gpm
	ined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	N/A	gpm
	Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	N/A	gpd

Fairways WTP Capacity Analysis
Facility Type - Well and Hydropneumatic Tank

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (from 2016-2017 MORs)	460,347	gpd
Average Day Demand	320	gpm
Maximum Day Demand (Calculated)	828,625	gpd
Maximum Day Demand (from 2016-2017 MORs)	861,000	gpd
Maximum Day Demand	575	gpm
Max Day Factor (MDF/ADF)	1.80	
Peak Hour Factor	3.60	
Peak Hour Demand (PHF x ADF)	1,151	gpm
Peak Instantaneous Factor	7	
Peak Instantaneous Demand (PIF x ADF)	2,238	gpm
Tank Low Pressure (Well Pump On)	50	psi
Tank High Pressure (Well Pump Off)	65	psi
Number of Connections (total system)	unknown	connections
Population Served (total system)	unknown	capita
Is Elevated Storage Available?	no	"yes" or "no"
Total EST Storage Available to WTP's Service Area	0	gallons

NOTE:
Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1 — According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2 — In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name	Pumping Capacity (gpm)
FW 1	700

Criteria #1

Total Available Well Capacity	700	gpm
Fire-flow Demand (EST replenishment rate)	83	gpm
Net Available Total Well Capacity	617	gpm
Available Max Day Demand	888,000	gpd
Rated Capacity (MDF)	617	gpm
Rated Capacity (MDF)	888,000	gpd

Criteria #2

Total Well Capacity	700	gpm
Largest Well	700	gpm
Well Capacity w/ Largest Well Out of Service	0	gpm
Rated Capacity (ADF or MDF)	0	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	0	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	0	GPD

FINISHED WATER STORAGE CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (19)(b)2, A demonstration showing that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient to meet the water system's peak-hour water demand for at least four consecutive hours. For small water systems with hydropneumatic tanks that are installed under a construction permit for which the Department receives a complete application on or after August 28, 2003, the supplier of water or construction permit applicant also shall demonstrate that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (i.e., the water system's total effective hydropneumatic tank volume) is sufficient to meet the water system's peak instantaneous water demand for at least 20 consecutive minutes.

Criteria #2

According to FDEP Rule 62-555.320 (20), hydropneumatic tanks shall be designed and constructed in accordance with Section 7.2 of the 10 States Standards.

Section 7.2 of the 10 States Standards requires the gross volume of a hydropneumatic tank to be 10 times the capacity of the largest pump, rated in gallons per minute. For example, a 250 gpm pump should have a 2,500 gallon pressure tank.

Hydro Tank Name	Type of Storage	Total Volume (gallons)	Useable Volume (gallons)
H1	Hydro Tank	10,000	1,882

Criteria #1

Well Pumping Capacity	700	gpm
Hydropneumatic Tank Useful Storage Volume	1,882	gallons
Useful Hydropneumatic Tank Storage Capacity (gpm for 4 hours)	8	gpm
Total Combined Capacity Available for Peak Hour Flow (4 hours) Excluding Fire Flow	(292)	gpm
Useful Hydropneumatic Tank Storage Capacity (gpm for 20 minutes)	627	gpm
Total Combined Capacity Available for Peak Instantaneous Flow (20 minutes)	1,327	gpm
Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	(210,354)	gpd
Capacity Based on Meeting Peak Instantaneous Demand for 20 Minutes (MDF)	491,500	gpd

Criteria #2

Total Gross Hydropneumatic Tank Volume	10,000	gallons
Allowable Pumping Rate Based on Hydropneumatic Tank Gross Volume	1,000	gpm
Largest Well Pump	700	gpm
Controlling Pumping Rate	700	gpm
Capacity Based on Hydropneumatic Tank Gross Volume Limitations (MDF)	1,008,000	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

HSP Name		Pumping Capacity (gpm)
FW 1		700

Criteria #1	Total HSP Pumping Capacity	700	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	0	gpm
	Fire Flow Rate	1,000	gpm
	Max Day Factor	1.80	
	Peak Hour Factor	3.6	
	Capacity Based on Meeting Peak Hour Demand (MDF)	0	gpm
	Capacity Based on Meeting Fire Flow @ Max Day Demand	0	gpm
Criteria #2	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Fire Flow Demand (Replenishment Rate)	N/A	gpm
	Net Available Pumping Capacity	N/A	gpm
	Potential Rated Capacity (MDF)	N/A	gpd
Criteria #3a	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity (gpm for 4 hours)	N/A	gpm
	Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	N/A	gpm
	Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	N/A	gpd
Criteria #3b	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	N/A	gpm
	ined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	N/A	gpm
	Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	N/A	gpd

Huey WTP Capacity Analysis
Facility Type - High Service Pump w/ Elevated Storage

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (from 2016-2017 MORs)	347,628	gpd
Average Day Demand	241	gpm
Maximum Day Demand (Calculated)	625,730	gpd
Maximum Day Demand (from 2016-2017 MORs)	670,000	gpd
Maximum Day Demand	435	gpm
Max Day Factor (MDF/ADF)	1.80	
Peak Hour Factor	3.60	
Peak Hour Demand (PHF x ADF)	869	gpm
Number of Connections (total system)	unknown	connections
Population Served (total system)	unknown	capita
Is Elevated Storage Available?	yes	"yes" or "no"
Total EST Storage Available to WTP's Service Area	500,000	gallons

NOTE:
Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1 According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2 In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name		Pumping Capacity (gpm)
11		500

Criteria #1

Total Available Well Capacity	500	gpm
Fire-flow Demand (EST replenishment rate)	83	gpm
Net Available Total Well Capacity	417	gpm
Available Max Day Demand	600,000	gpd
Rated Capacity (MDF)	417	gpm
Rated Capacity (MDF)	600,000	gpd

Criteria #2

Total Well Capacity	500	gpm
Largest Well	500	gpm
Well Capacity w/ Largest Well Out of Service	0	gpm
Rated Capacity (ADF or MDF)	-	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	-	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	-	GPD

FINISHED WATER STORAGE CAPACITY

Criteria #1 According to FDEP Rule 62-555.320 (19), the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire-flow demand.

Criteria #2 FDEP Rule 62-555.320 (19) also requires additional finished water storage capacity to meet the design fire flow rate for the design fire flow duration.

Storage Tank Name	Type of Storage	Capacity (gallons)
1	Elevated Storage	500,000

Criteria #1

Total Finished Water Storage Available	500,000	gallons
Fire Flow Storage Required	120,000	gallons
Useful Finished Water Storage Capacity	380,000	gallons
Rated Capacity (Based on 25% of MDF)	1,520,000	gpd

Criteria #2

Fire-flow Demand (Rate x Duration)	120,000	gallons
Total Storage Capacity	500,000	gallons
Net Available Storage Capacity	380,000	gallons
Rated Capacity (MDF)	1,520,000	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

HSP Name	Location	Capacity (gpm)
1	Huey St.	750

Criteria #1	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Fire Flow Rate	N/A	gpm
	Max Day Factor	N/A	
	Peak Hour Factor	N/A	
	Capacity Based on Meeting Peak Hour Demand (MDF)	N/A	gpm
	Capacity Based on Meeting Fire Flow @ Max Day Demand	N/A	gpm
Criteria #2	Total HSP Pumping Capacity	750	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
	Fire Flow Demand (Replenishment Rate)	83	gpm
	Net Available Pumping Capacity	(83)	gpm
	Potential Rated Capacity (MDF)	(120,000)	gpd
Criteria #3a	Total HSP Pumping Capacity	750	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
	Useful EST Storage Capacity (Total)	500,000	gallons
	Useful EST Storage Capacity (gpm for 4 hours)	2,083	gpm
	Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	2,083	gpm
	Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	1,500,000	gpd
Criteria #3b	Total HSP Pumping Capacity	750	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
	Elevated Storage Available to WTP's Service Area	500,000	gallons
	Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	4,167	gpm
	)ined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	4,167	gpm
	Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	6,000,000	gpd

NOTE: At each high-service or booster pumping station that is constructed or altered under a construction permit for which the Department receives a complete application on or after August 28, 2003, and that is connected to a community water system (CWS) serving, or designed to serve, 350 or more persons or 150 or more service connections, the supplier of water shall provide an installed or uninstalled standby pump of sufficient capacity to replace the largest pump. However, for CWSs that have multiple interconnected pumping stations subject to this requirement, the supplier of water may provide one uninstalled standby pump for each size of high-service or booster pump installed in the water system instead of providing a standby pump on site at each high-service or booster pumping station; and for water systems that have only one pumping station subject to this requirement and that are designed to serve 10,000 or fewer persons, as many as three water systems located in the same county, or within 50 miles of one another, may enter into a mutual aid agreement to share one appropriately sized, uninstalled standby pump instead of providing a standby pump on site at each water system's high-service or booster pumping station.

CCC WTP #1 Capacity Analysis
Facility Type - EST w/ Well

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (From MOR Reports)	97,371	gpd
Average Day Demand	68	gpm
Maximum Day Demand (Calculated)	219,085	gpd
Maximum Day Demand (From MOR Reports)	231,000	gpd
Maximum Day Demand	152	gpm
Max Day Factor (MDF/ADF)	2.25	
Peak Hour Factor	4.50	
Peak Hour Demand (PHF x ADF)	304	gpm
Number of Connections (total system)	942	connections
Population Served (total system)	1,888	capita
Is Elevated Storage Available?	yes	"yes" or "no"
Total EST Storage Available to WTP's Service Area	100,000	gallons

NOTE:
Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1

According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2

In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name	Location	Pumping Capacity (gpm)
Well #1	WTP #1	750

Criteria #1

Total Available Well Capacity	750	gpm
Fire-flow Demand (EST replenishment rate)	83	gpm
Net Available Total Well Capacity	667	gpm
Available Max Day Demand	960,000	gpd
Rated Capacity (MDF)	667	gpm
Rated Capacity (MDF)	960,000	gpd

Criteria #2

Total Well Capacity	750	gpm
Largest Well	750	gpm
Well Capacity w/ Largest Well Out of Service	-	gpm
Rated Capacity (ADF or MDF)	-	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	-	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	-	GPD

FINISHED WATER STORAGE CAPACITY

According to FDEP Rule 62-555.320 (19) - Finished-Drinking-Water Storage Capacity. This subsection addresses finished-water storage capacity necessary for operational equalization to meet peak water demand. (If fire protection is being provided, additional finished-water storage capacity shall be provided as necessary to meet the design fire-flow rate for the design fire-flow duration.) The finished-water storage capacity necessary to meet the peak water demand for a consecutive system may be provided by the consecutive system or by a wholesale system delivering water to the consecutive system.

(a) Except as noted in paragraph (b) below, the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire-flow demand.

(b) A total useful finished-water storage capacity less than that specified in paragraph (a) above is acceptable if the supplier of water or construction permit applicant makes one of the following demonstrations:

Criteria #1

1. A demonstration consistent with Section 10.6.3 in Water Distribution Systems Handbook as incorporated into Rule 62-555.330, F.A.C., showing that the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient for operational equalization.

2. A demonstration showing that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient to meet the water system's peak-hour water demand for at least four consecutive hours. For small water systems with hydropneumatic tanks that are installed under a construction permit for which the Department receives a complete application on or after August 28, 2003, the supplier of water or construction permit applicant also shall demonstrate that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (i.e., the water system's total effective hydropneumatic tank volume) is sufficient to meet the water system's peak instantaneous water demand for at least 20 consecutive minutes.

Storage Tank Name	Location	Type of Storage	Capacity (gallons)
E1	CCC	Elevated Storage	100,000

Criteria #1 (a)

Total Finished Water Storage Avaliable	100,000	gallons
Additional Storage Required for Fire Flow Rate x Duration	120,000	gallons
Total Useful Finished Water Storage Capacity	(20,000)	gallons
Rated Capacity (Based on 25% of MDF)	(80,000)	gpd

Criteria #1 (b)

Total Finished Water Storage Avaliable	100,000	gallons
Fire Flow Storage Required	120,000	gallons
Useful Finished Water Storage Capacity	(20,000)	gallons
Firm Pump Capacity	-	gpm
Combined pump and useful storage capacity for 4 hours	(20,000)	gallons
Combined pump and useful storage capacity for 4 hours	(83)	gpm
Peak Hour Demand	304	gpm
Peak Hour Demand for 4 Hours	73,028	gallons
MDF Rated Capacity (Based on meeting PHD for 4 hours)	(120,000)	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

Criteria #4

Per 62-555.320 (15) (c) - At each high-service or booster pumping station that is constructed or altered under a construction permit for which the Department receives a complete application on or after August 28, 2003, and that is connected to a community water system (CWS) serving, or designed to serve, 350 or more persons or 150 or more service connections, the supplier of water shall provide an installed or uninstalled standby pump of sufficient capacity to replace the largest pump. However, for CWSs that have multiple interconnected pumping stations subject to this requirement, the supplier of water may provide one uninstalled standby pump for each size of high-service or booster pump installed in the water system instead of providing a standby pump on site at each high-service or booster pumping station; and for water systems that have only one pumping station subject to this requirement and that are designed to serve 10,000 or fewer persons, as many as three water systems located in the same county, or within 50 miles of one another, may enter into a mutual aid agreement to share one appropriately sized, uninstalled standby pump instead of providing a standby pump on site at each water system's high-service or booster pumping station.

HSP Name	Location	Capacity (gpm)
Well Pump #1	CCC No.1	750

Criteria #1

Total HSP Pumping Capacity	N/A	gpm
HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
Fire Flow Rate	N/A	gpm
Max Day Factor	N/A	
Peak Hour Factor	N/A	
Capacity Based on Meeting Peak Hour Demand (MDF)	N/A	gpm
Capacity Based on Meeting Fire Flow @ Max Day Demand	N/A	gpm

Criteria #2

Total HSP Pumping Capacity	750	gpm
HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
Fire Flow Demand (Replenishment Rate)	83	gpm
Net Available Pumping Capacity	(83)	gpm
Potentinal Rated Capacity (MDF)	(120,000)	gpd

Criteria #3a

Total HSP Pumping Capacity	750	gpm
HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
Useful EST Storage Capacity (Total)	100,000	gallons
Useful EST Storage Capacity (gpm for 4 hours)	417	gpm
Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	417	gpm
Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	300,000	gpd

Criteria #3b

Total HSP Pumping Capacity	750	gpm
HSP Pumping Capacity with Largest Unit Out of Service	-	gpm
Elevated Storage Available to WTP's Service Area	100,000	gallons
Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	833	gpm
Combined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	833	gpm
Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	1,200,000	gpd

NOTE: Per 62-555.320 (15) (c) - At each high-service or booster pumping station that is constructed or altered under a construction permit for which the Department receives a complete application on or after August 28, 2003, and that is connected to a community water system (CWS) serving, or designed to serve, 350 or more persons or 150 or more service connections, the supplier of water shall provide an installed or uninstalled standby pump of sufficient capacity to replace the largest pump. However, for CWSs that have multiple interconnected pumping stations subject to this requirement, the supplier of water may provide one uninstalled standby pump for each size of high-service or booster pump installed in the water system instead of providing a standby pump on site at each high-service or booster pumping station; and for water systems that have only one pumping station subject to this requirement and that are designed to serve 10,000 or fewer persons, as many as three water systems located in the same county, or within 50 miles of one another, may enter into a mutual aid agreement to share one appropriately sized, uninstalled standby pump instead of providing a standby pump on site at each water system's high-service or booster pumping station.

CCC WTP #2 CAPACITY ANALYSIS
Facility Type - Well and Hydropneumatic Tank

SYSTEM PARAMETERS

Fire Flow Rate	1,000	gpm
Fire Flow Duration	2	hrs
Fire Flow Demand	120,000	gallons
Fire Flow Replenishment Rate	83.33	gpm
Average Day Demand (From 2016 MOR Reports)	62,981	gpd
Average Day Demand	44	gpm
Maximum Day Demand (Calculated)	141,707	gpd
Maximum Day Demand (From 2016 MOR Reports)	160,000	gpd
Maximum Day Demand	98	gpm
Max Day Factor (MDF/ADF)	2.25	
Peak Hour Factor	4.50	
Peak Hour Demand (PHF x ADF)	197	gpm
Peak Instantaneous Factor	7	
Peak Instantaneous Demand (PIF x ADF)	306	gpm
Tank Low Pressure (Well Pump On)	40	psi
Tank High Pressure (Well Pump Off)	60	psi
Number of Connections (total system)	942	connections
Population Served (total system)	1,888	capita
Is Elevated Storage Available?	no	"yes" or "no"
Total EST Storage Available to WTP's Service Area	100,000	gallons

NOTE:
Fire-flow demand as defined by 62-555.520(4)(a)3c is fire-flow rate times duration.
Fire replenishment rate is the fire-flow demand divided by 24 hours.

WELL CAPACITY

Criteria #1 — According to FDEP Rule 62-555.315 (3), the total well capacity for a water system using only ground water shall equal at least the system's design maximum day water demand (including design fire flow demand if fire protection is being provided).

Criteria #2 — In addition, for community systems serving 350 or more persons (or 150 or more service connections), the total well capacity with the largest producing well out of operation shall be equal to the design average daily flow (ADF) and preferably the design maximum daily flow (MDF).

Well Name		Pumping Capacity (gpm)
Well #2		750

Criteria #1

Total Available Well Capacity	750	gpm
Fire-flow Demand	1,000	gpm
Net Available Total Well Capacity	(250)	gpm
Available Max Day Demand	(360,000)	gpd
Rated Capacity (MDF)	(250)	gpm
Rated Capacity (MDF)	(360,000)	gpd

Criteria #2

Total Well Capacity	750	gpm
Largest Well	750	gpm
Well Capacity w/ Largest Well Out of Service	0	gpm
Rated Capacity (ADF or MDF)	0	gpm
Rated Capacity Assuming ADF is met with largest well out of service (MDF)	0	GPD
Rated Capacity Assuming MDF is met with largest well out of service (MDF)	0	GPD

FINISHED WATER STORAGE CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (19)(b)2, A demonstration showing that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (excluding any storage capacity for fire protection) is sufficient to meet the water system's peak-hour water demand for at least four consecutive hours. For small water systems with hydropneumatic tanks that are installed under a construction permit for which the Department receives a complete application on or after August 28, 2003, the supplier of water or construction permit applicant also shall demonstrate that, in conjunction with the capacity of the water system's source, treatment, and finished-water pumping facilities, the water system's total useful finished-water storage capacity (i.e., the water system's total effective hydropneumatic tank volume) is sufficient to meet the water system's peak instantaneous water demand for at least 20 consecutive minutes.

Criteria #2

According to FDEP Rule 62-555.320 (20), hydropneumatic tanks shall be designed and constructed in accordance with Section 7.2 of the 10 States Standards.

Section 7.2 of the 10 States Standards requires the gross volume of a hydropneumatic tank to be 10 times the capacity of the largest pump, rated in gallons per minute. For example, a 250 gpm pump should have a 2,500 gallon pressure tank.

Hydro Tank Name	Type of Storage	Total Volume (gallons)	Useable Volume (gallons)
H1	Hydro Tank	15,000	4,016
		-	-

Criteria #1

Well Pumping Capacity	750	gpm
Hydropneumatic Tank Useful Storage Volume	4,016	gallons
Useful Hydropneumatic Tank Storage Capacity (gpm for 4 hours)	17	gpm
Total Combined Capacity Available for Peak Hour Flow (4 hours) Excluding Fire Flow	(233)	gpm
Useful Hydropneumatic Tank Storage Capacity (gpm for 20 minutes)	1,339	gpm
Total Combined Capacity Available for Peak Instantaneous Flow (20 minutes)	2,089	gpm
Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	(167,952)	gpd
Capacity Based on Meeting Peak Instantaneous Demand for 20 Minutes (MDF)	966,764	gpd

Criteria #2

Total Gross Hydropneumatic Tank Volume	15,000	gallons
Allowable Pumping Rate Based on Hydropneumatic Tank Gross Volume	1,500	gpm
Largest Well Pump	750	gpm
Controlling Pumping Rate	750	gpm
Capacity Based on Hydropneumatic Tank Gross Volume Limitations (MDF)	1,080,000	gpd

PUMPING CAPACITY

Criteria #1

According to FDEP Rule 62-555.320 (15) (a), unless elevated finished drinking water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of booster pumping stations, shall be sufficient to meet at least the water system's, or booster station services area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and maintain a minimum system pressure of 20 pounds per square inch.

Criteria #2

According to FDEP Rule 62-555.320 (15) (b), where elevated finished drinking water storage is provided, the total capacity of all high service pumping stations shall be sufficient to meet the maximum day water demand (including design fire flow demand) and to maintain a minimum system pressure of 20 pounds per square inch.

Criteria #3

In addition, per FDEP Rule 62-555.320 (15) (b), the total capacity of the high-service pumping stations, or the capacity of the booster pumping station, *combined* with the useful elevated finished-water storage capacity shall be sufficient to meet the water system's, or the booster station service area's, peak-hour water demand for at least four consecutive hours (and if fire protection is being provided, shall be sufficient to meet the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand for the design fire-flow duration).

HSP Name	Pumping Capacity (gpm)	
Well Pump #1		750

Criteria #1	Total HSP Pumping Capacity	750	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	0	gpm
	Fire Flow Rate	1,000	gpm
	Max Day Factor	2.25	
	Peak Hour Factor	4.5	
	Capacity Based on Meeting Peak Hour Demand (MDF)	0	gpm
	Capacity Based on Meeting Fire Flow @ Max Day Demand	0	gpm
Criteria #2	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Fire Flow Demand (Replenishment Rate)	N/A	gpm
	Net Available Pumping Capacity	N/A	gpm
	Potentinal Rated Capacity (MDF)	N/A	gpd
Criteria #3a	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity (gpm for 4 hours)	N/A	gpm
	Combined Useful EST and HSP Capacity Available for Peak Hour Flow for 4 Hours	N/A	gpm
	Capacity Based on Meeting Peak Hour Flow for 4 Consecutive Hours (MDF)	N/A	gpd
Criteria #3b	Total HSP Pumping Capacity	N/A	gpm
	HSP Pumping Capacity with Largest Unit Out of Service	N/A	gpm
	Elevated Storage Available to WTP's Service Area	N/A	gallons
	Useful EST Storage Capacity Available for Max Day Demand for the Fire Flow Duration	N/A	gpm
	ıbined Useful EST and HSP Capacity Available for MDF and Fire Flow Rate for Fire Flow Duration	N/A	gpm
	Capacity Based on Meeting Fire Flow Rate plus MDF for Fire Flow Duration (MDF)	N/A	gpd

NOTE: At each high-service or booster pumping station that is constructed or altered under a construction

APPENDIX D:
Capital Improvement Project Timeline and Detailed Cost Opinions

City of Wildwood
2019 Utility System Master Plan
Capital Improvement Program

WATER DISTRIBUTION

Project No.	Project	Amount	Budget Year	Capacity Increase	System Expansion
PWS Improvement No.1	Oxford WTP	$ 6,637,777	2018	Y	-
PWS Improvement No.2A	Design: CR 209 WM Phase 1	$ 150,000	2019	-	Y
PWS Improvement No.2B	Construction: CR 209 WM Phase 1	$ 1,176,000	2020	-	Y
PWS Improvement No.3A	Design: CR 209 WM Phase 2	$ 246,000	2020	-	Y
PWS Improvement No.3B	Construction: CR 209 WM Phase 2	$ 1,968,000	2021	-	Y
PWS Improvement No.5A	Design: CR 209 WM Phase 3	$ 240,000	2021	-	Y
PWS Improvement No.5B	Construction: CR 209 WM Phase 3	$ 1,920,000	2022	-	Y
PWS Misc. Improvement	Loop/Upgrade Water Mains/ Install Valves Annually	$100,000/year	Annual	-	-

WATER SUPPLY

Project No.	Project	Amount	Budget Year	Capacity Increase	System Expansion
PWS Improvement No.4	Request SWFWMD Water Use Permit Modification: Reallocate capacities to the Oxford WTP and increase the City's withdrawal capacity.	$ 50,000	2022	-	-

WATER TREATMENT

Project No.	Project	Amount	Budget Year	Capacity Increase	System Expansion
PWS Misc. Improvement	CR 501 WTP Facility Planning Document (3.20 MGD MDD)	$ 50,000	2019		-
PWS Improvement No.6	Design and Construction: CR 501 WTP - Iron Treatment Upgrades	$ 1,300,000	2019	-	-
PWS Improvement No.7a	Design, Permitting, and Bidding: CR 501 WTP Electrical Upgrades and Expansion to 3.20 MGD Design Complete and Construction Permit by 2021. Construct CR 501 WTP Expansion to 3.20 MGD	$ 130,000	2021	Y	-
PWS Improvement No.7b	Design Complete and Construction Permit by 2021. Construct CR 501 WTP Expansion to 3.20 MGD Construction Complete and online by 2023	$ 1,150,000	2022-2023	Y	-
PWS Improvement No.8a	Design, Permitting, Bidding, Construction, and Construction Administration: Ashely WTP Upper Floridan Well.	$ 110,000	2020	Y	-
PWS Improvement No.8b	Design, Permitting, Bidding, Construction and Construction Administration: Ashley WTP Expansion to 0.720 MGD.	$ 270,000	2020	Y	-
PWS Improvement No.9	Design, Permitting, Bidding, and Construction : Oxford WTP Expansion to 6.7 MGD Design Complete and Construction Permit by 2035. Construct Oxford WTP Expansion to 6.7 MGD Construction Complete and New WTP online by 2037	$ 3,950,000	2035-2037	Y	-
PWS Improvement No.10	Design, Permitting, Bidding, and Construction : CR 214 WM Interconnect	$ 54,000	2025	-	-
PWS Option No.1	Decommission Fairways WTP	$ 165,000	2027	-	-
PWS Option No.2	Decommission CR 214 WTP	$ 340,000	2025	-	-
~~PWS Option No.3~~	~~CCC Northern Interconnect and the decommissioning of the CCC WTP No.1 and No.2 (Completion of PWS Improvement No. 11)~~	~~$ 675,000~~	~~2026~~	-	-

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City of Wildwood
2019 Utility System Master Plan
Capital Improvement Program

EST. 1877 WILDWOOD FLORIDA

WASTEWATER COLLECTION					
Project No.	**Project**	**Amount**	**Budget Year**	**Capacity Increase**	**System Expansion**
WW Improvement No.1A	Design and Permitting: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	$ 282,000	2020	-	Y (85%)
WW Improvement No.1B	Construction: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	$ 2,444,000	2021-2022	-	Y (85%)
WW Improvement No.2	Redirect Providence flows through the Trailwinds FM	$ -	2019	-	-
WW Improvement No.4	Gravity Collection System Condition Assessment including complete system cleaning, video inspection, infiltration and inflow study (approx. 200,000 LF of gravity sewer)	$ 250,000	2022	-	-
WW Improvement No.5	Prioritized Gravity Collection System Renewal, Rehab, and/or Replacement	$100,000/year	Annual	-	-
WW Improvement No.6	Main Street North Lift Station Rehabilitation	$ 505,000	2022	Y	
WW Improvement No.8	O'Dell Lift Station/Repump Station	$ 810,000	Developer Driven	Y	Y
WW Improvement No.9a	Monarch Ranch Lift Station and Force Main	$ 4,550,000	Developer Driven	Y	Y
WW Improvement No.9b	Sumter, LLC Lift Station and Force Main	$ 3,680,000	Developer Driven	Y	Y
WW Improvement No.10	Wildwood Entertainment Park/US 301 Lift Station and Force Main	$ 1,735,000	Developer Driven	Y	Y
WW Improvement No.11	CR 219 Lift Station Upgrades	$ 580,000	Developer Driven	Y	Y
WW Improvement No.12	Lake Andrews Preserve Lift Station and Force Main	$ 550,000	Developer Driven	Y	Y
WW Improvement No.13	Brown Property Lift Station and Force Main	$ 1,260,000	Developer Driven	Y	Y
WW Improvement No.14A	Design, Permitting, and Bidding of CR-468/Warm Springs Avenue Low Pressure Sewer System	$ 485,875	2022	-	Y
WW Improvement No.14B	Design, Permitting, and Bidding of CR-468/Warm Springs Avenue Low Pressure Sewer System to US 301	$ 560,625	2022	-	Y
WW Improvement No.15	Design, Permitting, and Bidding of SR-44A Low Pressure Sewer System (Contingent on project WW Improvement No.1)	$ 261,625	2023	-	Y
WW Misc. Improvement	Miscellaneous System Enhancements including lift station rehabilitation, main and lateral replacements	$100,000/year	Annual	-	-

City of Wildwood
2019 Utility System Master Plan
Capital Improvement Program

WASTEWATER TREATMENT					
Project No.	**Project**	**Amount**	**Budget Year**	**Capacity Increase**	**System Expansion**
WW Improvement No.3	Wastewater Treatment Facility Plan including FDEP SRF Facility Planning Document	$ 75,000	2018	-	-
WW Improvement No.7	Design, Permitting, Bidding, and Construction Administration: Existing City WWTF Expansion from 3.55 MGD to 6.00 MGD with Design Complete and Construction Permit by 2035. Construct Existing City WWTF Expansion from 3.55 MGD to 6.00 MGD: Expanded WWTF Online by 2037	$ 35,525,000	2030-2037	Y	-
WW Improvement No.16	WWTF Clarfiier Rehab	$ 600,000	2021		
WW Improvement No.17	WWTF Biosolids Improvements	$ 2,000,000	2022-2023		
RECLAIMED WATER TRANSMISSION AND DISPOSAL					
Project No.	**Project**	**Amount**	**Budget Year**	**Capacity Increase**	**System Expansion**
RCW Improvement No.1	Design and Construction: Install liner into the R-10 and R-11 ponds for NSU	$ 585,000	2019-2020	Y	-
RCW Improvement No.2	Effluent Disposal Expansion for R-12 and RIBs Site	$ 630,000	2035-2037	Y	-
RCW Improvement No.3	Millennium Park 10-inch reclaim water main extension	$ 1,435,500	2023-2024	-	Y

	DENOTES THAT PROJECT IS COMPLETE OR IN PROGRESS
	DENOTES THAT PROJECT IS DEVELOPER DRIVEN

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.2: CR 209 WM Phase I

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 7,500 LF of 12" PVC DR-18 Water Main and appurtenances.	LF	7,500	$ 120	$ 900,000
2	Install 850 LF of 6" PVC DR-18 Water Main and appurtenances.	LF	850	$ 90	$ 76,500
				SUBTOTAL	$ 980,000
				DESIGN AND PERMITTING (15%)	$ 150,000
				CONTINGENCY (20%)	$ 196,000
				TOTAL	$ 1,326,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.3: CR 209 WM Phase II

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 7,000 LF of 12" PVC DR-18 Water Main and appurtenances.	LF	7,000	$ 120	$ 840,000
2	Install 5,400 LF of 16" PVC DR-18 Water Main and appurtenances.	LF	5,000	$ 160	$ 800,000
				SUBTOTAL	$ 1,640,000
				DESIGN AND PERMITTING (15%)	$ 246,000
				CONTINGENCY (20%)	$ 328,000
				TOTAL	$ 2,214,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.5: CR 209 WM Phase III

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 10,500 LF of 16" PVC DR-18 Water Main and appurtenances.	LF	10,000	$ 160	$ 1,600,000
				SUBTOTAL	$ 1,600,000
				DESIGN AND PERMITTING (15%)	$ 240,000
				CONTINGENCY (20%)	$ 320,000
				TOTAL	$ 2,160,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.7: CR 501 WTP Expansion to 3.20 MGD MDD (HSP Limiting)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	CR 501 WTP Expansion to 3.20 MGD MDD (Well Pump Limiting)– Modifications to the existing electrical system, new generator and ATS, mechanical piping improvements, and installation of 2 new high service pumps for a total of 4 high service pumps (3 duty, 1 standby).	LS	1	$ 850,000	$ 850,000
				SUBTOTAL	$ 850,000
				DESIGN AND PERMITTING (15%)	$ 130,000
				CONTINGENCY (20%)	$ 170,000
				TOTAL	$ 1,150,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.8A: Expand Ashley WTP to 0.720 MGD

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct a new 12" Upper Floridan Well	LS	1	$ 75,000	$ 75,000
				SUBTOTAL	$ 75,000
				DESIGN AND PERMITTING (15%)	$ 20,000
				CONTINGENCY (20%)	$ 15,000
				TOTAL	$ 110,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.8A: Expand Ashley WTP to 0.720 MGD

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
2	Install a new Vertical Tubine Well Pump and Starter and requried yard piping (Includes Electrical and Instrumentation)	LS	1	$ 200,000	$ 200,000
				SUBTOTAL	$ 200,000
				DESIGN AND PERMITTING (15%)	$ 30,000
				CONTINGENCY (20%)	$ 40,000
				TOTAL	$ 270,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.9: Phase II Expansion of the Oxford WTP

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	MOBILIZATION	LS	1	$ 100,000	$ 100,000
2	ENVIRONMENTAL PROTECTION	LS	1	$ 20,000	$ 20,000
3	SURVEY LAYOUT AND RECORD DRAWINGS	LS	1	$ 10,000	$ 10,000
4	PROFESSIONAL SITE VIDEO TESTING (PRE & POST CONSTRUCTION)	LS	1	$ 10,000	$ 10,000
5	RESTORATION	LS	1	$ 20,000	$ 20,000
6	SITE CIVIL	LS	1	$ 20,000	$ 20,000
7	HIGH SERVICE PUMPS	EA	5	$ 120,000	$ 600,000
8	SULFURIC ACID FEED SYSTEM	EA	1	$ 90,000	$ 90,000
9	CHLORINE FEED SYSTEM	EA	1	$ 90,000	$ 90,000
10	PACKED TOWER AERATION SYSTEMS	EA	1	$ 250,000	$ 250,000
11	VTP WATER TRANSFER PUMPS	EA	1	$ 80,000	$ 80,000
12	ODOR CONTROL SYSTEM	EA	1	$ 275,000	$ 275,000
13	1.0 MG GROUND STORAGE TANK	LS	1	$ 820,000	$ 820,000
14	YARD PIPING	LS	1	$ 20,000	$ 20,000
15	ELECTRICAL AND INSTRUMENTATION	LS	1	$ 500,000	$ 500,000
				SUBTOTAL	$ 2,910,000
				DESIGN AND PERMITTING (15%)	$ 440,000
				CONTINGENCY (20%)	$ 600,000
				TOTAL	$ 3,950,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Improvement No.10: CR 214 Water Main Interconnect

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 100 LF of 12" PVC DR-18 Water Main and appurtenances.	LS	1	$ 40,000	$ 40,000
				SUBTOTAL	$ 40,000
				DESIGN AND PERMITTING (15%)	$ 6,000
				CONTINGENCY (20%)	$ 8,000
				TOTAL	$ 54,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Optional Improvement No.1: Fairways Decommission

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Decommission the Fairways WTP	LS	1	$ 125,000	$ 125,000
				SUBTOTAL	$ 125,000
				DESIGN AND PERMITTING (15%)	$ 20,000
				CONTINGENCY (20%)	$ 20,000
				TOTAL	$ 165,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Optional Improvement No.2: Decommission the CR 214 Repump Station

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Decommission the CR 214 Repump WTP	LS	1	$ 250,000	$ 250,000
				SUBTOTAL	$ 250,000
				DESIGN AND PERMITTING (15%)	$ 40,000
				CONTINGENCY (20%)	$ 50,000
				TOTAL	$ 340,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Optional Improvement No.3: CCC Northern Interconnect

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install a Pressure Sustaining/Reducing Valve. Install telemetry at Northern Entrance CCC. Tie into the existing and new PSV/PRV	LS	1	$ 150,000	$ 150,000
2	Decommission the CCC WTP No.1 and WTP No.2	LS	1	$ 350,000	$ 350,000
				SUBTOTAL	$ 500,000
				DESIGN AND PERMITTING (15%)	$ 75,000
				CONTINGENCY (20%)	$ 100,000
				TOTAL	$ 675,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

PWS Optional Improvement No.3: CCC Northern Interconnect

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 8,500 LF of 12" PVC DR-18 Water Main and appurtenances.	LF	8,500	$ 120	$ 1,020,000
				SUBTOTAL	$ 1,020,000
				DESIGN AND PERMITTING (15%)	$ 153,000
				CONTINGENCY (20%)	$ 204,000
				TOTAL	$ 1,377,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.1: CCC WWTF Decommissioning and Force Main

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Install 8" PVC DR-18 Force Main and appurtenances from the Rails End RV/Mobile Home Park along SR 44 and manifold into the existing 8" Force Main extending from the Wildwood Estates 3 lift station.	LF	16,500	$ 100	$ 1,650,000
2	Pressure test and reuse existing 6" Reclaim Main and tie into proposed 8" Force Main.	LF	6,160	$ 2	$ 12,320
3	Decommission CCC WWTF.	LS	1	$ 150,000	$ 150,000
4	Replace pumps in CCC master lift station (370 gpm peak hour flow capacity) and connect to 6" Reclaim Main	LS	1	$ 70,000	$ 70,000
				SUBTOTAL	$ 1,880,000
				DESIGN AND PERMITTING (15%)	$ 282,000
				CONTINGENCY (30%)	$ 564,000
				TOTAL	$ 2,726,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.6: Main St. North Lift Station Upgrades and Modifications

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Upgrade and make modificaitons to the Main St. North LS to mee the projected 20 Year demands. Upgrades to include but not limited to new pumps, install a generator and ATS, site civil work, new fence, and rehabilitation of the wet well, valve vault, and new piping.	LS	1	$ 350,000	$ 350,000
				SUBTOTAL	$ 350,000
				DESIGN AND PERMITTING (15%)	$ 50,000
				CONTINGENCY (30%)	$ 105,000
				TOTAL	$ 505,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.7: Wildwood WWTF Expansion to 6.00 MGD

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Wildwood WWTF Expansion from 3.55 MGD to 6.00 MGD	Gallons	2,450,000	$ 10	$ 24,500,000
				SUBTOTAL	$ 24,500,000
				DESIGN AND PERMITTING (15%)	$ 3,675,000
				CONTINGENCY (30%)	$ 7,350,000
				TOTAL	$ 35,525,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.8: Trailwinds Re-Pump Station (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct new Trailwinds Re-Pump Station (2.55 MGD PHF)	MGD	3	$ 200,000	$ 600,000
				SUBTOTAL	$ 600,000
				DESIGN AND PERMITTING (15%)	$ 90,000
				CONTINGENCY (30%)	$ 120,000
				TOTAL	$ 810,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.9a: Monarch Ranch (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 22,000 LF of 12" DR-18 PVC Force Main	LF	22,000	$ 120	$ 2,640,000
2	Construct new Wildwood Entertainment Park Lift Station	LS	1	$ 500,000	$ 500,000
				SUBTOTAL	$ 3,140,000
				DESIGN AND PERMITTING (15%)	$ 470,000
				CONTINGENCY (30%)	$ 940,000
				TOTAL	$ 4,550,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.9b: Sumter, LLC (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 17,000 LF of 12" DR-18 PVC Force Main	LF	17,000	$ 120	$ 2,040,000
2	Construct new Wildwood Entertainment Park Lift Station	LS	1	$ 500,000	$ 500,000
				SUBTOTAL	$ 2,540,000
				DESIGN AND PERMITTING (15%)	$ 380,000
				CONTINGENCY (30%)	$ 760,000
				TOTAL	$ 3,680,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.10: Wildwood Entertainment Park Lift Station and Force Main (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 11,000 LF of 8" DR-18 PVC Force Main	LF	11,000	$ 95	$ 1,045,000
2	Construct new Wildwood Entertainment Park Lift Station	LS	1	$ 150,000	$ 150,000
				SUBTOTAL	$ 1,195,000
				DESIGN AND PERMITTING (15%)	$ 180,000
				CONTINGENCY (30%)	$ 360,000
				TOTAL	$ 1,735,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.11: CR 219 Lift Station Upgrades and Modifications (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Upgrade and make modificaitons to the CR 219 LS to meet the projected 20 Year demands. Upgrades to include but not limited to new pumps, install a generator and ATS, site civil work, new fence, and rehabilitation of the wet well, valve vault, and new piping.	LS	1	$ 400,000	$ 400,000
				SUBTOTAL	$ 400,000
				DESIGN AND PERMITTING (15%)	$ 60,000
				CONTINGENCY (30%)	$ 120,000
				TOTAL	$ 580,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.12: Lake Andrews Preserve Lift Station and Force Main (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 1,000 LF of 6" DR-18 PVC Force Main	LF	1,000	$ 80	$ 80,000
2	Construct new Lake Andrews Preserve Lift Station	LS	1	$ 300,000	$ 300,000
				SUBTOTAL	$ 380,000
				DESIGN AND PERMITTING (15%)	$ 60,000
				CONTINGENCY (30%)	$ 110,000
				TOTAL	$ 550,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.13: Brown Development Lift Station and Force Main (Developer Driven)

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 6,000 LF of 8" DR-18 PVC Force Main	LF	6,000	$ 95	$ 570,000
2	Construct new Brown Development Lift Station	LS	1	$ 300,000	$ 300,000
				SUBTOTAL	$ 870,000
				DESIGN AND PERMITTING (15%)	$ 130,000
				CONTINGENCY (30%)	$ 260,000
				TOTAL	$ 1,260,000

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.14A: C-468 Low Pressure System

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 13,000 LF of 3" SCH 40 PVC Low Pressure Force Main	LF	13,000	$ 25	$ 325,000
				SUBTOTAL	$ 325,000
				DESIGN AND PERMITTING (15%)	$ 48,750
				CONTINGENCY (30%)	$ 112,125
				TOTAL	$ 485,875

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.14B: C-468 Low Pressure System

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 15,000 LF of 3" SCH 40 PVC Low Pressure Force Main	LF	15,000	$ 25	$ 375,000
				SUBTOTAL	$ 375,000
				DESIGN AND PERMITTING (15%)	$ 56,250
				CONTINGENCY (30%)	$ 129,375
				TOTAL	$ 560,625

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

WW Improvement No.15: SR-44A Low Pressure System

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 7,000 LF of 3" SCH 40 PVC Low Pressure Force Main	LF	7,000	$ 25	$ 175,000
				SUBTOTAL	$ 175,000
				DESIGN AND PERMITTING (15%)	$ 26,250
				CONTINGENCY (30%)	$ 60,375
				TOTAL	$ 261,625

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CITY OF WILDWOOD 2018 MASTER PLAN

ENGINEER'S OPINION OF PROBABLE COST

FOR

The City of Wildwood

RCW Improvement No.3: Millennim Park Reclaim Main extension

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Construct 9,000 LF of 10" DR-18 PVC Reclaim Watermain	LF	9,000	$ 110	$ 990,000
				SUBTOTAL	$ 990,000
				DESIGN AND PERMITTING (15%)	$ 148,500
				CONTINGENCY (30%)	$ 297,000
				TOTAL	$ 1,435,500

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APPENDIX E:
Revenue Sufficiency Analysis

Stantec

City of Wildwood, FL

FY 2019 Utility Revenue Sufficiency Analysis – Final Report

June 27, 2019

June 27, 2019

Mr. Jason McHugh
City Manager
100 N Main St
Wildwood, FL 34785

Re: FY 2019 Utility Revenue Sufficiency Analysis – Final Report

Dear Mr. McHugh,

Stantec Consulting Services Inc. is pleased to present this Final Report of the FY 2019 Utility Revenue Sufficiency Analysis that we performed for the City's Utility (Water and Sewer).

We appreciate the fine assistance provided by you and all the members of the City staff who participated in the study.

If you or others at the City have any questions, please do not hesitate to call me at (813) 204-3311 or email me at jeffrey.dykstra@stantec.com. We sincerely appreciate this opportunity to be of service to you and the City.

Sincerely,

Jeff Dykstra
Managing Consultant

S. 777 Harbour Island Blvd., Suite 600
Tampa, FL 33602
(813) 204-3311
Jeffrey.Dykstra@stantec.com

Enclosure

TABLE OF CONTENTS

1. INTRODUCTION

Stantec Consulting Services (Stantec) has conducted a Utility Revenue Sufficiency Analysis (RSA or Study) for the City of Wildwood, FL (City) Water, Sewer, and Reuse Water Utility System (Utility). This report presents the objectives, approach, source data, assumptions, results, and recommendations of the Study.

1.1 BACKGROUND

The City of Wildwood, FL presently serves approximately 6,800 equivalent residential connections (ERC) and is experiencing growth within the Utility's service area and demand for water and sewer services is expected to increase by nearly 200% by 2037. Significant growth within the Utility's service area was also anticipated by the City and accounted for by its Consulting Engineer[1] who completed a Utility Master Plan in 2015, which identified the corresponding infrastructure requirements needed to support substantial growth for the Utility. Stantec performed an RSA for the City in support of that Utility Master Plan and identified the need for 15.00% rate increases in FY 2016 and FY 2017 and a 2.50% annual rate indexing plan thereafter over the ten-year projection period. In September 2018, the City Commission adopted Resolution No. R2018-20 which established that the annual rate indexing plan will be equal to the 12-month percent change in the Consumer Price Index (CPI) – Water and Sewerage Maintenance Series as published by the United States Bureau of Labor Statistics.

Due to changes in the City's plan to provide water and sewer service for this growth, and discussions with The Villages to provide service to portions of the City's service area directly, have altered the Utility's capital infrastructure needs and financial projections. As such, the City is updating the Utility Master Plan and engaged Stantec to measure the adequacy of the revenue provided by its current rates and assumed growth to meet the Utility's projected operating and capital cost requirements over a ten-year projection period through fiscal year (FY) 2029.

1.2 OBJECTIVES

The primary objective of the Study is to evaluate the sufficiency of water, sewer, and reuse revenues generate by current rates and the City's approved plan of annual indexing adjustments to satisfy the Utility's projected ten-year requirements, including 1) operations and maintenance costs, 2) capital improvement program costs, 3) existing and projected debt service costs and corresponding debt service coverage ratios, 4) adequate operating reserves; and, if necessary, develop alternative plans of future annual rate adjustments that will satisfy these projected requirements during each year of the forecast. Stantec also performed a monthly bill comparison for a "typical" single-family water and sewer customer between the City and other utility systems in the surrounding geographic area.

[1] Kimley Horn serves as the City's Utility Consulting Engineer.

2. ANALYSIS

The primary objective of the study was to conduct a RSA that would evaluate the sufficiency of the revenue provided by the Utility's current water, sewer, and reuse water rates and approved plan of annual indexing adjustments to meet its projected expenditure requirements over a ten-year projection period (FY 2020 - FY 2029)[2]. The following sub-sections present the source data, assumptions, results, as well as the conclusions and recommendations of the RSA.

This section of the Report presents a description of the source data and key assumptions utilized in the development of the RSA. Appendix A, at the end of this report, includes detailed schedules supporting the financial management plan identified herein.

2.1 DESCRIPTION

To initialize the Study, we obtained the City's historical and budgeted financial information regarding the operation of its water, sewer, and reuse systems, as well as historical customer counts and volume data. We also discussed other assumptions and policies that would affect the financial performance of the Utility, planned developments/customer growth, debt coverage levels, levels of reserves, expected capital projects, sources of funding for those projects, earnings on invested funds, escalation rates for operating costs, etc.

All of this information was entered into the financial module of our proprietary Financial Analysis and Management System (FAMS-XL) interactive modeling system. This module of FAMS-XL produced a ten-year projection of the sufficiency of the revenue provided by the current rates to meet current and projected financial requirements and determined the level of rate revenue increases necessary in each year of the projection period to satisfy the system's annual financial requirements.

The revenue sufficiency and financial planning module of FAMS-XL utilizes all projected available funds in each year of the projection period to pay for capital projects. The model is set up to reflect the rules of cash application as defined and applied by City staff, and it produces a detailed summary of the funding sources to be used for each project in the water and sewer capital improvement plan (CIP). To the extent that current revenues and unrestricted reserves are not adequate to fund all capital projects in any year of the projection period, the model identifies a borrowing requirement to fund those projects, or portions thereof that are determined to be eligible for borrowing. In this way, the FAMS-XL model is used to

[2] While the RSA begins with FY 2019 data, most of this information serves as the base data upon which projected FY 2020 beginning fund balances were determined. As such, for purposes of this RSA, FY 2019 is not considered part of the projection period.

develop a borrowing program that includes the required borrowing amount by year, and the resultant annual debt service requirements for each year in the projection period.

As part of the Study, Stantec conducted a work session with City Staff in which alternative multi-year financial management plans were reviewed with corresponding rate revenue adjustments. In this way, Stantec developed the recommended financial management plan and corresponding plan of annual rate revenue adjustments presented in this report.

2.2 SOURCE DATA AND ASSUMPTIONS

The following section summarizes the key source data and assumptions utilized to conduct of the RSA.

2.2.1 Beginning Fund Balances

City Staff provided the Utility's balances as of the end of FY 2018, which was used to establish the beginning FY 2019 balances for each of the various funds for the system. Funds reserved or encumbered for specific capital projects were included in the beginning fund balances available for capital projects in FY 2019, and the associated costs were included in the CIP in FY 2019. Schedule 2 in Appendix A summarizes the beginning fund balances for FY 2019 which were utilized for this RSA.

2.2.2 Customers and Demand

New connection and demand/sales growth projections were based upon a review of multiple years of historical billing data, the projected growth in five-year increments identified in the Master Plan Update, and discussions with City staff regarding the timing or distribution of future growth within each five-year period. As part of the Study, Stantec reviewed historic customer growth as well as billed volume changes for the last six fiscal years (FY 2013 thru FY 2018) for the water and sewer system.

This Study assumes that approximately 2,600 accounts that the City currently provides retail water and sewer service to in the Village of Fenney will transition from the City to The Villages beginning in FY 2020. Outside of the loss of these customers, this RSA assumes that the water and sewer systems will grow by 495 equivalent residential connections (ERC) in FY 2020, 543 ERCs per year in FY 2021 and FY 2022, and 467 ERCs each year after that. Excluding the anticipated one-time reduction in customers in FY 2020, this assumed growth schedule represents average annual growth rates of approximately 7.00% per year for the water and sewer systems over the projection period. No customer growth is anticipated for the reuse system during the projection period.

This RSA projects that the Utility will experience reductions in average monthly billed volume per ERC for water and sewer service of 0.50% per year beginning in FY 2021 throughout the remainder of the projection period which is consistent with recent overall industry trends due to improved efficiency of fixtures and conservation efforts. Therefore, excluding the anticipated one-time reduction in customers and associated billed water and sewer in FY 2020, billed water is projected to increase over the projection period by approximately 6.50% per year while billed sewer flow is projected to increase by approximately 7.00% per year.

Schedule 1 in Appendix A summarizes the projection of water and sewer accounts and billed volumes over the projection period.

2.2.3 Rate and Other Revenues

The revenue utilized in the RSA consists of rate revenue, interest earnings, system development charges, grants, and other minor revenue from miscellaneous service charges. Rate revenue projections were based on FY 2018 actual revenues, adjusted for assumed growth and rate increases. Except for interest earnings and system development charges, all non-rate revenue amounts reflect the amounts as shown in the Utility's FY 2019 Budget.

Schedule 3 in Appendix A provides the projection of annual revenues during the projection period.

2.2.4 Adjustments to Revenue

Due to the City's anticipated loss in retail water and sewer customer accounts from the Village of Fenney beginning in FY 2020, and associated revenue losses the Utility is projected to achieve reduced debt service coverage ratios as compared to FY 2018 and projected FY 2019 results. As such, the City is in negotiations with The Villages to develop an agreement where the Utility would receive $0.54 million in FY 2020 and $0.23 million in FY 2021[3] in revenue from The Villages which will assist the Utility in meeting its debt service coverage requirements.

2.2.5 System Development Charges

Water and sewer system development charge revenues were calculated based upon the respective fee and assumed growth connections during each year of the projection period. It is assumed that 100% of projected new connections pay system development fees. A portion[4] of the Utility's debt service is expansion related and therefore eligible to be paid for with system development charge revenue. As such, this RSA assumes that the City will utilize system development fee balances as available and eligible to pay for expansion related debt service during each year of the projection period as shown in Schedule 11 of Appendix A for the water and sewer system development funds.

[3] Per discussions between the City and the City's Bond Counsel, this revenue is assumed to be considered Gross Revenues for the calculation of the Rate Covenant as defined in the Utility's Bond Resolution.

[4] Percentages of annual debt service for the water and sewer systems that is expansion related is summarized in Schedule 1 of Appendix A as provided by City Staff.

2.2.6 Interest Earnings

Annual interest earnings were calculated based upon projected fund balances and assumed interest rates[5]. The Study reflects interest-earning rates of 0.13% in FY 2019 and increases by 0.125% yearly until FY 2026 where it reaches 1.00% for the remainder of the projection period.

2.2.7 Cost Escalation

Annual cost escalation factors for the various types of O&M expenses were discussed with City staff and applied in each year of the projection period beginning in FY 2020. The specific escalation factors assumed for each category of expense are presented in Schedule 5 in Appendix A and reflect anticipated customer and system growth, recent historical trends, current industry observations, and City Management expectations.

2.2.8 Cost Requirements

The Utility's annual cost requirements include all the City's operations and maintenance (O&M) expenses directly attributable to the Utility, inter-fund transfers, debt service costs, and minor capital outlay.

The Study projected O&M based upon on the individual expense categories and amounts within the FY 2019 Budget, adjusted annually thereafter based upon assumed cost escalation factors. The Utility has historically executed under their budget (approximately 90.00%) for both Personnel Services and other O&M costs. In order to account for some annual fluctuation and conservatism, this Study assumes that these expenses will executed/spent at 95.00% of the FY 2019 Budget amounts. Beginning in FY 2020, the RSA assumes incremental O&M costs associated with the operation of the Utility's Oxford Water Treatment Plant coming online in the amount of $320,000 in FY 2020 and escalated thereafter based on the assumed annual escalation factors by expense category.

Per the direction of City Management, the RSA assumes that the annual transfer from the Utility to the General Fund is removed for the remainder of the projection period. Transfers to the Renewal & Replacement (R&R) Fund were assumed to be equal to 5.00% of the total prior year operating revenue for each year of the projection period.

Annual debt service payments on outstanding debt were also included in the projection based on schedules of debt service as provide by City Staff and total approximately $1.4 million in FY 2020 gradually decreasing to $0.5 million by FY 2029.

[5] The estimated annual interest earnings rate on invested funds is 0.25% in FY 2020; increasing to 0.38% in FY 2021, 0.50% in FY 2022, 0.63% in FY 2023, 0.75% in FY 2024, 0.88% in FY 2025, and 1.00% through the remainder of the projection period.

The Utility's projected annual cost requirements are provided in Schedule 4 of Appendix A.

2.2.9 Capital Improvement Program

The CIP utilized in this RSA was provided by the City's Consulting Engineer in current day dollars. Therefore, beginning in FY 2020, a compounded annual cost inflation factor of 4.00% was applied to each dollar of projected capital spending to account for inflation in the future cost of construction. The total CIP is approximately $36.3 million from FY 2020 through FY 2029 in current dollars. The annual CIP and assumed funding sources and amounts are provided in Schedules 6, 7, and 8 in Appendix A.

For the purpose of dedicating a minimum level of revenues for capital funding, annual contributions to the R&R Fund equal to 5.00% of total prior year operating revenues were assumed in each year of the projection period. These R&R funds were then used for funding various annual capital improvement requirements. Moreover, Kimley-Horn and City staff identified the portion of certain expansion-related projects that are presently expected to be funded all or in part from connection and tie fees, or system development charges as fund balances are available.

2.2.10 Borrowing Assumptions

Based on the annual CIP, projected annual cash flows, and available balances, the RSA projects that the City will need to borrow to fund a portion of the CIP beginning in FY 2021. The schedule of projected borrowing needs, assumptions of terms and associated annual debt service is summarized on Schedule 12 of Appendix A.

2.2.11 Debt Service Coverage

The Utility has several long-term debts outstanding, both senior and subordinate. The Utility must maintain net revenue (gross revenue minus operating expenses) that is at least 1.15 times greater than the annual debt service requirement (i.e. the annual principal and interest payments) on its outstanding senior-lien debt. Furthermore, the requirement for the Utility's outstanding SRF loans is that net income after senior lien debt service, must be at least 1.15 times the annual SRF debt service.

These coverage requirements are minimum requirements. To the extent the Utility is unable to meet these requirements it could be found in technical default, resulting in the Utility having its credit rating downgraded, which would likely negatively affect the interest rate and terms of future financing initiatives. As a policy decision, utilities often measure revenue sufficiency and set rates based upon a higher coverage level to ensure compliance with these covenants in the event future projections of revenue and expenses do not occur as predicted. This RSA targeted senior debt service coverage of at least 1.50 times net revenue. Debt service coverage of 1.50 to 2.00 times net revenue is considered "strong" coverage for utilities per guidance published by the municipal utility rating agencies.

The senior debt service coverage holds above the target of 1.50 throughout the projection period and the subordinate debt service remains above the minimum of 1.15 throughout the projection period provided

that The Villages provides the Utility with the revenues outlined in Section 2.2.4 herein. The Utility's existing and projected annual debt service and associated debt service coverage calculations are provided on Schedule 10 of Appendix A.

2.2.12 Minimum Operating Reserves

Reserve balances for utility systems are funds set aside for a specific cash flow requirement, financial need, project, task, or legal covenant. These balances are also maintained in order to meet short-term cash flow requirements, and at the same time, minimize the risk associated with meeting financial obligations and continued operational and capital needs under adverse conditions. The level of reserves maintained by a utility is an important component and consideration when developing a utility system multi-year financial management plan.

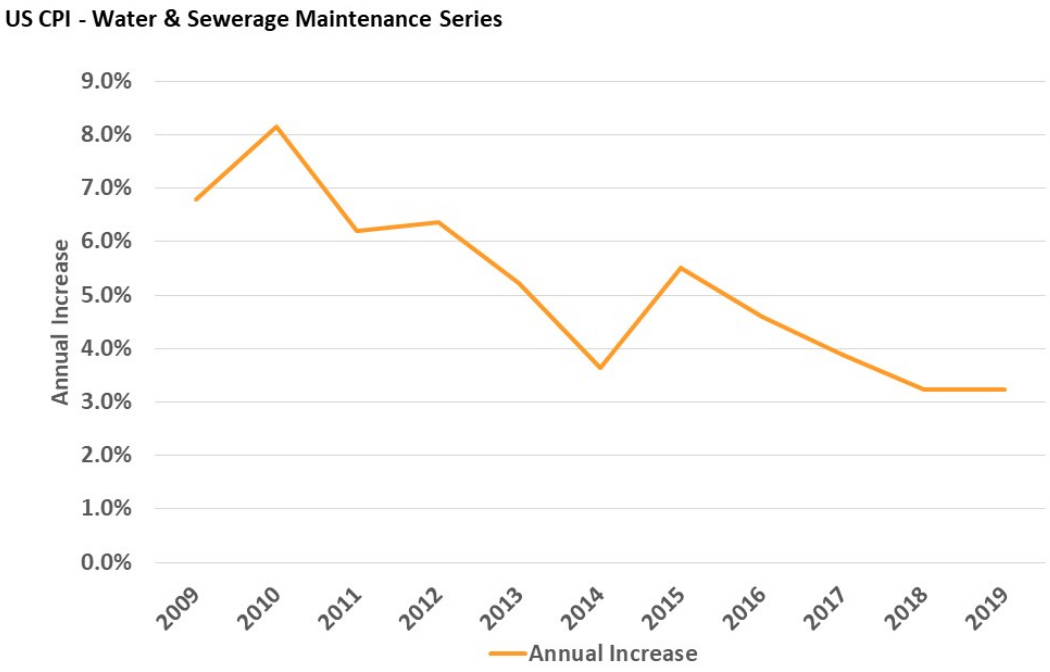
The financial management plans presented in this report assume that the City will aim to reach a minimum Operating Fund balance or Operating Reserve equal to 6 months of annual O&M expenses for the water and sewer system. This level of operating reserve meets the minimum standards for required reserves based upon 1) our industry experience for similar systems, 2) the findings of reserve studies conducted by the AWWA, and 3) a healthy level of reserves for a municipal utility system per the evaluation criteria published by the municipal utility rating agencies (Fitch, Moody's, and Standard & Poor's). The Study projects that the Utility will meet the 6 months of O&M expenses target over the projection period.

3. RESULTS

3.1 FINANCIAL MANAGEMENT PLAN

In 2018, the City adopted a resolution to provide for annual rate indexing adjustments equal to the annual change[6] in the U.S. CPI – Water and Sewerage Maintenance Series unless the City Commission acts to the contrary. This index specifically measures the average change in the cost of water and sewer service to households and has historically risen at an average annual rate of approximately 5.00% over the past ten years as shown in **Table 3-1**.

Table 3-1 – U.S. CPI Water & Sewerage Maintenance Series



Based upon the assumptions and supporting data presented herein, this RSA indicates that an annual water, sewer, and reuse rate adjustment plan of 3.24% in FY 2020 and an estimated average annual rate indexing plan of 4.00% from FY 2021 through FY 2029 is projected to generate sufficient revenue to meet its projected cost requirements over the projection period. It is expected that the actual annual change in the U.S. CPI – Water and Sewerage Maintenance Series will fluctuate on an annual basis, but an average of approximately 4.00% per year should generate sufficient revenue for the Utility.

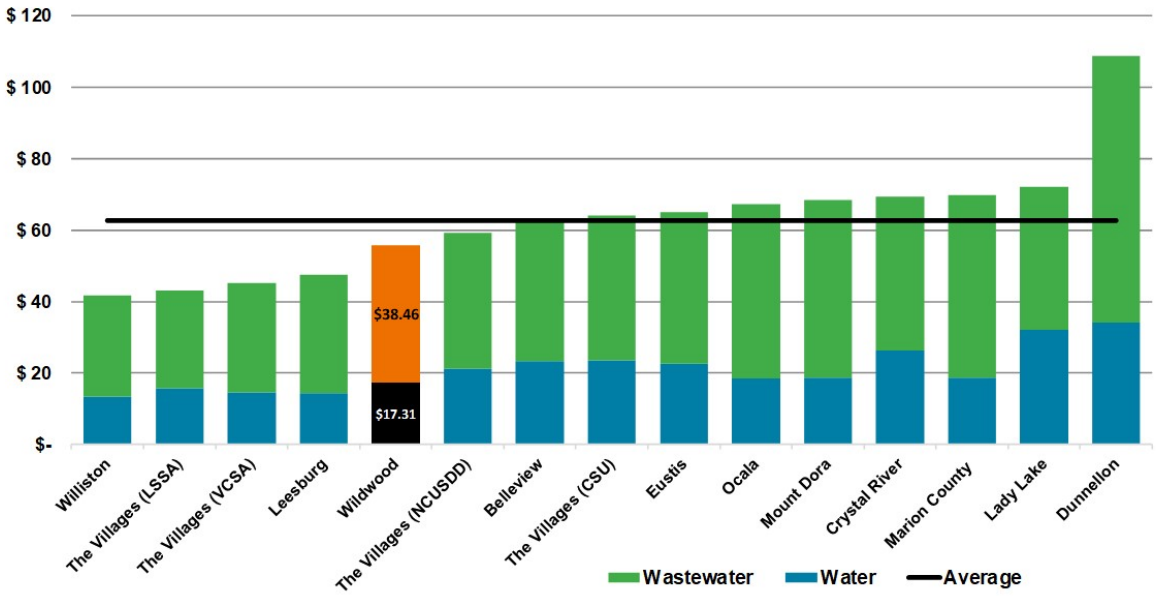
[6] Resolution No. R2018-20 establishes the index for the next fiscal year to be based upon the 12-month change from April of each year unless other action is taken by the City Commission.

3.2 BILL COMPARISON

As part of the RSA, we prepared a FY 2019 residential customer bill comparison that compares the monthly bill for the City's typical residential users to that of neighboring communities. The rate survey was prepared to provide an understanding of the current market range of typical utility costs in the area and how the City fits within that range. The results of the survey indicate that the Utility charges a combined water and sewer monthly bill that is very comparable to its neighboring communities for its typical customers. Figure 1 provides a comparison for the typical single-family residential customer using 5,000 gallons per month.

Additional graphs showing cost comparisons for the City based upon FY 2019 rates with neighboring communities at other usage levels are provided in Schedule 13 of Appendix A.

Figure 1 – Combined Water & Sewer Monthly Bill Comparison (5,000 Gallons)



It is important to note that the FY 2019 comparison of costs for neighboring communities is a "snapshot in time". With the multitude of financial and water demand pressures the water and sewer industry faces, many of the monthly bills shown in this survey are almost certain to increase in FY 2020 and beyond. Based upon publicly available information, our industry experience, and the plan of annual rate adjustments identified in this report, we expect that the City will continue to be of comparable cost to the neighboring utilities in its geographic area with the recommended rate indexing plan described herein.

3.3 CONCLUSIONS & RECOMMENDATIONS

Based upon the analysis presented herein and the results presented in the prior subsection, we have reached the following conclusions and recommendations:

This RSA evaluated the adequacy of current water and sewer revenues to meet the Utility's financial requirements over a ten-year projection period (FY 2020 thru FY 2029) as described herein. Based upon the data, assumptions, and policies presented herein, the Study concludes the following:

1. Rate indexing adjustments in-line with the estimated annual change in the U.S. CPI – Water and Sewerage Maintenance Series of 3.24% for FY 2020 and 4.00% thereafter are needed to satisfy the Utility's projected O&M expenditures and capital requirements, while maintaining adequate operating reserves and debt service coverage. The recommended annual rate indexing plan for the projection period is shown in the **Table 3-2**.

Table 3-2 – Annual Rate Indexing Plan

System	FY 2020	FY 2021 – FY 2029
Water	3.24%	4.00%
Sewer	3.24%	4.00%
Reuse Water	3.24%	4.00%

2. Based upon the identified plan of rate adjustments and current data and assumptions presented herein, the Utility will need to issue new borrowing of approximately $19.1 million over the projection period to fund the CIP beginning in FY 2021.

3. This RSA assumes that the Utility will discontinue the annual transfer to the General Fund and that system development charge balances will be utilized to pay for expansion related debt service as available.

4. The City should perform annual revenue sufficiency updates to ensure that the plan of annual rate adjustments is sufficient given additional information and changes to the Utility's revenue and expense information, as well as changes in economic conditions, changes in the Utility's service area, growth in demand for water and sewer services, capital requirements, regulatory requirements, and other factors so that any necessary changes can be made to the financial management plan presented herein. This will ensure that the Utility will be able to meet its financial and operating requirements in the future and minimize rate impacts to customers from future events occurring differently than currently projected. In addition, annual updates will allow the Utility to make adjustments if the U.S. CPI – Water and Sewerage Maintenance Series is substantially less than 4.00% in a given year.

APPENDIX A: SUPPORTING SCHEDULES

Schedule 1 Projected Accounts, Billed Volumes and Other Assumptions

Schedule 2 Beginning Balances

Schedule 3 Projection of Cash Inflows

Schedule 4 Projection of Cash Outflows

Schedule 5 Cost Escalation Factors

Schedule 6 Capital Improvement Program

Schedule 7 Capital Improvement Program Funding

Schedule 8 Capital Improvement Program Funding Summary

Schedule 9 Financial Management Plan Summary

Schedule 10 Pro Forma

Schedule 11 Funding Summary

Schedule 12 Senior Lien Borrowing Projections

Schedule 13 Monthly Bill Comparisons: Combined Water & Sewer Bills @ 2,000, 5,000, and 10,000 Gallons

Assumptions

Schedule 1

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Rate Increase Adoption Date	10/1/2018	10/1/2019	10/1/2020	10/1/2021	10/1/2022	10/1/2023	10/1/2024	10/1/2025	10/1/2026	10/1/2027	10/1/2028
Annual Growth											
Water											
Ending # of ERCs	7,298	5,199	5,742	6,285	6,752	7,219	7,686	8,153	8,620	9,087	9,554
ERC Growth [1]		(2,099)	543	543	467	467	467	467	467	467	467
% Change in ERCs		*-28.76%*	*10.44%*	*9.46%*	*7.43%*	*6.92%*	*6.47%*	*6.08%*	*5.73%*	*5.42%*	*5.14%*
Usage per ERC	7,793	7,793	7,754	7,716	7,677	7,639	7,600	7,562	7,525	7,487	7,449
% Change in Usage per ERC		*0.00%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*
Usage	682,498,249	486,233,283	534,328,967	581,931,539	622,043,370	661,739,535	701,023,188	739,897,460	778,365,464	816,430,291	854,095,010
% Change in Usage [1]		*-28.76%*	*9.89%*	*8.91%*	*6.89%*	*6.38%*	*5.94%*	*5.55%*	*5.20%*	*4.89%*	*4.61%*
% Paying Capital Charges	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
Sewer											
Ending # of ERCs	6,950	4,851	5,394	5,937	6,404	6,871	7,338	7,805	8,272	8,739	9,206
ERC Growth [1]		(2,099)	543	543	467	467	467	467	467	467	467
% Change in ERCs		*-30.20%*	*11.19%*	*10.07%*	*7.87%*	*7.29%*	*6.80%*	*6.36%*	*5.98%*	*5.65%*	*5.34%*
Billed Volume per ERC	6,736	6,736	6,702	6,669	6,636	6,602	6,569	6,536	6,504	6,471	6,439
% Change in Billed Volume per ERC		*0.00%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*	*-0.50%*
Usage	561,784,915	392,110,055	433,822,274	475,107,568	509,917,557	544,367,569	578,460,332	612,198,559	645,584,943	678,622,157	711,312,859
% Change in Billed Volume [1]		*-30.20%*	*10.64%*	*9.52%*	*7.33%*	*6.76%*	*6.26%*	*5.83%*	*5.45%*	*5.12%*	*4.82%*
% Paying Capital Charges	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
Capital Spending											
Annual Capital Budget (Future Year Dollars)	$ 2,385,000	$ 2,479,360	$ 4,986,176	$ 6,864,904	$ 5,620,439	$ 3,793,220	$ 3,226,563	$ 4,000,433	$ 4,200,138	$ 4,269,935	$ 5,410,293
Annual Percent Executed	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
System Development Fees											
Water System Development Fees (per ERC)	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082	$ 2,082
Sewer System Development Fees (per ERC)	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636
Average Annual Interest Earnings Rate	0.13%	0.25%	0.38%	0.50%	0.63%	0.75%	0.88%	1.00%	1.00%	1.00%	1.00%
Operating Reserve											
Target (Number of Months of Operatined Expen	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Operating Budget Execution Percentage											
Personal Services	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Variable Operations and Maintenance	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Fixed Operations and Maintenance	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Capital Outlay	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Debt Service Eligible to be Funded by System Development Fees (Expansion %)											
Water System Development Fees	0%	20%	20%	25%	33%	33%	33%	33%	33%	43%	60%
Sewer System Development Fees	39%	31%	31%	38%	51%	51%	51%	51%	51%	37%	11%

(1) This RSA assumes that 2,594 retail ERCs that the City currently serves in the Village of Fenny will transition from being served by the Utility as retail customers to being provided service by the Villages beginning in FY 2020. The FY 2020 reduction in ERCs and associated billed volume reflects this reduction and is partially offset by the projected growth in ERCs for the water and sewer systems during FY 2020.

FY 2019 Beginning Balances (As of October 1, 2018)

Schedule 2

Stantec Grouping of Funds in Model	Revenue Fund	Restricted Reserves	Water System Development Fees	Sewer System Development Fees	Water TIE Fees	Sewer TIE Fees	Capital Projects Fund	Renewal & Replacement	Water Connection Fees	Sewer Connection Fees
CURRENT UNRESTRICTED ASSETS										
Cash and Cash Equivalents	$ 3,318,679	$ -	$ 468,393	$ 840,501	$ 75,676	$ 237,036	$ 1,376,204	$ 112,074	$ 1,196,602	$ 3,434,432
A/R - Net of Uncollectibles	836,451	-	-	-	-	-	-	-	-	-
Due From Other Govts/Funds	1,098,616	-	-	-	-	-	-	-	-	-
Compensated Absences	70,888	-	-	-	-	-	-	-	-	-
Prepaid Expenses	1,132	-	-	-	-	-	-	-	-	-
Utility Deposits	233,932	-	-	-	-	-	-	-	-	-
CR209 Forcemain Debt Service	20,142	-	-	-	-	-	-	-	-	-
SRF Debt Service Reserve	-	262,791	-	-	-	-	-	-	-	-
Debt Service Sinking Fund	89,540	-	-	-	-	-	-	-	-	-
Water Certificate of Deposits	250,294	-	-	-	-	-	-	-	-	-
TOTAL ASSETS	**$ 5,919,675**	**$ 262,791**	**$ 468,393**	**$ 840,501**	**$ 75,676**	**$ 237,036**	**$ 1,376,204**	**$ 112,074**	**$ 1,196,602**	**$ 3,434,432**
CURRENT LIABILITIES										
Less: Accounts Payable	$ (100,974)	$ -	$ (137,943)	$ (3,700)	$ -	$ -	$ (528,441)	$ -	$ -	$ -
Less: Accrued Expenses	(200,808)	-	-	-	-	-	-	-	-	-
Less: Customer Deposits	(483,474)	-	-	-	-	-	-	-	-	-
Less: Due to Other Govts/Funds	(22,138)	-	(51,953)	-	-	-	(1,046,613)	-	-	-
Less: Debt - Current Portion	(982,897)	-	-	-	-	-	-	-	-	-
Less: Net Pension Liability - Current Portion	(7,072)	-	-	-	-	-	-	-	-	-
Calculated Fund Balance (Assets - Liabilities)	**$ 4,122,313**	**$ 262,791**	**$ 278,497**	**$ 836,801**	**$ 75,676**	**$ 237,036**	**$ (198,850)**	**$ 112,074**	**$ 1,196,602**	**$ 3,434,432**
Available Fund Balance	**$ 4,122,313**	**$ 262,791**	**$ 278,497**	**$ 836,801**	**$ 75,676**	**$ 237,036**	**$ (198,850)**	**$ 112,074**	**$ 1,196,602**	**$ 3,434,432**

Fund Summary	
Revenue Fund	$ 4,122,313
Restricted Reserves	262,791
Water System Development Fees	278,497
Sewer System Development Fees	836,801
Water TIE Fees	75,676
Capital Projects Fund	(198,850)
Renewal & Replacement	112,074
Total Available Funds	**$ 10,357,371**

Projection of Cash Inflows — Schedule 3

		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	Rate Revenue Growth Assumptions											
	Water											
1	% Change in ERCs		-28.76%	10.44%	9.46%	7.43%	6.92%	6.47%	6.08%	5.73%	5.42%	5.14%
2	% Change in Usage		-28.76%	9.89%	8.91%	6.89%	6.38%	5.94%	5.55%	5.20%	4.89%	4.61%
	Sewer											
3	% Change in ERCs		-30.20%	11.19%	10.07%	7.87%	7.29%	6.80%	6.36%	5.98%	5.65%	5.34%
4	% Change in Usage		-30.20%	10.64%	9.52%	7.33%	6.76%	6.26%	5.83%	5.45%	5.12%	4.82%
	Assumed Rate Revenue Increases											
5	Assumed Water Rate Increase		3.24%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
6	Assumed Sewer Rate Increase		3.24%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
7	Assumed Reuse Water Rate Increase		3.24%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
	Water Rate Revenue											
8	Base Rate Revenue	$ 840,129	$ 617,927	$ 709,760	$ 807,950	$ 902,701	$ 1,003,738	$ 1,111,414	$ 1,226,099	$ 1,348,179	$ 1,478,065	$ 1,616,184
9	Usage Rate Revenue	1,597,896	1,175,275	1,343,189	1,521,365	1,691,281	1,871,179	2,061,551	2,262,906	2,475,779	2,700,728	2,938,334
10	**Total Water Rate Revenue**	**$ 2,438,025**	**$ 1,793,202**	**$ 2,052,948**	**$ 2,329,316**	**$ 2,593,981**	**$ 2,874,918**	**$ 3,172,965**	**$ 3,489,005**	**$ 3,823,959**	**$ 4,178,793**	**$ 4,554,519**
	Sewer Rate Revenue											
11	Base Rate Revenue	$ 1,471,400	$ 1,060,270	$ 1,226,114	$ 1,403,528	$ 1,574,488	$ 1,756,879	$ 1,951,343	$ 2,158,552	$ 2,379,216	$ 2,614,079	$ 2,863,925
12	Usage Rate Revenue	2,444,484	1,761,461	2,026,797	2,308,468	2,576,708	2,860,821	3,161,589	3,479,826	3,816,383	4,172,150	4,548,057
13	**Total Sewer Rate Revenue**	**$ 3,915,884**	**$ 2,821,732**	**$ 3,252,911**	**$ 3,711,996**	**$ 4,151,196**	**$ 4,617,701**	**$ 5,112,932**	**$ 5,638,378**	**$ 6,195,599**	**$ 6,786,229**	**$ 7,411,982**
14	**Total Reuse Water Rate Revenue**	**$ 80,000**	**$ 82,592**	**$ 85,896**	**$ 89,332**	**$ 92,905**	**$ 96,621**	**$ 100,486**	**$ 104,505**	**$ 108,685**	**$ 113,033**	**$ 117,554**
	Other Revenue and Non Operating Revenues											
15	Water - Meter Installations	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
16	Water - Other (On/Off Fees)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
17	Water Income - Other	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
18	Sewer Other Misc	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
19	Land Lease - Turtle Mount (Tower)	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
20	TSS/COD Wastewater Fees	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000
21	Bulk Water Sales [1]	52,100	540,000	230,000	-	-	-	-	-	-	-	-
22	Bulk Wastewater Services	47,970	-	-	-	-	-	-	-	-	-	-
23	Wastewater PILOT [2]	-	30,783	84,054	108,508	139,119	163,573	182,945	182,945	182,945	182,945	182,945
24	Reclaimed PILOT [2]	-	-	13,200	32,211	51,223	67,772	77,984	77,984	77,984	77,984	77,984
25	Water Franchise Fees [2]	2,690	8,200	13,875	19,719	25,734	31,926	38,297	44,852	51,596	58,532	65,664
26	Wastewater Franchise Fees [2]	6,096	18,582	31,442	44,683	58,314	72,344	86,782	101,637	116,918	132,634	148,796
27	Reclaimed Water Franchise Fees [2]	8,035	24,494	41,444	58,897	76,865	95,359	114,390	133,970	154,112	174,828	196,131
28	**Total Other and Non Operating Revenues**	**$ 1,063,891**	**$ 1,569,059**	**$ 1,361,015**	**$ 1,211,018**	**$ 1,298,255**	**$ 1,377,973**	**$ 1,447,398**	**$ 1,488,388**	**$ 1,530,555**	**$ 1,573,923**	**$ 1,618,520**
	Interest Income											
29	Unrestricted	$ 11,271	$ 22,162	$ 28,675	$ 32,769	$ 37,977	$ 43,313	$ 50,501	$ 58,749	$ 61,081	$ 63,713	$ 66,474
30	Restricted	328	657	1,223	2,737	4,976	7,327	9,853	12,746	14,550	16,293	18,330
31	**Total Interest Income**	**$ 11,599**	**$ 22,819**	**$ 29,898**	**$ 35,506**	**$ 42,953**	**$ 50,640**	**$ 60,354**	**$ 71,495**	**$ 75,631**	**$ 80,006**	**$ 84,803**
	System Development Charges											
32	Water System Development Charges	$ 1,030,352	$ 1,031,046	$ 1,130,265	$ 1,130,265	$ 972,070	$ 972,070	$ 972,070	$ 972,070	$ 972,070	$ 972,070	$ 972,070
33	Sewer System Development Charges	1,799,842	1,799,539	1,974,372	1,974,372	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033
34	**Total System Development Charges**	**$ 2,830,195**	**$ 2,830,586**	**$ 3,104,638**	**$ 3,104,638**	**$ 2,670,103**	**$ 2,670,103**	**$ 2,670,103**	**$ 2,670,103**	**$ 2,670,103**	**$ 2,670,103**	**$ 2,670,103**
35	**Total Cash Inflows**	**$ 10,339,594**	**$ 9,119,989**	**$ 9,887,305**	**$ 10,481,805**	**$ 10,849,392**	**$ 11,687,955**	**$ 12,564,238**	**$ 13,461,874**	**$ 14,404,531**	**$ 15,402,087**	**$ 16,457,480**

(1) Assumes that the Utility will no longer receive bulk water and wastewater revenue from The Villages beginning in FY 2020 with the exception of the anticipated $540k in FY 2020 and $230k in FY 2021 per preliminary discussions between the City and The Villages.
(2) PILOT and Franchise Fee Revenues are anticipated as growth in areas where water and sewer services will be provided by The Villages. The RSA asssumes that these revenues are transferred to the City's General Fund.

Projection of Cash Outflows

Schedule 4

	Account Code	Expense Line Item	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	401-530-00-0000	**Physical Environment/Admin:**											
1	401-530-10-1200	Salaries	$ 177,220	$ 182,537	$ 197,544	$ 212,811	$ 228,165	$ 245,182	$ 262,919	$ 281,423	$ 300,740	$ 320,916	$ 341,998
2	401-530-10-1300	Overtime	1,000	1,030	1,115	1,201	1,287	1,383	1,484	1,588	1,697	1,811	1,930
3	401-530-10-2100	Fica Expense	13,640	14,049	15,204	16,379	17,561	18,871	20,236	21,660	23,147	24,700	26,322
4	401-530-10-2200	Retirement	14,580	15,017	16,252	17,508	18,771	20,171	21,631	23,153	24,742	26,402	28,136
5	401-530-10-2300	Life & Health Insurance	34,500	37,260	42,186	47,556	53,127	59,215	65,867	73,137	81,083	89,766	99,253
6	401-530-10-2500	Unemployment Compensation	1,500	1,545	1,672	1,801	1,931	2,075	2,225	2,382	2,545	2,716	2,895
7	401-530-30-3100	Professional Services	27,810	28,644	30,999	33,395	35,805	38,475	41,258	44,162	47,193	50,359	53,668
8	401-530-30-3200	Accounting & Auditing Fees	45,100	46,453	50,272	54,157	58,065	62,395	66,909	71,618	76,534	81,669	87,034
9	401-530-30-3400	Other Contractual Services	24,465	25,199	27,271	29,378	31,498	33,847	36,296	38,850	41,517	44,302	47,212
10	401-530-30-4000	Travel & Per Diem	2,000	2,060	2,229	2,402	2,575	2,767	2,967	3,176	3,394	3,622	3,860
11	401-530-30-4100	Telephone Expense	5,000	5,150	5,573	6,004	6,437	6,917	7,418	7,940	8,485	9,054	9,649
12	401-530-30-4200	Postage/Transportation Fees	30,000	30,900	33,441	36,025	38,624	41,505	44,507	47,640	50,910	54,325	57,894
13	401-530-30-4300	Utilities Expense	10,000	10,400	11,359	12,350	13,303	14,296	15,330	16,409	17,535	18,711	19,940
14	401-530-30-4400	Rental & Leasing	3,000	3,090	3,344	3,602	3,862	4,150	4,451	4,764	5,091	5,432	5,789
15	401-530-30-4500	General Insurance	95,000	97,850	105,895	114,079	122,310	131,431	140,940	150,859	161,214	172,029	183,330
16	401-530-30-4510	Workers Compensation Insurance	350	364	398	432	466	500	537	574	614	655	698
17	401-530-30-4600	Repair & Maintenance	20,860	21,486	23,252	25,049	26,857	28,860	30,947	33,125	35,399	37,774	40,256
18	401-530-30-4900	Misc. Expense & Other Current	16,750	17,253	18,671	20,114	21,565	23,173	24,850	26,599	28,425	30,331	32,324
19	401-530-30-5100	Office Supplies	7,000	7,210	7,803	8,406	9,012	9,684	10,385	11,116	11,879	12,676	13,509
20	401-530-30-5200	Operating Supplies	3,500	3,640	3,976	4,323	4,656	5,003	5,365	5,743	6,137	6,549	6,979
21	401-530-30-5400	Subscriptions/Dues	1,000	1,030	1,115	1,201	1,287	1,383	1,484	1,588	1,697	1,811	1,930
22	401-530-30-5500	Training	3,000	3,090	3,344	3,602	3,862	4,150	4,451	4,764	5,091	5,432	5,789
23	401-530-60-6300	Capital Improvement-Other	5,300	5,459	5,568	5,680	5,793	5,909	6,027	6,148	6,271	6,396	6,524
	401-533-00-0000	**Water Department:**											
24	401-533-10-1200	Salaries	579,630	597,019	646,105	696,036	746,255	801,912	859,925	920,446	983,624	1,049,612	1,118,567
25	401-533-10-1250	On Call	7,800	8,034	8,695	9,366	10,042	10,791	11,572	12,386	13,236	14,124	15,052
26	401-533-10-1300	Overtime	13,500	13,905	15,048	16,211	17,381	18,677	20,028	21,438	22,909	24,446	26,052
27	401-533-10-1820	Holiday Premium	2,560	2,637	2,854	3,074	3,296	3,542	3,798	4,065	4,344	4,636	4,940
28	401-533-10-2100	Fica Expense	46,170	47,555	51,465	55,442	59,442	63,876	68,497	73,317	78,350	83,606	89,099
29	401-533-10-2200	Retirement	49,850	51,346	55,567	59,861	64,180	68,967	73,956	79,161	84,595	90,270	96,200
30	401-533-10-2300	Life & Health Insurance	110,400	119,232	134,997	152,179	170,007	189,486	210,774	234,039	259,465	287,250	317,611
31	401-533-10-2500	Unemployment Compensation	2,500	2,575	2,787	3,002	3,219	3,459	3,709	3,970	4,242	4,527	4,824
32	401-533-30-3100	Professional Services	187,000	192,610	208,446	224,555	240,757	258,712	277,429	296,954	317,336	338,625	360,872
33	401-533-30-3400	Other Contractual Services	105,000	108,150	117,042	126,087	135,184	145,266	155,775	166,739	178,183	190,137	202,628
34	401-533-30-4000	Travel & Per Diem	4,500	4,635	5,016	5,404	5,794	6,226	6,676	7,146	7,636	8,149	8,684
35	401-533-30-4100	Telephone Expense	30,000	30,900	33,441	36,025	38,624	41,505	44,507	47,640	50,910	54,325	57,894
36	401-533-30-4200	Postage/Transportation Fees	2,700	2,781	3,010	3,242	3,476	3,735	4,006	4,288	4,582	4,889	5,210
37	401-533-30-4300	Utilities Expense	100,000	104,000	113,591	123,505	133,033	142,955	153,297	164,086	175,349	187,112	199,405
38	401-533-30-4400	Rental & Leasing	14,000	14,420	15,606	16,812	18,025	19,369	20,770	22,232	23,758	25,352	27,017
39	401-533-30-4510	Workers Compensation Insurance	10,500	10,920	11,927	12,968	13,969	15,010	16,096	17,229	18,412	19,647	20,937
40	401-533-30-4600	Repair & Maintenance	99,840	102,835	111,290	119,891	128,541	138,128	148,120	158,545	169,427	180,793	192,671
41	401-533-30-4900	Misc. Expense & Other Current	5,000	5,150	5,573	6,004	6,437	6,917	7,418	7,940	8,485	9,054	9,649
42	401-533-30-4960	Boot Allowance	1,230	1,267	1,371	1,477	1,584	1,702	1,825	1,953	2,087	2,227	2,374
43	401-533-30-5100	Office Supplies	4,000	4,120	4,459	4,803	5,150	5,534	5,934	6,352	6,788	7,243	7,719
44	401-533-30-5200	Operating Supplies	440,632	458,257	500,517	544,203	586,188	629,906	675,476	723,015	772,642	824,476	878,640
45	401-533-30-5250	Fuel Expense	22,000	22,660	24,523	26,418	28,324	30,437	32,639	34,936	37,334	39,838	42,455
46	401-533-30-5260	Chemicals	55,000	56,650	61,308	66,046	70,811	76,092	81,597	87,339	93,334	99,596	106,139
47	401-533-30-5270	Laboratory Samples	25,000	25,750	27,867	30,021	32,187	34,587	37,089	39,700	42,425	45,271	48,245
48	401-533-30-5400	Subscriptions/Dues	12,000	12,360	13,376	14,410	15,450	16,602	17,803	19,056	20,364	21,730	23,158
49	401-533-30-5500	Training	7,600	7,828	8,472	9,126	9,785	10,515	11,275	12,069	12,897	13,762	14,666
50	401-533-60-6300	Capital Improvement-Other	98,600	101,558	103,589	105,661	107,774	109,930	112,128	114,371	116,658	118,991	121,371
51	401-533-60-6301	Meter Change Out Program	100,000	103,000	111,469	120,083	128,747	138,349	148,358	158,799	169,699	181,083	192,979
52	401-533-60-6400	Cap. Improvement-Machinery	117,150	120,665	123,078	125,539	128,050	130,611	133,223	135,888	138,606	141,378	144,205

Projection of Cash Outflows — Schedule 4

	Account Code	Expense Line Item	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	401-535-00-0000	**Wastewater Department:**											
53	401-535-10-1200	Salaries	734,070	756,092	818,257	881,492	945,092	1,015,578	1,089,049	1,165,694	1,245,706	1,329,277	1,416,604
54	401-535-10-1250	On Call	7,800	8,034	8,695	9,366	10,042	10,791	11,572	12,386	13,236	14,124	15,052
55	401-535-10-1300	Overtime	15,300	15,759	17,055	18,373	19,698	21,167	22,699	24,296	25,964	27,706	29,526
56	401-535-10-1820	Holiday Premium	6,000	6,180	6,688	7,205	7,725	8,301	8,901	9,528	10,182	10,865	11,579
57	401-535-10-2100	Fica Expense	58,390	60,142	65,086	70,116	75,175	80,782	86,626	92,723	99,087	105,734	112,681
58	401-535-10-2200	Retirement	63,040	64,931	70,270	75,700	81,162	87,215	93,525	100,107	106,978	114,155	121,654
59	401-535-10-2300	Life & Health Insurance	103,500	111,780	126,559	142,668	159,382	177,644	197,601	219,412	243,248	269,297	297,760
60	401-535-10-2500	Unemployment Compensation	2,500	2,575	2,787	3,002	3,219	3,459	3,709	3,970	4,242	4,527	4,824
61	401-535-30-3100	Professional Services	190,000	195,700	211,790	228,157	244,619	262,863	281,879	301,718	322,427	344,058	366,661
62	401-535-30-3400	Other Contractual Services	50,000	51,500	55,734	60,041	64,373	69,174	74,179	79,399	84,849	90,542	96,490
63	401-535-30-4000	Travel & Per Diem	4,000	4,120	4,459	4,803	5,150	5,534	5,934	6,352	6,788	7,243	7,719
64	401-535-30-4100	Telephone Expense	13,000	13,390	14,491	15,611	16,737	17,985	19,286	20,644	22,061	23,541	25,087
65	401-535-30-4200	Postage/Transportation Fees	1,000	1,030	1,115	1,201	1,287	1,383	1,484	1,588	1,697	1,811	1,930
66	401-535-30-4300	Utilities Expense	295,000	306,800	335,093	364,340	392,449	421,718	452,226	484,054	517,278	551,981	588,244
67	401-535-30-4400	Rental & Leasing	9,500	9,785	10,590	11,408	12,231	13,143	14,094	15,086	16,121	17,203	18,333
68	401-535-30-4510	Workers Compensation Insurance	19,800	20,592	22,491	24,454	26,341	28,305	30,353	32,489	34,719	37,048	39,482
69	401-535-30-4600	Repair & Maintenance	119,000	122,570	132,648	142,899	153,209	164,635	176,546	188,971	201,941	215,489	229,646
70	401-535-30-4900	Misc. Expense & Other Current	8,000	8,240	8,917	9,607	10,300	11,068	11,869	12,704	13,576	14,487	15,438
71	401-535-30-4940	Landfill Disposal Fees	40,000	41,200	44,587	48,033	51,499	55,340	59,343	63,520	67,879	72,433	77,192
72	401-535-30-4960	Boot Allowance	1,500	1,545	1,672	1,801	1,931	2,075	2,225	2,382	2,545	2,716	2,895
73	401-535-30-5100	Office Supplies	5,500	5,665	6,131	6,605	7,081	7,609	8,160	8,734	9,333	9,960	10,614
74	401-535-30-5200	Operating Supplies	65,000	67,600	73,834	80,278	86,472	92,921	99,643	106,656	113,977	121,623	129,613
75	401-535-30-5250	Fuel Expense	15,000	15,450	16,720	18,012	19,312	20,752	22,254	23,820	25,455	27,162	28,947
76	401-535-30-5260	Chemicals	55,000	56,650	61,308	66,046	70,811	76,092	81,597	87,339	93,334	99,596	106,139
77	401-535-30-5270	Laboratory Samples	15,000	15,450	16,720	18,012	19,312	20,752	22,254	23,820	25,455	27,162	28,947
78	401-535-30-5400	Subscriptions/Dues	4,000	4,120	4,459	4,803	5,150	5,534	5,934	6,352	6,788	7,243	7,719
79	401-535-30-5500	Training	7,600	7,828	8,472	9,126	9,785	10,515	11,275	12,069	12,897	13,762	14,666
		Oxford Plant Incremental Expenses											
80		Operator	-	48,000	49,200	50,430	51,691	52,983	54,308	55,665	57,057	58,483	59,945
81		Chemicals	-	60,219	61,724	63,268	64,849	66,471	68,132	69,836	71,581	73,371	75,205
82		Electricity	-	103,474	106,061	108,712	111,430	114,216	117,071	119,998	122,998	126,073	129,225
83		Admin	-	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466
84		Maintenance/R&R	-	49,108	59,108	69,108	79,108	89,108	99,108	109,108	119,108	129,108	139,108
85		Contingency	-	29,080	30,684	32,304	33,938	35,589	37,256	38,940	40,641	42,359	44,095
		Contingency	-	-	-	-	-	-	-	-	-	-	-
		Total Expenses by Category											
86		Personal Services	$ 2,076,100	$ 2,199,110	$ 2,390,903	$ 2,588,636	$ 2,788,627	$ 3,009,342	$ 3,241,595	$ 3,486,240	$ 3,744,165	$ 4,016,301	$ 4,303,625
87		Operations & Maintenance	2,408,087	2,761,352	2,991,986	3,227,893	3,461,154	3,712,167	3,973,243	4,245,017	4,528,126	4,823,216	5,130,946
88		Capital Outlay	221,050	227,682	232,235	236,880	241,617	246,450	251,379	256,406	261,534	266,765	272,100
89		**Total Expenses**	**$ 4,705,237**	**$ 5,188,143**	**$ 5,615,124**	**$ 6,053,409**	**$ 6,491,398**	**$ 6,967,959**	**$ 7,466,217**	**$ 7,987,663**	**$ 8,533,825**	**$ 9,106,282**	**$ 9,706,672**

Projection of Cash Outflows — Schedule 4

	Account Code	Expense Line Item	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
		Expense Execution Factors											
90		Personal Services	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
91		Operations & Maintenance	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
92		Capital Outlay	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
		Total Expenses at Execution											
93		Personal Services	$ 1,972,295	$ 2,089,154	$ 2,271,358	$ 2,459,205	$ 2,649,195	$ 2,858,875	$ 3,079,515	$ 3,311,928	$ 3,556,957	$ 3,815,486	$ 4,088,444
94		Operations & Maintenance	2,287,683	2,623,284	2,842,387	3,066,498	3,288,096	3,526,559	3,774,581	4,032,766	4,301,720	4,582,056	4,874,399
95		Capital Outlay	209,998	216,297	220,623	225,036	229,537	234,127	238,810	243,586	248,458	253,427	258,495
96		**Total Expenses at Execution**	**$ 4,469,975**	**$ 4,928,736**	**$ 5,334,368**	**$ 5,750,739**	**$ 6,166,828**	**$ 6,619,561**	**$ 7,092,906**	**$ 7,588,280**	**$ 8,107,134**	**$ 8,650,968**	**$ 9,221,338**
		Transfers Out											
97		Transfer to General Fund - Franchise Fees	$ 16,821	$ 51,276	$ 86,761	$ 123,299	$ 160,913	$ 199,628	$ 239,469	$ 280,459	$ 322,626	$ 365,994	$ 410,591
98		Transfer to General Fund - PILOT	-	30,783	97,254	140,719	190,342	231,345	260,929	260,929	260,929	260,929	260,929
99		Transfer to R&R	374,049	309,226	328,438	353,882	389,254	426,812	466,669	508,944	553,762	601,253	651,553
100		**Total Transfers Out**	**$ 390,870**	**$ 391,286**	**$ 512,453**	**$ 617,900**	**$ 740,509**	**$ 857,785**	**$ 967,067**	**$ 1,050,333**	**$ 1,137,317**	**$ 1,228,176**	**$ 1,323,072**
		Debt Service											
101		SRF Loan #3	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 379,915	$ 189,957	$ -
102		Refunding & Project Bond	553,448	553,559	553,509	276,315	-	-	-	-	-	-	-
103		Continental Country Club	134,615	134,615	134,615	134,615	134,615	134,615	134,615	134,615	134,615	134,615	134,615
104		CR209 Design Loan	5,466	5,466	5,466	5,466	5,466	5,466	5,466	5,466	5,466	5,466	5,466
105		CR209 Construction Loan	45,520	45,520	45,520	45,520	45,520	45,520	45,520	45,520	45,520	45,520	45,520
106		Oxford WTP Construction	-	280,586	280,586	280,586	280,586	280,586	280,586	280,586	280,586	280,586	280,586
107		New Debt Service	-	-	68,818	298,455	541,250	722,020	868,399	1,019,633	1,200,084	1,373,788	1,580,669
108		**Total Debt Service**	**$ 1,118,964**	**$ 1,399,661**	**$ 1,468,429**	**$ 1,420,872**	**$ 1,387,352**	**$ 1,568,122**	**$ 1,714,500**	**$ 1,865,735**	**$ 2,046,186**	**$ 2,029,932**	**$ 2,046,856**
109		**Total Cash Outflows (Excluding Cash Funded Capital**	**$ 5,979,810**	**$ 6,719,682**	**$ 7,315,249**	**$ 7,789,511**	**$ 8,294,689**	**$ 9,045,468**	**$ 9,774,474**	**$ 10,504,348**	**$ 11,290,636**	**$ 11,909,076**	**$ 12,591,267**

Cost Escalation Factors — Schedule 5

Expense Line Item Description	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Personnel Services										
Salaries	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Overtime	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Sick Leave	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Vacation Pay	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Holiday Pay	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Fica Expense	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Retirement	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Life & Health Insurance	8.00%	13.22%	12.73%	11.72%	11.46%	11.23%	11.04%	10.86%	10.71%	10.57%
Unemployment Compensation	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
On Call	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Holiday Premium	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Workers Compensation Insurance	4.00%	9.22%	8.73%	7.72%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Operating Expenses										
Professional Services	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Accounting & Auditing Fees	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Other Contractual Services	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Travel & Per Diem	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Telephone Expense	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Postage/Transportation Fees	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Utilities Expense	4.00%	9.22%	8.73%	7.72%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Rental & Leasing	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
General Insurance	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Repair & Maintenance	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Misc. Expense & Other Current	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Office Supplies	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Operating Supplies	4.00%	9.22%	8.73%	7.72%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Subscriptions/Dues	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Boot Allowance	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Fuel Expense	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Chemicals	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Laboratory Samples	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Meter Change Out Program	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Landfill Disposal Fees	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Continental Country Club Water Utility	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Continental Country Club Wastewater Util	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Training	3.00%	8.22%	7.73%	7.22%	7.46%	7.23%	7.04%	6.86%	6.71%	6.57%
Capital Outlay										
Capital Improvement-Other	3.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Cap. Improv-Machinery/Equip.	3.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Cap. Improvement-Machinery	3.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Loop/Upgrade Water Mains	3.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Sumter County Recycling	3.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Additional Personal Services from Growth	3.00%	9.08%	8.46%	7.75%	7.97%	7.70%	7.47%	7.26%	7.07%	6.91%
Additional O&M Expense from Growth	3.00%	4.42%	4.38%	4.30%	4.28%	4.26%	4.24%	4.23%	4.22%	4.21%
Weighted Average Increase in O&M Expenses [1]		8.52%	8.06%	7.45%	7.55%	7.34%	7.16%	7.00%	6.86%	6.73%

[1] The Weighted Average Increase in O&M Expenses is reflective of the cost escalation factors presented on this schedule and the cost execution factors on Schedule 1.

Capital Improvement Program

Schedule 6

	Project No.	Project Description	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
1	PWS Improvement No.2A	Design: CR 209 WM Phase 1	150,000	-	-	-	-	-	-	-	-	-	-
2	PWS Improvement No.2B	Construction: CR 209 WM Phase 1	-	1,176,000	-	-	-	-	-	-	-	-	-
3	PWS Improvement No.3A	Design: CR 209 WM Phase 2	-	246,000	-	-	-	-	-	-	-	-	-
4	PWS Improvement No.3B	Construction: CR 209 WM Phase 2	-	-	1,968,000	-	-	-	-	-	-	-	-
5	PWS Improvement No.5A	Design: CR 209 WM Phase 3	-	-	240,000	-	-	-	-	-	-	-	-
6	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	1,920,000	-	-	-	-	-	-	-
7	PWS Misc. Improvement	Loop/Upgrade Water Mains/ Install Valves Annually	100,000	100,000	150,000	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000
8	PWS Improvement No.4	Request SWFWMD Water Use Permit Modification: Reallocate capacities to the Oxford WTP	-	-	-	50,000	-	-	-	-	-	-	-
9	PWS Misc. Improvement	CR 501 WTP Facility Planning Document (3.20 MGD MDD)	50,000	-	-	-	-	-	-	-	-	-	-
10	PWS Improvement No.XX	Design and Construction: CR 501 WTP - Iron Treatment Upgrades	1,300,000	-	-	-	-	-	-	-	-	-	-
11	PWS Improvement No.7A	Design, Permitting, and Bidding: CR 501 WTP Electrical Upgrades and Expansion to 3.20 MGD Design Complete and Construction Permit by 2021. Construct CR 501 WTP Expansion to 3.20 MGD	-	-	130,000	-	-	-	-	-	-	-	-
12	PWS Improvement No.7B	Design Complete and Construction Permit by 2020. Construct CR 501 WTP Expansion to 3.20 MGD Construction Complete and online by 2023	-	-	-	575,000	575,000	-	-	-	-	-	-
13	PWS Improvement No.8a	Design, Permitting, Bidding, Construction, and Construction Administration: Ashely WTP Upper Floridan Well.	-	110,000	-	-	-	-	-	-	-	-	-
14	PWS Improvement No.8b	Design, Permitting, Bidding, Construction and Construction Administration: Ashley WTP Expansion to 0.720 MGD.	-	270,000	-	-	-	-	-	-	-	-	-
15	PWS Improvement No.10	Design, Permitting, Bidding, and Construction : CR 214 WM Interconnect	-	-	-	-	-	-	-	-	54,000	-	-
16	PWS Option No.1	Decommission Fairways WTP	-	-	-	-	-	-	-	-	165,000	-	-
17	PWS Option No.2	Decommission CR 214 WTP	-	-	-	-	-	-	-	340,000	-	-	-
18	WW Improvement No.1A	Design and Permitting: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	-	282,000	-	-	-	-	-	-	-	-	-
19	WW Improvement No.1B	Construction: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	-	-	1,222,000	1,222,000	-	-	-	-	-	-	-
20	WW Improvement No.4	Gravity Collection System Condition Assessment including complete system cleaning, video inspection, infiltration and inflow study (approx. 200,000 LF of gravity sewer)	-	-	-	250,000	-	-	-	-	-	-	-
21	WW Improvement No.5	Prioritized Gravity Collection System Renewal, Rehab, and/or Replacement	100,000	100,000	150,000	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000
22	WW Improvement No.6	Main Street North Lift Station Rehabilitation	-	-	-	-	-	-	-	-	-	-	505,000
23	WW Improvement No.14	Design, Permitting, and Bidding of CR-468/Warm Springs Avenue Low Pressure Sewer System	-	-	-	485,875	-	-	-	-	-	-	-
24	WW Improvement No.15	Design, Permitting, and Bidding of SR-44A Low Pressure Sewer System (Contingent on project WW Improvement No.1)	-	-	-	-	261,625	-	-	-	-	-	-
25	WW Misc. Improvement	Miscellaneous System Enhancements including lift station rehabilitation, main and lateral replacements	100,000	100,000	150,000	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000
26	RCW Improvement No.1	Design and Construction: Install liner into the R-10 and R-11 ponds for NSU	585,000	-	-	-	-	-	-	-	-	-	-
27	RCW Improvement No.3	Millennium Park 10-inch reclaim water main extension	-	-	-	-	717,750	717,750	-	-	-	-	-
		Unspecified Future Spending	-	-	-	-	-	-	-	-	-	-	-
28		Water	-	-	-	-	750,000	750,000	750,000	750,000	750,000	750,000	750,000
29		Sewer	-	-	-	-	750,000	750,000	750,000	750,000	750,000	750,000	750,000
30	WW Improvement No.16	WWTF Biosolids Improvements	-	-	-	1,000,000	1,000,000	-	-	-	-	-	-
31	WW Improvement No.17	WWTF Clarfiier Rehab	-	-	600,000	-	-	-	-	-	-	-	-
32	**Total CIP Budget (in current dollars)**		**$ 2,385,000**	**$ 2,384,000**	**$ 4,610,000**	**$ 6,102,875**	**$ 4,804,375**	**$ 3,117,750**	**$ 2,550,000**	**$ 3,040,000**	**$ 3,069,000**	**$ 3,000,000**	**$ 3,655,000**
33	Cumulative Projected Cost Escalation[1]		0.0%	4.0%	8.2%	12.5%	17.0%	21.7%	26.5%	31.6%	36.9%	42.3%	48.0%
34	**Resulting CIP Funding Level**		**$ 2,385,000**	**$ 2,479,360**	**$ 4,986,176**	**$ 6,864,904**	**$ 5,620,439**	**$ 3,793,220**	**$ 3,226,563**	**$ 4,000,433**	**$ 4,200,138**	**$ 4,269,935**	**$ 5,410,293**
35	Annual CIP Execution Percentage		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
36	**Final CIP Funding Level**		**$ 2,385,000**	**$ 2,479,360**	**$ 4,986,176**	**$ 6,864,904**	**$ 5,620,439**	**$ 3,793,220**	**$ 3,226,563**	**$ 4,000,433**	**$ 4,200,138**	**$ 4,269,935**	**$ 5,410,293**

(1) CIP Escalation factors are compounded and consistent with the City's Consulting Engineer's expectations, and the Engineering News Record Construction Cost Index.

Capital Improvement Program Funding

Schedule 7

	Water System Development Fees		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	Project No.	**Project Description**											
1	PWS Improvement No.2A	Design: CR 209 WM Phase 1	$ 75,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	PWS Improvement No.2B	Construction: CR 209 WM Phase 1	-	611,520	-	-	-	-	-	-	-	-	-
3	PWS Improvement No.3A	Design: CR 209 WM Phase 2	-	127,920	-	-	-	-	-	-	-	-	-
4	PWS Improvement No.3B	Construction: CR 209 WM Phase 2	-	-	999,141	-	-	-	-	-	-	-	-
5	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	851,835	-	-	-	-	-	-	-
6	PWS Improvement No.XX	Design and Construction: CR 501 WTP - Iron Treatment Upgrades	203,125	-	-	-	-	-	-	-	-	-	-
7	PWS Improvement No.7B	Design Complete and Construction Permit by 2020. Construct CR 501 WTP E	-	-	-	-	672,669	-	-	-	-	-	-
8	PWS Improvement No.8a	Design, Permitting, Bidding, Construction, and Construction Administration: Ashely WTP Upper Floridan Well.	-	114,400	-	-	-	-	-	-	-	-	-
9	PWS Improvement No.8b	Design, Permitting, Bidding, Construction and Construction Administration: Ashley WTP Expansion to 0.720 MGD.	-	280,800	-	-	-	-	-	-	-	-	-
		Unspecified Future Spending											
10		Water System Projects	-	-	-	-	21,321	228,122	237,247	246,737	256,607	266,871	277,546
11	**Total Water System Development Fees**		**$ 278,125**	**$ 1,134,640**	**$ 999,141**	**$ 851,835**	**$ 693,989**	**$ 228,122**	**$ 237,247**	**$ 246,737**	**$ 256,607**	**$ 266,871**	**$ 277,546**
	Sewer System Development Fees		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
12	WW Improvement No.14	Design, Permitting, and Bidding of CR-468/Warm Springs Avenue Low Pressure Sewer System	$ -	$ -	$ -	$ 546,543	$ -	$ -	$ -	$ -	$ -	$ -	$ -
13	WW Improvement No.15	Design, Permitting, and Bidding of SR-44A Low Pressure Sewer System (Contingent on project WW Improvement No.1)	-	-	-	-	306,064	-	-	-	-	-	-
		Unspecified Future Spending											
14		Sewer System Projects	-	-	-	-	219,348	228,122	237,247	246,737	256,607	266,871	277,546
15		Bio Solids Improvements	-	-	-	562,432	584,929	-	-	-	-	-	-
16	**Total Sewer System Development Fees**		**$ -**	**$ -**	**$ -**	**$ 1,108,975**	**$ 1,110,342**	**$ 228,122**	**$ 237,247**	**$ 246,737**	**$ 256,607**	**$ 266,871**	**$ 277,546**
	Water TIE Fees		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
17	PWS Improvement No.2A	Design: CR 209 WM Phase 1	$ 75,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
18	PWS Improvement No.2B	Construction: CR 209 WM Phase 1	-	723	-	-	-	-	-	-	-	-	-
19	PWS Improvement No.3B	Construction: CR 209 WM Phase 2	-	-	1	-	-	-	-	-	-	-	-
20	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	0	-	-	-	-	-	-	-
21	**Total Water TIE Fees**		**$ 75,000**	**$ 723**	**$ 1**	**$ 0**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Sewer TIE Fees		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
22	WW Improvement No.1A	Design and Permitting: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	$ -	$ 146,640	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
23	WW Improvement No.1B	Construction: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	-	-	91,102	171	-	-	-	-	-	-	-
24	**Total Sewer TIE Fees**		**$ -**	**$ 146,640**	**$ 91,102**	**$ 171**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Renewal & Replacement		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
25	PWS Improvement No.2B	Construction: CR 209 WM Phase 1	$ -	$ 309,226	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
26	PWS Improvement No.3B	Construction: CR 209 WM Phase 2	-	-	328,438	-	-	-	-	-	-	-	-
27	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	353,882	-	-	-	-	-	-	-
28	PWS Misc. Improvement	Loop/Upgrade Water Mains/ Install Valves Annually	100,000	-	-	-	292,465	364,996	442,862	508,944	553,762	601,253	651,553
29	PWS Misc. Improvement	CR 501 WTP Facility Planning Document (3.20 MGD MDD)	50,000	-	-	-	-	-	-	-	-	-	-
30	PWS Improvement No.XX	Design and Construction: CR 501 WTP - Iron Treatment Upgrades	336,123	-	-	-	-	-	-	-	-	-	-
31	WW Improvement No.5	Prioritized Gravity Collection System Renewal, Rehab, and/or Replacement	-	-	-	-	96,789	61,816	23,807	-	-	-	-
32	**Total Renewal & Replacement**		**$ 486,123**	**$ 309,226**	**$ 328,438**	**$ 353,882**	**$ 389,254**	**$ 426,812**	**$ 466,669**	**$ 508,944**	**$ 553,762**	**$ 601,253**	**$ 651,553**

Capital Improvement Program Funding

Schedule 7

	Project No.	Project Description										
	Water Connection Fees		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
33	PWS Improvement No.3A	Design: CR 209 WM Phase 2	$ -	$ 252,756	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
34	PWS Improvement No.7A	Design, Permitting, and Bidding: CR 501 WTP Electrical Upgrades and Expansion to 3.20 MGD Design Complete and Construction Permit by 2021. Construct CR 501 WTP Expansion to 3.20 MGD	203,125	-	-	-	-	-	-	-	-	-	-
35	**Total Water Connection Fees**		**$ 203,125**	**$ 252,756**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
	Sewer Connection Fees		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
		Unspecified Future Spending											
36		Sewer System Projects	$ -	$ -	$ -	$ -	$ 219,348	$ 228,122	$ 237,247	$ 35,810	$ -	$ -	$ -
37		Bio Solids Improvements	-	-	-	562,432	584,929	-	-	-	-	-	-
38	**Total Sewer Connection Fees**		**$ -**	**$ -**	**$ -**	**$ 562,432**	**$ 804,278**	**$ 228,122**	**$ 237,247**	**$ 35,810**	**$ -**	**$ -**	**$ -**
	Revenue Fund		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
39	PWS Improvement No.2B	Construction: CR 209 WM Phase 1	$ -	$ 48,815	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
40	PWS Improvement No.3A	Design: CR 209 WM Phase 2	-	127,920	-	-	-	-	-	-	-	-	-
41	PWS Improvement No.3B	Construction: CR 209 WM Phase 2	-	-	801,009	-	-	-	-	-	-	-	-
42	PWS Improvement No.5A	Design: CR 209 WM Phase 3	-	-	259,584	-	-	-	-	-	-	-	-
43	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	93,164	-	-	-	-	-	-	-
44	PWS Misc. Improvement	Loop/Upgrade Water Mains/ Install Valves Annually	-	104,000	162,240	-	-	-	-	17,428	62,094	110,403	162,582
45	PWS Improvement No.XX	Design and Construction: CR 501 WTP - Iron Treatment Upgrades	557,627	-	-	-	-	-	-	-	-	-	-
46	PWS Improvement No.7A	Design, Permitting, and Bidding: CR 501 WTP Electrical Upgrades and Expan	-	-	140,608	-	-	-	-	-	-	-	-
47	PWS Improvement No.10	Design, Permitting, Bidding, and Construction : CR 214 WM Interconnect	-	-	-	-	-	-	-	-	73,903	-	-
48	PWS Option No.1	Decommission Fairways WTP	-	-	-	-	-	-	-	-	225,814	-	-
49	PWS Option No.2	Decommission CR 214 WTP	-	-	-	-	-	-	-	447,417	-	-	-
50	WW Improvement No.1A	Design and Permitting: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	-	146,640	-	-	-	-	-	-	-	-	-
51	WW Improvement No.1B	Construction: Continental Country Club/SR 44 Force Main, Master Lift Station r	-	-	644,602	-	-	-	-	-	-	-	-
52	WW Improvement No.5	Prioritized Gravity Collection System Renewal, Rehab, and/or Replacement	100,000	104,000	-	-	195,675	303,180	419,054	288,766	536,477	711,656	814,134
53	WW Improvement No.6	Main Street North Lift Station Rehabilitation	-	-	-	-	-	-	-	-	-	-	268,316
54	WW Misc. Improvement	Miscellaneous System Enhancements including lift station rehabilitation, main and lateral replacements	100,000	104,000	-	-	194,618	156,620	177,763	-	-	252,945	-
55	RCW Improvement No.1	Design and Construction: Install liner into the R-10 and R-11 ponds for NSU	585,000	-	-	-	-	-	-	-	-	-	-
56	**Total Revenue Fund**		**$ 1,342,627**	**$ 635,375**	**$ 2,008,043**	**$ 93,164**	**$ 390,294**	**$ 459,800**	**$ 596,817**	**$ 753,611**	**$ 898,287**	**$ 1,075,004**	**$ 1,245,032**
	Senior Lien Debt Funding		**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**
	Project No.	**Project Description**											
57	PWS Improvement No.5B	Construction: CR 209 WM Phase 3	-	-	-	860,858	-	-	-	-	-	-	-
58	PWS Misc. Improvement	Loop/Upgrade Water Mains/ Install Valves Annually	-	-	-	224,973	-	-	-	-	-	-	-
59	PWS Improvement No.4	Request SWFWMD Water Use Permit Modification: Reallocate capacities to the Oxford WTP	-	-	-	56,243	-	-	-	-	-	-	-
60	PWS Improvement No.7B	Design Complete and Construction Permit by 2020. Construct CR 501 WTP Expansion to 3.20 MGD Construction Complete and online by 2023	-	-	-	646,797	-	-	-	-	-	-	-
61	WW Improvement No.1B	Construction: Continental Country Club/SR 44 Force Main, Master Lift Station rehabilitation, and WWTP Demolition	-	-	586,011	1,374,413	-	-	-	-	-	-	-
62	WW Improvement No.4	Gravity Collection System Condition Assessment including complete system cleaning, video inspection, infiltration and inflow study (approx. 200,000 LF of gravity sewer)	-	-	-	281,216	-	-	-	-	-	-	-
63	WW Improvement No.5	Prioritized Gravity Collection System Renewal, Rehab, and/or Replacement	-	-	162,240	224,973	-	-	-	237,607	79,379	-	-
64	WW Improvement No.6	Main Street North Lift Station Rehabilitation	-	-	-	-	-	-	-	-	-	-	479,207
65	WW Misc. Improvement	Miscellaneous System Enhancements including lift station rehabilitation, main and lateral replacements	-	-	162,240	224,973	97,846	208,376	265,099	526,373	615,856	458,711	814,134
66	RCW Improvement No.3	Millennium Park 10-inch reclaim water main extension	-	-	-	-	839,666	873,253	-	-	-	-	-
		Unspecified Future Spending											
67		Water System Projects	-	-	-	-	856,073	684,367	711,742	740,212	769,820	800,613	832,637
68		Sewer System Projects	-	-	-	-	438,697	456,245	474,495	704,401	769,820	800,613	832,637
69		Clarifier	-	-	648,960	-	-	-	-	-	-	-	-
70	**Total Senior Lien Debt Funding**		**$ -**	**$ -**	**$ 1,559,451**	**$ 3,894,446**	**$ 2,232,283**	**$ 2,222,241**	**$ 1,451,336**	**$ 2,208,592**	**$ 2,234,876**	**$ 2,059,936**	**$ 2,958,616**

Capital Project Funding Summary

Schedule 8

Final Capital Projects Funding Sources	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Water System Development Fees	$ 278,125	$ 1,134,640	$ 999,141	$ 851,835	$ 693,989	$ 228,122	$ 237,247	$ 246,737	$ 256,607	$ 266,871	$ 277,546
Sewer System Development Fees	-	-	-	1,108,975	1,110,342	228,122	237,247	246,737	256,607	266,871	277,546
Water Tie Fees	75,000	723	1	0	-	-	-	-	-	-	-
Sewer Tie Fees	-	146,640	91,102	171	-	-	-	-	-	-	-
Renewal & Replacement	486,123	309,226	328,438	353,882	389,254	426,812	466,669	508,944	553,762	601,253	651,553
Water Connection Fees	203,125	252,756	-	-	-	-	-	-	-	-	-
Sewer Connection Fees	-	-	-	562,432	804,278	228,122	237,247	35,810	-	-	-
Revenue Fund	$ 1,342,627	$ 635,375	$ 2,008,043	$ 93,164	$ 390,294	$ 459,800	$ 596,817	$ 753,611	$ 898,287	$ 1,075,004	$ 1,245,032
Senior-Lien Debt Proceeds	-	-	1,559,451	3,894,446	2,232,283	2,222,241	1,451,336	2,208,592	2,234,876	2,059,936	2,958,616
Total Projects Paid	**$ 2,385,000**	**$ 2,479,360**	**$ 4,986,176**	**$ 6,864,904**	**$ 5,620,439**	**$ 3,793,220**	**$ 3,226,563**	**$ 4,000,433**	**$ 4,200,138**	**$ 4,269,935**	**$ 5,410,293**

FAMS - Control Panel **Schedule 9**

FAMS-XL | CITY OF WILDWOOD, FL

Stantec

CALC | SAVE | CTRL | LAST | OVR

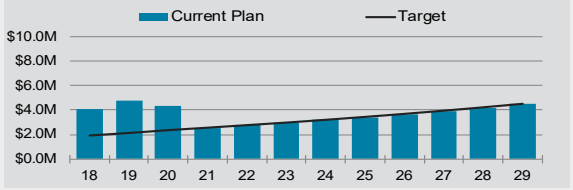
	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Rate Plan	0.00%	3.24%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Senior-Lien DSC	4.72	2.29	2.20	2.61	3.32	3.07	3.03	2.99	2.90	2.87	2.81
Subordinate DSC	5.94	1.25	1.28	1.61	2.20	2.50	2.86	3.22	3.57	5.42	9.38
All-In DSC	2.90	1.13	1.14	1.30	1.62	1.68	1.77	1.85	1.89	2.14	2.36
Total Single Family Bill	$55.77	$57.55	$59.86	$62.27	$64.77	$67.31	$70.01	$72.81	$75.70	$78.74	$81.89

	FY 2023	FY 2029
	20.73%	46.87%

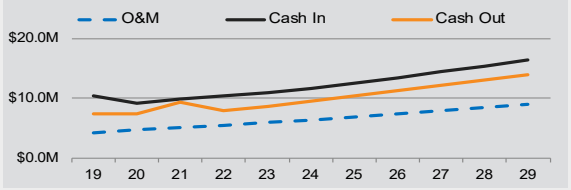
Scenario Manager

Growth Multiplier	60.00%
Villages Bulk	0.00%

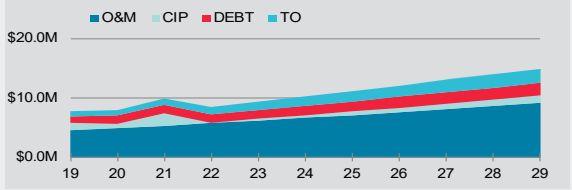
Operating Fund



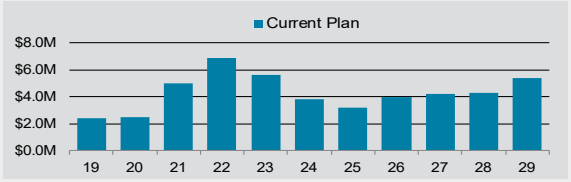
Revenues vs. Expenses



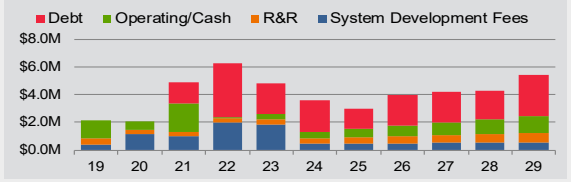
Expenses by Type



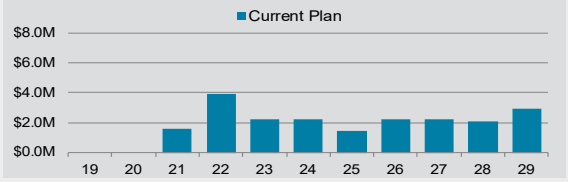
CIP Spending



CIP Funding



Borrowing



Pro Forma

Schedule 10

			FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	Operating Revenue												
1	Water, Sewer And Reuse Rate Revenue		$ 6,433,909	$ 6,433,909	$ 4,697,526	$ 5,391,755	$ 6,130,643	$ 6,838,082	$ 7,589,239	$ 8,386,383	$ 9,231,888	$ 10,128,243	$ 11,078,055
2	Change in Revenue From Growth		-	(1,883,806)	486,854	503,094	444,435	459,264	474,590	490,432	506,807	523,733	541,228
3	Subtotal		$ 6,433,909	$ 4,550,103	$ 5,184,380	$ 5,894,849	$ 6,575,079	$ 7,297,346	$ 8,063,830	$ 8,876,815	$ 9,738,695	$ 10,651,976	$ 11,619,283
4	*Weighted Average Rate Increase*		*0.00%*	*3.24%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*	*4.00%*
5	Additional Rate Revenue From Rate Increase		-	147,423	207,375	235,794	263,003	291,894	322,553	355,073	389,548	426,079	464,771
6	Price Elasticity Adjustment		-	-	-	-	-	-	-	-	-	-	-
7	Total Rate Revenue		$ 6,433,909	$ 4,697,526	$ 5,391,755	$ 6,130,643	$ 6,838,082	$ 7,589,239	$ 8,386,383	$ 9,231,888	$ 10,128,243	$ 11,078,055	$ 12,084,054
8	Plus: Other Operating Revenue		1,047,070	1,487,000	1,177,000	947,000	947,000	947,000	947,000	947,000	947,000	947,000	947,000
9	**Equals: Total Operating Revenue**		**$ 7,480,979**	**$ 6,184,526**	**$ 6,568,755**	**$ 7,077,643**	**$ 7,785,082**	**$ 8,536,239**	**$ 9,333,383**	**$ 10,178,888**	**$ 11,075,243**	**$ 12,025,055**	**$ 13,031,054**
	Less: Operating Expenses												
10	Personal Services		$ (1,972,295)	$ (2,089,154)	$ (2,271,358)	$ (2,459,205)	$ (2,649,195)	$ (2,858,875)	$ (3,079,515)	$ (3,311,928)	$ (3,556,957)	$ (3,815,486)	$ (4,088,444)
11	Operations & Maintenance Costs		(2,287,683)	(2,623,284)	(2,842,387)	(3,066,498)	(3,288,096)	(3,526,559)	(3,774,581)	(4,032,766)	(4,301,720)	(4,582,056)	(4,874,399)
12	**Equals: Net Operating Income**		**$ 3,221,001**	**$ 1,472,088**	**$ 1,455,011**	**$ 1,551,940**	**$ 1,847,790**	**$ 2,150,805**	**$ 2,479,286**	**$ 2,834,194**	**$ 3,216,566**	**$ 3,627,513**	**$ 4,068,212**
	Plus: Non-Operating Income/(Expense)												
13	Non-Operating Revenue		$ 16,821	$ 82,059	$ 184,015	$ 264,018	$ 351,255	$ 430,973	$ 500,398	$ 541,388	$ 583,555	$ 626,923	$ 671,520
14	Interest Income		11,599	22,819	29,898	35,506	42,953	50,640	60,354	71,495	75,631	80,006	84,803
15	Water System Development Fees		1,030,352	1,031,046	1,130,265	1,130,265	972,070	972,070	972,070	972,070	972,070	972,070	972,070
16	Sewer System Development Fees		1,799,842	1,799,539	1,974,372	1,974,372	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033
17	Transfers In		-	-	-	-	-	-	-	-	-	-	-
18	**Equals: Net Income**		**$ 6,079,617**	**$ 4,407,551**	**$ 4,773,561**	**$ 4,956,102**	**$ 4,912,101**	**$ 5,302,521**	**$ 5,710,141**	**$ 6,117,180**	**$ 6,545,855**	**$ 7,004,545**	**$ 7,494,638**
	Less: Revenues Excluded From Coverage Test												
19	System Development Fees		$ (2,830,195)	$ (2,830,586)	$ (3,104,638)	$ (3,104,638)	$ (2,670,103)	$ (2,670,103)	$ (2,670,103)	$ (2,670,103)	$ (2,670,103)	$ (2,670,103)	$ (2,670,103)
20	Transfers In		-	-	-	-	-	-	-	-	-	-	-
21	**Equals: Net Income Available For Debt Service**		**$ 3,249,422**	**$ 1,576,965**	**$ 1,668,923**	**$ 1,851,464**	**$ 2,241,998**	**$ 2,632,418**	**$ 3,040,038**	**$ 3,447,077**	**$ 3,875,752**	**$ 4,334,442**	**$ 4,824,535**
	Senior Lien Debt Service Coverage Test												
22	Net Income Available for Senior-Lien Debt Service		**$ 3,249,422**	**$ 1,576,965**	**$ 1,668,923**	**$ 1,851,464**	**$ 2,241,998**	**$ 2,632,418**	**$ 3,040,038**	**$ 3,447,077**	**$ 3,875,752**	**$ 4,334,442**	**$ 4,824,535**
23	Existing Senior-Lien Debt		688,063	688,174	688,124	410,930	134,615	134,615	134,615	134,615	134,615	134,615	134,615
24	Cumulative New Senior Lien Debt Service (calculated)		-	-	68,818	298,455	541,250	722,020	868,399	1,019,633	1,200,084	1,373,788	1,580,669
25	**Total Annual Senior-Lien Debt Service**	**Tar.**	**$ 688,063**	**$ 688,174**	**$ 756,942**	**$ 709,385**	**$ 675,865**	**$ 856,635**	**$ 1,003,014**	**$ 1,154,248**	**$ 1,334,699**	**$ 1,508,403**	**$ 1,715,284**
26	*Calculated Senior-Lien Debt Service Coverage*	**1.50**	**4.72**	**2.29**	**2.20**	**2.61**	**3.32**	**3.07**	**3.03**	**2.99**	**2.90**	**2.87**	**2.81**

Pro Forma

Schedule 10

			FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
	Subordinate Debt Service Coverage Test												
27	Net Income Available for Subordinate Debt Service		$ 2,561,359	$ 888,791	$ 911,981	$ 1,142,079	$ 1,566,133	$ 1,775,783	$ 2,037,025	$ 2,292,828	$ 2,541,053	$ 2,826,040	$ 3,109,251
28	Existing Subordinate Debt		430,901	711,487	711,487	711,487	711,487	711,487	711,487	711,487	711,487	521,529	331,572
29	Cumulative New Subordinate Debt Service (calculated)		-	-	-	-	-	-	-	-	-	-	-
30	**Total Annual Subordinate Debt Service**	**Req.**	**$ 430,901**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 711,487**	**$ 521,529**	**$ 331,572**
31	*Calculated Subordinate Debt Service Coverage*	**1.15**	**5.94**	**1.25**	**1.28**	**1.61**	**2.20**	**2.50**	**2.86**	**3.22**	**3.57**	**5.42**	**9.38**
	Total All-In Debt Service Coverage Test												
32	Net Income Available for Subordinate Debt Service		$ 3,249,422	$ 1,576,965	$ 1,668,923	$ 1,851,464	$ 2,241,998	$ 2,632,418	$ 3,040,038	$ 3,447,077	$ 3,875,752	$ 4,334,442	$ 4,824,535
33	Total Senior-Lien Debt Service		688,063	688,174	756,942	709,385	675,865	856,635	1,003,014	1,154,248	1,334,699	1,508,403	1,715,284
34	Total Subordinate Debt Service		430,901	711,487	711,487	711,487	711,487	711,487	711,487	711,487	711,487	521,529	331,572
35	**Total Annual Debt Service**	**Tar.**	**$ 1,118,964**	**$ 1,399,661**	**$ 1,468,429**	**$ 1,420,872**	**$ 1,387,352**	**$ 1,568,122**	**$ 1,714,500**	**$ 1,865,735**	**$ 2,046,186**	**$ 2,029,932**	**$ 2,046,856**
36	*Calculated All-In Debt Service Coverage*	**1.50**	**2.90**	**1.13**	**1.14**	**1.30**	**1.62**	**1.68**	**1.77**	**1.85**	**1.89**	**2.14**	**2.36**
	Cash Flow Test												
37	Net Income Available For Debt Service		$ 3,249,422	$ 1,576,965	$ 1,668,923	$ 1,851,464	$ 2,241,998	$ 2,632,418	$ 3,040,038	$ 3,447,077	$ 3,875,752	$ 4,334,442	$ 4,824,535
38	**Less: Non-Operating Expenditures**												
39	Net Interfund Transfers (In - Out)		(390,870)	(391,286)	(512,453)	(617,900)	(740,509)	(857,785)	(967,067)	(1,050,333)	(1,137,317)	(1,228,176)	(1,323,072)
40	Net Debt Service Payment[1]		(688,063)	(688,174)	(756,942)	(709,385)	(675,865)	(856,635)	(1,003,014)	(1,154,248)	(1,334,699)	(1,508,403)	(1,715,284)
41	Capital Outlay		(209,998)	(216,297)	(220,623)	(225,036)	(229,537)	(234,127)	(238,810)	(243,586)	(248,458)	(253,427)	(258,495)
42	**Net Cash Flow**		**$ 1,960,491**	**$ 281,208**	**$ 178,905**	**$ 299,143**	**$ 596,088**	**$ 683,871**	**$ 831,148**	**$ 998,910**	**$ 1,155,278**	**$ 1,344,437**	**$ 1,527,683**
	Unrestricted Reserve Fund Test												
43	Balance At Beginning Of Fiscal Year		$ 4,122,313	$ 4,740,177	$ 4,386,011	$ 2,556,872	$ 2,762,852	$ 2,968,646	$ 3,192,717	$ 3,427,048	$ 3,672,347	$ 3,929,338	$ 4,198,771
44	Cash Flow Surplus/(Deficit)		1,960,491	281,208	178,905	299,143	596,088	683,871	831,148	998,910	1,155,278	1,344,437	1,527,683
45	Projects Designated To Be Paid With Cash		-	-	-	-	-	-	-	-	-	-	-
46	Projects Paid With Non Specified Funds		(1,342,627)	(635,375)	(2,008,043)	(93,164)	(390,294)	(459,800)	(596,817)	(753,611)	(898,287)	(1,075,004)	(1,245,032)
47	**Balance At End Of Fiscal Year**		**$ 4,740,177**	**$ 4,386,011**	**$ 2,556,872**	**$ 2,762,852**	**$ 2,968,646**	**$ 3,192,717**	**$ 3,427,048**	**$ 3,672,347**	**$ 3,929,338**	**$ 4,198,771**	**$ 4,481,421**
48	Minimum Working Capital Reserve Target		2,129,989	2,356,219	2,556,872	2,762,852	2,968,646	3,192,717	3,427,048	3,672,347	3,929,338	4,198,771	4,481,421
49	**Excess/(Deficiency) Of Working Capital To Target**		**$ 2,610,188**	**$ 2,029,791**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

[1] Net Debt Service Payment represents net of expansion portion paid with System Development Fees

Funding Summary

Schedule 11

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Water System Development Fees											
Balance At Beginning Of Fiscal Year	$ 278,497	$ 1,031,543	$ 649,461	$ 502,155	$ 502,505	$ 503,133	$ 972,005	$ 1,436,734	$ 1,898,072	$ 2,354,104	$ 2,804,381
Annual Revenues	1,030,352	1,031,046	1,130,265	1,130,265	972,070	972,070	972,070	972,070	972,070	972,070	972,070
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)	(280,586)
Subtotal	$ 1,308,849	$ 1,782,003	$ 1,499,141	$ 1,351,835	$ 1,193,989	$ 1,194,617	$ 1,663,489	$ 2,128,218	$ 2,589,556	$ 3,045,588	$ 3,495,865
Less: Restricted Funds	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)	(500,000)
Total Amount Available For Projects	808,849	1,282,003	999,141	851,835	693,989	694,617	1,163,489	1,628,218	2,089,556	2,545,588	2,995,865
Amount Paid For Projects	(278,125)	(1,134,640)	(999,141)	(851,835)	(693,989)	(228,122)	(237,247)	(246,737)	(256,607)	(266,871)	(277,546)
Subtotal	$ 530,724	$ 147,363	$ -	$ -	$ -	$ 466,494	$ 926,242	$ 1,381,481	$ 1,832,949	$ 2,278,717	$ 2,718,319
Add Back: Restricted Funds	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Plus: Interest Earnings	818	2,099	2,155	2,505	3,133	5,511	10,492	16,591	21,155	25,664	30,114
Less: Interest Allocated To Cash Flow	-	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ 1,031,543**	**$ 649,461**	**$ 502,155**	**$ 502,505**	**$ 503,133**	**$ 972,005**	**$ 1,436,734**	**$ 1,898,072**	**$ 2,354,104**	**$ 2,804,381**	**$ 3,248,433**
Sewer System Development Fees											
Balance At Beginning Of Fiscal Year	$ 836,801	$ 2,207,644	$ 3,583,513	$ 5,143,316	$ 5,604,615	$ 5,796,924	$ 6,883,307	$ 7,977,927	$ 9,083,203	$ 10,189,613	$ 11,487,679
Annual Revenues	1,799,842	1,799,539	1,974,372	1,974,372	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033	1,698,033
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	(430,901)	(430,901)	(430,901)	(430,901)	(430,901)	(430,901)	(430,901)	(430,901)	(430,901)	(240,943)	(50,986)
Subtotal	$ 2,205,743	$ 3,576,283	$ 5,126,984	$ 6,686,788	$ 6,871,748	$ 7,064,057	$ 8,150,439	$ 9,245,059	$ 10,350,335	$ 11,646,703	$ 13,134,726
Less: Restricted Funds	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)	(2,000,000)
Total Amount Available For Projects	205,743	1,576,283	3,126,984	4,686,788	4,871,748	5,064,057	6,150,439	7,245,059	8,350,335	9,646,703	11,134,726
Amount Paid For Projects	-	-	-	(1,108,975)	(1,110,342)	(228,122)	(237,247)	(246,737)	(256,607)	(266,871)	(277,546)
Subtotal	$ 205,743	$ 1,576,283	$ 3,126,984	$ 3,577,813	$ 3,761,406	$ 4,835,934	$ 5,913,192	$ 6,998,322	$ 8,093,728	$ 9,379,832	$ 10,857,180
Add Back: Restricted Funds	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Plus: Interest Earnings	1,902	7,230	16,332	26,803	35,519	47,373	64,735	84,881	95,885	107,847	121,724
Less: Interest Allocated To Cash Flow	-	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ 2,207,644**	**$ 3,583,513**	**$ 5,143,316**	**$ 5,604,615**	**$ 5,796,924**	**$ 6,883,307**	**$ 7,977,927**	**$ 9,083,203**	**$ 10,189,613**	**$ 11,487,679**	**$ 12,978,905**
Water Tie Fees											
Balance At Beginning Of Fiscal Year	$ 75,676	$ 723	$ 1	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Annual Revenues	-	-	-	-	-	-	-	-	-	-	-
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	75,676	723	1	0	0	0	0	0	0	0	0
Less: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Total Amount Available For Projects	75,676	723	1	0	0	0	0	0	0	0	0
Amount Paid For Projects	(75,000)	(723)	(1)	(0)	-	-	-	-	-	-	-
Subtotal	676	-	-	-	0	0	0	0	0	0	0
Add Back: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Plus: Interest Earnings	48	1	0	0	0	0	0	0	0	0	0
Less: Interest Allocated To Cash Flow	-	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ 723**	**$ 1**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**

Funding Summary

Schedule 11

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Sewer Tie Fees											
Balance At Beginning Of Fiscal Year	$ 237,036	$ 237,332	$ 91,102	$ 171	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Annual Revenues	-	-	-	-	-	-	-	-	-	-	-
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ 237,036	$ 237,332	$ 91,102	$ 171	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Less: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Total Amount Available For Projects	237,036	237,332	91,102	171	0	0	0	0	0	0	0
Amount Paid For Projects	-	(146,640)	(91,102)	(171)	-	-	-	-	-	-	-
Subtotal	$ 237,036	$ 90,692	$ -	$ -	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Add Back: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Plus: Interest Earnings	296	410	171	0	0	0	0	0	0	0	0
Less: Interest Allocated To Cash Flow	-	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ 237,332**	**$ 91,102**	**$ 171**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Capital Projects Fund											
Balance At Beginning Of Fiscal Year	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)
Annual Revenues	-	-	-	-	-	-	-	-	-	-	-
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)
Less: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Total Amount Available For Projects	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)	(198,850)
Amount Paid For Projects	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)	$ (198,850)
Add Back: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Plus: Interest Earnings	-	-	-	-	-	-	-	-	-	-	-
Less: Interest Allocated To Cash Flow	-	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**	**$ (198,850)**
Renewal & Replacement											
Balance At Beginning Of Fiscal Year	$ 112,074	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Revenues	374,049	309,226	328,438	353,882	389,254	426,812	466,669	508,944	553,762	601,253	651,553
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ 486,123	$ 309,226	$ 328,438	$ 353,882	$ 389,254	$ 426,812	$ 466,669	$ 508,944	$ 553,762	$ 601,253	$ 651,553
Less: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Total Amount Available For Projects	486,123	309,226	328,438	353,882	389,254	426,812	466,669	508,944	553,762	601,253	651,553
Amount Paid For Projects	(486,123)	(309,226)	(328,438)	(353,882)	(389,254)	(426,812)	(466,669)	(508,944)	(553,762)	(601,253)	(651,553)
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Add Back: Restricted Funds	-	-	-	-	-	-	-	-	-	-	-
Plus: Interest Earnings	70	-	-	-	-	-	-	-	-	-	-
Less: Interest Allocated To Cash Flow	(70)	-	-	-	-	-	-	-	-	-	-
Balance At End Of Fiscal Year	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Funding Summary — Schedule 11

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Water Connection Fees											
Balance At Beginning Of Fiscal Year	$ 1,196,602	$ 993,477	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721
Annual Revenues	-	-	-	-	-	-	-	-	-	-	-
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ 1,196,602	$ 993,477	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721	$ 740,721
Less: Restricted Funds [1]	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)	(740,721)
Total Amount Available For Projects	455,881	252,756	-	-	-	-	-	-	-	-	-
Amount Paid For Projects	(203,125)	(252,756)	-	-	-	-	-	-	-	-	-
Subtotal	$ 252,756	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Add Back: Restricted Funds	740,721	740,721	740,721	740,721	740,721	740,721	740,721	740,721	740,721	740,721	740,721
Plus: Interest Earnings	1,369	2,168	2,778	3,704	4,630	5,555	6,481	7,407	7,407	7,407	7,407
Less: Interest Allocated To Cash Flow	(1,369)	(2,168)	(2,778)	(3,704)	(4,630)	(5,555)	(6,481)	(7,407)	(7,407)	(7,407)	(7,407)
Balance At End Of Fiscal Year	**$ 993,477**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**	**$ 740,721**
Sewer Connection Fees											
Balance At Beginning Of Fiscal Year	$ 3,434,432	$ 3,434,432	$ 3,434,432	$ 3,434,432	$ 2,872,000	$ 2,067,722	$ 1,839,600	$ 1,602,352	$ 1,566,542	$ 1,566,542	$ 1,566,542
Annual Revenues	-	-	-	-	-	-	-	-	-	-	-
Less: Annual Expenses	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ 3,434,432	$ 3,434,432	$ 3,434,432	$ 3,434,432	$ 2,872,000	$ 2,067,722	$ 1,839,600	$ 1,602,352	$ 1,566,542	$ 1,566,542	$ 1,566,542
Less: Restricted Funds [1]	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)	(1,566,542)
Total Amount Available For Projects	1,867,890	1,867,890	1,867,890	1,867,890	1,305,458	501,180	273,058	35,810	-	-	-
Amount Paid For Projects	-	-	-	(562,432)	(804,278)	(228,122)	(237,247)	(35,810)	-	-	-
Subtotal	$ 1,867,890	$ 1,867,890	$ 1,867,890	$ 1,305,458	$ 501,180	$ 273,058	$ 35,810	$ -	$ -	$ -	$ -
Add Back: Restricted Funds	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542	1,566,542
Plus: Interest Earnings	4,293	8,586	12,879	15,766	15,437	14,652	15,059	15,844	15,665	15,665	15,665
Less: Interest Allocated To Cash Flow	(4,293)	(8,586)	(12,879)	(15,766)	(15,437)	(14,652)	(15,059)	(15,844)	(15,665)	(15,665)	(15,665)
Balance At End Of Fiscal Year	**$ 3,434,432**	**$ 3,434,432**	**$ 3,434,432**	**$ 2,872,000**	**$ 2,067,722**	**$ 1,839,600**	**$ 1,602,352**	**$ 1,566,542**	**$ 1,566,542**	**$ 1,566,542**	**$ 1,566,542**
Revenue Fund											
Balance At Beginning Of Fiscal Year	$ 4,122,313	$ 4,740,177	$ 4,386,011	$ 2,556,872	$ 2,762,852	$ 2,968,646	$ 3,192,717	$ 3,427,048	$ 3,672,347	$ 3,929,338	$ 4,198,771
Net Cash Flow	1,960,491	281,208	178,905	299,143	596,088	683,871	831,148	998,910	1,155,278	1,344,437	1,527,683
Less: Cash-Funded Capital Projects	-	-	-	-	-	-	-	-	-	-	-
Less: Payment Of Debt Service	-	-	-	-	-	-	-	-	-	-	-
Subtotal	$ 6,082,804	$ 5,021,385	$ 4,564,916	$ 2,856,015	$ 3,358,939	$ 3,652,517	$ 4,023,865	$ 4,425,958	$ 4,827,625	$ 5,273,775	$ 5,726,454
Less: Restricted Funds	(2,129,989)	(2,356,219)	(2,556,872)	(2,762,852)	(2,968,646)	(3,192,717)	(3,427,048)	(3,672,347)	(3,929,338)	(4,198,771)	(4,481,421)
Total Amount Available For Projects	3,952,815	2,665,166	2,008,043	93,164	390,294	459,800	596,817	753,611	898,287	1,075,004	1,245,032
Amount Paid For Projects	(1,342,627)	(635,375)	(2,008,043)	(93,164)	(390,294)	(459,800)	(596,817)	(753,611)	(898,287)	(1,075,004)	(1,245,032)
Subtotal	$ 2,610,188	$ 2,029,791	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Add Back: Restricted Funds	2,129,989	2,356,219	2,556,872	2,762,852	2,968,646	3,192,717	3,427,048	3,672,347	3,929,338	4,198,771	4,481,421
Plus: Interest Earnings	5,539	11,408	13,018	13,299	17,911	23,105	28,961	35,497	38,008	40,641	43,401
Less: Interest Allocated To Cash Flow	(5,539)	(11,408)	(13,018)	(13,299)	(17,911)	(23,105)	(28,961)	(35,497)	(38,008)	(40,641)	(43,401)
Balance At End Of Fiscal Year	**$ 4,740,177**	**$ 4,386,011**	**$ 2,556,872**	**$ 2,762,852**	**$ 2,968,646**	**$ 3,192,717**	**$ 3,427,048**	**$ 3,672,347**	**$ 3,929,338**	**$ 4,198,771**	**$ 4,481,421**

Restricted Reserves																				
Balance At Beginning Of Fiscal Year	$	262,791	$	262,791	$	262,791	$	389,385	$	705,531	$	886,744	$	1,067,143	$	1,184,960	$	1,364,250	$	1,545,674	$	1,712,897
Additional Funds:		-		-		-		-		-		-		-		-		-		-		-
Debt Service Reserve On New Debt		$0		$0		$126,594		$316,146		$181,214		$180,398		$117,817		$179,290		$181,424		$167,223		$240,176
Other Additional Funds		-		-		-		-		-		-		-		-		-		-		-
Subtotal	$	262,791	$	262,791	$	389,385	$	705,531	$	886,744	$	1,067,143	$	1,184,960	$	1,364,250	$	1,545,674	$	1,712,897	$	1,953,073
Plus: Interest Earnings		328		657		1,223		2,737		4,976		7,327		9,853		12,746		14,550		16,293		18,330
Less: Interest Allocated To Cash Flow		(328)		(657)		(1,223)		(2,737)		(4,976)		(7,327)		(9,853)		(12,746)		(14,550)		(16,293)		(18,330)
Balance At End Of Fiscal Year	**$**	**262,791**	**$**	**262,791**	**$**	**389,385**	**$**	**705,531**	**$**	**886,744**	**$**	**1,067,143**	**$**	**1,184,960**	**$**	**1,364,250**	**$**	**1,545,674**	**$**	**1,712,897**	**$**	**1,953,073**

(1) Connection Fees restricted to be re-paid/owed back to The Villages.

Senior Lien Borrowing Projections [1]

Schedule 12

			FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Term (Years)			20	20	20	20	20	20	20	20	20	20	20
Interest Rate			3.50%	3.75%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Sources of Funds													
Par Amount			$ -	$ -	$ 1,720,454	$ 4,296,522	$ 2,462,751	$ 2,451,672	$ 1,601,176	$ 2,436,615	$ 2,465,612	$ 2,272,611	$ 3,264,074
Uses of Funds													
Proceeds			$ -	$ -	$ 1,559,451	$ 3,894,446	$ 2,232,283	$ 2,222,241	$ 1,451,336	$ 2,208,592	$ 2,234,876	$ 2,059,936	$ 2,958,616
Cost of Issuance	2.00%	of Par	-	-	34,409	85,930	49,255	49,033	32,024	48,732	49,312	45,452	65,281
Debt Service Reserve	1	Year(s) of Debt Service	-	-	126,594	316,146	181,214	180,398	117,817	179,290	181,424	167,223	240,176
Total Uses			$ -	$ -	$ 1,720,454	$ 4,296,522	$ 2,462,751	$ 2,451,672	$ 1,601,176	$ 2,436,615	$ 2,465,612	$ 2,272,611	$ 3,264,074
1 Year Interest			-	-	68,818	171,861	98,510	98,067	64,047	97,465	98,624	90,904	130,563
Annual Debt Service			$ -	$ -	$ 126,594	$ 316,146	$ 181,214	$ 180,398	$ 117,817	$ 179,290	$ 181,424	$ 167,223	$ 240,176
Total Debt Service			-	-	2,531,880	6,322,912	3,624,271	3,607,966	2,356,347	3,585,808	3,628,481	3,344,454	4,803,526
Cumulative New Annual Senior Lien Debt Service[2]			**$ -**	**$ -**	**$ 68,818**	**$ 298,455**	**$ 541,250**	**$ 722,020**	**$ 868,399**	**$ 1,019,633**	**$ 1,200,084**	**$ 1,373,788**	**$ 1,580,669**

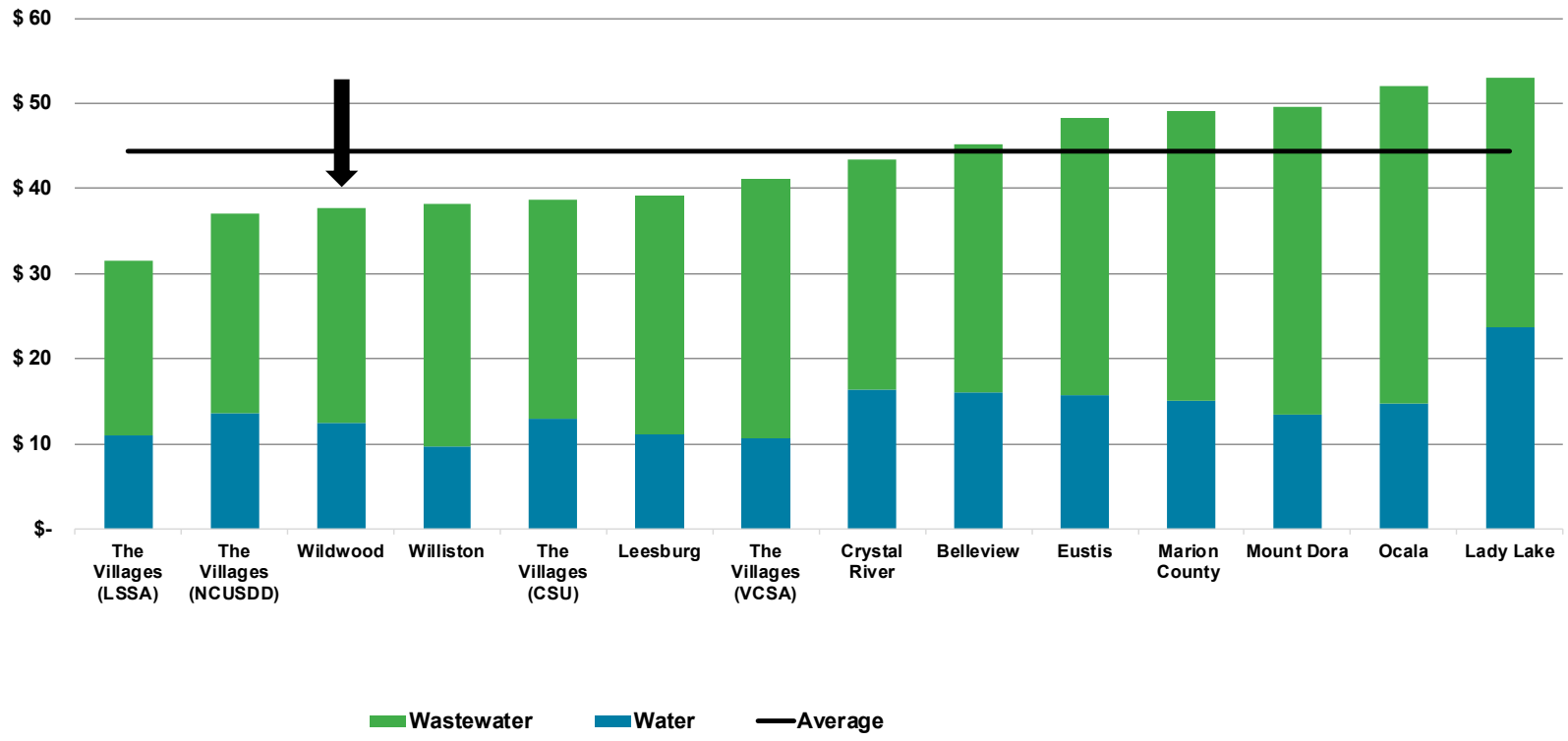
(1) While this schedule and RSA reflects the anticipated annual need of debt proceeds to assist in the funding of the CIP, it is likeley that the City would issue debt periodically instead of in each year depending on the actual financing tool and terms.

(2) Reflects interest-only payment due in year of issuance.

Bill Comparison **Schedule 13**

Water & Wastewater

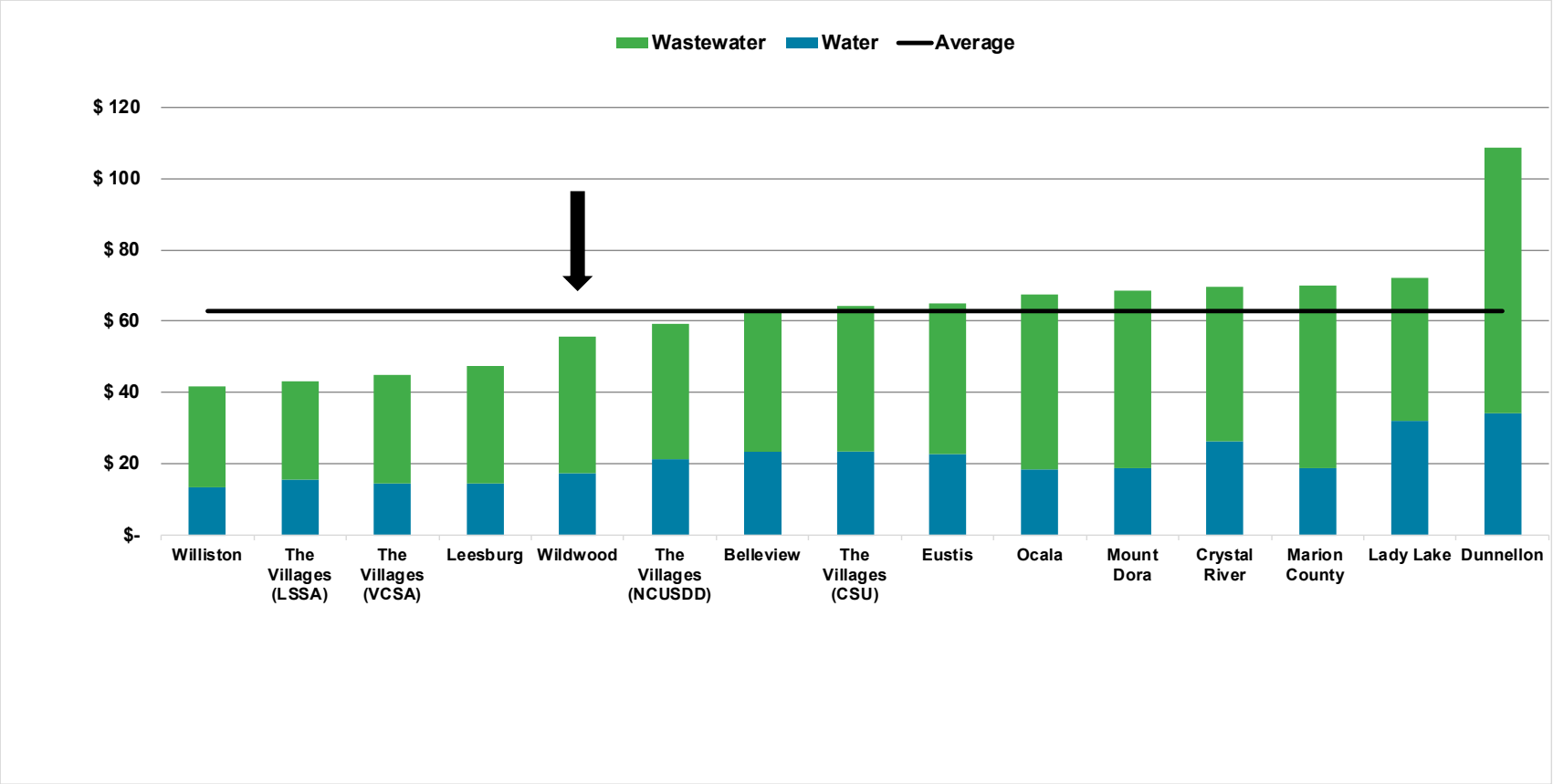
FY 2019 Residential 5/8" x 3/4" Meter Water & Wastewater Base and Usage Rate Survey at 2 kgal



Bill Comparison **Schedule 13**

Water & Wastewater

FY 2019 Residential 5/8" x 3/4" Meter Water & Wastewater Base and Usage Rate Survey at 5 kgal



Bill Comparison **Schedule 13**

Water & Wastewater

FY 2019 Residential 5/8" x 3/4" Meter Water & Wastewater Base and Usage Rate Survey at 10 kgal