



UTILITY MASTER PLAN

Groveland Utilities

FINAL



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City of Groveland, FL

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EXECUTIVE SUMMARY

Objective

The City of Groveland (City) is responsible for delivering a broad range of public services in relation to roads, traffic, planning, housing, economic and community development, environment, recreation, drinking water, wastewater, reclaimed water, stormwater, and emergency management. Drinking water, wastewater, and reclaimed water utilities (Water Utilities) touch most services provided by the City. Asset management and optimization of such utilities is paramount to providing these services at a competitive price while meeting customer demand and regulatory requirements.

This Utility Master Plan was a collaborative effort between The City of Groveland staff and Woodard & Curran utility operators, engineers, planners and financial staff, to evaluate the City's needs and desires of their Water Utilities through 2042. The City of Groveland Planning Area served as the basis for evaluating future needs and includes the incorporated City limits, the existing service area outside the City limits and certain contiguous adjacent lands (unincorporated Lake County), all totaling more than 54 square miles.

The Water Utilities planning period begins in 2021 and extends through the 2045 to include a holistic evaluation of water utility needs. The City's vision, values, goals, and guidelines incorporated in this Utility Master Plan are fivefold, and include consideration of the City's:

1. Strategic Plan
2. Policies
3. Growth Strategy
4. Objectives
5. Long Term Initiatives



The overall objective of the Utility Master Plan is to provide City staff with a 20-year strategy that supports the Water Utilities goals and intended purpose at a desired service level, within regulatory compliance, and at the lowest life cycle cost. This plan includes historical data, population projections, facts, figures, engineering principles, financial strategies, and other support material.

Major sections of this Utility Master Plan include:

- Evaluation of existing utilities and needs.
- Understanding current and projected demands and supplies.
- Quantifying future needs to support growth.
- Evaluation of operational needs and opportunities to upgrade technology.
- Improvements to asset management through utility mapping and planning.
- Development of future projects, phasing, and opportunities for efficiencies.
- Development of a financial strategy for growth.

Facts and Issues

Growth

The City of Groveland was incorporated in 1922 and the population today (100 years later) is about 20,000. The 2045 population is projected to be 98,673 and represents a 490% increase over a 24-year period. More than 60+ future developments or development areas with approximately 24,226 housing units are expected over the next 20+ years. As an example, the Villa City development northwest of the City is expected to have a population of 23,978, which is greater than the 2021 Groveland population. This growth rate is extraordinary and infrastructure management will be complex and challenging at this rate of population increase.

Drinking Water

Water resources in the area are managed by the St. Johns River Water Management District (SJRWMD) and the Florida Department of Environmental Protection. Source water has become precious as demand is beginning to approach permitted withdrawals in some areas of Central Florida. Regulation of water withdrawal has intensified, requiring innovative solutions to meet existing and future demands. Groveland's future demand due to planned growth has not been recognized in the planning efforts for the Central Florida Water Initiative.

Wastewater Conveyance and Treatment

Wastewater conveyance has become challenging to manage in recent years with 59 City-owned and operated lift stations. The City's Sampey WWTP is near capacity and the Sunshine WWTP will approach capacity in the next several years due to development within the service area. The City of Groveland has an interlocal agreement with the City of Mascotte to accept and treat wastewater. Wastewater flows from Mascotte will steadily increase over the next several years as Groveland works to increase treatment capacity.

Reclaimed Water and Irrigation

The City does an excellent job treating wastewater for unrestricted reuse as irrigation with nearly 100% converted from waste to irrigation each year. Existing demand on the reclaimed water system for irrigation, however, has exceeded supply and is now supplemented with SJRWMD Consumptive Use Permit (CUP) capacity, thus potentially limiting future drinking water withdrawal. Existing irrigation demand per capita in some areas of the City is excessive and needs to be managed. Additional creative irrigation supply technology and alternative water supplies for irrigation are needed.

Operations and Maintenance

While many water utilities in Groveland were constructed in the last 20 years, portions of the existing water utilities infrastructure have exceeded their design life such that operational compliance is a full-time effort and efficiencies are diminishing. Replacement of such infrastructure is a must to ensure customer demand is met in the most cost-efficient manner and

regulatory compliance is satisfied. Additionally, as the City has grown and will continue to grow rapidly, the Operations and Maintenance staff resources, facilities, and equipment need to grow.

Key Findings

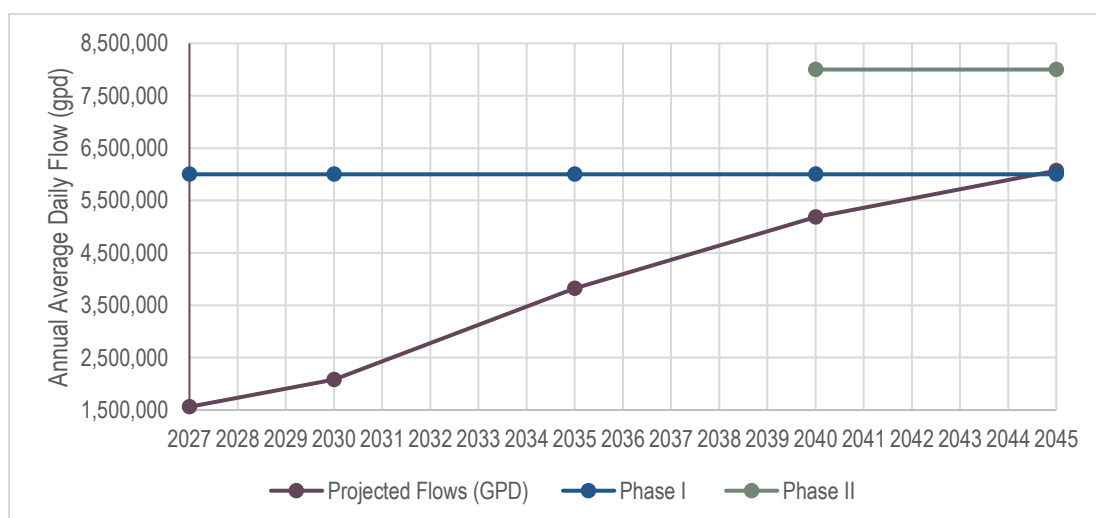
Drinking Water

Upgrades to portions of the infrastructure are needed over the upcoming 5 to 10 years. Upgrades include distribution piping improvements, looping of water mains for water quality and quantity, water supply development from the Lower Floridan Aquifer, and additional water storage and pump upgrades throughout the utility service area to meet peak demands and fire flow requirements. Much of the drinking water needs, less extraordinary growth, are identified in the 2021 Drinking Water Facilities Plan [Appendix I - Drinking Water Facilities Plan](#). This Utility Master Plan estimates an increase from current drinking water demands of 2.4 MGD to nearly 8 MGD and expounds on specific drinking water findings, recommendations, cost, and an implementation schedule through 2045.

Wastewater Conveyance and Treatment

Elements of the Groveland wastewater infrastructure needing upgrades include lift stations, force mains, manholes, collection piping and the wastewater treatment and disposal facilities. Much of the wastewater needs, less extraordinary growth, are identified in the 2021 Clean Water Facilities Plan [Appendix K - Clean Water Facilities Plan](#). The City initially envisioned upgrades to the Sampey WWTP, but as the wastewater conveyance and treatment systems were evaluated and the distribution of growth was better understood, it became apparent that a new Regional WWTP to provide an additional 6-8 MGD capacity is needed as soon as possible to support Groveland's growth and to continue to be a regional wastewater treatment provider for the City of Mascotte. This Utility Master Plan expounds on specific wastewater findings, recommendations, cost, and an implementation schedule through 2042.

Figure ES-1: Estimated Flows to Regional WWTP vs Phase Capacity



Reclaimed Water and Irrigation

The City's reclaimed water serves several purposes that include: an additional source of revenue, reduction of the drinking water demand for irrigation, a viable efficient method of disposing of treated wastewater effluent and reducing the land area needed to dispose of treated wastewater effluent. The process of treating wastewater effluent to public access reuse levels is somewhat costly, however proven viable where source water is limited. Existing irrigation demand needs to be reduced and future developments will need to meet stringent criteria. While some reclaimed water projects were included in the 2021 Clean Water Facilities Plan, the Utility Master Plan significantly expanded the scope of the reclaimed water evaluation to develop an approach to maximize reclaimed water supply and set targets for future irrigation demands that can be met with reclaimed water and alternative water supplies.

Operations and Maintenance

Operation and maintenance of the City's Water Utilities in recent years has reached new levels of efficiency to improve the level of service without significant rate increases. Planned growth and aging infrastructure will continue to demand a high level of operation and maintenance capacity from the staff. This will require continued investment in the Operation and Maintenance program through asset management and technology improvements in addition to steadily increasing staff, facility, and equipment resources. Many of these needs were evaluated in this Utility Master Plan to optimize the efficiency and performance of the Operation and Maintenance program.

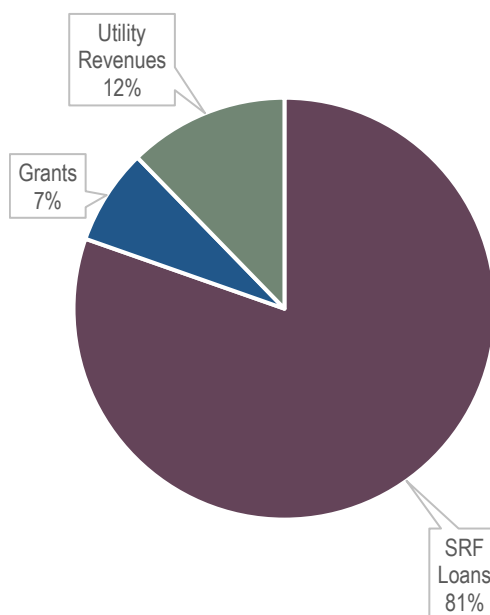
Capital Improvement Plan (CIP)

Existing Infrastructure Needs (5-Year CIP) - \$76M

The 5-Year CIP developed for existing infrastructure needs includes projects and costs will be supported by current rate payers and outside funding sources. The City's debt service for projects that will be funded by SRF loans has already been evaluated as part of the Drinking Water Facilities Plan.

The \$76M capital program includes \$61M for SRF funded projects, which were previously approved by City Council as part of the Drinking Water and Clean Water Facilities Plans, with debt service that will be paid through future utility revenues. The additional capital expenditures include \$14.9M with \$5.6M in grants and the remaining \$9.3M to be paid through utility revenues over the next 5 years.

Debt service will be further evaluated under the Funding Initiative Plan to consider the "Capacity



Expansion Percentage” of each project that is reserved for future development and could be paid by future impact fees to decrease the SRF loan burden on rate payers.

Growth Driven Needs (5-Year CIP) - **\$214.5M**

A separate 5-Year CIP was developed for projects that are driven by significant future growth and will be paid by future development. The \$214.5M capital to be paid by impact fees with an estimated \$5.2M in grants and legislative appropriation anticipated over the next 5 years.

This is a very front-loaded CIP based on the projected growth over the next 5-10 years that require construction of critical facilities (e.g., Regional WWTP) begin to keep pace with growth. Facilities need to be under construction and near complete to support ongoing construction of developments by the end of the 5-year planning period or shortly thereafter.

Preliminary Long-Term CIP (6-20 Years) – Under Development - **\$114M**

The Long-Term CIP includes all projects or the remaining effort for ongoing projects that are not included in the Short-Term CIPs and have been identified in the Utility Master Plan. Some projects have yet to be developed based on planning or engineering assessments that will be completed in the Short-Term CIPs and allowances have been budgeted to account for projected needs. It is important to note that the Short-Term CIPs may need to push into subsequent years to spread costs over a longer period and incorporate some projects into the Long-Term CIP.

A large portion of the Long-Term CIP cost (\$64.3M) is associated with the remaining construction cost for the Regional WWTP and expansion of this facility in 2040. Additionally, the costs for additional capital projects to replace aging infrastructure continue to grow as the City’s utility infrastructure expands and older infrastructure exceeds its life expectancy over the next 20 years.

The Long-Term CIP will likely be funded through a variety of sources, such as utility revenues and impact fees but some projects may be eligible for SRF and grant funds.

Funding Initiative Plan (FIP) – Under Development

The FIP will be developed following the City’s review of this draft Utility Master Plan. In general, the funding strategy for the water utilities will include a variety of funding sources (utility revenues, impact fees, grants, loans. The FIP will identify the need, if any, to further evaluate utility revenues through rate increases and changes to impact fees.

Next Steps (action items)

The following is a summary of key recommendations for City staff to implement actions to advance additional planning efforts and begin design and construction of projects:

1. Present the findings and recommendations in this report to City Council for their review and approval via resolution.

2. Continue to manage existing funding sources and begin the process of developing funding applications to state and federal agencies for critical projects over the next five years.
3. Initiate discussions with developers to determine their level of participation in water infrastructure expansion to serve their developments and creative input related to the recommendations for the City's future Water Utilities.
4. Identify and negotiate or procure land for treatment, production, storage, and disposal for drinking water and clean water facilities as soon as possible.
5. Meet with regulatory agencies regarding consumptive use permit capacity over the upcoming 10 years and the scope to update the groundwater model.
6. Advance design plans and permits for the expansion of the Sampey Road WWTP as soon as possible.
7. Initiate the new Regional WWTP planning, design and permitting with a target goal of activating the facility by 2027.
8. Begin developing plans and permits to upgrade and expand the distribution and collection infrastructure over the next five-years.
9. Enforce water conservation rules and new guidelines for indoor and outdoor water use. Incorporate reclaimed water piping and irrigation restrictions in all future development agreements.
10. Create a development agreement template and review all agreements with a focus on funding commitments in support of pledged revenue on debt dedicated to specific growth and needs based on planned utilities.
11. Continue to focus on coordinating development reviews and the management of growth across all City departments and leadership.
12. Continue to evaluate the potential to augment reclaimed water for irrigation with additional stormwater or other alternative water supply projects.
13. Expand the utility asset management program and improve technology across all water utilities.
14. Work closely with Operations and Management staff to support growth of the City's water utilities to maintain a high level of service and invest in continued improvements.

1. INTRODUCTION

This Utility Master Plan (Master Plan) is intended to be a planning-level assessment and roadmap for the City of Groveland, Florida (City) near-term needs and long-term goals for the water, wastewater, and reclaimed water utilities to support the City's growth. This Master Plan takes a holistic approach to planning, funding, design, and project implementation for these utilities.

It is important to note that some of the information and data used to inform this Master Plan were gathered and evaluated in 2020-2021 as part of ongoing planning work and some developments were constructed by 2022. These recent changes, however, do not significantly impact the recommendations, capital improvement projects, or the use of this Master Plan.

1.1 Background

The City is responsible for the planning and implementation for the water utilities utilizing Woodard & Curran, Inc. (Woodard & Curran) as a contract operator for the City's water systems (potable, wastewater, reclaimed water). Groveland was mainly an agriculturally based community but in recent years has become one of the fastest growing municipalities in Florida. The planning area incorporates 54 square miles and includes the City of Groveland and contiguous surrounding lands in Lake County.

The City treats groundwater from the Upper Floridan aquifer (UFA) utilizing either chlorine gas or sodium hypochlorite for disinfection before distribution to the customers. The treatment and distribution systems consist of five water treatment plants, four distribution zones, and one booster pump station. The City's distribution system is classified as three different public water systems that are interconnected: Groveland Water Department (PWS 3350476), Sunshine Parkway Systems (PWS 3350691), and Palisades Country Club (PWS 3354877).

The wastewater collection, treatment and reclaimed water distribution system consists of 64 miles of sewer mains, 56 miles of reclaimed water distribution mains, two wastewater treatment facilities, 59 lift stations, and two reclaimed water storage facilities. The two wastewater treatment facilities are the Sampey Road Wastewater Treatment Plant (FLA010513) (Sampey Road WWTP) and the Sunshine Parkway Wastewater Treatment Plant (FLA010656) (Sunshine Parkway WWTP).

1.2 Need and Vision

Need: The City of Groveland has experienced significant growth in the last 15 years, resulting in economic revitalization that has attracted businesses and residents, as well as supported local job growth. This growth, however, has resulted in the City rapidly approaching its wastewater treatment capacity and permitted groundwater withdrawal. Up until 2019, there were very few assessments or planning studies for utilities, prompting the need for a Utility Master Plan. The City recognized the needs for increased utility capacity to support the demands of future growth, natural resource protection, and a comprehensive "one water" approach for drinking water, wastewater, and reclaimed water that also considers stormwater.

The City's Comprehensive Plan identified water utility needs and projected a population of 48,717 in 2040, representing a near 3-fold increase from the 2019 population of 16,423. In early 2020, the draft Central Florida Water Initiative (CFWI) Regional Water Supply Plan 2020 (RWSP 2020) was released and projected a public supply population of 28,085 in 2040. The City's Comprehensive Plan population projection is 73% greater than the RWSP 2020 projections in Groveland which shows a lack of fully understanding the anticipated 20-year water demand in the region. It is critical that a strategic 20-year utility plan be developed and recognized by all utility stake holders.

As the Utility Master Planning effort began, the City's growth projections increased dramatically as 2020 Census data became available and new developments were quantified, and additional growth areas were estimated. The Utility Master Plan population projection for 2045 is over 98,000 and represents a 100% increase from the 2040 population projection in the Comprehensive Plan. To put things into perspective, the planned Villa City development in the northwestern part of the City is estimated to have a larger population (23,978) than the entire City of Groveland in 2021.

Vision: The City's existing water utility needs and the scale and rate of planned development efforts must align with the City's goals for responsible growth and natural resource protection. The vision for Groveland's water utilities is outlined in the following seven (7) strategies.



Growth Management

Expansion of the City's water utilities will be driven and paid for by planned growth. The City's planning and utility staff understand the need to manage planned developments and work with developers to support funding and implementation of water utilities. The timing of developments in some areas of the City will drive or enable other nearby developments via the availability of newly installed utilities and will help ensure that infrastructure projects remain economically feasible through economies of scale.

Water Conservation

Based on Groveland's permitted source water withdrawal, managing the current per capita water consumption is critical to remain within allocated permit limits. The existing demand on the reclaimed water system exceeds the supply and is currently supplemented with Water Management District (WMD) consumptive use permit (CUP) capacity, thus decreasing the available drinking water capacity. The goal is to target irrigation demand reductions on the potable system by supplementing irrigation use with reclaimed water. Provisions must be established and implemented to limit existing and future development irrigation demand as to not exceed reclaimed water supply.

Reclaimed Water to Irrigation

This strategy is directly related to the water conservation strategy. Wastewater flows are treated to standards that are suitable for non-potable reclaimed water use for irrigation. Requiring future developments to install dual lines for drinking water and reclaimed water for irrigation, and limiting irrigation use to match the reclaimed water supply is required.

Alternative Water Supplies

Water demand and anticipated groundwater withdrawal restrictions necessitate the development of alternative water supplies, such as stormwater capture and storage to augment the supply for irrigation use (see Sections 8.1.1.2 and 8.1.1.3). Alternative water supply source and use must be reviewed as part of all major developments and projects within Groveland.

Technology and Planning

Management of Groveland's water utilities has been enhanced in recent years and will continue to be improved as technology and asset management systems are upgraded or implemented. Due to the number of planned projects and significant growth for the next 20-25 years, the City must continuously enhance water utility operations with ongoing asset management, to include new technology, and a holistic coordinated planning program.

Funding

Groveland has been fortunate to receive significant grant and low interest loan funding for planning, design, and construction of projects. The funding strategy for the water utilities includes

a variety of funding sources (utility revenues, impact fees, grants, loans) that must be actively managed. Existing and future funding needs should not be a burden on the existing rate payers; the City's funding strategy identifies that growth shall be paid by future developments.

Regional Planning

Groveland is a regional wastewater provider, that provides additional reclaimed water supply and revenue by charging to treat the wastewater and selling the reclaimed water. Additional regional planning needs exist for drinking water, wastewater disposal, alternative water supplies, emergency operations, environmental stewardship, and advocacy with abutting communities and state agencies to support economic growth. Continued regional planning is required to support implementation of this Master Plan.

1.3 Scope of Study

The scope of this Master Plan is briefly summarized below:

- Evaluate existing utilities and needs.
- Understand current and projected demands and supplies.
- Evaluate existing sources of supply and utilities.
- Quantify future needs to support growth.
- Evaluate operational needs and opportunities to upgrade technology.
- Improve asset management through utility mapping and planning.
- Develop future projects, phasing, and opportunities for efficiencies.
- Develop a financial strategy for growth.

1.4 Summary of Referenced Reports

This Master Plan references numerous reports and documents related to the City's potable water, wastewater, and reclaimed water systems. Below are a list of the referenced reports and a brief description of each report. Reports can be viewed at the following OneDrive link: [Referenced Reports](#).

- Asset Management Plans (2022) – Catalog and perform an evaluation of the drinking water and wastewater system critical assets and plan future capital improvement projects for both horizontal and vertical assets for both systems.
- Drinking Water Facility Plan (2021) – This report addresses source water needs and improvements to the distribution and operations systems to meet the planning requirements of the Drinking Water State Revolving Fund program to obtain funding for new facilities.
- Clean Water Facility Plan (2021) – This report addresses source water needs and improvements to the distribution and operations systems to meet the planning

requirements of the Clean Water State Revolving Fund program to obtain funding for new facilities.

- 2021 Water Audit Letter – This letter details the assessment of water loss and the evaluation of the current water use for the Consumptive Use Permit #2796.
- 10-Year Water Supply Facilities Work Plan (2021) – The purpose of this plan is to identify and plan for water supply sources and associated facilities to serve the City's potable water customers for the 2020 through 2029 planning period and document compliance with the City's Consumptive Use Permit.
- Summary Report – Planning Level Groundwater Modeling Review, City of Groveland Service Area (2021) – Review of the permitted and assumed groundwater withdrawals in the regulatory groundwater model that would benefit the City if allocations could be transferred to the City, as well as recommendations to improve the model.
- Draft Amended and Restated Interlocal Agreement Between the City of Groveland and the City of Mascotte for Provision of Wastewater Services (2021) – The 2013 Interlocal Agreement and the 2016 Amendment were updated to reflect an increase from 250,000 to 275,000 gallons per day for Groveland to receive and treat wastewater from Mascotte, purchase of this treatment capacity by Mascotte, and changes to the rates and fees charged to Mascotte. The agreement is under review by both Cities.
- Innovation and Intelligent Technology Assessment Report (2021) – Review of the general condition and support status of existing Information Technology (IT) equipment and to recommend potential actions to address any issues or concerns discovered during the assessment.
- City of Groveland's Supervisory Control and Data Acquisition (SCADA) Standardization Plan (2021) – Report to establish standards for SCADA equipment installed at the City.
- Central Florida Water Initiative (CFWI) Regional Water Supply Plan (RWSP) (2020) – Report from CFWI to develop water demand estimates and projections for six water use categories and future reclaimed water supply in Central Florida.
- Consumptive Use Permit #2796 (2020) – This permit authorizes groundwater withdrawal from the Upper and Lower Floridan aquifers with restrictions for consumption consistent with the CFWI RWSP.
- Reclaimed Water System Hydraulic Model and Pressure Assistance Memo (2020) – Detailed description of the assessment of the North Reclaimed Water System.
- Watershed Planning Study (2020) – An evaluation of regional stormwater management, and a review of past flooding complaints and the realignment of State Road 50 in the Community Redevelopment Area.
- Waterside Pointe Districtwide Cost Share Funding Application (2020) – Application to modify Groveland surface water withdrawal system for irrigation and connect with

Waterside Pointe's irrigation reclaimed water system for cost saving and potentially increase withdrawal rate.

- City of Groveland Comprehensive Plan (2019) – Plan developed by the City's Planning Division to govern future growth of the City.
- 2013 Interlocal Agreement (2013) and 2016 First Amendment – Agreement and subsequent amendment to the 2013 Interlocal Agreement between the City of Mascotte and the City of Groveland to allow Mascotte to send up to 250,000 gallons per day (gpd) of wastewater to Groveland.

2. POPULATION AND DEVELOPMENT

2.1 Population

The population of Groveland is concentrated in urban areas with 90% of the population in an urban area and 10% residing in areas that are considered rural. Urban areas are defined as locations of population densities greater than 2,500 inhabitants per square mile. All areas outside urban places, regardless of population density, are considered rural. Groveland does not have a large transient population like many other areas within Florida, as most residents live there year-round. According to the U.S. Census American Community Survey (ACS) that is updated yearly, it is estimated that 78.9% of houses are owner-occupied. Current 2020 census data for the service area corresponds to census tracts 311.03, 312.02, 312.03, 312.04, and 312.05, as shown in **Figure 2-1** and summarized in **Table 2-1**.

Table 2-1: Census Data Summary

Population, July 1, 2019	16,423
Land Area in square miles, 2010	14.98
Owner-occupied housing unit rate 2015-2019	78.0%
Households, 2015-2019	4,410
Persons per household, 2015-2019	3.09
Median household income (in 2019 dollars) 2015-2019	\$62,384
Persons in poverty, percent	11.8%

Data from United States Census Bureau

Figure 2-1: Census Tracts

Link to Figure on OneDrive: [2-1 2020 Census Tracts](#)

The population projection for the 2020-2040 planning period in five-year increments, published in the City's Comprehensive Plan (April 2019), was based on population projections from the University of Florida Shimberg Center for Affordable Housing, Bureau of Economic and Business Research (BEBR), and the U.S. Census ACS. Modifications were made to these projections based on the three prior years of growth, approved developments, and the absorption rate by developers, which significantly increased the estimated population in the City. More specifically, when completing the population projection, the City analyzed all un-built but vested development including residential development on vacant parcels of record and residential development where the infrastructure has not been completed (e.g., Wilson Lake Parkway). **Table 2-2** reflects the population projections published in the City's Comprehensive plan.

Table 2-2: Comprehensive Plan Population Projections

Public Supply Population Projections			
2025	2030	2035	2040
31,029	37,214	42,105	48,717

Woodard & Curran preformed multiple reviews of the proposed developments with City staff in 2020 and throughout 2021 (as recently as September 2021) and updated the population projections through 2045. These projections are based on the City's understanding of developments under construction and properties with Developer Agreements, existing entitlements (Planned Unit Development (PUD)), or upland capacity with allowable development densities, as well as the estimated timing of each development. Additionally, growth in the Community Redevelopment Area (CRA) has been incorporated based on the CRA zoning that is anticipated to support growth, redevelopment, and infill.

Table 2-3 reflects the new population projections with 98,673 in 2045, which is more than double the 2040 projection in the City's Comprehensive Plan.

Table 2-3: Updated Population Projections

Public Supply Population Projections					
2020 ¹	2025	2030	2035	2040	2045
21,399	35,126	50,499	70,949	85,512	98,673

¹Based upon utility billing account level data.

Note: The projections use the 2020 U.S. Census data for people per household at 3.09, which would result in a higher population than that estimated in the Comprehensive Plan even if the number of households remained the same. The projections also assume the residential population of the CRA will increase by approximately 2,400 people due to redevelopment and infill.

2.2 Land Use and Planned Development

The planning area for this Master Plan extends beyond the existing service area and City limits in anticipation of the continued growth, as shown on **Figure 2-2**. The planning area is bounded on the west by the City of Mascotte, to the east by the City of Minneola, to the north by E Dewey Robbins Road, and to the south by the Green Swamp. The middle of the planning area consists of a mix of agricultural land, conservation land and low-density populated areas, the northern and southern portions of the planning area are made up of higher density urbanized areas and business parks. Residential and commercial development is expected to continue throughout the planning area and the City's planning department updated the land use designations map in 2020, which dictates the allowed development density. See the future land use map on **Figure 2-3**.

Planned Development

Woodard & Curran worked with the City's Community Development Department to identify future developments planned for construction, the number of remaining entitlements to be developed, and a timeline for development. For planning purposes, the City was divided into 3 areas that represent different existing and planned development characteristics, as well as water utility needs.

- Developments in Southern Groveland: these developments are within or near to the existing downtown and will be served by water utilities in the southern portion of the City. Utility planning in this area of the City includes expansion of existing facilities and utilities, and will be driven by these developments, infill within the Community Redevelopment

Area (CRA), and wastewater flows from Mascotte. Some of these developments are non-residential and do not represent a significant demand for water utilities; however, they were included in the analysis as examples of other types of infill development in the CRA.

- Developments in Central and Northern Groveland, South of Turnpike: these developments represent the largest increase in residential, commercial, and industrial land uses. This area includes expansion within the Christopher Ford Commerce Park, Villa City, and numerous small to mid-size developments. Utility planning in this area includes new facilities, new utilities, and interconnection with existing utilities and facilities. In terms of new growth potential, this area of the City is strategic to centrally locate new facilities.
- Developments North of Turnpike: these developments consist of primarily residential properties within the City's planning area and little to no nearby City utilities. Utility planning in this area includes new utilities and interconnection with existing and new utilities and facilities South of the turnpike.

The capacity and total number within Agriculture, Hamlet, and Village designations were estimated by the Community Development Department based on the upland capacity and zoning density. According to the Community Development Department, once developments go to design, the number of approved development units typically ends up being 20% less than the capacity based on zoning density. Planning for the full capacity was chosen as a reasonably conservative approach if the Agriculture zoning density were to increase through rezoning.

The City has seen conceptual plans for developments such as Little Everglades and a 370-acre portion of Hamlet along Dewey Robbins Road was recently purchased with plans for up to 740 residential units. Growth within this portion of the City has the potential to move quicker than projected if developments can support water utility expansion.

The proposed developments and potential development areas are summarized in **Table 2-4** with an estimated timeline for construction of units over the next 20-25 years. **Figure 2-4** shows the parcels that encompass the locations of these proposed developments and the land use designation of other development areas. A total of 60+ future developments or development areas and approximately residential 24,226 development units are expected over the next 20-25 years.

Development Notes

Most planned developments are residential and represent the primary demand for utility services; however, the large non-residential developments and some smaller non-residential developments were included to illustrate the range of planned development types. The evaluation of planned developments is not a full buildout analysis and does not account for additional, unknown or small developments that may occur during the planning period.

It is important to note that some developments were under construction during the 2020-2021 study period for this Master Plan, which is why the estimate for planned developments begins in 2021. Additionally, the status of several developments may have changed from “Intended” to “Approved”, for example. The list of developments should be reviewed by City staff in collaboration with developers and updated over the next year to inform the population and utility demand projections in this Master Plan.

Figure 2-2: Planning Area

Link to Figure on OneDrive: [2-2 City of Groveland Planning Area](#)

Figure 2-3: Future Land Use Designations

Link to Figure on OneDrive: [2-3 Future Land Use Designations](#)

Figure 2-4: Groveland Planned Developments

Link to Figure on OneDrive: [2-4 Groveland Planned Developments](#)

Table 2-4: Groveland Proposed Developments and Potential Development Areas

Name	Development Stage	Lot Count ¹	Percent Built	Remaining Entitlements	Lots Per Planning Period						Non-Residential (sf)
					2021	2025	2030	2035	2040	2045	
Developments in Southern Groveland											
Bennette Law Center	Approved	-	0%	-		X					8,400
Cypress Lake Reserve	Intended (PUD)	515	0%	515		103	412				
Cypress Oaks Phase 3	Construction	129	20%	103	21	82					
Dollar Tree	Approved	-	0%	-		X					9,997
Groveland Dental	Approved	-	0%	-		X					4,200
Groveland Point Center	Approved	-	0%	-		X					10,500
Indigo Lakes (Cypress Bluff)	Intended (PUD)	450	0%	450	90	360					
Lake Catherine Blueberry Farm	Intended (PUD)	120	0%	120					120		
Preserve at Sunrise Phase 3	Construction	141	0%	141	141						
Preserve at Lake David	Planning	76	0%	76		76					
Seneca Commerce Park	Approved	-	0%	-		X					14,000
Silver Eagle Reserve	Construction	23	0%	23	5	18					
South Lake Regional Park Annexation	Intended (PUD)	-	0%	-		X					6,000,000 ²
Sunrise Ridge	Construction	133	0%	133	133						
Thomas Ferguson Property	Intended (PUD)	180	0%	180	36	144					
Trailer Hub LLC	Intended (PUD)	-	0%	-		X					15,000
Trinity Lakes Phase 1 & 2	Construction	450	0%	450	115	335					
Waterside Pointe Townhomes	Intended (PUD)	95	0%	95	19	76					
Developments in Central and Northern Groveland (South of Turnpike)											
Arborwood	Construction	187	0%	187	37	150					
Blue Springs Reserve	Construction	164	0%	164	33	131					
Homestead Dr and Libby No. 3 Rd	PUD Expired	438	0%	438		150	150	138			
IMG Development	Under Review	3,000	0%	3,000				1,000	1,000	1,000	
Libby Landing Self Storage & Retail	Approved	n/a	0%	n/a		X					70,000
Libby No 3 Rd Parcel	Intended (PUD)	60	0%	60		40	20				
Meixsell Property (US 27)	Intended (PUD)	300	0%	300			30	150	120		
Milestone Hill Apartments	Approved	154	0%	154		154					
Palisades Phase 3	Under Review	130	20%	104	21	83					
Phillip's Landing (Unincorporated)	Approved	154	0%	154	15	62	77				
Trilogy	Construction	1,145	98%	23	23						
Trinity Lakes Phase 3-6	Approved	703	0%	703		242	461				

Name	Development Stage	Lot Count ¹	Percent Built	Remaining Entitlements	Lots Per Planning Period						Non-Residential (sf)
					2021	2025	2030	2035	2040	2045	
Avalon – Car Wash for airport vehicle maintenance	Intended (PUD)	n/a	0%	n/a		X					6,000
Avalon – Gas Station, Fast food and Restaurant	PUD Capacity	n/a	0%	n/a		X					30,400
US 27 Parcels West of Phillips Landing (SFR)	PUD Capacity	420	0%	420		120	150	150			
Wilson Estates	Construction	87	50%	44	9	35					
Cape at Cherry Lake Village	Intended (PUD)	57	0%	57	9	48					
Developments in Central and Northern Groveland (South of Turnpike) (Cont.)											
Wilson Island at Cherry Lake Village	Intended (PUD)	181	0%	181	30	151					
Springs at Cherry Lake Village	Intended (PUD)	105	0%	105	30	75					
Vista at Cherry Lake Village	Intended (PUD)	75	0%	75	10	50	15				
Amazon (Republic Dr)	Constructed	n/a	100%	n/a		X					202,000
American Way Cross-Dock Facility	Construction	n/a	100%	n/a		X					425,000
Captive Aire	Approved	n/a	0%	n/a		X					39,680
Groveland Commerce Center	Industrial	n/a	0%	n/a		X					60,000
JCJ Partnership	Intended (PUD)	n/a	0%	n/a		X					25,000
Meixsell Properties (Independence Blvd)	Commercial	n/a	0%	n/a		X					50,000
Meixsell Properties (American Way)	Industrial	n/a	0%	n/a		X					150,000
Matthew & Lourdes Life Estate	Intended (PUD)	396	0%	396			198	198			
O'Brian Development	Intended (PUD)	n/a	0%	n/a		X					1,000,000
Project Infinity (Kroger)	Approved	n/a	100%	n/a		X					325,000
Raney Lewis Grove	Approved	n/a	0%	n/a		X					113,000
US Hwy Twenty-Seven Rezoning	Rezoning	n/a	0%	n/a		X					667,100
Village Park	Intended (PUD)	165	0%	165		17	83	65			
Bellevue @ Estates of Cherry Lake	Construction	131	0%	131	26	105					
Commercial Area @ Estates of Cherry Lake	Intended (PUD)	302	0%	302			100	202			
Waterside @ Estates of Cherry Lake	Construction	208	80%	42	25	17					
Parkside @ Estates of Cherry Lake	Under Review	70	0%	70	10	50	10				
Unnamed @ Estates of Cherry Lake	Intended (PUD)	377	0%	377		100	277				
Villa City Phase 1	Approved	1,940	0%	1,940		500	1,000	440			
Villa City Phase 2-4	Approved	5,820	0%	5,820				1,940	1,940	1,940	
Proposed Developments North of Turnpike											
Agriculture	PUD Capacity	131	0%	131				65	66		
Daryl Carter West	Intended (PUD)	1,078	0%	1,078			150	300	300	328	
Daryl Carter East	Intended (PUD)	718	0%	718			150	200	200	168	

Name	Development Stage	Lot Count ¹	Percent Built	Remaining Entitlements	Lots Per Planning Period						Non-Residential (sf)
					2021	2025	2030	2035	2040	2045	
Daryl Carter South	Intended (PUD)	449	0%	449			225	224			
Hamlet	PUD Capacity	1,079	0%	1,079			500	579			
Village	PUD Capacity	3,073	0%	3,073			750	750	750	823	
	Total	25,609	--	24,226	838	3,320	4,758	6,401	4,496	4,259	3,225,277

¹Lot count is not available for commercial and industrial developments, but the timing of development is noted by an "X".

²Park land has negligible water demand and wastewater production; therefore, this development was not included in the total for non-residential sf total.

3. OVERVIEW OF EXISTING WATER SYSTEMS

The water system in the City is comprised of a potable water system, clean water system, and reclaimed water system. **Figure 3-1** depicts a flow chart of these three water systems to illustrate the infrastructure and how they interact to provide utility services. Each system is described in more detail below.

Figure 3-1: System Flow Chart

Link to Figure on OneDrive: [3-1 System Flow Chart](#)

3.1 Potable Water System

The City treats groundwater from the Upper Floridan aquifer utilizing either chlorine gas or sodium hypochlorite for disinfection before distribution to the customers. The treatment and distribution systems consist of five water treatment plants (WTP), four distribution pressure zones, and one booster pump station. The City's distribution system is classified as three different public water systems: Groveland Water Department (PWS 3350476), Sunshine Parkway Systems (PWS 3350691), and Palisades Country Club (PWS 3354877), **Figure 3-2**.

Figure 3-2: Water Distribution System

Link to Figure on OneDrive: [3-2 Water Distribution System](#)

3.1.1 Water Supply and Treatment

3.1.1.1 Groveland Water Department Public Water System (PWS 3350476)

The Groveland Water Department consists of three treatment plants and two pressure zones: WTP 1, WTP 2, and WTP 5, serving the southern portion of the City's service area.

WTP 1

WTP 1 is the booster plant for the southwestern pressure zone supplementing WTP 2 during periods of high demand and is typically used every day. WTP 1 receives water from one well with a capacity of approximately 550 GPM and is treated with chlorine gas. There is a 75,000-gallon elevated storage tank associated with WTP 1, production is dependent on the system pressure, turning on when system pressure drops to 35 pounds per square inch (psi) and off once it reaches 37 psi.

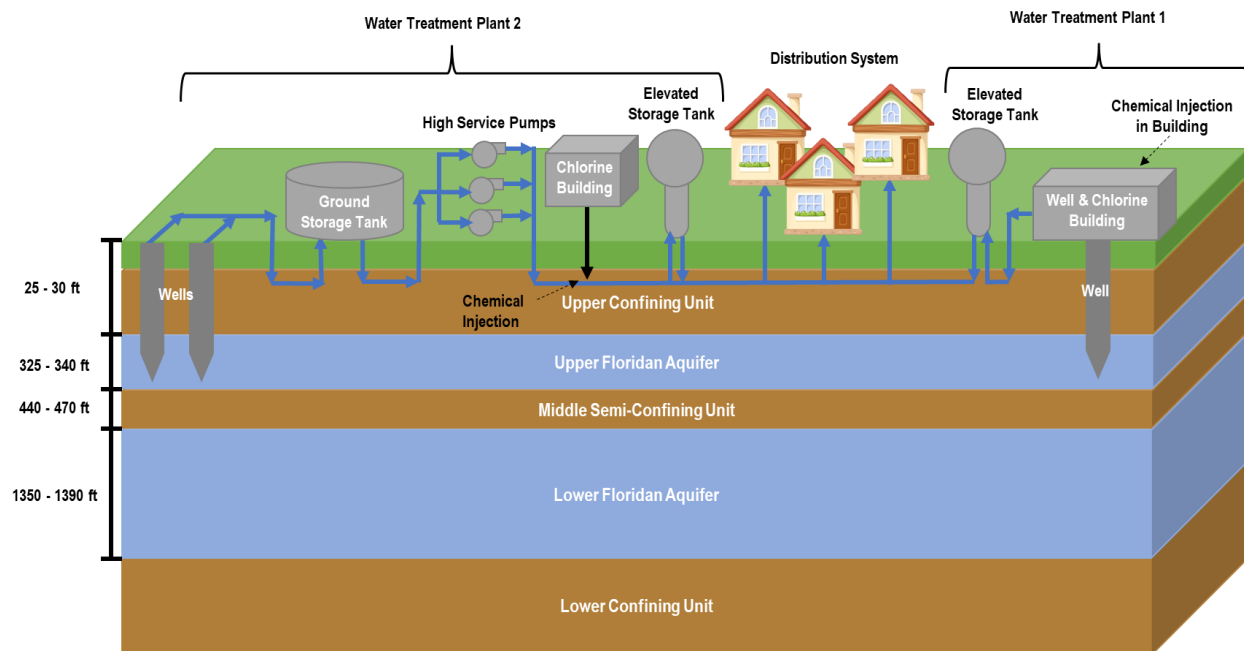
WTP 2

WTP 2 was constructed in the 1960s – 1970s and is the primary plant for the southwestern pressure zone. WTP 2 receives water from two active wells, each of which produce approximately 1,000 gallons per minute (GPM). There is one inactive well on the property. The only treatment at WTP 2 is disinfection via chlorination with chlorine gas. Production from WTP 2 is based on the water

surface elevation of the associated 200,000-gallon ground storage tank with three high service pumps providing system pressure. There is also a 100,000-gallon elevated storage tank associated with WTP 2 that provides additional system pressure.

A process flow diagram for the WTP 1 and 2 pressure zone is depicted in **Figure 3-3**.

Figure 3-3: Process Flow Diagram – WTP 1 and 2 Pressure Zone

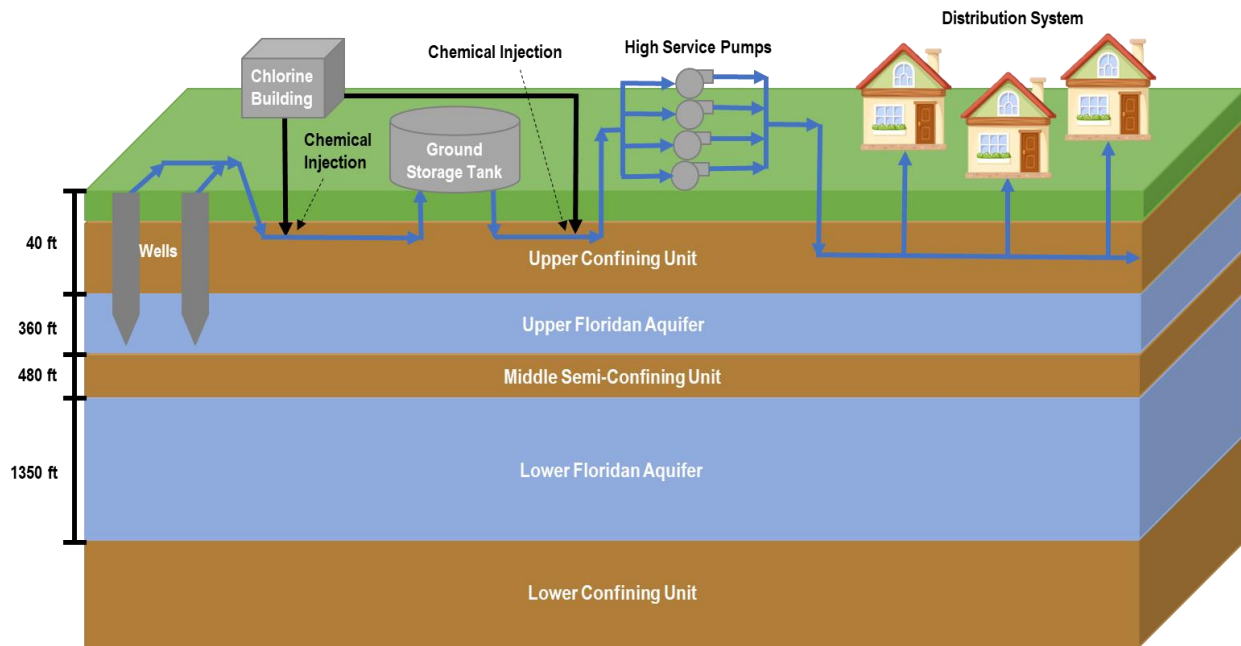


The thickness of each confining and aquifer layer are illustrated for the well locations above and in each of the subsequent process flow diagrams in Section 3.1.1. The water stored in the aquifer is replenished, or recharged, by rainfall. On average, Florida receives 51 inches of rain each year and about 38 inches evaporates or runs off the land into surface waters, like lakes, rivers and streams, before it has a chance to soak into the ground. This leaves, on average, 13 inches (25.5%) annually to recharge the aquifer in limited areas.

WTP 5

WTP 5 serves the southeastern portion of the City. WTP 5 was constructed in 2006 and obtains water from two wells, each with a capacity of approximately 1,000 GPM. Production from WTP 5 is based on system pressure maintaining an output pressure of 70 psi via four high service pumps. Treatment at WTP 5 is disinfection via chlorination with sodium hypochlorite. There is a 750,000-gallon concrete ground storage tank for this pressure zone. A process flow diagram for the WTP 5 pressure zone is depicted in **Figure 3-4**.

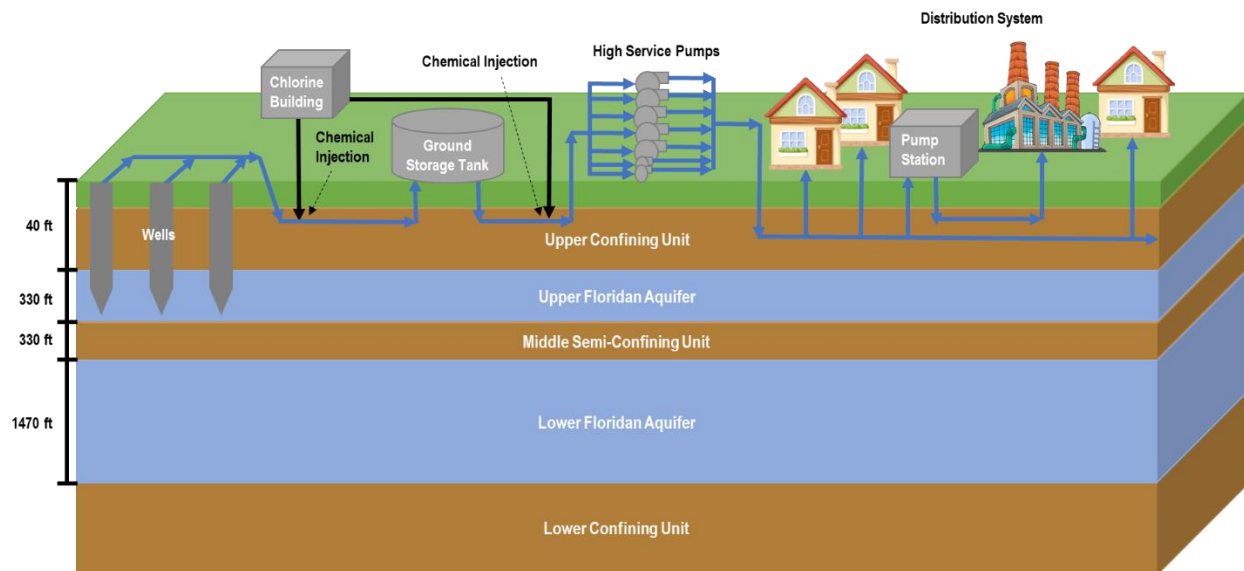
Figure 3-4: Process Flow Diagram – WTP 5 Pressure Zone



3.1.1.2 Sunshine Parkway Public Water System (PWS 3350691)

The Sunshine Parkway Public Water System supplies the northern portion of the service area from WTP 3, which was constructed in the 1970s and upgraded within the last five years. WTP 3 consists of three wells each with a production capacity of approximately 1,000 GPM and the water is disinfected via a chlorine gas system. There are five high service pumps and two jockey pumps used to maintain a system pressure of 90-95 psi. Additionally, there is a 1.5 million-gallon (MG) concrete ground storage tank and a booster pump station. The booster pump station is used to provide system pressure to the industrial park west of the treatment plant but is currently out of service for upgrades. A process flow diagram for the WTP 3 pressure zone is depicted in **Figure 3-5**.

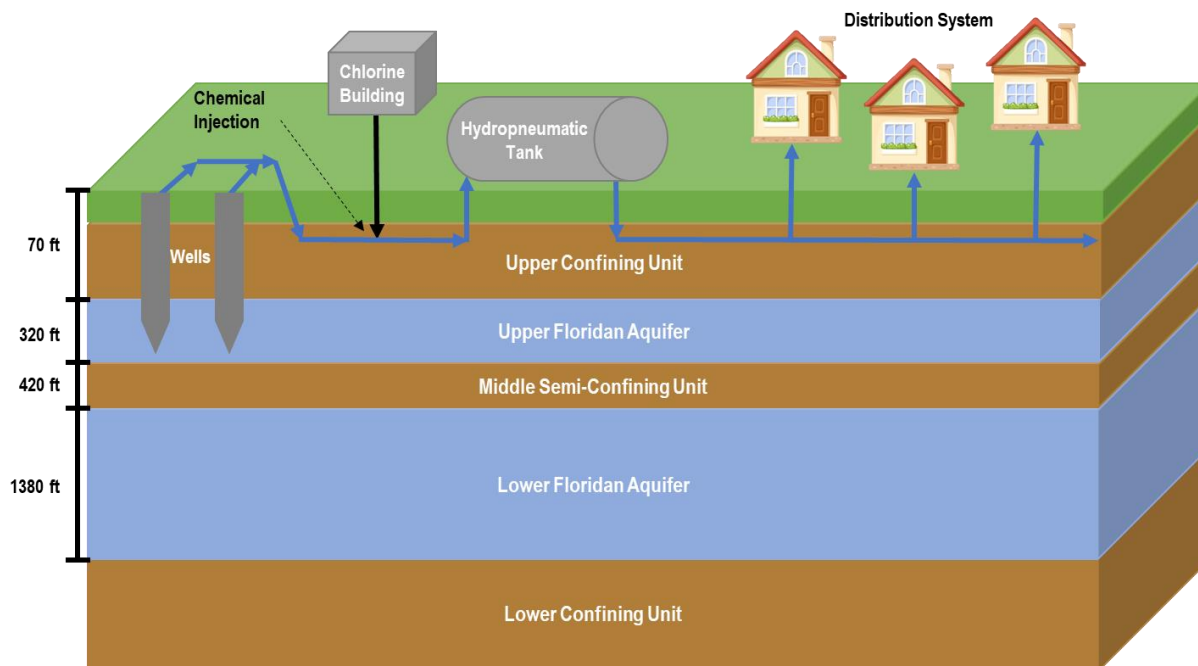
Figure 3-5: Process Flow Diagram – WTP 3 Pressure Zone



3.1.1.3 Palisades Country Club Public Water System (PWS 3354877)

WTP 4 services the eastern portion of the City's service area and is part of the Palisades Country Club Public Water System. There are two production wells each with a capacity of 800 GPM. The treatment at WTP 4 consists of disinfection with sodium hypochlorite. WTP 4 has been offline since October of 2018 as a result of an inspection of the hydropneumatic tank indicating metal loss. In 2021 the City replaced the tank and began rehabilitating the wells but identified issues with the pumps and decided to put further improvements on hold pending the outcome of this Master Plan. The Palisades Country Club system is currently being fed by the Sunshine Parkway Public Water System. A process flow diagram for the WTP 4 pressure zone is depicted in **Figure 3-6**.

Figure 3-6: Process Flow Diagram – WTP 4 Pressure Zone



3.1.2 Distribution System

The four pressure zones are interconnected by bi-directional automatic CLA-valves that will open if pressure is lost in any portion of the system. A current project is underway to connect the Palisades system to the Groveland Water Department pressure zone through the Crystal Cove development. Once this connection is complete the three Public Water Systems in Groveland will be completely looped. **Figure 3-7** is a map of the distribution system displaying the pressure zones and treatment plants. The length of distribution system pipe by material and diameter are summarized in **Table 3-1** and **Table 3-2**, respectively.

Figure 3-7: Water System Pressure Zones

Link to Figure on OneDrive: [3-7 Water Distribution Pressure Zones](#)

Table 3-1: Distribution System Composition by Piping Material

Material	Length of Pipe (ft)	Length of Pipe (mi)	Percent of System
Cast Iron	16,800	3.18	2%
Ductile Iron	6,100	1.16	1%
PVC	563,700	106.76	77%
Asbestos Cement	4,700	0.89	1%
Unknown ¹	142,200	26.93	19%
Total	733,500	138.92	100%

1. Unknown pipe was determined based on GIS mapping data that did not have supporting engineering plans.

Table 3-2: Distribution System Composition by Pipe Diameter

Diameter (in)	Length of Pipe (ft)	Length of Pipe (mi)	Percent of system
4	12,600	2.39	2%
6	168,800	31.97	23%
8	327,400	62.01	45%
10	68,100	12.90	9%
12	99,800	18.90	14%
14	1,900	0.36	0%
16	53,100	10.06	7%
18	600	0.11	0%
Unknown	1,200	0.23	0%
Total	733,500	138.92	100%

3.2 Wastewater System

The collection and treatment system consists of 64 miles of sewer mains, two wastewater treatment facilities, and 59 lift stations, as shown on **Figure 3-8**. The two treatment facilities are the Sampey Road WWTP (FLA010513) and Sunshine Parkway WWTP (FLA010656).

Figure 3-8: Wastewater Collection System

Link to Figure on OneDrive: [3-8 Wastewater Collection System](#)

3.2.1 Collection System

3.2.1.1 Gravity Sewer Collection System

The average age of the pipes is 15 years, with the Downtown area having some of the City's oldest sewers dating back to the 1990s. The gravity sewer collection system includes a variety of piping materials, such as polyvinyl chloride (PVC), ductile iron (DI), high density polyethylene (HDPE), and plastic/steel composite. **Table 3-3** includes a summary of the total length of pipe in the collection system by material. The significant amount of "unknown" material in the system (18%) is suspected to consist of primarily PVC due to the age of the system but would have to be verified through survey/observation. **Table 3-4** shows the collection system gravity sewer composition by pipe diameter.

Table 3-3: Collection System Composition by Piping Material

Material	Length of Pipe (ft)	Length of Pipe (mi)	Percent of System
Ductile Iron	430	0.1	<1%
Polyvinyl Chloride	274,600	52	82%
High Density Polyethylene	80	0.02	<1%
Plastic/Steel Composite	90	0.03	<1%
Unknown	60,600	11.5	18%
Total	335,800	63.6	100%

Table 3-4: Collection System Composition by Pipe Diameter

Diameter (in)	Length of Pipe (ft)	Length of Pipe (mi)	Percent of System
3	100	0.02	<1%
4	1,000	0.2	<1%
6	2,500	0.5	<1%
8	304,300	57.6	91%
10	8,000	1.5	2%
Unknown	19,900	3.8	6%
Total	335,800	63.6	100%

3.2.1.2 Low-Pressure and Force Main Collection System

The low-pressure sewer (LPS) and force main collection systems consist of 5 miles and 38 miles, respectively, as shown in **Figure 3-8**. The force main pipes date back to the 1990s, with majority of the lines installed in the 2000s, largely consisting of PVC, ductile iron, and HDPE. Limited records exist for the low-pressure sewer collection system. Of the available records, the pipes were installed in the 2000s.

3.2.1.3 Lift Stations

The City of Groveland owns and operates fifty-nine pump stations to convey wastewater to the treatment facilities, shown in **Figure 3-8**. **Table 3-5** lists the pump stations, their corresponding addresses, and whether they have an onsite generator. Each pump station has two submersible pumps (duplex) except for Lift Station #37 Waterside Pointe, which is an air vacuum system. Station Type is defined as follows:

- Lift Station (LS) – pump station to gravity connection
- Pump Station (PS) – pump station to combined pressure main
- Master Station (MPS) – pump station that relays wastewater from multiple stations.

Table 3-5: Lift Stations

Lift Station No.	Name	Address	Station Type
1	Sampey	7067 Sampey Road	PS
2	Curtis	200 Curtis Avenue	LS
3	Crane's Landing	1048 Sandhill Street	PS
4	Beverly	337 Beverly Drive	PS
5	Gadson	494 Gadson Street	PS
6	Anderson	699 Gadson Street	LS
7	Magnolia	571 E Magnolia Street	MPS
8	Lake David	498 S Lake Avenue	LS
9	Mt. Pleasant	306 Mt. Pleasant Road	LS
10	Ledbetter	177 Ledbetter Avenue	LS
11	Kent	391 Kent Street	LS
12	Quail Oaks	134 Quail Oaks Circle	PS
13	Arnold	700 Arnold Avenue	MPS
14	Phelps	279 N Main Avenue	PS
15	S. Independence	19910 Independence	PS
16	N. Independence	20220 Independence	PS
17	Sunshine Parkway	8700 Justice Place	PS
18	Hwy 19	20446 SR 19	MPS
19	Osprey Cove	1234 Osprey Nest Circle	PS
20	Bluegrass	1042 Bluegrass Drive	PS
21	Timber Run	446 Timber Village Road	PS
22	Eagle Pine	1027 Tawny Eagle Drive	PS
23	Westwood	548 Lake Sumner Drive	PS
24	Cherry Ridge	194 Dakota Avenue	PS
25	Trilogy #1	955 Wilson Lake Parkway	PS
26	Trilogy #2	201 Salt Marsh Lane	PS
27	Trilogy #3	301 Silver Maple Road	PS
28	Southridge	9301 Cherry Lake Road	PS
29	Marina Del Ray	484 Nuestra Place	PS
30	Sunrise Ridge	4039 Sunrise Ridge Avenue	PS
31	Eagle Pointe	530 Kestrel Drive	PS
32	Timber Villas	149 Cataloway	LS
33	Cherry Lake Oaks	10301 Cherry Lake Road	LS
34	Ardmore	1345 Ardmore Road	PS
35	Blue Spring Reserve	126 Long & Winding Road	PS
36	Lago Katrina	121 Isabella Way	PS
37	Waterside Pointe	9201 Hwy 50	PS
38	Publix	14600 CR 565A	PS
39	Republic Drive	7004 Republic Drive	PS
40	Catherine Lane	365 Catharine Lane	PS
41	Wendell Avenue	1240 Ester Lane	PS

Lift Station No.	Name	Address	Station Type
42	Vineyard	901 Wilson Lake Parkway	PS
43	Green Valley	15101 Silver Eagle Road	PS
44	Green Gate	15030 Max Hooks Road	PS
45	Messy Dog 2	20180 US Hwy 27	PS
46	Lake Douglas Preserve	1317 Waterwillow Drive	PS
47	Trilogy #4	221 Silver Maple Road	PS
48	Trilogy #5	698 Alcove Drive	PS
49	Sunrise	359 Irving Bend Drive	PS
50	Cypress Oaks	9540 Oglethorpe Drive	LS
51	Cherry Lake Landing	16356 Blooming Cherry Drive	PS
52	Stewart Lake Preserve	6348 Domenico Court	LS
53	Katrina Shores	5959 Church Hill Square Way	PS
54	Wilson Lake Park	131B Wilson Lake Parkway	PS
55	Wilson Lake Estates	1693 Wilson Prairie	PS
56	Kroger	7925 American Way	PS
57	Arbor Wood	18243 S. Libby Road	PS
58	Preserve at Sunrise	104 Juno Drive	PS
59	Trinity Lakes	6992 Perch Hammock Loop	PS

3.2.2 Wastewater Treatment

3.2.2.1 Sampey Road Wastewater Treatment Plant (FLA010513)

The Sampey Road WWTP treats the wastewater discharged from the sanitary collection system from the southern and central areas of the City. The WWTP is permitted and identified as a Type 1, Category III, Class C facility with the Florida Department of Environmental Protection. The facility was first constructed in 1995 as a 0.25 million gallons per day (MGD) extended aeration treatment plant. Since that time, several improvements and expansions to the plant have been made during the 2007 plant upgrade. The treated wastewater is pumped to the offsite public access reuse distribution system. If the treated effluent does not meet permit requirements for reuse, the treated flow is directed to either the 1.5 MG on-site reject water storage tank or land application through a sprayfield.

The WWTP is permitted for 0.99 MGD annual average daily flow (ADF) and was designed for a flow of 1.0 MGD and a peak hourly flow of 3.0 MGD. The WWTP includes preliminary treatment consisting of a mechanical screen, biological treatment utilizing a modification of the oxidation ditch configuration of the activated sludge process called the Carrousel Modified Ludzack Ettinger (MLE) Process, settling in two secondary clarifiers, tertiary filtration using two cloth media disk filters, and disinfection through two chlorine contact tanks. Sludge processing at the facility consists of two aerobic digesters and a sludge dewatering box. An aerial view of the facility is shown in **Figure 3-9**.

Figure 3-9: Sampey WWTP Aerial View



- | | |
|------------------------------|--------------------------|
| 1- Headworks | 6- Reject Storage Tank |
| 2- Oxidation Ditches | 7- Digesters |
| 3- Secondary Clarifiers | 8- Sludge Dewatering Box |
| 4- Disk Filters | 9- In-Plant Pump Station |
| 5- Chlorine Contact Chambers | 10- Operations Building |

3.2.2.2 Sunshine Parkway Wastewater Treatment Plant (FLA010656)

The Sunshine Parkway WWTP treats the wastewater discharged from the sanitary collection system from the northern and central areas of the City. The WWTP is permitted and identified as a Type 1, Category III, Class C facility with the Florida Department of Environmental Protection. The treated wastewater is pumped to the offsite public access reuse distribution system. Typically, the treated effluent goes to a 3.0 MG ground storage tank for public reuse. If the treated effluent does not meet permit requirements for reuse, the flow is directed to a Rapid Infiltration Basin System (RIBs).

The WWTP is permitted for 1.0 MGD annual ADF and was designed for an average flow of 1.0 MGD and a peak hourly flow of 4.0 MGD. The WWTP includes preliminary treatment consisting of a mechanical screen, biological treatment utilizing two oxidation ditches, settling in two secondary clarifiers, tertiary filtration using two cloth media disk filters, and disinfection through two chlorine contact tanks. Sludge processing at the facility consists of one aerobic digester. An aerial view of the facility is shown in **Figure 3-10**.

Figure 3-10: Sunshine WWTP Aerial View



- | | |
|------------------------------|------------------------------------|
| 1- Headworks | 6- Reclaimed Water Storage Tank |
| 2- Oxidation Ditches | 7- Digester |
| 3- Secondary Clarifiers | 8- Reclaimed Water Pump Station |
| 4- Disk Filters | 9- Laboratory Building |
| 5- Chlorine Contact Chambers | 10- Sunshine Water Treatment Plant |

3.3 Reclaimed Water System

The City's reclaimed water system includes approximately 56 miles of reclaimed water pipe and three storage tanks, depicted in **Figure 3-11**. The reclaimed water distribution system consists of two systems, North and South. The North reclaimed water system is primarily fed by the Sunshine WWTP via the reuse storage tank and is supplemented with raw water from Well 3 at WTP 3. There is also a bi-directional pipe connecting the reuse tank to the Sampey Road WWTP to move reclaimed water supply between the two facilities, but this pipe is rarely used.

The South reclaimed water system is primarily fed from the Sampey Road WWTP via the two Silver Eagle storage tanks and is supplemented with potable water from WTP 5. **Table 3-6** includes a summary of the total length of pipe in the reclaimed water system by material and **Table 3-7** is a summary of pipe length by diameter.

Figure 3-11: Reclaimed Water Distribution System

Link to Figure on OneDrive: [3-11 Reclaimed Water Distribution System](#)

Table 3-6: Reclaimed Water System Composition by Piping Material

Material	Length of Pipe (ft)	Length of Pipe (mi)	Percent of System
Ductile Iron	677	0.13	0.2%
PVC	280,744	53.17	94.5%
Polyethylene	169	0.03	0.1%
Unknown	15,520	2.94	5.2%
Total	297,110	56.27	100%

Table 3-7: Reclaimed Water System Composition by Pipe Diameter

Diameter (in)	Length of Pipe (ft)	Length of Pipe (mi)	Percent of system
4	9,622	1.82	3.2%
6	81,996	15.53	27.6%
8	95,803	18.14	32.2%
10	3,112	0.59	1.1%
12	60,272	11.42	20.3%
14	169	0.03	0.1%
16	33,039	6.26	11.1%
Unknown	13,097	2.48	4.4%
Total	297,110	56.27	100%

3.4 GIS Mapping Updates

The City has approximately 300 engineering record drawings of residential developments and infrastructure projects stored at the Sampey Road WWTP. The drawings were extensively reviewed by Woodard & Curran staff to build and update a Geographic Information System (GIS) model of the potable water distribution, reclaimed water, and sewer collection systems within the City of Groveland's jurisdiction. These features include pipes, valves, hydrants, booster pump stations, lift stations, and associated attributes such as installation year, material, diameter, and invert elevation. Most of the City's assets were not previously mapped, so each pipe alignment or asset location was created manually. In total, the GIS database now contains approximately 734,000 linear feet (139 miles) of potable water distribution system pipes, 335,000 linear feet (63 miles) of gravity sewer mains, 201,000 linear feet (38 miles) of pressurized sewer mains, 25,000 linear feet (5 miles) of vacuum sewer mains, and 297,000 linear feet (56 miles) of reclaimed water system pipes.

All water and wastewater utilities can be viewed via a GIS web format, which is serving City employees as well as staff operators to identify the location of assets and associated information. This information is also integrated into the City's Utility Cloud asset management platform, which is primarily used by staff operators (see Section 9.1.3 for additional information).

4. DRINKING WATER SUPPLY SOURCES AND COMSUMPTIVE USE PERMIT

4.1 Water Demand

Existing Demand

The average gross gallons per capita per day (gpcd) from 2019 was determined to be 156 gpcd in the water audit performed by SMW Geosciences Inc. (Section 4.3 and [Appendix A - 2021 Water Audit](#)). However, due to the potential for unoccupied units included in the billing data when the initial population was determined there is a concern that a higher population was used than actually exists, meaning the calculated gpcd may be low. The Central Florida Water Initiative (CFWI) published an annual conservation demand goal of 100 gpcd for public supply use in the CFWI Supplemental Applicants Handbook, Rule 62-41.302, [Appendix B - Central Florida Water Initiative Supplemental Applicant's Handbook](#). This gross target water usage includes potable use, irrigation in neighborhoods not connected to the reclaimed water system, and water used to supplement the reclaimed water system.

Goals and Assumptions

To meet the CFWI goals and support growth in Groveland, it was assumed that the outdoor water use for all future development will be supplied by the reclaimed water system. Any additional reclaimed water system demand will need to be supplemented by an alternative water supply(ies) (AWS), as opposed to the potable water aquifer sources. The future water demands are based on a constant 2.22 MGD of existing usage and an average domestic usage of 70 gpcd for all new development. Water usage for commercial and industrial development was estimated at 0.05 gallons per day per square foot (gpd/sf) for warehouse space and 0.15 gpd/sf for office space. On average the new commercial development is estimated to be approximately 90% of building area warehouse and 10% office.

All recommendations made in this master plan are based off these projections and if future use cannot meet this conservation goal, additional sources of potable water, beyond what is planned for in this document, will be required.

Future Demand

The estimated future public supply demands are summarized in **Table 4-1** and illustrated on **Figure 4-1**. The annual max daily flow (AMDF) was projected utilizing a peaking factor (ratio of maximum day usage in the year to the annual ADF) of 1.61. The peaking factor was determined by conducting a review of SCADA data for the City's water treatment plants. Based on a review of treatment plant production from 2015 to 2019, it was determined that the City's maximum day, often occurring in June, had a maximum day peaking factor of 1.61.

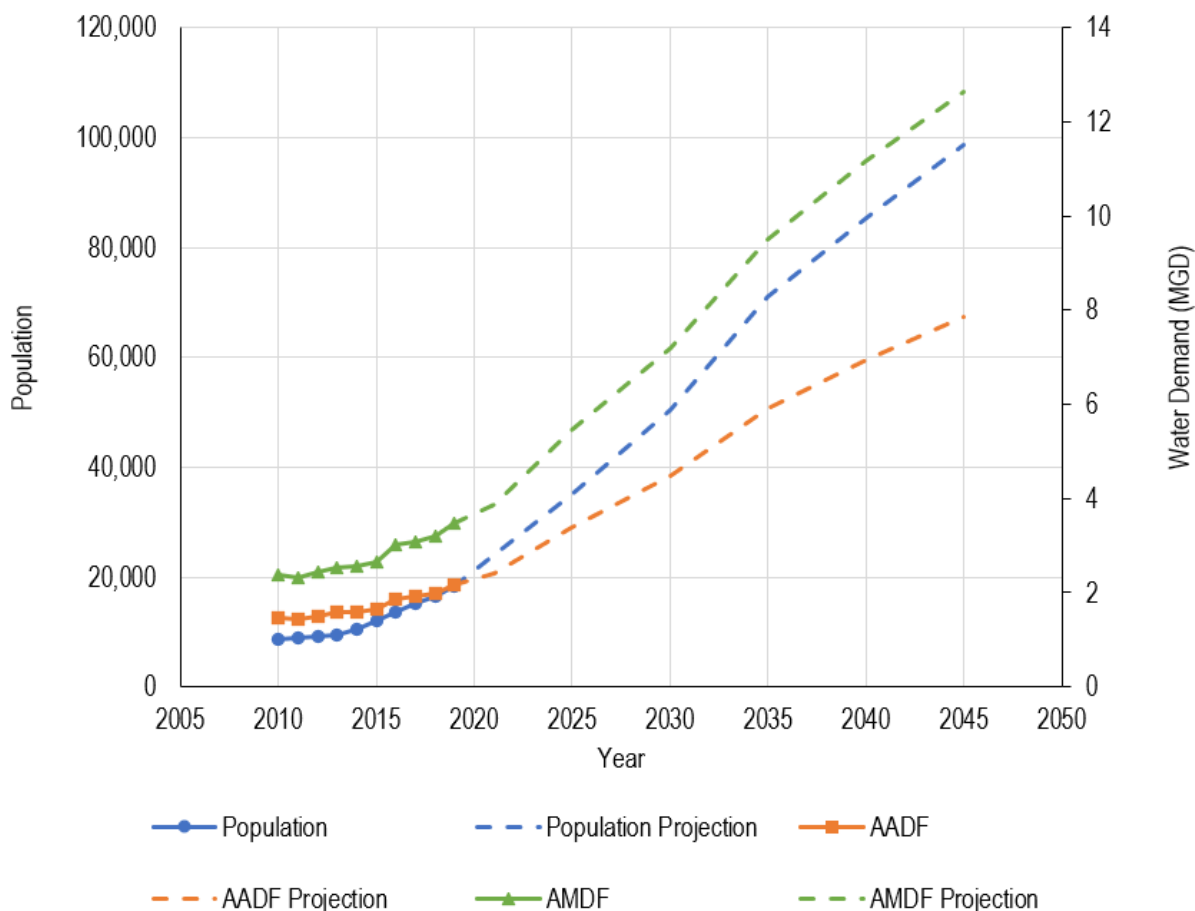
Table 4-1: City Public Water Supply Demand Projections

	2021	2025	2030	2035	2040	2045
Prior Annual Average Daily Flow (AADF)	2.22	2.40	3.38	4.47	5.91	6.94
Community Redevelopment Area Demand	0.00	0.03	0.06	0.06	0.06	0.00
New Development Domestic Demand	0.18	0.75	1.03	1.38	0.97	0.92
New Development Commercial Demand	0.00	0.19	0.00	0.00	0.00	0.00
Annual Average Daily Flow (AADF)¹	2.40	3.38	4.47	5.91	6.94	7.86
Annual Max Daily Flow (AMDF)¹	3.87	5.44	7.19	9.51	11.17	12.65

Demand projections presented in MGD

¹Total projected flows are cumulative from one period to the next.

Figure 4-1: Water Demand Forecast



4.2 Consumptive Use Permit

The St. Johns River Water Management District (SJRWMD) has issued Consumptive Use Permit (CUP) Number 2796 ([Appendix C - Consumptive Use Permit 2796-6](#)), regulating the amount of

water withdrawal from the aquifer permissible for potable water purposes. The maximum daily and annual withdrawals permitted under the latest CUP, which was authorized on February 28, 2020, and expires in 2038, are summarized in **Table 4-2**.

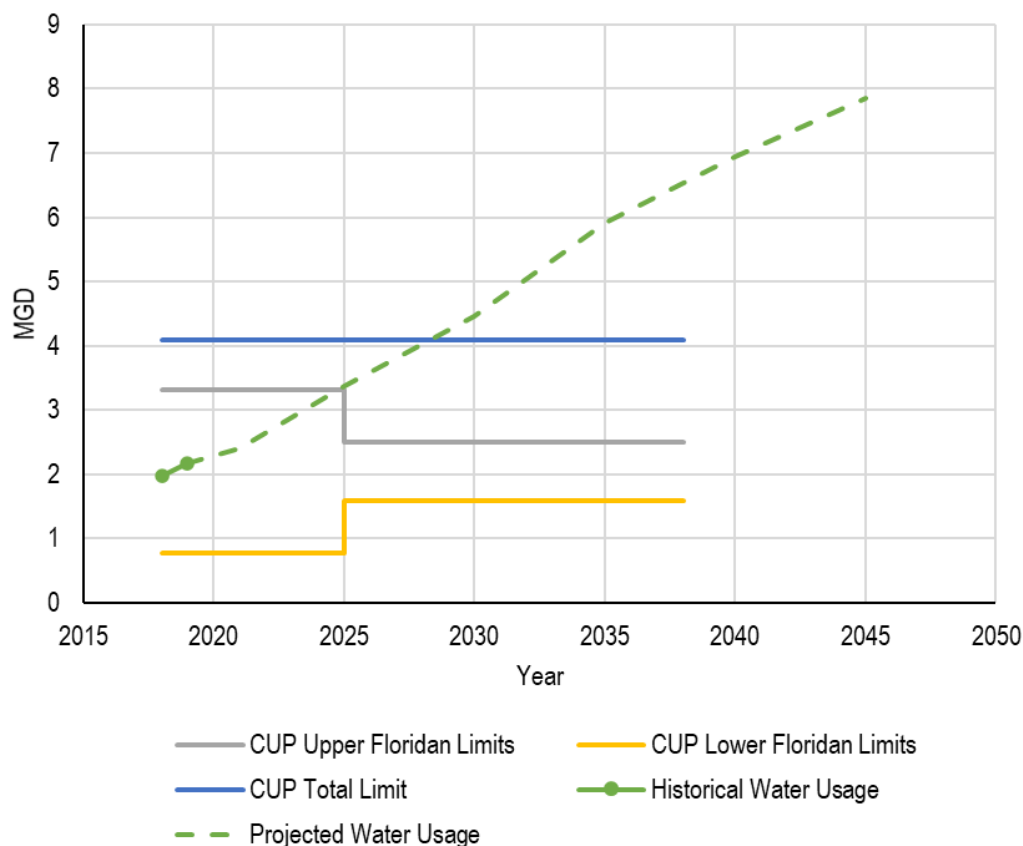
Table 4-2: CUP 2796-6 Allocation

Aquifer	Maximum Annual Withdrawal from 2020 through February 27, 2025	Maximum Annual Withdrawal from March 1, 2025 through February 14, 2038
Upper Floridan Aquifer	1211.8 million gallons (3.32 MGD average)	912.5 million gallons (2.5 MGD average)
Lower Floridan Aquifer	284.7 million gallons (0.78 MGD average)	584 million gallons (1.6 MGD average)

The SJRWMD authorized the total use of 1,496.5 million gallons per year (MGY) (3.32 MGD from the UFA and 0.78 MGD from the Lower Floridan Aquifer (LFA) to supply water for household, commercial / industrial, water utility, and urban landscape. The allocations will change to 2.5 MGD annual average of groundwater from the Upper Floridan aquifer and 1.6 MGD, annual average of groundwater from the Lower Floridan Aquifer in 2025. Currently, all wells utilized by the City are in the Upper Floridan Aquifer, but two new wells were permitted for construction in the Lower Floridan Aquifer in the update.

The CUP presents a compliance challenge, as it was based on the CFWI projected populations and water demand versus the City's most recent projections and will need to be updated as described in this Master Plan. As the CUP stands now, the projected water demands described in the previous section, the permitted withdrawal will be exceeded around 2028, as shown in **Figure 4-2**, below.

Figure 4-2: Permitted Water Use vs. Projected Water Use



4.3 Ground Water Model Review

The SJRWMD has indicated that there may be groundwater allocations in the groundwater model that are abandoned, expired, or not in use. The City may be able to get credit for increased groundwater withdrawals and to support a future CUP modification by acquiring these allocations. SMW conducted a review of the groundwater model that provides a detailed summary of the status of existing CUPs and groundwater withdrawals within the City of Groveland planning area ([Appendix D - Groveland Groundwater Review Report](#)).

Figure 4-3: City Limits, Future Development Areas, CUP & Domestic Self Supply Wells

Link to Figure on OneDrive: [4-3 Groundwater Model - City Limits, Future Development Areas, CUP & Domestic Self Supply Wells](#)

The report identified the following initial findings:

1. Several CUPs have been closed, but their withdrawals remain in the current well file. This accounts for 0.735 MGD.

2. The City's allocation and the sources permitted are not accurately represented in the ECFSS model. There is currently a deficit of 0.912 MGD between the City's CUP and the groundwater model.
3. Preliminary review of groundwater withdrawals within planned developments accounts for 2.378 MGD that could be recovered within the City's Service Area if these developments are served in the future by the City's water supply.
4. Upon review of the actual Technical Staff Reports (TSR) and permit conditions for the CUPs, it was noted that the CUP allocations for CUPs # 135476 and 137978 were 0.164 MGD and 0.0024 MGD, respectively. If these withdrawals were corrected in the model an additional 0.1796 MGD would be recovered within the City's Service Area.
5. It appears that some areas with domestic self-supply (DSS) wells may already be developed or may be planned for future development, and those withdrawals (accounting for 1.818 MGD total) could be removed from the model to provide a benefit to future groundwater modeling and impact analyses of withdrawals within the City Service Area.
6. The "FSAID" and "cen_Lake" identified wells are believed to mostly be "Phantom" wells that are existing in the model and do not actually exist in the City's Service Area. It is understood that at some time during model development that Land Use may have been reviewed and future withdrawal may have been put in the model for the Agricultural Community. If all these upper Floridan well withdrawals were to be removed (1.058 MGD), this would result in a significant benefit to the assessed impacts of the City's withdrawals.

The potential withdrawals in the model that could be considered for removal in the future are summarized in **Table 4-3**.

Table 4-3: Potential Withdrawals for Consideration for Future Removal from the Groundwater Model

Withdrawal Category	Identified as	Total MGD in GW Model	Comments
CUPs	Closed – but still active in the model	0.735	Includes CUPs #s 11146, 2462, 2654, 2585, 50135, and 50721.
CUPs	Active – within City limits, potential to be closed with future development	2.378	Includes CUPs #s 134734, 135476, 137978, 2471, 2567, 2594, 2759, 4501, 50307, 50736, 6271, and 65432.
CUPs	Active – outside of City limits, potential to be closed with future development	0.023	Includes CUP # 119989
Domestic Self Supply	DSS	1.818	Field verification of these potable and irrigation supply wells is recommended.
Agriculture - phantom	Cen_Lake	0.662	Overlapping assumed withdrawals? Field verification is recommended.
Agriculture – phantom	FSAID	0.396	

4.4 Water Audit

SMW Geosciences Inc. completed a detailed water audit on the City of Groveland's public supply system for 2019 and is included as [Appendix A - 2021 Water Audit](#). The water audit assesses the water lost and evaluated the gpcd as required for the CUP. The unaccounted-for-water (UAW) was determined to be 13% system wide (potable and reclaimed water system combined), exceeding the SJRWMD's allowable 10% threshold. The UAW above 10% requires the City to initiate further investigations including leak and meter surveys. As described in Section 4.1 the water audit calculated the gross per capita use to be 156 gpcd. Both aspects of this water audit were affected by inaccurate data that resulted in many inconsistencies which may have affected both the UAW and gpcd. Recommendations in the water audit to improve water use accountability include the following:

- Perform water audits annually until the UAW is below the 10% threshold;
- Review data collection and handling procedures with each department who processes water use data;
- Perform inspections of all large meters to identify and repair any malfunctioning meters;
- Geospatially locate meters for further spatial analysis, and;
- Develop improved billing data query options to allow for customized reporting.

4.5 10-Year Water Facilities Work Plan

The 10-year water facilities work plan was prepared by SMW Geosciences, Inc. in accordance with Chapter 163 F.S. and identifies and plans for water supply sources and associated facilities to serve the City's potable water customers for the 2020 through 2029 planning period. This Facilities Work Plan describes capability of the City to meet the water demands depicted in the 2020 CFWI Regional Water Supply Plan (RWSP) and the projects needed to meet the CUP and demand requirements. The 10-year Water Facilities Work Plan is included as [Appendix E - 10-Year Water System Facilities Work Plan](#).

This Master Plan projects a significantly greater population growth and water demand than was predicted in the CFWI RWSP, as described in Section 4.1, therefore disputing the conclusion that the City has sufficient groundwater allocation and treatment capacity, with the construction of two new Lower Floridan Aquifer wells, to meet future potable water needs.

4.6 Regional Planning

The City is actively participating with the CFWI, SJRWMD, and neighboring communities in South Lake County with the goal of resolving current and future water resource demands. The City participated in the CFWI's RWSP planning process by submitting a letter during the open comment period and attending all subsequent workshops and webinars related to the 2020 RWSP. Additionally, the City has entered into an inter-local agreement (included as [Appendix F -](#)

[Interlocal Agreement for Regional Water Supply Planning and Strategies](#)) with the City of Clermont, City of Minneola, and Utilities Inc. of Florida with the purpose of creating the South Lake Regional Technical Advisory Committee (SLRTAC). This interlocal agreement is in the process of being updated to include the City of Mascotte.

The SLRTAC is a fact-finding committee to explore and identify cost effective and sustainable water resource systems and management for South Lake County. The committee was established with representative members from each party and will aim to decrease the region's dependency on groundwater withdrawals and protect the Floridan aquifers. The SLRTAC meets quarterly to discuss opportunities with SJRWMD, CFWI, and Florida Department of Environmental Protection (FDEP), as well as regional opportunities and potential projects including:

- South Lake County Lower Floridan aquifer water facilities;
- Shifting existing Upper Floridan aquifer wells to Lower Floridan aquifer wells;
- A shared regional monitoring plan;
- Alternative water supply elements; and
- Development of coordinated and consistent water conservation goals, plans, and elements.

The recommendations in the next section are intended to support this regional planning effort.

4.7 Source of Supply Recommendations

4.7.1 Groundwater Model Update and CUP Renewal

Based on the findings from the Groundwater Model Review the following recommendations were developed.

Recommendations

1. Review and Update Findings based on Planned Development Updates: these findings should be reviewed by the City to assess and confirm the locations of existing withdrawal points, the proposed schedule and location areas of future development, and further determine the accuracy of mapped groundwater withdrawals. This should be reviewed once planned development areas are updated.
2. Ground Truth Existing Wells: more ground truthing is recommended to evaluate the presence or absence of the existing wells versus "phantom" wells that may exist in the model and should be removed
3. Scope and Update the Groundwater Model and the City's CUP: the City should engage with the SJRWMD to discuss the findings of the groundwater model review and scope the effort and approach to update the model and renew the City's CUP. Once the scope is defined, the City should update the groundwater model to more accurately represent

current conditions and incorporate the City's future groundwater withdrawals, as well as changes to existing withdrawals that may change due to planned growth. Also, an updated water audit in early 2022 is recommended to provide more accurate accounting of the City's water consumption and support the CUP renewal.

Cost

Woodard & Curran estimates the cost to ground truth existing wells, update the SJRWMD model, update and renew the CUP, and conduct annual water audits for the next five years is approximately \$375,000.

4.7.2 Increase and Enforce Conservation Measures

Water conservation initiatives are methods, procedures, and devices designed to promote efficient use of water and reduce wasted water. The City has implemented several conservation methods through irrigation rules dictating the frequency and timing of allowable irrigation via a City ordinance, as well as conservation tips and instructions on how to check for leaks published on the City's website (presented in [Appendix G - Irrigation Rules and Conservation Tips](#)). However, even with these conservation methods the City's existing per capita usage is higher than allowed by the SJRWMD.

Recommendations

Woodard & Curran recommends that the City implement additional water conservation measures and increase enforcement. Additional water conservation measures the City can adopt include:

- Residential Retrofit Program (RRP): This program would include educational information and water conservation devices such as toilet dams, low flow showerheads, and faucet adapters in residential retrofit kits. These retrofit kits could be made available to residents upon request and suggested to customers with high water bills, which may indicate older plumbing fixtures. The estimated cost of each retrofit kit is \$15.
- Increased Public Education: Information on water conservation is already available on the City's website, but an increased public education program will expand the reach of this vital information. Tactics for public education include:
 - Educational programs in elementary and middle schools.
 - Distribution of flyers or pamphlets to increase awareness of water conservation tips with the water bill.
 - Development of displays on water conservation habits including the resultant savings and benefits in visible areas around the City.
 - High water usage alerts to individual customers with higher-than-normal water usage via proposed water meter AMI system, Section 5.2.2.3.

- Design Standards for New Developments: Water conservation focused design standards should be required for all new developments including:
 - Water efficient plumbing fixtures: ultra-low-flow toilets, low-flow and censored sinks, low flow showerheads, and water efficient dishwashers and washing machines;
 - Irrigation and landscaping measures: water efficient irrigation systems, irrigation control systems, low-flow sprinkler heads, low water lawns or water efficient landscaping;
 - Separate irrigation meters;
 - Water recycling or reuse measures;
 - Methods to reduce water use in heating, ventilation, and air conditioning (HVAC) systems; and
 - Stormwater retention ponds or eco-parks used as storage to supplement the reclaimed water system.
- Increase irrigation water rates and install irrigation meters on those residences with a single water meter.

These water conservation methods are intended to assist the City in reaching the target 100 gpcd. If the City is unable to reduce water usage to 100 gpcd, additional potable water sources will need to be developed and permitted.

Cost

Woodard & Curran has assumed that these recommendations can be implemented by City staff.

4.7.3 Lower Floridan Wells and Treatment Facility

As previously depicted in **Figure 4-2**, the City's water demand is expected to grow significantly, and it is unlikely that the SJRWMD will permit additional withdrawal from the Upper Floridan aquifer. This is pending the outcome of next steps for groundwater modeling and CUP renewal, as discussed in Section 4.6.1; however, at this time it is assumed that all additional capacity for the City is planned to be sourced from the Lower Floridan aquifer. Woodard & Curran recommends the City construct new wells and a treatment facility to supply all demand exceeding the 2.5 MGD permitted Upper Floridan aquifer withdrawal that will go into effect in 2025. The Lower Floridan aquifer projected demands are depicted in **Table 4-4**.

Table 4-4: Lower Floridan Aquifer Water Demands (MGD)

	2025	2030	2035	2040	2045
AADF	0.88	1.97	3.41	4.44	5.36
AMDF	1.42	3.17	5.49	7.14	8.63

The new wells and treatment facility are proposed to be constructed in the intended Villa City development in the northwest portion of the planning area on land to be provided to the City by the developer, as identified in **Figure 4-4**.

Figure 4-4: Proposed New Wells and Treatment Facility

Link to Figure on OneDrive: [4-4 Proposed New Wells and Treatment Facility](#)

Treatment

Other Lower Floridan aquifer wells nearby to the proposed wells, including a private well located within City limits, have shown excellent water quality. As a result, Woodard & Curran understands that the Lower Floridan aquifer source water in this area is of good quality and the only treatment required will be disinfection, the same as the existing treatment facilities. See [Appendix H - Lower Floridan Aquifer Water Quality - Well Construction Report, Niagara Bottling, LLC](#) for the abridged Lower Floridan aquifer well construction report at Niagara Bottling, LLC, which is located near the proposed City Lower Floridan wells and contains relevant water quality information for the Lower Floridan aquifer.

There are some areas of known groundwater contamination near the proposed wells, as shown in **Figure 4-5**, published by the Division of Water Resource Management (DWRM). All groundwater contamination plumes in Groveland are ethylene dibromide which was commonly used as a fumigant, insecticide, and nematicide for growing grains and fruit. As these areas of contamination are most likely a result of previous agricultural activities it is assumed they do not reach the Lower Floridan aquifer. A water quality analysis must be performed as part of final design to confirm there is no contamination and to identify additional treatment steps that may be needed if the observed water quality requires it to provide safe, high quality potable water to the City.

Figure 4-5: Areas of Known Groundwater Contamination

Link to Figure on OneDrive: [4-5 Areas of Known Groundwater Contamination](#)

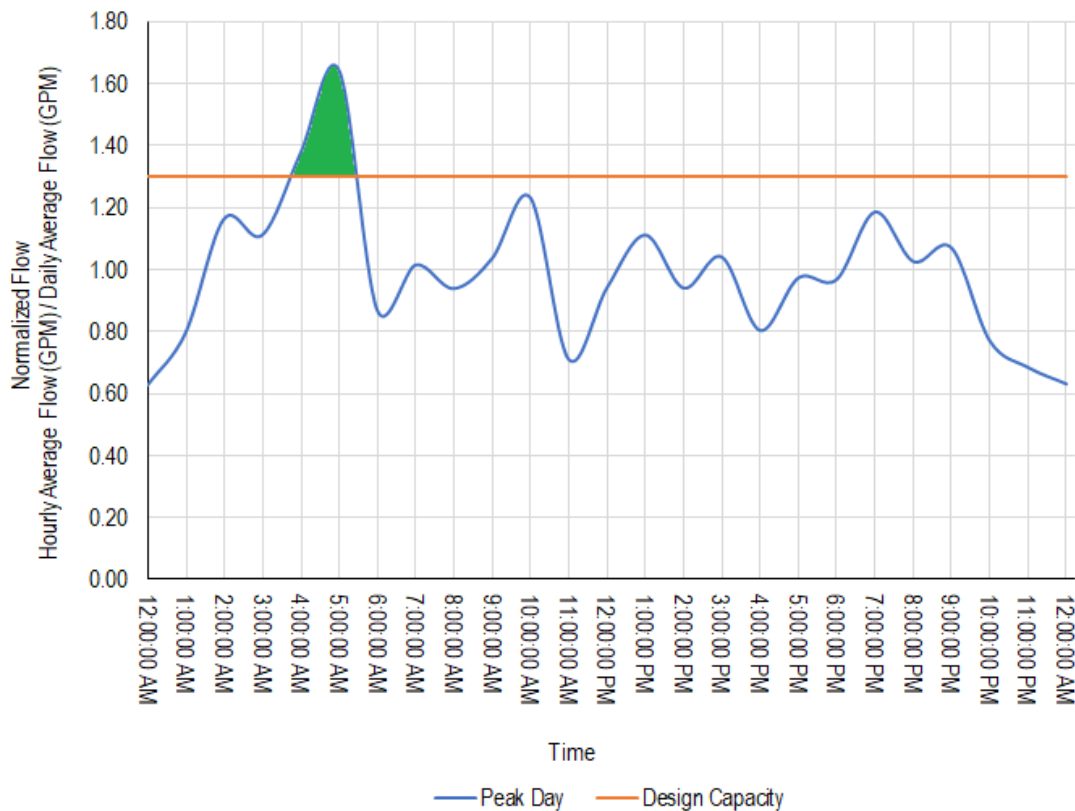
Sodium hypochlorite was chosen as the disinfectant for the new treatment facility, and the construction of a concrete masonry unit (CMU) building that will hold all chemical feed equipment and controls is proposed as part of this project. The sodium hypochlorite solution already in use at WTP 5 has a solution strength of 10.5%, and the City typically maintains a residual of 1.5-2 milligrams per liter (mg/L) throughout the system. When the Lower Floridan well is constructed a water quality test must be conducted to determine the required dose to maintain chlorine residual throughout the service area. The disinfection system will consist of two bulk tanks, hydraulically connected so the second can be brought on-line as demand increases, a day tank, transfer pump, and a triplex chemical metering pump skid. Peristaltic metering pumps have been assumed as they dose consistently, are easy to maintain, and can pump gas as well as liquid which will allow for dosing to continue in the event that sodium hypochlorite off-gases. Peristaltic metering pumps are most effective pumping against a relatively low head pressure, which is expected at this

location since the well pumps will be filling ground-level storage. This should be confirmed during final design.

Storage and Distribution

A new ground-level storage tank and high service pumping station is also proposed on the same plot of land as the new wells and treatment facility as depicted in **Figure 4-4**. The proposed storage tank has been sized to accommodate the capacity required for the full planning period, as it is cost prohibitive to expand the storage capacity compared to constructing a single adequately sized tank. The proposed concrete ground storage tank will have a usable capacity of approximately 3 MG. This capacity is based on required storage to meet peak hour and fire protection requirements while maintaining a constant pumping rate from the aquifer. The diurnal curve of the WTP 5 pressure zone in August 2019 was utilized to estimate a normalized peaking factor to be used in calculating storage required above the maximum day design capacity of the treatment facility, 0.41 shown below in green (**Figure 4-6**). Due to lack of data a diurnal curve analysis was not conducted on the WTP 3 pressure zone, where the storage tank will be located. During final design, data should be collected, and a diurnal curve analysis should be performed on the WTP 3 pressure zone to confirm the peaking factor and required tank size – a change would only be necessary if usage patterns in this zone are different than those in the WTP 5 zone.

Figure 4-6: WTP5 Diurnal Curve



Required fire protection storage was determined via the American Water Works Association (AWWA) Manual 31: Distribution Requirements for Fire Protection Insurance Services Office (ISO) Method based on the needed fire flow for a 3,000 square foot house with frame construction and combustible materials. The needed fire flow for this representative structure is approximately 2,500 GPM with a duration of two hours. In this case, the same needed fire flow is required for industrial areas, so this tank sizing is expected to provide adequate fire storage regardless of location.

The high service pump station will also be located on the plot of land housing the wells, treatment facility, and storage tank. The pump station will be sized to meet peak hour demand for the new treatment facility.

To connect the new treatment facility and storage tank to the existing water distribution system a 24-inch ductile iron transmission main spanning approximately 2 miles down Highway 27 connecting to the existing distribution system was proposed in the Drinking Water Facilities Plan ([Appendix I - Drinking Water Facilities Plan](#)). Originally this option was selected to allow the Lower Floridan aquifer source water to be utilized by the entire existing service area for the City. However, while evaluating all future proposed developments with the hydraulic model it was determined that the City would be better served with two 16" transmission mains leading from the new WTP. As part of the New Wells and Treatment Plant project Woodard & Curran recommends

constructing one of these transmission mains, the second transmission main would be constructed as part of the Zone 3 Expansion project as development progresses. The location of the proposed transmission mains are included in the Zone 3 expansion, **Figure 4-7**.

Figure 4-7: Pressure Zone 3 Expansion

Link to Figure on OneDrive: [4-7 Pressure Zone 3 Expansion](#)

Phased Approach

A multi-phase approach is proposed for the construction of the treatment plant and source water expansion to avoid overdesign by installing equipment that will age without being used, and offset costs of expansion with the use of developer contributions as growth continues. The following is the proposed phased approach for the new water treatment facility:

- Phase I constructed by 2025:
 - Construct two 1,500 GPM wells in the Lower Floridan aquifer;
 - Construct chemical feed treatment facility with a single chemical bulk tank and provisions to install a second;
 - Construct 3 MG Storage Tank;
 - Construct 8 MGD Pump Station consisting of three high service pumps and two jockey pumps; and
 - Construct a 16" Transmission Main.
- Phase II sized to meet projected 2045 demand:
 - Construct two additional 1,500 GPM wells in the Lower Floridan aquifer;
 - Install a second chemical bulk tank in chem feed facility; and
 - Expand Pump Station to 12.5 MGD by installing two additional high service pumps.

The well pump capacities presented in Phase I are based on the capacities determined in the current CUP application. During final design the potential for larger capacity well pumps that can better match changes in demand throughout the day while still averaging the 1,500 GPM capacity, should be considered to minimize storage requirements and delay Phase II construction.

Cost

The anticipated cost of Phase I is \$19,307,000 and the estimated cost of Phase II is \$4,390,000.

4.7.4 Pressure Zone 3 Expansion

The new Lower Floridan wells and WTP are planned to be located on the new Villa City development property which is not currently connected to the existing system.

Recommendation

Woodard & Curran recommends that the City expand pressure zone 3 to connect the new area served by the new WTP. The scope of this expansion is depicted in **Figure 4-7**.

Cost

The cost and phasing of installing these new water mains are included with other distribution system recommendations in Section 5.2.2.2.

4.7.5 Pressure Zone 1 & 2 Capacity Reduction

Growth and increased capacity within pressure Zone 1 & 2 cannot be supplemented by the new Lower Floridan wells and WTP. The pressure in this zone is governed by two elevated storage tanks (264' at WTP 1 and 263' at WTP 2) so the pressure cannot be raised to match that of pressure Zone 3 without significant capital investment.

Recommendations

To accommodate the additional capacity required in this zone as the Community Redevelopment Area undergoes future redevelopment, Woodard & Curran recommends altering the boundary of the pressure zone using existing valves. This will eliminate the need for costly infrastructure and pipe size upgrades. The pressure zone boundary alterations should occur in two phases along with growth in the City that are shown on **Figure 4-7**, **Figure 4-8**, **Figure 4-9**, and **Figure 4-10**.

Phase 1 to accommodate projected 2025 demand:

- Zone Expansion 1 – Expand Pressure Zone 3 by rezoning part of Zone 1 & 2 along Villa City Road south to Newtown Road.
- Zone Expansion 2 – Expand Pressure Zone 3 by rezoning part of Zone 1 & 2 to the intersection of State Route 19 and Cherry Lake Road.

Phase 2 to accommodate projected 2045 demand:

- Zone Expansion 3 – Expand Pressure Zone 1 & 2 by rezoning part of Zone 3 to intersection of Hunt Island Road and Cherry Lake Road.
 - This reverts part of Zone Expansion 2 to avoid an extensive pipe upsizing project that would otherwise be required.
- Zone Expansion 4 – Expand Pressure Zone 5 by rezoning part of Zone 1 & 2 to the intersection of State Route 50 and Timber Village Road.

Figure 4-8: Zone Expansion 1

Link to Figure on OneDrive: [4-8 Zone Expansion 1](#)

Figure 4-9: Zone Expansion 2

Link to Figure on OneDrive: [4-9 Zone Expansion 2](#)

Figure 4-10: Zone Expansion 3

Link to Figure on OneDrive: [4-10 Zone Expansion 3](#)

Figure 4-11: Zone Expansion 4

Link to Figure on OneDrive: [4-11 Zone Expansion 4](#)

5. POTABLE WATER SYSTEM

5.1 Treatment Facilities Assessment

The WTPs, in their current state can adequately treat the current demand for potable water and utilizes chlorine gas disinfection systems at WTP 1, 2, and 3. Chlorine gas, a respiratory irritant, poses many safety hazards to the operators and surrounding communities. Additionally, WTP 4 has been offline since 2018 due to structural integrity issues with the hydropneumatic tank. In 2021 the City replaced the tank and began rehabilitating the wells but identified issues with the pumps and decided to put further improvements on hold pending the outcome of this Master Plan.

5.1.1 Treatment Recommendations

5.1.1.1 WTP 4 Decommissioning

WTP 4 was taken offline in 2018 following an inspection of the hydropneumatic tank by Kimley-Horn that identified it as degraded and not fit for pressure use. Since being taken offline, the wells at WTP 4 have fallen into disrepair and would require significant rehabilitation before bringing the plant back online. There has also been a history of water quality issues from these wells as they have high levels of hydrogen sulfide. Additionally, since these wells draw water from the Upper Floridan Aquifer (UFA) and the City already has functional wells that exceed the 2025 permitted capacity from the UFA (see Section 4.2), restoration of these wells would only temporarily increase the water available to the system.

Recommendation

Due to the poor water quality, significant rehabilitation that would be required, and limited time that water can be withdrawn from the UFA, Woodard & Curran recommends that WTP 4 be decommissioned. WTP 3 has been able to feed the WTP 4 pressure zone since it went offline in 2018, and the hydraulic model predicts that will be able to continue to feed this zone throughout the planning period.

Cost

The estimated cost to pull the pumps, cap the wells, and remove other equipment at WTP 4 is approximately \$50,000.

5.1.1.2 PFAS/PFOA Sampling Program

Per- and polyfluoroalkyl substances (PFAS) and perfluorooctanoic acid (PFOA) are emerging contaminants of concern as they are highly persistent, resistant to degradation, and accumulating in the body. The potential sources of PFAS/PFOA include metal plating, food packaging, chemical products, fire-fighting foams, biosolids, and treated fabric and carpet. Due to the prevalence of these industries across the country the Department of Defense (DoD) has predicted that

PFAS/PFOA will be found in water systems in every state in the country. The rising public awareness of the health dangers of PFAS/PFOA have put them on the fast track for regulation and treatment requirements. The U.S. Environmental Protection Agency (USEPA) has issued a health advisory of 70 parts per trillion (ppt) for the sum of PFAS and PFOA and many states, not including Florida, have already issued regulations in advance of federal regulations anticipated in 5-10 years.

Recommendation

Woodard & Curran recommends the City of Groveland implement a testing program to identify if PFAS/PFOA are present in the source water. If PFAS/PFOA is detected at unacceptable levels, the City may need to implement a large-scale capital project to add additional treatment at each contaminated site. Typical PFAS/PFOA treatment methods include granular activated carbon filtration, ion exchange, or reverse osmosis. For lower levels of PFAS/PFOA at isolated sources, blending source water to keep finished water below regulatory levels may also be an option.

Cost

The estimated cost of this sampling program is \$8,000, with initial sampling occurring quarterly for a year followed by confirmatory sampling if PFAS/PFOA is detected.

5.1.1.3 Conversion of Chlorine Gas to Sodium Hypochlorite – WTP 3 Upgrades

The City utilizes chlorine gas disinfection systems at WTP 1, 2, and 3. Chlorine gas, a respiratory irritant, poses many safety hazards to the operators and surrounding communities. Additionally, a chlorine gas leak has the potential to cause irreparable damage to the electrical equipment onsite, which the City experienced at WTP 5 in 2018. The City upgraded WTP 5 to sodium hypochlorite after this gas leak, and WTP 4 was originally designed as a sodium hypochlorite plant.

Recommendation

Due to constantly changing safety regulations, the hazards associated with chlorine gas, and the economy of scale benefits from utilizing the same disinfection system at each site, Woodard & Curran recommends the City convert the chlorine gas systems at WTPs 1, 2, and 3 to sodium hypochlorite disinfection systems. Concurrent with the chlorine gas conversion projects, Woodard & Curran recommends the City install a second chlorine injection point at WTP 2 before the storage tank to provide greater operator flexibility and to prevent bacteria growth in the tank.

Cost

The anticipated cost to convert WTP 3 to a sodium hypochlorite system is \$120,000. The costs to convert WTP 1 and WTP 2 to a sodium hypochlorite disinfection system are included as part of the WTP 1 and WTP 2 upgrades discussed in Section 5.1.1.4 and Section 5.1.1.5, respectively.

5.1.1.4 WTP 1 Upgrades

The raw water well at WTP 1 is located inside the operations building. The building is small and does not have enough space to allow for proper maintenance or replacement of the well equipment if necessary.

Recommendation

Woodard & Curran recommends that WTP 1 be upgraded by demolishing the building around the well to provide adequate space for maintenance and constructing a separate chemical building to house the new sodium hypochlorite disinfection system adjacent to, but not over, the well.

Cost

The anticipated cost of these upgrades is \$977,000.

5.1.1.5 WTP 2 Upgrades

WTP 2 was built in the 1990s and all equipment is due for an upgrade. Since WTP 2 is interconnected to WTP 1, Woodard & Curran recommends the Sodium Hypochlorite conversion (Section 5.1.1.3) occur at the same time. The three high service pumps should also be replaced during this project due to age as a preventative maintenance measure. The anticipated cost of these upgrades is \$477,000.

5.2 Distribution, Transmission, and Storage System Assessment

The distribution system is in good condition. The City reports a small number of leaks and water main breaks throughout the system each year, with no notable trends. Most of the distribution system is relatively new, having been installed in the last 10-15 years. However, the City regularly receives discolored water complaints, most likely due to tuberculation on older, unlined cast iron water mains. City records also indicate that there is asbestos cement (A/C) pipe in the older part of the City. While the A/C pipes have historically not had many breaks, they are aging, and as the pipes near the end of their useful life a higher rate of repairs is anticipated. Due to the hazardous materials involved, repairs on A/C pipe pose more risk to workers and are more costly than repairs of other materials.

Additionally, many of the water meters in the City are over 10 years old and have exceeded their useful life. Due to wear of the mechanical components typical in meters of this age, they are likely losing the ability to correctly measure and record flow. This wear can result in the loss of revenue and increased UAW.

5.2.1 Hydraulic Model

A hydraulic model of the City's potable water system was developed as part of the Utility Master Plan. Prior to this effort, the City did not have a hydraulic model for the potable water system.

5.2.1.1 Hydraulic Model Development

The hydraulic model was developed using the InfoWater™ modeling software by Innovyze. InfoWater is an industry-standard, GIS-based modeling program. The model was constructed using GIS data developed as part of the Utility Master Plan effort, based on available City maps, record drawings and other plans and references.

Model demands for the existing system were developed based on water billing data geolocated to customer parcels and then allocated to the model. Model demands for future scenarios were developed based on provided development information and the water demand factors discussed in Section 4.1. A detailed description of the model development is provided in the Potable Water Hydraulic Model Development Technical Memo, included in [Appendix J - Potable Water Hydraulic Model Development Technical Model](#).

5.2.1.2 Performance and Design Criteria

The performance and design criteria discussed below reflect typical industry standards for water system design under the demand conditions of average day, maximum day, and maximum day plus fire flow. These criteria were used to evaluate the City's potable water distribution system.

Fire Flow Requirements

Needed fire flows (NFF) are assumed to be concurrent with a maximum day demand scenario and must meet a minimum residual pressure of 20 psi measured at the fire demand node (or hydrant) for evaluation of both current and future system operation. These fire flow requirements are listed in **Table 5-1** for both residential and commercial/industrial land use.

Table 5-1: Minimum Fire Flows

Land Use	Fire Flow (gpm) ¹	Duration
Residential	1,000	2 hours
Commercial/Industrial	2,500	2 hours

Notes:

1. Fire flow requirement was based on industry standard.

Potable Water Distribution System

Adequate system pressure is a basic indicator of acceptable water distribution system performance. The recommended performance standards for the City's potable water system pressures are summarized in **Table 5-2**.

Table 5-2: Potable Water System Pressure Criteria

Condition	System Pressure Range (psi) ¹
Average Day	up to 120
Maximum Day	45 – 100
Maximum Day plus Fire Flow	20 – 100

Notes:

1. Allowable pressure range at any point within the distribution system.
2. A pressure near zero psi should only be observed at storage tank sites.

The transmission pipelines in the City's water system generally range between 12 and 16-inches in diameter with distribution pipelines ranging between 4- and 10-inch in diameter. Recommendations presented in Section 5.2.2 were based on these standards, and future pipelines should continue to be designed based on the velocity and head loss criteria presented in **Table 5-3** and sized in order to meet the pressure criteria presented in **Table 5-2**.

Table 5-3: Water Pipeline Sizing Criteria

Condition	Maximum Velocity (fps)	Maximum Head loss (ft/1,000ft of pipeline)
Average Day	10	5
Maximum Day	10	3 (for pipes 16-inch and larger) 10 (for pipes smaller than 16-inch)
Maximum Day plus Fire Flow	10	10

5.2.1.3 Existing System Capacities and Deficiencies

Once the hydraulic model was developed and validated, it was used to perform an in-depth review of existing distribution system performance based on the criteria presented in the previous section. The following scenarios were evaluated to assess the distribution system performance under existing potable water demand conditions:

- 2020 Existing Average Day Demand (ADD) Scenario: In this scenario, existing network infrastructure was evaluated during ADD conditions to find any areas with pressure deficiencies.
- 2020 Existing Max Day Demand (MDD) Scenario: In this scenario, node pressures, pipe velocities, and pipe head losses were evaluated during MDD conditions to local pressure deficiencies or any pipes with high flow velocities.
- 2020 Existing Max Day Demand with Fire Flow (MDD+FF) Scenario: In this scenario, hydrant pressures, pipe velocities, and pipe head losses were evaluated during a MDD condition with the addition of fire flow demand. Fire flow demands were analyzed at each individual hydrant to locate flow deficiencies.

A summary of the City's existing system capacity deficiencies is presented in **Table 5-4** and discussed in the following sections.

Table 5-4: Existing Water System Capacity Assessment Summary

Zone	MDD Pipe Velocity Criteria Triggered	MDD 35psi Deficiencies	MDD+FF Deficient Hydrants	No. of Hydrants Tested	Deficient Pressures at Hydrants
Zone 1/2	0	76	145	264	55%
Zone 3/4	0	0	16	262	6%
Zone 5	0	0	1	231	0%
Total	0	76	162	757	21%

5.2.1.3.1 Average Day Demand Scenario

The model was first run under the ADD condition in order to identify pressure deficiencies and pipes triggering the velocity criteria. No deficiencies were identified under ADD condition.

5.2.1.3.2 Max Day Demand Scenario

Under MDD condition, no pipes triggered the velocity criteria, but 76 model junctions did record delivery pressures below 35 psi. All these locations are in Zone 1/2, with most grouped near WTP 1 and the rest located in the north of the zone farther away from the supply sources and at higher elevations. The locations of these pressure deficiencies are shown in **Figure 5-1**.

Figure 5-1: Existing MDD and MDD + FF Deficiencies

Link to Figure on OneDrive: [5-1 Existing MDD and MDD+FF Deficiencies](#)

5.2.1.3.3 Fire Flow Demand Scenario

The fire flow evaluation was completed using InfoWater's fire flow simulation tool. A steady-state hydraulic evaluation was used to determine if modeled nodes representing hydrant locations could meet a residual pressure of 20 psi under MDD conditions with the addition of the required fire flow demand, as discussed in Section 5.2.1.2.

The results of the Fire Flow evaluation indicate that the existing water distribution system has significant fire flow deficiencies in Zone 1 & 2, with over 50 percent of tested hydrants failing to meet their required residual pressure. These deficiencies are caused by insufficiently sized pipes. Additionally, there are some observed deficiencies around Timber Village Road. Prior to recommending projects in this area, the existence of the supposed pipe interconnections between Timber Village Road, State Road 50 and Sourwood Lane should be confirmed.

There were also identified deficiencies in Zones 3 and 4, with six percent of tested hydrants identified as deficient. These deficiencies are all located near WTP 4 and are likely a result of the new operation condition with WTP 4 out of service. With the recommendation to leave WTP 4 offline, the fire flow deficiencies in this area will need to be resolved. There was also a single fire flow deficiency in Zone 5 on a dead-end pipe. The fire flow deficiencies across the system are shown in **Figure 5-1**.

5.2.1.4 Future Needs

As discussed previously in this Master Plan, the City is anticipating extensive development across the City and will be expanding its potable water distribution system to meet those future demands. As discussed in Section 4, this expansion includes the construction of new groundwater wells drawing from the Lower Floridan aquifer. For the purposes of the hydraulic modeling, it was assumed that all new wells and distribution system infrastructure would be sized to meet the needs of future developments. The model scenarios described in the following sections were used to confirm the sizing needs of those future facilities and to identify any deficiencies that may be triggered in the existing system as the City grows.

For the purposes of this planning document, it was assumed that the capacity improvement projects to address existing deficiencies (detailed in Section 5.2.2) will be implemented prior to the 2025 development occurring and that capacity improvement projects to address 2025 deficiencies will be implemented prior to the 2045 development occurring. The predictions are based on projected developments presented to Woodard & Curran as of September 2021 and the City may need to adjust these projects and timelines if the schedule, location, or size of developments change in the future.

5.2.1.4.1 2025 Future Needs

Building on the existing system scenarios, model scenarios were developed for the first of two planning horizons: 2025. The following scenarios were used to size new facilities to meet the needs of the planned development and to identify any deficiencies that may be triggered in the existing system:

- 2025 Existing ADD Scenario: In this scenario, existing network infrastructure was evaluated during average day demand conditions to find any areas with pressure deficiencies.
- 2025 Existing MDD Scenario: In this scenario, node pressures, pipe velocities, and pipe head losses were evaluated during MDD conditions to local pressure deficiencies or any pipes with high flow velocities.
- 2025 Existing MDD with Fire Flow (MDD+FF) Scenario: In this scenario, hydrant pressures, pipe velocities, and pipe head losses were evaluated during a maximum day demand condition with the addition of fire flow demand. Fire flow demands were analyzed at each individual hydrant to locate flow and pressure deficiencies.

A summary of the City's existing system and 2025 system capacity deficiencies is presented in **Table 5-5** and discussed in the following sections. This represents the deficiencies that exist now or will occur with near-term development by 2025.

Table 5-5: 2025 System Capacity Assessment Summary

Zone	MDD Pipe Velocity Criteria Triggered	MDD 35psi Deficient Nodes	MDD+FF Deficiencies	No. of Hydrants Modeled	Deficiencies
Zone 1 & 2	0	19	10	264	4%
Zones 3 and 4	0	0	2	280	1%
Zone 5	0	0	0	231	0%
Total	0	19	12	775	2%

5.2.1.4.1.1 Average Day Demand Scenario

As with the existing conditions, there were no pressure deficiencies identified under 2025 ADD condition.

5.2.1.4.1.2 Max Day Demand Scenario

Under MDD condition, no pipes triggered the velocity criteria, but 19 model junctions did record delivery pressures below 35 psi. All these locations are in Zone 1 & 2 near WTP 1. This area is likely to continue to experience lower pressures unless water mains in this Zone are upsized. The locations of these pressure deficiencies are shown in **Figure 5-2**.

Figure 5-2: Future MDD and MDD + FF Deficiencies

Link to Figure on OneDrive: [5-2 Future MDD and MDD+FF Deficiencies](#)

5.2.1.4.1.3 Fire Flow Demand Scenario

The results of the Fire Flow evaluation indicate that the 2025 development will trigger fire flow deficiencies at 12 nodes in the model in Zone 1 & 2 and Zone 3, representing only two percent of the nodes that represent hydrants modeled across the City. Aside from those deficiencies in the Timber Village Road area discussed previously, the deficiencies are caused by increased velocities in some existing pipelines resulting from increased water demands. These deficiencies can be addressed by the projects detailed in Section 5.2.2. The fire flow deficiencies across the system are shown in **Figure 5-2**.

5.2.1.4.2 2045 Future Needs

Building on the 2025 system scenarios, model scenarios were developed for the final (2045) planning horizon to determine if the proposed 2025 system improvements will need to change to meet the 2045 needs. The following scenarios were used to size new facilities to meet the needs of the planned development and to identify any deficiencies that may be triggered in the existing system:

- 2045 Existing ADD Scenario: In this scenario, existing network infrastructure was evaluated during ADD conditions to find any areas with pressure deficiencies.
- 2045 Existing MDD Scenario: In this scenario, node pressures, pipe velocities, and pipe head losses were evaluated during MDD conditions to locate pressure deficiencies or any pipes with high flow velocities.
- 2045 Existing MDD with Fire Flow (MDD+FF) Scenario: In this scenario, hydrant pressures, pipe velocities, and pipe head losses were evaluated during a MDD condition with the addition of fire flow demand. Fire flow demands were analyzed at each individual hydrant to locate flow deficiencies.

A summary of the City's existing system capacity deficiencies is presented in **Table 5-6** and discussed in the following sections.

Table 5-6: 2045 Water System Capacity Assessment Summary

Zone	MDD Pipe Velocity Criteria Triggered	MDD 35psi Deficient Nodes	MDD+FF Deficient Nodes	No. of Hydrants Tested	Deficient Pressures at Hydrants
Zone 1 & 2	0	33	7	267	3%
Zone 3 and 4	0	0	7	280	3%
Zone 5	0	0	0	235	0%
Total	0	33	14	782	2%

5.2.1.4.2.1 Average Day Demand Scenario

As with the 2025 conditions, there were no pressure deficiencies identified under 2045 ADD condition.

5.2.1.4.2.2 Max Day Demand Scenario

Under MDD condition, no pipes triggered the velocity criteria, but 33 model junctions did record delivery pressures below 35 psi. All of these locations are located in Zone 1 & 2 near WTP 1. This area is likely to continue to experience lower pressures unless the water mains in this Zone are upsized. The locations of these pressure deficiencies are shown in **Figure 5-2**.

5.2.1.4.2.3 Fire Flow Demand Scenario

The results of the Fire Flow evaluation indicate that the 2025 development will trigger 14 fire flow deficiencies in Zone 1 & 2 and Zone 3, representing only two percent of the hydrants modeled across the City. Aside from those deficiencies in the Timber Village Road area discussed previously, the deficiencies are caused by increased velocities in existing pipelines resulting from increased water demands. These deficiencies can be addressed by the projects detailed in Section 5.2.2. The fire flow deficiencies across the system are shown in **Figure 5-2**.

5.2.2 Distribution Recommendations

5.2.2.1 WTP 2 Elevated Tank Overflow Pipe

The outlet for the overflow on the elevated tank at WTP 2 is located too close to the ground causing erosion, potentially undermining the tank support leg.

Recommendation

In 2018, Kimley-Horn recommended replacing the overflow pipe with an upgraded pipe capable of proper operation, to prevent this erosion. Woodard & Curran estimated that the cost of this replacement to be \$20,000 assuming there are no hazardous materials (i.e., lead paint on the tank). However, a less expensive splash pad, located under the existing overflow instead of replacing the pipe may also be a viable option to prevent this erosion.

Cost

The cost to construct a splash pad under the existing overflow is approximately \$5,000.

5.2.2.2 Water Main Upgrades

New Water Main

As Groveland continues to grow the City must connect the new developments to the existing water system. The new water mains recommended in this report reflect only those required to connect the new WTP and new developments to the distribution system; it was assumed that the construction of the distribution water mains within each development are the responsibility of the individual developers. Additionally, there are some existing deficiencies, particularly dead ends in the system, that can be eliminated via looping.

It is important to note that the projected water demand may not be present in 2025, unless those developments are fully constructed and occupied. The new water main to support these developments, however, needs to be installed by this time for developments to connect and receive water thereafter.

Recommendations and Costs

Table 5-7 lists the length of new water main recommended, separated into three categories:

- Water main required to address existing deficiencies
- Phase 1 – Water main needed to address development planned by 2025
- Phase 2 – Water main needed to address development planned by 2045

Table 5-7: New Water Main

Diameter (in)	Length (ft)		
	Existing Deficiencies	New Development Phase 1	New Development Phase 2
8	3	15,330	2,000
10	--	2,470	--
12	4060	11,120	51,870
16	--	31,210	--
Total	4,063	60,130	53,870
Total Cost (\$)	\$677,000	\$20,055,000	\$8,905,000

Figure 5-3, Figure 5-4, and Figure 5-5 shows the scope and locations of the new water main to be installed.

Figure 5-3: New Water Main Scope – Address Existing Deficiencies

Link to Figure on OneDrive: [5-3 New Water Main Scope - Address Existing Deficiencies](#)

Figure 5-4: New Water Main Scope – New Development Phase 1

Link to Figure on OneDrive: [5-4 New Water Main Scope - New Development Phase 1](#)

Figure 5-5: New Water Main Scope – New Development Phase 2

Link to Figure on OneDrive: [5-5 New Water Main Scope - New Development Phase 2](#)

Upsize Existing Pipe

Existing pipes will need to be upsized to meet minimum fire flow requirements, 1,000 GPM in residential areas, and 2,500 GPM in commercial/industrial/institutional areas.

Recommendations and Costs

Table 5-8 depicts the proposed phasing and length of pipe to be installed replacing small diameter pipe.

Table 5-8: Upsize Water Main

Diameter (in)	Length (ft)		
	Existing Deficiencies	New Development Phase 1	New Development Phase 2
6	5,700	0	0
8	3,400	3,100	1,900
10	21,300	200	400

Diameter (in)	Length (ft)		
	Existing Deficiencies	New Development Phase 1	New Development Phase 2
12	20,300	3,800	11,500
16	7,700	0	4,200
Total	58,400	7,100	18,000
Total Cost (\$)	\$11,667,000	\$1,078,000	\$4,353,000

Figure 5-6, Figure 5-7, and Figure 5-8 shows the scope and the locations of the pipe to be upsized.

Figure 5-6: Upsize Water Main Scope – Address Existing Deficiencies

Link to Figure on OneDrive: [5-6 Upsize Water Main Scope - Address Existing Deficiencies](#)

Figure 5-7: Upsize Water Main Scope – New Development Phase 1

Link to Figure on OneDrive: [5-7 Upsize Water Main Scope - New Development Phase 1](#)

Figure 5-8: Upsize Water Main Scope – New Development Phase 2

Link to Figure on OneDrive: [5-8 Upsize Water Main Scope - New Development Phase 2](#)

In the older part of Town there are areas with active small diameter pipe (2-inch or smaller) and in many instances in the same road with a larger diameter pipe. All of this pipe is in the areas recommended to have upsized pipe projects as identified above in **Figure 5-6, Figure 5-7, and Figure 5-8**. Woodard & Curran recommends that this small diameter pipe be decommissioned during these upsized projects and all services be connected to the new larger diameter pipe.

Multiphase

Four of the recommended water main upgrade projects could be constructed in a phased approach, as shown on **Figure 5-9**. For these projects, the City should carefully consider the certainty of the future development to weigh the potential additional upfront cost of installing a larger water main with the potential additional cost of replacing a relatively new water main within the next 20 years.

Figure 5-9: Multiphase Water Main Scope

Link to Figure on OneDrive: [5-9 Multiphase Water Main Scope](#)

Recommendations and Costs

If future development is certain, Woodard & Curran recommends initially installing the largest diameter pipe instead of completing these projects in phases due to the predicted population growth rate and to save on capital cost. The cost estimates presented in **Table 5-9** only include

construction of the largest pipe diameter. However, during final design the required pipe size should be confirmed based on the City's actual growth rate and the timing of developments within the service area for pipe replacement.

Table 5-9: Multiphase Water Main Scopes

Project Number	Phasing			Length (ft)			Cost Estimate ¹
	Existing Deficiencies	New Dev. Phase 1	New Dev. Phase 2	Existing Deficiencies	New Dev. Phase 1	New Dev. Phase 2	
1	--	New 8" pipe	Upsize to 16"	--	1,200	1,200	\$607,000
2	Upsize to 10"	Upsize to 12"	--	300	300	--	\$50,000
3	Upsize to 12"	--	Upsize to 16"	300	--	300	\$152,000

¹Cost estimate only includes construction of the largest pipe diameter phase

Asbestos Pipe Replacement

The existing distribution system is adequate and in good condition, with only limited breaks and leakage each year. Most of the distribution system is relatively new, having been installed in the last 10-15 years. However, there are A/C pipes in some older parts of the system. While the A/C pipes have historically not had many breaks, they are aging, and as the pipes near the end of their useful life a higher rate of repairs is anticipated putting workers at risk. The deteriorating pipe, including the A/C pipe, needs to be replaced safely.

Recommendations

Woodard & Curran recommends the City complete a water main replacement project consisting of a total of approximately 22,500 linear feet of pipe to be replaced, 1,500 of which is A/C. The scope of this replacement is depicted in **Figure 5-10**. The existing pipe is a combination of 8-inch, 6-inch, and 2-inch and smaller water main. To accommodate growth within the downtown area as well as fire flow requirements, the proposed replacement pipe will all be upsized to at least 8-inch water main. It should also be noted that the hydraulic model should be updated to reflect this project as during the design phase and the updated results may reduce the scope of the projects required to address the fire flow deficiencies in this area.

Figure 5-10: Scope of A/C Pipe Replacement Project

Link to Figure on OneDrive: [5-10 Asbestos Pipe Replacement](#)

Cost

The anticipated cost of this project is \$1,802,000.

Additional cost information and an alternatives analysis is located in the Drinking Water Facilities Plan, [Appendix I - Drinking Water Facilities Plan](#).

Replace Galvanized Pipe

The City has experienced reports of discolored water in the distribution system, particularly in the older part of the city. The condition of the water mains likely contributed to the discolored water complaints. New pipe is typically lined and limits the accumulation of deposits and limits the internal corrosion of the pipe. Old pipe, unlined pipe, or pipe that is infrequently flushed, can accumulate deposits, tuberculation, and undergo internal corrosion. This both obstructs flow and harbors biofilm and pipe deposits, increasing the risk of unexpected resuspension of this material that can reach customer services. Approximately 3.5 miles of water main in the distribution system is cast iron pipe, **Figure 5-11**, which is typically unlined and is likely to develop tuberculation.

Figure 5-11: Map of Cast Iron Mains

Link to Figure on OneDrive: [5-11 Map of Cast Iron Mains](#)

Recommendations

All of the cast iron water mains in the system are recommended to be replaced in the water main projects detailed above, and the completion of these projects should alleviate the discolored water issues within the City.

Cost

The cost for pipe replacement is included in other pipe replacement projects (e.g., A/C main) and upsized projects discussed previously.

5.2.2.3 Water Meter Replacement Program

Many of the water meters in the City have exceeded their useful life, and due to wear of the mechanical components typical of meters of this age, they are consequently losing the ability to correctly measure and record flow. This wear can result in a loss of revenue and increased UAW. New meter technology has higher accuracies, which will decrease the City's UAW and provide more revenue. Additionally, the implementation of Automated Meter Infrastructure (AMI) to automatically read the meters each month would aid in reducing operating costs for the utility and in leak detection throughout the system.

Recommendation

Woodard & Curran recommends the City complete a meter replacement program and implement an AMI system throughout the City.

The City has already begun replacing some water meters within the service area and this project should consist of replacing the remaining meters with new meters that are compatible with AMI

technology. These meters will be equipped with a transmitter that sends a radio signal to one of many collectors to be installed around the City with the usage data for that meter. A propagation study was completed by Neptune Technology Group, and they found that 19 radio towers are necessary to cover the entire planning area of the City shown in **Figure 5-12**. The AMI vendor will also host the usage data, integrate with the City's billing system, and provide usage data to consumers to indicate the presence of leaks throughout the system. The instantaneous collection of information through the AMI system will help with the City's water conservation efforts.

Figure 5-12: Proposed Radio Towers

Link to Figure on OneDrive: [5-12 Proposed Radio Towers](#)

The AMI radio system being planned for wireless metering reading will have substantial infrastructure overlap with the SCADA system. The antenna towers planned in the high-level design could be dual purposed as repeater points or access points for the wireless SCADA system at Water plants, Booster Stations, Reuse facilities and some lift stations. The spread spectrum radio frequency planned for the wireless meter reading system is 900MHZ which would not interfere with the licensed radio frequency of 215MHZ if the antennas are properly distanced at a minimum of 5 feet apart. Some utility sites have existing infrastructure including 25-foot antenna towers, cables, and antennas from a mothballed 900MHZ radio system installed for the old SCADA controllers at lift stations and water sites. These existing installations could result in cost savings if reused. The proposed 50-foot antenna towers included in the AMI wireless meter reading path study document could also be reused for other City needs including repeaters for Fire, Rescue and Police radio systems if properly designed and installed to avoid interference.

Cost

The estimated cost for this project is \$3,609,000. The cost estimate and radio tower locations presented here are based on the Neptune Technology Groups study and services.

Additional cost information and an alternatives analysis is located in the Drinking Water Facilities Plan, [Appendix I - Drinking Water Facilities Plan](#). It should be noted that replacing the water meters typically results in increased revenue to the utility, effectively reducing the capital required for this project.

5.2.2.4 Lead Service Line Inventory

The USEPA proposed the Lead and Copper Rule Revisions (LCRR) in December 2020, with an effective date of December 2021 and compliance required by October 2024. In summary the revisions will require water suppliers to:

- Identify those areas most impacted by lead and copper contamination;
- Strengthen drinking water treatment practices;
- Replace lead service lines (LSLs);

- Increase sampling reliability;
- Improve risk communication; and
- Protect children in schools and childcare facilities.

As part of the LCRR it will be required that each water utility has a publicly available inventory that identifies all lead service lines, with those of unknown material assumed to be lead.

Recommendation

Woodard & Curran recommends the City begin developing this inventory and display tool as an extension of the GIS work already completed as part of this project. The LSL inventory project can be conducted in conjunction with the water meter replacement project, Section 5.2.2.3, identifying the service line material at each residence during the meter installation. Combining these projects will reduce both the cost and the labor required to complete this project as additional cost will only be incurred to determine the material of those meters already replaced. This inventory will help the City to target homes with the greatest potential for elevated lead levels for sampling and assist in educating the public.

Cost

The development of the inventory and data display tool will cost approximately \$152,500 when done concurrently with the water meter replacement project.

6. WASTEWATER FLOWS AND SYSTEM CAPACITY

6.1 Projected Flows

Future flows to the Sampey Road WWTP were initially estimated in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#). The same methodology was applied to the Sunshine service area, as well as future development outside of the existing service areas in the City of Groveland and the potential service area for the City of Mascotte, and has been updated based on the following:

- Increased flows to the Sampey Road WWTP from 0.69 MGD to 0.75 MGD due to ongoing construction since the original data from mid-2020.
- Further analysis of the timing of growth from 2021-2025 in Groveland in the Sampey service area.
- Projections use 3.09 people per household, based on the 2020 census.
- Commercial/Industrial flows projected at 0.05 gpd/sf for warehouse space and 0.15 gpd/sf for office space, assuming 90% of new commercial construction is warehouse space and 10% is office space.

The total projected wastewater flow for the City of Groveland and the City of Mascotte over the planning period is summarized in **Table 6-1**, and detailed in the following sub-sections.

Table 6-1: Groveland and Mascotte Projected Wastewater Flows

Source	Future Additional and Total Flow (AADF) (gpd)					
	2021	2025	2030	2035	2040	2045
Existing Total Flows ¹	1,260,000					
Groveland Additional Flows ²	176,000	979,000	1,131,000	1,414,000	1,014,000	893,000
Mascotte Additional Flows ³	33,000	285,000	365,000	365,000	365,000	0 ⁴
Total⁴	1,469,000	2,733,000	4,229,000	6,008,000	7,387,000	8,280,000

¹Sum of Sampey and Sunshine WWTP existing flows.

²Sum of Sampey, Sunshine, and projected development north of the turnpike flows.

³Total projected flows are cumulative from one planning period to the next.

⁴No new flows from Mascotte in 2045.

6.1.1 Projected Flow to Sampey WWTP

The five-year projected future flows to the Sampey Road WWTP from within the City of Groveland, depicted in **Table 6-2**, are based on the estimated 63 gpcd from the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#). The residential and commercial flows in **Table 6-2** are from the developments listed in Southern Groveland in **Table 2-4**.

Table 6-2: Five-Year Future Groveland Flows to Sampey

Source	New Additional Flow to WWTP (AADF) (gpd) ¹				
	2021	2022	2023	2024	2025
Residential Flows ²	109,000	58,000	58,000	58,000	58,000
Commercial Flows	0	900	900	900	900
CRA Growth Flows ³			13,300	13,300	13,300
I/I from New Gravity Sewers ⁴	8,400	4,500	5,500	5,500	5,500
Total⁵	117,400	180,800	258,500	336,200	413,900

¹Does not include existing flows to the WWTP. Assumes septic to sewer conversion will occur after 2025.

²Assumes steady development rate of 299 units/year for 2022-2025.

³Assumes Community Redevelopment Area (CRA) growth and resulting flows will begin to increase in 2023 once construction is completed for any near-term projects. CRA flows in the Facilities Plan were 0.24 MGD over the planning period to 2040, so flows were assumed to be steady for an 18-year period.

⁴Assumes 7.7% of flows from new gravity sewers over the next 5 years. This may increase in subsequent years.

⁵Total projected flows are cumulative from one year to the next.

The Clean Water Facilities Plan estimated an additional 1.0 MGD (to the 0.69 MGD existing flow at the time of that report) from Groveland and Mascotte up to 2040, resulting in a total flow of 1.69 MGD. The flows to the Sampey Road WWTP are based on the projections in **Table 6-2** through 2025 and the original assumptions in the Clean Water Facilities Plan up to 2040 are summarized in **Table 6-3**. These projections assume that any new residential developments outside of Southern Groveland (**Table 2-4**) will not be directed to the Sampey Road WWTP and only a portion of Mascotte flows (up to 0.275 MGD) will be directed to the Sampey Road WWTP. Remaining flows from Mascotte will be directed to the proposed Regional WWTP along Villa City Road sometime between 2025-2030, as discussed in Section 6.2.3.2.

Table 6-3: Flows to Sampey Road WWTP

Source	Future Flow (gpd)				
	2021	2025	2030	2035	2040
Existing Wastewater Flow	750,000				
Groveland Flows ¹	117,000	297,000	219,000	72,000	96,000
Mascotte Flows ²	32,700	284,700	365,200	365,200	365,200
Total³	899,700	1,481,400	2,065,600	2,502,800	2,964,000

¹Assumes septic to sewer conversion in 2026-2027 for Crane's Landing and Hidden Lake Estates (291 units total) with an estimated flow of 57,000 gpd. Assumes the remaining CRA flows (0.2 MGD) will be steady rate for 2026-2040. Infiltration and inflow estimates assume 7.7% of flows from new gravity sewers.

²See Section 6.1.1.1 for Mascotte Flow Projections

³Total projected flows are cumulative

6.1.1.1 City of Mascotte Interconnection Flows

The City of Groveland has an interlocal agreement (refer to Section 1.4) with the City of Mascotte to accept no more than 250,000 gpd of wastewater. This interlocal agreement has been updated

for the City of Groveland to accept up to 275,000 gpd (among several other changes) and is pending final review and approval by both cities.

Existing Flows

Currently, only three users are connected to the Mascotte sanitary sewer system, one of which has only been connected since May 2020. Monthly water billing data for these users was provided from August 2019 to August 2020. During this period, these users consumed 521,000 gallons of potable water. Average daily water use per customer per year was calculated, resulting in approximately 1,400 gpd to the interconnection with the Groveland sanitary sewer system.

Future Flows

Future wastewater flows from the City of Mascotte were calculated using historical residential water consumption data from 2018 to 2020 to establish a base average sewer flow of 213 gpd per household, or 62 gpcd using the estimated 3.43 people per household provided by the 2010 U.S. Census. Wastewater flow projections were developed assuming that all potential future development flows and existing dry sewer flows (potential for conversion within the next 20 years) will be sent to the Groveland wastewater system.

The planned developments, as provided by the City of Mascotte staff or obtained from Development Agreements in early 2021, are listed in **Table 6-4**. Developments with existing septic systems and dry sewers that could be converted to flow to the City of Groveland are listed in **Table 6-5**. The location of future developments in Mascotte are shown on **Figure 6-1**.

Table 6-4: Mascotte Planned Residential Developments

Development Name	Proposed Number of Units	Development Agreement Status
BL Investments ¹	540	No Application
Gardens at Lake Jackson Estates (KB Homes)	105	No Application
Heron's Glen	999	Approved & Recorded
Indigo Lakes (River Meadows)	794	Approved & Recorded
Langley Property	2,800	No Application
Roper Trails	75	Approved & Recorded
Sunset Lake Estates	134	Approved & Recorded
The Grove (Crittenden Property)	80	Pending
Villa Pass	351	Approved, Pending Recording
Woodbury	78	Approved & Recorded
Total	5,960	

¹As of February 2022, this development was approved for rezoning and includes 299 units. It has also been identified as "Loucks Village".

Figure 6-1: Mascotte Future Developments

Link to Figure on OneDrive: [6-1 Mascotte Future Developments](#)

Table 6-5: Mascotte Dry Sewer Developments

Development Name	Number of Units
Shearwater	200
Knights Lake, Phases 1&2	181
Lake Jackson Estates/Gardens	350
Lakeview Estates	23
Total	754

Table 6-6 includes a summary of the future wastewater flows from the City of Mascotte based on existing flows and the developments identified in **Table 6-4** and **Table 6-5**. Additional I/I from new sewers was calculated using an estimated 250 gpd per inch diameter mile and assuming 50 linear feet per household required to service the proposed developments.

Table 6-6: Mascotte Estimated Future Wastewater Average Daily Flows (ADF)

Source	Flow (gpd)
Existing Sanitary Flows	1,400
New Residential Development Within Service Area	1,126,400
New Non-Residential Development Within Service Area	13,500
Dry Sewer Connection	144,500
Additional I/I from New Gravity Sewers	127,000
Total	1,412,800

Error! Not a valid bookmark self-reference. includes a summary of the future wastewater flow increases for each planning period and indicate that the flows will exceed the 275,000 gpd limit in the proposed amendment to the interlocal agreement around 2025. The interlocal agreement, however, has been structured to allow for amendment of the total flow to the City of Groveland wastewater system once the Sampey WWTP is upgraded in 2025 and the future Regional WWTP along Villa City Road is constructed around 2027 (see Section 6.2.3.2).

Table 6-7: Mascotte Future Flows (AADF)¹

	2021	2025	2030	2035	2040
Additional Flows (gpd)	32,700	284,700	365,200	365,200	365,200
Cumulative Flow (gpd)		317,400	682,600	1,047,800	1,413,000

¹Estimates represent the flows at the end of the planning period.

6.1.2 Projected Flow to Sunshine WWTP

The Sunshine WWTP has a permitted capacity of 1.0 MGD and the current flows to the WWTP are 0.57 MGD. These projections reflect a portion of the proposed developments in Central and

Northern Groveland (South of the Turnpike in **Table 2-4**) that are closest to the Sunshine WWTP and utilizing 63 gpcd for flows, not including I/I. The future flows are projected for the Sunshine WWTP are summarized in **Table 6-8** and indicate that capacity will be exceeded prior to 2025.

Table 6-8: Future Flows within Sunshine WWTP Service Area

Source	Future Flow (gpd)					
	2021	2025	2030	2035	2040	2045
Existing Flow	510,000					
New Residential Flows	54,000	444,000	501,000	834,000	596,000	572,000
New Commercial Flows	0	190,000	0	0	0	0
New I/I from New Gravity Sewers ¹	4,200	48,800	38,600	64,200	45,900	44,000
Total^{2,3}	568,200	1,251,000	1,790,600	2,688,800	3,330,700	3,946,700

¹Assumes 7.7% of flows from new gravity sewers.

²Total projected flows are cumulative.

³The City signed an agreement with Shelley's Septic Tank, Inc. in October 2021 to receive an additional 100,000 gpd of pretreated septage flows (with low BOD/TSS) to the WWTP. This flow is not considered in the projected flows at this time since the agreement is subject to renewal on an annual basis and the flow is not guaranteed. Furthermore, the City can decide to suspend receipt of flows as capacity becomes an issue closer to 2025. Future flows within the Sunshine WWTP service area are anticipated to be directed to the proposed Regional WWTP along Villa City Road.

It will be important to manage development commitments by the City and expectations for developers within this service area until additional capacity is available through redirection of wastewater flows to the proposed Regional WWTP along Villa City Road around 2027 (see Section 6.2.3.2). The City should work closely with developers to evaluate phasing options to better synchronize developments and the timing of actual wastewater flows with available treatment capacity and planned facilities. This will allow developments to proceed while additional treatment capacity is under construction.

6.1.3 Projected Flow North of the Turnpike

The land north of the turnpike has been recently annexed by the City and is not currently developed nor connected to either service zone. Development of this area is intended throughout the latter part of the planning period addressed in this plan (refer to **Table 2-4**). The future flows are summarized in **Table 6-9** and utilize 63 gpcd for flows.

Table 6-9: Flows North of the Turnpike

Source	Future Flow (gpd)			
	2030	2035	2040	2045
Residential Flows	346,000	412,000	256,000	257,000
I/I from New Gravity Sewers ¹	26,600	31,700	19,700	19,800
Total²	372,600	816,300	1,092,000	1,368,800

¹Assumes 7.7% of flows from new gravity sewers

²Total projected flows are cumulative

6.2 Capacity Recommendations

The two WWTPs, Sampey Road WWTP and Sunshine WWTP, each have capacities of 1.0 MGD, which is anticipated to be consumed by growth around 2025. New treatment capacity, as well as new lift stations and conveyance pipe are needed to accommodate future growth. In addition to the upgrades, the existing treatment and lift station equipment and infrastructure requires upgrades to replace aging infrastructure and address existing safety and reliability issues. Woodard & Curran recommends the expansion of the Sampey Road WWTP, construction of a new Regional WWTP, and conversion of Sunshine WWTP into a master pump station if deemed appropriate once the new Regional WWTP is online. Each of these recommendations is discussed in more detail below.

6.2.1 Regional Wastewater System Enhancements

The 2016 Amendment (Resolution 2016-10-593) to the 2013 Interlocal Agreement (Agreement) between the City of Mascotte and the City of Groveland authorizes up to 0.25 MGD of wastewater flow to the Sampey Road WWTP from the City of Mascotte, see [Appendix L - Interlocal Agreement with Mascotte, FL](#). There is an existing force main along Route 50 in Mascotte that connects to Groveland's wastewater collection system east of Arlington Road. The Agreement includes provisions for an additional interconnection at Underpass Road.

The Agreement benefits both communities as Mascotte has no existing means of treating wastewater and Groveland utilizes the treated additional flows to supplement its reclaimed water system. As discussed in Section 6.1.1.1, this capacity will likely be fully utilized by the end of 2025. An amendment to the Agreement is under review by Mascotte and Groveland as of February 2022 and includes an increase from 0.25 to 0.275 MGD flow to the Sampey Road WWTP with several additional changes that are based on the following general recommendations:

- Review and update cost per 1,000 gallons of wastewater accepted by Groveland from Mascotte, including a system charge per Equivalent Residential Unit (ERU), connection fees, rates (cost for treatment), etc. in support of associated debt service and operations and maintenance.
- Update the process for annual rate increases and consider rate increases take effect at the beginning of each calendar year versus the beginning of the fiscal year in October.
- Require adoption of the Groveland industrial pre-treatment program, Sewer Use Ordinance, and associated regulations.
- Incorporate language that commits Mascotte to sending wastewater to Groveland versus development of its own wastewater treatment facilities or allowing package treatment plants. This could be a 20-year agreement with a two-year notice of termination, for example.
- Incorporate a "gate-keeping" schedule for wastewater flows and loads to Groveland and a procedure for Groveland to review available capacity requests by developments in Mascotte.

- Incorporate a future interconnection at the intersection of Simon Brown Road and Villa City Road between Groveland and Mascotte to allow flows from the new developments in the northern portion of Mascotte to be sent to the new Regional WWTP.
- Establish a policy or procedure for Mascotte and Groveland to coordinate the annexing of property and approval of developments.
- Establish a policy or procedure for the collection of impact fees and transfer to Groveland.

The above recommended policies and procedures can be established through a Memorandum of Understanding (MOU) or other document for staff in Groveland and Mascotte to follow.

6.2.2 Lift Station Expansion

A flow chart depicting the flow paths of the existing 59 lift station systems is depicted in **Figure 6-2**.

Figure 6-2: Existing System Lift Station Flow Chart

Link to Figure on OneDrive: [6-2 Existing System Lift Station Flow Chart](#)

New Lift Stations

As new developments are constructed throughout the City additional lift stations will be necessary to convey the wastewater to the treatment plants. Woodard & Curran recommends the City construct 23 new municipal lift stations to support developments over the planning period. An additional 9 municipal lift stations will need to be constructed by the City of Mascotte to support wastewater flows developments that are anticipated to be treated at the new Regional WWTP. The existing Sunshine WWTP should be converted into a lift station to accommodate this additional flow, pending further review of the need and/or timing for treatment capacity before the proposed Regional WWTP is constructed. The Sunshine WWTP will still provide reclaimed water distribution and additional water supply for the reclaimed water system from the proposed Lower Floridan aquifer well at this facility (see Section 8.1.1.3).

The proposed lift stations depicted here are intended to be installed along the major utility corridors adjacent to new developments and will not be sufficient to convey all wastewater in the new developments to a WWTP. Additional lift stations are required to convey the wastewater to these proposed municipal lift stations and are assumed to be the responsibility of the developers to construct. The addition of these new lift stations will also cause some existing lift stations to need rehabilitation, which will be discussed in Section 7.1.3.2.

Details on the proposed lift stations are summarized in **Table 6-10**.

Table 6-10: Proposed Lift Stations

Development Served	Phase	Firm Capacity Need (MGD)	Cost
Bellevue	2025	0.11	\$300,000
Cape @ Cherry Lakes	2025	0.04	\$300,000
Commerce Park 1	Phased	0.34/6.5	\$1,750,000
Christopher Ford Commerce Park (CP2)	2025/2045	0.04	\$300,000
Cypress Lake Reserve	2025	0.55	\$370,000
Hidden Lakes	2025	0.05	\$300,000
Indigo Lakes (Cypress Bluffs)	2025	0.38	\$370,000
Libby	2025	0.09	\$300,000
Palisades Ph 3	2025	0.09	\$300,000
Springs @ Cherry Lake	2025	0.40	\$370,000
Thomas Ferguson	2025	0.15	\$370,000
Village Park	2025	0.14	\$300,000
Vista @ Cherry Lakes	2025	0.04	\$300,000
Waterside Pointe	2025	0.08	\$300,000
Wilson Island, Palisades	2025	0.23	\$370,000
Sunshine Regional	Phased	4.2/8.0	\$2,000,000
Trinity Lakes Ph 3-6	Phased	0.2/5.0	\$1,750,000
Villa City Ph1	Phased	0.42/1.65	\$1,250,000
Agriculture, Daryl Carter East, Daryl Carter South (New LS1)	2045	1.05	Developer Constructed
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet (New LS2)	2045	2.92	Developer Constructed
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet, Village (New LS3)	2045	5.55	Developer Constructed
IMG	2045	2.52	Developer Constructed
Villa City Ph 2-4	2045	4.88	Developer Constructed
City of Groveland 23 New Lift Stations		Total Cost	\$11,300,000
BL Investments, Heron's Glen	2025	1.29	Mascotte
Indigo Lakes (River Meadows)	2025	0.01	Mascotte
Knights Lake, Shearwater	2025	0.32	Mascotte
Lake Jackson, Lakeview	2025	0.31	Mascotte
Langley	2025	2.35	Mascotte
Roper Trails	2025	0.06	Mascotte
Sunset Lakes Estates, The Grove	2025	0.18	Mascotte
Villa Pass	2025	0.29	Mascotte
Woodbury	2025	0.07	Mascotte
City of Mascotte 9 New Lift Stations			

The phasing of these proposed lift stations to be constructed by 2025 and 2045 can be seen in **Figure 6-3** (new lift stations in yellow) and **Figure 6-4** (new lift stations in green).

Figure 6-3: 2025-2027 System Lift Station Flow Chart

Link to Figure on OneDrive: [6-3 2025-2027 System Lift Station Flow Chart](#)

Figure 6-4: 2045 System Lift Station Flow Chart

Link to Figure on OneDrive: [6-4 2045 System Lift Station Flow Chart](#)

It should be noted that by 2045 existing Lift Station 51 and Trinity Lakes Phase 1 & 2 (LS 59) lift stations, including all Cherry Lake lift stations (Springs at Cherry Lake, Cape at Cherry Lake, Vista at Cherry Lake, Wilson Island, and Palisades Phase 3), will be rerouted from the Sampey Road WWTP to the new Regional WWTP.

6.2.3 Wastewater Treatment Plants

Woodard & Curran is proposing the City maintain two WWTP's to treat all wastewater for the City and neighboring Mascotte, the Sampey Road WWTP and a Regional WWTP. It is recommended that the existing Sunshine WWTP be converted into a master pump station to the Regional WWTP instead of being rehabilitated and expanded due to the limited space onsite. The need and/or timing for treatment capacity and redundancy once the proposed Regional WWTP is constructed should be reviewed in more detail before the Sunshine WWTP is decommissioned and converted to a master pump station (Section 6.2.2). The Sunshine WWTP will still provide reclaimed water distribution and additional water supply for the reclaimed water system from the proposed Lower Floridan aquifer well at this facility (see Section 8.1.1.3).

Projected Flows

The projected flow to each WWTP based on the proposed lift station configurations in **Figure 6-3** and **Figure 6-4** are depicted in **Table 6-11** and **Table 6-12**. Additionally, as part of the regional wastewater system enhancements discussed in Section 6.2.1, Woodard & Curran recommends that a second interconnection be constructed to send a portion of the Mascotte flow to the proposed Regional WWTP. Based on the location and timing of the proposed developments it has been assumed that all additional Mascotte flows after 2025 will be sent to the Regional WWTP via the new interconnection.

Table 6-11: Sampey WWTP Projected Flows (AADF)

Source	Future Flow (gpd) ¹					
	2021	2025	2030	2035	2040	2045
Existing Flows	750,000					
Residential Flows	104,000	214,000	83,000	0	23,000	-189,000 ¹
Commercial Flows	0	3,700	0	0	0	0
CRA Flows	0	39,900	66,500	66,500	66,500	0
Septic to Sewer Conversion	0	0	57,000	0	0	0
Inflow and Infiltration ²	8,000	19,800	15,900	5,100	6,900	-14,600 ¹
Mascotte Flows	32,700	284,700	0	0	0	0

Source	Future Flow (gpd) ¹					
	2021	2025	2030	2035	2040	2045
Total³	895,000	1,457,000	1,679,400	1,751,000	1,847,400	1,643,800

¹Negative flows indicate reduction in flow to Sampey WWTP when LS 51 and Trinity Lakes Phase 1&2 lift stations are rerouted to the Regional WWTP

²Assumes 7.7% of flows from new gravity sewers

³Total flows are cumulative

Table 6-12: Regional WWTP Projected Flows (AADF)

Source	Future Flow (gpd) ¹					
	2021	2025 ²	2030	2035	2040	2045
Existing Flows ³	510,000					
Residential Flows	59,000	463,000	843,000	1,246,000	852,000	1,018,000
Commercial Flows	0	189,800	0	0	0	0
Mascotte Flows	0	0	365,200	365,200	365,200	0
Inflow and Infiltration ⁴	4,500	50,300	64,900	95,900	65,600	78,400
Total⁵	573,500	1,276,600	2,549,700	4,256,800	5,539,600	6,636,000

¹Includes flows rerouted from Sampey WWTP to the Regional WWTP

²Flows through 2025 will be directed to the Sunshine WWTP while the Regional WWTP is constructed

³Existing flows from the Sunshine WWTP

⁴Assumes 7.7% of flows from new gravity sewers

⁵Total flows are cumulative

Details on each of the Sampey WWTP expansion and proposed Regional WWTP are presented in the following sections.

6.2.3.1 Sampey Road WWTP Expansion

The Sampey Road WWTP is approaching its hydraulic design capacity of 1.0 MGD for average daily flows. The Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#), recommended an expansion of the Sampey Road WWTP to a design capacity of 2.0 MGD by September 2025 to meet anticipated flows. As detailed in Section 6.1, the projected flows have changed slightly since publication of the Facilities Plan, as shown in **Table 6-11** and account for changes to flows due to new developments and shifting of wastewater flows to the proposed Regional WWTP.

With the proposed regionalization, the 2.0 MGD proposed capacity of the Sampey Road WWTP after the expansion is sufficient to treat the projected flows through 2045. The anticipated cost of this expansion is approximately \$27,257,000. An overview of the expansion of each unit process is described below with additional details, alternatives analysis, and cost information located in the Clean Water Facilities Plan.

Biological Treatment

The expansion of the biological treatment process will consist of the addition of two new oxidation ditches equipped with aeration and mixing equipment capable of meeting maximum aeration requirements and the retrofit of the existing oxidation ditches by the addition of new aerators to

handle future flow and loads and meet future permit requirements. Since oxidation ditches are currently employed at the plant, the operators are familiar with operation and maintenance and very little additional training is needed. The proposed oxidation ditch system is a reliable treatment system due to its operational simplicity and dependable performance.

The current oxidation ditch effluent pipes to the secondary clarifiers do not have the capacity to convey the future peak design flows. The existing pipelines connecting the oxidation ditches to the secondary clarifier will need to be replaced with larger capacity pipes or additional pipelines will need to be installed.

To improve process monitoring and control, nitrate and oxidation-reduction potential (ORP) probes are recommended to be installed at each of the new and existing oxidation ditches and dissolved oxygen (DO) probes should be installed at the new oxidation ditches, similar to the existing ditches.

Secondary Clarifiers

Two additional 55-foot diameter secondary clarifiers and associated mechanisms with capacity to handle future flows and loads are recommended. To ensure uniform flow distribution and provide flexible operations, a distribution box is recommended to be constructed upstream of the clarifiers. Each of the two proposed clarifiers will be provided with an identical spiral blade scraper mechanism (similar to existing), along with density current baffles to enhance settling and minimize short-circuiting within the tanks, effluent weirs, Energy Dissipating Inlets (EDIs) to produce uniform flow into the feedwell and promote flocculation within the feedwell, influent and effluent gates, and handrails. Each of the collector mechanisms should also be provided with full-radius scum troughs and collectors.

To alleviate the algae growth issues, FRP launder covers are recommended for all four clarifiers (2 existing and 2 proposed). The installation of the covers should reduce maintenance for operations staff.

The current secondary clarifier effluent pipes to the disk filters do not have the capacity to convey the future peak design flows. It is recommended that parallel effluent pipes be installed, and existing effluent pipes be upsized to provide more flow capacity.

Return Activated Sludge/Waste Activated Sludge (RAS/WAS) Pumps

The manually operated RAS/WAS pumps located adjacent to the existing secondary clarifiers should be replaced to improve sludge management and provide adequate capacity. The recommended configuration for the proposed RAS/WAS pumps includes installing two new WAS pumps (one duty and one spare) and four new RAS pumps (three duty and one spare) that will be controlled automatically using the existing SCADA system. The RAS pumps will be operated using variable frequency drives (VFDs) that are paced off the plant flow signal. VFDs will also be provided for the WAS pumps to allow sludge to be wasted at a variable rate. New valving and piping will allow flexibility in assigning pump service to all four clarifiers (two existing and two new). Both the

return and waste sludge systems should be provided with reliable and accurate flow metering and recording capabilities.

Tertiary Treatment

The current disk filters used for tertiary treatment are in poor condition and require frequent maintenance. The sensors regularly malfunction, requiring the backwash system to be run manually. Two new, larger disk filters are recommended to replace the current system in order to eliminate the extensive maintenance required and to support the future loads. The proposed system is expected to treat peak flow with one unit out of service. Additionally, the existing effluent pipes from the disk filters are hydraulically limiting for future flows. It is recommended that the effluent pipes be upsized between the disk filters and the chlorine contact chamber.

Disinfection

The sodium hypochlorite disinfection system is recommended to replace the existing gas chlorine system. Sodium hypochlorite provides a reliable method of disinfecting wastewater effluent while alleviating the safety risks of storing and handling chlorine gas. A hypochlorite chemical feed skid pump and two sodium hypochlorite storage tanks are recommended to be installed.

Reuse Effluent Pumps

The existing reuse effluent pumps are reported to be in good condition. Hydraulically, the current number of effluent pumps is insufficient to meet future flows and loads projections. Three additional pumps with a total pumping capacity of 4,700 gpm (two duty and one jockey) will be required to handle these future flows and loads and provide sufficient redundancy. It is recommended that the piping and valve configuration be modified to allow all pumps to provide reuse water to the Sunshine reclaimed water system, the Silver Eagle reuse pump station and/or the onsite reject storage tank.

Onsite Reject Ground Storage

The existing onsite reject storage tank is in good condition but does not have sufficient volume to provide additional storage of future flows. It is recommended to construct a new 1.5 MG reject storage tank with a diameter of 85 feet and a sidewall depth of approximately 36 feet. This will provide more than one day of storage at future maximum month flows (2.31 MGD).

In-Plant Recycle Pump Station (IPPS)

The In-plant Recycle Pump Station (IPPS) is reportedly in good condition and though the existing pumps can handle the maximum anticipated process side stream flows with no redundancy, it is recommended to install one additional 350 gpm pump at the IPPS, matching the existing pumps. The IPPS is critical to the plant process and there is no means to bypass the IPPS, so retaining this redundancy is essential.

In-Plant Reuse Pump Station

The recommended plan is to replace the existing pumps with larger pumps and further evaluate the electrical system for necessary upgrades. Operationally, staff have reported low pressure issues and that the pumps require replacement. The addition of recommended process upgrades will increase demand at the pump station. The recommended pumps will accommodate this added demand. In addition, the electrical panel needs to be upgraded with larger breakers.

Alum Feed System

The existing liquid alum feed system is currently not being used at the WWTP and the pumps are in poor condition. In conjunction with the proposed tertiary filtration upgrades, it is recommended to reinstate the alum feed system, including the replacement of the two metering pumps and chemical storage. The proposed alum feed system will provide operators with the capability to inject alum at different locations (proposed distribution box to secondary clarifiers, downstream of the secondary clarifiers, or the oxidation ditches) to improve settling and enhance total suspended solids (TSS) and phosphorus removal. It is expected that the existing alum feed system structure be reused to house the proposed equipment.

Aerobic Digesters

Performing basic maintenance on the aerobic digesters is recommended to improve operations and bring the digesters closer to industry standards. The following improvements are also recommended:

- Install VFDs on the existing blowers to allow operators to use both blowers and have more control over the air supplied to the system, which should increase the volatile solids destruction, reducing overall disposal costs.
- Install blind flanges on the wye of the decanting pipe to increase operator's ability to maximize fluid decanting;
- Replace existing manual winches with electric winches to facilitate operation;
- Install additional instrumentation and controls to monitor pH, temperature, and ORP and provide the operators with better tools to assess the overall health of the digesters;
- Replace the submersible aerator originally installed in Digester 1 with a rag-friendly technology, which will improve mixing and aeration in Digester 1 and reduce maintenance requirements. Note that if the proposed headworks screen is installed by the time of funding approval and clogging with rags has been significantly reduced, the removed submersible aerator may be able to be reinstalled to save costs.
- Operate the digesters in series to improve plug flow through the digesters;
- Perform vibrational testing on blowers to improve the blower life span; and
- Re-coat the existing steel tanks (internal and external).

It should be noted that conversion to a Class AA process has high capital costs, but yields cost savings for operation and maintenance and should be further explored during final design.

Emergency Power Generator

It is recommended that a new 600 kW emergency generator and fuel tank be installed at the facility to double the existing standby power capacity. This upgrade will ensure adequate standby electrical power for existing equipment and expansion upgrades and that critical processes at the plant will run uninterrupted during a power outage. Final sizing of the generator should be confirmed in detailed design.

6.2.3.2 Regional WWTP

Woodard & Curran recommends the construction of the Regional WWTP be completed as soon as possible and if possible, before 2027. During construction of the regional plant, new wastewater flow in the Sampey and Sunshine service areas will be directed to the Sampey and Sunshine WWTP, respectively, as capacity is available. The Sampey WWTP is already nearly at capacity and the Sunshine WWTP is expected to reach the capacity limit of 1.0 MGD by 2025, as depicted in **Table 6-8**. Once the Regional WWTP enters service, wastewater will be diverted from the Sunshine WWTP to the Regional WWTP and a portion of the flow from the Sampey WWTP will need to be diverted to the Regional WWTP to meet minimum flow requirements to be determined through further design.

The Regional WWTP is assumed to have the following unity processes:

- Headworks
- Equalization Tanks
- Grit Removal System
- Four (4) Oxidation Ditches
- Four (4) Secondary Clarifiers
- Two (2) Disk Filters
- Chlorine Contact Tanks
- 6 MG Reject Tanks
- Sludge Thickening Equipment
- Three (3) Digesters
- Sludge Dewatering Equipment
- Chemical Feed Systems
- Operations Building

Cost

The anticipated cost of the Regional WWTP is estimated to be between \$90,000,000 and \$100,000,000. This does not include facilities to handle disposal or the cost to purchase land for the Regional WWTP and disposal areas.

Proposed Regional WWTP Location

Villa City is the most significant proposed development in Groveland with an existing Development Agreement and an estimated 7,760 residential lots planned for 2025 – 2040. As part of the existing Development Agreement, up to 20 acres will be provided to the City to support drinking water and wastewater utilities. An approximate 5-acre site has been identified for drinking water utilities along Villa City Road just south of U.S. Highway 27 (U.S. Hwy) (see Section 4.7.3), which leaves 15 acres for wastewater utilities. At the time that the Villa City Development Agreement was created (2017), the full scope of potential development and utility needs in the City had not been evaluated.

Villa City is a key driver for siting a new WWTP to support this development and is a strategic location to support future wastewater flows from developments throughout the City of Groveland and Mascotte. Preliminary planning efforts between the City and representatives for the Villa City development have identified a potential location for a new WWTP along Villa City Road that can serve the Villa City development and provide regional wastewater treatment. This location or an alternate location(s) (if needed) for the Regional WWTP and disposal within a 2-mile radius of this location to be centrally located to the future developments in Groveland and Mascotte.

Figure 6-5 shows the approximate location of the Regional WWTP and planning efforts are ongoing to evaluate the land area required for the plant, including requirements for disposal. 15-20 acres appears to be the minimum site needed to support the Regional WWTP infrastructure and an additional 50-55 acres may be needed to support disposal (see further discussion in Section 7.4.1.1 related to the capacity at the Sunshine RIBs). The land needed for wastewater treatment and disposal facilities requires further evaluation, as well as coordination with the Villa City developer as part of updates to the Development Agreement.

Figure 6-5: Proposed Location of Regional WWTP

Link to Figure on OneDrive: [6-5 Proposed location of Regional WWTP](#)

Based on discussions with the City of Groveland staff and initial review with the developer for Villa City, the location of the proposed Regional WWTP is strategic for the following reasons:

- Property at the southern portion of the Villa City development is proposed as residential and less valuable compared to commercial areas to the north along U.S. Hwy 27. This location can serve Villa City and move into design and construction with a modification to the existing Development Agreement.
- A centrally located Regional WWTP will maximize the efficiency of operations and reduce the distance wastewater need be conveyed, which will result in energy conservation.
- The large footprint and associated wastewater collection system throughout the Villa City development provides access to future developments along U.S. Hwy 27 and the existing utilities to Sunshine Parkway WWTP. This also enables access to developments north of

the Turnpike and Sunshine Parkway WWTP to accommodate future flows from northern Groveland.

- The Ford Commerce Park is directly to the east and several large developments in central Groveland are near this location. Flows from these developments cannot be accommodated at the Sampey Road or Sunshine Parkway WWTPs.
- Wastewater utilities exist within Villa City Road and provide multiple options to move wastewater to and from the Sampey Road WWTP and Regional WWTP.
- Mascotte can access a future utilities corridor in Villa City Road to the Regional WWTP nearby through an interconnection at Simon Brown Road. A wastewater interconnection along Simon Brown Road can provide access to County Road 33 and along or near the largest future developments in Mascotte.

Estimated Flows to the Regional WWTP

The projected flows to the Regional WWTP are presented in **Table 6-12**. It is assumed that the Regional WWTP will be ready to accept flow from the Villa City Phase 1 development and the full wastewater flow entering the Sunshine WWTP will be conveyed to the Regional WWTP to provide sufficient flow for startup. It is also assumed Villa City Phase 2 could promptly be directed to the Regional WWTP.

The Regional WWTP should be designed to receive septage from Groveland, Mascotte and surrounding communities. The projected flows to the Regional WWTP do not include estimates for septage associated with current or future developments. An estimate of flows, however, should be developed as part of a future planning effort and incorporated into the next steps for design of the Regional WWTP. Accepting septage will provide additional flows at facility startup and generate revenue.

Preliminary Phased Approach for Regional WWTP

The timing and location of developments will drive the approach for wastewater management and the overall growth requires phasing of the Regional WWTP and supporting infrastructure to support capital investment and avoid over-building where future developments in the 15 to 20-year planning period are less certain. Additionally, the capital investment needs to be supported by commitments from developments to support each phase of expansion.

Average daily wastewater flows over the next 25 years for Groveland and Mascotte are estimated to approach 8.2 MGD with up to 1.85 MGD (prior to redirecting approximately 200,000 gpd to Regional WWTP) to be treated at the Sampey Road WWTP and the remaining 6.6 MGD treated at the new Regional WWTP, assuming the Sunshine WWTP is decommissioned. The total design capacity for the Regional WWTP needs further consideration, but a 7.5-8.0 MGD annual average daily flow permitted capacity facility may be needed as the regional program grows to 2045. The Regional WWTP will be designed to be scalable with additional room for future expansion and

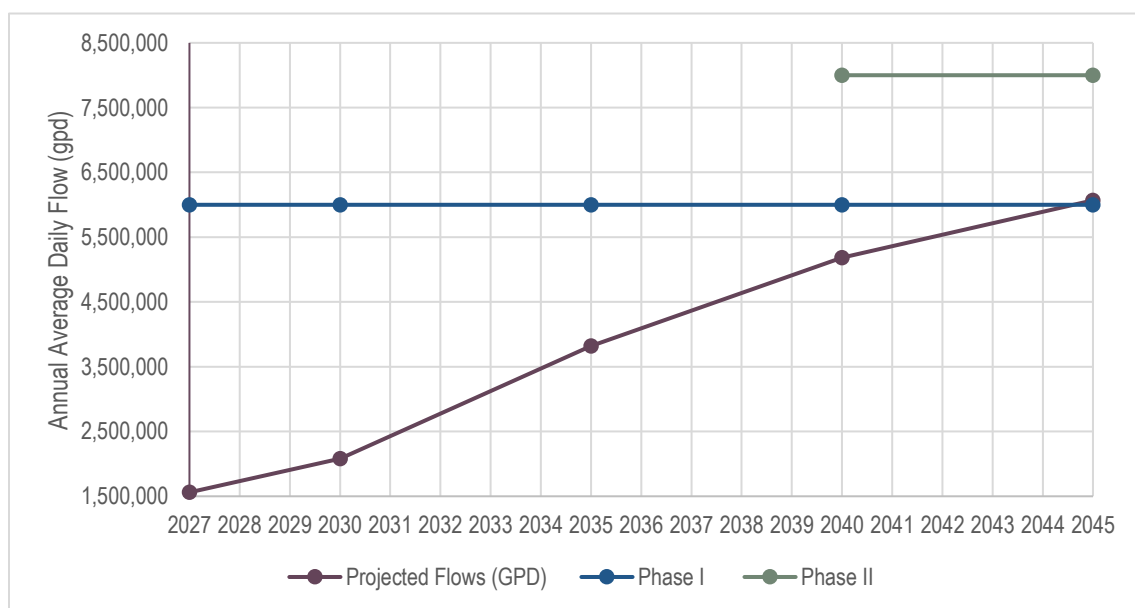
wastewater flow should be reevaluated periodically to confirm if the planning assumptions are correct or if changes in development schedule alter the phasing plan and final design capacity.

The following preliminary phased approach for wastewater management and the Regional WWTP has been developed for discussion purposes with the City of Groveland, the City of Mascotte, and developers in both communities.

- Regional WWTP Phase I:
 - Construct a 6.0 MGD permitted capacity facility by 2027 to accommodate flows from future developments through 2040 and additional flows until Phase II upgrade is completed.
 - Treat flows from Groveland (3.2 MGD) and Mascotte (1.1 MGD).
 - Pump Sunshine WWTP flows (1.0 MGD) to the Regional WWTP in 2027.
- Regional WWTP Phase II:
 - Complete expansion to an 8.0 MGD permitted capacity facility by the end of 2043.
 - Consider sending some flows (0.25-0.5 MGD) from developments in the Sampey Road WWTP service area to the Regional WWTP to preserve capacity for additional CRA buildout.

The estimated flows to the Regional WWTP and capacity of each proposed phase are illustrated in **Figure 6-6**.

Figure 6-6: Estimated Flows to Regional WWTP vs. Phase Capacity



Expansion of disposal systems is discussed in Section 7.4.

7. WASTEWATER SYSTEM

7.1 Lift Station, Collection, and Transmission System Assessment

As presented in Section 3 of this report, the Groveland collection system consists of 59 lift stations (refer to Section 3.2.1.3 and Table 3-5), 63 miles of gravity sewer and 43 miles of pressure conveyance piping of various ages and materials. The oldest sewer pipes in the City are located in the downtown Hill area installed in the early 1990s. The system generally consists of plastic pipe, PVC or HDPE, and is up to 30 years old. Buried pipe typically has a 50-year service life, however, this may be extended with maintenance.

The sewer mains are likely in good condition due to the pipe material and age, with no known issues other than some infiltration and inflow identified using lift station data. Discussion with operations staff revealed no significant operational issues in the collection system and staff provided information on the condition of the existing lift stations, and most were noted to be functioning and in fair to good condition with a couple lift stations in need of immediate repair.

7.1.1 Hydraulic Model

As part of the Utility Master Plan, a hydraulic model for the City's clean water (wastewater) collection system was developed. The City did not previously have mapped infrastructure or a hydraulic model for the wastewater collection system.

7.1.1.1 Hydraulic Model Development

The hydraulic model was developed using InfoWorks™ ICM which is a fully dynamic hydraulic modeling program with version control and in-model data documentation functionality. The model was constructed using GIS data developed as part of the Utility Master Plan effort, based on available City maps, record drawings and other plans and references.

Sewer loads for the existing system were developed based on water billing data geolocated to customer parcels and then allocated to the model. Model loads for future scenarios were developed based on provided development information and the sewer load factors discussed in Section 6.1. A detailed description of the model development is provided in the Clean Water Hydraulic Model Development Technical Memorandum, included in [Appendix M - Clean Water Hydraulic Model Development Technical Memo](#).

7.1.1.2 Hydraulic Criteria

Hydraulic criteria include both capacity deficiency criteria, which are used to identify the sewer pipes or pump stations needing relief due to inadequate capacity, and design criteria, which determine how large new sewers or pumping facilities should be. The criteria used by the City should ideally be stringent enough to ensure that sewer overflows caused by capacity limitations are very rare occurrences, but not so conservative that they result in pipes that are so large that cleansing velocities cannot be achieved that may result in maintenance issues, pump stations that

cannot operate efficiently under normal flow conditions, potential generation of corrosive gases and nuisance odors that reduce the life of the lift station equipment due to excessive detention times, or that cause the City to spend renewal and replacement funds unnecessarily.

Capacity deficiency criteria and design criteria are discussed in the sections below.

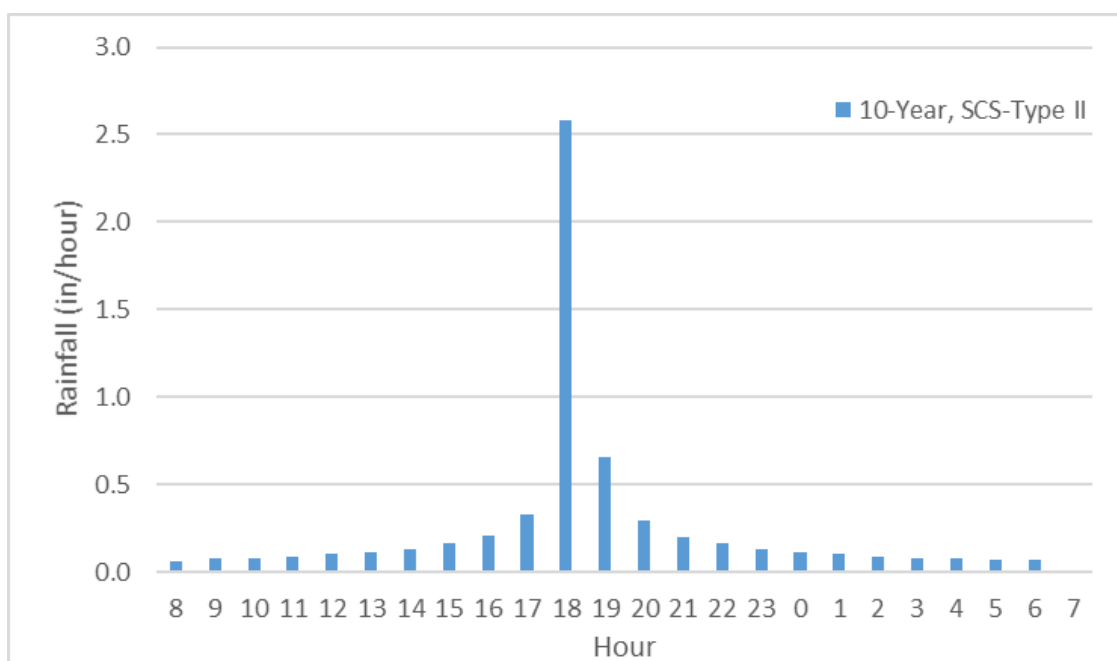
7.1.1.2.1 Design Storm Event

The following design event parameters have been adopted for the model update capacity assessment:

- Storm return period 10 years
- Rainfall depth Per NOAA *Atlas 14*: 6.03 inches
- Storm duration 24 hours
- Rainfall distribution SCS Type II
- Storm timing "peak-on-peak"

Figure 7-1 shows the storm rainfall pattern for the 10-year design event. Note that the rainfall is timed to have a peak intensity at about 7:00 P.M., which would tend to generate a peak RDI/I response about an hour or so later, coinciding with the weekday peak diurnal base wastewater flow (BWF) for typical residential areas ("peak-on-peak" timing). Additional information related to the development of the design storm event can be found in the Clean Water Hydraulic Model Development Technical Memorandum, included in [Appendix M - Clean Water Hydraulic Model Development Technical Memo](#).

Figure 7-1: City of Groveland Design Storm Event¹



Note: Storm timing has been adjusted to create peak-on-peak conditions (aligning the I/I response with peak BWF). The peak rainfall is 2.58 inches per hour.

7.1.1.2.2 Performance and Design Criteria

Capacity deficiency criteria are used to determine if the capacity of an existing sewer facility is exceeded to the extent that a capacity relief project is needed. These criteria are sometimes called “trigger” criteria, in that they trigger the need for a capacity relief project, unlike design criteria that are applied to determine the size of a new facility. The difference between deficiency criteria and design criteria reflects the fact that some existing facilities can continue to provide adequate, if not optimal, conveyance capacity, but new facilities should be designed to a higher standard.

The following criteria (**Table 7-1**) were used to identify capacity deficiencies in the City’s collection system under dry and wet weather conditions.

Table 7-1: Capacity Deficiency Criteria

Facility	Criteria ¹
Manholes	Surcharging should result in no less than 5-feet of freeboard to minimize the potential of a sanitary sewer overflow (SSO) (e.g., water level within 5 feet of the ground surface). Surge conditions in the gravity collection system should be avoided.
Lift Station Wet Wells	Wet well should not reach a fill level 3-feet or less from the roof of the wet well (e.g., water level within 3 feet of the ground surface)
Lift Station Pumps	The lift station’s firm capacity should be greater than or equal to the peak flow
Force Mains	Peak velocities should be between 2 and 8 feet per second (fps), high velocity in a force main can result in higher pressures and larger pump motors increasing capital and operating costs.
Gravity Sewers	Sewer capacities were evaluated based on surcharging in upstream manholes (see Manhole criteria). Additionally, minimum flow velocity under average dry-weather flow conditions should not be less than 2 fps.

Note:

1. Criteria apply to dry and wet weather conditions.

7.1.1.2.3 Design Criteria for New Sewer Facilities

Capacity improvement projects (CIPs) developed to alleviate deficiencies identified as part of the capacity assessment were sized based on the following criteria:

- Gravity Sewers: Maximum allowable depth-to-diameter ratio (d/D) of 1.0 under future Peak Wastewater Flow (PWWF) conditions (i.e., full pipe).
- Force Mains: Velocity between 3 and 8 feet per second (fps) under future PWWF conditions, targeting a typical maximum flow of 6 fps.
- Lift Station: Duty pumps should be sized for future PWWF conditions with redundant standby pump.

7.1.1.3 Existing System Capacities and Deficiencies

Once the hydraulic model was constructed and validated, it was used to perform an in-depth review of existing collection system performance based on the criteria presented in the previous section. A summary of the deficiencies is provided in **Table 7-2**. Deficiencies are based on the design criteria outlined in **Table 7.1**. Lift stations and gravity and force main pipes that do not exceed the criteria may still experience reduced capacity or restrictions. Additional flow and development data updates to the City's wastewater collection system model may result in assets being added or removed from the deficiencies lists.

7.1.1.3.1 Dry Weather Flow Conditions

Dry weather flow conditions are sanitary service flows with limited extraneous wastewater flow. Based on the model simulation results for existing conditions under dry weather conditions, none of the gravity system is under capacity nor are any of the force mains. However, one of the lift stations (LS 13) does not have sufficient firm capacity based on the sum of lift stations conveying flow to LS13 simultaneously. City staff has not indicated observing any capacity issues currently.

7.1.1.3.2 Design Storm Conditions

Design storm conditions are the collection systems reaction to wet weather conditions that include sanitary service flow and extraneous flows such as inflow and infiltration into the collection system from public and private sources. Based on the model simulation results for existing conditions under design storm peak wastewater flow (PWWF), one 1,400-foot segment of the gravity system is under capacity near LS 7 with the surcharge resulting in a condition exceeds the criteria in **Table 7-1**. There are three force main segments totaling almost 5,000 feet of pipe that trigger the City's velocity criteria: the force mains for LS 18, 24, and 35 as well as a segment of shared force main in SR-19.

The model results also indicated that eight of the City's lift stations are under capacity, one with insufficient firm capacity previously identified during the dry weather simulation (LS 13), two additional with insufficient firm capacity (LS 6 and 7) and five experiencing potential excessive force main pressure issues related to the multiple pumps operating simultaneously in a shared force main (LS 17, 18, 24, 30 and 37). The high pressure in the force main, which can result from a larger number of pumps operating simultaneously on a common force main, can result in a reduction in pump capacity in all operating pumps. In the most severe case, a pump station's pumping capacity can be reduced to effectively zero which can result in a sanitary sewer overflow at the station or sewer backup into nearby buildings. This condition is referred to as "deadhead" in this report.

A summary of the existing system capacity assessment is presented in **Table 7-2**. The model results under existing peak design storm conditions are shown in **Figure 7-2**.

Table 7-2: Summary of Clean Water Collection System Deficiencies Under Existing Conditions

Pipe Deficiencies					
Location	Facility Type	Length (ft)	Phasing	Deficiency	Notes
E Magnolia St (Tributary to LS 7)	Gravity Main	1,400	Existing	Pipe size restriction – surcharge condition – resulting in less than 5 feet of freeboard	MH-324 to LS 7 Wetwell
Shared FM in SR-19	Force Main	1,900	Existing	Velocity exceeds 8 fps	Final segment of shared Force Main for LS 15, 16, 17, 39, and 56 (after connection of LS 17, prior to connection with gravity main upstream of LS 18).
LS 18 FM	Force Main	150	Existing	Velocity exceeds 8 fps	LS 18 to shared force main with LS 35
LS 24 FM	Force Main	2,650	Existing	Velocity exceeds 8 fps	LS 24 to shared force main with LS 28
Total Gravity Main		1,400			
Total Force Main		4,700			
Lift Station Deficiencies					
Lift Station	Firm Capacity (MGD)	Phasing	Deficiency	Notes	
LS 6	0.22	Existing	Insufficient firm capacity		
LS 7	0.79	Existing	Insufficient firm capacity	Discharge pipe replacement required	
LS 13	0.12	Existing	Insufficient firm capacity	Lift station will be impacted by 2025 and 2045 development. Any updated development plans should be reviewed prior to development of a project for this lift station.	
LS 17	0.23	Existing	Deadhead	Under existing conditions force main pressure may reduce pump capacity below required capacity.	
LS 18	0.50	Existing	Deadhead		
LS 24	1.01	Existing	Deadhead		
LS 30	0.28	Existing	Deadhead		
LS 37	N/A	Existing	Deadhead	Pump curve/operating point was not available so model should be updated to confirm deficiency before project development. Additional information is required.	

Figure 7-2: Existing Collection System and Deficiencies

Link to Figure on OneDrive: [7-2 Existing Collection System and Deficiencies](#)

7.1.1.4 Future Needs

As discussed previously in this Master Plan, extensive development is anticipated across the City and will be expanding its clean water collection system to serve the future developments. As discussed in Section 6, this expansion includes the improvements to an existing WWTP and construction of a new Regional WWTP. For the purposes of the hydraulic modeling, it was assumed that all new lift stations and collection system infrastructure would be sized to meet the needs of future developments. The model scenarios described in the following sections were used to confirm the sizing needs of those future facilities and to identify any deficiencies that may be triggered in the existing system as the City grows.

It was assumed that the capacity improvement projects to address existing deficiencies (detailed in Section 7.1.3) will be implemented prior to the 2025 development occurring. Capacity improvement projects to address 2025 and 2045 deficiencies will be implemented prior to the 2025 and 2045 development occurring. The actual rate of new development is variable and may result in changes to the model assumptions for where and when new assets and wastewater flows are connected to the City's collection system. The model should be updated accordingly to incorporate work that is completed and changes in the schedule of development buildout.

7.1.1.4.1 2025 System Capacities and Deficiencies

Building on the existing system, the hydraulic model was expanded to perform a review of the collection system needs for 2025 planning horizon. A summary of the deficiencies identified in the City's 2025 infrastructure are presented in **Table 7-3**. The expansion of collection system to accept wastewater from new development and where new development is connected to the existing system was designed to minimize impact on the existing common force mains and reserve additional capacity for new developments with limited connection locations and infill development within existing lift stations.

7.1.1.4.1.1 Dry Weather Flow Conditions

Based on the model simulation results for 2025 conditions under dry weather conditions, none of the gravity system is under capacity based on the criteria nor do any of the force mains trigger the velocity criteria.

7.1.1.4.1.2 Design Storm Conditions

Based on the model simulation results for 2025 conditions under design storm PWWF, none of the gravity mains are under capacity. There are two force main segments totaling about 1,000 feet of pipe, for LS 17 and LS 30, that trigger the City's velocity criteria.

The model results also indicated that five of the City's pump stations are under capacity, with all experiencing deadhead issues related to the multiple pumps operating simultaneously in a shared force main (LS 20, 36, 49, 51 and 53). These five stations are mostly impacted by the connection of the Trinity Lakes Phase 1 and 2 project and the projects identified around Cherry Lake that are conveyed west along Cherry Lake Road (478) to Howey Road (SR19) and connection to the common force main near LS51. LS 53 was missing data at the time this report was prepared. Based on assumptions and limited information, LS 53 will need to be upgraded to service both the 2025 and 2045 flow conditions. Update of the model with additional information for LS 53 may remove the lift station from the upgrade list.

A summary of the existing 2025 capacity assessment is presented in **Table 7-3**. The model results under existing peak design storm conditions are shown in **Figure 7-3**.

7.1.1.4.1.3 New Developments

In addition to reviewing the capacity of the City's existing infrastructure, the hydraulic model was used to size facilities needed to serve planned developments. To meet the needs of the projected 2025 development, the City will need to construct about 28,000 feet of gravity main, 127,000 feet of force main and 26 new lift stations. The new infrastructure is summarized in **Table 7-4** and **Table 7-5** and shown in **Figure 7-3**. The additional pipe and lift stations outlined here excludes pipe and lift stations to convey flow internally within the limits of the new developments.

7.1.1.4.2 2045 System Capacities and Deficiencies

Building on the 2025 system, the hydraulic model was expanded to perform a review of the collection system needs for 2045 planning horizon. A summary of the deficiencies identified in the City's existing infrastructure in **Table 7-3**. Similar to 2025, new connections were design to limit impact to existing common force mains. For developments scheduled for 2045, new infrastructure to serve developments constructed after the construction of the proposed Regional WWTP were designed to direct new developments directly to the regional facility. As noted in section 7.1.1.4, the model should be updated as changes in the timing of new developments occurs.

7.1.1.4.2.1 Dry Weather Flow Conditions

The model simulation results for 2045 conditions under dry weather conditions indicated that none of the gravity system is under capacity compared to the trigger criteria above, nor do any of the lift stations or force mains exceed model criteria.

7.1.1.4.2.2 Design Storm Conditions

Based on the model simulation results for 2045 conditions under design storm PWWF, three segments of the gravity main totaling about 4,000 feet are under capacity as a result of planned development near LS 18, 28 and 35 which causes surcharging in the mains. Additionally, the force main segment originally constructed for LS 51 and planned to be converted into a shared force main to serve the Cherry Lake developments will trigger the velocity criteria once the IMG

development is connected to the collection system. It is recommended that this force main potentially be phased with multiple pipes of the same or two different sizes to avoid upgrading this section of pipe twice or relocating the future connection from IMG to Trinity Lakes Phase 3-6 lift station directly rather than connecting to the Cherry Lake force main.

The model results also indicated that three of the City's lift stations are under capacity, including LS 53 which had already been upsized in the model to address the deficiency identified under 2025 conditions. Of the three lift stations, two have insufficient firm capacity (LS 35 and 59) and LS 53 once again experiences deadhead issues related to the multiple pumps operating simultaneously in a shared force main. Additional information on LS 53 will allow the station to be upgraded in 2025 or 2045 or in a phased approach to reduce the potential of premature replacement of newly upgrade infrastructure.

A summary of the existing 2045 capacity assessment is presented in **Table 7-3**. The model results under existing peak design storm conditions are shown in **Figure 7-3**.

In addition to reviewing the City's existing collection system, the 2045 model scenario was also used to review the sizing of new facilities established during the 2025 scenario to serve new development across the City. Based on this review, it was determined that one gravity main segment (about 11,000 feet) and nine force mains (about 41,000 feet) sized for 2025 needs are undersized for the 2045 scenario. Design of these pipes, summarized in **Table 7-4**, should consider the needs of both 2025 and 2045 developments and can either be upsized or have parallel pipes installed for additional capacity to accommodate 2045 development when completed. The decision to upsize or install parallel pipes should be informed as the design of 2025 improvements begins and the planned development within the service area is updated.

Further, the model results indicate that three of the lift stations added in the 2025 scenario do not have sufficient firm capacity to meet the needs of 2045 development. As with the pipelines, the design of these lift stations, summarized in **Table 7-5**, should consider the needs of both 2025 and 2045 developments.

7.1.1.4.2.3 New Developments

As with the 2025 model scenario, the 2045 model scenario was used to size facilities needed to serve planned developments. To meet the needs of the projected 2025 development, the City will need to construct about 42,000 feet of gravity main, 61,000 feet of force main and five new lift stations. The new pipeline and lift station infrastructure are summarized in **Table 7-4** and **Table 7-5**, respectively, and shown in **Figure 7-3**.

Table 7-3: Summary of Clean Water Collection System Deficiencies Under 2025 and 2045 Conditions

Pipe Deficiencies					
Location	Facility Type	Length (ft)	Phasing	Deficiency	Notes
LS 17 FM	Force Main	50	2025	Velocity exceeds 8 fps	LS 17 to shared FM with LS 15, 16, 39, and 56
LS 30 FM	Force Main	1,000	2025	Velocity exceeds 8 fps	LS 30 to shared FM with LS 49 and 58
Near SR-19 and US 27	Gravity Main	2,800	2045	Throttle Surge – resulting in less than 5 feet of freeboard	MH-608 to LS 18 WW
Blackstone Creek Rd	Gravity Main	600	2045	Throttle Surge – resulting in less than 5 feet of freeboard	MH-1243 to LS 28 WW
Glass Onion Dr near Long and Winding Road	Gravity Main	600	2045	Throttle Surge – resulting in less than 5 feet of freeboard	MH-154 to LS 35 WW
LS 51 to Trinity Lakes FM	Force Main	2,700	2045	Velocity exceeds 8 fps	Shared FM for LS 51, IMG and Springs @ Cherry Lake to Trinity Lake Ph 1-2 WW
Total Gravity Main		4,000			
Total Force Main		3,750			
Lift Station Deficiencies					
Lift Station	Firm Capacity (MGD)	Phasing	Deficiency	Notes	
LS 20	1.02	2025	Deadhead	Under 2025 conditions force main pressure may reduce pump capacity below required capacity.	
LS 36	0.16	2025	Deadhead		
LS 49	0.30	2025	Deadhead		
LS 51	0.68	2025	Deadhead		
LS 53	n/a	2025 / 2045	Deadhead	Increased capacity to address 2025 deficiency is not sufficient to meet 2045 needs. Pump curve/operating point was not available so model should be updated to confirm deficiency before project development. Additional information required for LS 53	
LS 35	0.27	2045	Insufficient firm capacity		
LS 59	1.76	2045	Insufficient firm capacity	Significant flow to be added (from reroute of Cherry Lake + IMG development flows). Consider phasing of lift station improvements and redirection of flow from Trinity Phase 1 & 2	

				and Cherry Lake developments and LS51 from Sampey WWTP to Regional WWTP.
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Table 7-4: Summary of Pipelines Added to the Hydraulic Model to Serve New Developments for the 2025 and 2045 Planning Horizons

Development Served	Connection Point to Collection System	Facility Type	Length (ft)	Phase	Diameter (in)	Notes
Arborwood	LS 55	Gravity	1,200	2025	8	
Bellevue	LS 54 FM	Force Main	200	2025	4	Assess impact to Wilson Lake Pkwy lift station
BL Investments, Heron's Glen	Shared FM to Reg. WWTP	Force Main	1,200	2025	6	To Regional WWTP
Blue Springs Reserve	MH-146, LS 35	Gravity	3,300	2025	12	
Palisades, Wilson Island	New shared FM to Springs @ Cherry LS	Force Main	2,700	2025	6	
Christopher Ford	Villa City Rd FM to Reg. WWTP	Force Main	9,300	2025	4	
Palisades, Wilson Island, Vista @ Cherry Lakes	SR 19 FM near LS 51	Force Main	14,700	2025	6	Parallel force main
Palisades, Wilson Island, Vista @ Cherry Lakes, Cape @ Cherry Lakes	Springs @ Cherry LS	Force Main	3,700	2025	6	
Cypress Lake Reserve	Cypress LS	Gravity	5,600	2025	8	
Cypress Lake Reserve	Hwy 50 FM near LS 37	Force Main	700	2025	4	
Hidden Lakes	Eagles Crossing/LS 38 FM	Force Main	3,200	2025	4	
Indigo Lakes (River Meadows)	Shared FM to Reg. WWTP	Force Main	3,300	2025	6	
Indigo Lakes (Cypress Bluffs)	Reg. WWTP w/Ferguson and Trinity Lake 3-6	Force Main	1,500	2025	4	
Knights Lake, Shearwater	Shared FM to Hwy 50 near LS 34	Force Main	6,400	2025	4	
Lake Jackson, Lakeview	Shared FM to Reg. WWTP	Force Main	600	2025	6	

Development Served	Connection Point to Collection System	Facility Type	Length (ft)	Phase	Diameter (in)	Notes
Langley	Shared FM to Reg. WWTP	Force Main	400	2025	8	
Libby	Hwy 27 FM near LS 45	Force Main	1,000	2025	4	
Knights Lake, Shearwater, Sunset Lakes Estates, The Grove	Shared FM LS 34	Force Main	1,400	2025	6	
Knights Lake, Shearwater, Sunset Lakes Estates, The Grove, Woodbury	Shared FM to Hwy 50 near LS 34	Force Main	2,500	2025	8	
Palisades	MH-243 to LS33	Force Main	2,600	2025	4	
Parkside Gravity	LS 54	Gravity	4,300	2025	8	
Roper Trails	Shared FM to Reg. WWTP	Force Main	4,600	2025	4	
Sunset Lakes Estates, The Grove	Shared FM to Hwy 50 near LS 34	Force Main	3,500	2025	6	
The Cape Cherry Lake	New shared FM to Springs Cherry Lake	Force Main	2,700	2025	4	
Thomas Ferguson	Shared FM to Reg. WWTP	Force Main	5,100	2025	4	
All new development collected by Villa City WWTP	Influent FM to Reg. WWTP	Force Main	2,600	2025	24	
Lake Jackson, Lakeview, Roper, Heron's Glen, BL Investments, Indigo Lakes (River Meadows), Langley Properties, Indigo Lakes (Cypress Bluffs), Thomas Ferguson, Trinity Lakes Ph 3-6	New shared FM to Reg. WWTP	Force Main	1,400	2025	16	
Indigo Lakes (Cypress Bluffs), Thomas Ferguson	New shared FM to Reg WWTP	Force Main	5,700	2025	6	
Lake Jackson, Lakeview, Roper, Heron's Glen, BL Investments, Indigo Lakes	New shared FM to Reg. WWTP	Force Main	700	2025	10	

Development Served	Connection Point to Collection System	Facility Type	Length (ft)	Phase	Diameter (in)	Notes
(River Meadows), Langley Properties						
Lake Jackson, Lakeview, Roper, Heron's Glen, BL Investments	New shared FM to Reg. WWTP	Force Main	1,400	2025	10	
Villa Pass	Shared FM in Villa City Road near LS 30 FM	Force Main	1,400	2025	4	
Village Park	MH-623 to LS 18	Force Main	500	2025	4	
Vista Cherry Lake	New shared FM to Springs Cherry Lake	Force Main	600	2025	4	
Waterside Pointe	Hwy 50 FM near LS 37	Force Main	4,000	2025	4	
Wilson Estates	LS 55	Gravity	100	2025	8	
Wilson Island, Palisades	New shared FM to Springs Cherry Lake	Force Main	7,300	2025	4	
Woodbury	Shared FM to Hwy 50 near LS 34	Force Main	2,700	2025	4	
Commerce Park FM	FM to Villa City PH 2 to Reg. WWTF	Force Main	7,800	Phased	4 / 16	Pipe to be upsized (or parallel installed) as development expands.
Palisades, Wilson Island, Vista @ Cherry Lakes, Cape @ Cherry Lakes, Springs @ Cherry Lake, IMG	LS 51 FM	Force Main	700	Phased	6 / 12	Pipe to be upsized (or parallel installed) as development expands.
Philips Landing	New Facility	Gravity	11,100	Phased	8 / 16	Pipe to be upsized (or parallel installed) as development expands.
Palisades, Wilson Island, Vista @ Cherry Lakes, Cape @ Cherry Lakes, Springs @ Cherry Lake	FM to Hwy 19 FM near LS51	Force Main	1,600	Phased	4 / 8	Pipe to be upsized (or parallel installed) as development expands.
Trinity Lakes Ph 3-6, Trinity Lakes Ph 1-2, IMG	FM to Reg. WWTP	Force Main	8,000	Phased	4 / 12	Pipe to be upsized (or parallel installed) as development expands.
Trinity Lakes Ph 1-2	LS 51 FM	Force Main	8,000	Phased	6 / 12	Pipe to be upsized (or parallel installed) as development expands.

Development Served	Connection Point to Collection System	Facility Type	Length (ft)	Phase	Diameter (in)	Notes
Christopher Ford Commerce Park, Commerce Park, US Parcels near US 27, Villa City Ph 1, Villa City Ph 2-4	New	Force Main	2,500	Phased	8 / 24	Pipe to be upsized (or parallel installed) as development expands.
Commerce Park, US Parcels near US 27, Villa City Ph 1, Villa City Ph 2-4	New	Force Main	4,500	Phased	6 / 24	Pipe to be upsized (or parallel installed) as development expands.
Commerce Park, US Parcels near US 27, Villa City Ph 1	FM to Sunshine WWTP/Redirect to Villa City Phase 2	Force Main	5,300	Phased	6 / 20	Pipe to be upsized (or parallel installed) as development expands.
Villa City Ph 1	FM to Sunshine WWTF/Redirect to Villa City Phase 2	Force Main	2,700	Phased	4 / 12	Pipe to be upsized (or parallel installed) as development expands.
Commercial Gravity	MH-951 to LS24	Gravity	2,100	2045	8	
Matthew + Lourdes	MH-635 to LS17	Gravity	2,700	2045	8	
Meixsell	FM to Reg. WWTF	Force Main	1,700	2045	8	
Agriculture	To New LS1	Gravity	8,900	2045	12	
Agriculture, Daryl Carter East, Daryl Carter South	New LS 1	Gravity	4,000	2045	8	
Agriculture, Daryl Carter East, Daryl Carter South	To New LS2	Force Main	1,500	2045	12	
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet	New LS2	Gravity	2,600	2045	12	
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet	New LS2	Gravity	8,900	2045	16	
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet, Village	New LS3	Force Main	5,000	2045	12	
O'Brian Development	MH-635 to LS17	Gravity	4,000	2045	8	
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet, Village	New LS3 to Reg. WWTP	Force Main	12,000	2045	16	

Development Served	Connection Point to Collection System	Facility Type	Length (ft)	Phase	Diameter (in)	Notes
Trin Lakes Ph1-2, IMG	Shared FM to Trinity Lakes 3-6	Force Main	9,300	2045	16	
Villa City Ph 2-4	Shared FM to Reg. WWTP	Force Main	1,700	2045	12	
2025 Total Gravity			28,200			
2025 Total Force Main			126,700			
2045 Total Gravity			41,600			
2045 Total Force Main			61,300			

Table 7-5: Summary of Lift Stations Added to the Hydraulic Model to Serve New Developments for the 2025 and 2045 Planning Horizons

Development Served	Phase	Firm Capacity Need (MGD)	Notes
Bellevue	2025	0.11	
BL Investments, Heron's Glen	2025	1.29	
Cape @ Cherry Lakes	2025	0.04	
Christopher Ford Commerce Park	Phased	0.04/6.5	Pump sizing/construction should consider 2025 and 2045 needs (once development north of the Turnpike is connected).
Cypress Lake Reserve	2025	0.55	
Hidden Lakes	2025	0.05	
Indigo Lakes (Cypress Bluffs)	2025	0.38	
Indigo Lakes (River Meadows)	2025	0.01	
Knights Lake, Shearwater	2025	0.32	
Lake Jackson, Lakeview	2025	0.31	
Langley	2025	2.35	
Libby	2025	0.09	
Palisades Ph. 3	2025	0.09	
Roper Trails	2025	0.06	
Springs @ Cherry Lake	2025	0.40	
Sunset Lakes Estates, The Grove	2025	0.18	
Thomas Ferguson	2025	0.15	
Villa Pass	2025	0.29	
Village Park	2025	0.14	
Vista @ Cherry Lakes	2025	0.04	
Waterside Pointe	2025	0.08	
Wilson Island, Palisades	2025	0.23	
Woodbury	2025	0.07	
Philips Landing, Parcels near US 27	Phased	0.34	
Trinity Lakes Ph3-6	Phased	0.2 / 5.0	Pump sizing/construction should consider 2025 and 2045 needs (once flow is rerouted through this LS).
Villa City Ph1	Phased	0.42 / 1.65	Pump sizing/construction should consider 2025 and 2045 needs.
Agriculture, Daryl Carter East, Daryl Carter South (New LS1)	2045	1.05	
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet (New LS2)	2045	2.92	

Development Served	Phase	Firm Capacity Need (MGD)	Notes
Agriculture, Daryl Carter East, Daryl Carter South, Daryl Carter East, Hamlet, Village (New LS3)	2045	5.55	
IMG	2045	2.52	
Villa City Ph 2-4	2045	4.88	
Bellevue	2025	0.11	

Figure 7-3: Future Collection System and Deficiencies

Link to Figure on OneDrive: [7-3 Future Collection and Deficiencies](#)

7.1.2 Inflow and Infiltration (I/I) Evaluation

An I/I evaluation was conducted for the Groveland collection system using lift station daily pump runtimes to indicate relative difference between dry weather and wet weather days and different times of year. This evaluation method can provide a preliminary understanding of the condition of the piping system tributary to each of the lift stations and aid in understanding if lift stations are sized appropriately and if extraneous flow is entering the collection system and using lift station and wastewater treatment capacity.

While operators and City staff have not reported any significant problems with I/I in general, there is some suspected I/I throughout the system during high groundwater and precipitation events. Operators indicated that a high-water level alarm was received from lift stations 9, 18, 21, 24, 25, 28, 29, 31, 47, and 55 during a rain event on September 13, 2021. A high-level alarm can indicate that I/I flow is exceeding the pumping capacity of the lift station or that the additional flow into the various lift stations may cause force mains to be overloaded which can result in a reduction of pumping capacity. The assessment discovered potential I/I in the system. Data were not available for all lift stations or for gravity sewer that conveys wastewater directly to the wastewater treatment facilities. A similar I/I evaluation for those areas should be completed with dry weather days adjusted as needed for new development flows.

I/I Analysis

The I/I analysis was conducted by comparing rainfall data to pump station runtime hours and observing if there is an increase in the pump operation time during or after rain events. These reactions are shown as spikes in runtime when plotted on a graph. Typically, sudden increases in flow triggered by rainfall indicate inflow is the primary problem within the system as opposed to infiltration which is more apparent where the groundwater table is high and can be identified as longer pump runtimes after rainfall events or a steady increase in pump runtimes during seasons with traditionally higher rainfall.

Daily runtime and flow data for all SCADA-equipped Lift Stations (all Lift Stations except 1, 2, 4, 5, 6, 11-14, 36, 40, 41, 45, 53, and 55), were obtained through the City's SCADA system, while runtime data for Lift Station 6 was only able to be obtained from manual, handwritten logs from the operators. The manual logs are not recorded daily, but instead are recorded multiple times per week. Flow and pumping rates are not recorded at Lift Station 6. The lift station runtime hours (hours per day) were plotted against the rainfall data (inches), obtained from the National Oceanic and Atmospheric Administration (NOAA) Climate Data Online (CDO) from weather station Orlando West ID GHCND:USC00086634, to analyze trends. If a distinct spike inflow occurs during or immediately after a rain event, the extraneous runtime hours can be attributed to inflow sources such as leaky manhole covers, sump pump connections, or stormwater drains or catch basins

connected directly to the sanitary sewer system. If extended periods of higher-than-normal runtimes are observed after a rain event or during particular times of the year, the extraneous flow can be attributed to infiltration source. These sources include leaking pipe joints in the mainline or sewer lateral pipes, pipe connections to manholes, or defects in pipes or manholes where groundwater can enter the collection system.

According to the United States Geological Survey (USGS), the wet weather and high groundwater period occurs during the months of June through September, with the remaining months being the dry weather and low groundwater period. If wastewater flow totals tend to be lower during the dry, low groundwater months and trend upward during the high groundwater months, there is an indication of infiltration in the system. Infiltration in the system is caused by a high groundwater table in the early spring where the water is able to enter the system via cracking, separated joints, or other various structural defects. Once the groundwater table drops below the depth of sewer during the dry weather months, flow totals drop since infiltration is no longer entering the system. Infiltration can be analyzed by adding a linear trendline showing the trend from a dry day during high groundwater periods to a dry day during low groundwater periods to identify if wastewater flow totals trend upward in the drier months. The low and high groundwater periods analyzed were during consecutive days of no rainfall.

Lift Station Runtime Analysis

All available pump station runtimes and local area rainfall were analyzed over a period from February 2019 to August 2020. Available runtime data for lift stations were analyzed to assess extraneous wet weather flow relative to average daily flows for the lift station. Lift stations that experienced high wet weather runtimes and had peaking factors of 3 or higher were classified as having potentially significant I/I issues and warrant additional investigation. The lift stations that met the I/I issue criteria are lift stations 9, 10, 21, 26, and 29. The results of the analysis are summarized in [Appendix N - Lift Station Runtime Analysis](#). The collection systems upstream of the lift stations identified as having excessive I/I should be investigated to locate and rehabilitate sources of extraneous flow to prevent future high-water alarm or overflowing events as a result of overwhelming pumping equipment. Mitigating infiltration into the lift stations will also reduce the amount of extraneous water sent to the wastewater treatment plants for treatment, reducing chemical and power costs to transport and treat and potentially extending the lifetime of current equipment. Woodard & Curran recommends the City conduct a detailed evaluation on these lift stations which experience excessive I/I to identify and mitigate areas of infiltration.

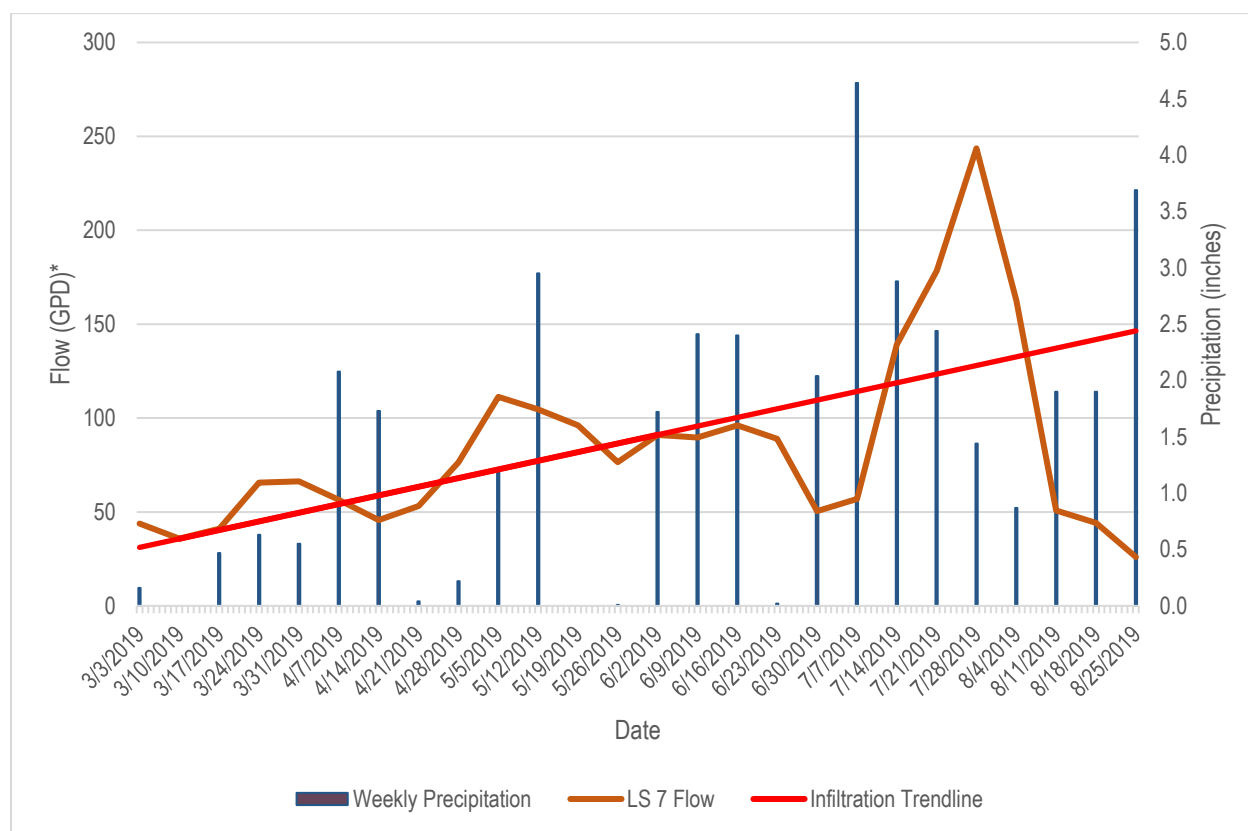
High-Water Alarms

Five of the lift stations that recently experienced high-water alarms in September (LS 25, 26, 28, 47, and 55) are located on a common force main which conveys wastewater to the Sunshine Parkway WWTP, as shown in Figure 6-2. These lift stations did not show a significantly higher pump runtime during historical periods of rainfall, which suggests that the high-water event was not I/I exceeding the capacity of the pumps at the individual lift stations. The high-water alarms are more likely a result of multiple stations operating simultaneously for longer periods of time

and increasing the pressure in the common force main which subsequently reduces the individual pumps hydraulic capacity. The force main issues are anticipated to worsen over time as increased flows from future developments are connected to the common force mains. Woodard & Curran recommends the City conduct a detailed evaluation of each of the lift stations on the combined force main conveying wastewater from the general area along Wilson Lake Parkway and Route 27 to the Sunshine Parkway WWTP to identify a cost-effective approach to avoid overloading in the force main.

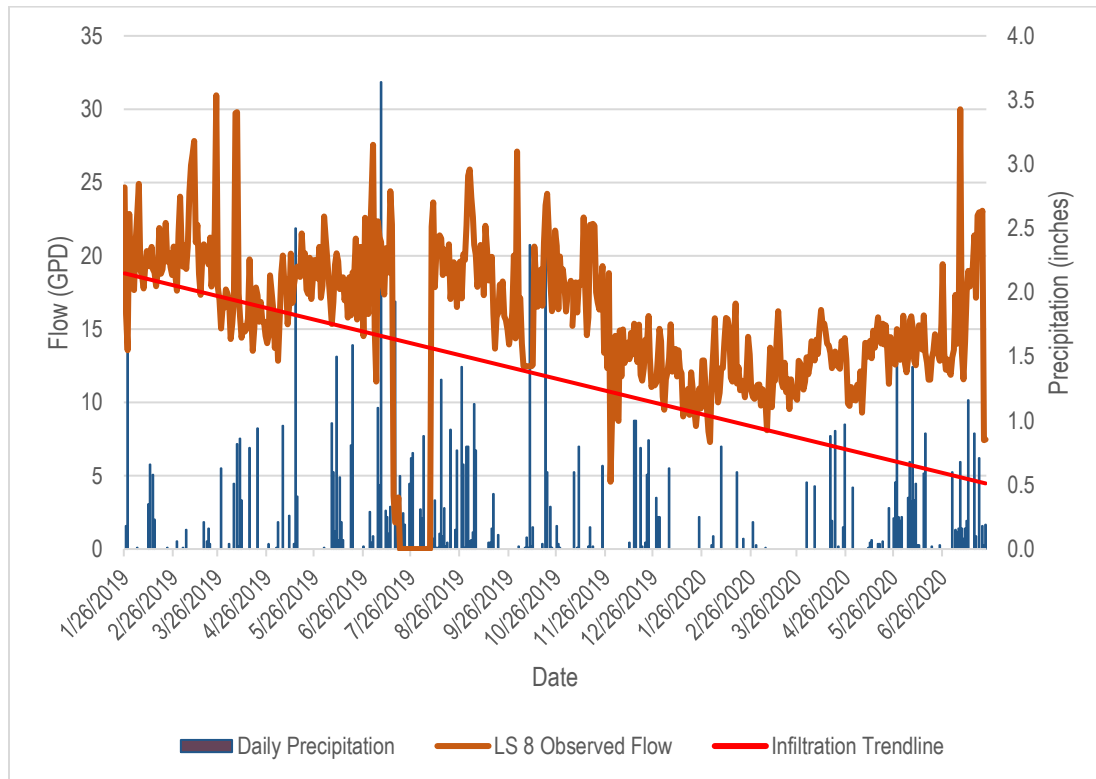
In addition to identifying areas of potentially excessive I/I flow, an analysis in a select area tributary to the Sampey Road WWTP was performed to observe the percentage of extraneous flow vs wastewater. Wastewater flows, infiltration trendlines, and historic rainfall data were all plotted for Lift Stations 7 and 8 in **Figure 7-4** and **Figure 7-5**, respectively. Only eight months of data were plotted for Lift Station 7 (compared to the 18 months plotted for Lift Station 8) due to a lack of runtime data existing after August 25, 2019.

Figure 7-4: Lift Station 7 Flow vs. Rainfall



*Flow based on pump ratings, not pumping capacity

Figure 7-5: Lift Station 8 Flow vs. Rainfall



To quantify the I/I the average base flow (calculated at Sampey Road WWTP from ADFs from characteristically dry months), including residential, municipal, commercial, and industrial flows was calculated to be approximately 637,715 gpd in 2019. The average daily I/I at the Sampey Road WWTP was estimated by subtracting the base flow from the average daily Sampey Road WWTP flow of 693,259 gpd and the additional flow of 1,875 gpd from the City of Mascotte. Therefore, the estimated average I/I component of the WWTP flow is estimated to be 53,668 gpd, or 7.7% of the ADFs. This calculation was done on the Sampey service area as it contains the older portions of the collections system and is likely to have a higher I/I rate than the Sunshine service area. When projecting future flows, Section 6.1, the rate of 7.7% was used for all service areas as a conservative estimate of I/I throughout the City.

The City should continue to monitor the system for signs of I/I, such as increases in influent quantities at the treatment facilities or increases in pump station run times following rain events. I/I could be an indicator of structural defects in the collection system and the need for more detailed system investigations, such as Closed-Circuit Television (CCTV) inspections to identify the sources of infiltration. Recommendations to evaluate I/I are provided in Section 7.1.3.

7.1.3 Recommendations

7.1.3.1 Collection System

The model results presented in **Table 7-2** identified a constriction in the gravity sewer collection system under existing wastewater flow conditions. This restriction, which limits the capacity of the gravity main, resulted in surcharging of the upstream gravity sewer. The remaining increases in gravity sewer flows are a result of new development discharging to the gravity sewer specifically in the collection system tributary to LS 18 and Sunshine WWTP, gravity pipe near LS 35, and upstream of LS 28 near Cherry Lake. Recommended gravity sewer pipe upgrades based on the model results are summarized in **Table 7-6**.

Table 7-6: Existing Gravity Pipe Upgrades

Location	Pipe Type	Length (ft)	Phase	Proposed Upgrade	Notes
E Magnolia Street	Gravity Main	1,400	Existing	Throttle Surge – resulting in less than 5 feet of freeboard	MH-324 to LS 7 WW
Near SR-19 and US 27 (LS 18)	Gravity Main	2,800	2045	Upgrade From 10 to 12 inch	MH-608 to LS 18 WW
Blackstone Creek Road	Gravity Main	600	2045	Upgrade from 8-inch to 10-inch	MH-1243 to LS 28 WW
Glass Onion Drive near Long and Winding Road	Gravity Main	600	2045	Upgrade from 8-inch to 16-inch	MH-154 to LS 35 WW

In addition to periodic cleaning and inspection of gravity collection sewer components, periodic review of inflow and infiltration should be completed. As discussed in the previous section, infiltration can be an indicator of structural defects in the collection system. Data collected via the SCADA can aid in the monitoring of flows at individual lift stations to allow this to be completed periodically or using an automated process. Woodard & Curran recommends that the City perform an I/I investigation for lift stations nearing capacity to both remove the extraneous water in the collection system and to allow the pump station to be upgraded or renewed with appropriately sized pumping equipment.

Table 7 presents lift stations for which their tributary area collection system should be investigated to remove I/I. The cost included assumes infiltration investigation tasks flow isolation of the full area and CCTV of 50% of the area and inflow investigation tasks including smoke testing, 20 dye tests, and 20 building inspections:

Table 7-7: Lift Stations to be Investigated for I/I

Lift Station	Pipe (LF)	Cost
9	4,500	\$ 16,250
10	1,900	\$ 9,750
21	4,450	\$ 16,250
26	14,450	\$ 41,250
29	16,600	\$ 46,500
Total		\$130,000

Future gravity pipe connections to future lift stations should be evaluated on a case-by-case basis at such time the developer has a proposed site layout, layout for sewer collection piping within the development, internal development lift stations and when each development will be implemented. W&C has assumed that all utilities and conveyance piping within the developments and to the nearest municipal lift station, as described in the following section, should be cost borne by the developer or developers.

Figure 7-6: Collection System Upgrades

Link to Figure on OneDrive: [7-6 Collection System Upgrades](#)

7.1.3.2 Lift Station Upgrades

Lift station upgrades can be classified as Age, Undersized pump, or Future Development. Age, simply put, is the lift station components have exceeded their service life. Lift station components are generally anticipated to have a 20-year typical service life for equipment such as pumps, valves, and some sensors and control panels, and a 50-year service life for pipe, fittings, and structural components. There are currently 59 lift stations in Groveland of which 15 have exceeded the 20-year service life with an additional 12 lift stations exceeding the 20-year service life by 2025.

Recommendations for rehabilitation and upgrade of the City's existing 59 lift stations is summarized in **Table 7-8** and are described in more detail below. The following lift station rehabilitation and upgrade schedule is based on a 22-year service life for lift station equipment and an assumed minimum 50-year service life for pipe and concrete structures such as wet wells, valve vaults, and concrete control buildings.

Undersized pumps may be a result of extraneous flow (I/I) overwhelming the pumping capacity, degradation of equipment over time, or as a result of connection to a common force main, as described below.

I/I Removal

I/I should ideally be removed from the collection system; however, the cost to pump and treat (which may include upgrade of downstream pump station and/or wastewater treatment capacity)

the extraneous flow should be compared to locating and removing the I/I source, and the more cost-effective option should be considered. Prior to considering upgrade of lift station equipment, those lift stations identified in 7.1.2 above should be evaluated to remove extraneous flow prior to upgrade.

Future Development

Future development indicates that a pump station will see additional wastewater flow from new developments requiring a capacity upgrade or additional wastewater flow added to the common force main which requires that station to have the pump horsepower upgraded to maintain the existing pump capacity.

Capacity Degradation

Degradation of equipment, like age, is the reduction in efficiency over time and may be a result of: ablation of impeller material by abrasion, end of bearing life, seal failure and leakage, or breakdown due to exposure to the wastewater environment. Maintenance can extend the life, but a reduction in capacity from the original design conditions should be expected.

Common Force Mains

Common force mains can be challenging as they are typically sized for particular flow range and generally rely on the pump stations to operate independently. Under normal operating conditions, the lift stations will each pump down their wastewater volume and have little impact on the other lift stations in the system. As additional lift stations are connected or when extraneous flow enters the system, the individual stations pump for longer periods of time. When the pump stations pump concurrently into a manifold force main system, the overall pressure of the common force main increases. As a result, the individual pumps will pump at a lower rate or if the pressure is high enough, not pump at all until the pressure in the main is reduced when other stations cease operating. As new connections to the common main are made, the system must be balanced to avoid this “deadhead” condition that can result in surcharging of lift station or sanitary sewer overflows.

Woodard & Curran recommends that an evaluation of each pump station be completed, and the Master Utilities Plan model be updated to better understand the current operating conditions of each lift station and to better predict the impact of increased flows as a result of redevelopment or new development. There are currently four large common force mains in Groveland with two connecting to Sampey Road WWTP from the east and west and two connecting to Sunshine Parkway WWTP, Wilson Lake Parkway and the Industrial Park. The model currently identifies six pump stations that experience reduced capacity as a result of being undersized (LS 17, 18, 24, 30, 37, 45). To avoid wet well surcharging, the following solutions can be implemented: balancing of the force main by use of controls to limit simultaneous operation; adjusting pump horsepower for even pumping under simultaneous operations; or increasing the force main diameter.

Future development is upgrading equipment or completely replacing a lift station to provide an increase in service for a new source generating wastewater.

Annual Renewal and Replacement Program

The City should update annual funding needs to replace equipment that has exceeded typical operational life. Replacement of aging equipment and new lift stations to convey wastewater from new developments should be balanced and will likely need to be evaluated as new developments are proposed and adjusted to reflect actual wastewater flow conditions after construction of new and redeveloped areas.

Table 7-8: Phased Lift Station Rehabilitation/Upgrade

Lift Station	Upgrade Trigger	Year	Upgrade/ Rehabilitation	Capacity (MGD)	Cost (\$)
13	Inadequate Peak Flow Capacity/Future Development 2025	2022	Upgrade	1.5	\$95,000
16	Age, High Pressure in Main	2022	Rehab	0.73	\$70,000
17	Undersized Pump/Future Development 2025	2022	Upgrade	0.37	\$95,000
18	Undersized Pump (high runtimes)/Future Development 2025/2045	2022	Upgrade	1.45	\$95,000
24	Undersized Pump (high pressure in common main)	2022	Rehab	1.01	\$70,000
30	Undersized Pump (high pressure in common main)	2022	Rehab	0.28	\$70,000
37	Future Development 2025	2022	Upgrade	TBD	\$95,000
45	Undersized Pump (high pressure in common main)	2022	Rehab	0.13	\$70,000
1	Age	2023	Rehab	0.32	\$70,000
2	Age	2023	Rehab	0.17	\$70,000
6	Inadequate Peak Flow Capacity	2023	Upgrade	0.39	\$95,000
7	Inadequate Peak Flow Capacity/Future Development 2025	2023	Upgrade	1.10	\$95,000
8	Undersized Pump	2023	Upgrade	0.30	\$95,000
20	Future Development 2025, Age	2023	Rehab	1.02	\$70,000
36	Future Development 2025	2023	Rehab	0.16	\$70,000
49	Future Development 2025	2023	Rehab	0.30	\$70,000
51	Future Development 2025	2023	Rehab	0.68	\$70,000
53	Future Development 2025/Missing Information	2023	Rehab	0.10	\$70,000
4	Undersized Pump/Future Development	2024	Upgrade	0.21	\$95,000
5	Age/Undersized Pump	2024	Upgrade	0.18	\$95,000
9	Age/Re-Evaluate Post I/I	2024	Rehab	0.10	\$70,000
10	Undersized Pump	2024	Upgrade	0.19	\$95,000
11	Age	2024	Rehab	0.17	\$70,000

Lift Station	Upgrade Trigger	Year	Upgrade/ Rehabilitation	Capacity (MGD)	Cost (\$)
12	Age/Future Development 2025	2024	Rehab	0.24	\$70,000
14	Age/Future Development 2025	2024	Rehab	0.26	\$70,000
15	Age	2024	Rehab	0.65	\$70,000
48	Future Development 2025	2024	Upgrade	0.92	\$95,000
3	Age	2025	Rehab	0.39	\$70,000
19	Age	2026	Rehab	0.19	\$70,000
21	Age/Re-Evaluate Post I/I	2026	Rehab	0.37	\$70,000
22	Undersized Pump/Age	2026	Upgrade	0.31	\$95,000
23	Age	2027	Rehab	0.26	\$70,000
25	Age	2027	Rehab	0.21	\$70,000
26	Age	2027	Rehab	0.64	\$70,000
27	Age	2027	Rehab	0.40	\$70,000
28	Age/Future Development 2045	2027	Upgrade	0.90	\$95,000
29	Age/Undersized Pump/Future Development 2045	2028	Upgrade	1.0	\$95,000
31	Age/Undersized Pump	2028	Rehab	0.54	\$70,000
32	Age	2028	Rehab	0.28	\$70,000
33	Age	2028	Rehab	0.13	\$70,000
35	Age/Future Development 2045	2029	Upgrade	3.9	\$70,000
34	Age/Future Development 2045	2030	Upgrade	0.13	\$95,000
38	Age	2030	Rehab	0.15	\$70,000
39	Age	2030	Rehab	0.26	\$70,000
40	Age	2034	Rehab	0.12	\$70,000
41	Age	2034	Rehab	0.12	\$70,000
42	Age	2035	Rehab	1.04	\$70,000
43	Age	2036	Rehab	0.36	\$70,000
44	Age	2036	Rehab	0.19	\$70,000
46	Age	2037	Rehab	0.36	\$70,000
47	Age	2037	Rehab	0.37	\$70,000
50	Age/Future Development 2045	2039	Upgrade	0.24	\$95,000
52	Age	2040	Rehab	0.14	\$70,000
54	Age	2041	Rehab	0.14	\$70,000
55	Age	2041	Rehab	0.22	\$70,000
56	Age	2042	Rehab	0.16	\$70,000
57	Age	2042	Rehab	0.43	\$70,000
58	Age/Undersized Pump	2043	Rehab	0.18	\$70,000
59	Age/Redirection to Phase 3-6	2043	Rehab	1.76	\$70,000
Total					\$4,530,000

Lift stations identified for rehabilitation in 2022 through 2024 generally require rehabilitation or upgrade to provide conveyance capacity sufficient for development scheduled for the 2025 to 2027 time period. The list provided above should be reevaluated annually based on inflow and infiltration mitigation, additional information from lift station evaluations, operations staff observations of equipment performance, and the frequently changing demands of new development. Scheduled lift station rehabilitation may be extended based on actual conditions, criticality, emergency storage capacity, and redundancy of pumping. Lift stations to be

rehabilitated after 2028 are generally identified for rehabilitation due to reaching the 22-year service life. Replacement of pump motors, impellers or other components and proper maintenance may extend the service life beyond 22 years and allow the City to direct resources to more critical repairs and facilitate the new lift stations previously identified in **Table 6-10**.

These new lift stations to provide conveyance for future buildout are identified by year and include the firm capacity in MGD based on W&C current understanding of the planned developments or proposed housing density. The new lift stations costs are in 2021 dollars and for lift stations located in or handling only flows from Mascotte, it has been assumed that those costs will be borne fully by the City of Mascotte. The City may consider funding these proposed lift stations with impact fees or providing design criteria and equipment requirements to the developers to allow the developers to construct the lift stations as part and to the standards of the City and the plan presented herein.

Generators

Woodard & Curran investigated the generators at each lift station to determine the presence of a generator, if the site could accommodate a generator, and the year the lift station was constructed (assumed to be year of generator installation if one is present), as shown on **Figure 7-7** and in **Table 7-6**. In addition to the rehabilitation detailed above, Woodard & Curran recommends installing a generator at all lift stations where one doesn't exist and replacing existing generators as they approach the end of their useful life. Existing generators should be replaced based on maintenance history, total operating hours, availability, overall age, and condition assessment by a qualified technician. Woodard & Curran recommends budgeting to replace the four oldest generators in year two and two or three of the next oldest generators per year.

Figure 7-7: Lift Station Generator Status

Link to Figure on OneDrive: [7-7 Lift Station Generator Status](#)

Table 7-6: Lift Station Generators

Lift Station	Location	Generator Present	Proposed Genset	Cost of Installation¹	Year of Installation
5	Gadson	No	C35 D6	\$49,000	1991
13	Arnold	No	C50 D6C	\$54,000	1993
1	Sampey	No	Site Cannot Accommodate a Generator		1994
8	Lake David	No	C40 D6	\$51,000	1994
9	Mt. Pleasant	No	C35 D6	\$49,000	1994
10	Ledbetter	No	C40 D6	\$51,000	1994
14	Phelps	No	Site Cannot Accommodate a Generator		1994
15	S. Independence	No	C50 D6C	\$54,000	1995
4	Beverly	No	C50 D6C	\$54,000	1998

Lift Station	Location	Generator Present	Proposed Genset	Cost of Installation ¹	Year of Installation
2	Curtis	No	C40 D6	\$51,000	2001
6	Anderson	No	C35 D6	\$49,000	2001
11	Kent	No	C35 D6	\$49,000	2002
12	Quail Oaks	No	C50 D6C	\$50,000	2002
3	Crane's Landing	No	C50 D6C	\$54,000	2003
19	Osprey Cove	No	C40 D6	\$51,000	2004
21	Timber Run	No	C50 D6C	\$54,000	2004
22	Eagle Pine	No	C50 D6C	\$55,000	2004
34	Ardmore	No	Site Cannot Accommodate a Generator		2008
40	Catherine Ln	No	Site Cannot Accommodate a Generator		2012
41	Wendell Ave.	No	C50 D6C	\$54,000	2012
18	Hwy 19	No	C50 D6C	\$54,000	2016
54	Cherry Lake Park	No	C50 D6C	\$55,000	2019
44	Green Gate	No	Site Cannot Accommodate a Generator		Unknown
45	Messy Dog 2	No	Site Cannot Accommodate a Generator		Unknown
7	Magnolia	Yes	--	--	1994
16	N. Independence	Yes	--	--	1995
17	Sunshine Pkwy	Yes	--	--	1995
20	Bluegrass	Yes	--	--	1995
24	Cherry Ridge	Yes	--	--	2004
23	Westwood	Yes	--	--	2005
25	Trilogy #1	Yes	--	--	2005
26	Trilogy #2	Yes	--	--	2005
27	Trilogy #3	Yes	--	--	2005
28	Southridge	Yes	--	--	2005
29	Marina Del Ray	Yes	--	--	2006
30	Sunshine Ridge	Yes	--	--	2006
31	Eagle Pointe	Yes	--	--	2006
32	Timber Villas	Yes	--	--	2006
33	Cherry Lake Oaks	Yes	--	--	2006
35	Blue Spring Reserve	Yes	--	--	2007
36	Lago Katrina	Yes	--	--	2008
37	Waterside Pointe	Yes	--	--	2008
38	Publix	Yes	--	--	2008
39	Republic Drive	Yes	--	--	2008
42	Vineyard	Yes	--	--	2013
43	Green Valley	Yes	--	--	2014
46	Lake Douglas Preserve	Yes	--	--	2015
47	Trilogy #4	Yes	--	--	2015

Lift Station	Location	Generator Present	Proposed Genset	Cost of Installation ¹	Year of Installation
48	Trilogy #5	Yes	--	--	2016
49	Sunrise	Yes	--	--	2017
50	Cypress Oaks	Yes	--	--	2017
51	Cherry Lake Landing	Yes	--	--	2017
52	Stewart Lake Preserve	Yes	--	--	2018
53	Katrina Shores	Yes	--	--	2019
55	Wilson Lake Estates	Yes	--	--	2019
56	Kroger	Yes	--	--	2019
57	Arbor Wood	Yes	--	--	2020
58	Preserve at Sunrise	Yes	--	--	2021
59	Trinity Lakes	Yes	--	--	2021

¹Proposed gensets have not been selected for lift stations with an existing generator. A replacement cost of approximately \$52,000 can be assumed for planning purposes to replace existing generators.

7.1.3.3 Force Main Upsizing

There are several existing force main pipes that are undersized as a result of additional wastewater flows to existing lift stations and new lift stations constructed and connected to existing force mains to accommodate new development. These force mains issues can be exacerbated by pumping from multiple lift stations simultaneously. Additional lift station connections and increases in wastewater flow can further overwhelm the existing pipe network. As discussed previously, the overtaxed force mains can result in higher operating pressures which can reduce the pumping capacity of the individual lift stations. The reduced capacity can result in surcharging in lift station wet wells with lift station pumps being overloaded and may potentially cause sanitary sewer overflow.

Table 7-9 below presents segments of force main that are considered undersized under existing conditions. These force mains should be addressed in the near future to maintain reliable operation of the associated lift stations. **Table 7-10** presents force main segments that have restrictions under existing conditions but are not considered critical or replacement may be contingent on other projects. These lift station should be upgraded accordingly as development occurs. The pipe size recommendation in the table below is a based on the flows describe previously in this report and like the lift station and other assets, reevaluated on an annual basis.

Table 7-9: Existing Force Main Upgrades

Force Main Pipe Deficiencies				
Location	Phasing	Length (ft)	Upgrade Pipe Size (in)	Cost
LS 18 FM	Existing	150	Increase to 12-inch diameter	\$37,500
LS 24 FM	2025	2,650	Increase to 8-inch diameter	\$650,000
Total Force Main		2,800		

Table 7-10 – Future Force Main Pipes

Location	Facility Type	Length (ft)	Phasing	Proposed Upgrade	Cost
LS 17 FM	Force Main	50	2025	Increase force main to 8-inch diameter	\$12,500
LS 30 FM	Force Main	1,000	2025	Increase force main to 6-inch diameter	\$250,000
Shared FM in SR-19	Force Main	1,900	Existing	Velocity exceeds 8 fps	\$475,000
Total Force Main		2,950			

7.1.3.4 Septic to Sewer Conversion

There are many homes within the Sampey WWTP service area that have sewer access but are not connected to the sewer system. Woodard & Curran recommends those developments within 200 feet of an existing sewer be transitioned from septic to sewer. These developments are Crane's Landing (165 units) and Hidden Lakes Estates (126 units). The transition may occur either when the septic systems begin to fail or under City guidance. The treatment capacity for this septic to sewer conversion has been included in Section 6.1.1. Woodard & Curran anticipates the cost to convert these septic systems to sewer to be approximately \$7,839,000, including the new connection fee and decommissioning the existing septic system. This project is not economically feasible unless significant outside funding can be secured.

The Sunshine WWTP service area was investigated as well and no economically feasible septic to sewer conversion opportunities were identified. The City should continue to seek funding to cost-effectively connect these septic areas as opportunities present themselves.

7.1.3.5 Septic to Distributed Sewer Conversion

It is not feasible to connect many of the homes on septic in Groveland to the sewer system due to distance or cost. The septic systems at these homes will continue to pose threats to the water quality in the City. Use of a Distributed Sewer system could mitigate the threat to water quality by treating the wastewater onsite resulting in a reduction in nitrogen released into nearby bodies of water. Distributed Sewer systems have been implemented successfully in the City of Apopka

and it is anticipated that this system will result in a total nitrogen load reduction of 10 to 23 pounds per year (88% removal efficiency) per tank installed. Additional information on the Apopka conversion program can be found at [Apopka Septic Tank Remediation Program \(onsyte.com\)](https://onsyte.com).

From the above website: "Distributed Sewer is a new method of providing wastewater treatment to homeowners anywhere, without the need to connect the home to a central plant through pipes. A miniature wastewater treatment unit – about the size of a regular septic tank – is installed underground at a residence to provide sewer service. A small but powerful computer and network interface mounts to the side of the house, allowing the utility to monitor and operate the treatment unit from a remote location."

Woodard & Curran recommends Distributed Sewer technology be considered for homes within environmentally sensitive areas and a pilot study to evaluate the feasibility of implementing this treatment technology in Groveland. A budgetary cost of \$75,000 is recommended to implement the pilot study, which is anticipated to include soliciting interest by homeowners with septic systems and fully or partially funding up to 5 or more conversion sites. The City should seek to reduce this cost and/or expand the pilot study by pursuing grant funds. Additionally, pending the results of the pilot study, the City should consider incorporating Distributed Sewer systems as an alternative or requirement to traditional septic systems for new developments within the City limits that will not be connected to the City's wastewater utilities.

7.2 Treatment Facilities Assessment

The Sampey and Sunshine WWTP treatment facilities can adequately treat the existing sanitary wastewater flows in compliance with the existing FDEP permits at the current flow loading rate. The headworks at both WWTPs, however, experience large amounts of fats, oils, and grease (FOG) resulting in a failure of the screen at the Sampey Road WWTP and a significant increase in maintenance requirements at the Sunshine WWTP.

The capacity increases described in Section 6, will cause many unit processes to exceed their hydraulic loading capabilities rendering them unable to treat to permit levels. Expansion of the Sampey Road WWTP is needed to meet this increased capacity and will require an upgrade to all treatment processes. An assessment and recommendations for increased capacity is not discussed in this section of the report. A detailed assessment of the Sampey Road WWTP and analysis of hydraulic capacity is located in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#), and the recommended expansion upgrades are presented in Section 6.2.3.1 of this report. It is proposed that increased wastewater flows in the northern portion of the City will be sent to the new Regional WWTP as opposed to the Sunshine WWTP. Since capacity is not expected to increase at the Sunshine WWTP and it is currently able to meet treatment requirements and no upgrades are planned, the same hydraulic capacity analysis was not conducted.

7.2.1 Recommendations

7.2.1.1 Upgrade Headworks

The headworks at the Sampey Road and Sunshine WWTPs are experiencing high levels of FOG and ragging that have caused a failure of the step screen at Sampey and excessive maintenance at Sunshine. As a result, downstream equipment and processes have been damaged and have required additional preventative maintenance. Woodard & Curran recommends an upgrade to the headworks at both the Sampey Road and Sunshine WWTPs. Additional details, alternatives analysis, and cost information on the recommended headworks project are located in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#).

Sampey Road WWTP

The recommended upgrades for the Headworks at Sampey include two new fine screens, two washer-compactors, a hot water skid for FOG management, and replacement of several gates. The facility has not had a fine, automated headworks screen since late 2018 when the existing equipment was damaged. This plan proposes installing a center-flow screen in both channels due to its ability to be retrofitted for the existing channels, its high screenings capture ratio (SCR), and operations and maintenance ease. A brief structural evaluation should be conducted during detailed design to confirm that the concrete structure has adequate capacity to support the proposed equipment. A Hammerhead Onsite Screen Sizing (HOSS) test was performed by HydroDyne Engineering and recommended a 4 millimeter (mm) slotted screen for optimal screenings capture.

Washer/Compacter

The washer/compacter at Sampey Road WWTP has been removed and is not salvageable due to damage sustained from the FOG surcharge. Therefore, new washer/compactors are recommended for each screen installation, the stainless-steel piping (verification of the type of stainless steel will occur during detailed design) that conveys screenings to the dumpster is still on-site and can potentially be utilized.

Hot Water Heater Skid

Due to the potential for grease at Sampey Road WWTP, a hot water heater skid is recommended to be installed at the headworks. If the screen begins to blind because of grease accumulation, the hot water heater will allow the grease to pass and protect the equipment from completely blinding. The skid should include a booster pump to ensure sufficient pressure to the hot water system. The Industrial Pretreatment Program (IPP) went into effect in 2020 for large users (SouthWaste, Dominos Distribution, and Niagara Bottling) and in 2021 for smaller users (local food service establishments). As the IPP program continues to be implemented it is anticipated that FOG will be minimized but could change due to growth within the service area, and the use of the hot water heater will be needed either as part of ongoing operations or to avoid disruption at the WWTP due to noncompliance.

Stop Gates

In addition to screenings upgrades, the headworks requires to replace the stop gates at the influent channel with a motorized or hand crank slide gate and replace the stop gates at the discharge to future Oxidation Ditches 3 and 4 with flow-splitting weirs to ensure equal flow distribution among the four oxidation ditches.

Cost

The anticipated cost of the Sampey Road WWTP headworks upgrade project is \$586,000. Note that the cost to replace one screen has already been funded via emergency funding and that cost was removed from the estimate projected in this plan.

Sunshine WWTP

Woodard & Curran recommends retrofitting both channels with a center-flow screen design at Sunshine WWTP, similarly, recommended at the Sampey Road WWTP. No hot water heater is recommended at Sunshine WWTP because there has not been evidence of large quantities of FOG.

Cost

The anticipated cost of the Sunshine WWTP headworks upgrade project is \$1,010,000.

7.3 Dewatering and Biosolids Assessment

The plant flows have been increasing the last few years and the proper management of sludge is a growing concern. The existing sludge dewatering box does not have the capacity to handle the existing flows and the plant is forced to haul liquid waste offsite at a high cost.

7.3.1 Recommendations

7.3.1.1 Biosolids Dewatering at Sunshine WWTP

Currently, the City has a contract with a third-party contractor, Synagro, to collect and treat the liquid biosolids from the Sunshine WWTP. They utilize a mobile centrifuge to dewater the liquid sludge, haul the dewatered cake and pay the tip fee at a Class A compost facility permitted by the FDEP. They provide all the dewatering equipment, necessary supplies such as hoses and polymer, and dewater the sludge while on-site.

Prior to employing Synagro, the City utilized a dewatering box, which does not have the capacity to handle all the sludge currently produced at the facility. This has resulted in frequent, costly hauling of liquid sludge.

As mentioned in Section 6.2 above, Woodard & Curran recommends the expansion of the Sampey Road WWTP, construction of a new Regional WWTP and the conversion of Sunshine WWTP into a pump station to meet ongoing and future collection, conveyance, and wastewater treatment

needs. Therefore, Woodard & Curran recommends the City continue to utilize Synagro to manage biosolids dewatering at the Sunshine facility before converting it into a lift station but should re-evaluate this option if the dewatering contract costs significantly increase in the near future.

7.3.1.2 Upgrade Biosolids Dewatering at Sampey WWTP

Woodard & Curran recommends the City install a screw press to upgrade the biosolids dewatering process at the Sampey Road WWTP. The proposed screw press technology allows for more flexible operations in the future, can handle future flows and loads, can be run without continuous supervision, and can handle variable sludge feed. The sludge cake should be conveyed by the new screw conveyors to a roll off dumpster for disposal. The filtrate should be tied into the In-Plant Recycle Pump Station (Section 6.2.3.1) to be returned to the head of the plant. A new polymer feed system and sludge feed pump are recommended to feed sludge entering the proposed screw press.

Based on bench testing, the screw press performance provides an average sludge cake solids of 17% dry solids (DS). This performance provides flexibility in the future if the City opts to pursue generating Class A biosolids.

Cost

Woodard & Curran anticipates the cost to upgrade the biosolids dewatering process at the Sampey Road WWTP is \$2,121,000. Additional details, alternatives analysis, and cost information on the recommended headworks project are located in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#).

7.4 Disposal Systems Assessment

Groveland sends 100% of its treated wastewater to the reclaimed water system, except during wet periods or emergencies when reclaimed water demand is low and existing storage is exceeded, resulting in disposal to RIBs that serve the Sunshine Parkway WWTP or the sprayfield that serves the Sampey Road WWTP.

Sampey WWTP Sprayfield

The sprayfield at the Sampey Road WWTP site is permitted for spraying effluent water if the quality is considered reject. The sprayfield is the only option for the disposal of reject water at the Sampey WWTP when the onsite 1.5 MG reject storage is exceeded. This storage is subject to exhaustion during prolonged or intense wet weather events. Without the sprayfield, the City would be in violation of regulation and permits that govern the WWTP's discharge. The sprayfield is even more pertinent understanding the rapid project population growth and associated increase in wastewater flows over the next 10 to 20 years. Sampey is scheduled for expansion (Section 6.2.3.1) and the demand for disposal will only continue to increase, both at Sampey and other City facilities and the sprayfield supports the required disposal capacity. Additionally, while added reject storage is included in the Sampey WWTP upgrades, the sprayfield remains the only permitted

option for reject water disposal. The continued use of the sprayfield, therefore, is still an important component for plant operators.

The condition of the pipe to the sprayfields is unknown and the potential for exfiltration is undetermined. There are few sprinklers in working condition, however, many are damaged, have missing heads, or are plugged. Additionally, it is impossible to bypass the sprayfield pump, so if the pump were to fail and the reject tank was full, the plant would have to discharge low quality effluent in violation of their permit.

Sunshine WWTP RIBs

The Sunshine WWTP discharges wastewater effluent to RIBs. The site is located just east of the intersection of Route 19 and O'Brian Road and includes three RIBs that are permitted for 0.42 MG of total flow per day. The site was originally designed in 1989 to accommodate six RIBs, but limited information is available to develop an understanding of the maximum disposal capacity that can be achieved at the site. Given the projected wastewater flows to the proposed Regional WWTP and disposal capacity limitation at the Sunshine Parkway WWTP RIB site, additional disposal capacity will be needed.

7.4.1 Recommendations

7.4.1.1 Sunshine WWTP RIB Expansion

The existing Sunshine Parkway WWTP RIB site is a desirable location for expansion to support disposal of a portion of the future wastewater effluent flows from the Regional WWTP. Woodard & Curran performed a preliminary desktop analysis of the potential disposal capacity for the site, but this information requires further review and on-site hydrogeologic investigations to confirm this information, summarized in **Table 7-7**.

Table 7-7: Potential Capacity with Expansion to 6 RIBs

Option	Capacity	Annual Loading	Assumptions
A. Expansion under Current Conditions	0.84 MGD	3.2 inches per day	- No hydrogeologic constraints 7 days of loading and 14 days of resting
B. Max loading ¹ without process controls	2.4 MGD	9 inches per day	- No hydrogeologic constraints 7 days of loading and 14 days of resting
C. Max loading ¹ with process controls	>2.4 MGD	Filtration required: TSS < 5 mg/L TN < 10 mg/L	- Potential use of zone of discharge to waive WQ criteria - Approved pre-treatment program - Class I reliability

1. Max loading assumes the maximum groundwater loading conditions of 9 inches per day with 7 days of loading and 14 days of resting.

Future RIB site(s) with suitable hydrogeologic conditions may require an additional 50-55 acres. An additional 35 acres will be needed to support Phase I of the Regional WWTP, assuming a capacity of approximately 2.5 MGD can be achieved with expansion of the Sunshine RIBs.

Expansion of the Sunshine Parkway WWTP RIB site may be able to accommodate the first phase of the Regional WWTP; however, additional sites are needed to support the full capacity. The following options are recommended to pursue suitable sites for additional disposal for the Regional WWTP:

- Regional WWTP Site: Review the suitability of the proposed Regional WWTP site for RIBs or a sprayfield and the options to acquire additional land as part of an update to the Development Agreement for Villa City.
- Site Suitability Analysis: Conduct a site suitability analysis for potential disposal sites in Groveland and identify sites for hydrogeologic investigations. This should include an evaluation of RIB and sprayfield options.
- Options with Mascotte: Review disposal site options with Mascotte as part of future developments or other sites as part of a site suitability analysis.
- Public Use Reuse: Evaluate alternatives disposal methods and locations such as public use reuse and incorporate these locations into future developments with large open space or recreation areas. For example, subsurface infiltration beneath athletic fields provides a multi-use facility that can be incorporated into developments.
- Increased Storage: Consider options to increase reclaimed water storage at the Regional WWTP and Sunshine Parkway WWTP. Additional space for storage at the Sunshine Parkway WWTP may be more feasible if wastewater treatment operations cease and it is converted into a wastewater pump station. 62-610.414(c) of the Florida Administrative Code requires reclaimed water "system storage capacity shall be the volume equal to three times that portion of ADF of the reuse capacity for which no alternative reuse or disposal method is permitted." A combination of increased storage, RIBs, sprayfields, and public access reuse could be used to meet disposal requirements.
- Deep Injection Well: A deep injection well could be considered for disposal once all other options have been exhausted, but this option is technically challenging and costly.

7.4.1.2 Sampey Sprayfield Upgrades

The sprayfield water distribution system is in poor condition, with suspected infiltration/exfiltration issues along the distribution pipe and most of the sprinkler heads are broken or clogged with a poor spray radius. No operational issues were noted about the sprayfield existing pump, although there is no redundancy in the pumping system. The City can consider additional options in the future to meet reject and disposal requirements for the Sampey WWTP.

The Sunshine WWTP RIBs have been considered as an option for reject disposal. This would require an interconnection to the Sunshine Parkway WWTP RIBs by connecting the existing 12-

inch reclaimed water pipeline between the Sampey and Sunshine WWTPs to the existing discharge to the RIBs. This option poses significant operational challenges and costs to meet permit requirements due to the flushing of approximately 36,000 LF of the 12-inch reclaimed water pipeline to return it to service. This also results in the loss of approximately 211,000 gallons of water to flush the pipeline.

Even if the Sunshine RIBs were an economical option to support disposal from the Sampey WWTP, the Sunshine WWTP is expected to reach its 1.0 MGD capacity by 2027 due to planned developments in the service area. Additionally, the Sunshine RIBs are expected to support the disposal requirements for the proposed Regional WWTP (Section 6.2.3.2). It is anticipated that the full capacity of the RIBs once expanded will be utilized by the Regional WWTP and additional disposal sites will be required throughout the City. A combination of storage options (e.g., tanks and lagoons), PAR disposal sites, and restricted sites (e.g., RIBs and sprayfields) will likely be needed to support the City's growing wastewater treatment needs.

Woodard & Curran recommends the City preserve the existing sprayfield disposal site by installing a second sprayfield pump for redundancy and a flowmeter at the sprayfield site to quantify exfiltration or infiltration with the existing 8-inch pipe, as well as replacing the broken sprinkler system heads. Additionally, the City should work to identify additional storage and disposal options to support future development. Once adequate future disposal sites are identified, the City could consider modification of existing sites to meet permit requirements.

Cost

The anticipated cost of these upgrades to the existing sprayfield is \$190,000. Additional details, alternatives analysis, and cost information on the recommended headworks project are located in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#).

7.4.1.3 Explore Aquaponic Opportunities

Aquaponics is the combination of Aquaculture and Hydroponics which involves an ecosystem-like indoor farm that raises both fish and vegetables in a symbiotic, soil-less system. The waste from the fish serves as nutrients for the plants, which in turn purify the water that cycles within the system. Aquaponics may provide the City with another option to use treated wastewater as opposed to sending it to RIBs or sprayfields and there may be a nutrient benefit to supply local aquaponic farms with a treated wastewater.

The City is in the middle of a pilot study at the City of Groveland Aquaponic Farm, a collaborative effort between Backyard Farm Express LLC and the City of Groveland. At the pilot farm, tilapia will be grown in tanks alongside fruit and vegetable crops. Woodard & Curran recommends monitoring the success of this pilot farm and reevaluate the efficacy of utilizing aquaponics as a wastewater disposal system after the farm is fully established.

There are many other benefits to the City supporting local aquaponic farms and more information on aquaponics and the current Aquaponic Farm pilot study in Groveland is provided in [Appendix O - Aquaponics Farm Agreement](#).

8. RECLAIMED WATER SYSTEM

8.1 Reclaimed Water Capacity Assessment

The City currently treats all wastewater flows to meet reclaimed water standards for use as irrigation. Very little reject water is sent to the Sampey Sprayfield or Sunshine RIBs throughout the year based on maintenance needs and is typically fewer than 50,000 gallons. In rare instances when irrigation demand is low (e.g., major storm events), treated reclaimed water may need to be disposed at the Sampey Sprayfield or Sunshine RIBs. Existing irrigation demand, however, exceeds the reclaimed water supply and irrigation demand is supplemented from raw and potable water sources.

A future irrigation application rate target of 28.24 inches per year per irrigated area was developed based on USEPA guidelines to meet the SJRWMD goals for gross per capita daily water use. This is an average over the service area for future developments to be served by 100% reclaimed water and avoid using raw or potable water from the Upper or Lower Floridan aquifers, which will support increased withdrawal to meet future indoor water demands. To meet this target demand significant conservation is required and if the City cannot meet this conservation goal, additional water from alternative water sources from those presented in this Master Plan may be required. The future reclaimed water demand was projected assuming that all future developments maintain a target usage rate of 57 gpcd.

Methodology for Estimating Future Irrigation Demand

The irrigation demand for future developments was split into two categories based on the land use: residential and "other". Other uses include irrigating parks, easements, open space etc. The Cherry Lake Village development and corresponding land use area was utilized as a representative development to estimate an average residential demand per lot and other demand dependent on the size of the development.

The average size of residential lots was estimated at 0.16 acres, and it was assumed that 45% of the lot would be irrigated.

The "other" reclaimed water use demand was calculated using the Cherry Lake Village land use areas at the following assumed percent of irrigated of each land use category:

- Open Space: 30%
- Recreation: 65%
- Retention/Open Space: 10%

With these assumptions the other reclaimed water use is approximately 12% of the water used for irrigation in each development.

The 2020 Discharge Monitoring Reports (DMRs) illustrate that on average, between both the Sunshine Parkway and Sampey Road WWTPs, approximately 80% of the influent wastewater is available for use in the reclaimed water system.

Table 8-1 depicts the projected reclaimed water demands and projected available treated wastewater.

Table 8-1: Reclaimed Water 5-Year Incremental Demand Projections (AADF)

	2021	2025	2030	2035	2040	2045
Existing Reclaimed Water Demand (gpd)	1,218,000					
Residential Reclaimed Water Demand (gpd) ¹	147,600 ¹	536,000	734,000	988,000	694,000	657,000
Other Reclaimed Water Demand (gpd)	16,000	65,000	89,000	120,000	84,000	80,000
Total Reclaimed Water Demand (gpd)²	1,381,600	1,982,600	2,805,600	3,913,600	4,691,600	5,428,000
Available Treated WW for Reclaim	1,175,000	2,187,000	3,383,000	4,806,000	5,909,000	6,624,000

¹Projected with target rate of 57 gpcd and assumes that future developments meet this requirement.

²Total reclaimed water demand is cumulative.

Note: The City has a contract with Shelly's Septic to accept up to 100,000 gpd of wastewater that is not reflected in the above totals but will be available for additional reclaimed water use.

The demands presented in **Table 8-1** represent an annual average, however due to the conservation regulations allowing irrigation only two days a week daily demands will be much higher than the above projections indicate. While on average throughout the year there should be enough available treated wastewater for reclaim, the actual instantaneous reclaimed water demands often exceed the treated wastewater effluent requiring additional storage or sources of reclaimed water to support all needs.

8.1.1 Recommendations

If the City can meet the conservation target for irrigation by 2025, then there should be sufficient treated wastewater to supply the entire reclaimed water system. However, the conservation target is significantly lower than the irrigation rate currently practiced across the City, so some additional sources of reclaimed water capacity have been recommended to assist the City in meeting their short term reclaimed water needs while increasing conservation efforts.

To provide an understanding of the "irrigation rate currently practiced across the City", current irrigation practices are generally based on individual development characteristics, the size of lawns, and watering practices by some users that exceed several hundred gpcd compared to the new target of 57 gpcd.

8.1.1.1 Reclaimed Water Lower Floridan Well at Sunshine

The Sunshine WWTP serves the north reclaimed water distribution system in the City and the demand (~0.25 MGD) is augmented by Well #3 that also serves as one of three wells for Water Treatment Plant #3 (potable). Woodard & Curran recommends the City drill another production well that will be dedicated to provide reclaimed water from the Lower Floridan and reduce the demand from the Upper Aquifer at Well #3. The Sunshine WWTP has adequate space to install a Lower Floridan and this project will not require an exploratory well since treatment will not be required for the reclaimed water system.

Cost

The anticipated cost of drilling this well is \$2,640,000.

8.1.1.2 Waterside Pointe Surface Water Withdrawal System Rehabilitation

The Waterside Pointe development has a CUP (No. 2849) to withdraw 28.99 MG annually (0.079 MGD AADF) from Crystal Lake until 2027. The City inherited this challenging system from Waterside Pointe Homeowner's Association and there is the potential for a large benefit to properly managing this alternative water supply and compliance with the CUP. Woodard & Curran recommends the City rehabilitate the existing surface water withdrawal system with a new intake structure, pumps, piping, controls, SCADA, and a new lake weir system to manage storage and control discharge. The new system should be connected to the existing reclaimed water system for Waterside Pointe. This project will reduce the water withdrawn from the Upper Aquifer which is currently being used to supplement the City's Silver Eagle reclaimed water system for this portion of the City.

The existing reclaimed water distribution system is connected to the Silver Eagle Reclaimed Water Plant and withdrawals from Crystal Lake can be used to supplement the City's reclaimed water supply depending on the weather conditions and demand from Waterside Pointe. In addition to rehabilitating the Waterside Pointe reclaimed water system, the system should be optimized with a monitoring and SCADA system to manage lake water levels to service Waterside Pointe and potentially supplement reclaimed water demand for the Silver Eagle reclaimed water distribution system. The optimized system will provide additional benefit to Waterside Pointe and the City and may support a CUP modification to increase withdrawal from Crystal Lake based on the availability of water.

Cost

Woodard & Curran anticipates this project will cost approximately \$415,000. The City received a grant for \$87,500 to support the project and additional details can be found in the Districtwide Cost Share Funding Application, [Appendix P - Application for Districtwide Cost Share](#).

8.1.1.3 Stormwater Alternative Water Source Planning Study

The use of stormwater for reclaimed water augmentation (e.g., “stormwater reuse” or “stormwater harvesting”) benefits water supply when it is successfully used to meet irrigation and other non-potable demands, by offsetting potable demands and reducing groundwater withdrawals. Stormwater reuse also helps reduce nutrient loading to surface water bodies, improves flood protection, and promotes aquifer recharge of stormwater. The practice of stormwater reuse is supported by the SJRWMD as an AWS, and the feasibility of stormwater reuse is required by SJRWMD to be evaluated as part of CUP applications. Stormwater reuse can also be incorporated into public access facilities such as parks or trails.

Stormwater reuse involves the collection and storage of stormwater runoff for later use. Since approximately 70% of rainfall occurs within a 5-month wet season, stormwater runoff must be stored for reuse during drier periods. Nearby examples of stormwater being reused on a regional scale include:

- Tohopekeliga Water Authority (TWA) Judge Farms: As reported in the Florida Water Resources Journal, February 2019, TWA uses a 470-million-gallon stormwater reservoir and pump station which are used to supplement the reclaimed water system. The project includes a public park and provides up to 6 MGD of stormwater to TWA’s reclaimed water system. See [Appendix Q - Florida Water Resources Journal - The Judge Farms Project](#).
- Altamonte Springs A-First: This is a joint Florida Department of Transportation (FDOT) project that uses an I-4 stormwater pond for reuse. It includes a pipeline and stormwater pump station and provides up to 3 MGD of stormwater to Apopka’s reclaimed water system. See [Appendix R - Altamonte Springs A-First](#).
- City of Apopka North Shore: This project uses a reservoir and canal on the north shore of Lake Apopka. It also includes two lined storage ponds, slow sand filter, storage tank and two pump stations which produce up to 5 MGD of stormwater for the reclaimed water system. See [Appendix S - Apopka North Shore Reclaimed Water Treatment Facility](#).

As the City grows, evaluation of additional stormwater sources will be necessary to help meet future reclaimed water demands and permit requirements. Therefore, the development of a stormwater AWS study is recommended. The stormwater AWS study should include:

- Review of the existing Stormwater Master Plan, which focuses on flood protection in the Community Redevelopment Area (CRA).
- Review of Palatlakaha River system blueway/greenway planning data and minimum flow and levels (MFL’s).
- Use of the SJRWMD’s stormwater harvesting GIS tool to identify potential stormwater reuse benefits and applications.
- Review of local development rules and requirements to encourage stormwater storage in new developments.

- Identification and assessment of potential stormwater storage facilities, including borrow pits, reservoirs, FDOT stormwater ponds, new developments, and wetland restoration areas.
- Identification and assessment of potential multi-benefit opportunities, including recreational use of storage facilities.
- Development of project concepts to include stormwater source, storage facilities, and infrastructure required for delivery into the reclaimed water system.
- Prioritization, ranking, and cost estimating of project concepts to determine recommended alternative(s).
- Identification of outside funding sources for potential stormwater reuse project implementation.

Cost

The anticipated cost for this study is approximately \$175,000.

Two potential project concepts are described below to provide examples of the types of stormwater alternative water supply projects. These projects, as well as others identified, will be explored in the recommended study.

Route 50 Relocation

The FDOT has proposed a project that will relocate State Route 50 (SR50). There are two small stormwater retention ponds proposed as part of the SR50 relocation project, detailed in the Watershed Study, [Appendix T - Watershed Study](#). These detention ponds have the potential to be another source of water to supplement the reclaimed water system. The watershed study proposes consolidating the detention ponds into a single larger detention pond that can be used both for reclaimed water and as the center point for a recreational space in the downtown area. Woodard & Curran recommends the City further evaluate this proposal as part of the stormwater alternative water source planning study.

Eco Parks

As the City grows a strong emphasis has been placed on improving the parks and trails by both increasing the percentage of land to be allocated toward open space and diversifying the types of open spaces throughout the City. Groveland can utilize this drive to improve the park system to benefit the water system by considering Eco-Parks. Eco-Parks prioritize storage of storm, flood, and surface waters that can be then used to supplement the reclaimed water system for irrigation. These parks would be designed to be aesthetically pleasing at varying water levels to maximize withdrawal when needed for irrigation during dry weather. Woodard & Curran recommends the City explore areas and designs of these Eco-Parks in the Stormwater Alternative Water Source Planning Study in coordination with the City's Parks, Recreation, Trails and Open Spaces Master Plan.

8.2 Transmission, Distribution, and Storage Assessment

The reclaimed water system for the City consists of the North Reclaimed Water System and the South Reclaimed Water System. The South Reclaimed water system is in good shape and does not have any known operational issues. The North reclaimed water system has a history of low pressure. The Reclaimed Water System Hydraulic Model and Pressure Assistance Memo, [Appendix U - Reclaimed Water System Hydraulic Model and Pressure Assistance](#), has a detailed description of the assessment of the North Reclaimed Water System.

8.2.1 Hydraulic Model

A hydraulic model of the City's reclaimed water system was developed as part of the Utility Master Plan. Prior to this effort, the City did not previously have mapped infrastructure or a hydraulic model for the reclaimed water system.

8.2.1.1 Hydraulic Model Development

The hydraulic model was developed using the InfoWater™ modeling software by Innovyze. InfoWater is an industry-standard, GIS-based modeling program. The model was constructed using GIS data developed as part of the Utility Master Plan effort, based on available City maps, record drawings and other plans and references.

Model demands for the existing system were developed based on reclaimed water billing data geolocated to customer parcels and then allocated to the model. Model demands for future scenarios were developed based on provided development information discussed in Section 2.2. A detailed description of the model development is provided in the Reclaimed Water Hydraulic Model Development Technical Memo, included in [Appendix V - Reclaimed Water Hydraulic Model Development Technical Memo](#).

8.2.1.2 Performance and Design Criteria

The performance and design criteria discussed below reflect typical industry standards for a reclaimed water system design. These criteria were used to evaluate the City's reclaimed water distribution system.

Adequate system pressure is a basic indicator of acceptable water distribution system performance. Additionally, pipeline velocities should be managed in order to avoid significant headloss and deterioration of pipes. The recommended performance standards for the City's reclaimed water system are summarized in **Table 8-2**.

Table 8-2: Reclaimed Water System Criteria

Criteria	Value
System Delivery Pressure	40 – 90 psi
Pipeline Velocity	< 10 fps

8.2.1.3 Existing System Capacities and Deficiencies

Once the hydraulic model was developed and validated, it was used to perform a review of the existing distribution system performance based on the criteria presented in the previous section. A single model scenario—including both the North and South distribution systems—was used to capture the City’s typical, existing irrigation demand conditions in which customers irrigate two days a week based on their house number and property type. Note that the existing system model does not include the pipeline connecting the Sunshine and Sampey/Silver Eagle treatment plants as that pipeline is currently used only to shift supply between the two zones and is not currently used for distribution.

Based on the results of the existing system scenario, the only pressure deficiency identified was in the Trilogy development area in the Northern system. This area has experienced customer complaints related to pressure in the past. There were no pipelines exceeding the velocity criteria. The location of the pressure deficiencies is shown in **Figure 8-1**.

Figure 8-1: Reclaimed Water Distribution System Existing Deficiencies

Link to above Figure on OneDrive: [8-1 Reclaimed Water Existing Deficiencies](#)

8.2.1.4 Future Needs

As discussed previously in this Master Plan, extensive development is expected across the City and new developments will be expected to install reclaimed water irrigation systems. As such, the City will need to expand its reclaimed water distribution system to meet those future demands. As discussed in previous sections, this expansion includes the construction of a new groundwater well dedicated to supplementing the reclaimed water system (located at WTP 3) as well as the construction of a new wastewater treatment plant at Villa City which will also provide a reclaimed water supply.

For the purposes of the hydraulic modeling, it was assumed that all new distribution system infrastructure would be sized to meet the needs of future developments. Additionally, it was assumed that the capacity improvement project to address the existing deficiencies (detailed in 8.2.2) will be implemented prior to 2025 development occurring and that capacity improvement projects to address 2025 deficiencies will be implemented prior to the 2045 development occurring. The predictions are based on projected developments presented to Woodard & Curran as of September 2021 and the City may need to adjust these projects and timelines if the schedule, location, or size of developments change in the future.

The model scenarios described in the following sections were used to confirm the sizing needs of those future facilities and to identify any deficiencies that may be triggered in the existing system as the City grows.

8.2.1.4.1 2025 Future Needs

Building on the existing system scenario, a model scenario was developed for the 2025 planning horizon. This scenario was used to size new facilities to meet the needs of the planned development and to identify any deficiencies that may be triggered in the existing system. In the 2025 scenario, the North and South reclaimed water systems will be combined into one system by utilizing the existing supply transmission main which runs between the two treatment plants along SR-19.

Results of this model scenario simulation indicate that the Sunshine and Silver Eagle pump stations are undersized and cannot provide adequate head to meet needs of the increased demands across the City. Additionally, a portion of the existing 12-inch transmission line along SR-19 triggers the velocity criteria and should be upsized to better facilitate the creation of the single distribution system.

8.2.1.4.2 2045 Future Needs

Building on the 2025 system scenario, a model scenario was developed for the 2045 planning horizon. Like the 2025 scenario, this scenario was used to size new facilities to provide adequate pressure to meet increased demands across the City. In the 2045 scenario it is assumed that the Regional WWTP is online and that the Sunshine treatment plant has been taken out of service. However, since the groundwater well at WTP 3 will still online the pump station at the Sunshine plant will be in service to convey that supply.

Results of this model scenario simulation indicate that due to the significant development the Sunshine and Silver Eagle pump stations are undersized and will need increased capacity. The simulation also indicates that nearly half of the pipe required for the system expansion in 2025 will be undersized (triggering velocity criteria) and will need to be upsized or have a parallel pipe installed. Additionally, a small section of existing pipeline near the Trinity development triggers the velocity criteria and will need to be upsized in order to serve the additional development expected in that area.

8.2.2 Distribution Recommendations

8.2.2.1 Reclaimed Water Main Improvements

The reclaimed water main improvements required to address those deficiencies detailed in the previous section and to connect the existing system to the planned developments are described in the sections below. Recommended projects for Phase 1 (2025) and Phase 2 (2045) are illustrated in **Figure 8-2** and **Figure 8-3**, respectively.

Figure 8-2: Phase 1 Reclaimed Water Distribution System Projects

Link to above Figure on OneDrive: [8-2 Reclaim Water Main Phase 1 Projects](#)

Figure 8-3: Phase 2 Reclaimed Water Distribution System Projects

Link to above Figure on OneDrive: [8-3 Reclaim Water Main Phase 2 Projects](#)

New Reclaimed Water Main

As Groveland continues to grow the City must expand its existing reclaimed water system to connect the new developments. The new reclaimed water mains recommended in this report reflect only those required to connect the new Regional WWTP reclaimed water supply and new developments to the distribution system; it was assumed that the construction of the distribution water mains within each development are the responsibility of the individual developers. Table 8-3 lists the length of new water main recommended, separated into two phases:

- Phase 1 – Water main needed to address development planned by 2025
- Phase 2 – Water main needed to address development planned by 2045

Table 8-3: New Reclaimed Water Main

Diameter (in)	Length (ft)	
	New Development Phase 1	New Development Phase 2
4	37,000	0
6	11,900	0
8	3,800	0
12	7,000	59,800
16	200	9,400
Total	59,900	69,200
Total Cost (\$)	\$9,971,000	\$36,537,000

Upsize Existing Pipe

Along with the new pipeline required to connect planned developments, sections of the City's existing system will need to be upsized in order to facilitate the expected growth. **Table 8-4** summarizes the length of pipe to be installed replacing smaller diameter pipe.

Table 8-4: Upsized Reclaimed Water Main

Existing Diameter (in)	Upsize Diameter (in)	Length (ft)	
		New Development Phase 1	New Development Phase 2
8	12	0	600
12	16	22,700	0
Total		22,700	600
Total Cost (\$)		\$11,768,000	\$104,000

Multiphase Approach

Nearly half of the new pipe to be installed for Phase 1 will be undersized in Phase 2. Thus, those pipelines may be constructed in a phased approach (either as parallel lines or as pipe replacements). The lengths and details of the multiphase pipelines are included in **Table 8-5**.

As with those multiphase projects presented for the potable water system, for these projects the City should carefully consider the certainty of the future development to weigh the potential additional upfront cost of installing a larger main with the potential additional cost of replacing a relatively new main within the next 20 years.

If future development is relatively certain, Woodard & Curran recommends initially installing the largest diameter pipe instead of completing these projects in phases due to the predicted population growth rate and to save on future construction and material cost. The cost estimates presented in **Table 8-5** only include construction of the largest pipe diameter. However, during final design the required pipe size should be confirmed based on the City's actual growth rate and final buildout for individual developments throughout the service area.

If the City chooses to install the larger diameter pipe in **Table 8-5**, a portion of the New Development Phase 1 pipe in **Table 8-3** will not be needed.

Table 8-5: Multiphase Reclaimed Water Main Projects

Project Number	Phasing		Length (ft)		Cost Estimate ¹
	New Dev. Phase 1	New Dev. Phase 2	New Dev. Phase 1	New Dev. Phase 2	
1	New 4"	Upsize 8"	700	700	\$97,000
2	New 4"	Upsize 16"	9,700	9,700	\$5,030,000
3	New 4"	Upsize 20"	700	700	\$413,000
4	New 6"	Upsize 12"	5,600	5,600	\$957,000
5	New 6"	Upsize 16"	7,900	7,900	\$4,096,000
6	New 6"	Upsize 24"	12,200	12,200	\$7,620,000
7	New 8"	Upsize 12"	6,800	6,800	\$1,162,000
8	New 8"	Upsize 24"	3,100	3,100	\$1,937,000
9	New 10"	Upsize 24"	2,800	2,800	\$1,751,000
10	New 12"	Upsize 24"	4,000	4,000	\$2,500,000
Total					\$25,563,000

¹Cost estimate only includes construction of the largest pipe diameter phase.

8.2.2.2 Reclaimed Water Storage Tank Improvements

Based on the projected reclaimed water system demands and irrigation patterns, the existing 2.5 MG of storage at the Sampey/Silver Eagle facility and 3.0 MG of storage at the Sunshine facility is sufficient to meet future system needs. When the Regional WWTP is constructed, the model simulations indicate that a 3.5 MG tank, located at the plant site, would be needed to provide enough storage to handle peak demands.

A second smaller reclaimed water storage tank at the Sunshine WWTP was considered, however, and recommended for the following reasons: to support near-term growth until the new Regional WWTP is online around 2027 and new reclaimed lines are constructed; provide for additional redundancy within the existing service area and the future service area north of the Turnpike; manage peak demands during or a lack of supply due to an upset at one or more WWTPs; and allow for maintenance of other reclaimed storage tanks that may need to be out of service. A summary of these project costs is included in **Table 8-6**.

Table 8-6: Reclaimed Water Storage Tank Improvements

Storage Location	Storage Volume (MG)	Cost
Regional WWTP	3.5	\$4,546,000
Sunshine WWTP	1.0	\$2,125,000
	Total	\$6,671,000

8.2.2.3 Pump Station Expansion

Sunshine

The Reuse Water pump station located at the Sunshine WWTP has pumps that are 14 years old, approaching the end of their useful life. There are customer complaints of low pressure and demand continues to increase. The system requires evaluation to establish upgrade or rehabilitation needs to meet the demands of the current and future population. Woodard & Curran recommends upgrading the pump station in two phases, addressing the high priority upgrades within the first five years to prolong the reclaimed water source and continue to serve the community with reclaimed water in a feasible way and the long-term upgrades to provide longer term solutions to the low pressure and high demand issues.

Both non-technical and technical strategies are recommended to address immediate needs as part of the recommended high priority upgrades.

- Non-technical strategies include:
 - Implementing operational protocols to lower peak demands;
 - Increasing reclaimed water rates to incentivize conservation;

- Implementing a moratorium for new connections to the Sunshine reclaimed water system; and
- Enforcing the even/odd household address irrigation ordinance.
- The technical strategies include:
 - Installing two new pumps or replacing all pumps; and
 - Installing a new Lower Floridan well, see Section 8.1.1.1.

The long-term upgrades include the non-technical strategies mentioned as part of the high priority upgrades and additional technical strategies that will provide longer term solutions to the low pressure and high demand issues, but at an increased cost. These technical strategies include:¹

- Replacing all existing pumps with larger pumps;
- Installing flushing stands on the transmission main;
- Constructing a new 1.0 MG storage tank; and
- Constructing a new transmission main connecting the North and South reclaimed water system.

Additional details, alternatives analysis, and cost information on the recommended reclaimed water pump station upgrades project are located in the Clean Water Facilities Plan, [Appendix K - Clean Water Facilities Plan](#).

It should be noted that based on the model results, which were not available when the Facilities Plan was completed, the initial phase of the pump station expansion detailed in the Facilities Plan may be undersized and thus the project may cost more than the projected \$3,308,000. Additionally, the model simulation results provide approximate operating ranges for the required pump station for the Phase 1 and Phase 2 expansion, as summarized in **Table 8-7**.

Table 8-7: Sunshine Pump Station Improvements

Pump Operations	Phase 1	Phase 2
Flow Range (gpm)	500 – 4,000	500 – 5,500
Pressure Boost (ft.)	205 – 260	205 – 270
Total Cost	\$TBD	\$TBD

¹ Note that the strategies vary slightly from those presented in the City's Facility Plan. Second, the connection proposed in this Master Plan, along Cherry Lake Road, does not match the connection between the North and South systems presented in the Facility Plan. The proposed alignment was adjusted based on review of the full projected buildout demands and necessary infrastructure, which was not available during development of the Facility Plan.

The modeling results will be incorporated into the design effort of the Phase 1 pump station improvements which will be funded by SRF and the costs for each phase will be updated at that time.

Sampey/Silver Eagle

The model simulation results indicate the need to increase the capacity of the Sampey/Silver Eagle pump station under both Phase 1 and Phase 2 of the expected City expansion. A summary of the capacity needs is presented in **Table 8-8**. Operating points and potential phasing of the pump station project should be reviewed during design, with the most up to date information regarding the City's growth rate and planned developments incorporated into the hydraulic model to confirm the necessary capacity.

Table 8-8: Sampey/Silver Eagle Pump Station Improvements

Pump Operations	Phase 1	Phase 2
Flow Range (gpm)	500 – 2,400	500 – 4,300
Pressure Boost (ft.)	200 – 245	210 – 245
Total Cost	\$TBD	\$TBD

The modeling results will be incorporated into a future design effort to evaluate the cost for improvements under each phase, but a cost of \$3,308,000 will be incorporated into the budget at this time.

Regional WWTP

The Regional WWTP reclaimed water pump station will be included as part of the Regional WWTP project. Based on the model results, the pump station will operate with flows between 2,000 and 11,000 gpm and with a head gain of 215 – 260 feet and cost approximately \$915,000.

9. INNOVATION AND INTELLIGENT TECHNOLOGIES

Woodard & Curran completed an assessment of the City of Groveland's intelligent technology system, which included reviewing the remote stations at Treatment Plants. The assessment reviewed the age and condition of the Programmable Logic Controllers (PLC) equipment, Operator Interface Terminals (OIT), Human Machine Interfaces (HMI), Uninterruptable Power Supplies (UPS), and data communication equipment including routers, switches, and telecommunication devices.

The intent of this assessment was to review the general condition and support status of the existing equipment and to recommend potential actions to address any issues or concerns discovered during the assessment. The following report provides recommendations for both the plant and remote stations. The Groveland SCADA system is well maintained, but much of the system components are proprietary and at risk of potential failure without replacement parts available to address the failure. Additionally, software versions are out of date, which could present risks related to cybersecurity, specifically exploitation of vulnerabilities in older software revisions.

The recommendation of this report is to undertake a multi-phased upgrade project that will over a period replace obsolete equipment and update software to current revisions. In addition, opportunities to improve operational efficiency by providing additional visibility into the operational aspects of the remote stations have been identified.

9.1 Existing Site Details

9.1.1 SCADA Control Panel Conditions

The SCADA control panels inspected during site investigations are in varying condition. The components are mounted properly, but the bulk of wiring is entangled, mislabeled, and improperly secured. There are no signs of rodent infestations or water damage, but some panels have insect infestations, such as wasp nests. There are some panels that either have misplaced or have no panel drawings available. Common equipment in SCADA control panels include, DC power supplies, ethernet switches, and UPS and battery systems. All systems vary in organization and cleanliness. Some have been upgraded and are in good condition, and others are in poor condition due to the number of times they have been modified with no documentation. Details on the inspection of each control panel are located in the Innovation and Intelligent Technology Assessment Report, [Appendix W - Innovation and Intelligent Technology Assessment Report](#).

9.1.2 SCADA Software & Hardware

Groveland utilizes VTSCADA software for its HMI application, version 11.3.29 licensed for 5,000 tags with approximately 70% of the tags being used. Two servers are present with VTSCADA installed, one is located at the Sunshine Parkway WWTP and the other at the Sampey Road WWTP. The current computers are running 64-bit Windows 10 professional with 32 GB RAM. VTSCADA HMI has capabilities of alarm notifications, report generation, trend viewer, etc. The software is not currently being used to its full potential.

Allen-Bradley MicroLogix 1400 PLC is used mainly at plant sites, as well as ControlLogix 5561 and 5333ER, with Ethernet I/P for communication, although at Water Treatment Plant 5 a Unitronix PLC is implemented. There is no standard firmware revision for the controllers installed. There is not a standard PLC code set, which often causes confusion when making operational adjustments and when receiving alarms. Consistent source code is needed to ensure operational efficiency and troubleshooting.

Details on the software and hardware at each site are located in [Appendix W - Innovation and Intelligent Technology Assessment Report](#).

9.1.3 Asset Management Software

Groveland uses Utility Cloud software for asset management. The Utility Cloud software platform is used to track horizontal and vertical assets through their respective life cycle. Utility Cloud allows the operators to see a list of all assets that are located at each of these sites, plants and processes and see all work orders regarding each of them, if they exist. From the map interface an operator can click on a given site to view all assets and past/present work orders. Currently the Asset Management System is not connected to the SCADA system, doing so will increase operational efficiency by automating work orders and tracking SCADA assets through their life cycle including software and hardware.

9.1.4 High Level Overview with Power BI

Microsoft Power BI is currently being used for a high-level view of the system. The use of Microsoft Power BI helps to quickly connect data sets, transform, and clean data into a model and create charts or graphs to provide visual data. It's used to find insights within specific plant data and securely share it with others. The developed graphics through Power BI graph the water and wastewater treatment plant flows. Historical data from the SCADA system and Asset Management System can be rolled up to Power BI to display a high-level view of chemical usage, solids data, compliance information and other critical process information.

Hach Water Information Management Solution (Hach WIMS) is used for reporting. The information from all meters (both potable and reclaimed water) is received daily and is manually entered by operators. The software has the potential to display a complete picture of the water or wastewater process with data collection, streamlined reporting, powerful graphing and more. This software can be beneficial for reporting and managing data to the USEPA and other regulatory agencies. Currently there is no historical data from the SCADA system automatically reported.

9.1.5 HMI Standards, Tags, Screens, Etc.

Currently the SCADA screens are comprised of 3D style graphics. There is some operator control but most of the adjustable setpoints are accessible only through the source code of the PLC which requires a site visit by an integrator and the use of PLC programming software. 3D graphics have little functional or operational value, and often cause distraction. Currently, the HMI standard for

tagging is Parent / Child tags standard for VTSCADA. The parent child tagging system is organized, efficient and duplicatable. The tags are currently not addressed as Process & Instrumentation diagram tag standards. The navigation of the HMI screens is standard to VTSCADA, organized by an overview of each location; Sampey or Sunshine, Wastewater or Water, and process based; reclaimed water, RAS/WAS, etc. Some controls are accessible when viewing a specific process screen along with graphics. See [Appendix W - Innovation and Intelligent Technology Assessment Report](#) for a summary of screen operation details.

9.1.6 Ethernet Network Architecture & Communications and Cyber Security

Each plant has a different configuration of networking equipment. There appears to be varying network architecture and communication standards at each site. The two treatment plants are connected via VPN tunnel. The data is passed between the redundant servers over this connection. Currently alarms are sent to the operators via cellular SMS, the modem for this alarm notification is located at Sampey Road WWTP. A communication break between sites due to, for example downtime from the Internet Service Provider will prevent alarm data from passing over this connection and calling out. The redundant servers log duplicate, historical data over this connection, during a connection failure, historical data will be collected at each individual site then synchronized upon reconnection or the servers. The VTSCADA web client allows the operators to log into the system and make adjustments or view the process. There is a firewall at each location.

9.1.7 System Documentation

Although some system documentation has been located during the evaluation, there is not a complete set of instrumentation and control drawings. Many drawings that were found do not reflect field changes that were made after commissioning. There is little red lining of drawings to show Electrical modifications over the years.

Along with the lack of physical documentation, drawings (process, instrumentation, etc.), IP addressing/network documentation there is also a lack of digital documentation and comments. Many of the PLC programs are undocumented or containing no source code. PLC Program re-documentation has started recently as well as periodic program backups. It is important to have PLC programs documented with comments for troubleshooting and disaster recovery. The better the documentation a PLC program has, the easier and less time consuming it is to troubleshoot.

9.1.8 Current Process Control

The control system has the capability for automated process control at most facilities. Most processes are controlled in hand mode rather than left in automatic; this is a sign of reliability issues and lack of trust in the SCADA system. The hardware is typically consistent at plants and up to date, but the programs lack consistency and standard code. See [Appendix W - Innovation and Intelligent Technology Assessment Report](#) for an outline of each process controller, the names for each and whether the system can be controlled via SCADA.

The operating staff can access and control most processes via the SCADA HMIs and OITs, but are mainly, and for some processes only, trained on accessing the screens to observe, then if a change is needed, go to the process site, and make adjustments by hand. The observation has been that the operators are trained to run systems in HAND using the physical Hand-Off-Auto (HOA) switch, rather than control the process via SCADA. Some process control, such as control setpoints, alarm setpoints and HOA control, have been implemented in the SCADA HMI and OIT systems, but it is not often used or accessible due to HMI security restrictions for operators, confusing system controls or the operators limited training and exposure.

9.2 Recommendations

Detailed descriptions of all innovation and intelligent technologies recommendations are in [Appendix W - Innovation and Intelligent Technology Assessment Report](#). The following sections include a summary of the scope of work and cost estimate.

9.2.1 SCADA Standardization, Process Reprogramming and Cyber Security Evaluation

Implement universal programming standards indicated in this document to all PLCs in system. Standardizing PLC programming will increase operational efficiency by creating uniformity of setpoints, alarm descriptions and indicators.

- Setup and configure VTSCADA as the Alarm Notification Software replacing SCI Text unit
- Replace Unitronics PLC & OIT at WTP 5 with Compact Logix L33ER PLC & Panel View Plus7 OIT
- Reprogram WWTP PLC, Re-Use, RAS PLC, WTP PLC at Sampey Road to include new standards
- Reprogram WWTP PLC, Re-Use, WTP PLC at Sunshine Parkway to include new standards
- Perform cyber security assessment and install managed router and firewall with secure remote access

Cost

This project will cost approximately \$180,000 and includes one week of programming, startup, and testing for each existing plant controller.

9.2.2 High Performance HMI

To provide cohesion, reduce training time and provide better process visualization, it is proposed to revamp the existing SCADA screens to create a High-Performance HMI. This would include an upgraded version of the VTSCADA software and would incorporate High-Performance HMI screens that further provide operators with clearer understanding of process control. This upgrade will incorporate all aspects of the current system including but not limited to navigation, symbols, colors, and alarming. The new standard will provide a baseline platform for building upon in the

future. Standardizing descriptions and alarm notification will reduce the amount of service calls that require a site visit. Newly implemented account controls will allow operators at their respective levels to make appropriate changes to the process setpoints while keeping a log of all changes made.

Cost

This project will cost approximately \$75,000.

9.2.3 SCADA Systems for Sewer Lift Stations & Licensed Radio

Fifteen (15) lift stations do not have SCADA systems. Woodard & Curran is proposing to design SCADA control panels to interface with the existing controls to provide remote monitoring and control. The SCADA panel will utilize the Allen Bradley MicroLogix 850 PLC. The MicroLogix 850 PLC is one of the open platform Allen Bradley PLC's specified in the City of Groveland's SCADA standardization plan. The SCADA panel will communicate back to the treatment plant via a licensed radio which will allow monitoring as well as controlling the functions of the lift station. We further propose the migration of the existing 47 stations to licensed radios to enable greater troubleshooting and performance during weather events. During disaster recovery, the need for third party involvement will be eliminated. The City can keep several spare radios and processors in stock to replace during a failure.

- Implement 47 Licensed Viper radios and associated hardware at existing stations
- Implement 15 SCADA communication panels with licensed radios for existing lift stations
- Implement one new polling master radio and PLC at WTP with new tank mounted antenna

Cost

This project will cost approximately \$550,000.

9.2.4 Historical Data and Reporting

Create a standard for improved operational trends and integrate them into the existing HMI including all integral datapoints both digital and analog. Further, we would implement a reporting software that will harness this historical data. Automatically generating reports allows operators to focus on daily tasks and look at process parameters in a more detailed manner across a greater timescale. As Groveland is already using Hach WIMS, setting up a Hach WIMS collector on the SCADA server at Sampey Road will allow data to be pulled directly from the SCADA system.

Cost

This project will cost approximately \$26,000.

9.2.5 Remote Alarming and Notification

Reliable and informative remote alarming is a critical part of any SCADA system. Woodard & Curran propose to move the current alarming structure from the SCI-text system to VTSCADA's integrated alarming system. This would allow operators to directly clear alarms as well as acquire more detailed information. Descriptions that currently do not match between the SCI text system and the SCADA system will be corrected at the time this is implemented.

Cost

This project will cost approximately \$17,000.

9.2.6 Equipment Maintenance

All 120VAC UPS and 24 VDC battery backup systems should be evaluated for replacement on a regular basis, typically every five years. Preventive maintenance of these backup power systems will reduce the chance of catastrophic failures as well as ensure optimal performance of the system. In addition, we propose to institute a PM program for the replacement of UPS systems that would prevent failures. A UPS study would identify problem sites and plan for their replacement.

Cost

This project will cost approximately \$17,000.

9.2.7 Asset Management

As Utility Cloud is currently being utilized and expanded by the City, continuing with that platform is recommended. Interfacing Utility Cloud with VTSCADA will allow for important data such as runtimes and flow rates to be pulled directly from the SCADA system. Woodard & Curran proposes to integrate important controller tag data such as pump run times and flow rates into Utility Cloud asset management system to trigger work requests and service orders.

Cost

This project will cost approximately \$22,000.

9.2.8 Power BI and Other Technologies

Having both macro and granular views of the systemwide process are extremely helpful tools. Knowing the status of large demand customer flow rates or linking rainfall to process throughput are but two examples of how merging different technologies can be beneficial to performance. Woodard & Curran proposes to utilize these platforms to provide the most complete view of the system in real time. On-site interviews with operators will be conducted to determine which information would be most appropriate for a high-performance reporting dashboard. Graphic interfaces will be designed and interfaced with Utility Cloud, VTSCADA, and Hach WIMS to

produce an operator portal with quick access to maintenance ticket information, system performance and critical process information.

Cost

This project will cost approximately \$20,000.

9.2.9 Networking and Remote Access

Implement standard network architecture including the creation of DMZs at WTP 2, WTP 3 and WTP 5, Silver Eagle, design to be duplicated at WTP 1 during its separate upgrade project. Install firewall and network equipment to facilitate secure access to DMZs. Install and configure server hardware and software in the DMZs for engineering remote access, operator access to the HMI system and business analytics interfaces for access to SCADA data from tools external to the SCADA system. This includes additional enhancements to align with industry best practices to meet America's Water Infrastructure Act (AWIA) of 2018 requirements. Setup the passing of data between the enterprise and industrial network allowing for SCADA Data, Reporting Data and Asset Management Data to be shared while simultaneously reducing risk. Upgrade media at plants to fiber and ethernet, removing 2 wire and outdated protocols.

This project will cost approximately \$60,000.

9.2.10 SCADA System for WTP 1

Design, fabricate and install a SCADA PLC control panel. This panel will be based on the Allen Bradley Compact Logix L33ER. The Compact Logix L33ER PLC is one of the open platform Allen Bradley PLC's specified in the City of Groveland's SCADA standardization plan. The SCADA panel will provide monitoring and remote control of the local controls of WTP 1. A Panel View Plus 7 OIT is to be installed onsite to create redundancy and allow for independent control in the case of a catastrophic failure of the main WTP.

Cost

This project will cost approximately \$140,000.

9.2.11 Troubleshoot Maintenance Repair (TMR) List

- Repair/replace/calibrate level transducers
- Repair/replace/calibrate flow meters
- Repair/replace/calibrate chlorine, turbidity, and pH analyzers
- Repair/replace panel equipment (relays, fuses, etc.)

Cost

This project will cost approximately \$60,000.

9.2.12 System Documentation

Complete Control & Instrumentation documentation for entire system at each plant and panel.

Cost

This project will cost approximately \$15,000.

9.2.13 WTP 5 Upgrades

Upgrade the existing WTP 5 control panel from the current Unitronics PLC and OIT to the standard. This panel will be based on the Allen Bradley Compact Logix L33ER. The Compact Logix L33ER PLC is one of the open platform Allen Bradley PLC's specified in the City of Groveland's SCADA standardization plan. The SCADA panel will provide monitoring and remote control of the local controls of WTP 5. A Panel View Plus 7 OIT is to be installed onsite to create redundancy and allow for independent control in the case of a catastrophic failure of the main WTP.

Cost

This project will cost approximately \$104,000.

9.2.14 Miscellaneous SCADA Projects

Following the SCADA evaluation, [Appendix W - Innovation and Intelligent Technology Assessment Report](#), the following additional SCADA projects were identified:

- SCADA Upgrade at the Vacuum Station: Install a radio TCU and a new PLC at the Vac Station. This project will cost approximately \$80,000.
- Vacuum Pit SCADA Installation: Install SCADA at 245 vacuum pits throughout Waterside Pointe to reduce O&M costs and improve overall level of service. This project will cost approximately \$300,000.
- Silver Eagle SCADA, Control Panel, and Backup Pressure System Upgrades: Update existing SCADA and Control Panel at the Silver Eagle facility as well as update the existing pressure switches. This project will cost approximately \$165,000.
- Uninterrupted Power Supply (UPS) Equipment Maintenance Evaluation: Replace as needed UPS and volts direct current (VDC) batteries as identified in the evaluation described in Section 9.2.6. This project will cost approximately \$45,000 over the course of three years.

10. OPERATIONS AND MAINTENANCE

10.1 Managerial Capacity

The City contracts out the operations and maintenance (O&M) of the water system (potable, waste, and reclaimed water) but maintains responsibility for construction projects. The Woodard & Curran area manager is the person in responsible charge for the contract operations efforts. There are 15 people on staff within the water and wastewater departments, four of which have distribution and treatment operation licenses. The operators are cross trained on both the water and wastewater system, and three of the operators have dual licenses (water and wastewater).

General O&M Activities

All drinking water plants are operated in automatic mode via control setpoints through the SCADA system, which calls out alarms to the operators on duty as programmed. By state regulations WTP 3 must be visited one hour per day at least five days a week. The remaining plants, WTP 1, 2, 4, and 5 must be visited one hour per day at least six days per week. Each visit is performed by at least one person licensed as a Class C Drinking Water Operator or higher. The lead operator works Monday through Friday and is licensed as a Class A Drinking Water Operator. Both Sampey Road & Sunshine WWTPs have operators onsite for a minimum of six hours a day, seven days a week. Operators visit lift stations at a minimum every two weeks. They check the general conditions of the premises, check generator fluid levels, run the pumps to ensure proper operations and record pump run times in logs. The contract operations team utilizes Flowers Chemical Labs for routine water quality testing.

Existing Operations Building

The water and wastewater departments currently work out of and store critical utility information in a double wide trailer with a leaking roof and rotted floor. The floor has been replaced twice in the last decade due to seasonal flooding and moisture beneath the structure. The roof has developed leaks during past storm events which has damaged office spaces, printers and SCADA equipment that stores critical utility information, including that pertaining to compliance. During past emergencies, such as recent hurricanes, utility staff are unable to respond in an effective manner since they are forced to work out of their homes or vehicles because the building is not suitable or safe to withstand a storm.

10.2 Asset Management Plans

The City created two Asset Management Plans (AMP) to catalog and perform an evaluation of the drinking water and wastewater system critical assets and plan future capital improvement projects for both horizontal and vertical assets for both systems. An AMP allows the City to inventory and assess their critical assets based on condition and performances to proactively plan and prioritize for maintaining, repairing, and/or replacing those assets as well as plan for future funding. The plans also provide a systemic cost and value of the critical assets in the drinking water and wastewater system and Level of Service Goals. The recommendations and costs to address critical

assets in the AMPs have been incorporated into this Utility Master Plan and the Capital Improvement Plan.

The development of the AMP serves to reduce the City's future State Revolving Fund (SRF) funding interest rates and result in substantial savings for projects outlined in the Drinking Water and Clean Water Facilities Plans. The Drinking Water and Clean Water AMPs are located on the OneDrive at [Referenced Reports](#).

10.3 Recommendations

10.3.1 Utility Operations and Emergency Operations Center

Woodard & Curran recommends the City construct a new approximately 3,000 square-foot, multi-function, administrative, utility operations and emergency operations center, located on high ground near the Sampey Road Wastewater and Water Treatment Facilities, as identified in **Figure 10-1**. The new building should provide space for relocation of the utility's Customer Contact and Dispatch Centers, and Data Center. The building will provide resilient office spaces for routine and emergency operations.

During major emergency incidents (hurricanes, tropical storms, flooding, tornadoes), the emergency operations center will house critical City staff that will manage the City functions including but not limited to the utility department, offices of Emergency Management, the Health Department, the City commissioners, the City Manager, law enforcement, search and rescue personnel, and others. By aggregating all the decision makers in one place, the City will expedite the response and mitigate emergencies during and after natural or malevolent disasters.

Figure 10-1: Proposed Location of EOC Building

Link to Figure on OneDrive: [10-1 Proposed Location of EOC Building.pdf](#)

The facility will be self-sufficient for seven days and will have a photovoltaic (solar) system and generator on the roof and will include a room with a significant battery backup system to retain critical electronic information in case of a power outage. The facility will include a full-scale kitchen, locker room, restrooms, showers, and supply closets. One room in the facility will include three bunk beds, that, when working during extended operations, could provide sleeping quarters for six emergency responders which would make it easier to operate from the site 24 hours per day. The facility will also house a multi-use meeting room large enough for 30 staff and first responders that will include video conference for relaying emergency situation briefings and double as a training facility, media center, and breakroom during non-emergencies.

The structure is to be constructed to modern building codes and to withstand a category 5 hurricane. Outside the building, an adjacent area has stations with six RV hookups, including water and electricity, to house emergency responders from additional agencies who may need to operate from the site.

Cost

The cost to construct this facility is approximately \$3,276,000 and should be split between the water and wastewater departments as the facility will be shared. Additional details, alternatives analysis and cost information can be found in the Drinking Water Facilities Plan, [Appendix I - Drinking Water Facilities Plan](#).

10.3.2 Mutual Aid Study

Regionalization of the potable water system with neighboring communities will provide greater flexibility, resiliency, and security when it comes to water resources. Sharing water resources will enable the communities in southern Lake County to utilize the limited water resources in the areas where highest demand occurs allowing continued growth in all communities. Woodard & Curran recommends Groveland conduct a mutual aid study with the neighboring communities of Mascotte, Minneola, and Clermont. This study will determine if these adjacent systems are viable options for emergency water supply, prepare a conceptual design of infrastructure needed for these emergency connections, and standard operating procedures to utilize existing interconnections if available. Additionally, this study will start the conversation for system regionalization in non-emergency conditions.

Cost

The anticipated cost for this mutual aid study is \$150,000 and the City of Groveland should seek to share this cost with Mascotte, Minneola, and Clermont.

10.3.3 Public Water System Consolidation

The Groveland public water system (PWS) consists of three separate PWS Identification (PWSID) numbers that are managed and operated together as one system. Due to population growth, new facilities planning, and the likelihood that the Palisades WTP 4 will be decommissioned, it is likely that the existing sampling plans will have to be updated and resubmitted to DEP.

The City is interested in consolidating all water treatment plants and distribution systems under one PWSID number to save time and expenses by reducing administrative duties and sampling activities. Consolidation will also simplify the City's overall compliance sampling plans (triennial, LCRR, DBP, bacteriological) since the consolidated plan would be based on the requirements for only one system instead of three

Woodard & Curran reviewed the requirements to consolidate the PWSs with FDEP and a summary is provided below:

- Submit a letter requesting the consolidation of the three PWSIDs, indicating the purpose of consolidation and provide an explanation of the benefits to be attained by combining the three PWSIDs.
- Submit a map or schematic delineating the resulting service area that is planned to be served by the consolidated PWSID.
- Submit a hydraulic model(s) demonstrating that the consolidated system can meet the estimated operating conditions with certain scenarios introduced to resemble plausible worse-case scenarios to meet all water quality and hydraulic standards in accordance with Chapter 62-550 and 62-555, F.A.C. (Rules).
- Provide a narrative explanation of the assumptions and peaking factors used in the hydraulic analysis and the results of each of the hydraulic modeling scenarios.
- Document that each plant is individually operated within the confines of the Rules.
- Prepare a Consolidation Plan and update the Sampling Plan.
- Submit a formal permit request to FDEP.

Cost

This project is anticipated to cost approximately \$75,000.

10.3.4 Asset Management Plans

The AMPs are intended to act as a living document. The City should assess their current maintenance programs to ensure that routine and critical maintenance is performed so that assets that have been identified in the AMPs as critical are in good working order and perform according to function. As conditions and the equipment likelihood of failure change, these changes should be updated and reflected in the AMPs to continue to proactively drive capital improvement planning.

Woodard & Curran recommends the City continue to utilize Utility Cloud and build a robust list of assets that is updated and evaluated regularly. Operators can use Utility Cloud to assign priorities to the most critical pieces of equipment so that critical equipment work orders are completed as soon as possible.

Cost

A budget of \$50,000 is recommended to support buildout of Utility Cloud to incorporate information for all critical assets, recommendations to repair or replace assets, and support the development of baseline data for Level of Service criteria outlined in the AMPs.

11. CAPITAL IMPROVEMENT PLAN

11.1 Short Term Improvements (1-5 years)

Summary of Capital Improvement Plan (CIP) Approach

A short-term CIP was developed based on the projects identified in this Utility Master Plan and the City's past approach for tracking CIP projects by department. The CIP was restructured to differentiate the types of projects (i.e., projects funded through SRF, planning projects, equipment) more clearly. The departments and project types are summarized below:

- Water Department
- Wastewater Department
- Reclaimed Water Department
- Within each of the three departments above, the following project types were consolidated:
 - Facility Plan Projects Funded by the State Revolving Fund (SRF) Program
 - Additional Infrastructure Improvement Projects
 - SCADA Projects
 - Planning and Engineering Projects
 - Vehicles and Equipment
- Repairs and Replacement Fund – the City budgets for replacement of miscellaneous, small items that are not part of a significant capital project or purchase and are not included in Woodard & Curran's O&M contract.

Project Cost Estimates

The costs for construction projects summarized in the CIP were developed using the Engineering News-Record Construction Cost Index (ENR CCI) for most projects with some estimates developed by Woodard & Curran for small projects using engineering best practices and costs provided by vendors. Most cost estimates were developed between May and September 2021. Escalation factors were not applied to the costs in the CIP, but the ENR CCI can be used to apply cost escalation factors, when appropriate, to estimate project costs in the future.

Equipment, planning, and engineering project costs in the CIP were estimated using engineering best practices, past projects and experience by the Operations and Maintenance Team, and vendor provided costs.

Funding Sources for Short-term CIP

The primary funding sources identified for each project are summarized below:

- Utility Revenues: utility fees collected from existing rate payers

- **Debt Proceeds:** debt service paid on loans to support the design and construction of utility infrastructure. This is primarily through the FDEP SRF program. It is important to note that while the CIP is intended to show the project expenditure, it does not reflect the debt service for the next 20 years that will be paid through utility revenues. The capital outlay for the City, therefore, is much less on an annual basis than presented in the CIP.
- **Impact Fees:** fees collected from new development units that are intended for capital costs of construction and related costs for increases in or expansion of capacity or capital requirements due solely because of new development. In some cases, developers have decided to pre-pay impact fees to support projects.
- **Grant Revenues:** grants (cash) received from various agencies (federal, state, county, local).

Existing Infrastructure Needs (5-Year CIP) - \$76M

Table 11-1 summarizes the projects to support existing infrastructure needs through anticipated utility revenues, debt proceeds (SRF loans), and grants. These projects and costs will be supported by current rate payers and outside funding sources. The City's debt service for projects that will be funded by SRF loans has already been evaluated as part of the Drinking Water Facilities Plan (Appendix J – Drinking Water SRF Business Plan) in [Appendix I - Drinking Water Facilities Plan](#) and the Clean Water Facilities Plan (Appendix I – Capital Financing Plan) in [Appendix K - Clean Water Facilities Plan](#).

Table 11-1 shows a total capital program of approximately \$76M, which includes \$61M for SRF funded projects, which were previously approved by City Council as part of the above Facilities Plans, with debt service that will be paid through future utility revenues. The additional capital expenditures include \$14.9M with \$5.6M in grants and the remaining \$9.3M to be paid through utility revenues over the next 5 years.

Capacity Expansion Percentage for Capital Projects

Debt service for the 5-Year CIP in Table 11-1 will be further evaluated under the Funding Initiative Plan to consider the "Capacity Expansion Percentage" of each project. This is the percent of the project that is funded now to reserve capacity for future development, which could be paid by future impact fees to decrease the SRF loan burden on rate payers.

For example, the Sampey WWTP expansion project is estimated to cost \$33M to upgrade the capacity from 1.0 MGD to 2.0 MGD. The WWTP is operating at 0.754 MGD (March 2022 – note that SouthWaste is currently not flowing to Sampey), which is almost at the recommended flow (80%) for the existing facility and the City of Mascotte plans to purchase 0.275 MGD of capacity in 2022. Wastewater flows from the City of Groveland are projected to increase 0.297 MGD by 2025 and will result in a total committed capacity of 1.326 MGD by 2025 (0.754 MGD + 0.275 MGD + 0.297 MGD = 1.326 MGD).

A 2.0 MGD WWTP operating at 80% capacity = 1.6 MGD; therefore, 0.274 MGD of capacity is remaining for future development wastewater flows beyond 2025 and represents ~17% or \$5.6M

of the capacity expansion for the Sampey WWTP project. It is important to note that these calculations are provided as an example for the City to consider with the Funding Initiative Plan and will need to be updated.

Growth Driven Needs (5-Year CIP) - \$214.5M

Table 11-2 summarizes the projects those that are driven by significant future growth and will be paid by future development. These projects are anticipated to be funded primarily from existing and future impact fees but will need to be evaluated further as part of the Funding Initiative Plan. The City should also work with developers to support the capital investment for projects through development agreements, which benefit the development and the City by gaining efficiencies and economies of scale.

Table 11-2 shows a total capital program of approximately \$214.5M to be paid by impact fees with an estimated \$4.5M in grants over the next 5 years. This is a very front-loaded CIP based on the projected growth over the next 5-10 years that require construction of critical facilities (e.g., Regional WWTP) begin to keep pace with growth. Facilities need to be under construction and nearing completion to support ongoing utility service to new developments.

General Note for Short-Term CIPs

The CIPs are intended to estimate the projected needs for the next 5 years, but some projects and the associated capital expenditure may continue 1-2 years beyond the 5-year schedule. Further review of the CIPs is needed to ensure that the schedule is realistic to design and construct the planned infrastructure as funds become available.

11.1.1 Schedule

The schedule for the Short-Term CIP is incorporated into **Table 11-1** and **Table 11-2** and is based on several factors that reflect current needs and growth requiring projects to begin immediately or within the next 5 years, which includes 2022. The schedule will likely change, however, based on the availability of funding sources to support some projects and shifting priorities driven by new development. The Short-Term CIP should be updated annually by the City with outside support as needed.

11.2 Long Term Improvements (6-20 years)

The Long-Term CIP includes all projects or the remaining effort for ongoing projects that are not included in the Short-Term CIPs and have been identified in the Utility Master Plan. Some projects have yet to be developed based on planning or engineering assessments that will be completed in the Short-Term CIPs and allowances have been budgeted to account for projected needs.

It's possible that the Long-Term CIP will increase over the next several years as additional planning and engineering assessments are completed. Additionally, aging infrastructure over the next 20 years will need to be replaced and the extent of replacement has not been evaluated. Some

budgetary allowances have been carried to account for projects that will need to be updated over the next several years.

The Long-Term CIP is summarized in **Table 11-3**. Costs are in 2021 dollars using the same approach for the Long-Term CIPs and are not escalated year to year.

Preliminary Long-Term CIP (6-20 Years) - \$114M

Table 11-3 shows a preliminary total capital program of approximately \$114M. A large portion of this cost (\$64.3M) is associated with the remaining construction cost for the Regional WWTP and expansion of this facility in 2040. Additionally, the costs for additional capital projects to replace aging infrastructure continue to grow as the City's utility infrastructure expands and older infrastructure exceeds its life expectancy over the next 20 years.

It is important to note that the Short-Term CIPs may need to push into subsequent years to spread costs over a longer period and incorporate some projects into the Long-Term CIP. The City should consult with its Operations and Maintenance and engineering teams to determine which projects are less critical and can be pushed further out in the schedule.

The Long-Term CIP will likely be funded through a variety of sources, such as utility revenues and impact fees but some projects may be eligible for SRF and grant funds. The Long-Term CIP should be updated after the first 2-3 years of implementing the Short-Term CIPs, unless the City wishes to only update a rolling 5-Year CIP each year.

Table 11-1: Short-Term (5-Year) Capital Improvement Plan for Existing Infrastructure Needs

Link to Table on OneDrive: [Table 11-1 Short-Term \(5-Year\) CIP for Existing Infrastructure Needs](#)

Table 11-2: Short-Term (5-Year) Capital Improvement Plan for Planned Development Needs

Link to Table on OneDrive: [Table 11-2 Short-Term \(5-Year\) CIP for Planned Development Needs](#)

Table 11-3: Preliminary Long-Term (6-20 Year) Capital Improvement Plan

Link to Table on OneDrive: [Table 11-3 Preliminary Long-Term \(6-20 Year\) CIP](#)

12. FUNDING INITIATIVE PLAN

The Funding Initiative Plan (FIP) will be developed and delivered separately to the City from this Utility Master Plan. In general, the funding strategy for the water utilities will include a variety of funding sources (utility revenues, impact fees, grants, loans), many of which are identified in the Capital Improvement Plan in Section 11, and focus on the 5-Year CIPs.

Existing and future funding needs should not be a burden on the existing rate payers; the City's funding strategy identifies that growth shall be paid by future developments. The FIP will be a road map for the City to follow and continually manage projects and funding sources, as well as plan with the private sector to identify collaborative funding approaches to support proposed development. As discussed in Section 11.1, debt service will be further evaluated to consider the "Capacity Expansion Percentage" of each project that is reserved for future development and could be paid by future impact fees to decrease the SRF loan burden on rate payers.

The FIP will identify the need, if any, to further evaluate utility revenues through rate increases and changes to impact fees.

13. LIST OF ABBREVIATIONS AND ACRONYMS

A/C	Asbestos Cement
ACS	American Community Survey
ADD	Average Day Demand
ADF	Average Daily Flow
AMDF	Annual Max Daily Flow
AMI	Automated Meter Infrastructure
AMP	Asset Management Plan
AWIA	America's Water Infrastructure Act
AWS	Alternative Water Sources
AWWA	American Water Works Association
BEBR	Bureau of Economic and Business Research
BWF	Base Wastewater Flow
CCTV	Closed-Circuit Television
CDO	Climate Data Online
CFWI	Central Florida Water Initiative
CIP	Capacity Improvement Projects
CMU	Concrete Masonry Unit
CRA	Community Redevelopment Area
CUP	Consumptive Use Permit
d/D	Depth-To-Diameter
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
DoD	Department of Defense
DSS	Domestic Self Supply
EDI	Energy Dissipating Inlets
EOP	End of Permit
ERU	Equivalent Residential Unit
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FF	Fire Flow
FOG	Fats, Oils, and Grease
FPS	Feet per Square
GIS	Geographic Information System
GPCD	Gallons Per Capita Per Day

GPD	Gallons Per Day
GPD/SF	Gallons per Day per Square Foot
GPM	Gallons Per Minute
HACH WIMS	Hach Water Information Management Solution
HDPE	High Density Polyethylene
HMI	Human Machine Interfaces
HOA	Homeowners Association
HOSS	Hammerhead Onsite Screen Sizing
HVAC	Heating, Ventilation, and Air Conditioning
IPP	Industrial Pretreatment Program
IPPS	In-Plant Recycle Pump Station
ISO	Insurance Services Office
IT	Information Technology
LCRR	Lead and Copper Rule Revisions
LSL	Lead Service Lines
MDD	Max Day Demand
MG	Million-Gallon
MGD	Million Gallons Per Day
MG/L	Milligrams per Liter
MGY	Million Gallons per Year
MFL	Minimum Flow and Levels
MLE	Modified Ludzack Ettinger
MM	Millimeter
MOU	Memorandum of Understanding
NFF	Needed Fire Flows
NOAA	National Oceanic and Atmospheric Administration
OIT	Operator Interface Terminals
O&M	Operations and Maintenance
ORP	Oxidation-Reduction Potential
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PLC	Programable Logic Controllers
PPT	Parts per Trillion
PSI	Pounds per Square Inch
PUD	Planned Unit Development
PVC	Polyvinyl Chloride

PWS	Public Water System
RIBS	Rapid Infiltration Basin System
RRP	Residential Retrofit Program
RWSP	Regional Water Supply Plan
SCADA	Supervisory Control and Data Acquisition
SCR	Screenings Capture Ratio
SJRWMD	St. Johns River Water Management District
SRF	State Revolving Fund
SLRTAC	South Lake Regional Technical Advisory Committee
SR50	State Route 50
TMR	Troubleshoot Maintenance Repair
TSS	Total Suspended Solids
TWA	Tohopekeliga Water Authority
UAW	Unaccounted for Water
UFA	Upper Floridan Aquifer
UPS	Uninterruptable Power Supplies
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VCP	Vitrified Clay Pipe
VDC	Volts Direct Current
VFD	Variable Frequency Drives
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

APPENDIX A: 2021 WATER AUDIT

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX B: CENTRAL FLORIDA WATER INITIATIVE SUPPLEMENTAL APPLICANT’S HANDBOOK

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX C: CONSUMPTIVE USE PERMIT 2796-6

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX D: GROVELAND GROUNDWATER MODEL REVIEW AND REPORT

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX E: 10-YEAR FACILITIES WORK PLAN

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX F: INTERLOCAL AGREEMENT FOR REGIONAL WATER SUPPLY PLANNING AND STRATEGIES

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX G: IRRIGATION RULES AND CONSERVATION TIPS

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX H: LOWER FLORIDAN AQUIFER WATER QUALITY – WELL CONSTRUCTION REPORT, NIAGARA BOTTLING, LLC

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX I: DRINKING WATER FACILITIES PLAN

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX J: POTABLE WATER HYDRAULIC MODEL DEVELOPMENT TECHNICAL MEMO

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX K: CLEAN WATER FACILITIES PLAN

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX L: INTERLOCAL AGREEMENT WITH MASCOTTE, FL

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX M: CLEAN WATER HYDRAULIC MODEL DEVELOPMENT TECHNICAL MEMO

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX N: LIFT STATION RUNTIME ANALYSIS

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX O: AQUAPONICS FARM AGREEMENT

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX P: APPLICATION FOR DISTRICTWIDE COST SHARE

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX Q: FLORIDA WATER RESOURCES JOURNAL – THE JUDGE FARMS PROJECT

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX R: ALMONTE SPRINGS A-FIRST

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX S: APOPKA NORTH SHORE RECLAIMED WATER TREATMENT FACILITY

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX T: WATERSHED STUDY

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX U: RECLAIMED WATER SYSTEM HYDRAULIC MODEL AND PRESSURE ASSISTANCE

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX V: RECLAIMED WATER HYDRAULIC MODEL DEVELOPMENT TECHNICAL MEMO

Link to above Appendix on OneDrive: [Appendices](#)

APPENDIX W: INNOVATION AND INTELLIGENT TECHNOLOGY ASSESSMENT REPORT

Link to above Appendix on OneDrive: [Appendices](#)



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