CHARLOTTE COUNTY
FLORIDA

Charlotte County Utilities Department

2019 Annual Report
March 2020

Prepared by

JonesEdmunds

2019 ANNUAL REPORT

Prepared for:

Charlotte County Utilities Department

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Certificate of Engineering Authorization #1841

Jones Edmunds Project No.: 03405-029-03

March 2020

SIGN-OFF SHEET

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

Abbreviation	Definition
AADF	Annual Average Daily Flow
AMI	Advanced Metering Infrastructure
ARV	Air-Release Valve
ASR	Aquifer Storage and Recovery
ATS	Automatic Transfer Switch
AWWA	American Water Works Association
BCC	Board of County Commissioners
BFP	Belt Filter Press
CAR	Capacity Analysis Report
CBOD5	Carbonaceous Biochemical Oxygen Demand (5 day)
CCC	Chlorine Contact Chamber
CCR	Consumer Confidence Report
CCTV	Closed-Circuit Television
CCU	Charlotte County Utilities
CDL	Commercial Driver's License
CDOC	Continuing Demonstrations of Capability
cfm	Cubic Foot per Minute
CHWA	Charlotte Harbor Water Association
CIP	Capital Improvement Program
CMMS	Computerized Maintenance Management System
CR	County Road
CRA	Community Redevelopment Area
°F	Degrees Fahrenheit
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EAMS	Enterprise Asset Management System
EPA	US Environmental Protection Agency
EPLAB	East Port Laboratory
EQ	Equalization
ERU	Equivalent Residential Unit
EWD	Englewood Water District
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FEMA	Federal Emergency Management Agency
FOG	Fat, Oil, and Grease
FSAWWA	Florida Section of AWWA
FY	Fiscal Year
GIS	Geographical Information System
GIWA	Gasparilla Island Water Association

Abbreviation	Definition
gpd	Gallons Per Day
gpm	Gallons Per Minute
GPS	Global Positioning System
GST	Ground Storage Tank
HDPE	High-Density Polyethylene
HMI	Human Machine Interface
HOA	Homeowners Association
HP	Horsepower
HSP	High-Service Pump
I&C	Instrumentation and Controls
I/I	Inflow/Infiltration
IDOC	Initial Demonstrations of Capability
IR	Internal Recycle
IW	Injection Well
kVA	Kilovolt-Ampere
kW	Kilowatt
LES	Liquid Environmental Solutions
LIMS	Laboratory Information Management System
LPS	Low-Pressure Sewer
LS	Lift Station
LTF	Leachate Treatment Facility
µS/cm	Micro Siemens Per Centimeter
MBR	Membrane Bioreactor
MCC	Motor Control Center
MG	Million Gallon
mg/L	Milligrams Per Liter
MGD	Million Gallons Per Day
MIT	Mechanical Integrity Test
mL	Milliliters
MLE	Modified Ludzack-Ettinger
MLSS	Mixed Liquor Suspended Solids
MLVSS	Mixed Liquor Volatile Suspended Solids
mm	Millimeter
MSBU	Municipal Service Benefit Unit
NEC	National Electrical Code
NELAP	National Environmental Laboratory Accreditation Program
NFPA	National Fire Protection Association
O&M	Operations and Maintenance
ORP	Oxygen Reduction Potential
OSHA	Occupational Safety and Health Administration
PAC	Powdered-Activated Carbon
PACT	Powdered-Activated Carbon Treatment

Abbreviation	Definition
PLC	Programmable Logic Controller
PPM	Parts Per Million
PRMG	Public Resource Management Group
PRMRWSA	Peace River/Manasota Regional Water Supply Authority
PRMRWSF	Peach River/Manasota Regional Water Facility
PRV	Pressure-Reducing Valve
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PWS	Potable Water System
QAS	Quality Assurance Specialist
RAS	Return-Activated Sludge
RCW	Reclaimed Water
RO	Reverse Osmosis
ROW	Right-Of-Way
RRA	Risk and Resilience Assessment
RTS	Regional Transmission System
RTU	Radio Telemetry Units
SCADA	Supervisory Control and Data Acquisition
SDS	Safety Data Sheet
SF	Square Feet
SM	Standard Method
SO	Service Order
SOP	Standard Operating Procedure
SR	State Road
SRF	State Revolving Fund
SRS	Septage Receiving Station
SWFWMD	Southwest Florida Water Management District
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
TMADF	3-Month Average Daily Flow
TMDL	Total Maximum Daily Load
TNI	The National Environmental Laboratory Accreditation Conference Institute
TSS	Total Suspended Solids
UCMR4	Unregulated Contaminant Monitoring Rule
UF/IFAS	University of Florida/Institute for Food and Agricultural Sciences
UV	Ultraviolet
VFD	Variable Frequency Drive
WAS	Waste-Activated Sludge
WBS	Water Booster Stations
WRF	Water Reclamation Facility
WTP	Water Treatment Plant
WUP	Water Use Permit

GLOSSARY

Term	Description
Activated sludge	A process for treating wastewater using air and a biological floc to reduce the organic content of the wastewater.
Annual average daily flow (AADF)	The total volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 365 days, divided by 365.
Backflow prevention	A physical means to keep water from flowing back into a water system once it is discharged from the system. Examples are air gaps, double check valve assemblies, and reduced pressure zone devices.
Consumer Confidence Report (CCR)	An annual water quality report, required by the US Environmental Protection Agency and Florida Department of Environmental Protection, distributed to the customers of a water utility.
Cross-connection	Any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewage or other waste, or liquid of unknown or unsafe quality that may be capable of imparting contamination to the public water supply as the result of backflow.
Deep injection well	A well, drilled into a confined, non-potable aquifer for disposal of treated wastewater.
Diurnal flow	The cumulative flow plotted against the time of day for a consecutive 24-hour period.
Force main	A pressure pipe joining the pump discharge at a wastewater pumping station with a point of gravity flow.
Gravity sewer	Piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity.
Headworks	The "front end" of a wastewater treatment plant that removes items from the wastewater that cannot be removed by the treatment process.
Lift station (pumping station)	A structure equipped with pumps to impart energy to convey wastewater through a force main.
Low pressure sewer	An alternative to gravity sewers that requires a small pump at each property. Piping is small and shallow and can be constructed to follow the contours of the land, as opposed to deeper and larger pipes necessary to accommodate the slopes required for gravity sewers.
Peak day flow	The largest volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 24-hour period.
Peak hour flow	The largest volume of wastewater flowing into a wastewater facility, or water flowing from a water facility, during any consecutive 1-hour period.

Term	Description
Public-access reclaimed water	Treated wastewater meeting the requirements of Chapter 62-610, Part III of the Florida Administrative Code for application on areas accessible to the general public.
Restricted-access reclaimed water	Treated wastewater meeting the requirements of Chapter 62-610, Part II of the Florida Administrative Code for application on areas where access by the general public is controlled and infrequent.
Reverse osmosis	A water treatment method that uses pressure and a semi-permeable membrane to purify water.
Three-month average daily flow	The total volume of wastewater flowing into a wastewater facility or water flowing from a water facility during a period of three consecutive months, divided by the number of days in this 3-month period.
Vacuum sewer	A mechanized system of wastewater transport that relies on differential air pressure to move wastewater. Vacuum pumps maintain a negative pressure on the collection system. The differential pressure between atmosphere and vacuum is the driving force that conveys wastewater through the system.

EXECUTIVE SUMMARY

INTRODUCTION

The Charlotte County Utilities (CCU) 2019 Annual Report updates the public and bond holders on the utility system's status and provides CCU staff with a tool for planning capital projects and improving operations. The report provides a high-level review and update of CCU's administration organization, financial information, major events, and capital improvement program (CIP) projects and the conditions and recommendations for the water treatment plants, water distribution systems, wastewater collection systems, wastewater treatment facilities, and reclaimed water (RCW) distribution systems.

ADMINISTRATION

The current five-tier rate structure was approved in 2006 by the Board of County Commissioners (BCC) and is considered appropriate for providing services to current customers. On June 24, 2014, the BCC approved a rate increase (water 0.75 percent, wastewater 6 percent) for fiscal years (FYs) 2015, 2016, and 2017.

In 2010, CCU began transitioning to a new fixed-base water meter system that allows CCU staff to access real-time data via central data collectors. This technology offers several advantages to customers and CCU staff including enhanced leak detection and the ability to address customer issues more promptly. The new meters and transponders have a 20-year warranty, increasing the expected life of the meters by 10 years. At the end of FY 2019, more than 96.1 percent of the customer accounts were served by the fixed-base meter system.

Since July 2014, CCU offers customers electronic billing and payment options. In 2019, approximately 55 percent of customers paid their bills electronically and 33 percent of CCU customers received their bills electronically.

The total Operations and Maintenance (O&M) revenue for FY 2019 was:

- $68,331,553 (water and wastewater services)
- $ 5,182,714 (connection charges)
- $10,435,289 (connection fees)

In FY 2019, CCU continued to see growth with the number of active water customers increasing by 2.50 percent (from 59,792 to 61,287) and the number of active wastewater customers increasing by 8.49 percent (from 36,649 to 39,762).

WATER TREATMENT PLANTS

CCU has two water supply sources for its two independent public water systems (PWSs). CCU is member government and purchases treated water from the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) for the consecutive PWS which serves Mid/West County. The PRMRWSA owns, operates, and maintains the Peace River/Manasota Regional Water Supply Facility (PRMRWSF), which has its own water use permit and provides treated surface water to neighboring counties. Charlotte County's allocation of the PRMRWSA-produced water is 16.1 million gallons per day (MGD) Annual Average Daily Flow (AADF), 19.32 MGD for the

peak month, and 22.54 MGD for the maximum day. CCU is using approximately 64 percent of the water allocated by the PRMRWSA under AADF conditions.

CCU also owns and operates the Burnt Store Reverse Osmosis (RO) Water Treatment Plant (WTP), which produces water to serve the South County distribution system. The Burnt Store RO WTP operates under Water Use Permit No. 3522, which expires in 2033. As currently configured, the Burnt Store RO WTP capacity is 3.61 MGD and has 1.5 MG of storage. On average, the Burnt Store RO WTP is operating at an average annual capacity of 0.55 MGD or approximately 15 percent of its design capacity. Raw water is supplied by six water production wells. Concentrate from the treatment process is disposed of into two onsite deep injection wells with a combined capacity of 3.44 MGD. The primary recommendations for the Burnt Store RO WTP include performing a load study, applying appropriate arc flash labeling, and implementing the recommendations from CCU's Risk and Resilience Assessment (RRA) report (CCU, March 2020).

WATER DISTRIBUTION

Chapter 4 reviews and discusses CCU's distribution system infrastructure for its two independent PWSs. In FY 2019, CCU installed one hydrant, replaced 23 hydrants, repaired 38 hydrants, and performed maintenance on 539 hydrants, repaired 60-line breaks on pipes 3 inches diameter or larger, replaced 12 valves, and performed maintenance activities on 1,597 valves throughout the Mid/West County and South County distribution systems. The 2019 Consumer Confidence Reports confirms that the water delivered by both CCU water distribution systems meets or exceeds regulatory quality requirements.

At the end of FY 2019, the Mid/West County distribution system consisted of approximately 1,500 miles of water main, four water-booster pumping stations (WBS) with ground storage tanks (GSTs), one chemical booster station, eight supply interconnects with PRMRWSA, and seven emergency interconnects with neighboring water utilities. The current total GST capacity for this system is 10 million gallons (MG). The PRMRWSA also has an additional 12 MG of storage capacity available to the Authority members for emergency fire flow or for general distribution during temporary loss of treatment at the PRMRWSF. For FY 2019, the total unaccounted-for water loss for the Mid/West County distribution system was 5.15 percent. The Mid/West County distribution system recommendations include performing a load study at each WBS, applying arc flash labeling on appropriate equipment, increasing the resiliency at the Gulf Cove WBS by replacing the Myakka River water main, and implementing the recommendations from CCU's RRA report (CCU, March 2020).

At the end of FY 2019, the South County distribution system consisted of 64 miles of water main and has no interconnects with neighboring water utilities. For FY 2019, the total unaccounted-for water loss for the South County system was 16 percent. Annual water loss over 10 percent for the South County system triggered a water audit, which includes a plan to mitigate the high loss. CCU, in concert with the Southwest Florida Water Management District (SWFWMD), continues its leak detection study in South County. Recommendations for the South County system include continuing to replace the old "class" polyvinyl chloride (PVC) pipes with new C-900 PVC pipes to mitigate leaks in the system, continuing to develop a computerized hydraulic model for the distribution system, and continuing to identify sources of unaccounted-for water loss throughout the system.

WASTEWATER COLLECTION

Chapter 5 presents the CCU wastewater collection system, which currently serves 39,762 customer accounts in four distinct collection areas. The total collection system consists of 371.8 miles of gravity sewer, 380.2 miles of low-pressure sewers (LPSs), 23.9 miles of vacuum sewer, 184 miles of force main, 314 lift stations of which 13 are under service contracts from other Charlotte County departments, 2 vacuum stations, and approximately 7,750 manholes. CCU also owns tanker trucks that are available to haul wastewater from lift stations to the treatment plants during emergencies. The complete wastewater collection system was hydraulically modeled using SEWERGEMS™ as part of a County-wide wastewater master plan. As part of the master plan, the model was last calibrated in FY 2019.

During FY 2019, all lift stations were maintained in working order. Recommendations for the CCU wastewater collection system include continuing to rehabilitate lift stations, continuing to use the hydraulic modeling to assess the need for upgrades, continuing to televise and repair gravity sewers and manholes, and installing odor-control systems at lift stations that are significantly impacted by sewer gases.

WASTEWATER TREATMENT FACILITIES

Chapter 6 includes an overview and discussion of CCU's state-certified laboratory, four water reclamation facilities (WRFs), and Zemel Road leachate treatment facility. The East Port Laboratory (EPLAB) conducts most water quality testing for the County's facilities. In FY 2019, the laboratory processed 7,220 samples (28,762 analyses) including on-site analyses and additional off-site testing. The EPLAB implemented Laboratory Information Management System (LIMS) – a data management software that generates paper documentation forms and sample identification numbers to record and track test results. The tracking system also monitors quality control results and chemical use to manage ordering of supplies. To verify the LIMS operation was reliable, the original paper tracking system continued until late 2017. The paper tracking system is still better suited for certain data analysis management than the electronic tracking.

EPLAB has excellent record of scoring high – within two standards of deviation of the national average of all laboratories – on Proficiency Testing (PT) required to maintain Laboratory Certification. During FY 2019, the laboratory obtained certification for Ammonia-Nitrogen by EPA Method 350.1 (November 2018), Ammonia-Nitrogen by Standard Method (SM) 4500-NH3 D-2011 (September 2018), Nitrate-Nitrogen, Nitrite-Nitrogen, and Total Nitrate-Nitrite by SM 4500-NO3-H/SM, 4500-NO2-B (November 2018), and Sulfate by ASTM D516-11 (September 2018). Recommendations for EPLAB improvements include continuing to expand the use of the LIMS within its capabilities, continue working with sampling personnel on sampling protocols, and evaluate staffing requirements and ability to provide sampling services.

CCU also owns and operates four WRFs for treating municipal wastewater and operates one landfill leachate treatment facility. Table ES-1 summarizes permit information and current percent permit capacity associated with each facility. The WRFs are complex plants that require continual repair and maintenance. The main recommendations include completing the upgrades at the East Port WRF, completing the expansion plans for the Burnt Store WRF and

evaluating improvements for biosolids handling facilities at all four WRFs. Chapter 6 of this report provides more detailed information and an extensive list of recommendations.

Table ES-1 CCU WRFs Flow and Capacity Statistics

Facility	Permitted Capacity (MGD AADF)	AADF[1] (MGD)	Maximum TMADF[2] (MGD)	Permitted Operating Capacity[1] (%)	Maximum TMADF Operating Capacity[2] (%)
East Port WRF	6.00[a]	4.56	5.39	76	90
West Port WRF	1.20	0.64	0.77	54	64
Rotonda WRF	2.00	1.08	1.20	54	60
Burnt Store WRF	0.50[b]	0.32	0.38	63	76
Zemel Road Landfill Leachate Facility	0.15	0.07	NA	50	NA

Notes: [a] Design of upgrades to 12.0 MGD began in FY 2019. Construction activities will commence after the design is complete in two phases – Phase 1: Construction of upgrades from 6 MGD to 9 MGD; and Phase 2: Construction of upgrades from 9 MGD to 12 MGD. [b] Design for expansion to 2.5 MGD began in FY 2019.

[1] Based on the AADF/Permitted Capacity.

[2] Based on the highest 3-month average daily flow (TMADF)/Permitted Capacity, which is used to help determine when a facility should begin planning for expansion.

RECLAIMED WATER DISTRIBUTION SYSTEM

Chapter 7 discusses CCU's reclaimed water (RCW) distribution system. CCU continues to encourage the beneficial use of RCW, a resource produced by the four WRFs. CCU permitted a Master Reuse System for the Mid/West County system which receives RCW from the East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 60 miles of transmission mains, three booster stations, and three GSTs. A 20 MG storage pond is located at the West Port WRF and an additional 95 MG of storage capacity was added at the East Port WRF with the completion of Stage 5 Improvements, which provided conversion of an existing secondary storage pond to a reclaim storage pond. The Master Reuse System infrastructure is in good condition; however, it requires more pipe hydraulic capacity to allow more RCW to be transferred to major RCW users in West County. CCU's primary focus is to continue expanding the system to serve additional customers.

The South County RCW distribution system consists of one 3-mile-long transmission main that serves three large user customers. The infrastructure of the systems is in good condition, although it requires pipe, which will be incorporated under the proposed WRF Expansion Project.

The primary recommendations for the RCW distribution system are to develop a County-wide Reclaim Water Master Plan (Currently being completed under the 2019 East Port WRF Expansion Project) to identify immediate, short-term and long-term improvements and capital improvement project (CIP) planning, develop a comprehensive operating protocol for the Master Reuse System, install throttling control valves at all current major RCW users with pond discharges in the Mid and West County areas, install certified staff gauges for pond water surface elevations for all pond discharges, develop an operational protocol for using the

Westport RCW Pump Station, and RCW storage and high-service pump facilities at the Burnt Store WRF as part of the expansion project.

ENGINEERING

As Charlotte County's population continues to grow, CCU's ability to develop plans that address the projected growth is vital. The Engineering Division develops CIP projects for CCU's water, wastewater, and RCW infrastructure systems. Table ES-2 summarizes FY 2019 capital improvement budget dollars and expenditures for the three infrastructure sectors. The budget includes multi-year CIPs; therefore, expenditures occur over multi-years. Details of the capital improvement budget and expenditures are contained in Chapter 8 of this report.

Table ES-2 FY 2019 Capital Improvement Budget and Expenditures

Infrastructure Sector	Budget	Expenditure
Water	$ 9,731,000	$ 5,309,000
Wastewater	$50,185,000	$15,679,000
Reclaimed Water	$ 4,826,000	$ 812,000

CONSOLIDATED RECOMMENDATIONS

Chapter 9 consolidates all recommendations discussed throughout this Annual Report for each CCU water, wastewater, and RCW facility visited.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

Charlotte County Utilities Department (CCU) prepares an Annual Report to provide the public with a utilities status update and to fulfill Revenue Bonds requirements. The bonds issued to Charlotte County require that the County retain the services of a licensed professional engineer to verify the quality of CCU's operation. The bond covenant states:

> *The Issuer shall at all times employ Consulting Engineers, whose duties shall be to make any certificates and perform any other acts required or permitted of the Consulting Engineer under this Resolution, and also to review the construction and operation of the System at least once a year, and, not more than 120 days prior to the end of each Fiscal Year, to submit to the Issuer a report with recommendations as to the proper maintenance, repair and operation of the System during the ensuing Fiscal Year, including recommendations for expansion and additions to the System to meet anticipated service demands, and an estimate of the amount of money necessary for such purposes. Copies of such reports, recommendations and estimates made as here in above provided shall be filed with the issuer for the inspection by bondholders, if such inspection is required.*

Table 1-1 summarizes the principal balances for CCU bonds as of March 2019.

Table 1-1 Principle Balances on CCU Bonds by FY 2019

Bond Issues	Original Issuance	Current Debt	Comments
2008 Bond	Wastewater Expansion – 1998	$20,985,000	Wastewater Expansion Program
2011 Bond	Refinance – 2011	$29,725,000	Refinanced Debt
2013 Bond	Refinance – 2003A	$14,740,000	Refinanced Debt
2016 Bond	Refinance – 2006 & part of 2011	$17,745,000	Refinanced Debt
	Total Current Bond Debt	$83,195,000	
	State Revolving Fund Debt	$3,603,705	
	Total Long-Term Debt	$86,798,705	

The Report is divided into the following chapters:

1. **Introduction:** General information concerning the report's preparation.
2. **Administration**: Charlotte County government structure and CCU's organization, administration programs, and financial information.
3. **Water Treatment Plants**: Description and records concerning the purchase and production of potable water and the general condition of the components.
4. **Water Distribution System**: Description of water distribution system and the general condition of components.

5. **Wastewater Collection:** Description and records concerning the collection of wastewater and the general condition of components.

6. **Wastewater Treatment Facilities**: Description and records concerning the facilities used to treat wastewater and leachate and the general condition of the components.

7. **Reclaimed Water Distribution System**: Description of reclaimed water (RCW) distribution system and the general condition of the components.

8. **Engineering**: The status of the water, wastewater, and reclaimed water Capital Improvement Program (CIP) projects and a summary of the major engineering reports completed for the County.

9. **Consolidated Recommendations**: Summary of planning recommendations, capital improvements, and operation and maintenance items for the water, wastewater, and reclaimed water systems.

1.2 AUTHORITY

Jones Edmunds' preparation of the Fiscal Year (FY) 2019 Annual Report is authorized by Charlotte County Purchase Order No. 2020001142 for File No. 20-050, Work Order No. 23.

1.3 DEMOGRAPHICS

Charlotte County is on the southwest coast of Florida about 96 miles south of Tampa. It covers 694 square miles and contains about 126 miles of waterways. With an elevation ranging from 5 to 25 feet above sea level, Charlotte County enjoys a sub-tropical climate where the extreme temperatures of both summer and winter are subdued by the prevailing gulf breezes. Numerous upland and aquatic preservation areas occur in the area. Charlotte Harbor includes one of the world's largest protected marine estuaries encompassing 270 square miles with 219 miles of natural shoreline.

The Office of Economic and Demographic Research estimated the Charlotte County population in 2019 at 181,770. In 2009, Port Charlotte was named "Best Place to Retire" by *Money* magazine, and the community has received similar recognition from other sources during the past decade.

A large portion of this coastal community's urban development is in the west third of the County, including the barrier islands abutting the Gulf of Mexico. The Port Charlotte planned residential development occupies most of Central County with some house lots having canal access to Charlotte Harbor. A large development known as Rotonda is in the west area of the County. Every lot within Rotonda is within half mile of a golf course.

A growing area in the extreme south area of the County, near the Lee County border, is known as the Burnt Store Corridor because of its location on and near Burnt Store Road. This area encompasses 8 square miles and is currently only at 15-percent build-out.

Commercial growth along many of the main corridors constitutes over 1,500 acres. Most of the commercial epicenters are along US Highway 41 and in the Murdock area of Port Charlotte. Commercial zones have also developed along Kings Highway, Rampart Boulevard, and State Road (SR) 776. Less than 0.1 percent of the County area consists of industrial development.

The industrial development is primarily within the Community Redevelopment Area (CRA) in Charlotte Harbor.

1.4 MAJOR EVENTS

CCU is an active Charlotte County Department with projects and administrative activities underway. The following sections list significant events occurring within FY 2019.

1.4.1 GENERAL OPERATIONS

- On February 12, 2019, the Charlotte County Board of County Commissioners (BCC) approved resolution 2019-021 that adopts water and sewer utility rates, fees and charges for the first year 7% rate increase, second year 7% rate increase, and third year 7% rate increase, with an amendment to strike fourth year 5% rate and fifth year 5% rate, and add that at the end of the second year to look at the financial condition of the utility and discuss needs. Rates become effective on or after April 1 of each fiscal year beginning April 1, 2019.

- LA Consulting Inc. worked with utility staff to develop activity guidelines for the various departments; started on data refinement and gathering in preparation of implementation of the computerized maintenance asset management system (CMAMS); and worked with staff on proposal requirements.

- On January 29, 2019 the BCC directed the Utilities Department to start the design and planning process for the Ackerman Septic to Sewer Wastewater Expansion Project. On June 25, 2019 the BCC approved the Initial Assessment Resolution and set a Public Hearing for November 19, 2019 for creating an Ackerman Sewer MSBU.

1.4.2 ENGINEERING

- The BCC awarded the contract for the construction of the El Jobean Vacuum Station and the Myakka Potable Water Booster Station on March 12, 2019. The wastewater collection system will be awarded under a separate contract in FY 2020.

- Additional grant and low-interest funding were secured for various projects through the Southwest Florida Water Management District (SWFWMD) Cooperative Funding Initiative (CFI) and Florida Department of Environmental Protection (FDEP) State Revolving Fund (SRF) construction loans.

- CCU is pursuing land acquisition and design for expansion/replacement of the Burnt Store Water Reclamation Facility (WRF), including the treatment facility, reclaimed water (RCW) storage, and pumping for expected growth in the community.

- CCU has begun planning for the East Port WRF expansions to 9.0- and to 12.0-million-gallon-per-day (MGD) facilities.

- Major construction activities in FY 2019:

    - Ackerman Septic to Sewer Conversion Project – The Charlotte County BCC determined that, due to aged septic systems and water quality problems, central sewer will be installed, and each developed property will be required to connect to

the sewer after it is installed. A portion of the cost of the sewer collection system will be funded by special assessments against each property to be served. The remaining costs will be subsidized by the County.

- El Jobean Septic to Sewer Project – The Charlotte County BCC approved the contract for the El Jobean Vacuum Station. All of the easements were obtained, and the plans were finalized. Construction started in Summer 2019.
- US Highway 41 Southbound Utility Improvements from Enterprise Drive to Morningstar Waterway – This project includes removing and replacing the existing 12-inch water main along southbound US 41. These improvements are planned as a result of the proposed Florida Department of Transportation (FDOT) sidewalk and drainage improvement project along southbound US 41. Total project length is approximately 3 miles. The project started in August 2019.
- Coliseum Force Main Replacement Project – This project involves removing and installing 12-inch polyvinyl chloride (PVC) and high-density polyethylene (HDPE) sewer force mains within the utility easement on the pond and rear lots along Coliseum Boulevard. Estimated completion: Fall 2020.
- Loveland Grand Master Lift Station and 48-inch Gravity Interceptor Project – Utility crews are constructing a master lift station and a major 48-inch wastewater gravity interceptor to transfer wastewater to the East Port WRF. This project will improve the operation and efficiency of a substantial number of lift stations in the Mid County area. Work in the Kings Highway area requires some traffic disruption as crews install the pipeline. The installation also requires temporarily draining the stormwater retention ponds along Kings Highway. Although dewatering is a common practice when installing pipes, due to the County's high-water table, draining stormwater ponds is unusual. While designing the pipeline, engineers chose to run pipes below the ponds to avoid impacting Kings Highway as much as possible. The pipeline will have to cross beneath the road at some point, and advance notice and detour information will be provided as needed. Contractor: Kiewit Infrastructure South Co. Estimated completion: Winter 2021.
- Construction continued on East Port WRF Stage 5 Reclaimed Water Improvements project including a 95-million-gallon (MG) storage pond conversion, a 9-MGD High Service Pump (HSP) Station, a 1,500-kilowatt (kW) emergency generator, and electrical, instrumentation, and control improvements. This work was completed in FY 2019 with final performance testing scheduled for March 2020.
- Completed Forrest Nelson force main replacement.
- Completed East West Spring Lake on-lot connection plumbing contracts.
- Completed Maracaibo gravity sewer main extension.
- Biscayne-Cornelius 16-inch water main completion.
- North County Regional Park – Lift station force main completion.
- Linwood water/sewer transmission lines completion.
- Ingram 24-inch water transmission main completion.
- Construction of Myakka potable water booster station.
- Harbor boulevard utility improvements.
- Rehabilitation of lift station (LS) 815.
- Relocation of FDOT Toledo blade force main.

- Major design activities in FY 2019:
    - Coliseum 8-inch and 12-inche AC Force Main Replacement.
    - Ramblewood Water Line Extension.
    - Hillsborough-Flamingo 12-inch Water Main.
    - Ackerman Septic to Sewer Expansion Project with Water System Improvements.
    - El Jobean Septic to Sewer Vacuum Sewer Collection System.
    - Miakka Water Booster Station
    - Cape Haze Reclaim Water Main and Force Main.
    - Olean Blvd and Gertrude Ave Utility Improvements.
    - Burnt Store Road Widening Phase 2.
    - Deep Creek Sewer Force Main Replacement.
    - Midway Blvd (Ellicott to Lakeview) 24-inch FM and 16-inch Water Main.
    - Block 3696 S Access Rd Force Main.
    - Burnt Store WRF Expansion Preliminary Engineering, Design & Construction Services. CCU is pursuing land acquisition and design for expansion/replacement of the Burnt Store WRF, including the treatment facility, reclaimed water storage and pumping for anticipated growth in the community.
    - Potable Water Master Plan Request for Proposals.
    - CCU has begun planning for the East Port WRF expansion to 9.0 MGD. The work includes designing for an additional 3 MG for planning provisions to 12.0 MGD.

1.4.3 Water System Operations

- CCU provided approximately 3.34 billion gallons of water to 61,287 connections in FY 2019.
- CCU received 131 MG of Punta Gorda-produced water through the new CCU/Punta Gorda 24-inch interconnect pipe. CCU distributed 201 MG back to Punta Gorda during their peak demand period.

1.4.4 Wastewater System Operations

- CCU treated 2.41 billion gallons of wastewater from 39,762 customers in FY 2019.
- CCU continued the successful program of sewer rehabilitation to reduce groundwater infiltration into the collection system. Work included internal TV inspection of gravity sewer, smoke testing, manhole repairs, and service lateral repairs.

1.4.5 RCW System Operations

- CCU provided irrigation water to eight golf courses, one professional sports park, and numerous residential and commercial customers.

1.4.6 Instrumentation and Control Group

- CCU provided programmable logic controller (PLC) programming.
- CCU cross-trained between divisions.
- CCU installed and calibrated controls.

1.4.7 Operations Data Management

- CCU entered into a Supervisory Control and Data Acquisition (SCADA) Master Plan study to determine future needs and to pursue cost-efficient alternatives for a consolidated system approach.

1.4.8 Reports and Studies

- CCU presented *Charlotte Harbor Water Quality Initiative* to the BCC to show how the sewer expansion program will help improve water quality.
- *Charlotte County Water Quality Assessment Phase I: Data Analysis and Recommendations for Long-Term Monitoring*, Florida Atlantic University-Harbor Branch Oceanographic Institute, Marine Ecosystem Health Program, December 2016.
- Facilities Quarterly Reports, Stantec Consulting Engineers, 2019.
- Entered partnership with Western Michigan University for a study to develop numerical models populated with hydro/hydro-geological and metrological data to investigate the two dominant mechanisms that control nitrogen fluxes into Charlotte Harbor.
- *Western Michigan Ground Water Tracer Study* update was presented to the Board on January 29, 2019, by Matt Reeves, PhD.

1.5 Acknowledgements

Jones Edmunds would like to acknowledge the following Charlotte County staff for providing guidance, information, and review in the preparation of this report: Stephen Bozman, Bruce Bullert, Michael McCrumb, Dean Campbell, Chris Carpenter, Denise Caruthers, Delmis Castillo, Thomas Cimino, Thomas Dunn, Jeremy Frost, Peter Giannotti, Tod Avers, Stephen Kipfinger, Henri Lafenetre, Sandra Lavoie, Travis Mortimer, Craig Rudy, Bruce Schellinger, John Thompson, Bill Thornton, Matt Trepal, Matt Valentine, Ruta Vardys, Caroline Wannall, David Watson, Johnny Chamberlain, Sandra Weaver, Matthew Couturiaux, Scott Ericson, and Norma Rogers.

2 ADMINISTRATION

2.1 COUNTY GOVERNMENT

Charlotte County government operates under an elected BCC and an appointed County Administrator. The BCC is responsible for the legislative duties of the County government. Five County Commissioners representing separate Districts serve on the BCC over staggered 4-year terms.

The County Administrator is the County's chief administrative officer and is responsible for all administrative matters and operations under the authority of the BCC. The County Administrator's responsibilities include appointing County Department Directors, with final approval by the BCC.

2.2 UTILITIES DEPARTMENT

CCU, a Charlotte County government department, provides potable water production and distribution, wastewater collection and treatment, and RCW distribution for irrigation within the certified service area. CCU serves over 60,000 homes and businesses in the Greater Port Charlotte area, El Jobean, Gulf Cove, Englewood East, Rotonda, and Burnt Store, as well as bulk customers, including El Jobean Water Association, Riverwood Development, Inc., Encore Super Park, and Little Gasparilla Island.

CCU maintains interconnects for emergency bulk water sales with the Charlotte Harbor Water Association, Gasparilla Island Water Association, City of North Port Utilities, and Englewood Water District. An interconnect with the City of Punta Gorda allows CCU to provide or receive water depending on each system's demands.

CCU's mission, vision, and values are as follows:

Mission: To provide safe, reliable drinking water, reclaimed water, and wastewater service for the enrichment of the community.

Vision: To exceed expectations in the delivery of water and sewer services.

Values:

- **Integrity** – Serve honestly.
- **Customer service** – Provide excellent service and achieve real results that earn the public's trust.
- **Partnership** – Work cooperatively with our coworkers and others for the overall good of the community.
- **Innovation** – Be committed to innovation and continual learning.
- **Stewardship** – Be committed to being good stewards of our resources.

Figure 2-1 shows the CCU certificated service area outlined in yellow.

Figure 2-1 CCU Certificated Service Area

CCU is led by a Utilities Director, who works under the direction of the County Administrator and Deputy County Administrator. CCU consists of four divisions: Administration, Business Services, Engineering Services, and Operations.

The Administration Division includes the Utilities Director and support staff. The Administration Division manages the overall utility and supervises all other utility divisions.

The Director's responsibilities include:

- Planning for water and wastewater needs.
- Developing potable water treatment/distribution systems.
- Developing wastewater treatment/collection systems.
- Developing RCW distribution systems.
- Operating the County's water, wastewater, and RCW systems.
- Instituting water conservation practices and educational programs.
- Communicating – internally and externally with customers.

The Business Services Division is managed by the Business Services Manager and includes:

- Customer Service
- Billing and Collections
- Meter Services

The Engineering Services Division provides engineering and construction observation services to residential and commercial utility customers. The Division is managed by the Engineering Services Manager and includes:

- Preliminary Engineering Group
- Design Group
- Construction Services Group

The Operations Division, overseen by the Utility Operations Manager, is responsible for the operation and maintenance of all County-owned and operated water, wastewater, and RCW facilities including:

- Water and wastewater treatment facilities.
- Water distribution systems including booster pumping stations, storage tanks, fire hydrants, valves, and the entire water distribution piping.
- Wastewater collections including lift stations, vacuum stations, and wastewater collection systems.
- RCW distribution including cross-connection control and water quality monitoring.
- A new Instrumentation and Controls (I&C) Group, under a supervisor, formed from existing I&C technicians in each division.
- Parts and equipment warehouse.

Financial Services are supplied by the Fiscal Services Division of the Charlotte County Budget & Administrative Services Department. CCU pays for five personnel, led by a Financial Manager, through an inter-fund transfer.

CCU also funds two positions in the County IT Department to assist with upgrading and maintaining hardware and software systems.

In FY 2019, the total number of positions budgeted for CCU were 237. CCU had 230 full-time employees at the end of September 2019.

Figure 2-2 and Figure 2-3 show the CCU organizational structure as of October 2019.

2.3 ADMINISTRATION FACILITIES

The Charlotte County Environmental Campus is on an out-parcel of the East Port WRF. The campus includes the CCU Administration Building, Operations Service Center/Warehouse, Charlotte County Public Works Solid Waste Division, Community Services, University of Florida Institute of Food and Agricultural Services (UF/IFAS) Extension Services Division, the Charlotte County/Punta Gorda Municipal Planning Organization, and Public Works Mosquito and Aquatic Weed Control.

Figure 2-2 2019 CCU Organizational Chart – Overall

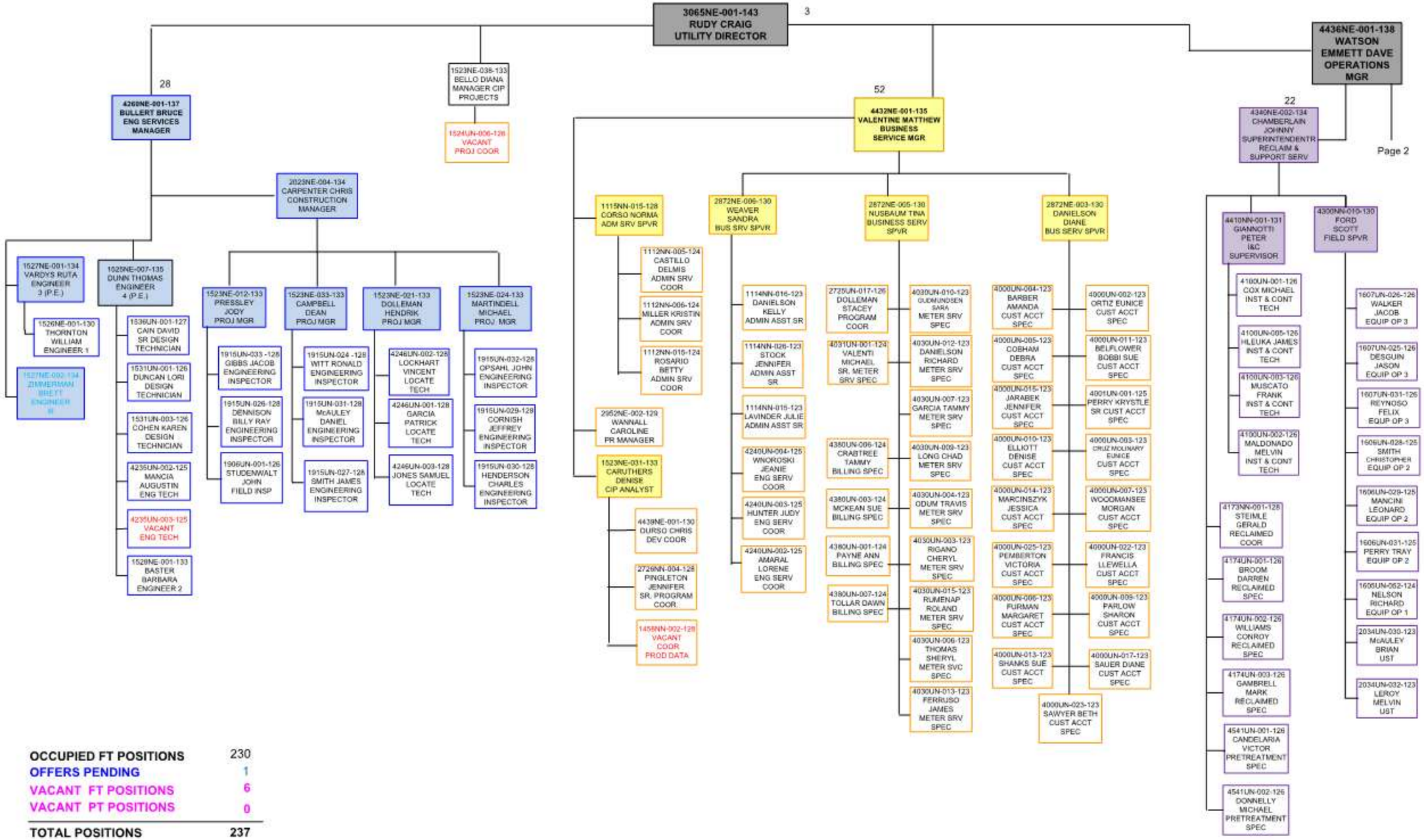
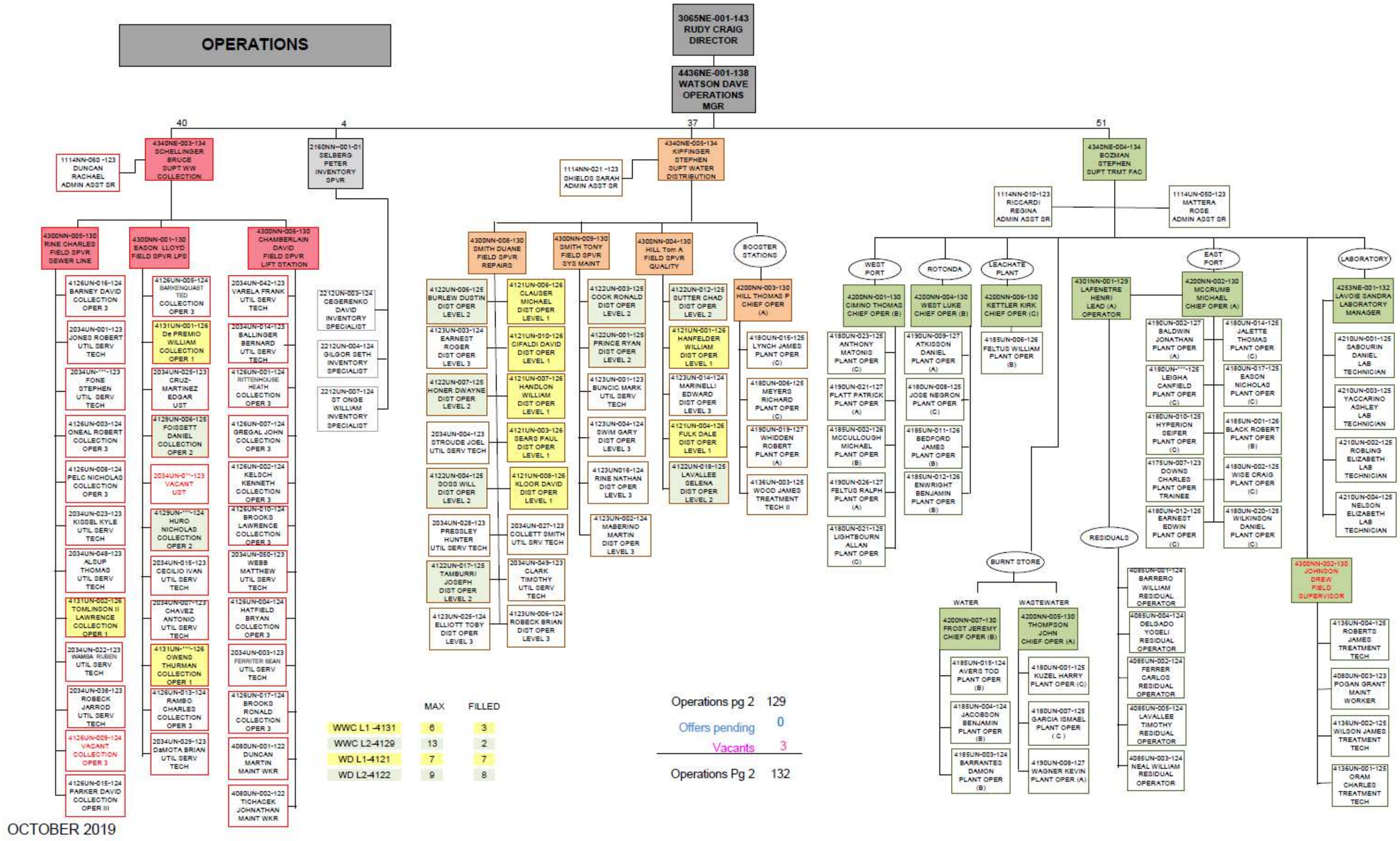


Figure 2-3 2019 CCU Organizational Chart – Operations



2.4 CCU WATER CONSERVATION EFFORTS

In 2019, CCU continued with its outreach efforts, including oversight of the Water Conservation Programs and community education efforts discussed in the following sections.

2.4.1 WATERING RESTRICTIONS

Charlotte County began once-per-week watering restrictions for potable water in 2001. In early 2008, the County adopted the same once-per-week watering schedule recommended by SWFWMD to be consistent with other utilities in the area and aid in the ease of enforcement. Once-a-week restrictions expired on June 30, 2010. Charlotte County adopted SWFWMD's year-round water restrictions, by ordinance, on March 30, 2010. This ensured that Charlotte County would be consistent with SWFWMD's recommendations for year-round restrictions. SWFWMD's year-round water conservation measures went into effect July 1, 2010. SWFWMD's Phase I Water Shortage Restrictions (Moderate Water Shortage) went into effect on December 1, 2010, except in areas where local governments imposed stricter measures. In Phase I, CCU continued to follow the year-round water restriction in-place in Charlotte County. On August 1, 2013, the Phase I Water Shortage Restrictions were lifted by SWFWMD. Charlotte County has continued year-round water restrictions, which limit irrigation watering to 2 days per week (if needed). Hand watering and micro-irrigation of plants (other than lawns) may be done on any day and any time.

2.4.2 IN-HOUSE ENFORCEMENT OF WATERING RESTRICTIONS

Enforcement of watering restrictions was approved by the BCC in early 2008. The enforcement allows CCU staff to progressively enforce water restrictions for CCU customers, including written warnings with educational materials and escalating unauthorized water usage charges for repeat offenses. These charges appear on the customer's water bills. The Sheriff's Office continues to provide enforcement services for non-CCU customers.

2.4.3 WATER RESTRICTIONS ORDINANCE

Charlotte County Ordinance 2010-016 adopted SWFWMD's year-round water conservation measures. The details of the watering restrictions are contained at *www.charlottecountyfl.gov/dept/utilities/Pages/Conservation-Outreach.aspx*

2.4.4 CONSERVATION-BASED RATE TIERS

As part of a year-long rate study by Public Resource Management Group (PRMG) and as recommended by SWFWMD, CCU's three-tier rate structure was replaced with a five-tier system in October 2006. The first tier is 0 to 5,999 gallons; the highest tier is 25,000 gallons and above.

2.4.5 EMERGENCY WATER CONSERVATION RATE

Emergency water conservation rates have not been used since June 2010 when they were replaced with CCU conservation-based rates as discussed in Section 2.4.4.

2.4.6 Regional RCW Expansion

CCU's RCW system operates under a Master Reuse Permit approved by FDEP that allows CCU to move RCW from East Port WRF, West Port WRF, and Rotonda WRF to customers. Abundant RCW at the East Port WRF and customer demands for irrigation water throughout the central and west parts of the County were the driving forces behind CCU's desire to expand its RCW distribution system. Using RCW for irrigation and other non-potable water needs reduces the demand for potable water, surface water, and groundwater. A Reuse Master Plan was prepared in 2005 to expand the RCW system.

Phase 1, completed in 2009, included two strategically placed 0.5-MG storage tanks and pumping stations along with 14 miles of 16-inch-diameter RCW transmission main.

Phase 2, completed in 2014, included approximately 2 miles of 16-inch transmission pipe, additional storage at the West Port WRF in West County, and a booster pumping station along the interconnect between the RCW systems for the Rotonda and West Port WRFs.

Phase 3, which began in 2017 and continued in FY 2019, included a new RCW main for Spring Lakes on Port Charlotte Boulevard and US 41 between Hillsborough Boulevard and Enterprise Boulevard and the Stage 5 RCW Improvements at East Port WRF for a 95-MG RCW storage pond and a 9-MGD HSP station.

RCW modeling was approved in December 2018 to recommend operational and structural improvements to the RCW distribution and pumping system to improve the delivery of RCW from East Port WRF to customers in Mid and West County. In January 2020, a Technical Memorandum (TM) was completed by Jones Edmunds, which documented the updates to the CCU RCW hydraulic model, model verification, current operations, and analyses and recommendations for RCW system improvements to maximize conveyance of RCW to existing and future customers.

2.4.7 Indoor Water Conservation Kits

CCU continues to provide customers with Indoor Water Conservation Kits during local area community outreach events. Each kit includes a low-flow showerhead, bathroom aerators, a kitchen aerator, toilet flapper, leak detection tablets, water conservation literature, and more water conservation-related information.

2.4.8 Community Outreach

CCU regularly participates in water conservation-related outreach, including bill inserts, news articles, and speaking engagements within the community. CCU funded a portion of the salary for a Florida Yards and Neighborhoods Charlotte County UF/IFAS Extension Program Assistant for the past several years. CCU and the UF/IFAS Extension Services work jointly promoting Florida Friendly Landscaping. A donated demonstration garden is on CCU's Environmental Campus property. The garden is accessible to all Charlotte County residents and is maintained by Master Gardeners who are given free space at the Campus to better educate the residents.

CCU conducted seven citizen educational tours during FY 2019 at the Eastport WRF, West Port WRF, Rotonda WRF, Burnt Store WRF, and the Burnt Store Reverse Osmosis (RO) Water Treatment Plant (WTP). The tours involved promoting alternative water sources, conservation, and good stewardship of water resources.

The water/wastewater plant tours included:

- Wastewater/Water Treatment Processes
- Regulatory Requirements
- State-of-the-Art Membrane Bioreactor (MBR) and RO Technology
- Process for Producing RCW
- Treatment and Disposal of Effluent
- Biosolids and Their Disposal
- Environmental Impacts of Water Reclamation
- Alternative Water Sources

CCU promotes an understanding of its operations through outreach programs such as:

- Water Conservation Booth at the Charlotte Harbor Nature Festival
- Presentation of the Utility for County Ambassador Program
- Handouts and Conservation Display at the Environmental Campus and Administration Building
- Speaking Engagements at Homeowner Association (HOA) meetings
- Engineering Availability and Business Services Presentations to Charlotte County Realtors
- Participation at Safety and Emergency Planning Fair at Heritage Oak Park Association
- Hydration Presentations to Community Groups: Parkside Neighborhood Watch Group, Volunteers of America Veterans Village, Summer Day Campers at Cedar Point Park, etc.
- Participation at the SWFWMD Conservation Expo
- Participation at Government Academy Day
- Project Information Meetings for Residents and Business Owners

CCU added a new initiative to their community outreach efforts toward the end of FY 2013/2014. The importance of staying properly hydrated, "H_20 and Your Health," was developed; the program focuses on the need to stay properly hydrated, and CCU tap water is the most economical way to do so.

2.4.9 Conservation Signs

Utility vehicles have ***CONSERVE WATER*** stickers on the bumpers.

2.4.10 Water Conservation Month

CCU's annual Water Conservation Month program includes a BCC proclamation with community outreach/educational displays at Murdock County Administration office and at the CCU office year-round.

2.4.11 CCU Website/Social Media

Customers can receive the latest water restrictions, conservation tips, and general CCU current events at the Charlotte County website, *www.charlottecountyfl.gov,* and at the Administration office. CCU launched its Utilities' Facebook page to the public on November 11, 2014.

The public can also receive updated information on projects, services, conservation tips, hydration information, and general current events with pictures on Facebook. Facebook also

provides an avenue to announce public outreach events and educational tours and to make reservations online to attend events and tours.

2.5 FINANCIAL

CCU is a government-owned enterprise fully funded by customer rates, not by tax dollars. Savings opportunities (or profits) are passed through to the benefit of the utility customers. CCU's policies, rates, and security deposits are established by the BCC. The County Clerk of Circuit Court serves as the accountant and auditor for the BCC and is responsible for the collection and disbursement of County funds.

2.5.1 REVENUES

The rate plan, approved by the BCC in 2006, incorporated projected water and wastewater demands through 2011, based on growth estimates. In September 2010, the rate increase that would have taken effect October 2010 was repealed. The BCC determined that the revenues based on the 2009 rates would be adequate for CCU to meet the needs of current and future customers through FY 2014. On June 24, 2014, the BCC approved rate increases (water 0.75 percent, wastewater 6 percent) for FY 2015, 2016, and 2017. The combined charges remained the same as in 2018. The BCC approved on February 12, 2019, to increase water, sewer and reclaimed rates at 7 percent across the board effective April 1, 2019.

In 2010, CCU embarked on a new fixed-base water meter project. This project is designed to replace existing meters with fixed-base meters in a phased approach. The new meter system also extends the life of the meters from 10 to 20 years. At the end of FY 2019, 60,824 of the accounts were served by the fixed-base meter system. The fixed-base meter system provides remote reading capabilities, event notification such as high water consumption or potential leaks, and online consumer engagement features. Water use data are securely transferred from each individual meter to the central data collectors. It is then made available to CCU via a graphical and simple-to-use web interface and integrated with CCU's Computerized Maintenance Management System (CMMS) and Geographic Information System (GIS) software packages. Account-specific consumption data are also available to CCU customers via a separate, easy-to-use online interface.

CCU offers multiple methods of electronic payment and electronic billing, which has resulted in 33 percent of the County's customers receiving their bills electronically and 55 percent of the customers paying their bill electronically.

The HeartShip Program is available to help customers who are faced with a period of personal or family crisis and do not have sufficient money to pay their utility bill. This program is funded by contributions from caring members of the community. The County's Human Services Department, in cooperation with CCU's Business Services Division, administers the HeartShip funds.

The total Operations and Maintenance (O&M) revenue for FY 2019 water and wastewater services was $68,331,553. The total O&M connection charge revenue was $5,182,714, and total connection fee revenue was $10,435,289.

2.5.2 CCU CUSTOMER BASE

During FY 2019, the number of active water services increased from 59,792 to 61,048, and the number of active sewer services increased from 36,649 to 39,560. For planning purposes, the level of water and wastewater service established by CCU is 225 gallons per day (gpd) of water consumption per equivalent residential unit (ERU) and 190 gpd of wastewater flow per ERU. These levels represent peak day usage, including fire flow.

2.5.3 INSURANCE

CCU is self-insured. The self-insurance is provided by the County and is administered by the Gehring Group, with Kurt Gehring acting as the Agent of Record. In addition, CCU is also covered by general property and liability insurance, excess property insurance, boiler and machinery insurance, and pollution liability insurance. Utility buildings and contents are covered for up to 100 percent of the replacement cost without depreciation. In Mr. Gehring's opinion, there is adequate insurance on CCU and its facilities. Therefore, the County complies with the bond covenant property insurance requirements as set forth below:

> *Insurance – The Issuer will carry such insurance as is ordinarily carried by private or public corporations owning and operating utilities similar to the System with a reputable insurance carrier or carriers, including public and product liability insurance in such amounts as the Issuer shall determine to be sufficient and such other insurance against loss or damage by fire, explosion (including underground explosion), hurricane, tornado or other hazards and risks, and said property loss or damage insurance shall at all times be in an amount or amounts equal to the fair appraisal value of the buildings, properties, furniture, fixtures and equipment of the System, or such other amount or amounts as the Consulting Engineers shall approve as sufficient.*
>
> *The Issuer may establish certain minimum levels of insurance for which the Issuer may self-insure. Such minimum levels of insurance shall be in amounts as recommended in writing by an insurance consultant who has a favorable reputation and experience and is qualified to survey risks and to recommend insurance coverage for persons engaged in operations similar to the System.*
>
> *The Issuer shall, immediately upon receipt, deposit the proceeds from property loss and casualty insurance to the credit of the Revenue Fund. The proceeds from property loss and casualty insurance shall be applied as follows: (A) if such proceeds, together with other available funds of the Issuer, are sufficient to repair or replace the damaged portion of the System, such proceeds and other available funds shall be deposited to the credit of the Renewal and Replacement Funds and, together with any other available funds of the Issuer, applied to such repair or replacement; or (B) if such proceeds, together with other available funds of the Issuer, are not sufficient to repair or replace the damaged portion of the System or if the Issuer makes a determination in accordance with Section 5.07 hereof that such portion of the System is no longer necessary or useful in the operation of the System, such proceeds shall (1) if such proceeds equal or exceed $50,000, (a) be*

applied to the redemption or purchase of Bonds or (b) be deposited in irrevocable trust for the payment of Bonds in the manner set forth in Section 9.01, provided the Issuer has received an opinion of Bond Counsel to the effect that such deposit shall not adversely affect the exclusion, if any, from gross income of interest on the Bonds for purposes of federal income taxation, or (2) if such proceeds are less than $50,000, be deposited in the Revenue Fund.

2.6 RATE COMPARISON

The County investigated the rates and rate structure for various neighboring utility systems that provide residential services. The results of this comparison, as of September 30, 2019, assumes that water service consists of delivering 4,000 gallons of water per month through a standard (3/4-inch) meter and that sewer service flows correspond with 4,000 gallons of water per month. Table 2-1 presents the rate comparison results.

Table 2-1 Rate Comparison

Utility Systems	Water Charge ($)[1]	Wastewater Charge ($)[1]	Combined Charges ($)[1]
CCU:			
Rates as of September 30, 2019	39.55	53.14	92.69
Other Neighboring Utilities:			
City of Cape Coral	32.92	57.23	90.15
City of Clearwater	30.10	39.32	69.42
Bonita Springs Utility	24.78	45.31	70.09
City of Fort Myers	28.05	69.95	98.00
City of Marco Island	53.92	52.48	106.40
City of North Port	34.77	54.08	88.85
City of Punta Gorda	28.02	33.66	61.68
Collier County	33.76	52.07	85.83
Immokalee Water and Sewer District	31.14	51.28	82.42
Hillsborough County	27.35	31.96	59.31
Lee County	25.67	43.85	69.52
Manatee County	18.57	42.66	61.23
Okeechobee Utility Authority	37.40	48.75	86.15
Sarasota County	25.83	45.05	70.88
St. Lucie County Utilities	36.45	51.97	88.42

Note: [1] The reflected residential rates were in effect December 19, 2018, are exclusive of taxes or franchise fees if any, and reflect rates charged for inside the service, unless otherwise noted.

2.7 LARGE WATER USERS

Table 2-2 lists the system's 10 largest water consumers and the corresponding percentage of total water consumption for each.

Table 2-2 CCU Large Water Users (FY 2019)

Water Customer	Total Water Purchased (thousands of gallons)	Percentage of Total Water Sales
Riverwood[1]	86,143	2.58%
Peace River Regional Medical Center	27,886	0.83%
El Jobean Water Association	23,977	0.72%
Charlotte County School Board	23,491	0.70%
Fawcett Memorial Hospital	23,424	0.70%
South Port Square	21,950	0.66%
Encore Super Park, Port Charlotte	14,536	0.43%
Hampton Point Limited Partnership	13,400	0.40%
Little Gasparilla Water Utility[1]	12,918	0.39%
Coast Concrete Company LLC	11,919	0.36%
Total 10 Largest Users	259,644	7.77%
All Other System Users	3,083,116	92.23%
Total FY 2018/2019 System Water Sales – All Customers	3,342,760	100.00%

Note: [1]Denotes water customers only; all others listed are both water and sewer customers of the system.

2.8 PLANNING RECOMMENDATIONS

The following tables summarize the planning recommendations for CCU's continued operations of the utilities systems.

Table 2-3 Administration Planning Recommendations

Recommendation:	Continue CCU's vision to ensure safe, reliable utility service at fair and reasonable rates.
Recommendation:	Continue developing and updating standards for water and sewer construction to ensure the most effective use of CIP funds.
Recommendation:	Continue developing options for water, sewer, and RCW service in the County to meet the growing demand for municipal utility services.
Recommendation:	Continue developing the Utilities' Information System functions to update/replace software and computer equipment to increase operating efficiencies and cost savings.
Recommendation:	Continue to explore regional solutions to water and wastewater service needs for the mutual benefit of Charlotte County and the adjoining counties and cities.

Table 2-4 Water System Planning Recommendations

Recommendation:	Continue to update the water system computer model and use it as a planning tool for future water system improvements.
Recommendation:	Continue the fixed-base Water Meter Replacement Program.
Recommendation:	Continue the extension of the new 24-inch transmission main from the Myakka River Bridge to the Rotonda storage tank and the new Myakka River 24-inch crossings to serve the growing demand for water in west Charlotte County.
Recommendation:	Continue to integrate acquired utilities into the overall CCU water system to maximize reliability and reduce costs to CCU customers.
Recommendation:	Explore ways to augment the demands on the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) treatment facility through economically feasible means including new water sources.
Recommendation:	Continue to make improvements at the water storage tank/booster pumping station facilities to increase reliability and control of the pumps to improve water distribution to customers.
Recommendation:	Plan for future water demands in the South County Service Area by analyzing the water distribution system using the computer water model completed in 2004 and most recently updated in 2014.

Table 2-5 Wastewater System Planning Recommendations

Recommendation:	Evaluate improvements and capacity upgrades for the Burnt Store WRF as outlined in the latest Capacity Analysis Report (CAR) and Operating Permit.
Recommendation:	Continue the scheduled repair of sanitary lift stations that have deteriorated due to age and hydrogen sulfide presence.
Recommendation:	Use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on expected demand for services.
Recommendation:	Continue to televise and smoke test gravity sewers to locate source(s) of inflow/infiltration (I/I). Repair gravity sewers and manholes as required to mitigate I/I and regain sewer and WRF capacity.
Recommendation:	Continue to provide for the disposal of septage at the East Port WRF.
Recommendation:	Install odor-control systems at lift stations where hydrogen sulfide concentrations cause odors and deteriorate structures.
Recommendation:	Continue to upgrade the East Port WRF to meet growth demands and septic-to-sewer conversions.
Recommendation:	Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.

Table 2-6 RCW System Planning Recommendations

Recommendation:	Continue Phase 3 of the RCW expansion project that began in FY 2016 by constructing a transmission main from the West Port WRF to the Rotonda East RCW Booster Pumping Station.
Recommendation:	Finalize construction of the East Port WRF Stage 5 RCW Improvements that include a 95-MG RCW storage pond and a 9-MGD RCW pump station.
Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County RCW transmission system.
Recommendation:	Determine the feasibility of creating RCW storage at the Burnt Store WRF.
Recommendation:	Seek ways to increase the use of public-access RCW currently produced by CCU WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

3 WATER TREATMENT PLANTS

CCU has two water supply sources for its two independent public water systems (PWSs). The mid and west parts of Charlotte County are provided with treated surface water from the Peace River/Manasota Regional Water Supply Facility (PRMRWSF). The water is purchased from the PRMRWSA under a multi-county water supply agreement and conveyed to the County via transmission mains. The south area of Charlotte County (South County) is supplied treated groundwater from the CCU-owned Burnt Store RO WTP. Figure 3-1 shows the Burnt Store RO WTP, PRMRWSA supply interconnect, and water service areas. This Chapter presents an overview of the PRMRWSF and a detailed assessment of the County-owned Burnt Store RO WTP.

Figure 3-1 Charlotte County Water Service Areas

3.1 PEACE RIVER/MANASOTA REGIONAL WATER SUPPLY FACILITY

Charlotte County is a member of the PRMRWSA, which was created by agreement on February 26, 1982, by Charlotte, DeSoto, Manatee, Hardee, and Sarasota Counties. Hardee County ceased to be a member the following year. The initial term of the agreement was 35 years, renewable for an equal consecutive term; a new Master Water Supply Contract was executed in 2005 with amendments in 2008 and 2015 by the four members and one customer – the City of North Port.

The PRMRWSA owns and operates the PRMRWSF, which is on the Peace River in DeSoto County approximately 4 miles northeast of Charlotte County. The source water, the Peace River, is treated via conventional surface water treatment consisting of coagulation, flocculation, sedimentation, filtration, and disinfection. The five-step process is used to remove organics, color, and turbidity while inactivating bacteria that may be present in the

source water. The water produced by the PRMRWSA meets current US Environmental Protection Agency (EPA) and FDEP drinking water requirements.

Treated water is distributed to member customers using high-pressure pumps and transmission mains. The PRMRWSA completed a Regional Expansion Program in 2009, which included constructing a 6-billion-gallon reservoir. The reservoir is designed to store water during periods of high Peace River flow for use when the Peace River flow is low and the withdrawal from the river is reduced or not permitted. The allocated cost to Charlotte County for the expansion was approximately $27.7 million.

Charlotte County's allocation of the PRMRWSA-produced water is currently 16.1 MGD annual average daily flow (AADF), 19.320 MGD for the peak monthly average day, and 22.54 MGD for the maximum day. In FY 2019, PRMRWSA supplied Charlotte County with a total of 3,743 MG or approximately 10.3 MGD. However, each PRMRWSA member has an equal right to reasonably increase its allocation of water if the member can demonstrate the need for the increase because of future water demands or to meet current demands that cannot be met by the current supply. In this instance, the PRMRWSA is responsible for obtaining all environmental permits for the expansion to meet demands.

3.2 Burnt Store RO WTP

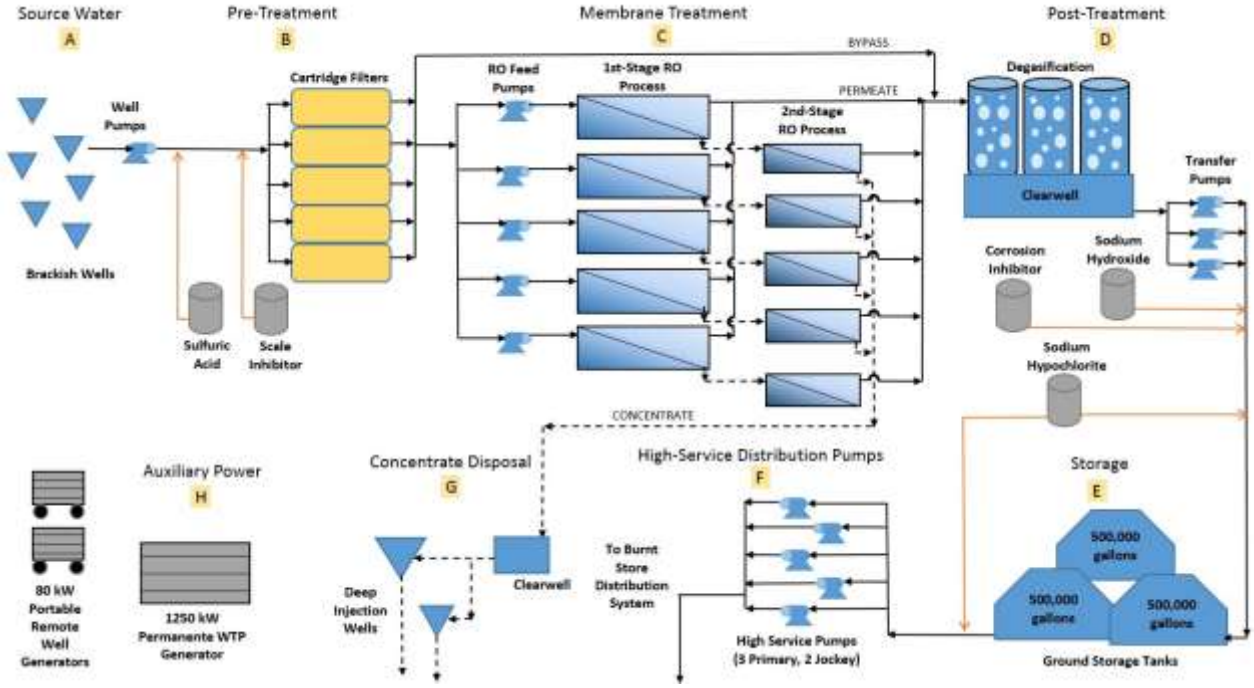
The Burnt Store RO WTP (PWS ID6080318) is owned and operated by CCU. The South County service area is served by the Burnt Store RO WTP at 17430 Burnt Store Road in Punta Gorda. The Burnt Store RO WTP was expanded in 2009 and has a permitted treatment capacity of 3.61 MGD.

The Burnt Store RO WTP draws groundwater from six production wells. As raw source water is pumped from the production wells to the RO process room, sulfuric acid and a scale inhibitor are injected into the raw water stream to prevent membrane scaling during the RO treatment process. Downstream of the chemical injection, the pH-adjusted raw water passes through cartridge filters to remove sand and small particles present in the raw water sources. After the cartridge filters, the RO feed water passes through high-pressure RO feed pumps before entering the RO treatment trains.

The RO process separates dissolved solids from the water by forcing water through a semi-permeable membrane. The process requires significant pressure and results in two streams. The water that permeates through the membrane is referred to as permeate, and the water that remains on the feed side of the membrane is referred to as the concentrate. Two-stage processes can be used to increase the water recovery of the system by processing the concentrate of the first stage through a second stage of membranes. The remaining concentrate is disposed of via on-site deep well injection. Approximately 9 percent of the cartridge-filtered water bypasses the membrane process for permeate stabilization before post-treatment.

During post-treatment, the permeate is conveyed through packed tower degasifiers for hydrogen sulfide removal. After degasification, sodium hydroxide is added for pH adjustment, followed by a corrosion inhibitor and sodium hypochlorite for disinfection. The finished water is stored in ground storage tanks (GSTs) before passing through the HSPs to the distribution system. Figure 3-2 shows the Burnt Store RO WTP process flow diagram.

Figure 3-2 Burnt Store RO WTP Process Flow Diagram



The Burnt Store RO WTP process consists of the following components:

A) Source Water

- Six Groundwater Wells (Well No. 15 is out of service and is not currently permitted for withdrawals.)
- Six Submersible Pumps
- Twelve Monitoring Wells

B) Pre-Treatment Process

- Sulfuric Acid Chemical Feed System
- Scale Inhibitor Chemical Feed System
- Five Cartridge Filter Vessels

C) Membrane Treatment Process

- Five RO High-Pressure Feed Pumps
- Two 2-Stage RO Trains (500,000-gpd capacity each)
- Three 2-Stage RO Trains (750,000-gpd capacity each)

D) Post-Treatment Process

- Sodium Hypochlorite Chemical Feed System
- Sodium Hydroxide Chemical Feed System
- Corrosion Inhibitor Chemical Feed System
- Control Valve for Blended Raw Water
- Three Packed Tower Degasification Units
- Three Transfer Pumps

E) Storage

- 1.5 MG – Three 500,000-gallon Finished-Water GSTs

F) Distribution HSPs

- Two Distribution HSPs (medium flows)
- One Distribution HSP (high flows)
- Two Distribution Jockey Pump (low flows)

G) Concentrate Disposal

- Two Deep Injection Wells with a Total Capacity of 3.44 MGD
- One Dual-Level Deep Monitoring Well

H) Auxiliary Power

- One 1,250-kW Generator (Serving the Original RO Process Building, RO Process Building, Operations Building, and Three On-Site Groundwater Wells)
- Two 80-kW Portable Generators (Serving four Remote Groundwater Wells)

3.2.1 Regulatory Considerations

The Burnt Store RO WTP is a Category II, Plant Class B, community PWS. The permit schedule includes:

- FDEP – Deep Injection Well IW-1 (Underground Injection Control [UIC] Permit No.: 0271367-007-UO/1I) was issued on May 14, 2019 and expires on May 14, 2024.
- SWFWMD Water Use Permit (WUP) was issued on September 25, 2013 and expires on September 25, 2033.

3.2.1.1 Water Quality Monitoring

As required by federal and state regulations for all utilities, CCU routinely and continuously monitors the quality of the raw water and finished water produced at the Burnt Store RO WTP. Monitoring wells are sampled quarterly, and the samples are sent to the CCU laboratory at the East Port WRF. Water quality data from the production and monitoring wells are reported to SWFWMD and stored on the CCU Enterprise Asset Management System (EAMS). In addition to meeting regulations, water quality parameters are used to assess the performance of the WTP and to determine maintenance events.

Table 3-1 shows the Burnt Store RO WTP finished water quality for the past year. Additional water quality data are found in the Consumer Confidence Reports discussed in Chapter 4.

Table 3-1 Burnt Store RO WTP Finished Water Quality for FY 2019

Month	pH (Std Units)*	TDS (mg/L)*	Cond. (µS/cm)*	Free Chlorine (mg/L)*	Alkalinity (mg/L)*	Total Hardness (mg/L)*	Remote Sample pH (Std Units)	Remote Sample Free Chlorine (mg/L)
Oct-17	7.97	275	594	1.66	22	85	7.91	1.49
Nov-17	7.85	268	585	1.83	23	85	7.88	1.52
Dec-17	7.86	267	584	1.78	32	85	7.81	1.58
Jan-18	7.83	269	755	1.77	22	85	7.81	1.57
Feb-18	7.83	271	589	1.78	22	88	7.81	1.57
Mar-18	7.83	270	588	1.80	22	88	7.81	1.59
Apr-18	7.80	272	590	1.72	20	86	7.79	1.51
May-18	7.88	270	589	1.68	22	93	7.76	1.49
Jun-18	7.89	273	593	1.63	24	85	7.84	1.39
Jul-18	7.86	276	598	1.61	23	85	7.83	1.41
Aug-18	7.91	276	597	1.51	23	79	7.81	1.29
Sep-18	7.86	277	598	1.56	22	85	7.82	1.34
Annual Avg.	7.86	272	605	1.69	23	86	7.82	1.48

Notes: * GST Sample Location; mg/L = milligrams per liter; µS/cm = micro Siemens per centimeter.

3.2.1.2 Production Wells and Treatment Capacity

The SWFWMD WUP (Permit No. 3522.012) specifies the Burnt Store RO WTP's permitted well capacities. Table 3-2 lists the well specifications and permitted withdrawal capacity of the current and future wells based on average day and peak month conditions.

Table 3-2 Burnt Store RO WTP Current and Future Production Wells

Well ID No.	Diameter (inches)	Depth Total/Cased (feet-bls)	Permit Limit, Average (gpd)	Permit Limit, Peak Month (gpd)
RO-7	8	596/300	200,000	272,000
RO-8	8	600/304	200,000	272,000
RO-9	8	602/550	200,000	272,000
RO-11	12	650/526	367,500	471,700
RO-12	12	470/412	367,400	471,700
RO-14*	12	650/450	367,400	471,700
RO-15[1]	12	1,050/800	—	—
RO-16	12	611/320	367,400	471,800
RO-17*	12	650/450	367,500	471,700
RO-18*	12	650/450	367,400	471,700
RO-19*	12	650/450	367,400	471,700
		TOTAL	**3,172,000**	**4,117,900**

Notes: [1] Well No. 15 is out-of-service. Rehabilitation of this well was discussed in the 2017 Brackish Groundwater Wellfield Study; bls = below land surface; * Future wells; — = Not Applicable.

The permitted maximum day operating capacity of the WTP is 3.61 MGD. Table 3-3 and Table 3-4 show the total and average monthly water flows, respectively. The tables summarize the amount of water that was bypassed around the RO process, produced from the WTP, discharged to the deep injection wells (concentrate), and conveyed to the distribution system. As of 2019, the Burnt Store RO WTP is operating on average at 15 percent of its design capacity.

Table 3-3 Burnt Store RO WTP – Total Water Balance FY 2019

Month	Raw Water From Wells (MG)	Raw Water Bypass (MG)	Total Water Produced (MG)	Total Concentrate (MG)	Finished Water To Distribution (MG)
Oct-18	14.38	1.29	11.57	2.89	12.02
Nov-18	18.68	1.61	15.07	3.71	14.96
Dec-18	18.43	1.59	14.81	3.67	15.32
Jan-19	21.20	1.82	16.99	4.18	17.27
Feb-19	17.91	1.54	14.41	3.54	14.26
Mar-19	19.43	1.68	15.65	3.84	16.02
Apr-19	18.14	1.56	14.58	3.61	14.53
May-19	17.89	1.54	13.92	3.51	14.21
Jun-19	12.94	1.11	10.40	2.58	10.41
Jul-19	12.28	1.05	9.83	2.46	10.29
Aug-19	12.10	1.03	9.59	2.40	10.02
Sep-19	14.99	1.29	12.07	2.99	12.01
Total	198.38	17.12	158.89	39.37	161.33

Table 3-4 Burnt Store RO WTP – Average Flows FY 2019

Month	Raw Water From Wells (MGD)	Raw Water Bypass (MGD)	Total Water Produced (MGD)	Total Concentrate (MGD)	Finished Water to Distribution (MGD)
Oct-18	0.479	0.041	0.386	0.096	0.388
Nov-18	0.623	0.054	0.502	0.124	0.499
Dec-18	0.614	0.053	0.494	0.122	0.494
Jan-19	0.707	0.061	0.566	0.139	0.557
Feb-19	0.640	0.055	0.515	0.126	0.509
Mar-19	0.648	0.056	0.522	0.128	0.517
Apr-19	0.605	0.052	0.486	0.120	0.484
May-19	0.579	0.050	0.465	0.116	0.459
Jun-19	0.431	0.037	0.347	0.086	0.347
Jul-19	0.409	0.035	0.328	0.082	0.332
Aug-19	0.403	0.034	0.320	0.080	0.323
Sep-19	0.500	0.043	0.402	0.100	0.400
Annual Avg.	0.553	0.048	0.444	0.110	0.442

3.2.2 Treatment Components and Condition Assessments

Jones Edmunds personnel performed an on-site review of the WTP on January 31, 2020. A tour of the facility was conducted with the Chief Operator and representation of the County's Engineering Department to review plant conditions, operations, and records. Access to the WTP is through a secure gate in a fence that surrounds the Burnt Store RO WTP and WRF. The perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals, clearing debris off the fence, and creating a cleared path on the northwest fence line. The process building, storage room, motor control building, and operations/administration building (shared with the Burnt Store WRF) were observed to be in good condition. The exterior of the motor control buildings should be painted, the process and operation building should be cleaned, and the gutters of the process building should be cleared of debris. Secondary containment should be installed underneath the chemical drums in the storage room. Three SCADA computer stations use on-site computer graphic monitoring screens. The site contains a small operations testing laboratory for monitoring water quality parameters such as conductivity, pH, and temperature.

Overall, the WTP site is well maintained. Staff does an excellent job of keeping the interior of the buildings neat and clean as is customary for potable WTPs. Valves throughout the WTP are exercised once per year. Process piping is painted and clearly marked indicating the raw, feed, permeate, concentrate, and finished water streams. The stainless-steel pipe and equipment are cleaned frequently. Compliance meters are calibrated every 6 months, and calibration tags are up to date. Bulk-storage chemical tanks are in a covered area that is attached to the east end of the WTP process building. During the site visit, we noted that the ceiling of the chemical storage area should be scrapped and painted. The chemical tanks have proper secondary containment areas, but the containment area for the sodium hypochlorite should be repainted. The chemical tanks and piping are painted and well-marked. Eyewash and shower stations are at the bulk storage area and the chemical feed area and are in good condition.

The chemical feed pumps and piping are inside the building along the wall that is common to the bulk storage area. The chemical feed pump area requires routine maintenance as would be expected for any chemical feed system. The area is inspected daily for leaks and pump functionality. The chemical feed pumps are operating and in good condition. The scale inhibitor, sodium hydroxide, and sodium hypochlorite chemical feed pipes occasionally leak due to the nature of the chemicals. The manufacturer of the chemical feed units indicated that the connections need to be checked regularly and tightened as needed. The chemical feed units are discussed in more detail in the following sections.

The required documents maintained on site include:

- Monthly Operating Reports
- Operating Permits
- Operators' Licenses
- Facility Logbook
- Facility Operating Plans
- Well Laboratory Reports
- Sampling Plans
- Laboratory Results
- Flow Meter Calibrations
- Chlorine and pH Meter Calibrations
- Chain-of-Custody Forms
- Facility O&M Manuals
- Maintenance Records
- Facility Record Drawings
- Daily Temperature Logs
- Spill Protocol and Record of Spills

3.2.2.1 Source Water

The WTP currently uses six production wells with a total permitted AADF of 1,702,300 gpd. The wells have flow meters on their discharge pipes, and withdrawal rates meet the WUP requirements. Two of the production wells are outside the WTP site. In November 2009, nine groundwater monitoring wells were constructed and placed into operation. Three of the monitoring wells are on site. Two of the four production wells on the Burnt Store RO WTP site were placed into operation in August 2010. Three additional shallow groundwater monitoring wells were installed on site in February 2014.

All production wells are confined in fenced areas and include submersible well pumps. Flow and pressure for each of the wells are monitored through SCADA. Well pads are elevated from the surrounding ground and are not prone to flooding that would result from normal rain events. The well observations from the condition assessment are as follows:

- Well No. 7 is an 8-inch-diameter well, located on site adjacent to the WTP's back-up generator. This is the oldest well in operation at the WTP, but it remains in good condition. Minor rust was observed on the stainless-steel wellhead and butterfly valve operator.

- Well No. 8 is an 8-inch-diameter well, located on site near the WTP entrance. The well pump was replaced in February 2015 and is in good condition. Minor rust was observed on the pressure transducer saddle.

- Well No. 9 is an 8-inch-diameter well, located on site near the GSTs. A new well pump and motor were installed in 2016. Minor rust was observed on the wellhead and butterfly valve operator, but overall the well is in good condition.

- Well No. 11 is a 12-inch-diameter well located off site on Burnt Store Road. The well meter flow tube and check valve were replaced in February 2016 and are in excellent condition. Minor rust was observed on the wellhead stainless-steel pipe.

- Well No. 12 is a 12-inch-diameter well located off site on Burnt Store Road. A small burrow was found under the concrete, which should be filled to prevent concrete cracking. Minor rust was observed on the stainless-steel wellhead pipe, but the pump and motor are in excellent condition.

- Well No. 15 is at the rear of the site. The well pump and piping are in excellent condition. However, Well No. 15 is currently not in service due to suspected intrusion of lower quality water from this well's terminal strata. The 2013-issued WUP required this well be abandoned and capped. A study was completed in 2017 to evaluate an alternative way to bring this well back into service.

- Well No. 16 is a 12-inch-diameter well on the east side of the site. The well pump is in excellent condition.

3.2.2.2 Pre-Treatment Components

Sulfuric Acid Addition

Sulfuric acid is used to decrease the pH of the raw water and prevent calcium carbonate precipitation. The 1,000-gallon bulk sulfuric acid storage tank is outside in the covered bulk storage area. The 100-gallon sulfuric acid storage tank is indoors near the chemical feed skid. The sulfuric acid skid contains two metering pumps. The metering pumps are in good working condition. The concrete in the secondary containment in the bulk chemical storage area was painted in 2018, and the 100-gallon tank inside the process room was replaced.

Scale Inhibitor Addition

Scale inhibitor is used to prevent precipitation and scaling of carbonate, sulfate, silica, and iron onto the membrane surface. The scale inhibitor is stored in a 75-gallon tank near the scale inhibitor feed skid in the process room. The scale inhibitor skid contains two metering pumps for redundancy. The scale inhibitor system is in good condition.

Cartridge Filtration

The facility contains five stainless-steel cartridge filter-housing vessels. Each vessel holds 40 1-micron cartridge filters. The pressure differential of each cartridge filter vessel is monitored to determine when filters need to be replaced, which is typically completed two times per year. The vessels are in good condition, and the staff changes the filters within the recommended differential pressure. No irregularities were reported, and the equipment appeared to be in excellent working order at the time of the site visit. Water monitoring gauges and instrumentation for pretreatment components are centrally mounted on a wall that is adjacent to the chemical feed pumps and the filter vessels. The gauges are functioning properly and are in good condition.

3.2.2.3 Membrane Treatment Components

RO Feed Pumps

The Burnt Store RO WTP has five two-stage RO process trains, A through E. Trains A and B were installed in 2007, and Trains C, D, and E were installed in 2009. Trains A and B are served by two horizontal split-case pumps, and Trains C, D, and E are fed by vertical turbine pumps. Each RO feed pump is painted and in good condition.

Membranes

Trains A and B are arranged in an 8:4 array – eight pressure vessels in the first stage and four pressure vessels in the second stage. Trains C, D, and E are arranged in a 14:6 array. Each pressure vessel contains seven RO membrane elements resulting in a total of 84 for Trains A and B and 120 for Trains C, D, and E. The total number of membrane elements at the Burnt Store RO WTP is 528.

Sampling and Instrumentation

Membrane performance is assessed by monitoring the pressure, recovery, and water quality of the system. Staff can monitor water quality and pressure throughout the membrane process. Sampling sinks and instrumentation are operating properly and in good condition.

Membrane Cleaning System

Over time, membranes may experience fouling due to scaling, plugging, break-through, or several additional factors. Reversible fouling can be mitigated by in situ cleaning of the membranes, whereas some fouling may require membrane replacement. The WTP's membrane cleaning system has not been used in over 5 years. Operators restored the system in 2018 and will test the system's functionality in 2019.

The older trains (A and B) are still producing good-quality permeate but operate at a higher pressure, indicating minor fouling is occurring. Cleaning was last conducted on Train A in 2012 to reverse the effects of fouling and reduce the operating pressure. Minor improvements were achieved indicating that fouling is irreversible and will eventually require membrane replacement. Treatment Trains C, D, and E are in good working condition, except for some leaks on the concentrate port seals on Trains C and D. The port seals should be replaced.

3.2.2.4 Post-Treatment Components

Degasification and Clearwell

Hydrogen sulfide is removed from the RO permeate via packed-tower degasification. Three packed-tower degasification units are on top of the concrete clearwell and can be operated automatically or manually. One of the degasifier blowers was repaired in February 2017. The degasifier media is expected to be in good condition but should be inspected and potentially cleaned or replaced pending the inspection. In 2014, the clearwell was temporarily taken out of service for inspection. The clearwell inspection report noted for staff to paint the clearwell and exercise the isolation valve between the two tanks. The clearwell valve has been exercised by staff and found to be operational in 2019. The outside of the clearwell should be painted.

Degasified water is transferred from the clearwells to the GSTs by three horizontal centrifugal pumps. In 2013, two in-line static mixers were installed in the transfer pipe leading to the GSTs to mix sodium hydroxide, corrosion inhibitor, and sodium hypochlorite. We recommend that these injection points be labeled. In 2015, two additional air-release valves (ARVs) were installed downstream of the pumps. We recommend that the pumps and piping be covered to prevent sun damage and to prolong the equipment life.

Sodium Hydroxide

Sodium hydroxide is used to adjust the pH of the finished water before pumping it into the distribution system. The sodium hydroxide system consists of a 1,100-gallon bulk storage tank, a chemical feed skid with two metering pumps, and a 90-gallon chemical feed tank. The skid and smaller storage tank are in the RO process room and are in good condition. The bulk storage tank is outside near the other bulk chemical storage tanks, which poses operational issues during cold weather. When temperatures are less than 45 degrees Fahrenheit (°F), operators install heat lamps to prevent the sodium hydroxide viscosity from increasing. The glass sight gauge on the bottom of the 1,100-gallon bulk storage tank and the ball valve on the transfer line from the bulk tank were replaced in 2018 and are functioning properly.

Corrosion Inhibitor

A zinc-orthophosphate-based corrosion inhibitor is used to reduce the dissolving of copper, lead, and zinc in the distribution system. A 30-gallon tank and chemical feed pump are indoors near the HSPs. The system is in good condition.

Sodium Hypochlorite

The sodium hypochlorite system consists of two bulk storage tanks, one 200-gallon storage tank, two chemical metering pumps, and two injection points. The bulk storage tanks are outside the process room and hold 1,400 and 1,100 gallons, respectively. The chemical containment area for the bulk storage tanks showed signs of deterioration and should be painted. The smaller storage tank and chemical feed skid are in a segment of the RO process room. Sodium hypochlorite is primarily injected before water enters the storage tanks (pre-disinfection), although operators also have the capability of injecting after the GSTs (post-disinfection) if needed to boost chlorine residual. The sodium hypochlorite system is in good operating condition.

Redundant analyzers that monitor post-treatment conditions of the water are on the wall of the clearwell. The instruments are well organized with SCADA connections to the Wonderware program, which can be monitored from the operations building. Instruments and chemical feed rates can be adjusted to obtain the proper water quality. Instrumentation is calibrated and up to date. Operation staff reported that the conductivity meter requires periodic replacement. We recommend the cover of the analyzer panel be extended to prevent water from contacting the equipment during rain events.

Ammonium Sulfate

Because the distribution system currently operates with free chlorine, the ammonia system used to produce combined chlorine residual (chloramine) is not being used. Disinfection via chloramination may be used when the Burnt Store water system is expanded or connected to another water system that uses chloramines such as the PRMRWSF. In the meantime, the chemical feed pumps for this system have been stored indoors for use as spares for other chemical feed systems.

3.2.2.5 Storage

The Burnt Store RO WTP contains three 0.5-MG concrete GSTs housing a total of 1.5 MG of finished water. GSTs A and B were cleaned and inspected in FY 2013, and GST C was inspected in FY 2019. No sedimentation or defects were found in any tank. The outside of GST B was painted in 2019. The outside of the GST A is scheduled to be cleaned and painted in 2020.

3.2.2.6 Distribution HSPs

The RO WTP has one high-flow HSP (Pump A), two medium-flow pumps (Pumps B and C), and two jockey pumps (Jockey Pumps A and B) providing flow to the distribution system. The two medium-flow pumps were installed in early 2012 to more accurately match the system flow needs. One of the jockey pumps was installed in August 2017.

Normally, the jockey pump and either of the two medium-flow service pumps are all that are needed to supply water and pressure to customers. The high-flow service pumps are necessary for fire flow demands and are exercised when system flushing is performed.

The variable-frequency (motor speed) drives (VFDs) on the pumps provide a constant pressure of 55 pounds per square inch (psi) at the beginning of the distribution system at the WTP regardless of the water use. Pump C was offline for maintenance at the time of the site visit, but the other HSPs are operational and in good condition.

3.2.2.7 Concentrate Disposal/Deep Injection Wells

Concentrate from the RO process is disposed of by means of the on-site Deep Injection Wells IW-1 and IW-2. Both wells are permitted to accept concentrate and treated wastewater effluent. Concentrate is transferred to the deep well pumping station clearwell by latent pressure in the RO trains. There it is combined with wastewater effluent and injected into the deep wells. The maximum capacity of IW-1 is 0.564 MGD at a maximum rate of 392 gallons per minute (gpm). The maximum capacity of IW-2 is 2.88 MGD at a maximum rate of 2,000 gpm.

Both injection wells have flow meters and pressure gauges that can be monitored in the control room. Both wells undergo mechanical integrity testing every 5 years. A mechanical integrity test was successfully performed on IW-2 in 2013. A vibration analysis was also conducted for the vertical turbine injection well pumps in 2017. Due to the test results, the pumps were reprogrammed to minimize wear and appear to be functioning properly at the time of the site visit. The pumps at the station were painted in 2018, but the concrete wetwell needs to be painted.

3.2.2.8 Electrical Components, Standby Power, and Circuitry

The main electrical components of this facility include the electrical components of the RO process buildings, one 1,250-kW standby generator, and two 80-kW portable generators. The distribution transformer, which provides power to the site, was in good condition with no obvious signs of significant concern.

RO Process Building and Motor Control Center (MCC) Building

The incoming switchgear was in good condition with minor issues. The switchgear contains warning labels identifying parts and components behind blank cabinets as being energized. The block wall in the northwest corner of the MCC building is eroded and should be repaired a painted. The floor near the electrical equipment is marked with hazard tape, but none of the equipment includes the appropriate arc flash labeling as required by the National Fire Protection Association (NFPA) 70E.

Auxiliary Power

Auxiliary power is adequately sized to run the WTP. The WTP generator and automatic transfer switch were part of the 2009 upgrade of the WTP. The standby generator is operated for 4 hours under load twice per month. An outside contractor performs the maintenance. The generator was cleaned and serviced in 2019. Two generators that were historically attached to Wells No. 15 and 16 were converted to portable trailers. These generators can now be used to power the pumps at Wells No. 11, 12, 15, and 16 through permanently mounted generator connections at each well.

Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

3.2.3 OPERATIONS

The facility is staffed 16 hours per day, 7 days a week. The Burnt Store RO WTP operators remotely monitor the pressures in the Burnt Store distribution system 24 hours per day. Alarms can be evaluated, and operators or maintenance personnel can be deployed to take corrective action, if necessary. Since the water demand of the system does not require 24-hour production, the RO trains are regularly alternated to reduce membrane fouling.

3.2.4 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the CIP that is revised yearly. Maintenance that is required to keep the WTP in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors. The treatment process requires constant maintenance of the chemical systems included in the treatment process. The Chief Operator has established a chemical system inspection routine where operators inspect chemical systems daily. Inspection results are recorded in a log. Leaks or other malfunctions are addressed immediately or referred to the Chief Operator for maintenance.

As part of the daily inspection, the Operations staff examines the membrane process piping and tightens pipe fitting bolts when necessary. Operators visually check the union connections and other potential sources of leaks for each chemical storage and feed system daily and tighten as needed. The staff changes the filters every 6 months or when the differential pressure across the vessel exceeds 50 psi. Membranes are cleaned or replaced as needed determined by continuous water quality and hydraulic monitoring. The GSTs A and B at the Burnt Store RO WTP were cleaned and inspected in FY 2013 and did not reveal any deficiencies. GST C was cleaned and inspected in FY 2019 and did not show any deficiencies. GSTs are scheduled for cleaning and inspection every 5 years in accordance with FDEP Rule 62.555.350(2), Florida Administrative Code (FAC). As a result of the maintenance practices and the HSPs that were placed into operation in FY 2013, no service interruptions due to pump malfunction occurred in 2019.

3.2.5 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Table 3-5 summarizes the recommendations and current status from the 2018 Annual Report for the Burnt Store RO WTP.

Table 3-5 Burnt Store RO WTP 2018 Recommendations and Status

Recommendation:	Determine the ultimate use of Well No. 15.
Progress:	*To be investigated as part of the potable water master plan.*
Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily to prevent leakage.
Progress:	*Ongoing.*
Recommendation:	Paint the motor on Jockey Pump A and the bases on other motors.
Progress:	*Completed.*
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Progress:	*Ongoing – leaking end caps are periodically found and repaired.*

Recommendation:	Paint the concentrate disposal wetwell.
Progress:	*Not completed.*
Recommendation:	Repair the cameras on site.
Progress:	*Completed.*
Recommendation:	Paint GST A and GST B.
Progress:	*GST B completed; GST A not completed.*
Recommendation:	Test the functionality of the membrane cleaning system and develop standard operating procedures (SOPs) for membrane cleaning.
Progress:	*Completed.*
Recommendation:	Conduct 5-year GST cleaning and inspections in accordance with FDEP Rule 62-555.350(2), FAC.
Progress:	*Completed.*
Recommendation:	Paint the outside of the MCC building.
Progress:	*Not completed.*
Recommendation:	Pressure wash the outside of the Operations building.
Progress:	*Ongoing*
Recommendation:	County should have the fuel level alarm adjusted to accurately predict high-level conditions.
Progress:	*Completed.*
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Progress:	*Not completed.*
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	*Not completed.*

3.2.6 Summary and Recommendations

CCU purchases water treated at the PRMRWSF to serve its Mid/West distribution system and produces water at the Burnt Store RO WTP to serve the South County distribution system. The PRMRWSF is owned, operated, and maintained by the PRMRWSA, and the Burnt Store RO WTP is owned, operated, and maintained by CCU. Charlotte County's allocation of the PRMRWSA-produced water is currently 16.1 MGD, and the Burnt Store RO WTP permitted capacity is 3.61 MGD AADF. Overall, CCU purchased or produced an average of 10.7 MGD of water in FY 2019. CCU is using approximately 64 percent of its allocated supply under the PRMRWSA, and the Burnt Store RO WTP is operating at approximately 15 percent of its design capacity. CCU routinely and continuously monitors the quality of the raw and finished water sources. Monthly operating and water quality reports indicate that the water delivered to the distribution system meets or exceeds regulatory quality requirements.

Like other brackish groundwater RO WTPs, the process components include chemical pretreatment, cartridge filtration, membrane treatment, degasification, and post-treatment stabilization and disinfection. Chemical use and cartridge filtration are conducted as recommended. The membrane elements in Trains A and B are approximately 13 years old and have shown signs of minor membrane fouling. The membrane elements in Trains C, D, and E are 11 years old. Cleaning was conducted on Trains A and B in 2012, but little performance was recovered. Overall, the Burnt Store RO WTP is in good condition. Minor items were noted during the site visit. The WTP is clean and well organized, and staff continually performs maintenance.

Reviewing the electrical components at this facility shows that they are in good condition. Considering the age of the facility, finding extensive deterioration in the equipment would not be unusual. Recommendations from the 2018 Annual Report continue to be implemented. Table 3-6 lists the recommendations from the 2019 site visit.

Table 3-6 Burnt Store WTP – 2019 Recommendations

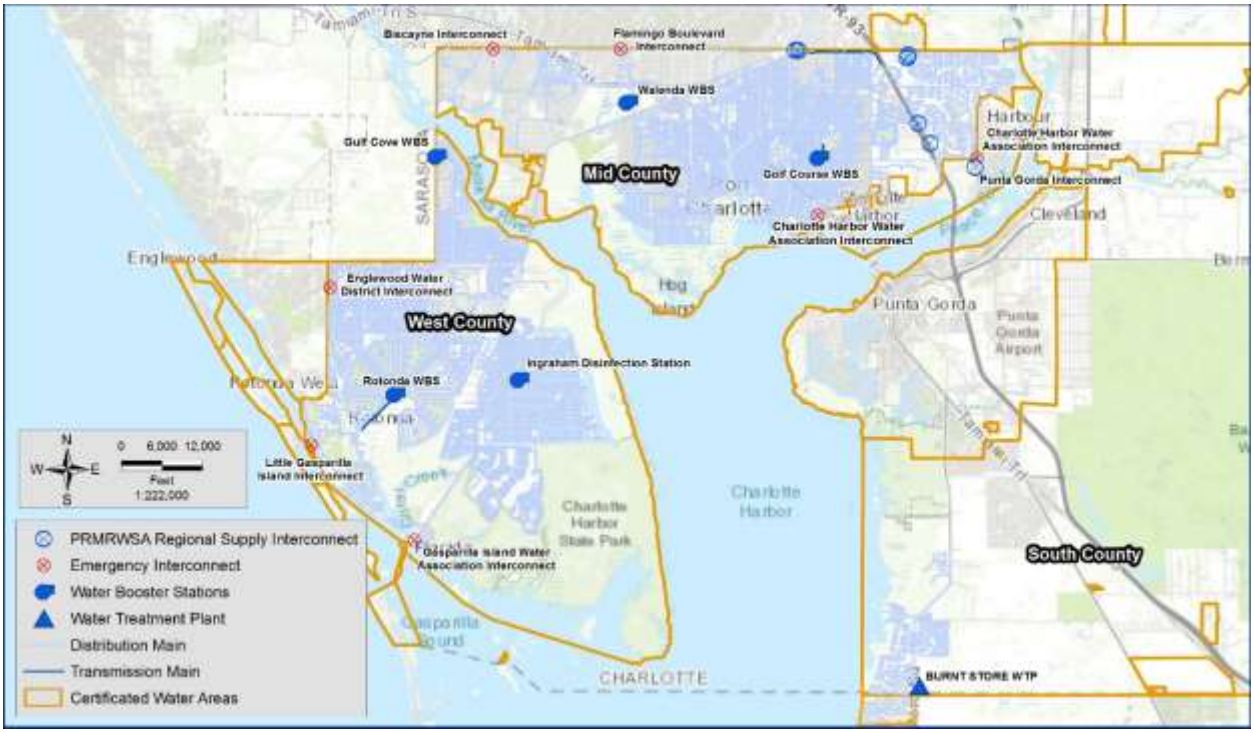
Recommendation:	Determine the ultimate use of Well No. 15.
Recommendation:	Perform yard maintenance around the perimeter fencing.
Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily to prevent leakage.
Recommendation:	Install secondary containment under the chemical drums in the storage room.
Recommendation:	Scrape and paint the ceiling of the bulk storage containment area.
Recommendation:	Paint the concrete of the sodium hypochlorite secondary containment area.
Recommendation:	A small burrow was found under the concrete at Well No. 12, which should be filled to prevent future cracking.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Install a cover over the transfer pumps and piping near the degasifier towers to prevent sun damage and prolong equipment life.
Recommendation:	Extend the cover of the analyzer panel attached to the wetwell to prevent water from contacting the equipment during rain events.
Recommendation:	Repair HSP C.
Recommendation:	Paint the concentrate disposal wetwell.
Recommendation:	Clean and paint GST A.
Recommendation:	Paint the outside of the MCC building.
Recommendation:	Paint the northwest inside wall of the MCC building.
Recommendation:	Pressure wash the outside of the Operations building.
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.

Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

4 WATER DISTRIBUTION SYSTEM

This Chapter reviews the potable water distribution system infrastructure of CCU's two independent PWSs. The water distribution system components were evaluated by Jones Edmunds personnel on February 3, 2020. The larger system that serves the central and west portions of Charlotte County (referred to as Mid/West County or Peace River distribution system) is supplied with water from the PRMRWSA and uses chloramine as the disinfectant. The smaller system that serves the south area of Charlotte County (South County or Burnt Store distribution system) is supplied by water from the CCU-owned Burnt Store RO WTP, which uses free chlorine as the disinfectant. Figure 4-1 shows the certificated water service area and water distribution system infrastructure.

Figure 4-1 CCU Water Distribution System



At the end of FY 2019, CCU had 58,687 customer accounts in the Mid/West County distribution system and 2,600 customer accounts in the South County distribution system. The Mid/West County system contains bulk water users as listed in Chapter 2. The two systems contained approximately 1,500 miles of water mains, ranging in size from 1.5 to 24 inches in diameter for the distribution mains and from 4 to 36 inches in diameter for the transmission mains. Ninety-six percent of the distribution piping is 4 to 12 inches in diameter. There were 5,538 fire hydrants at the end of FY 2019.

The CCU water distribution system consists of the following major components:

- Regional transmission mains to transport water from the PRMRWSF to the CCU Mid/West County distribution system with flow meters at connections to the Charlotte County system.
- CCU transmission mains that supply water to the distribution mains from the regional transmission mains.

- Transmission mains in South County that transport water from the Burnt Store RO WTP to distribution mains in South County and north Lee County.
- Distribution mains that supply water from the transmission mains to customers.
- Fire protection assemblies and fire hydrants that may also be used for flushing the distribution system for maintenance purposes.
- Isolation valves that allow the operators to shut off the flow in pipe sections for maintenance purposes.
- GSTs that provide storage for peak customer demand, firefighting, and periods when treatment plants are not producing water.
- Disinfection facilities to maintain appropriate disinfection levels in the distribution system for delivery to the consumer.
- Water booster stations (WBSs) adjacent to GSTs and associated disinfection chemical feed facilities.
- A 24-inch check valve on the main supply line from the PRMRWSF to maintain system pressures and reserve water supply if the PRMRWSF is unable to supply water and pressure during emergencies.
- Interconnects with neighboring utilities for system redundancy and system flexibility.

4.1 Mid and West County Distribution System

The Mid/West County distribution system water is supplied to CCU through four PRMRWSA-owned regional transmission mains. The original pipeline is a 36-inch-diameter line supplemented by a 12-inch line. In September 2007, a 24-inch main became operational. In August 2012, a 42-inch main became operational. The Mid/West County distribution system consists of four aboveground, pre-stressed concrete GSTs with an active combined capacity of 10 MG, four WBSs, one chemical booster station, eight supply interconnects, seven emergency interconnects, and approximately 1,498 miles of water pipes between 2 and 24 inches in diameter. The following sections describe the system interconnects and WBSs in Mid and West Charlotte County.

4.1.1 Supply Interconnects

The Mid/West County distribution system contains several interconnects with neighboring utilities. Although some utilities use interconnects to sell water to neighboring systems, the PRMRWSA contract restricts members from selling water supplied by the PRMRWSA outside the member's service area without permission from the Authority. Therefore, CCU primarily uses its interconnects for redundancy and system flexibility. Table 4-1 lists the Charlotte County metered supply interconnects with neighboring entities.

Table 4-1 Charlotte County Metered Supply Interconnects

Entity	Name	Approximate Location	Size
PRMRWSA	Discovery Drive Meter Station	Discovery Drive	24-inch
PRMRWSA	Kings Hwy Meter Station	10 Kings Highway	24-inch
PRMRWSA	Kings Hwy Meter Station	10 Kings Highway	12-inch
PRMRWSA	Harbor Blvd Interconnect	21453 Bachmann Boulevard	24-inch

3.2.6.1 Discovery Drive Meter Station

The Phase 1A Punta Gorda pipeline interconnect (Kings Highway/Shell Creek Loop) consists of over 12 miles of pipeline with a minimum design capacity of 6.0 MGD, aboveground storage, high-service pumping, disinfection facilities, and tie-in points with CCU. The geographical end points of the interconnect are the PRMRWSA's 24-inch Regional Transmission System (RTS) on Kings Highway at the Charlotte/DeSoto County line and the City of Punta Gorda's Shell Creek WTP on South Washington Loop Road in Charlotte County. The interconnect, which is on Discovery Drive, is used to supply water to the City of Punta Gorda during the dry-season and receive water from the Punta Gorda system during the wet season. The interconnect is owned and operated by the PRMRWSA, and the flow meter at the interconnect is used to calculate the County's water usage. In FY 2019, Punta Gorda supplied 131 MG of water to Charlotte County, and Charlotte County supplied 201 MG to Punta Gorda through this interconnect.

Condition Assessment

Overall, the interconnect is in good condition, and no deficiencies were noted.

4.1.1.1 PRMRWSA Supply Connections

The PRMRWSA Supply Connections are on the north and east edges of the Mid County distribution system and supply water to Mid and West County. The Kings Highway and Harbor Boulevard connections contain interconnect vaults and telemetry, which are owned by PRMRWSA but can be accessed by Charlotte County. The connections along I-75 (Rampart, Luther, and Sandhill are buried and do not have flow monitoring at each location; rather the flow is calculated from the flow meters on Kings Highway and the Punta Gorda Interconnect flow meter.

Condition Assessment

The interconnects were reported to be in good condition, and no deficiencies were noted.

4.1.2 EMERGENCY INTERCONNECTS

As a further safeguard for uninterrupted water supplies to Charlotte County citizens, CCU has additional emergency interconnects with adjacent water distribution systems. These interconnects are manually operated, equipped with bi-directional flow meters, and connected to the County's advanced metering infrastructure (AMI) system. The County has two 6-inch interconnects with Charlotte Harbor Water Association (CHWA), one 16-inch and one 12-inch interconnect with the City of North Port PWS, two interconnects with the Gasparilla Island Water Association (GIWA), and one interconnect with Englewood Water District (EWD). Table 4-2 lists the County's emergency interconnects.

Table 4-2 Charlotte County Emergency Interconnects

Entity	Name	Approximate Location	Size
CHWA	CHWA Interconnect	2606 Mauritania Road	6-inch
CHWA	CHWA Interconnect	22234 Edgewater Drive	6-inch
City of North Port	Flamingo Blvd. Interconnect	W Hillsborough Boulevard	12-inch
City of North Port	Biscayne Drive Interconnect	17 Biscayne Drive	16-inch
GIWA	GIWA Interconnect	12595 Gasparilla Road	10-inch
GIWA	GIWA WTP Interconnect	5050 Linwood Road	6-inch
EWD	Englewood Interconnect	6369 Richledge Street	12-inch

The emergency interconnects with CHWA, North Port, and GIWA require little maintenance other than exercising valves, but a flow meter at the Biscayne interconnect with the City of North Port was replaced in FY 2017. In FY 2018, the design for a new interconnect was completed in North Port interconnection with Flamingo Boulevard. The County relocated the Flamingo Boulevard interconnect to the City of North Port's nearby new pump station on Hillsborough Boulevard. The project was completed in FY 2019.

Condition Assessment

The emergency interconnects were reported to be in good condition.

4.1.2.1 Englewood Water District Interconnect

The EWD interconnect not only provides redundancy for both EWD and CCU in the event of an emergency, but also acts as a pressure booster station. The EWD interconnect facilities include two 40-horsepower (HP) booster pumps with a diesel generator for backup power supply. Monitoring at the interconnect facility includes total chlorine residual, pressure, and flow. No storage or chemical dosing is provided at this facility at this time. By opening or closing valves, the EWD interconnect pumping station can pump water in either direction, i.e., to or from EWD. However, both EWD and CCU must get permission from and will be billed by the PRMRWSA to receive excess water as stipulated by the PRMRWSA contract.

In FY 2015, Charlotte County completed minor modifications to the pumps and piping system that allow this facility to increase water circulation in the west portion of CCU's service area. A new flow meter was installed and shows the circulation is approximately 750 gpm. This change has resulted in increased system pressure and chlorination residual levels in the area that are required to meet state delivery disinfection requirements. The County replaced a faulty human-machine interface (HMI) in FY 2017, and constructed an aluminum cover over the pumps and piping at the site in FY 2018. The County also installed a new flow meter at the interconnect to monitor flows crossing SR 776 in West County. A new Dupolox 400M total chlorine meter was installed in FY 2019.

Condition Assessment

Overall, the interconnect is in good condition, but the lights should be lowered so the cover does not block the illumination of the pumps and equipment.

4.1.3 Water and Chemical Booster Stations

Water and chemical booster stations are strategically located in the distribution system and typically adjacent to GSTs. The equipment at the booster stations is secured by chain link fences with barbed-wire tops. The booster stations can increase the disinfectant concentrations in the discharge water through sodium hypochlorite and ammonium sulfate addition. The following sections describe the booster station operations and their respective conditions.

4.1.3.1 Port Charlotte Golf Course Booster Station

The Port Charlotte Golf Course Booster Station is at 22339 Gleneagle Terrace, Port Charlotte, FL 33952. The station provides local storage and pressure and disinfectant boosting capability for the Mid County service area east of Tamiami Trail. The station was built in 1966 and rehabilitated in 2010. The station contains a climate-controlled laboratory and electrical room, a ventilated pump and chemical feed room, and a 1-MG GST. The station is fenced and has one automatic access gate. The station contains two chemical-injection systems for sodium hypochlorite and ammonium sulfate addition. Each system contains three metering pumps and two chemical storage tanks. The two 300-gallon ammonium sulfate storage tanks and two 800-gallon sodium hypochlorite tanks are under a covered shed adjacent to the pump room. The County operates the station to maintain a 4.0-mg/L disinfectant residual. The station has a detached diesel generator for backup power supply.

The following major upgrades were made over the last 4 years:

- 2016 – The GST was painted.
- 2017 – The holes penetrating the building walls from the new chemical feed lines were patched.
- 2017 – Site cameras were repaired.
- 2017 – The sodium hypochlorite skid was rebuilt.
- 2018 – The Chemscan process analyzer was replaced with a HACH 5500SC for ammonia/ monochloramine analysis.
- 2018 – A new sodium hypochlorite pump was installed, and a second pump was rebuilt.
- 2018 – The GST fill valve was rebuilt.
- 2018 – The GST manway gasket was replaced.
- 2018 – The GST inspection occurred in 2018.
- 2019 – A new monochloramine analyzer was installed at the station.
- 2019 – A platform was installed to access the generator.
- 2019 – A faulty distribution pressure transmitter was replaced.
- 2019 – A leak was repaired on the influent main.
- 2019 – New 800-gallon sodium hypochlorite tanks were installed.
- 2019 – The area around the chemical storage tanks was upgraded.

Condition Assessment

The station is in excellent condition with updated equipment and building furnishings. Graveled areas around the station infrastructure are weeded, and landscaping is well maintained. The perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs are well maintained and functioning properly.

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The generator and enclosure are mounted outside on an elevated sub-base fuel tank. They are in good condition. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

The following deficiencies were noted:

- The switchgear contains no labels identifying parts and components as being energized.

4.1.3.2 Walenda Booster Station

The Walenda Booster Station is at 17177 Walenda Avenue, Port Charlotte, FL 33953. The property contains potable water and reclaimed water infrastructure including reclaimed and potable water GSTs. The potable water GST has a capacity of 2 MG. The potable water station was built in 1994 and has two 100-HP and three 75-HP pumps. The larger pumps were replaced in 2010, and the smaller pumps are being investigated as part of the potable water master plan. The pumps and electrical components are in a ventilated room. The laboratory and office are in a climate-controlled room. The station is fenced and has two entrances with automatic gates. The station contains two liquid-handling systems for sodium hypochlorite and ammonium sulfate injection. The sodium hypochlorite system contains two 1,000-gallon bulk storage tanks and a chemical injection skid. The ammonium sulfate system consists of two 300-gallon bulk storage tanks and a chemical skid. The chemical skids for sodium hypochlorite and ammonium sulfate each contain two metering pumps and are in ventilated rooms. The bulk storage tanks are outside under covered sheds within secondary containment structures. The County operates the station to maintain a 4.0-mg/L disinfectant residual using a Hach APA 6000 ammonia/monochloramine analyzer and a Wallace & Tiernan DEPOLOX 3 plus total chlorine analyzer. A diesel generator is in the pump room to provide backup power to the station.

The following O&M improvements were completed over the past 4 years:

- 2016 – New sodium hypochlorite storage and containment area were added.
- 2016 – Ammonia scales were removed and converted to ultra-sonic volume measurement.
- 2017 – A new flow meter assembly was installed to improve meter accuracy and distribution of disinfectant.
- 2017 – The 1,000-gallon sodium hypochlorite bulk tank was replaced, and a containment wall was constructed.
- 2017 – Site cameras were repaired.
- 2017 – The ammonium sulfate and sodium hypochlorite skids were rebuilt.
- 2017 – Motor No. 4 was rebuilt, and Motor No. 5 was replaced.
- 2018 – A new liner was installed in the interior of the GST.
- 2018 – Pump No. 4 seals were replaced.
- 2018 – Pump No. 5 was rebuilt, and the suction and discharge valves were replaced.
- 2019 – New LED lighting was installed in the pump room.
- 2019 – Stratification of the GST was checked to confirm mixing in the tank.
- 2019 – A GST inspection was completed.
- 2019 – The facility's diesel fuel supply was updated.

Condition Assessment

The general condition of the station is good. The access roads outside the facility are aging but are in fair condition inside the property. Graveled areas around the station infrastructure are weeded, and landscaping is well maintained. The perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs are well maintained and functioning properly.

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. CCU Operations staff reported that whenever the emergency generator is placed into operation, the power demand is usually greater than its rated capacity of 350 kW. The generator is inside the building that also contains the electrical switchgear. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

The following deficiencies were noted:

- The seal of Pump 3 has a small leak.
- The tank inspection found an issue in the tank bonding that will require multi-layer stripping before the tank can be repainted.
- CCU Operations staff reported that the generator is unable to accommodate the existing loads of the facility, which is a significant concern and relates to the operational security of the facility. Additionally, since the generator is inside the building that also contains the electrical switchgear, it raises concerns regarding maintenance personnel being properly notified of hazardous conditions that may exist during maintenance operations including fuels present, elevated noise level, and potentially excessive heat. This heat may also prove detrimental to the VFDs in the building since these devices are typically temperature sensitive.
- A junction box in the area of the exposed ceiling rafters is missing its cover.
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling as required by NFPA 70E.

4.1.3.3 Gulf Cove Booster Station

The Gulf Cove Booster Station (WBS No. 3) was built in 1980 and is at 12050 Van Lenten, Port Charlotte, FL 33981. The station receives flow through an aging 12-inch ductile-iron pipe that spans under the Myakka River and feeds the 2-MG GST. The station has four HSPs, rated at 50, 60, 75, and 100 HP. The pumps and electrical components of the station are in a ventilated building. The station is fenced and contains two entrances with automatic gates.

The station contains two chemical injection systems for ammonium sulfate and sodium hypochlorite addition. Each skid has two chemical feed pumps for redundancy. The booster station has two 600-gallon sodium hypochlorite storage tanks and two 300-gallon ammonium sulfate storage tanks. Chemical skids and associated analyzers are in ventilated buildings, and the chemical storage tanks are outside under covered sheds. The sodium hypochlorite storage tanks are double walled, and the ammonium sulfate storage tanks contain secondary containment basins for safety.

Disinfectant residual is continuously monitored using a Hach 5500sc ammonia/ monochloramine analyzer. The County operates the station to maintain a 4.0-mg/L disinfectant residual. The booster station contains a diesel generator as a backup power supply.

The following O&M improvements were completed over the past 4 years:

- 2016 – CCU staff renovated the old chemical storage and metering rooms into an operations room and a restroom.
- 2016 – The PLC was upgraded to include pump operations.
- 2017 – A window was installed in the office to view the gate and chemical skids.
- 2017 – Exterior lighting was repaired
- 2017 – Site cameras were repaired.
- 2017 – Motor No. 2 was replaced.
- 2018 – An eyewash station was installed.
- 2019 – The GST was relined, painted, and inspected. The 5-year washout test was conducted on the GST.
- 2019 – The sodium hypochlorite tank was replaced.

Condition Assessment

The station is generally in good condition. Roads and landscaping are well maintained. Graveled areas around the facility infrastructure are weeded and the grass is cut. The perimeter of the site requires some maintenance including filling holes under the fence caused by burrowing animals and clearing debris off the fence. The indoor buildings are kept clean, and tools and equipment are organized and stored properly. The HSPs are well maintained

and functioning properly. In 2016, the County began planning to install a new water feed pipe across the Myakka River. The project is ongoing and in the permitting phase.

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The incoming power company transformer shows signs of surficial rust. The standby generator reportedly functions properly and has no issues, although reports from staff indicated that it may be undersized for full load. The fuel system on the generator is a separate fuel tank, not a sub-base fuel tank as in many other installations throughout the County. The fuel tank is undersized and should be increased to hold additional fuel. The fuel piping and transfer system appears in good condition with no apparent signs of leakage. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

The following deficiencies were noted:

- The pipe connecting the GST to the pump station is constructed of formed concrete, which is not industry standard.
- The influent pipe to the GST was leaking.
- A leak was noted on HSP No. 2.
- The vault containing the feed piping to the pumps contained water that should be pumped out.
- The paint on the floor of the sodium hypochlorite injection room was eroded.
- The electrical conduit providing power to the gate camera is not properly secured.
- Conduit in the chemical containment area is broken loose from its connection
- The switchgear contains warning labels identifying parts and components as being energized; however, none of the equipment includes the appropriate arc flash labeling as required by NFPA 70E.

4.1.3.4 Rotonda Booster Station

The Rotonda Booster Station (WBS No. 6) is at 46 Parade Circle, Rotonda, FL 33947. Built in 1973, the station has two 100-HP pumps, two 65-HP pumps, and a 5-MG GST. The pumps and electrical components of the station are in a ventilated building. The station also contains a separate climate-controlled building with an office and laboratory. The station is fenced and contains one gated entrance.

The station has two chemical feed systems for injecting ammonium sulfate and sodium hypochlorite. The ammonium sulfate skids are in a ventilated shed, and each contains two metering pumps for injection before and after the GST. The sodium hypochlorite skids are in a chemical room attached to the main pumping room, and each skid contains two metering pumps for injection before and after the GST. Ammonium sulfate is stored in two 300-gallon bulk storage tanks, and sodium hypochlorite is in two 1,000-gallon bulk storage tanks. The chemical storage tanks are housed within a covered structure with secondary containment chambers for safety.

Disinfectant residuals are continuously monitored using a Hach 5500sc ammonia/ monochloramine analyzer. The County operates the station to maintain a 4.0-mg/L disinfectant residual. A diesel generator is available on site to provide backup power supply to the station.

The following O&M improvements were completed over the past 4 years:

- 2016 – A new PLC was constructed by CCU personnel to collect data for reports. The new PLC is connected to the SCADA and controls the pumps and the chemical feed systems.
- 2016 – The GST was drained, cleaned, and inspected according to FDEP protocol of every 5 years.
- 2017 – The exterior of the GST was painted.
- 2017 – The decommissioned lime-softening WTP adjacent to the GST was demolished.
- 2017 – Two new shelter roofs for the ammonium sulfate tank and equipment storage were constructed.
- 2017 – Security cameras were replaced.
- 2017 – The Hach 5500sc ammonia/monochloramine analyzer was installed.
- 2017 – The 1,000-gallon sodium hypochlorite bulk storage tank was replaced.
- 2017 – Pump No. 3 was rebuilt.
- 2018 – A containment area was constructed, and the concrete flooring was sealed in the sodium hypochlorite skid feed room.
- 2018 – A new monochloramine analyzer was installed to monitor free and total chlorine and free ammonia.
- 2018 – A distribution flow meter transmitter was replaced.
- 2018 – The manway hatch of the GST was replaced.
- 2018 – Poly containment lines for the chemical feed systems were installed for the future GST bypass station.
- 2018 – HSP Nos. 1 and 3 were painted.
- 2018 – The top of the diesel fuel storage tank for the generator was painted.
- 2019 – Motor No. 3 was replaced in December.
- 2019 – The feed piping to the GST was replaced after the Ingraham transmission main was completed.

Condition Assessment

The station is in good condition. Roads and landscaping are in fair condition. Graveled areas around the facility infrastructure are weeded, but minor plant growth on the perimeter fencing was observed. The indoor buildings are kept clean, and tools and equipment are organized and stored properly.

The incoming switchgear and distribution transformer appear in fair condition. County staff reported that the incoming main breaker failed to reclose during the last maintenance and likely indicates that the breaker is near failure and should be replaced. The incoming power company transformer showed signs of surficial rust. The standby generator reportedly functions properly and has no issues. The generator equipment inside the enclosure showed signs light surface corrosion and wear. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff with the exception of the issue above. The equipment is quite dated with several components no longer manufactured. Several of the drives have been updated to Yaskawa VFDs and were retrofitted into the existing cabinets. However, the spaces provided did not match the drives, and there is now a gap between the drive and the enclosure (see photo at right) which may be problematic. Although no live parts appear to be exposed, this does raise a maintenance concern and the possibility of exposed parts.

The following deficiencies were noted:

- The wall that contains the HMI in the pump room requires painting.
- Much of the switchgear appears to be in only fair condition and is possibly reaching the end of its service life. Many components may no longer be manufactured, making long-term maintenance an issue.
- An exterior-mounted automatic transfer switch (ATS) appears to be in fair condition and degraded due to exposure to weather.
- The switchgear contains no warning labels identifying parts and components as being energized.
- Gaps exist between the updated VFD drives and the enclosure.

4.1.3.5 Ingraham Disinfection Station

The Mid/West County distribution system contains one disinfection booster station at 14276 Ingraham Boulevard, Port Charlotte, FL 33981. The Ingraham Boulevard sodium hypochlorite/ammonium sulfate injection station monitors chlorine residual and injects additional disinfection chemicals to maintain the FDEP-required levels. The injection station is enclosed in a 6-foot chain-link fence with barbed wire on top. The station contains two ventilated buildings, one serves as an office and the other houses the chemical skids. Each skid contains one metering pump, and a spare is kept on site.

The system does not have a permanent backup generator and relies on the sewer system pump station power adjacent to the booster station. A total chlorine residual of 4.0 mg/L is maintained by injecting sodium hypochlorite at a rate that is paced by the flow passing the station. The chlorine level and local water pressure are monitored continuously.

The following upgrades were made over the last 3 years:

- 2016 – A new chloramine-addition control was installed.
- 2019 – A new flow meter was installed.
- 2019 – A new canopy was installed over the sodium hypochlorite storage tank.

Condition Assessment

The general condition of the station is fair. The buildings are weathered but in operational condition. The landscaping is maintained.

The following deficiency was noted:

- The doorstep to the water quality testing and storage shed needs repair.

4.1.4 STORAGE

GSTs are typically located at WTPs and booster pump stations. The tanks are designed to be filled by system pressure. The water is pumped from the GST and pressurized to the desired system pressure before re-entering the distribution system. The GSTs provide the following functions for the CCU water supply system:

- Store water in case of an interruption of service at the WTP or a main transmission pipe failure.
- Provide local water to booster stations to provide adequate pressure for CCU customers and for firefighting.
- Meet peak demand by storing water during low-use periods for release during high-use periods.

Four operational potable water GSTs are within the main (Mid/West County) CCU service area, ranging in capacity from 1 to 5 MG, for a total capacity of 10 MG. Table 4-3 lists the GST capacities and number of pumps at each booster station.

Table 4-3 GST Capacities

Booster Station Name	GST Capacity (MG)	Number of Pumps
Golf Course	1	2
Gulf Cove	2	4
Rotonda	5	4
Walenda	2	5
Total	10	15

In addition, six 2-MG GSTs (for a total capacity of 12 MG) are at the PRMRWSF. This stored amount of treated water is available to Charlotte County and other PRMRWSA members for water supply for peak use such as fire flow or in case of a temporary loss of treatment at the PRMRWSF.

4.1.5 OPERATIONS

Treated water from the PRMRWSF enters the main CCU service area via four metered regional transmission mains. Although the system is looped, the flow generally continues to the Golf Course and Walenda Booster Stations, then to the Gulf Cove Booster Station, and lastly to the Rotonda Booster Station. General practice is to fill the Rotonda 5-MG tank through the new Ingraham 24-inch transmission main from a 16-inch water main from Walenda Booster Station to the Rotonda storage tank.

This 16-inch transmission pipe also serves customers along its route; however, the 24-inch transmission main has no customers connected to the main. Sodium hypochlorite and ammonium sulfate are injected into the system to maintain proper disinfectant concentrations in the GSTs. Each tank is refilled when its level falls below the two-thirds point, unless there is reason for caution, such as during hurricane season. In such emergency situations, each tank is generally kept full.

Sound O&M processes implemented by a well-trained staff maintain the CCU system's integrity. Expected capacity needs are met through careful forecasting of demands and by capital improvements planning. The Water Distribution workgroup is responsible for dozens of operational processes with the common goal of maintaining adequate flow rate, volume, quality, and water pressure to CCU customers. CCU has a proactive training program for its staff. The County uses the industry-recognized University of California/Sacramento study books to assist staff in obtaining their operator licenses. CCU requires staff to take the course before sitting for the state certification tests.

4.1.6 WATER REPORT

CCU maintains a continuous, monthly water audit for its Mid/West County water distribution system. Table 4-4 shows the Mid/West County audit results for FY 2019. The audit table compares the water received from the PRMRWSF to the sum of total water billed to customers, water for distribution system flushing and fire department uses, and water loss due to identified leaks and breaks.

CCU estimates the quantity of water used for flushing the distribution system water lines by the size of the outlet and amount of time flushing has occurred. Water regulations require a minimum chloramine residual throughout the system of 0.6 part per million (ppm). Most of the flushing water used is to maintain chlorine residual levels in the distant, isolated parts of the distribution system.

Water loss due to line breaks is estimated based on the pressure in the line before the break and the size of the pipe. At present, most main breaks are caused by contractors excavating for other utility installations or by aging pipe in the system. For example, new telephone systems are being changed from copper to fiber, new electricity poles are being installed, and underground lines are replacing old pole lines. Loss due to line breaks is estimated at 855,125 gallons per month or less than 0.3 percent of the total FY 2019 water use.

The unaccounted-for water loss column is the total metered water (Column 2) minus the sum of the known usages (Columns 3 through 8). The American Water Works Association (AWWA) considers a range of 10 to 20 percent for unaccounted-for water to be acceptable in a fully metered system. The annual average value for the unaccounted-for water in the CCU Mid/West County system was approximately 16,077,767 gallons per month or 5.15 percent.

Table 4-4 CCU Unaccountable Water Report (Mid/West County) FY 2019

Month	Total Metered Water (gal)	Sold (gal)	Construction Flushing (gal)	Hydrant Flushing (gal)	Construction Fill (gal)	Line Breaks (gal)	Fire Fighting (gal)	Unaccounted-for Water Loss[1] (gal)[1]
Oct-18	302,015,000	217,531,000	0	27,781,945	0	412,400	50,000	56,239,655
Nov-18	300,759,000	282,213,000	342,375	22,268,190	4,623	520,558	50,000	(4,639,746)
Dec-18	306,658,000	267,678,000	267,340	24,827,290	3,774	342,295	50,000	13,489,301
Jan-19	321,671,000	275,457,000	51,405	25,524,873	611	1,412,245	50,000	19,174,866
Feb-19	299,605,000	288,129,000	255,820	24,760,201	18,701	1,164,607	50,000	(14,773,329)
Mar-19	345,460,000	270,080,000	59,250	24,913,343	6,800	672,491	50,000	49,678,116
Apr-19	338,514,000	291,223,000	57,700	24,836,655	15,486	122,502	50,000	22,208,658
May-19	342,806,000	295,782,000	816,000	24,910,673	423,180	340,350	50,000	20,483,797
Jun-19	299,281,000	300,974,000	1,718,630	23,990,020	423	778,661	50,000	(28,230,734)
Jul-19	297,971,000	243,051,000	2,826,600	25,520,568	3,060	370,333	50,000	26,149,439
Aug-19	285,066,000	227,469,000	215,300	28,442,623	10,631	3,192,672	50,000	25,685,774
Sep-19	303,198,000	259,364,000	293,665	35,088,969	1,584	932,381	50,000	7,467,401
Total (gal)	3,743,004,000	3,218,951,000	6,904,085	312,865,350	488,874	10,261,494	600,000	192,933,198
Monthly Average (gal)	311,917,000	268,245,917	575,340	26,072,113	40,739	855,125	50,000	16,077,767

Note: [1]Negative monthly water loss occurs because the meters are not read on the same day every month.

4.2 SOUTH COUNTY DISTRIBUTION SYSTEM

The CCU South County water distribution system, also known as the Burnt Store system, is wholly separated physically and geographically from the Mid/West County water distribution system. It is owned and operated by CCU. The current service area is concentrated in the south part of Charlotte County and a small area in north Lee County along the County border.

The South County service area is approximately 8 square miles of land in Charlotte County and 2 square miles in Lee County. The system services the nearly built-out Burnt Store Marina residential development in Lee County and a sparsely populated but growing residential development in Charlotte County. The water is produced by the CCU-owned Burnt Store RO WTP.

The South County distribution system consists of 64 miles of water main ranging in size from 2- to 20-inch diameter. Water main installations are expected to continue north and south of the WTP extending toward Punta Gorda and into Lee County, respectively. Approximately 408 fire hydrants exist throughout the South County distribution system.

4.2.1 INTERCONNECTS

The South County distribution system does not currently have interconnects with neighboring utilities. Since this is a future possibility, the County has constructed an ammonium sulfate injection system to maintain disinfectant compatibility. The system is not currently in operation but can be implemented if interconnects are added to the South County distribution system.

4.2.2 WATER BOOSTER STATIONS

Due to the relatively small size of the South County distribution system, the system has no booster stations or disinfection injection points. The chemicals and pumps are at the Burnt Store RO WTP.

4.2.3 STORAGE

The water storage for the South County distribution system is at the Burnt Store RO WTP; no additional storage is provided within the South County distribution system.

4.2.4 OPERATIONS

Treated water from the Burnt Store RO WTP enters the South County service area through a 20-inch transmission main. The transmission system divides into 16-inch north and 16-inch south transmission pipes within the Burnt Store Road right-of-way.

As with the Mid/West County distribution system, forecasting and capital improvements planning are also conducted for the South County system. The Water Distribution workgroup is also responsible for maintaining adequate flow rate, volume, quality, and pressure to the South County CCU customers.

4.2.5 WATER AUDIT

CCU maintains a continuous, monthly water audit for its South County water distribution system. The audit is calculated differently than the SWFWMD audit. Table 4-5 shows the results of the 2019 CCU audit for the South County distribution system. The audit table compares the water passing through the discharge meter at the Burnt Store RO WTP to the sum of total water billed to customers, water for distribution system flushing and fire department uses, and water loss due to identified leaks and breaks.

CCU estimates the quantity of water used for flushing the distribution system water lines by the size of the outlet and amount of time flushing has occurred. Water regulations require a minimum free chlorine residual throughout the system of 0.2 ppm. A large portion of the flushing water is used to maintain chlorine residual levels in the distant isolated parts of the distribution system.

At present, most main breaks are caused by contractors excavating for other utility installations or by aging pipe in the system. The South County distribution system has experienced line breaks due to pressure surges in the system. The system includes old PVC water pipes that are thinner than the current CCU standard PVC water pipes. The thinner pipes are more brittle and susceptible to breakage. The pumps that pressurize the South County distribution system have been modified with VFDs to reduce pressure surges.

The unaccounted-for water loss column is the total metered water (Column 2) minus the sum of the known usages (Columns 3 through 6). The unaccounted-for water loss for FY 2019 was approximately 16 percent for the South County distribution system.

A water loss percentage over 10 percent requires that a water loss audit be prepared using a SWFWMD-automated water loss calculator. A water-loss-reduction plan was prepared in 2015 with the specific task to determine the source of the water loss. CCU has been working directly with SWFWMD staff to implement the plan. Several water loss sources were discovered in 2015.

The work included in the plan continued into FY 2019. CCU has installed new meters in every residential water service and checked the accuracy of commercial water meters to try to reduce the percentage loss. The Water Distribution workgroup performed a leak analysis throughout the South County distribution system, and a few minor leaks were found. SWFWMD conceded that continued search for small leaks is a futile effort that can be stopped by CCU, if requested by letter. In 2019, the City reduced the operating pressure of the system to reduce leaks and continued to investigate the issue by checking the accuracy of the meters and water accounting system. CCU continues to investigate the sources of the water loss in South County.

Table 4-5 CCU Unaccountable Water Report (South County) FY 2019

Month	Total Pumped to Distribution (gal)	Total Sold (gal)	Hydrant Flushing (gal)	Line Breaks (gal)	Construction Flushing and Fill (gal)	Total Accounted-For Water (gal)	Total Unaccounted-For Water (gal)
Oct-18	11,838,368	7,919,000	134,934	2,350	10,000	8,066,284	3,772,084
Nov-18	14,792,032	13,214,000	678,290	354,745	10,000	14,257,035	534,997
Dec-18	15,143,490	11,423,000	542,169	930	10,000	11,976,099	3,167,391
Jan-19	17,093,182	12,630,000	592,825	1,034,400	10,000	14,267,225	2,825,957
Feb-19	14,098,464	12,506,000	508,797	390	10,000	13,025,187	1,073,277
Mar-19	15,843,264	11,460,000	660,239	18,240	10,000	12,148,479	3,694,785
Apr-19	14,357,859	11,606,000	623,066	0	10,000	12,239,066	2,118,793
May-19	14,035,549	11,098,000	669,131	245,320	10,000	12,022,451	2,013,098
Jun-19	10,239,324	9,519,000	907,834	4,750	10,000	10,441,584	-202,260
Jul-19	10,112,410	7,438,000	1,061,340	41,480	10,000	8,550,820	1,561,590
Aug-19	9,837,098	6,413,000	531,503	67,350	10,000	7,021,853	2,815,245
Sep-19	11,841,216	8,583,000	510,952	984,975	10,000	10,088,927	1,752,289
Total (gal)	159,232,256	123,809,000	7,421,080	2,754,930	120,000	134,105,010	25,127,246
Monthly Average (gal)	13,269,355	10,317,417	618,423	229,578	10,000	11,175,418	2,093,937

4.3 MAINTENANCE

CCU performs three types of maintenance on its water distribution systems: predictive, preventive, and corrective. In predictive maintenance, tests and observations are performed on equipment to predict when failure of the component might occur. An example of a CCU predictive maintenance procedure occurs during the daily inspection of large stations. While at the station, the Operator takes infrared readings on motors and other components to measure abnormally high temperature readings. In doing so, an impending failure can be averted by addressing the cause of the temperature spike. Predictive maintenance is most suitable for equipment that is in essentially continuous operation, where abrupt failure would prove detrimental.

Preventive maintenance involves exercising components such as valves and hydrants, changing lubricants, and replacing wearable parts on a schedule of time or usage. Preventive maintenance is most suitable for equipment that must be ready to be operated, even though it is typically not in use.

Corrective maintenance occurs when there is an abrupt failure or when the system is compromised by others, such as a cable installer puncturing a water main. Corrective maintenance focuses on restoring service as soon as possible, even with a temporary repair to be upgraded later.

4.3.1 SERVICE ORDERS

Maintenance begins with a service order (SO). Predictive and preventive SOs are generated by staff, so there is flexibility as to when they are performed. They are scheduled at such a time to be most efficient in terms of the availability of resources, especially labor.

Corrective SOs are usually generated by a customer phone call. During normal office hours, a CCU dispatcher documents the information and contacts the appropriate foreman to respond. During off-hours, an answering service records the information and contacts the on-call line technician for response. The on-call line technician has the resources to organize a four-person crew after hours, if needed. The level of service, from the customer's perspective, is that a live voice will respond to an emergency call 24 hours a day, 7 days a week. Some corrective SOs are generated by a telemetered alarm when certain parameters are breached; for example, low system pressure. The telemetry system sends a message to the cell phone of the Chief Operator, who deploys the required staff. This procedure allows for a problem to be addressed before a loss or reduction of service to the customer occurs.

The response time by the repair crew, even to the farthest point of the service area, is less than 45 minutes. This level of service is maintained in part by distributing crews geographically to reduce response distance. To maintain this level of service during off-hours, emergency staff is equipped with cell phones to expedite communication and wireless-enabled laptop computers. Every crew is in a vehicle equipped with the materials and tools to perform a wide range of maintenance activities, reducing the need for trips to the warehouse. In addition, warehouse personnel are on call 24/7 and are equipped to deliver materials and parts as needed.

4.3.2 Data Management

SOs generate valuable data that can be used to improve O&M based on actual performance. Historically, data were maintained in several media, including electronic and paper based, so it was not always easily retrievable. This condition was greatly improved with the County's implementation of a computerized maintenance management system. Known as the EAMS, it allows data to be located on a file server and be accessible to authorized users. The system has standard reports, but custom reports can be created for specific purposes. EAMS has greatly reduced paperwork and improved efficiency. The system continues to be expanded to other County departments, and staff training continues. A County-wide evaluation of current needs is underway to revise or replace the EAMS system.

Information being maintained includes costs to complete a SO in terms of labor, parts, and equipment use, including vehicles and outside contractors, if needed. The data can be used to generate budgets, evaluate the efficiency of processes and particular components of equipment, perform "what-if" scenarios, and conduct many other analyses that were too cumbersome to perform in the past.

4.3.3 Maintenance Activities

The CCU water distribution staff perform daily visual inspections, water quality tests, and temperature checks at each of the booster stations. In addition, each booster station is visited at least monthly to perform mechanical and electrical tests, greasing, and lubrication. Staff perform repairs and replacement of booster station pumps and motors, rather than relying on outsourced services that are expensive and not as responsive. Each in-service booster station has a portable gantry on site to enable pumping units and motors to be pulled and replaced quickly. Because of these maintenance practices, the booster stations and especially the pumps are operating efficiently.

In 2019, CCU started testing the new AMI automatic meters for accuracy. Initial results show a 10- to 20-percent failure rate at low flow. The new fixed-base water meters are maintained and warranted for a 20-year replacement cycle, which is the optimum time for replacement. The existing design standards for pipes, valves, and hydrants allow the maintenance staff to be more efficient and cost-effective in maintaining the system. Water valves have been surveyed using a global positioning system (GPS), which allows any valve to be quickly located if it needs to be shut off. Staff regularly exercise hydrants and system valves to increase reliability. Large water meters are checked for accuracy yearly and repairs are conducted when necessary.

Maintenance activities for 2019 in both County distribution systems included:

- Completed 4,418 SOs within the distribution systems.
- Responded to 226 water quality calls and 771 customer calls for leaks.
- Installed one hydrant, replaced 23 hydrants, repaired 38 hydrants, and performed maintenance on 539 hydrants, including exercising, flow testing, and painting.
- Issued and addressed 109 boil water notices and repaired 60 line breaks on pipes 3 inches or larger.
- Installed eight new valves, replaced 12 valves, conducted one valve insertion, and performed maintenance on 1,597 valves.
- Performed 884 new line installations and cleared 20 lines.

- Tested 74 large meters and replaced 16.
- Replaced 57 galvanized-steel service connections.
- Upgraded three distribution system sampling points.
- Conducted sampling (sets 1 and 2) for phase two of the Unregulated Contaminant Monitoring Rule (UCMR4).
- Completed three water main diversions for Public Works.
- Completed flushing on the 24-inch transmission main to the Rotonda Booster Station.
- Completed flushing on the 16-inch Biscayne water main for the Contractor.
- Removed 50 feet of asbestos concrete pipe to the landfill for Engineering.
- Updated the Emergency Response Plan (ERP) book.

4.3.4 Staff Training and Employee Retention

CCU encourages employees and staff members to participate in training activities to maintain license requirements and attract superior staff among a competitive labor market. The following training was conducted by CCU staff:

- Six employees attended Florida Water and Pollution Control Operators Association (FW&PCOA) short school for Level 2 Distribution System Operator (DSO).
- All supervisors attended Interacting with Citizens journalist training.
- Staff members participated in Ambassador and Charlotte County University training.
- Three staff members attended the Florida Section of the American Water Works Association (FSAWWA) Fall conference for training.

As with many organizations, maintaining the proper amount of staff is required to complete the maintenance activities that accompany the management of a distribution system. In 2019, the following staffing change occurred:

- Three new staff members were hired.

4.4 Consumer Confidence Reports

As required by federal and state regulations for utilities, CCU provides accessibility to every customer to view electronically or obtain a hard copy of the annual water quality report, also known as the Consumer Confidence Report (CCR). The report tabulates the results of water quality testing to identify the level of any contaminants detected in the drinking water. All water, including bottled water, originates from rivers, lakes, streams, ponds, reservoirs, springs, or wells. As water travels over land or through the ground, it dissolves naturally occurring minerals and can also absorb substances that originate from animal or human activity. These contaminants may include:

- Microbial contaminants, such as viruses and bacteria.
- Inorganic contaminants, such as salts, metals, pesticides, and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals.
- Radioactive contaminants, which can be naturally occurring.

To ensure that tap water is safe to drink, EPA regulations limit the concentrations of certain contaminants in water provided by PWSs. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

The results, as reported in the latest CCRs for the Mid/West and South County distribution systems, indicate the levels of tested water contaminants in the CCU service area are safely below the maximum contaminant level allowed by federal and state regulations and orders, and in most cases are well below the level. In addition, the CCU Mid/West County distribution system water was the recipient of the FSAWWA's Water Distribution System of the Year award for Division 6 in 2019. Besides, CCU won the FSAWWA's Region X Best Testing Drinking Water award in 2019.

The most recent CCRs for the Mid/West (Peace River) and South (Burnt Store) County distribution systems are available at *https://www.charlottecountyfl.gov/dept/utilities/Pages/Reports.aspx*.

4.5 Review of Previous Recommendations

Table 4-6 and Table 4-7 summarize the recommendations and current status from the 2018 Annual Report for the Mid/West and South County distribution systems, respectively.

Table 4-6 Mid/West County Distribution System – 2018 Recommendations and Status

	Interconnects
Recommendations:	1. Install a canopy over the control panel at the EWD interconnect. 2. Complete the relocation of the North Port interconnect at Flamingo Boulevard.
Progress:	1. *Completed.* 2. *Completed.*
	WBS General
Recommendations:	1. Perform a load study to identify any issues related to power quality, quantity, and capacity and to help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. 2. Apply appropriate arc flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required.
Progress:	1. *Not completed.* 2. *Not completed.*

	Port Charlotte Golf Course WBS
Recommendations:	1. Evaluate the generator at the Port Charlotte Golf Course WBS to verify that Occupational Safety and Health Administration (OSHA) compliance is maintained and accessibility of the equipment is provided. 2. Label the switchgear to identify parts and components that could be energized.
Progress:	1. *Completed.* 2. *Not completed.*
	Walenda WBS
Recommendations:	1. Re-paint the outside of the GST. 2. Replace the generator at the WBS with a properly sized generator to accommodate the loads and maintain reliable operation of the station.
Progress:	1. *Not completed.* The recent inspection found a deficiency in the tank bonding, which will require multi-layer stripping before the tank can be repainted. 2. *Not completed.*
	Gulf Cove WBS
Recommendations:	1. Continue to upgrade the WBS by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the WBS. 2. Replace the concrete pipe connecting the GST to the pump station at the WBS. 3. Paint the concrete support on the influent pipe to the GST to prevent deterioration. 4. Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. 5. Conduct further analysis of the ATS based on the elevated temperatures of the primary and secondary conductors entering and leaving the drive to determine if this is a nominal temperature rise or if another condition exists that may be detrimental to the drive or the electrical system.
Progress:	1. *Not completed.* 2. *Not completed.* 3. *Completed.* 4. *Not completed.* 5. *Not completed.*

	Rotonda WBS
Recommendations:	1. Complete installation of the 24-inch water transmission main from Ingraham Street to the Rotonda GST. 2. Conduct further analysis of the ATS based on the degradation of the enclosure to verify that it is functioning properly. 3. Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures.
Progress:	*1. Completed.* *2. Not completed.* *3. Not completed.*
	Ingraham Disinfection Station
Recommendations:	1. Cover the sodium hypochlorite storage tank and associated piping to prevent sun exposure and degradation. 2. Repair the doorstep to the water quality testing and storage shed.
Progress:	*1. Completed.* *2. Not completed.*

Table 4-7 South County Distribution System – 2018 Recommendations

Recommendation:	Continue to replace old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Progress:	*Ongoing*.
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.
Progress:	*Ongoing.*

4.6 Summary and Recommendations

Charlotte County is a member of the PRMRWSA, which is charged with the task of providing adequate quantity and quality water to its members. The Mid/West County CCU service area is supplied with water that is purchased from the PRMRWSA through four transmission mains. CCU also maintains emergency interconnects with adjacent water utilities. These interconnects have proven to be valuable during emergency conditions. CCU has four WBSs and one chemical booster station to maintain sufficient pressures and proper disinfectant residuals throughout the system. Each WBS contains a GST, high-pressure pumps, and chemical feed systems. At the end FY 2019, the Mid/West County system had 58,534 service connections and served a population of 146,362.

The electrical components at the Port Charlotte Golf Course WBS are in very good condition. Without permanent platforms in place, accessibility of the generator is a concern. A review of the site by the electrical engineer identified a single minor code issue where some flexible conduits were being improperly supported using a strap to other rigid conduit. County staff immediately resolved this by removing the improper support. No other issues were found.

The electrical components at the Walenda WBS are in good condition. The standby generator is reportedly undersized and needs to be replaced to meet the existing demands. Interviews with County Staff reported minor unresolved issues. Staff identified a previous issue with a level probe inside the tank being inconsistent. The original probe was an ultrasonic-based

probe and the replacement probe is radar-based, which should provide better service for the intended task. Staff also reported that the existing on-site standby generating system is slightly undersized for a full load of the facility. Also, the amount of fuel storage on site is reported to be less than the minimum required for 3 days (County standard). A review of the site by the electrical engineer identified a single minor code issue. A junction box in the area of the exposed ceiling rafters is missing its cover.

The electrical components at the Gulf Cove WBS are in good condition. Interviews with County staff reported minor unresolved issues. Staff stated that the on-site standby generating system was too small in capacity to accommodate the full load of the pumping station and that the fuel system was insufficient to provide the County's minimum required 72 hours of operation during a storm event. A review of the site by the electrical engineer identified two minor code issues. The first was the flexible conduit that was installed at the main entry gate to accommodate video surveillance. The flexible conduit is wholly unsupported its entire length running some 12 feet. Its only support is being provided by its connection to the junction box.

The electrical components at the Rotonda WBS are in fair condition. Components were identified as possibly being at the end of their service life because of their age. The standby generator and incoming power appear in fair condition as well. Interviews with County staff reported an unresolved issue. During the last management cycle of the incoming main breaker for the facility would not re-close. After several attempts, maintenance personnel were able to get the breaker to close and maintain position. However, this is an indication that the breaker has an issue and likely may fail soon. A review of the site by the electrical engineer found an unresolved issue from the last annual report. The VFDs, which were placed into the original MCC as an upgrade display a significant gap of approximately 1-½ inches around their circumference. This gap between the equipment and the enclosure may represent a hazard if it exposes staff to live parts during maintenance.

The electrical components at the Ingraham Disinfection Station are in good condition. Interviews with County staff reported no unresolved issues. A review of the site by the electrical engineer found no issues. The total storage in the Mid/West County distribution system is 10 MG, which can be supplemented with additional storage at the PRMRWSF. The CCU GSTs are cleaned and inspected every 5 years. This proactive maintenance procedure did not uncover any significant GST deficiencies in FY 2019. For FY 2019, the total water use was 3,743,004,000 gallons of water, and flushing quantities were increased from 296 MG to approximately 313 MG in the Mid/West County distribution system. Maintaining the required chlorine disinfection concentrations throughout the system has required flushing water mains in the extremities of the system where residential demand is small.

The South County service area is supplied with water that is produced by the Burnt Store RO WTP. The South County distribution system does not currently have interconnects or booster stations. The Burnt Store RO WTP has sufficient storage and pumping capacity to serve the South County customers. At the end of FY 2019, the South County distribution system had 2,592 service connections and served a population of 7,330. The total water use was 159,232,256 gallons of water, and flushing quantities increased from 1.5 MG to approximately 7.4 MG in the South County distribution system. Water audit investigations continued during FY 2018, but no significant leaks have been identified. CCU continues to investigate.

CCU continues to perform preventive maintenance on hydrants and valves throughout both distribution systems. Residential and small commercial water meters are replaced on a 20-year cycle to capture accurate readings. Large water meters are checked for accuracy yearly. The 2016 Water Quality Reports confirm that the water delivered by the CCU water distribution systems meets or exceeds regulatory quality requirements. Recommendations from the 2016 Annual Report continue to be implemented for the South County distribution system and the Gulf Cove booster station.

Table 4-8 and Table 4-9 list the recommendations for the Mid/West and South distribution systems from the 2019 site visit.

Table 4-8 Mid/West County Distribution System – 2019 Recommendations

Recommendations:	**Interconnects** ▪ Lower the lighting under the canopy to illuminate the pumps and equipment at the EWD interconnect.
Recommendations:	**WBS General** ▪ Perform a load study to identify any issues related to power quality, quantity, and capacity and to help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. ▪ Apply appropriate arc flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendations:	**Port Charlotte Golf Course WBS** ▪ Perform yard maintenance around the perimeter fencing. ▪ Label the switchgear to identify parts and components that could be energized.
Recommendations:	**Walenda WBS** ▪ Perform yard maintenance around the perimeter fencing. ▪ Replace the generator at the WBS with a properly sized generator to accommodate the loads and maintain reliable operation of the station. ▪ Fix the leak on the seal of Pump 3. ▪ Repair the bonding and re-paint the GST. ▪ Replace the missing cover on the junction box.

Recommendations:	**Gulf Cove WBS** ▪ Perform yard maintenance around the perimeter fencing. ▪ Continue to upgrade the WBS by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the WBS. ▪ Replace the concrete pipe connecting the GST to the pump station at the WBS. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Increase the size of the fuel tank to hold additional fuel. ▪ Fix the leak on the influent pipe to the GST. ▪ Fix the leak on HSP No. 2. ▪ Pump out the water in the vault containing the HSP feed piping. ▪ Secure the electrical conduit for the gate camera. ▪ Provide additional support for the flex conduit bearing the video surveillance system. ▪ Repair conduit in the chemical feed system.
Recommendations:	**Rotonda WBS** ▪ Conduct further analysis of the ATS based on the degradation of the enclosure to verify that it is functioning properly. ▪ Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures. ▪ Clean the small oil spill inside the generator enclosure. ▪ Paint the wall that contains the HMI in the pump room. ▪ Replace the incoming breaker as soon as possible. The failure of this specific device may render the station out of service for an extended period. ▪ Further recommend that the gaps surrounding the VFDs be mitigated to prevent potential contact with live parts.
Recommendations:	**Ingraham Disinfection Station** ▪ Repair the doorstep to the water quality testing and storage shed.

Table 4-9 South County Distribution System – 2019 Recommendations

Recommendation:	Continue replacing old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.

5 WASTEWATER COLLECTION SYSTEM

5.1 SEWER SYSTEMS

The purpose of a wastewater collection system is to transport wastewater from customer structures to a treatment facility. The CCU collection system consists of the following components:

- **Gravity Sewer** – as the name implies, is piping installed at a gradual incline (slope) that allows wastewater to flow exclusively by the energy of gravity. Gravity sewers include manholes that allow for maintenance staff entry and equipment use. Flow entering gravity sewers discharges to manholes, lift stations, or a treatment plant.
- **Vacuum Sewer** – moves sewage from an individual service wastewater storage tank to a wastewater pumping station by a vacuum that is created at a pumping station site. This system uses smaller diameter pipes than a gravity sewer system.
- **Low-Pressure Sewer (LPS)** — is an alternative to a gravity sewer system and requires a small pump at each property. This system costs less to construct (smaller dimeter pipes, shallow depth piping) but costs more to operate and maintain (electrically driven equipment). Flows within an LPS system move only when pushed by new flow contributions.
- **Force Main** – is a pressured sewer pipe that conveys wastewater in a situation where gravity sewer flow is not possible. This system component is fed by a lift station.
- **Lift Station** – also referred to as pump station, is a facility designed to move wastewater from lower to higher elevations through force mains. This system component provides additional energy to the system where reliance on gravity is not possible. Lift stations are common in Florida because of the flat terrain.
- **Vacuum Station** – it houses a collection tank, discharge pumps to send the sewage to the treatment plant, controls to automate the station, and vacuum pumps that create a negative pressure in the vacuum mains.

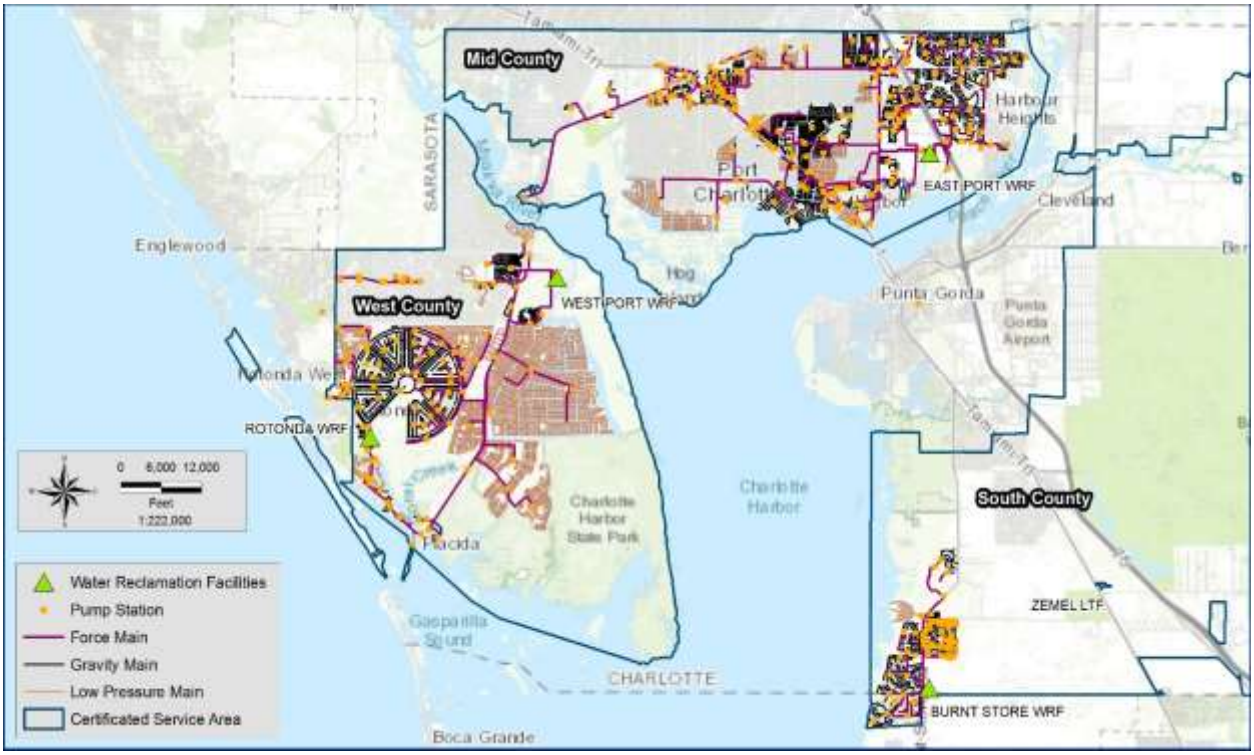
CCU's Service Area is served by four collection systems. Each system is tributary to a WRF, discussed further in Chapter 6. Figure 5-1 shows the CCU certificated service area and wastewater infrastructure.

At the end of FY 2019, there were 39,762 wastewater customers, an increase of 3,113 customers since FY 2018. These customers are served by:

- 371.8 miles of gravity sewer
- 380.2 miles of LPS mains
- 23.9 miles of vacuum sewers
- 184 miles of force mains
- 7,750 manholes
- 314 lift stations:
  - 301 CCU-owned and maintained lift stations.
  - 13 lift stations outside the Service Area (maintained by CCU under service contracts).

East-West Spring Lake vacuum sewer system went into service in 2016 and currently serves approximately 1,855 homes. The second (Contract D) vacuum/pumping station went into service in FY 2018 and serves approximately 354 homes.

Figure 5-1 CCU Certificated Wastewater Service Area



5.1.1 System Expansion

The existing South, Mid, and West County wastewater systems were hydraulically modeled using SewerGEMS™ software as part of a County-wide wastewater master plan. The model was updated in FY 2017 as part of the project but was not calibrated. The model identifies areas where capacity upgrades are needed to support future growth, as well as upgrades needed for future system expansions.

The model is a constant work in progress that it is regularly updated when system changes occur. Most recently, the County is improving the reliability of the model in the Mid County area. The updates to the model will aid in sizing planned infrastructure improvements in the Deep Creek and Ackerman neighborhoods as well as to aid in the implementation of the Regional Transmission System Interceptor and Grand Master Loveland Lift Station near the East Port WRF.

5.2 Lift Stations

At the end of FY 2019, the system has a total of 314 maintained lift stations – 301 owned by the County within their collection system and 13 additional stations not in the County's service area, but currently maintained by the wastewater collection department under service contracts. Ten master lift stations have permanent auxiliary power. CCU owns portable standby power equipment; through FY 2019, initial steps have been taken toward Federal Emergency Management Agency (FEMA) grant funding agreements providing funding for

24 additional generators that will be dispersed throughout the lift stations strategically based on need. Of the 24, 14 are planned to be stationary generators and 10 are planned to be trailer-mounted generators. Although the grant agreement has not yet been fully executed, this is expected to proceed during FY 2020. In a catastrophic event, the ability to provide power to the rest of the collection system is limited. Connections/receptacles for these portable generators are at nearly every lift station within the system. All lift stations allow wastewater pumping from wetwells during emergencies through a portable pump connection or an adaptor that can be installed when needed.

On February 5 and 6, 2020, Jones Edmunds personnel and CCU Operations staff conducted site visits to three of the regional master lift stations and 15 lift stations dispersed among the West, Mid, and South portions of the County. Table 5-1 lists the 18 lift stations visited. The site-visit assessments will help CCU to identify and prioritize maintenance, rehabilitation, or replacement work at these lift stations.

Table 5-1 Visited Wastewater Collection Systems – Master and Representative Lift Stations

Station No.	Location
Master Lift Stations	
LS 309 – Bridgewater	Bridgewater Rd & New Castle Lane
LS 801 – Field	Cape Haze and Boundary Blvd
LS 816 – Rotonda Boulevard West	300 Rotonda Blvd West Boundary and Blvd West
Representative Lift Stations	
LS 7 – Pure Oil	3666 Tamiami Trail Easy Street & US 41
LS 12 – Plaza	Aaron St behind Promenades
LS 28 – Peachlove	24123 Peachland Boulevard, Peachland & Loveland Boulevard
LS 113 – Kerrigan	Kerrigan Circle & Myakka Ave
LS 123 – KHW Walmart	Kings Highway & Sandhill Boulevard
LS 139 – Altoona	Edgewater Dr & Altoona St
LS 143 – Harbor Vac	3450 Harbor Blvd
LS 303 – Constantine	26173, Constantine Road & Aiden Way
LS 415 – Prada	Prada Drive & Doredo Drive
LS 417 – Wonran	Tern Bay Blvd & Longmeadow
LS 442 – Doredo 2	25191 Doredo Drive
LS 817 – Bunker Road	Behind 66 Bunker Road
LS 818 – Harbor West	14613 Ponce De Leon Trail
LS 828 – Sweetwater	226 Wayne Road
LS 884 – Wiltshire	8531 Wiltshire Dr- South of Ingraham

5.2.1 Master Lift Station 309 – Bridgewater (Deep Creek)

The Bridgewater Wastewater Lift Station (LS 309) is a master lift station purchased by Charlotte County in 2003 that receives wastewater from 28 County-owned pump stations (LSs 300 through 308 and LSs 310 through 328) in the Deep Creek Area, a small number of

private pump stations, and an elementary school. It contains two recently replaced pumps – one replaced April 2019 and one replaced January 2020 – each 50-HP Flygt Model NP3202.185 submersible pumps with 460-millimeter (mm) impellers. The pumps are in a 10-foot-diameter, 20-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 660 gpm at approximately 120 feet of head. The pumps discharge into an 8-inch 2-mile-long force main that pumps to the East Port WRF. The 8-inch force main is scheduled to be upgraded during FY 2020.

The station is fenced and generally well kept, although adjacent vegetation is impacting the surrounding barbed wire. Power is provided by a 480-volt, three-phase power service. The station contains a telemetry transmitter that allows monitoring to occur from the CCU central office and treatment plants.

Wastewater flows through the 10-foot diameter manhole directly to the wetwell containing the pumps. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail retrieval system. The discharge isolation valves and the emergency pump discharge connection are in an underground concrete vault. The pump discharge pipes in the wetwell were replaced with HDPE pipe in 2010. The pump discharge check valves were also rebuilt at the same time, but have recent wear and sticking and require additional repair and replacement. The wetwell was last coated in the 1980s.

A biological odor-control unit with a fan draws air from the wetwell and reduces the hydrogen sulfide odor generated. Additionally, the wastewater flowing to this lift station is also treated for odor by Hydrogen Peroxide addition at LS 321 Angol. The air movement also reduces the concentration of hydrogen sulfide in the wetwell, which will lengthen the life of this concrete structure. The station receives wastewater with long detention times in numerous tributary pumping stations.

The pumps are started without the use of VFDs or soft starts. The station's main power panel is equipped with a portable generator receptacle, and this station is scheduled to be equipped with a permanent stationary generator once the FEMA grant agreement is executed later in FY 2020. Operations staff indicated that the water level in the wetwell is usually high even with both pumps on.

LS 309 currently experiences frequent infiltration during the wet season that requires manual trucking of the excessive flows. During the site visit, the lag float was triggering due to high inflow with no recent rainfall.

The condition of this critical station should be kept at a high level through planned equipment upgrades. An on-site generator with an ATS will be added to this regional master lift station. The County has noted that this station is on the list to receive one of the FEMA grant generators, but the County is waiting for confirmation on the approval. The addition of a protective coating in the wetwell would also help prevent future degradation due to high levels of hydrogen sulfide.

The following deficiencies were noted:

- Signs of corrosion on the wetwell interior wall likely due to high hydrogen sulfide concentration.
- Corrosion of piping and valves in the underground vault.
- Seepage under the west discharge pipe in the wetwell.
- Substantial concrete wear around the odor-control intake piping.
- Minor wear of the fence barbed wire due to local vegetation.

Proposed 2020 improvements to the station include:

- Provide a stationary generator.
- Coat the wetwell.
- Replace concrete control panel posts with County aluminum standard.
- Replace/repair check valves.
- Replace pumps and other related equipment.

5.2.2 Master Lift Station 801 – Field

The Field Master Lift Station (LS 801) is just south of the intersection of Cape Haze Drive and Boundary Boulevard. It receives wastewater from 33 pump stations in the Rotonda Area including LS 816 and the 10 satellite stations. LS 801 discharges through a 12-inch force main and is conveyed to the Rotonda WRF.

The station contains two 75-HP Flygt Model CP3300 submersible pumps with 642-mm impellers in a 10-foot diameter, 20-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 1,762 gpm at approximately 66 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps using the rail retrieval system. The wetwell lining is in good condition and largely unaffected by Hydrogen Sulfide. The discharge isolation valves and the emergency dedicated pump discharge connection are above grade to the south of the wetwell.

The station is fenced and has a dual carbon vessel odor-control system. A single photometric-operated overhead light is between the generator and the operating panels. The power service to the station is 480-volt, three-phase. The station has a SCADA system with a telemetry transmitter/receiver in the control panel. A 200-kW Kohler generator, rated at 250 kilovolt-amperes (kVA), with an ATS within the fence at the north end of the site. The fenced area also contains a 460-gallon fuel tank. The generator is operated once a week each Monday morning at 9:00 a.m. to maintain generator operability. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- The generator door was replaced due to vandalism.

Proposed 2020 improvements to the station include the following tasks:

- Evaluate the security of the site including securing stone footing underneath and around the fence and maintaining locked gates at all times.
- Coordinate with adjacent property maintenance to keep vegetation growth from impeding the lift station.

5.2.3 Master Lift Station 816 – Rotonda Boulevard West

The Rotonda Boulevard West Master Lift Station (LS 816) was built in the 1980s. LS 816 receives wastewater from 10 pump stations in the Rotonda area and contains two 10-HP Flygt model NP3127 submersible pumps with 432-mm impellers inside a 10-foot-diameter, 22-foot-6-inch-deep concrete wetwell. The station discharge main is a 12-inch force main that is approximately 1/4 mile long and discharges to a 24-inch gravity transmission main. Each pump has an estimated capacity of 244 gpm at approximately 22 feet of head.

LS 816 receives flow from a 21-inch gravity sewer and a 2 1/2-inch LPS force main and discharges flow to LS 801, which discharges to the Rotonda WRF. The station has a SCADA system with a telemetry transmitter/receiver.

The station wetwell exterior and electrical equipment are in relatively good condition, and the station wetwell interior is showing signs of corrosion. The valve vault cover was recently replaced with a concrete slab and updated hatches; however, significant mud is filling the valve vault and partially covers the valves. The new concrete slab appears to be partially covering some of the valve bolts, which may cause future maintenance issues. The wetwell interior has sufficient storage capacity and does not incur significant impacts from I/I, but the coating is worn, and the concrete top slab is degraded, exposing structural rebar and wood. The valve vault's surrounding concrete wall base exhibits significant wear-through. The degradation and exposure of the vault has resulted in partially buried valves.

The station is not fenced and does not have site lighting or odor control, although the wetwell is vented. Power service to the station is 230 volts, three-phase. The station has a potable water hose bibb for washdown.

The following deficiencies were noted:

- Signs of corrosion on the wetwell interior wall likely due to high hydrogen sulfide concentration.
- Interior concrete slab shows wear, exposing structural rebar and wood.
- Valve vault includes partial burial of the valves.
- No dedicated suction or discharge bypass piping.
- Phase monitors appeared to be missing.
- The low height of the aerial power supply to the electrical meter possess a potential electrical hazard.
- Missing seal-offs from the control panel conduit. This represents a significant code violation as well as a potential explosion hazard.

Proposed 2020 improvements to the station include:

- Coat the wetwell.
- Repair or rehabilitate the concrete top slab.
- Modify the valve vault to allow full access to the valves and to prevent them from being buried.
- Evaluate relocating the power supply underground.
- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with current codes.
- Evaluate the adjacent lot for future lift station conversion.

5.2.4 Representative Lift Stations' Condition Assessments

On February 5 and 6, 2020, Jones Edmunds personnel and CCU Operations staff also toured the selected group of neighborhood lift stations to develop a general sense of the overall condition of the lift stations that are within the CCU wastewater collection system. The outcome of the assessment will allow CCU to identify and prioritize maintenance, rehabilitation, or replacement work at these lift stations.

5.2.4.1 Lift Station 7 – Pure Oil

The Pure Oil Lift Station (LS 7) is north of a gasoline station on the northeast corner of the intersection of Tamiami Trail and Easy Street. The lift station serves residential and commercial areas to its north and west, receiving flows from the Judd Lift Station (LS 8), which discharges into the upstream gravity sewer through a 4-inch force main and is conveyed to LS 65 South Port Master then through the 16-inch Westchester FM to the East Port WRF. This lift station contains two aboveground, self-priming, belt-driven 20-HP Gorman-Rupp model T4A3B pumps providing a 48-amp draw. Each pump has an estimated capacity of 440 gpm at approximately 50 feet of head. The LS 7 pumps are above the wetwell in a small concrete block building. The concrete wetwell is corroded by years of hydrogen sulfide exposure, and metal reinforcement is exposed near the access hatch. The wetwell has an older trough design, with estimated rectangular dimensions of 6 feet by 13 feet and a 13-foot depth.

Power service to the station is 240-volt, three-phase, and a pole-mounted transformer directly west feeds the station. The station is not fenced, and metal reinforcement had to be installed behind the vented window after the plexiglass panels were broken by vandals. The building door and panels are typically locked, and the station has internal building lighting. The station has no odor control and no dedicated well suction bypass piping, although a circular penetration in the wall directly above the wetwell cover is available for local pump trucks to access. The site has no potable water available.

The main control panel is a wooden box mounted on the outside the building. The space inside the building is exposed to sewer gases because access for the wetwell entry and float switches are open holes in the floor of the building. A portable generator receptacle with a manual transfer switch was added in recent years. A portable pump connection is in a valve box outside of the building. The station has a SCADA system with a telemetry transmitter/receiver.

The County's easement to access the station only extends 10 to 15 feet from the curb and is currently mostly obstructed with multiple electrical power poles that provide overhead electric. The County currently accesses the station through the parking lot of the adjacent gas station; however, the employee parking and dumpster often partially block this access. Additionally, the nearby overhead power lines result in potential danger to County staff when operating a crane truck in this area.

The following deficiencies were noted:

- Deteriorated roof overhang.
- Missing glass windowpanes.
- Missing seal-offs from the control panel conduit.
- Obstructed access for a crane truck.
- Remove existing aerial power supply and install underground supply.

Proposed 2020 improvements to the station include:

- Repair the roof overhang.
- Replace the glass windowpanes.
- Evaluate odor-control opportunities.
- Install seal-offs on any electrical equipment within 10 feet of the wetwell to conform with code.
- Evaluate current pump performance to verify if it is operating efficiently.
- Evaluate possibilities for a dedicated access to the station.
- Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment.

5.2.4.2 Lift Station 12 – Plaza

The Plaza Lift Station (LS 12) is on Aaron Street directly northeast of the Promenades Mall and directly southwest of the intersection of Olean Boulevard and Harbor Boulevard. LS 12 previously received flow from LS 31, which has since been converted to a manhole as part of the Harbor Blvd. beautification project. LS 12 discharges to a 10-inch force main and conveys flows to the East Port WRF through the Olean FM.

The station contains two 30-HP Flygt CP Model 3170.180 submersible pumps, with 452-mm impellers in a 10-foot-diameter, 21-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 440 gpm at approximately 103 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the rail retrieval system. The wetwell was re-lined within 6 months of the site visit and is largely unaffected by hydrogen sulfide. The discharge isolation valves and the emergency dedicated pump discharge connection are above grade to the northwest of the wetwell.

The station is fenced and does not have dedicated lighting but is across the street from a well-lit mall parking lot. The station does not have an odor-control system but has a snorkel vent on the wetwell.

The power service to the station is 480-volt, three-phase. The main power panel is equipped with a portable generator receptacle with a mechanical interlock between the main breaker and generator breaker. The control panel has seal-offs. The station has a SCADA system with a telemetry transmitter/receiver. However, the transformer is resting unbolted on a concrete pad behind the lift station site. The station also has a potable water hose bibb for washdown.

Operations staff noted that the hatch doors at this station are significantly heavier than others in the system and lack a shock or spring system to assist in operation.

The following deficiencies were noted:

- Hatches did not have adequate shocks or springs to assist in their operation.
- Inadequate lighting for evaluating control panel or wetwell.

Proposed 2020 improvements to the station include:

- Install shocks or springs on the existing hatch or evaluate replacing hatches.
- Evaluate site lighting for lift station employee serviceability.

5.2.4.3 Lift Station 28 – Peachlove

The Peachlove Lift Station (LS 28) is on the southeast corner of the intersection of Peachland Boulevard and Loveland Boulevard. It currently has three influent gravity mains and receives flow directly from the Harold Recreation Center Lift Station (LS 63). LS 28 discharges to an 8-inch force main that manifolds to a 20-inch force main directly influent to the East Port WRF.

The station contains two 30-HP Flygt Model CP3102.180 submersible pumps with 454-mm impellers in a 10-foot-diameter, 25-foot-deep concrete wetwell. Each pump has an estimated capacity of 1,076 gpm at approximately 100 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps on the rail retrieval system. The rails stop a short distance from the top of the wetwell and are composed of two rails welded together which appear to be buckling at the connection point and causing some difficulty when reinstalling the pumps into the wetwell once maintenance or inspection is complete. However, the design of this system was required to account for larger pumps in this station.

The wetwell lining is largely unaffected by hydrogen sulfide; however, the seams including those in the liner and the pipe penetrations all have signs of seepage and wear. The discharge isolation valves and the emergency dedicated-pump discharge connection are below ground in an adjacent valve vault that is locked with a padlock. The pipe penetrations appear to have been sealed after the HDPE discharge piping was installed; however, an active steady drip from the pipe penetrations has resulted in standing water in the vault despite an open drain port. This condition was observed during a relatively dry period when there was no rain for multiple days.

The station is fenced. The station has no dedicated site lighting, although a lit overflow parking lot behind a strip mall is immediately southeast of the station. The standard carbon odor-control system was removed and replaced with a Hivent system installed on the wetwell vent.

The power service to the LS 28 is 480-volt, three-phase, and a pole-mounted transformer is south of the site. The station has a SCADA system with a telemetry transmitter/receiver. Minor concrete wear and structural metal rusting were observed on the meter and disconnect switch support posts. Two of the control panel seal-offs were severely discolored and the updated control panel layout covers them, making maintenance difficult. The station has a potable water hose bibb for washdown.

A road-widening project was completed during FY 2019 that included traffic improvements at the intersection of Peachland and Loveland Boulevards. This project encroached on much of the easement that formerly served as the driveway into the LS 28 site. The County acquired an easement from the parking lot south of the station and built a separate driveway to the facility. This will require a rearrangement of the equipment to enable the continued access to the wetwell with a crane truck. The proposed solution includes moving the odor-control unit to the master manhole, the data flow system panel to the other side of the control panel, and the gate to the east side of the property, which will allow the direct access to the wetwell.

The following deficiencies were noted:

- Minor wear of the concrete meter and disconnect switch posts.
- Rusting of the structural metal supporting the disconnect switch posts.
- Seepage and lining wear around seams and pipe penetrations within the wetwell.
- Nonfunctioning valve vault drain.

Proposed 2020 improvements to the station include:

- Replace concrete control panel posts with County aluminum standard.
- Re-line the wetwell or specifically address the exposed penetrations and seams.
- Grout the valve vault at the appropriate slope for proper draining.
- Correct the leak in the valve vault piping.

5.2.4.4 Lift Station 113 – Kerrigan

The Kerrigan Lift Station (LS 113) is on Myakka Avenue just west of the intersection of Kerrigan Circle and Myakka Avenue. It currently receives flows from the local LPS as well as a small gravity collection system. The station conveys flows through a 2-inch PVC force main that manifolds to a 10-inch force main on SR 776, which then flow to the Quesada Master Lift Station (LS 37) before being conveyed to the East Port WRF.

The station contains two 2.5-HP Liberty Model LGH023 submersible grinder pumps with 5.86-inch impellers in a 4-foot-diameter, 12-foot-deep fiberglass wetwell. Each pump has an estimated capacity of 32.5 gpm at approximately 100 feet of head.

The wetwell hatches are in good condition and provide adequate access to remove the pumps from the installed rail retrieval system. The wetwell lining is largely unaffected by hydrogen sulfide. The discharge isolation valves and the emergency dedicated-pump discharge connection are below ground in an adjacent valve vault.

The station is not fenced, has no site lighting, and does not have an odor-control system (although the wetwell is vented). The power service to the station is 240-volt, singe-phase with a pole-mounted transformer approximately 1/4 mile away. The main power panel is equipped with a portable generator receptacle and has a mechanical interlock between the main breaker and generator breaker. The station has an Omni-Beacon Telemetry System. Seal-offs on the control panel were missing.

The station has an RCW hose bibb for washdown with adequate RCW markings. Most hose bibbs at other County lift stations have a potable water connection.

The most notable concern at this lift station is the small size of the discharge piping and the varying sizes of the discharge force mains. Operations staff noted that the station experiences debris and gas attenuation within the bores causing low flow and increased run times. Therefore, Operations flushes the main every month or so to regain normal operation. The County will convert this station to an air-vac pod once the vacuum system is extended in the near future.

The following deficiencies were noted:

- Valve vault drain piping is not well supported.
- Effluent force main frequently requires flushing.

Proposed 2020 improvements to the station include:

- Replace the pipe supports.

5.2.4.5 Lift Station 123 – KHW Walmart

The KHW Walmart Lift Station (LS 123) is between the Murphy USA gas station and the Walmart at Kings Highway and Sandhill Boulevard. The station receives local gravity flow from Walmart, the gas station, Arby's, and from all businesses around Walmart and along the West Side of Kings Highway.

The lift station contains two 20-HP Flygt model CP3152 submersible pumps with 454-mm impellers in a 6-foot-diameter, 20-foot-6-inch-deep wetwell. Each pump has an estimated capacity of 264 gpm at 61 feet of head. The pumps discharge into a 4-inch force main that manifolds with an 8-inch force main on King's Highway and connects to the Loveland FM that conveys flow to the East Port WRF.

The station is fenced. No odor control is provided on site, but the wetwell is vented. Multiple locks on the site allow Florida Power & Light to access the transformer. The station has no dedicated site lighting, but the adjacent parking lot and gas station are well lit.

Power service to the station is 480-volt, three-phase, and the Florida Power & Light transformer rests unbolted on a pad within the station fence. The wetwell hatches are in good condition and provide adequate access to remove the pumps along the lift station's rail retrieval system. The discharge isolation valves and the emergency pump connection are above ground and appear to be in good condition.

The electrical panel is in good condition and is equipped with seal-offs and a portable generator receptacle with mechanical interlock between the main breaker and generator breaker. The station has a SCADA system with a telemetry transmitter/receiver.

In a previous report, staff had observed severe settling. During the recent site visit, Operations staff noted that site work on this station had been completed. The site work included digging around the station and compacting the layers to prevent additional settling from occurring.

During FY 2019, elevations were taken to ascertain if settling was still occurring at the site. No settling has occurred since this work was completed.

Finally, the lift station shares an access with the busy Walmart entrance. When pump maintenance is required, County pump trucks must back into the small entrance to complete work.

The following deficiencies were noted:

- Settlement impacts including, but not limited to, concrete cracking, pipe bending, PVC cracking, metal bending, and conduit separation.
- Difficult driveway for County trucks to access lift station pumps for maintenance.

Proposed 2020 improvements to the station include:

- Evaluate two major improvements for the lift station:
    - Repair the on-site infrastructure damaged by the former settling and secure the site with flowable fill.
    - Evaluate the need for driveway relocation.

5.2.4.6 Lift Station 139 – Altoona

The Altoona Lift Station (LS 139) is at the northeast corner of the intersection of Edgewater Drive and Altoona Street. This station receives wastewater from three County-owned stations (LS 20 Lakeview; LS 60 McGrath; and LS 23 O'Hara). LS 139 discharges through a 12-inch HDPE force main to the Southport Master Lift Station (LS 65), which flows directly to the East Port WRF.

The station contains two 47-HP ABS/Sulzer model XFP100J-CH.1.335 PE 350/4-J-60FP submersible pumps in a 12-foot-diameter, 25-foot-deep concrete wetwell. Each pump has an estimated capacity of 948 gpm at approximately 90 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system. The wetwell lining is largely unaffected by hydrogen sulfide. The discharge isolation valves, the emergency dedicated pump suction, and the emergency discharge connections are all above grade to the east of the wetwell.

The station is fenced, has site lighting, and has a bio-trickling tower odor-control system.

The power service to the station is 480-volt, three-phase with an unbolted pad-mounted transformer directly west of the station outside of the fence.

The main power panel is equipped with a portable generator receptacle and has a mechanical interlock between the main breaker and generator breaker. This station is scheduled to be equipped with a permanent stationary generator once the FEMA grant agreement is executed later in FY 2020. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs. The station has a potable water hose bibb for washdown.

The odor-control blower motor was not operating during the visit. The Operations staff noted that the breaker had been tripped and the unit had not been functioning.

The following deficiencies were noted:

- The odor control unit was not operating and there was no known alarm.

Proposed 2020 improvements to the station include:

- Tie the odor control into SCADA and evaluate the cause of the breaker tripping.

5.2.4.7 Lift Station 143 (Vacuum Station) – Harbor Vac

The Harbor Vac Lift Station (LS 143) is at 3450 Harbor Boulevard. This vacuum lift station receives flow from two 8-inch vacuum lines, with a third 8-inch influent line for future use. collecting from approximately 200 homes in the surrounding area. LS 143 discharges through two 6-inch force mains that transmit flows to the Southport Master Lift Station (LS 65), which flows directly to the East Port WRF.

The station contains two 25-HP Cornell dry-pit centrifugal Model 4514T-VC18D8 pumps with 10-inch impellers inside the building. Each pump has an estimated capacity of 411 gpm at approximately 92 feet of head.

A 6,000-gallon Duratech Vacuum Tank in the lower level of the building has a design pressure of 5 psi/26-inch vacuum. Three Busch Mink Model MM 1502 AV vacuum pumps force flows into the vacuum tank; room is available for a fourth pump for future flows.

The building contains a dedicated pump crane for removal of pumps and valves from the lower level; however, the crane is not completely aligned with either the pumps or the valves. The discharge isolation valves are overhead and accessible by the dedicated overhead crane in the building.

The station is gated and surrounded by a 4-foot block wall. The station has indoor site lighting and a bio-trickling odor-control system using pine bark media. The power service to the station is 480-volt, three-phase. A 175-kW Cummins generator, rated at 218.7 kVA, with an ATS, is installed within the fence on the north end of the site with a 500-gallon fuel tank. The generator is operated once a week each Monday to verify standby power capabilities. The station has a SCADA system with a telemetry transmitter/receiver. The station has a potable water hose bibb for washdown.

The vacuum tank was approaching its scheduled maintenance at the time of the visit; however, a feasible way to access the equipment on top of the tank to maintain and clean the equipment was not apparent.

The following deficiencies were noted:

- The generator controls were above 6 feet.
- The crane pump on site is not aligned with the pump or the valves.
- The valves are vertically below the common discharge line and meter, making them difficult to access with the crane.
- The access for tank maintenance is at the top of the tank without a dedicated access point.
- The overhead door to pull the vacuum pumps is relatively short and has a low ceiling.

Proposed 2020 improvements to the station include:

- Evaluate stairs or similar access to generator to return to conformance with the National Electric Code.
- Evaluate modifying the overhead crane with a trolley for lateral movement.
- Evaluate a catwalk or ladder for accessing the top of the tank for maintenance.
- Evaluate either a portable hoist or dedicated overhead crane for easier access of the vacuum pumps.
- Verify the vacuum station site is in accordance with OSHA and County safety and confined-space requirements.

5.2.4.8 Lift Station 303 – Constantine

The Constantine Lift Station (LS 303) is at the southeast corner of the intersection of Constantine Road and Aden Way. The station receives residential flow from the surrounding development through three gravity inverts and discharges through a recently replaced 4-inch force main to the Mauritania Lift Station (LS 302) and ultimately to the East Port WRF.

The lift station contains a single 3-HP Flygt submersible pump that was replaced in 2016 along with the floats and drive to include a model NP3085 pump with 462-mm cutter impeller due to significant ragging in the system. The pump has an estimated capacity of 312 gpm at 16 feet of head and is installed in a 7-foot-diameter, 14-foot-6-inch-deep concrete wetwell. The station has no emergency dedicated pump discharge connection, and there are no guardrails to guide removal of the pump.

The site is not fenced, does not have dedicated site lighting, and has no odor-control or wetwell venting. The power service to the station is 240-volt, single-phase and is serviced through underground electric. The control panel uses an inverter to allow a three-phase generator hookup for the portable generator quick connection. No interlock was noted between the main breaker and the generator breaker. The station has an Omni-Beacon telemetry system. No hose bibb is provided on site for washdown.

The wetwell is in the center of the road intersection, which requires Operations staff to manage traffic during routine maintenance and any pump removal. The wetwell has some signs of corrosion and seepage under pipe penetrations in addition to having an older conical lid design that obstructs access during the maintenance events. The County owns the adjacent lot southeast of the intersection. The design to move the lift station into the lot and the existing wetwell converted to a master manhole has been completed. The new design includes isolation valves and bypass piping, which currently do not exist at this simplex station.

The following deficiencies were noted:

- Signs of corrosion on the wetwell interior wall likely due to hydrogen sulfide concentration.
- No interlock between the generator breaker and the main breaker.
- Missing seal-offs from the control panel conduit.
- Difficult to access wetwell.
- No isolation valves.

Proposed 2020 improvements to the station include:

- Coat the wetwell or repair some of the degraded concrete.
- Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code.
- Evaluate the installation of a secondary standby pump.
- Prepare for construction of improved design noted by Operations staff.

5.2.4.9 Lift Station 415 – Prada

The Prada Lift Station (LS 415) is on a dirt road just south of the intersection of Doredo Drive and Prada Drive. The station receives flow from approximately 15 simplex stations in the Burnt Store Village area and discharges through a 4-inch force main that manifolds to the 12-inch trunk force main that transmits flows directly to the Burnt Store WRF.

The station contains two 7.5-HP Davis EMU model FA104 submersible pumps with 208-mm impellers in the 8-foot-diameter, 18-foot-6-inch-deep wetwell. Each pump has an estimated capacity of 109 gpm at 80 feet of head. The pumps are installed on an older t-rail system. The station is fenced, and no odor control is provided at the station; but the wetwell is vented. The station has no dedicated site lighting.

Power service to the station is 240-volt, three-phase. A portable generator is kept on site for convenience but is not dedicated to the station. The generator is tested monthly. A portable generator receptacle with a manual transfer switch is available as well as a discharge pump connection inside the valve vault. The station has a SCADA system with a telemetry transmitter/ receiver. Operations staff noted that the panel was redone during FY 2019. The pump base, rails, check valves, and pumps are planned to be replaced during FY 2020.

The following deficiencies were noted:

- Signs of corrosion on the wetwell and valve vault interior due to hydrogen sulfide concentrations.
- The valve vault is very deep and may be a confined space.
- Missing seal-offs from the control panel conduit.
- The conduit was partially installed within the concrete of the wetwell, possibly undermining the integrity of the concrete and resulting in difficulty performing electrical maintenance.
- Check valve was noticeably leaking.

Proposed 2020 improvements to the station include:

- Coat the wetwell and seal and repair the contents of the valve vault.
- Evaluate replacing the valve vault with all above grade discharge piping for easier maintenance and to prevent any confined space concerns.
- Install seal-offs on electrical equipment within 10 feet of the wetwell to conform with code.
- Evaluate an upgrade to the electrical equipment including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards.

5.2.4.10 Lift Station 417 – Wonran

The Wonran Lift Station (LS 417) is directly west of the intersection of Tern Bay Boulevard and Longmeadow Drive. This station receives gravity flow from the surrounding area, which is then pumped to the Tern Bay Master Lift Station (LS 416). LS 417 discharges through an 8-inch HDPE force main and is conveyed to the Burnt Store WRF.

The station contains two 30-HP Flygt model CP3170 submersible pumps with 443-mm impellers in an 8-foot-diameter, 23-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 878 gpm at approximately 82 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station rail retrieval system; however, the rails appeared to be composed of two rails welded together and appear to be buckling slightly at their connection point, causing potential difficulty in pulling or replacing the pumps. The discharge isolation valves and the emergency dedicated pump suction and discharge connections are all above grade north of the wetwell.

The station is fenced, has site lighting, and does not have an odor-control system, but does include a wetwell vent. The power service to the station is 480-volt, three-phase and has an unbolted pad-mounted transformer approximately 100 feet east of the fence that feeds the station. The main power panel is equipped with a portable generator receptacle and has a mechanical interlock between the main breaker and generator breaker. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs.

Building construction in the subdivision around the station is ongoing.

The following deficiencies were noted:

- The guide rails were noted to be jutting out.
- The pumps in the wetwell were extremely large for the small flow being observed, resulting in short run times.

Proposed 2020 improvements to the station include:

- Continue to monitor the station as flows increase.
- Evaluate replacing the guide rails with a single rail of the correct length.
- Evaluate if a smaller impeller diameter might be worth considering while the flow demands are still low.

5.2.4.11 Lift Station 442 – Doredo 2

The Doredo 2 Lift Station (LS 442) is at the intersection of Doredo Drive and Alcazar Drive. The station receives flow from approximately 15 simplex stations in the Burnt Store Village area and discharges to the Roland Lift Station (LS 412), which flows to Burnt Store WRF.

LS 442 contains a single 2-HP Hydromatic model HPGLX200CD submersible pump. The pump has an estimated capacity of 413 gpm at 7 feet of head and sits in a 6.75-foot-diameter, 10-foot-0-inch-deep concrete wetwell. The station has no emergency dedicated pump discharge connection and no guide rails to remove the pump.

The station is not fenced, does not have dedicated site lighting, does not have odor control, and has no wetwell vent.

Power service to the station is 240-volt, three-phase. A portable generator receptacle with a mechanical interlock is available. The station has an Omni-Beacon telemetry system. The station experiences high flows and site ponding during extreme rain events. The station has no hose bibb on site for washdown.

The wetwell has almost no signs of corrosion and has bolt-down access hatch. The wetwell is in the center of the intersection, which requires Operations staff to manage traffic during all maintenance activities. Additionally, Operations staff may schedule some operations to be performed at night when warranted.

The County would like to move the wetwell out of the road and convert the existing wetwell to a master manhole; however, the adjacent lots to the south of the intersection are not owned by the County.

Moving the wetwell would allow for the installation of a stand-by pump, isolation valves, and bypass piping. Operations staff noted that during Hurricane Irma's flooding, the generator had to be brought almost a quarter mile away to find a higher elevation area to cross the ditch separating the road and control panel to access the panel.

The following deficiencies were noted:

- Location of wetwell and method to access hatch requires maintenance of traffic to avoid endangering staff.
- No isolation valves.
- No stand-by pump.
- No bypass piping.

Proposed 2020 improvements to the station include:

- Evaluate an adjacent lot for future lift station conversion or install a method to allow generator access during a flooding event.
- Evaluate the installation of a secondary stand-by pump.

5.2.4.12 Lift Station 817 – Bunker Road

The Bunker Road Lift Station (LS 817) is near Hole 9 at The Palms Golf Course and to the rear of both 66 Bunker Road and 52 Bunker Place. It receives gravity flow from the surrounding residential subdivision and discharges to LS 816 through a 4-inch force main.

The lift station contains two 5-HP Flygt model NP3102 submersible pumps with 463-mm impellers in a 6-foot-diameter, 19-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 362 gpm at approximately 19 feet of head. The pumps are installed on an older t-rail system.

The power service to the station is 240-volt, single-phase. The control panel uses an inverter to allow a three-phase generator hook up for the portable generator quick connection. No mechanical interlock was noted between the main breaker and generator breaker, and a sizeable hole was present on the dead front panel. The station does not have a SCADA system, but does have sufficient storage for current flows. The control panel does not have seal-offs.

The station is not fenced and has no odor control. The wetwell has cracking and root intrusion. Previous sealing patches inside the wetwell have corrosion, which may allow I/I into this wetwell. The station has no valve vault cover, and the surrounding soil erosion has filled the remaining cracked concrete walls, partially burying the isolation and check valves. The area around the valves was recently built up with cinder blocks in FY 2019; however, the valves remain buried, likely due to rainfall runoff shifting the soils. The pipes appear to have been sealed to prevent the water from leaking from the discharge force main into the valve vault, but there are signs of damp soil in this area. No hose bibb is provided for washdown.

The lift station is difficult to access with a crane truck due to the low elevation and narrow 7-foot easement. The property to the north of the station could become a new location for the lift station with conversion of the current wetwell to a master manhole. Additionally, the

area just southwest of the existing lift station should be evaluated as a higher-elevation option. The location change would allow the current lift station to be converted to a wetwell, which could then be easily repaired, coated, and converted to a master manhole.

The following deficiencies were noted:

- Signs of corrosion and intrusion in the wetwell.
- Missing seal-offs from the control panel conduit.
- Despite recent improvements, worn and partially buried valve vault.

Proposed 2020 improvements to the station include:

- Coat the wetwell and seal and repair the contents of the valve vault.
- Install interconnect and seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
- Repair the dead front panel or modify to bring back to conformance with OSHA, NEC, and County safety requirements.
- Evaluate the two proposed adjacent lots for future lift station conversion.

5.2.4.13 Lift Station 818 – Harbor West

The Harbor West Lift Station (LS 818) is at 14613 Ponce De Leon Trail and receives gravity flows from the surrounding area. LS 818 discharges through a 4-inch HDPE and manifolds to an 8-inch force main that transmits flows to the West Port WRF. The station contains two 6.5-HP Flygt NP3102.070 submersible pumps with 463-mm impellers in an 8-foot-diameter, 26-foot-6-inch-deep concrete wetwell. Each pump has an estimated capacity of 362 gpm at approximately 19 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system. The wetwell lining is largely unaffected by hydrogen sulfide. The discharge isolation valves, and the emergency dedicated pump suction and discharge connections are above grade to the north of the wetwell.

The station is fenced and has site lighting but does not have a standard carbon odor-control system; however, the wetwell is vented. The power service to the station is 480-volt, three-phase. The main power panel is equipped with a portable generator receptacle and has dedicated suction and discharge bypass piping. The control panel has a mechanical interlock between the main breaker and generator breaker. The station has a SCADA system with a telemetry transmitter/receiver. The control panel has seal-offs. The station has a potable water hose bibb for washdown.

The surrounding area is undergoing construction for a large subdivision. Although the lift station is sized for the buildout, there is currently little-to-no flow experienced at this site.

The following deficiencies were noted:

- Building construction in the subdivision around the station is ongoing.

Proposed 2020 improvements to the station include:

- Evaluate if a smaller-diameter impeller might be worth considering while the flow demands remain low.

5.2.4.14 Lift Station 828 – Sweetwater

The Sweetwater Lift Station (LS 828) is in the roundabout at the intersection of Sweetwater Drive and Wayne Road. It receives influent flows from residential LPS systems and discharges to the Rebel Court Lift Station (LS 821) through a 6-inch force main. The lift station contains two 4.4-HP Davis EMU model FA104 163 submersible pumps with 163-mm impellers in a 6-foot-diameter, 11-foot-deep wetwell. Each pump has an estimated capacity of 363 gpm at approximately 19 feet of head. The pumps are installed on an older t-rail system.

The station is not fenced, does not have dedicated site lighting, and does not have odor control; although the wetwell does have a capped vent. The power service to the station is 230-volt, three-phase. The control panel has a generator hookup for the portable generator quick connection with mechanical interlock between the main breaker and generator breaker. The station does not have a SCADA system, but does have sufficient storage for current flows. The County shifted the control panel location during FY 2019 to be adjacent to the wetwell.

Signs of hydrogen sulfide corrosion and wear exist on the influent manhole and in areas where the wetwell coatings are separated and where pipes penetrate the walls. The valve vault had standing water despite an open drain port and no recent rainfall.

Additionally, signs of corrosion were observed in the valve vault, likely due to hydrogen sulfide gas. The bypass pumping connection in the valve vault was directly tied into one of the discharge pipes instead of the combined discharge header. The valves also had significant rust and wear.

The following deficiencies were noted:

- Wetwell and valve vault corrosion.
- No fencing or odor control.
- Standing water in valve vault
- No SCADA or Omni-Beacon system.

Proposed 2020 improvements to the station include:

- Coat the wetwell and seal and repair the contents of the valve vault.
- Evaluate fencing and odor control.
- Grout the valve vault at the appropriate slope for proper draining.
- Evaluate installation of a SCADA or Omni-Beacon system for remote monitoring or control.

5.2.4.15 Lift Station 884 – Wiltshire

The Wiltshire Lift Station (LS 884) is at 8531 Wiltshire Drive. It currently receives LPS flow from the east section of SR 771 and transmits flow to the West Port WRF through the 20-inch force main on SR 776.

The station contains two 47-HP Flygt CP model 3201 submersible pumps with 457-mm impellers in an 8-foot-diameter, 21-foot deep concrete wetwell. While visiting the site, only one pump was installed and in operation because one of the pumps had been moved to the Rosemary lift station. Each pump has an estimated capacity of 668 gpm at approximately 106 feet of head. The wetwell hatches are in good condition and provide adequate access to remove the pumps from the lift station's rail retrieval system. The wetwell lining is largely unaffected by hydrogen sulfide. The discharge isolation valves and the emergency dedicated-pump discharge connection are below ground in an adjacent valve vault. Discharge piping was replaced in November 2019.

The station is fenced and does not have dedicated site lighting, but a streetlight is immediately adjacent northeast of the fencing. The station has no odor-control system on site, but the wetwell is vented.

The power service to the station is 480-volt, three-phase and there is a pole-mounted transformer feeding this site from across the street. The main power panel is equipped with a portable generator receptacle and has a mechanical interlock between the main breaker and the generator breaker. The station has a SCADA system with a telemetry transmitter/ receiver. The control panel has seal-offs. The station has a potable water hose bibb for washdown.

The station recently received improvements related to the adjacent highway design. The updated layout included a steep driveway leading up to the lift station. Operations staff noted this has caused difficulty bringing trucks and generators up to the lift station site.

The following deficiencies were noted:

- The driveway leading up to the station is steep and may provide difficulty driving over or bringing a generator over it.
- One of the pumps was removed during the on-site visit.
- Operations staff noted that the station only runs about 5 to 7 hours per month.

Proposed 2020 improvements to the station include:

- Evaluate lengthening the driveway to reduce the slope or provide a smoother access point to prevent damage to vehicles or generators.
- Evaluate the benefit of either an uninstalled spare or keeping an emergency pump connection on site when only one pump is available.
- Evaluate if a smaller impeller diameter might be worth considering while the flow remains low.

5.3 Operations

The operation of the wastewater collection system requires the ability to move all service area-generated wastewater to its tributary treatment plant. The wastewater quantity is in constant flux, and CCU Operations staff is tasked to understand and manage the daily, monthly, and seasonal lows and peaks. The flat terrain of Charlotte County requires more than 300 pumping stations to transfer wastewater from the customer connections to the treatment plants.

CCU maintains a separate department for operating and maintaining the collection systems. Although many of the pumping stations (lift stations) are continuously monitored by radio telemetry units (RTUs), each station is visited a minimum of once a month per FDEP requirements. Most of the daily sewer department effort is involved with maintaining the pumping stations through daily or weekly physical inspections and a proactive maintenance program.

Unforeseen pump station failures require immediate attention. CCU maintains two 6,000-gallon tankers and three 4,000-gallon tankers and has contracts with local septage haulers to transport flows from the pump stations to the treatment plants. In addition, many pump stations include on-site standby power or portable generator receptacles that can used during power failures and bypass pump connections in the event of a pump failure. CCU owns 10 trailer-mounted portable generators and six trailer-mounted portable pumps that can be dispatched in the event of a power or pump failure. Through FEMA grants, the County is pursuing an additional 14 stationary generators and 10 trailer-mounted generators.

5.4 MAINTENANCE

Maintenance procedures for the wastewater collection system are similar to those followed for the water distribution systems.

5.4.1 SERVICE ORDERS

The process for generating and completing SOs in the Wastewater Collection workgroup is the same as described for the Water Distribution workgroup. As in Water Distribution, predictive and preventive SOs are generated internally and processed in a similar manner. A total of 6,665 corrective SOs were generated by customer calls during FY 2019. Designating a SO as being related to wastewater or water is determined by the dispatcher. Table 5-2 denotes the FY 2019 SOs by source and issuer:

Table 5-2 Service Orders – FY 2019

System/Issue	Customer Calls	PM Work Orders
Low Pressure Sewer	2,781	313
Gravity Sewer	551	422
Lift Stations	1,506	865
Vacuum Sewer	180	47

5.4.2 DATA MANAGEMENT

The EAMS, as described in the Water Distribution Section, is in full implementation. As its database continues to expand, it will also be shared even more than it is currently. For example, a manager will be able to query the system to determine if there are open work orders in a specific neighborhood, regardless of whether they are water or wastewater related, or if the Public Works Department is planning to pave a street before a planned open-cut repair of a wastewater collection line.

During the planning stages of a new collection system, CCU engages an engineering consultant to perform a feasibility study that includes an economic comparison of installing a conventional or modified gravity system, with its network of lift stations and force mains, versus an LPS and/or a vacuum system. The major components of the comparison are initial construction costs and future maintenance costs over the life of the system. Future costs are brought to present day costs, much like an annuity, and added to construction costs to determine total project cost. The final selection of the new collection system is based on these life cycle costs and the specific needs of each area served.

EAMS will allow this type of economic analysis to be performed with greater precision in future studies, because costs will be more accurately known.

5.4.3 PREVENTATIVE MAINTENANCE

The wetwells of all lift stations are inspected regularly. Problems are addressed as they are found. This effort extends beyond the thorough inspection of representative stations, as described in Section 5.2 of this report.

The average age of the CCU gravity system is nearly 50 years. Older sewers were typically installed in swales, which made them more prone to I/I. Also, design and construction standards were not as stringent as the current practices. Pipe material and joints were constructed with material that deteriorates with time. The older gravity sewer pipes are vitrified clay with frequent joints that are sources of infiltration. Vitrified clay pipe is resistant

to corrosion but is more brittle than PVC and HDPE pipe. After many years of service, cracks develop and pieces of the clay pipe protrude into the flow stream. Although CCU has relatively few plugged sewers, the broken clay pipe will cause blockage and must be repaired.

CCU Wastewater Collections staff performs in-place pipe repairs to fix most of the broken pipes in the system. Most of these repairs involve a cast-in-place lining, fold-and-form lining, or PVC lining. These repair methods restore the integrity of the sewer system without requiring excavation.

The gravity sewer system provides considerable storage time during power failures to allow CCU staff time to address the issue. If a power failure occurs in the LPS system, approximately 20 minutes of wastewater storage remains in the LPS system lift station wetwells.

CCU currently has 10 trailer-mounted portable generators and six trailer-mounted portable pumps that can be dispatched in the event of a power failure. The FEMA grant being completed will add 14 stationary generators and 10 trailer-mounted generators when fully executed. CCU had 9,305 systems in FY 2019 and has developed an emergency preparedness program for the systems in the service area. The program was originally implemented in the aftermath of Hurricane Charley.

CCU has three 4,000-gallon tank trucks, which are used in conjunction with an external vendor's tank trucks of similar capacity for emergency pumping at LPS tanks and lift stations. In addition, CCU currently has two tankers, each with a capacity of 6,000 gallons. These tankers serve a dual purpose. They are used to transport sludge from the wastewater treatment plants, but are also available to haul raw wastewater from lift station sites during emergencies.

In FY 2019, inspections and maintenance of manholes and gravity mains to locate rainfall inflow sources included the following:

- At LS 10 Hernando collection system: 23 laterals repairs and 56,967 linear feet of gravity mains smoke tested.
- At LS 11 McGuire Park collection system: 52,099 linear feet of gravity mains smoke tested, internally televised 63,756 linear feet of gravity mains, lined 14 manholes covering over 1,665 square feet (SF) of piping, and repaired numerous manholes when defects were discovered.

5.5 Review of Previous Report Recommendations

Table 5-3 summarizes the recommendations and current status from the 2018 Annual Report for the wastewater collection system.

Table 5-3 Wastewater Collection System – FY 2018 Recommendations

Recommendation:	Continue the scheduled rehabilitation of sanitary lift stations that have deteriorated due to use and hydrogen sulfide presence, including overseeing the evaluation and design of each improvement.
Progress:	*Lift station rehabilitations are performed each year.*
Recommendation:	Continue to use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on expected demand for services.
Progress:	*Ongoing.*
Recommendation:	Continue to search for sewer I/I sources using smoke testing or closed-circuit television (CCTV) inspections, and repair gravity sewers and manholes as required.
Progress:	*Work performed: 23 laterals were repaired, 63,756 feet of gravity sewer were televised, 109,066 feet were smoke tested, 1,665 SF of manholes were lined, and numerous manholes were repaired.*
Recommendation:	Continue acquisition of stand-by generators and pumps to maintain service during power outages when budget allows to meet FDEP requirements.
Progress:	*FEMA grant funding is underway for the procurement of 24 new generators.*
Recommendation:	In addition to overseeing lift station rehabilitations, continue the in-house program of performing all engineering and construction necessary for the rehabilitation of at least one lift station annually.
Progress:	*No work performed by in-house staff in FY 2018.*
Recommendation:	Continue to repair and upgrade existing lift stations as required. Perform the maintenance activities at the specific lift stations that were inspected for each former Annual Report and previously not completed.
Progress:	*See comments for each lift station below.*

Recommendation:	Lift Station No. 1 – Community Center ▪ Paint the above ground discharge pump and piping. ▪ Repair/replace the patched wye connection. ▪ Repair cracks in the building. ▪ Seal pipe penetrations. ▪ Provide an odor-control system. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Replace the outdated control panel and bring the electrical up to current standards. ▪ Perform thorough rehabilitation of the lift station including repairing the building or replace the station with a modern submersible configuration and new equipment.
Progress:	*Not Completed.*
Recommendation:	Lift Station No. 7 – Pure Oil ▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Paint the building. ▪ Install odor controls. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration with all new equipment. ▪ Evaluate providing a dedicated access to the station.
Progress:	*Not Completed.*
Recommendation:	Lift Station No. 15 – Sistina ▪ Coat the wetwell or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Replace the valve vault and bring to current standards or evaluate converting the valves to above ground. ▪ Evaluate the adjacent lot for future lift station conversion.
Progress:	*Not Completed.*

	Lift Station No. 28 – Peachlove
Recommendation:	▪ Replace concrete control panel posts with the County aluminum standard. ▪ Re-line the wetwell or specifically address the exposed penetrations and seams. ▪ Replace the odor-control system base. ▪ Grout the valve vault at the appropriate slope. ▪ Evaluate and prepare for rearrangement of the site to accommodate east access.
Progress:	*All items appeared to be either completed or addressed by the road-widening project with the exception of the control panel supports and the valve vault improvements.*
	Master Lift Station No. 65 – Southport
Recommendation:	▪ Fence the entire site. ▪ Repair the flow meter. ▪ Evaluate generator control elevations to conform to National Electric Code. ▪ Evaluate the use of a chopper pump or grinder station to reduce ragging. ▪ Bolt down the transformer.
Progress:	*Touch-up paint completed; fence and flow meter repairs not completed.*
	Lift Station No. 82 – Selkirk Maple Leaf Estates
Recommendation:	▪ Coat the wetwell or repair some of the degraded concrete. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
Progress:	*Not Completed.*
	Lift Station No. 123 – KHW Walmart
Recommendation:	▪ Evaluate the lift station site to determine the source of the settling and either repair with flowable fill or relocate the station to an adjacent site. ▪ Install a 6-inch force main to connect to the manifold 8-inch force main at King's Highway.
Progress:	*Lower pump capacities are seen at the Lift Station and progress is being made to evaluate and repair the settling.*
	Lift Station No. 301 – San Marino
Recommendation:	▪ Coat the wetwell or repair some of the degraded concrete. ▪ Clear out the valve vault and perform required repair to maintain integrity. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
Progress:	*Not Completed.*

	Lift Station No. 303 – Constantine
Recommendation:	▪ Coat the wetwell or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.
Progress:	*Not Completed.*
	Master Lift Station No. 309 – Bridgewater
Recommendation:	▪ Provide a stationary generator. ▪ Evaluate pump capacities for potential upsizing. ▪ Coat the wetwell. ▪ Replace concrete control panel posts with County aluminum standard.
Progress:	*All items are either complete or progress is being made toward their completion.*
	Lift Station No. 323 – Aysen
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Proceed with lift station conversion.
Progress:	*Not completed.*
	Lift Station No. 415 – Prada
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate upgrading the electrical including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards.
Progress:	*The wetwell and valve vault have improvements scheduled for FY 2020. The panel was redone during FY 2019; however, seal-offs did not appear to be present.*
	Lift Station No. 442 – Doredo 2
Recommendation:	▪ Evaluate an adjacent lot for future lift station conversion. ▪ Evaluate the installation of a secondary standby pump.
Progress:	*Not completed.*

	Lift Station No. 800 – Holiday Lakes
Recommendation:	▪ Coat or repair the pipe penetrations within the wetwell. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate the odor-control unit to prevent algae growth. ▪ Evaluate the possibility of an on-site generator in preparation for the projected future buildout.
Progress:	*Not completed.*
	Master Lift Station No. 816 – Rotonda Boulevard West
Recommendation:	▪ Coat the wetwell. ▪ Repair or rehabilitate the concrete top slab. ▪ Replace the valve vault and bring to current standards or evaluate converting the valves to above ground. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Progress:	*The valve vault top was replaced with a concrete slab and hatch; however, the remaining items did not appear completed.*
	Lift Station No. 817 – Bunker Road
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Progress:	*Not completed.*
	Lift Station No. 828 – Sweetwater
Recommendation:	▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate fencing and odor control at this site ▪ Move the control panel and meter to the updated posts.
Progress:	*Not completed.*
	Lift Station No. 845 – David
Recommendation:	▪ Replace or repair the valve vault and piping.
Progress:	*Not completed.*

5.6 Summary and Recommendations

There were 39,762 wastewater customer accounts served by CCU at the end of FY 2019. Individual facilities connected to a wastewater collection system include 314 maintained lift stations, 184 miles of force mains, 380.2 miles of LPS mains, 23.9 miles of vacuum sewer, and 371.8 miles of gravity mains.

Wastewater from each customer is transported to one of four WRFs, depending on the location of the customer. The Wastewater Collection workgroup has a maintenance program that includes inspections for condition assessment by CCTV inspections and cleaning of collection

lines to restore/maintain hydraulic capacity. A site review of random, representative facilities showed them to be maintained in working order.

Table 5-4 lists the recommended repairs for the stations viewed during the preparation of this report.

Table 5-4 Wastewater Collection System – FY 2019 Recommendations

Recommendations:	Master Lift Station No. 309 – Bridgewater ▪ Provide a stationary generator. ▪ Coat the wetwell. ▪ Replace concrete control panel posts with County aluminum standard. ▪ Replace/repair check valves. ▪ Replace pumps and other related equipment.
Recommendations:	Master Lift Station No. 801 – Field ▪ Evaluate the security of the site including securing stone footing underneath and around fence, and ensuring gates are locked at all times.
Recommendations:	Master Lift Station No. 816 – Rotonda Boulevard West ▪ Coat the wetwell. ▪ Repair or rehabilitate the concrete top slab. ▪ Modify the valve vault to allow full access to the valves and to prevent them from being buried. ▪ Evaluate relocation or proper protection of the power equipment. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 7 – Pure Oil ▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Evaluate odor control opportunities. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment. ▪ Evaluate providing a dedicated access to the station. ▪ Evaluate current pump performance to verify if it is operating efficiently. ▪ Remove existing aerial power supply and install underground supply.

Recommendations:	Lift Station No. 12 – Plaza ▪ Install shocks or springs on existing hatch or evaluate replacing hatches. ▪ Evaluate site lighting for lift station employee serviceability.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Replace concrete control panel posts with County aluminum standard. ▪ Re-line the wetwell or specifically address the exposed penetrations and seams. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Correct the leak in the valve vault piping. ▪ Evaluate replacing the guide rails with a single rail of the correct length.
Recommendations:	Lift Station No. 113 – Kerrigan ▪ Replace the pipe supports.
Recommendations:	Lift Station No. 123 – KHW Walmart ▪ Evaluate further repair and secure the site with flowable fill. ▪ Evaluate repairing the on-site infrastructure damaged by the former settling. ▪ Evaluate relocating the driveway.
Recommendations:	Lift Station No. 139 – Altoona ▪ Verify the odor control is tied into SCADA and evaluate the cause of the breaker tripping.
Recommendations:	Lift Station No. 143 (Vacuum Station) – Harbor Vac ▪ Evaluate stairs or similar access to generator to return to conformance with the National Electric Code. ▪ Evaluate modifying the overhead crane to use a trolley for lateral movement. ▪ Evaluate a catwalk or ladder for accessing the top of the tank for maintenance. ▪ Evaluate either a portable hoist or dedicated overhead crane for easier access of the vacuum pumps. ▪ Verify the vacuum station site is in accordance with all OSHA and County safety and confined space requirements.
Recommendations:	Lift Station No. 303 – Constantine ▪ Coat the wetwell or repair some of the degraded concrete. ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Evaluate the installation of a secondary standby pump. ▪ Prepare for construction of improved design noted by Operations staff.

Recommendations:	Lift Station No. 415 – Prada ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate replacing the valve vault with all above grade discharge piping for easier maintenance and to prevent any confined space concerns. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Evaluate an upgrade to the electrical equipment including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards. ▪ Evaluate replacing or fixing the leaking check valve.
Recommendations:	Lift Station No. 417 – Wonran ▪ Monitor the station as flows continue to increase. ▪ Evaluate replacing the guide rails with a single rail of the correct length. ▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.
Recommendations:	Lift Station No. 442 – Doredo 2 ▪ Evaluate an adjacent lot for future lift station conversion or install a method to allow generator access during a flooding event. ▪ Evaluate the installation of a secondary stand-by pump.
Recommendations:	Lift Station No. 817 – Bunker Road ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code. ▪ Repair the dead front panel or modify to bring back to conformance with OSHA, NEC, and County safety requirements. ▪ Evaluate the two proposed adjacent lots for future lift station conversion.
Recommendations:	Lift Station No. 818 – Harbor West ▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.
Recommendations:	Lift Station No. 828 – Sweetwater ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate fencing and odor control. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Evaluate installation of SCADA or Omni-Beacon system for remote monitoring or control.

	Lift Station No. 884 – Wiltshire
Recommendations:	▪ Evaluate lengthening the driveway to reduce slope or provide a smoother access point to prevent damage to vehicles or generators. ▪ Evaluate the benefit of either an uninstalled spare or keeping an emergency pump connection on site when only one pump is installed ▪ Evaluate if a smaller impeller diameter might be worth considering while the flows remain low.

6 WASTEWATER TREATMENT FACILITIES

CCU owns and operates four WRFs throughout Charlotte County and one leachate treatment facility (LTF) for the County landfill as shown in Figure 6-1. The East Port WRF serves Mid County, the West Port and Rotonda WRFs serve the West County service area, and the Burnt Store WRF serves the South County service area. Each WRF is unique in its design and treatment approach, so each facility needs to be evaluated independently. Table 6-1 shows that the WRFs are designed and permitted to treat a specific volume of wastewater expressed on an AADF basis.

Figure 6-1 CCU Wastewater Treatment Facilities

Table 6-1 CCU Water Reclamation Facilities and Design Capacities

Wastewater Treatment Facilities	Permitted Capacity (MGD)
East Port	6.0[a]
West Port	1.2
Rotonda	2.0
Burnt Store	0.5[b]
Total	9.7

Notes:

[a] Design of upgrades to 12.0 MGD began in FY 2019. Construction activities will commence after the design is complete in two phases – Phase 1: Construction of upgrades from 6 MGD to 9 MGD; and Phase 2: Construction of upgrades from 9 MGD to 12 MGD.

[b] Design for expansion to 2.5 MGD began in FY 2019.

6.1 STATE-CERTIFIED LABORATORY

The East Port Laboratory (EPLAB) is a part of the CCU and is at the East Port WRF. EPLAB provides regulatory and operational support for CCU facilities including four WRFs, one WTP, one LTF, six deep injection wells, and a potable water distribution system monitoring.

EPLAB is a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory (Florida Department of Health [FDOH] ID E54436, which was renewed July 1, 2019) and a member of The National Environmental Laboratory Accreditation Conference (NELAC) Institute (TNI). The current EPLAB staff includes the Laboratory Manager, Laboratory Quality Assurance Specialist (QAS), and three additional laboratory support personnel (laboratory technicians). The laboratory accreditations include performing analyses for potable water microbiology, non-potable water general chemistry, and non-potable water microbiology.

6.1.1 SITE VISIT

Jones Edmunds staff visited the EPLAB on February 11, 2020, and met with the Laboratory Manager, Sandra Lavoie, and the Laboratory QAS, Elizabeth Robling, to discuss changes in FY 2019 operations.

6.1.2 ACCREDITATION REQUIREMENTS

EPLAB operates in compliance with the 2016 Environmental Laboratory Sector Standards set by TNI and in accordance with Chapter 64E-1, FAC (Certification of Environmental Testing Laboratories), FDEP Quality Assurance requirements (Chapter 62-160, FAC), and FDOH Environmental Laboratory Certification requirements.

The current Quality Control Manual went into effect on December 1, 2019. The Quality Assurance Plan and in-house SOPs are references for laboratory technicians and management. The SOPs are maintained and revised annually to coincide with new TNI standards in accordance with FDOH's Environmental Laboratory Program. A review of internal laboratory documentation shows that SOPs for all certified methods were reviewed and revised (as needed) during 2019. Review of personnel records indicates that all laboratory staff received appropriate quality assurance, SOP, and data integrity training. Hardcopies of the most current Quality Assurance Plan and SOPs are readily available to EPLAB staff in the laboratory. A Master List of all documents currently in use in the laboratory including effective date, revision number, and location is maintained by the QAS.

All laboratory personnel are required to obtain certification to perform specific analyses in the laboratory including documentation of Initial and Continuing Demonstrations of Capability (IDOC/CDOC) and analysis of Proficiency Testing samples. Review of internal laboratory documentation indicates that all IDOC/CDOC records are complete and up to date. The results

of the most recent Proficiency Testing study (September 2019) were reviewed and all analytical results were within the Acceptable range (100-percent passing).

As required by current TNI standards and FDEP regulations, the laboratory operation is assessed every 2 years as a part of its continuing certification process. The most recent assessment was performed by a private company under contract with FDOH in October 2018, and the next assessment is due in October 2020. The 2019 Annual Management Review (required by TNI Standards) notes that laboratory audits were performed by an FDEP representative on July 31, 2019, and by a representative from Stantec Consulting on February 7, 2019. No deficiencies were noted during either audit.

6.1.3 LABORATORY OPERATIONS

The EPLAB workspace consists of five main rooms:

1. Sample receiving and storage.
2. Un-refrigerated chemicals and equipment storage.
3. Administrative workstations for laboratory technicians.
4. Main laboratory benches.
5. Drinking water laboratory.

The EPLAB received and analyzed 7,220 samples (28,762 analyses) during the 2019 fiscal year, slightly less than the 7,530 samples received during the 2018 fiscal year. The Laboratory Manager indicated that the decrease in sample load was due to the conclusion of the Spring Lake Septic-to-Sewer research project in October 2018. However, she also indicated that a new long-term monitoring program for Spring Lake began in October 2019, and that additional groundwater monitoring well sampling is expected to begin in early 2020. This will increase the laboratory workload again. Current laboratory staffing appears to be appropriate for the expected analytical workload for the 2020 fiscal year.

The laboratory uses the EthoSoft web-based X-LIMS (Laboratory Information Management System) for data management. Data in the LIMS and on all computers used in the laboratory are backed-up on a daily basis by the County's IT Department and to the EthoSoft off-site server ('the Cloud"). All analytical data is also downloaded annually by the QAS onto an external hard drive for long-term storage.

The LIMS software is used to prepare paper documentation forms and to assign unique sample identification numbers to samples for recording and tracking results. The LIMS can be used to track samples through the storage, analysis, and reporting phases, reducing the possibility of error. The LM is able to produce daily status reports of all current laboratory work through LIMS. The LIMS is also capable of monitoring quality control results and chemical use to manage supplies ordering.

A hardcopy tracking system, developed by the Laboratory Manager, is also used in conjunction with the LIMS for those analytes not suited to electronic tracking.

Quality assurance procedures are well documented, and all laboratory personnel have received documented training on all quality assurance/control protocols. Chain-of-custody documentation is strictly adhered to during sample receipt and handling. The Quality Control Manual was revised in November 2019 with an effective date of December 1, 2019. The comprehensive manual contains 28 sections, including organization, document control, purchasing services and supplies, client service, control of records, data integrity, environmental conditions, calibration, sample handling, quality assurance, and reporting methods. TNI standards are referenced for each section of the Quality Control Manual, which allows for quick reference between this local document and the TNI standards.

Proficiency tests are required every 6 months to maintain EPLAB's certifications. Results from the test samples are sent to FDOH for regulation compliance and compared to results from other laboratories nationwide. Ms. Lavoie takes pride in all her staff passing the required proficiency tests within two standard deviations of the national average of all laboratories using the County's testing vendor.

Laboratory equipment is tested for accuracy in accordance with the Quality Control Manual. Samples are arranged efficiently for analysis by batches to reduce the numbers of blanks, calibration standards, and quality control samples needed per analysis. During FY 2019, the laboratory obtained certification for Ammonia-Nitrogen by EPA Method 350.1 (November 2018), Ammonia-Nitrogen by Standard Method (SM) 4500-NH3 D-2011 (September 2018), Nitrate-Nitrogen, Nitrite-Nitrogen, and Total Nitrate-Nitrite by SM 4500-NO3-H/SM 4500-NO2-B (November 2018), and Sulfate by ASTM D516-11 (September 2018).

The laboratory staff continues to demonstrate their diligence in ensuring all laboratory data entries, chain-of-custody forms, bench sheets, etc., are correctly transferred to the final laboratory analysis report, which is used for reporting to regulatory agencies.

Quality control is a high priority at EPLAB. Electronic entry of data at the laboratory station or output of an automatic analyzer directly to report forms has eliminated one source of potential errors. Quality assurance by a responsible person-in-charge is required to check hand-entered data entries. All data is reviewed and approved by the Laboratory Manager or QAS before being released to the client or FDEP.

Organization of data in an electronic form would allow direct input into FDEP forms, which would eliminate another source of data entry error. Currently, FDEP water quality forms are not compatible with LIMS. The FDEP forms are expected to be updated soon.

EPLAB sends some samples to outside laboratories that are certified to perform tests that EPLAB is not certified to perform. Copies of FDOH certifications for the outside laboratories are maintained by the QAS. Laboratory results from the outside laboratories are received, reviewed, and forwarded to the WTP and WRF Chief Operators for use in compliance reporting.

6.1.4 Record Keeping

The Quality Assurance Manual and SOPs are kept in a neat and organized manner and are easily accessible to all laboratory personnel. Safety Data Sheets (SDSs) required by the Hazard Communication Standard (29 CFR 1910.1200(g)) are available for all chemicals used

in the laboratory. Personnel records including documentation of training and IDOC/CDOC are maintained by the Laboratory Manager and QAS. All sample data are cross-referenced to sampling information, standards and reagent information, and analysis logbooks using Chain-of-Custody and the assigned unique sample ID. Electronic data are backed up daily, and historical data are archived on an external hard-drive. Paper and electronic records are well maintained to meet regulatory requirements. Sampling schedules for each facility are clearly posted for staff to review, and all upcoming special sampling events (e.g., Annual Effluent Analysis, Cryptosporidium, and Giardia) are clearly posted with their due dates.

6.1.5 Certification Compliance Schedule

- The biannual FDOH review was conducted in October 2018. The next FDOH assessment is scheduled for October 2020.
- Proficiency tests occur every 6 months. The last tests were conducted in September 2019. The next set of proficiency testing is scheduled for March 2020.
- The 2019 Annual Management Review was submitted on January 13, 2020, as required by the TNI Standards.

6.1.6 Review of Previous Report Recommendations

Table 6-2 CCU EPLAB 2018 Recommendations and Status

Recommendation:	Continue implementation of the LIMS.
Progress:	*Although some progress has been made in the LIMS implementation, time constraints on laboratory personnel due to sample load as well as instrument integration issues appear to have slowed progress.*
Recommendation:	Continue to expand the use of the LIMS within its capabilities, including the use of bar codes to track samples from collection to results posting.
Progress:	*Ongoing.*
Recommendation:	Educate sampling personnel on the need for accuracy in use of collection bottles, sample storage, and delivery to the laboratory.
Progress:	*Ongoing.*
Recommendation:	Hire an Analytical/Quality Assurance Specialist or Quality Assurance Officer to help the EPLAB remain in compliance.
Progress:	*Elizabeth Robling was promoted to Laboratory Quality Assurance Specialist in August 2019.*
Recommendation:	Evaluate staffing requirements and ability to provide additional sampling support to Operations staff.
Progress:	*Ongoing.*
Recommendation:	Recommend seeking certification for potable water Total Dissolved Solids (TDS) and Sulfate.
Progress:	*Ongoing. May not be sufficient sample load to warrant these certifications for this matrix.*

6.1.7 RECOMMENDATIONS

Table 6-3 CCU EPLAB 2019 Recommendations

Recommendation:	Continue implementation of the LIMS system. Evaluate hiring IT support that can work exclusively on the set-up and implementation of the LIMS or purchase a service package from the vendor to do the set-up of laboratory-specific forms and reports with remote installation.
Recommendation:	Continue working with sampling personnel on sampling protocols; in particular, sample labeling in the field, correct completion of chain-of-custody information, and sample submittal.
Recommendation:	Evaluate staffing requirements and ability to provide sampling services. The Laboratory Manager has indicated that the EPLAB may be taking over field sampling services since current field samplers are changing departments and duties and will no longer be available to collect and/or transport samples. This includes spill sampling, water-quality sampling, groundwater sampling, surface water sampling, miscellaneous sampling, and sample transport. Current laboratory staffing appears to be appropriate for the expected analytical workload for the 2020 fiscal year. Adding sampling services may require at least one additional EPLAB staff member.

6.2 WASTEWATER PRETREATMENT COMPLIANCE

CCU's Pretreatment section is responsible for the following:

- Transported Waste Receiving Program.
- Restaurant Grease Interceptor Inspection Program.
- Investigation of unauthorized discharges to the wastewater system.

6.2.1 TRANSPORTED WASTE RECEIVING PROGRAM

CCU is proud of the Waste Receiving Program, which provides an environmentally safe disposal option for septic waste, reducing land application and environmental impacts. Located at the East Port WRF, the septage receiving station (SRS) combines the hauled waste with plant influent to achieve RCW-quality effluent and beneficial reuse of biosolids. Once on site, septage haulers enter a code to activate the SRS and then another code to identify their hauled septage as either In-County or Out-of-County septage for billing purposes.

In FY 2019, the SRS hours of operation were from 7:00 a.m. to 4:30 p.m., Monday through Friday, which allows CCU staff to monitor operations. This approach prolongs the life of the equipment by ensuring compliance with disposal requirements and eliminating mixed loads that damage equipment. In FY 2019, the program accepted 7,670,994 gallons from 41 permitted haulers.

6.2.2 RESTAURANT GREASE INTERCEPTOR INSPECTION PROGRAM

This program helps prevent sanitary sewer overflows in the CCU sanitary sewer collection system by removing fat, oil, and grease (FOG) at the source. Program staff perform spot inspections and monitor grease interceptors at more than 240 restaurants and other food-preparation facilities County-wide to maintain compliance with the required pump-out schedule (e.g., 30, 60, 90 days) and other required maintenance. The focus has been on older

buildings and facilities that might have inadequate grease interceptors. Plans for new restaurants and other food preparation facilities are reviewed by CCU's Engineering Services Division for adherence to County specifications. This coordination with the Building Department has made the program more efficient. In FY 2019, 1,236 inspections were conducted, and three Notices of Violation were issued for non-compliance.

Through a partnership with Liquid Environmental Solutions (LES), the FOG is transformed into bio-diesel and other beneficial byproducts. LES receives restaurant grease directly from haulers and partially processes it for recycle use at a facility on the East Port WRF site. FOG is not treated through the East Port WRF process.

6.2.3 Investigation of Unauthorized Discharges

Investigation and prevention of unauthorized discharges are important for protecting the treatment capabilities of WRFs and the environment. These unauthorized discharges are pollutants that enter the municipal waste stream and have an adverse effect on the treatment process. Fortunately, no significant or categorical users are in the CCU collection system, eliminating the need for a full Industrial Pretreatment Program. When plant Operations staff report issues pertaining to the treatment process at any WRF, pretreatment staff begin investigating by sampling upstream lift stations and manholes, reviewing activities from local connections, and working closely with lift station crews and plant personnel. The goal is to determine the source of the illegal discharge, take steps to eliminate the problem up to and including fines, and return the plant to normal operations.

6.3 Wastewater Biosolids Transport, Processing, and Disposal

Partially digested biosolids from CCU's four WRFs are processed at the East Port WRF biosolids management and processing facility.

CCU owns two 6,000-gallon tankers for biosolids transportation from the West Port, Rotonda, and Burnt Store WRFs. The biosolids are discharged into a 2.05-MG aerated tank for partial stabilization and decant thickening before dewatering. Biosolids dewatering is accomplished by two 2-meter-wide belt filter presses (BFPs) near the holding tank. The biosolids are dewatered to approximately 17-percent Total Solids and hauled to the compost facility at the Charlotte County Zemel Road Landfill. The dewatered biosolids are mixed with chipped yard waste and composted to Class A for further use as an organic amendment for sandy soil enhancement and material for landfill final cover.

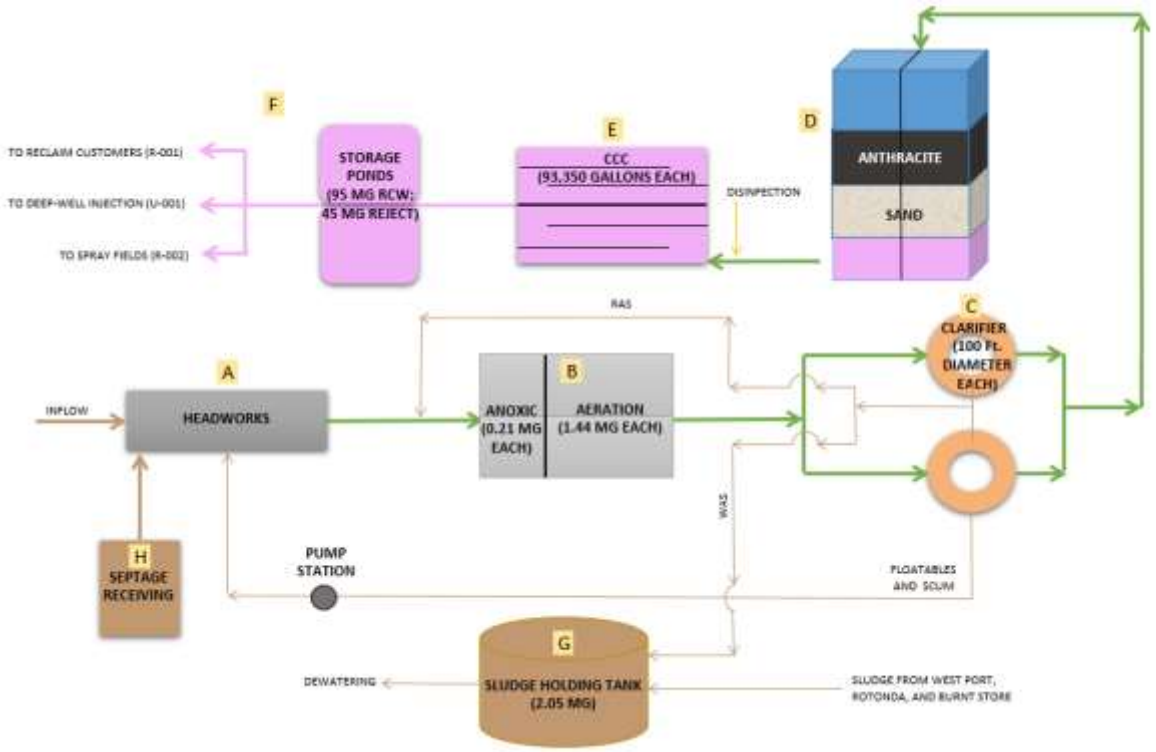
6.4 EAST PORT WRF

The East Port WRF is at 3100 Loveland Boulevard, Port Charlotte, Florida, and was acquired as part of the 1991 General Development Utilities purchase. The WRF began its current operations in 1996 and has a current permitted operating capacity of 6.0 MGD AADF. East Port WRF uses an activated sludge process to treat domestic wastewater collected from the Mid County service area. Emergency power is provided by two diesel emergency generators in an on-site building with an Automatic Transfer Switch (ATS) to maintain operation of critical facilities.

This location also houses the NELAP-certified EPLAB. The WRF site includes 51 acres of conservation easement, with the remaining area consisting primarily of woodlands. The site is home to more than 20 varieties of birds, including great egrets, osprey, and Carolina wrens. Many other wildlife species including gopher tortoises, scrub jays, bobcats, armadillos, cottontails, and alligators make the East Port WRF their home.

The East Port WRF is permitted to distribute reclaimed-quality water to unrestricted-public-access reuse sites, inject into a deep well injection system, and apply to a slow-rate restricted-access land application system. The WRF is classified as a Type I, Category II, Class A domestic wastewater treatment facility under FAC 62-699 and is required to meet Class III Reliability standards in accordance with FAC 62-600 and FAC 62-610. The restricted irrigation system consists of 187 acres on site using slow-rate irrigation (R-002 Spray Fields). About 45 acres of the spray field were abandoned in 2018 for use by the Charlotte County Sheriff Department. Figure 6-2 shows the East Port WRF process flow diagram. The key components of the East Port process are described in the following sections.

Figure 6-2 East Port WRF Process Flow Diagram



A) Headworks: Raw wastewater enters the WRF headworks structure where screening and grit removal take place. After screening, wastewater flows into one of the two vortex-type grit-removal units for grit separation. Compacted screening and separated grit are dewatered and discharged to dumpsters for disposal. Internal plant flows from the on-site pump station are introduced, including septage, biosolids dewatering system filtrate, tank and unit processes drain flows, and supernatant from the aerobic digesters.

B) Biological Treatment Using Modified Ludzack-Ettinger (MLE) Process: Wastewater from the headworks splits between two treatment trains. Each train includes an anoxic basin and oxidation ditch (aeration basin) for organics and nutrient removal. Mixers keep solids suspended and homogenous in the anoxic zones. Mechanical surface agitators keep the oxidation ditches aerated and maintain a channel velocity to keep mixed liquor in suspension. Internal recycle (IR) pumps send flow from the oxidation ditch (aeration basin) to the anoxic basins for Nitrogen removal.

C) Secondary Treatment: Flow from the biological treatment process splits between two clarifiers. These provide a passive environment for solids separation. The clarifiers are skimmed to remove floatables and scum before the clarifier effluent flows over a circumferential weir. Sludge pumps send settled solids from the secondary clarifiers to two locations: to the front of the anoxic basins as return-activated sludge (RAS) to replenish the microbial community and to the digesters as waste-activated sludge (WAS).

D) Tertiary Treatment – Filtration: Clarified water splits between two multi-media traveling bridge filters, containing sand and anthracite, to remove remaining

suspended solids. A metal canopy over the filters with an ultraviolet (UV) shade cloth inhibits algae growth and provides protection from sun exposure.

E) Tertiary Treatment – Disinfection: Filtered water splits between two chlorine contact chambers (CCCs) where liquid sodium hypochlorite is dosed for disinfection. CCC No. 1 is designated for RCW production that meets high-level disinfection requirements. CCC No. 2 is designated for disposal to restricted-access sites (e.g., Class I deep injection wells or spray fields) using unfiltered effluent from the secondary clarifiers that meet basic-level disinfection requirements. A UV-inhibiting net over the chamber reduces algae growth. Sodium hypochlorite is stored in two storage tanks with a total capacity of 6,000 gallons. A 5,000-gallon storage tank was installed in 2013, and a 1,000-gallon tank was installed in 2014. A non-reagent analyzer is used to adjust chlorine feed rates, and a non-reagent analyzer is used for chlorine residual compliance measurement.

F) Effluent RCW Storage and Disposal Facilities: Reclaimed-quality water is pumped directly to distribution to the reclaimed system. Water not meeting RCW standards flows to a separate reject pond. From there, reject water can be sent to the slow-rate restricted-access RCW spray fields or the two Class I injection wells (IW-1 and IW-2) with permitted capacities of 1,420 gpm (2.045 MGD) and 5,250 gpm (7.560 MGD), respectively.

G) Aerobic Digestion: WAS is pumped from the clarifiers to the 1.4-MG sludge holding tank where blowers provide aeration to aerobically digest the sludge before dewatering using two BFPs. The sludge transfer pumps that discharge to the dewatering units are operated by controls at the BFPs. Dewatered sludge is hauled to the Charlotte County Class I Landfill for disposal. The East Port WRF digester is permitted to accept waste sludge from the West Port, Rotonda, and Burnt Store WRFs. The County was authorized to convert one digester to an equalization tank as part of the planned modifications to increase the East port WRF capacity to 9.0 MGD AADF.

H) Septage Receiving Stations: The WRF has two stations – one for conventional septage and one for FOG from private septage tank haulers. The receiving station materials are screened and directly pumped to the WRF headworks. The station containing FOG is screened, collected, and stored in two holding tanks and converted to bio-diesel. Decant from these tanks is pumped to the headworks for treatment, and the remainder is treated by a rotating drum. The non-biodegradable waste is stored in a roll-off container and transported to the landfill for disposal.

6.4.1 Regulatory Considerations

The East Port WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permits governs plant operations:

- Plant Operating Permit (FL0040291) Expiration Date: September 6, 2022; includes a planned expansion from 6.0 MGD to 9.0 MGD.

- IW-1 Permit (44274-253-UO) Expiration Date: October 17, 2021
    - The mechanical integrity test (MIT) was performed on IW-1 in October 2019. The next MIT will be due by October 2024.
- IW-2 Permit (330486-002-UO/1M) Expiration Date: April 12, 2020
    - The MIT was performed on IW-2 in August 2015. The next MIT will be due by August 2020.

The expansion work included in the 2017 Plant Operating Permit renewal was divided into stages to address the needed improvements while allowing the schedule of the expansion to be determined by CCU based on projected service area growth:

- Stage 1 and 2 Improvements were completed in FY 2015 and addressed the headworks, biological treatment processes, tertiary treatment, sludge handling, and electrical systems.
- Stage 5 RCW Improvements were prioritized ahead of Stages 3 and 4 to enhance RCW storage and transmission capacity. Stage 5 design was completed in FY 2016, the work was bid in spring 2017, and construction completion was completed in FY 2019.
- Stage 3 and 4 Improvements were designed in 2014, including bid-ready specifications and drawings, and are scheduled for construction sometime between 2020 and 2024 depending on population growth. CCU has recently issued a request for proposals to evaluate the feasibility of sequentially upgrading the WRF from 6.0 MGD to 9.0 MGD and then to 12.0 MGD versus upgrading the WRF from 6.0 MGD to 12.0 MGD in one phase. Improvements include a new oxidation ditch flow splitter box; additional biological treatment train(s), secondary clarifier(s) with associated RAS and WAS pumps, effluent filters and CCCs, chemical dosing facilities, and biosolids storage; and possible improvements to convert the old aerated sludge-holding basins into a flow equalization (EQ) tank.

6.4.2 Wastewater Flows and Loads

The East Port WRF permitted capacity is 6.0 MGD AADF. In FY 2019, the AADF was 4.361 MGD, and the East Port WRF was operating at 73 percent of the plant permit capacity. The maximum monthly average flow of 6.528 MGD occurred in August 2019. The highest 3-month average daily flow (TMADF) of 5.388 MGD occurred in September 2019, which is 90 percent of the plant permitted capacity, demonstrating the influence of wet weather and I&I on flows to the facility. The plant permit capacity is based on AADF, so the facility remains in compliance with the plant permitted capacity of 6.0 MGD. Although the plant is currently operating at 73-percent rated capacity of 6.0 MGD AADF, the ongoing efforts and completed plant improvement design described above are prepared to increase the design capacity of the East Port WRF to 9.0 MGD, and an option to increase capacity to 12.0 MGD is being evaluated by CCU. Table 6-4 summarizes the influent flows as reported in the Discharge Monitoring Reports (DMRs).

Table 6-4 East Port WRF Influent Flows FY 2019

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max (MGD)	Monthly Min (MGD)	TMADF Percent Capacity (%)[1]
Oct-18	4.241	4.641	4.906	4.984	3.701	82
Nov-18	4.013	4.621	4.990	4.202	3.847	83
Dec-18	4.157	4.623	4.137	4.759	2.827	69
Jan-19	4.489	4.639	4.220	5.894	4.180	70
Feb-19	4.844	4.658	4.497	5.300	4.625	75
Mar-19	4.519	4.672	4.617	4.779	4.323	77
Apr-19	4.114	4.688	4.492	4.369	3.853	75
May-19	3.902	4.566	4.178	4.740	2.603	70
Jun-19	4.290	4.524	4.110	5.612	3.731	69
Jul-19	5.275	4.524	4.478	5.275	3.455	75
Aug-19	6.528	4.633	5.350	8.682	4.306	89
Sep-19	4.361	4.563	5.388	5.584	3.846	90

[1] Permitted plant capacity of 6.0 MGD.

At the end of FY 2019, the average annual influent load for 5-day Carbonaceous Biochemical Oxygen Demand (CBOD5) was 144 mg/L and for Total Suspended Solids (TSS) was 176 mg/L. The maximum monthly average for CBOD5 was 177 mg/L in December 2018 and for TSS was 215 mg/L in February 2019, which correspond with seasonal residents and the dry season. Table 6-5 summarizes the wastewater characteristics of the East Port WRF influent as reported in the DMRs.

Table 6-5 East Port WRF Influent Water Quality FY 2019

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-18	142.0	131.0	147.0	177.0
Nov-18	170.0	135.0	160.0	177.0
Dec-18	177.0	138.0	174.0	175.0
Jan-19	170.0	137.0	199.0	167.0
Feb-19	159.0	139.0	215.0	176.0
Mar-19	163.0	138.0	200.0	168.0
Apr-19	158.0	139.0	186.0	167.0
May-19	145.0	140.0	181.0	166.0
Jun-19	139.0	142.0	172.0	167.0
Jul-19	104.0	142.0	154.0	168.0
Aug-19	84.0	140.0	189.0	170.0
Sep-19	138.5	144.0	205.0	176.0

6.4.3 Treatment Objectives and Effluent Quality

The East Port WRF is permitted to treat wastewater to two effluent standards: one for disposal to the deep injection well and the on-site sprayfields (CBOD5 = 20 mg/L, TSS = 20 mg/L), requiring basic disinfection; and the other for unrestricted public-access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

Table 6-6 and Table 6-7 summarize the effluent water quality, as measured at the discharge of the two CCCs for EP 31 (no filtration) and EP 32 (filtration). For both locations, the Chlorine residual levels must be achieved at the discharge of the CCC. A review of the FY 2019 data shows that the East Port WRF effluent quality was well within the permit limits for both standards.

Table 6-6 East Port Effluent Water Quality FY 2019 (EP 31 Sample Location)

Month	CBOD		TSS		Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (No./100 mL)
Oct-18	No flow	No Flow	No flow	No Flow	No flow
Nov-18	No flow	No Flow	No flow	No Flow	No flow
Dec-18	No flow	No Flow	No flow	No Flow	No flow
Jan-19	No flow	No Flow	No flow	No Flow	No flow
Feb-19	No flow	6.29	No flow	1.17	No flow
Mar-19	2.53	No Flow	3.40	No Flow	5.0
Apr-19	No flow	No Flow	No flow	No Flow	No flow
May-19	2.24	No Flow	2.13	No Flow	1.0
Jun-19	No flow	No Flow	No flow	No Flow	No flow
Jul-19	No flow	No Flow	No flow	No Flow	No flow
Aug-19	3.03	No Flow	1.50	No Flow	1.0
Sep-19	No flow	No Flow	No flow	No Flow	No flow

Note: No./100 mL = number per 100 milliliters.

Table 6-7 East Port WRF Effluent Water Quality FY 2019 (EP 32 Sample Location)

Month	CBOD5			TSS			Fecal Monthly Avg. (No./100 mL)
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	
Oct-18	4.22	2.05	97.0	0.84	0.45	99.4	1.0
Nov-18	2.77	2.06	98.4	0.40	0.41	99.8	1.0
Dec-18	2.03	2.09	98.9	0.50	0.64	99.7	1.0
Jan-19	2.50	2.20	98.5	0.67	0.33	99.7	1.0
Feb-19	3.03	4.74	98.1	0.31	0.67	99.9	1.1
Mar-19	2.25	3.81	98.6	0.80	0.57	99.6	1.7
Apr-19	2.30	2.65	98.5	1.09	0.22	99.4	1.0
May-19	2.00	2.00	98.6	0.83	0.38	99.5	1.1
Jun-19	2.00	5.07	98.6	0.32	0.48	99.8	1.0
Jul-19	<2.00	4.22	98.1	0.17	0.84	99.9	1.0
Aug-19	<2.00	2.77	97.6	0.32	0.40	99.8	1.1
Sep-19	<2.00	2.03	98.6	0.13	0.50	99.9	1.0

Table 6-8 East Port WRF Residual Handling Mass Balance During FY 2019

Month	Received from Other WRFs, (gallons) (A)	Volume Wasted (gallons) (B)	Total Volume In (gallons) (C) = (A+B)	Volume Decanted (gallons) (D)	Volume Pressed (gallons) (E)	Total Volume Out (gallons) (F) = (D+E)	Net (gallons)* (G)=(F-C)
Oct-18	182,495	2,518,000	2,700,495	788,674	2,553,826	3,342,348	641,853
Nov-18	205,289	3,013,000	3,298,289	816,941	1,794,723	2,611,669	-686,620
Dec-18	249,763	3,315,000	3,564,763	709,587	1,598,879	2,308,466	-1,256,297
Jan-19	294,612	3,548,000	3,842,612	1,211,765	2,800,187	4,011,952	169,340
Feb-19	138,068	3,780,000	3,918,068	1,722,162	3,678,538	5,400,700	1,482,632
Mar-19	335,900	3,820,000	4,155,900	1,071,059	2,944,712	4,015,771	-140,129
Apr-19	365,311	2,720,000	3,085,311	1,009,527	2,154,274	3,163,801	78,490
May-19	256,185	3,340,000	3,596,185	639,410	3,104,680	3,744,080	147,895
Jun-19	263,026	3,080,000	3,343,026	1,108,529	4,496,879	5,605,408	2,262,382
Jul-19	188,872	3,100,000	3,288,872	1,299,118	2,320,526	3,619,644	330,772
Aug-19	210,702	3,100,000	3,310,702	658,825	1,832,459	2,491,284	-819,418
Sep-19	184,610	2,910,000	3,094,610	937,429	2,186,058	3,123,487	28,877

*Values in red are negative numbers that indicate over capacity.

6.4.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on February 6, 2020. Jones Edmunds personnel met with Henri Lafenetre, Lead Plant Operator, to review plant conditions, operations, and records. Access to the facility is through a secure gate in a fence that surrounds the wastewater plant and on-site irrigation and deep injection well areas. In general, the plant site and irrigation fields are well maintained. Mowing of spray fields and brush clearing is nearly continual.

The operations building includes the office of the Treatment Facilities Division Manager, the EPLAB, the Backflow and Reclaimed Water Coordinator, a conference room, administrative space, operations room, break room, and offices for Operations staff and other related staff.

General observations noted during the site visit include:

- All valves appear to be regularly exercised.
- Process piping is painted and clearly marked.
- All compliance meters are being calibrated every 6 months, and calibration tags are up to date.

Required documents maintained on site include:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium).
- Reports required to complete the last permit application (in process).
- Certification of the EPLAB.
- Sampling plan.
- Groundwater monitoring plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- Spill protocol and record of spills.

The Cross-Connection and Backflow Prevention Manuals are kept at the Reclaimed Water Coordinator's office at the East Port WRF.

6.4.4.1 Headworks

The overall condition of the headworks is good.

The upper concrete deck of the headworks was painted due to years of hydrogen sulfide exposure. A thorough cleaning and epoxy coating of the deck was completed in FY 2016 and appears to be providing adequate coverage of the area. In FY 2017, Screen No. 1 was repaired, and grit pumps were rebuilt.

The old grease dewatering building is now used for bulk storage. The screening and grit bagging system that was attached to the chutes that discharge into the dumpsters has significantly reduced the water on the floor, flies, and odors that usually accompany headworks' dumpster areas. The floor is clean and dry.

The two septage receiving stations require constant maintenance due to the high number of septage haulers that use the facilities and the nature of the waste. The septage receiving units are aging and need to be included in future capital replacement plans. Replacement of moving parts on Septage Receiving Unit No. 1 was completed in FY 2016.

The septage receiving units and the adjacent driveway area collect grit and spillage of septic waste. A hose is used by the haulers to clean the area. The wash water is collected in the plant sewer system and pumped to the headworks for treatment. A steam cleaner is used by CCU WRF staff for cleaning this area periodically.

6.4.4.2 Flow Equalization

The East Port WRF does not have flow EQ storage for peak hour influent flows and loads, but this should be evaluated and/or included in the future plant expansion.

6.4.4.3 Biological Treatment Train – MLE Process

The overall condition of the MLE process is good following the Stage 1 and 2 Improvements in 2015 and 2016, respectively. The concrete is in good shape for its age and showing very little cracking or spalling. The anoxic zones are thoroughly mixed by four submerged mixers. A baffle wall was installed in both anoxic tanks to minimize short-circuiting and improve performance.

Four VFD-controlled surface aerators are in operation in the oxidation ditches. The aerator speed is adjusted based on the dissolved oxygen (DO) probe at the end of the ditches. The aerators are well maintained. The DO control system helps the WRF lower its power consumption and improve the denitrification process by minimizing DO carry-over to the anoxic zone. Six VFD-controlled IR pumps were replaced in the Stage 1 and 2 Improvements. These pumps are controlled by the SCADA based on operators' settings. The IR pumps are well maintained and in good working order.

The five RAS pumps are VFD controlled. The two WAS pumps are controlled by operators' settings in the SCADA system. Both pumping systems are well maintained and in good working order.

6.4.4.4 Clarifiers

In 2016 the two clarifiers were rehabilitated as part of the Stage 1 and 2 upgrades, which included replacement of the clarifier scraper mechanisms. The overall condition of the sedimentation process is well maintained and clean, and the clarifiers are producing a high-quality effluent.

The existing scum ejectors are out of service and should be replaced with a cost-effective scum-removal system as part of future plant expansion.

A "weir washer" system was installed on Clarifier No. 1 and Clarifier No. 2 in 2017 and 2018, respectively. The weir washers eliminate the need to have O&M staff enter the clarifier effluent launders to remove algae, eliminating associated safety concerns. The weir washers do an excellent job keeping the clarifier effluent weirs and troughs clean. An excellent-quality effluent is being produced by both clarifiers.

6.4.4.5 Filtration

The overall condition of the effluent filtration system is excellent and well maintained. Filters were rehabilitated as part of the Stage 1 and 2 Improvements.

The two-traveling bridge sand/anthracite filters were both in operation at the time of the site visit. Turbidity results indicate that the filters are producing an excellent effluent for unrestricted public-access reuse water. Additional anthracite is scheduled to be added during FY 2020.

A galvanized metal frame was installed over the filters in the Stage 1 and 2 Improvements to support a fabric roof constructed of UV shade cloth. The cloth roof reduces algae growth and lowers the temperatures within the travelling bridge filters to produce a higher quality effluent and reduce the amount of chlorine cleaning needed to remove algae from the filters.

6.4.4.6 Disinfection

The CCCs are in good condition, well maintained, and operated to produce RCW for unrestricted public-access reuse. A UV shade cloth was recently installed over the CCCs to reduce the loss of chlorine residual in the tanks. The previous UV shade cloth was removed by strong winds during Hurricane Irma in September 2017. Liquid Sodium Hypochlorite (12.5 percent) is used for disinfection to maintain a residual of ≥1.0 mg/L to meet unrestricted public-access reuse standards. In 2018, the old liquid reagent chlorine residual analyzer was replaced with a non-reagent analyzer to control chlorine feed rates. Another non-reagent analyzer is used for chlorine residual compliance measurement. The new skid-mounted chlorine feed system is encased in a clear plastic enclosure to control the spray of liquid chlorine for safety purposes. The two sodium hypochlorite storage tanks are well kept and meet regulatory requirements. The overall chemical feed systems and instrumentation are well operated and maintained to meet regulatory permit requirements.

6.4.4.7 Biosolids Handling Facilities

The overall condition of the biosolids storage/digestion tanks, associated piping, truck off-loading facilities, decant supernatant pumping, and BFP feed pumps at the new biosolids handling and storage tanks constructed under the Stage 1 and 2 Improvements are good.

The facilities are well maintained and operated and receive waste biosolids from East Port and the three other CCU WRFs. CCU has two tankers used for hauling liquid sludge from the other WRFs and off-loading into the aerobic sludge-holding tanks before dewatering.

The Lead Operator noted that in 2019, the capacity of the aerobic digesters to handle biosolids from all four facilities is starting to become an issue where sufficient time to allow tank decanting is limited due to the increased sludge flows. As illustrated in Table 6-8, the total processed biosolids at the East Port WRF was more than available digesters' capacity during March 2019 and August 2019. This limited capacity led to holding back on hauling of biosolids from the other three facilities, which negatively impacted their performance.

The Lead Operator also indicated that the aeration and decant equipment associated with the aerobic digesters are not functioning properly and require extensive O&M effort for up to 16 hours a day including weekends. One of the blowers is down and being rebuilt. In addition, the BFP requires constant attention and experiences a lot of down time, reducing the dewatering capacity of the WRF. Installing a third BFP is recommended to add more dewatering capacity and allow for refurbishing of the older units.

Improvements to the feed piping to the two 2-m BFPs were completed under the Stage 1 and 2 Improvements. The BFPs run 5 days per week, 8 hours per day to dewater the CCU's biosolids. Dewatered biosolids are hauled to the County's Zemel Road Landfill Compost Facility for composting.

6.4.4.8 Reject Storage and Alternate Disposal

Excess RCW or effluent not meeting RCW standards (reject water) is disposed of through two deep injection wells and a restricted-access, on-site slow-rate irrigation system (on-site sprayfield). The 45-MG effluent storage pond is used to store effluent before injection well and/or sprayfield disposal. The 45-MG pond liner is in good condition.

Effluent transfer pumps are well maintained but are showing signs that they need to be repainted. The irrigation pump station is on the east bank of the 45-MG pond and pumps water from the pond to the deep injection wells or the sprayfield.

Both deep injection wells are well maintained and in good working order. All valves are exercised regularly. All associated meters are calibrated semi-annually and are up to date.

6.4.4.9 RCW Storage and Distribution

The East Port WRF is part of a Master Reuse System Permit that includes Rotonda and West Port WRFs. Chapter 7 discusses the overall RCW system in detail.

The RCW HSP station has three VFD-controlled 100-HP vertical turbine pumps that pump RCW from a wet well adjacent to CCC No. 1 into the RCW distribution system. The RCW service pumps at the end of the CCC clearwell are well maintained and operated. The speed of the RCW HSPs is controlled by system pressure (RCW demand) and high and low wet well levels. The pressure set point at the pumps is 70 psi, which helps maintain a distribution system pressure of at least 60 psi. The VFD controls allow the pumps to operate at high speeds to meet distribution system demand and at low speeds to provide non-potable water on site for O&M purposes. The total RCW flows to the distribution system can vary from 400 to 700 gpm. Each HSP is equipped with 120-micron filters for polishing RCW before entering the distribution system. These filters help prevent larger particles that may clog sprinkler systems from entering the distribution system from the RCW storage pond.

In FY 2016/2017 the 95-MG pond was drained and cleaned, and the pond liner repaired and modified by CCU Staff for conversion to a 95-MG on-site RCW storage pond as part of the Stage 5 RCW Improvements. The Stage 5 RCW Improvements included a new automatically cleaned intake screen in the 95-MGD storage pond that provides the intake of RCW from the pond to the new 9.0-MGD HSP station.

6.4.4.10 Wet Weather Storage

The East Port WRF 95-MG and 45-MG storage ponds have a combined capacity of 140 MG to provide effluent storage before use or disposal. Sections 6.4.4.8 and 6.4.4.9 provide details on the ponds.

6.4.4.11 Electrical Components and Circuitry

The East Port WRF contains one 1,250-kW generator serving the primary WRF as standby power. An additional 1,500-kW generator was installed as part of the Stage 5 RCW Improvements. One standby generator serving the administration building was relocated from another facility in used condition. The facility has five primary electrical switchgear locations – the administration building, the generator/MCC building, the new primary incoming switchgear building, new electrical building #2, and the blower building. The administration building has a separate service drop from the power company. The rest of the WRF is served through two new parallel transformers serving the incoming switchgear building recently constructed. The administration building, the incoming switchgear building, and electrical building #2 were all constructed within the last 8 years. The generator/MCC building had upgrades and improvements to existing original equipment and generators. The blower building has been in service for several years.

The incoming service and distribution transformers at the administration building are relatively new and in excellent condition with no obvious signs of concern. The standby generator functions properly and is in good condition. Since it was relocated from another location, it does show signs of wear and deterioration but with no major issues to interfere with its function. The distribution switchgear of the administration building was in excellent condition with minor issues (see below). Overall, the electrical equipment is in good functioning condition based on information from Operations staff.

The incoming switchgear building was constructed only a few years ago. As such, all equipment is in excellent condition (see photograph at left). The facility is fed from two power company transformers, also newly installed. A thermographic survey of the facility showed no anomalies or issues.

The generator/MCC building is an existing building with older equipment and new equipment installed under Stage 5, and Stage 1 & 2 Improvements. The existing switchgear appears to be in good condition. The switchgear includes complete arc flash labeling required by NFPA 70E. The existing 1,250-kW generator is in overall good condition, but the Chief Operator reported that it requires upgrades and an overhaul. The generator set shows minor points of fluids seepage.

The distribution switchgear was in excellent condition with minor issues. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff.

6.4.5 Operations

The East Port WRF produces a high-quality RCW by using biological nutrient removal with an MLE process, clarification, sand filtration, and high-rate chlorine disinfection. The WRF can be operated to produce secondary effluent without filtration, but this alternative operation is only used for maintenance purposes and excess and/or unfiltered effluent is diverted to storage ponds for on-site spray irrigation or disposal in the two on-site deep IWs.

The East Port WRF accepts septic tank waste through two septage pretreatment units. This service provides a necessary waste treatment component for local septage hauling companies that service locations outside the CCU collection system service area.

The East Port WRF accepts and treats sludge from East Port, West Port, Rotonda, and Burnt Store WRFs. However, the East Port WRF sludge holding capacity has experienced issues in 2019 when receiving increased volume of waste sludge from all four WRFs as illustrated by the negative net volume of sludge in Table 6-8. The limited sludge storage capacity resulted in reducing the frequency of sludge hauling trips to the East Port WRF from the other facilities which reduced wasting volumes and frequency and, as a result, reduced performance. As part of the undergoing planned East Port WRF Expansion, the sludge storage capacity at the East Port WRF will be increased to handle projected volumes of sludge from the East Port WRF and the other facilities. Sludge thickening to 4 to 5 % total solids (TS) can be evaluated at the other facilities to reduce waste sludge volumes (reduce volume be a factor of 3), reduce number of hauling events and reduce required volume at the East Port WRF sludge aerobic digester. Consolidating the sludge digestion in one location provides an economy of scale and allows for more efficient operations, and consideration of sludge thickening from 1.5% TS to 5% TS to reduce hauling O&M Costs.

The East Port WRF is staffed 24 hours per day, 7 days a week by licensed operators who also monitor the other WRFs within the CCU system 24 hours per day. Alarms are evaluated, and operators or maintenance personnel are dispatched to take corrective action, if necessary.

6.4.6 MAINTENANCE

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

In FY 2019 the Stage 5 RCW Improvements at the East Port WRF was completed. Stage 5 RCW Improvements will maximize RCW production, storage, and distribution to customers within the Mid and West County Master Reuse Systems. Design of the East Port WRF Expansion improvements began in FY 2019 and will complete the design plans for an increased plant capacity from 6.0 to 12.0 MGD, and provide Bid Documents for an expansion to 9.0 MGD.

6.4.7 REVIEW OF PREVIOUS REPORT RECOMMENDATIONS

Stages 1 and 2 of the East Port WRF upgrade were completed in FY 2016. Stage 5 RCW Improvements were designed and bid for construction in FY 2017. Construction of Stage 5 finished in 2019. Other improvements leading to a rerating of the plant to 12.0 MGD are in design and are scheduled to be constructed once growth and capacity issues dictate. The expansion to 9.0 MGD which is currently expected for FY 2021 to FY 2024 and the future expansion to 12.0 MGD in expected in FY 2030 dependent on growth and development.

Table 6-9 East Port WRF 2018 Recommendations and Status

Recommendation:	Complete construction of the Stage 5 RCW Improvements to the effluent storage ponds, HSP station, and 1,500-kW stand-by power generator.
Progress:	*Completed.*
Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Progress:	*Upgrades were designed as part of Stage 3 and 4 Improvements. Construction activities will be included in the East Port WRF Expansion project.*
Recommendation:	Work with the East Port WRF Expansion Design Engineer to prepare the expansion from 6.0 MGD to 12.0 MGD.
Progress:	*In Progress.*
Recommendation:	Evaluate the structural integrity of the old sludge digester to serve as an influent EQ tank.
Progress:	*Not started. This work will be evaluated as part of the East Port WRF Expansion Preliminary Engineering.*
Recommendation:	Replace septage receiving pre-treatment units when repair is no longer cost effective and modify to allow septage treatment in aerated sludge holding tank and/or pump to headworks.
Progress:	*Not started. This work will be evaluated as part of the East Port WRF Expansion Preliminary Engineering.*

6.4.8 SUMMARY AND RECOMMENDATIONS

The wastewater permit for the East Port WRF issued by FDEP in FY 2017 authorizes a planned expansion from 6.0 MGD to 9.0 MGD. The new East Port WRF Expansion plans and

specifications will be designed for a future capacity of 12.0 MGD. The date for the complete expansion will be determined by CCU based on actual service area growth.

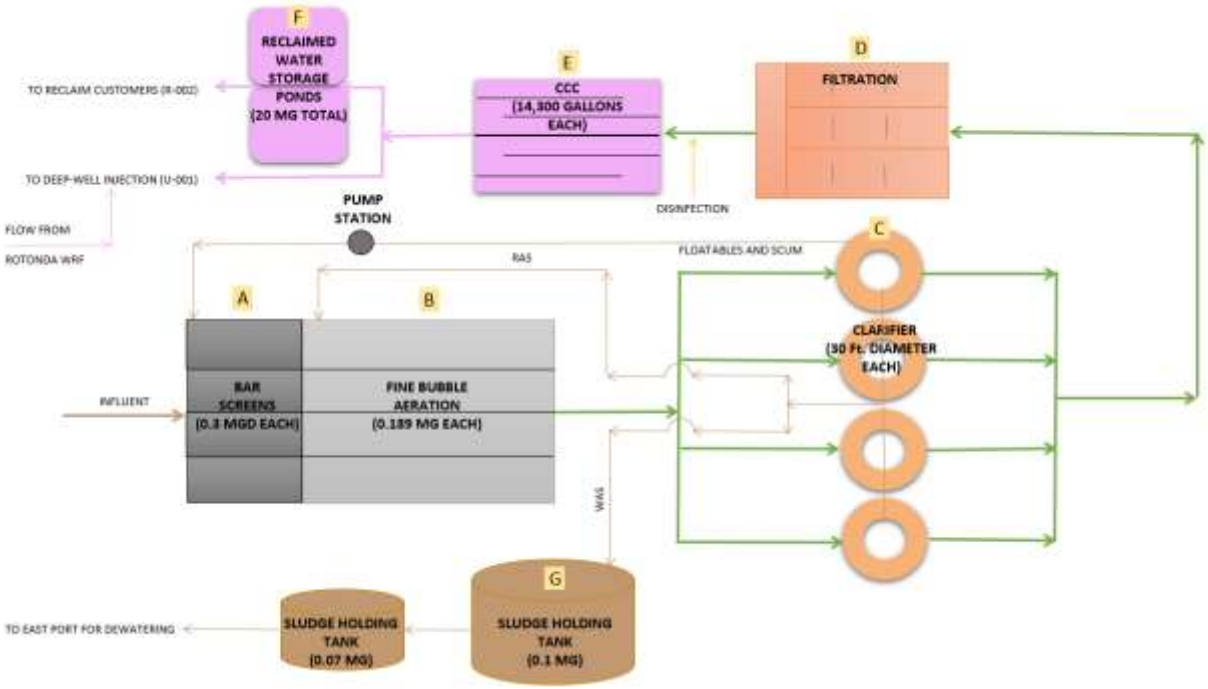
Table 6-10 East Port WRF 2019 Recommendations

Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Recommendation:	Evaluate the structural integrity of the digester walkways and the digester's ability to serve as an influent EQ tank.
Recommendation:	Add additional biosolids handling capacity (including aerobic digesters, BFP, and ancillary equipment) as part of the plant upgrade.
Recommendation:	Evaluate cost-effective disposal alternatives for dewatered biosolids other than hauling off to Synagro and the landfill as part of the plant upgrade.
Recommendation:	Replace septage receiving pre-treatment units when repair is no longer cost effective and modify to allow septage treatment in aerated sludge holding tank and/or pump to headworks.
Recommendation:	Evaluate the addition of a fourth sludge bay to the 2.05 MG aerated storage tank.
Recommendation:	Evaluate the addition of a biosolids dewatering press at East Port WRF.

6.5 WEST PORT WRF

The West Port WRF is in the Gulf Cove area of West Charlotte County at 15005 Cattle Dock Point Road, Port Charlotte, Florida. This WRF was upgraded in 2005 and has a current permitted capacity of 1.20 MGD AADF. The West Port WRF uses an activated sludge process to treat domestic wastewater collected from part of the West County service area. The West Port WRF is permitted to distribute reclaimed-quality water to unrestricted public-access reuse sites and inject into a deep well injection system. Two diesel-powered emergency generators with ATSs provide standby power to the WRF. Figure 6-3 shows the West Port WRF process flow diagram.

Figure 6-3 West Port WRF Process Flow Diagram



A) Screening: Raw wastewater from the West County service area collection/transmission system is screened to remove large inorganic material by four rotary influent screens. A manual bar screen is also available for bypass purposes. Screenings are collected in a dumpster and hauled to the landfill for disposal. Internal plant flows from the on-site pump station are introduced at the bar screens.

B) Biological Treatment for Organics Removal: Screened wastewater is split equally into four aeration basins where aeration and microorganisms are used to treat

biodegradable material. Blowers aerate the wastewater through fine-bubble diffusers in each aeration basin.

C) Secondary Treatment: Flow from the biological treatment process is split between four secondary clarifiers for solids separation. The clarifiers are skimmed to remove floatables and scum before the effluent flows over a circumferential weir. Telescoping valves adjust sludge withdrawal from the bottom of each clarifier and convey it to the sludge return chamber. The sludge exits the return chamber where it is conveyed to the front of the aeration basins as RAS to replenish the microbial community or to the sludge holding/aerobic digestion tanks as WAS.

D) Tertiary Treatment – Filtration: Clarified water enters three automatic cleaning, disc-type cloth media filters for tertiary filtration to remove the remaining solids. The filters are housed in individual steel tanks.

E) Tertiary Treatment – Disinfection: The filtered water enters the CCCs where liquid Sodium Hypochlorite is dosed for disinfection. Only one chamber is currently in use.

F) Effluent Reclaimed and Disposal Facilities: Reclaimed-quality water is pumped to two lined storage ponds for storage and distribution to the reclaimed system. Excess RCW and water not meeting reclaimed standards are pumped to the Class I injection well by three equally sized pumps. The West Port WRF and Rotonda WRF RCW systems are interconnected, allowing Rotonda WRF to dispose of excess RCW.

G) Aerobic Digestion: WAS is pumped from the clarifiers to the sludge holding/aerobic digestion tanks where blowers provide aeration through coarse-bubble diffusers. The sludge is gravity thickened and decanted before being hauled to the East Port WRF for aerobic digestion, dewatering, and transport to the Charlotte County Zemel Road Landfill where it is processed into compost available for sale as a soil conditioner.

6.5.1 Regulatory Considerations

The West Port WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permits govern plant operations:

- Plant Operating Permit (FLA014048), Expiration Date: February 24, 2021.
- Deep Well (IW-1) Permit (0330461-001-UO/1M), Expiration Date: April 12, 2020:
  - The MIT was performed on IW-1 in August 2015. The next MIT will be due by August 2020.

6.5.2 Wastewater Flows and Loads

The West Port WRF permitted capacity is 1.20 MGD AADF. At the end of FY 2019, the AADF was 0.686 MGD, and the West Port WRF is operating at 57 percent of the plant permit capacity. The maximum monthly average flow of 0.799 MGD occurred in February 2019. The highest TMADF of 0.769 MGD occurred in March 2019, which is 64 percent of the plant permit capacity, demonstrating the influence of wet weather and I&I to the facility. Table 6-11 summarizes influent flows as reported in the DMRs.

Table 6-11 West Port WRF Influent Flows in FY 2019

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	Monthly Min Day (MGD)	TMADF Percent Capacity (%)
Oct-18	0.630	0.684	0.661	0.665	0.602	55
Nov-18	0.650	0.684	0.655	0.707	0.621	55
Dec-18	0.670	0.685	0.650	0.780	0.520	54
Jan-19	0.738	0.688	0.686	0.929	0.680	57
Feb-19	0.799	0.692	0.736	0.850	0.770	61
Mar-19	0.771	0.695	0.769	0.834	0.711	64
Apr-19	0.681	0.698	0.750	0.748	0.581	63
May-19	0.619	0.692	0.690	0.707	0.561	58
Jun-19	0.594	0.684	0.631	0.642	0.562	53
Jul-19	0.679	0.682	0.631	0.812	0.603	53
Aug-19	0.759	0.690	0.677	0.891	0.662	56
Sep-19	0.644	0.686	0.694	0.815	0.572	58

[1] Permitted capacity = 1.2 MGD AADF.

In FY 2019, the average annual influent load for CBOD5 was 94.1 mg/L and for TSS was 175.7 mg/L. The maximum monthly average for CBOD5 was 132.8 mg/L in December 2018 and for TSS was 232.5 mg/L in February 2019, which correspond with seasonal residents and the dry season. Table 6-12 summarizes the wastewater characteristics of the West Port WRF influent.

Table 6-12 West Port WRF Influent Water Quality in FY 2019

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-18	87.8	102.9	194.6	185.2
Nov-18	111.8	104.4	229.8	190.7
Dec-18	132.8	106.2	229.5	196.3
Jan-19	110.1	105.7	144.7	195.7
Feb-19	124.8	106.5	232.5	201.0
Mar-19	109.7	105.3	232.3	199.0
Apr-19	93.3	103.1	137.0	196.6
May-19	87.6	101.3	168.2	193.9
Jun-19	66.6	98.4	114.0	182.9
Jul-19	77.6	97.1	157.0	180.6
Aug-19	65.0	95.5	137.3	178.1
Sep-19	62.3	94.1	132.0	175.7

6.5.3 Treatment Objectives and Effluent Quality

The West Port WRF is permitted to treat wastewater to two effluent standards: one for disposal to the deep injection well (CBOD5 = 20 mg/L, TSS = 20 mg/L), requiring basic disinfection; and the other for public access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2019, the annual average effluent CBOD5 and TSS values were 2.05 mg/L and 0.6 mg/L, respectively. The maximum CBOD5 monthly average of 2.53 mg/L occurred in November 2018. The TSS effluent typically remained below 1.0 mg/L throughout FY 2019. These CBOD5 and TSS concentrations are well within public-access reuse standards. Table 6-13 summarizes the water quality of the West Port WRF effluent.

Table 6-13 West Port WRF Effluent Water Quality in FY 2019

Month	CBOD5			TSS			Fecal Monthly Avg. (No./100 mL)
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	
Oct-18	<2.00	2.33	97.7	0.6	1.2	99.8	<1
Nov-18	2.53	2.37	97.7	0.7	0.7	99.7	1
Dec-18	2.07	2.38	98.4	0.6	0.7	99.8	<1
Jan-19	1.85	2.37	98.2	0.8	0.7	99.4	<1
Feb-19	<2.00	2.28	98.4	0.5	0.6	99.8	1
Mar-19	<2.00	2.26	98.2	0.4	0.6	99.8	<1
Apr-19	<2.00	2.26	97.9	0.6	0.6	99.6	<1
May-19	<2.00	2.26	97.7	0.7	0.7	99.6	<1
Jun-19	<2.00	2.11	97.0	0.8	0.6	99.3	<1
Jul-19	<2.00	2.09	97.4	0.7	0.7	99.5	<1
Aug-19	<2.00	2.09	98.5	0.6	0.6	99.6	<1
Sep-19	<2.00	2.05	98.4	0.5	0.6	99.6	<1

6.5.4 Treatment Components and Condition Assessment

Jones Edmunds completed an on-site review of the WRF on February 4, 2020. Our personnel met with Thomas Cimino, Chief Operator of the West Port WRF, to review plant conditions, operations, and records. Access to the facility is through a secure gate in a fence that extends to a water moat that completely surrounds the wastewater plant and RCW storage ponds. A warning sign is on the access gate, and multiple warning signs are outside the moat near the property boundary.

In general, the plant site is well kept. Staff has done a good job in grounds-keeping and facility appearance. The area of mowed grass on the outside of the RCW storage pond is an aesthetic welcome to plant visitors. The operations building and shop area are clean and organized.

The plant operators continue to exercise all valves regularly. All compliance meters are calibrated every 6 months, and calibration tags were up to date at the time of the site visit.

Required documents maintained on site include:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium every 2 years).
- Reports required to complete the last permit application.
- Certification of EPLAB.
- Sampling Plan.
- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-Custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- Spill protocol and record of spills.

The Cross-connection and Backflow Prevention Manuals are kept at the Reclaimed Water Coordinator's office at the East Port WRF. The Chief Operator has prepared a binder of required documents that is readily available for anyone's inspection.

6.5.4.1 WRF Influent

The WRF includes a 24-inch influent force main and 16-inch flow meter assembly that have been in service since January 2014.

6.5.4.2 Headworks

The overall condition of the headworks structure was considered fair to poor at the time of the site visit. The County will replace the Headworks components in FY 2020. In FY 2017, the bottom of the headworks area was cleaned, and in FY 2018 the top of the headworks was power washed.

The rotary screens were rebuilt in 2017 but are still having problems. At the time of the site visit, two screens were out of service. Therefore, the rotary screens will be replaced in FY 2020.

Pin holes have developed in the 304 stainless steel housing due to the highly corrosive gases released in the headworks. To help protect the equipment, the screen housings have been sand blasted and painted with epoxy paint. Other alternatives to reduce or eliminate the highly corrosive hydrogen sulfide gasses at the headworks include flow equalization and chemical oxidation.

Most components are stainless steel, but the few carbon steel components are a constant maintenance challenge. Staff clean the screens twice daily to help delay rusting from exposure to hydrogen sulfide. The Type 316 stainless steel wedge wire drums are in very good condition. The concrete area around the screens is cleaned twice daily by hosing down screenings liquid into the aeration basins.

At the time of inspection, the dumpster area was found to be clean with only slight leakage of water from the dumpsters to the drains under the dumpsters.

A fiberglass grating over the influent flow splitter area had been supported by two carbon-steel beams. These beams were replaced with aluminum beams in FY 2015. The fiberglass grating is showing no signs of deterioration.

The WRF has no grit removal system. Grit usually accumulate in aeration basins and at the on-site lift station. Grit is removed from the system periodically by vacuum trucks. The Chief Operator indicated that the vacuum truck has easier access to the outer basins than the inner basins that require more physical labor to remove grit.

Although the lack of a grit removal system is an issue, grit content of the wastewater entering the WRF is probably lower than most plants because nearly all flow is received from septic tank effluent pumps.

6.5.4.3 Flow Equalization

The West Port WRF does not have flow equalization storage for peak hour flows. Introducing flow equalization would improve the efficiency of plant operations.

6.5.4.4 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good.

The WRF has four aeration basins that were in service at the time of the site review. New fine-bubble diffusers were installed in all basins in 2013 and 2014. This has had a positive effect on the treatment process by providing a more even air flow distribution. However, the lack of grit removal continues to present a maintenance challenge since deposited grit levels rise to block the diffusers. Basin No. 3 was cleaned of grit and damaged aerators were repaired in FY 2016.

All three blowers were operating properly. Usually, one blower is operated at a time to meet aeration requirements. The Operators cycle the blowers weekly. The plant operates between a pH of 6.7 and 7.0. A timer is used to turn the blower on and off throughout the day. Using pH for operational control is not the most practical method for treating wastewater; an alternate control method including DO and oxygen reduction potential (ORP) should be evaluated.

The outlet weirs of the aeration tanks require manual cleaning when debris catches on the weirs.

The steel supports of the walkway over the aeration tank effluent splitter box were touched up with paint in FY 2017, and the aeration tanks were repainted in 2018.

6.5.4.5 Sedimentation

The overall condition of the sedimentation process is fair.

Plant Operations staff follows a routine schedule of clarifier inspection, repair, and painting. At the time of inspection, three of the four clarifiers were in service. Clarifier No. 3 was taken offline, serviced, and painted in FY 2018, and put online in FY 2019. Servicing and painting of Clarifier No. 4 is scheduled to follow Clarifier No. 3 in FY 2020. However, due to some warranty claims on the painting of Clarifier No. 3, painting of Clarifier No. 4 may be delayed.

Overflow weirs are hosed daily and brushed weekly to keep them clean. The overflow weirs were leveled in FY 2017. New weirs were installed in Clarifier No. 1 and Clarifier No. 2 in 2018. Clarifier No. 3 and Clarifier No. 4 are scheduled to have new weirs in FY 2020.

The sludge return chambers on the side of each clarifier have telescoping valves used to adjust sludge withdrawal from the bottom of the clarifier. All telescopic valves are operating properly.

Four RAS/WAS pumps are in good operating condition and are under a sheet-metal roof. The pumps were painted in 2017.

Floatables accumulate in these sludge boxes and are periodically removed by manually skimming the 5-foot-by-5-foot boxes from the clarifier bridge when the chambers are full.

6.5.4.6 Filtration

The filters are in good condition. The tanks are cleaned every month with 5 gallons of bleach. A UV cover was put on the filter tanks and then removed because access to the filters during maintenance activities was blocked. We recommend installing a galvanized metal frame and UV cover above each tank to prevent algae growth in the filters.

All three filters were in operation at the time of the site visit and working properly. All three filters have been replaced with new 5-micron filter cloths. The Chief Operator stated that a higher-quality effluent is obtained when all three filters are operating in parallel.

The filters are constructed of Type 304 stainless steel, but the fiberglass grating platform between the filters is supported by carbon steel angles. The paint is in good condition.

The control panels and meter readouts for the three filters are under an aluminum cover.

The turbidity sampling point is located where it receives the combined flow of all three filters.

6.5.4.7 Chlorination

The overall condition of the chlorination system is excellent. Only one CCC was in operation at the time of the site visit. Good turbulent flow in the inlet boxes to the CCCs created effective mixing. The pH and chlorine analyzers are in good working order. Plant operators clean the analyzer assemblies at regular intervals to remove any algae buildup.

In June 2017, a new chlorine feed system with two chemical feed pumps for each CCC and new storage tanks was installed in a new chlorine storage and feed area between the two CCC structures. This will enable two parallel CCCs to operate when peak hourly flows exceed 955 gpm. The new dosing pumps have double-containment protection.

6.5.4.8 Solids Handling Facilities

The overall condition of the sludge holding tanks is good, but the capacity of the aerobic digesters is limited. Expanding the sludge holding tank storage will improve sludge decanting and thickening.

The existing system currently cannot reach above 1.0 percent TSS. Sludge is transferred between tanks and loaded onto tanker trucks by a sludge transfer pump. Valve changes determine where sludge is directed.

The liquid sludge load-out pump was replaced in 2017.

The WRF has four emergency sludge-drying beds.

6.5.4.9 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent disposal is accomplished through an RCW distribution system and one deep injection well. A total of 20 MG of on-site RCW storage is provided. The two HSPs and one jockey RCW pump are in good condition.

Three new deep-well pumps with a 16-inch manifold pipe connect to the deep well and on-site irrigation pipes. All pumps were fully functioning at the time of the inspection.

The effluent composite sampler and compliance monitoring equipment are working properly.

6.5.4.10 RCW Storage and Distribution

The West Port WRF has two lined RCW storage ponds – one 5 MG and one 15 MG. The storage ponds are used to store RCW produced during the day for distribution at night or to store excess RCW during wet-weather periods. The stored water can be pumped to the RCW distribution system or the deep injection well.

The West Port WRF RCW system is part of the Master Reuse System that interconnects with the Rotonda WRF and the East Port WRF RCW systems. This provides flexibility to serve existing and future RCW customers. The main customer for the RCW produced at the West Port WRF is the Coral Creek Golf Club golf course, which receives RCW through a 7-mile-long, 10-inch-diameter RCW main constructed by the golf course owners.

6.5.4.11 Reject Storage and Alternate Disposal

The West Port WRF has no reject storage. Effluent that does not meet public-access RCW standards is injected into the on-site deep injection well.

6.5.4.12 Wet Weather Storage

The two RCW storage ponds are used for wet-weather storage of excess RCW. If the volume of RCW produced exceeds the storage capacity, the RCW is injected into the deep well.

6.5.4.13 Electrical Components and Circuitry

The incoming switchgear and distribution transformer appear in good condition with no obvious signs of significant concern. The incoming power via overhead aerial is new and was installed within the past couple of years. The WRF is served from two 400-kVA generators connected in parallel that are fed from a subbase tank and an auxiliary tank adjacent to them. Operations staff indicates that a new 6,000-gallon fuel tank and pad for the generators will be installed in the near future. Overall, the electrical equipment is in good functioning condition based on information from the Operations staff, except for the deficiencies listed below. Thermography scanning of the equipment showed no anomalies.

The following deficiencies were noted:

- A power distribution panel within the plant's MCC is missing a protective cover. Access in the panel to activate a breaker could potentially expose personnel to live conductors (see photograph).
- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling required by NFPA 70E.
- County Staff reported that the existing blowers at the West Port WRF do not operate properly when running under the generator. It is uncertain why this occurs as the existing generators should have ample capacity to operate the blowers.

6.5.5 Operations

The West Port WRF produces RCW using biological treatment, cloth filtration, and high-level chlorine disinfection. The plant can be operated to produce secondary effluent without filtration, but this alternative operation is rarely used.

The West Port WRF is staffed 16 hours per day, 7 days per week. Key plant components are automatic, and continuous effluent monitoring allows the plant to produce high-quality effluent 24 hours per day. The East Port WRF operators monitor the operations of the West Port WRF 24 hours per day through a County-wide telemetry system. Alarms are evaluated, and operators or maintenance staff can be dispatched to the West Port WRF to address issues, if necessary. Effluent not meeting the RCW standards is automatically diverted to the deep

injection well for disposal. RCW is also automatically diverted to the deep injection wells when the RCW storage ponds are full.

6.5.6 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

6.5.7 Review of Previous Report Recommendations

Table 6-14 West Port WRF 2018 Recommendations and Status

Recommendation:	Provide additional aerobic sludge holding tank volume and decanting capacity to improve decant thickening.
Progress:	*Ongoing.*
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess RCW from West Port during wet-weather events.
Progress:	*Ongoing.*
Recommendation:	Complete repairs/upgrades on Rotary Screen Nos. 1 and 2.
Progress:	*Ongoing. CCU is requesting professional services to upgrade the existing Rotary Screens*
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Progress:	*Not Started.*
Recommendation:	Proceed with the scheduled repair and/or replacement and painting of Clarifier Nos. 3 and 4. Include leveling of clarifier overflow weirs in the work to be accomplished.
Progress:	*Ongoing.*
Recommendation:	Replace the overflow weirs for all clarifiers.
Progress:	*Replacement of overflow weirs of Clarifier Nos. 1, 2, & 3 was completed. Replacement of overflow weirs of Clarifier No. 4 is scheduled in FY 2020.*
Recommendation:	Evaluate the addition of a flow equalization tank to improve treatment plant operations.
Progress:	*Not Started.*
Recommendation:	Install a galvanized metal frame and UV fabric cover over each filter tank to minimize algae growth.
Progress:	*Ongoing.*
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Progress:	*Ongoing.*

Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Progress:	*Ongoing.*
Recommendation:	Perform a load study to identify any issues related to the system power quality, quantity, and capacity. The load study would help identify deficiencies in the system and to identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	*Ongoing.*

6.5.8 Summary and Recommendations

The West Port WRF is a conventional activated-sludge treatment plant with effluent filtration to produce public-access RCW. The effluent consistently meets public-access RCW quality. Nearly all current RCW produced is consumed by one primary golf course customer.

Most of the unit process tanks are made of concrete or Type 304 stainless steel except for four secondary clarifiers. The clarifier tanks appear to be in good condition, but the mechanical components of the clarifiers require constant paint maintenance. Clarifier No. 2 and Clarifier No. 3 were taken out of service in FY 2017 and FY 2019, respectively, for major overhaul and painting. Clarifier No. 4 is scheduled to be taken out of service in FY 2020 for major overhaul and painting. The stairways leading to the bridges of the aboveground clarifiers have been painted. Their condition should be checked yearly, and touch-up paint applied when necessary. The clarifiers should be completely repainted every 4 years with touch-up of rust spots occurring every year. The inclusion of four clarifiers at the West Port WRF allows for one to be taken out of service for painting with minimal impact to the effluent quality.

The sludge produced as a byproduct of treatment is pumped to aerobic sludge-holding tanks and then thickened at the West Port WRF before being truck hauled in liquid form to the East Port WRF for sludge dewatering and final disposal at the compost facility. The aerobic sludge-holding tank volume is too small and prevents proper decant thickening, resulting in a decant thickened sludge of 1-percent total solids or less. Additional sludge-holding tank volume and decant thickening capabilities should be provided to allow a thickened sludge of 1.5- to 2.0-percent total solids, which will reduce sludge hauling volume by 50 to 100 percent and reduce the resulting costs. CCU is currently considering evaluating the feasibility of adding more biosolids handling capacity at the West Port WRF to handle biosolids generated at the West Port and Rotonda WRFs.

The new influent force main, RCW transmission pipe from the Walenda Pumping Station and the Rotonda WRF, and the expanded RCW storage ponds have added considerable value to the WRF and its ability to function as a supplier of RCW for the east section of the West County peninsula. However, there are still issues with transmission of reclaimed water from East Port WRF to customers in West Port area as summarized in Chapter 7. In addition, excess RCW disposal during wet-weather events is an issue for the West Port WRF since Rotonda's excess

water is pumped for co-disposal in the West Port's injection well. West Port's excess RCW flows by gravity to the irrigation wet well and to the on-site storage ponds.

The electrical components at this facility are in good-to-fair condition. The facility staff has identified several issues related to power including faulty generator paralleling and overloaded circuits when some equipment is called for. Additional code-related issues were also identified.

Table 6-15 West Port WRF 2019 Recommendations

Recommendation:	Provide additional aerobic sludge-holding tank volume and decanting capacity to improve decant thickening.
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess RCW from West Port during wet-weather events.
Recommendation:	Replace Rotary Screen Nos. 1, 2, 3, and 4.
Recommendation:	Replace electrical panel of Rotary Screen No. 4.
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Recommendation:	Proceed with the scheduled repair and/or replacement and painting of Clarifier No. 4. Include leveling of clarifier overflow weirs.
Recommendation:	Replace the overflow weirs for all four clarifiers.
Recommendation:	Evaluate adding a flow EQ tank to improve plant operations.
Recommendation:	Install a galvanized metal frame and UV cover above each filter tank to prevent algae growth in the filters.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Investigate blower electrical system to determine why the blowers will not run under generator. The capacity onsite should be sufficient.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to the system power quality, quantity, and capacity. The load study would help identify deficiencies in the system such as the issues related to the blowers unable to properly operate when energized by the generators. This study can support the efforts made by the County to identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.

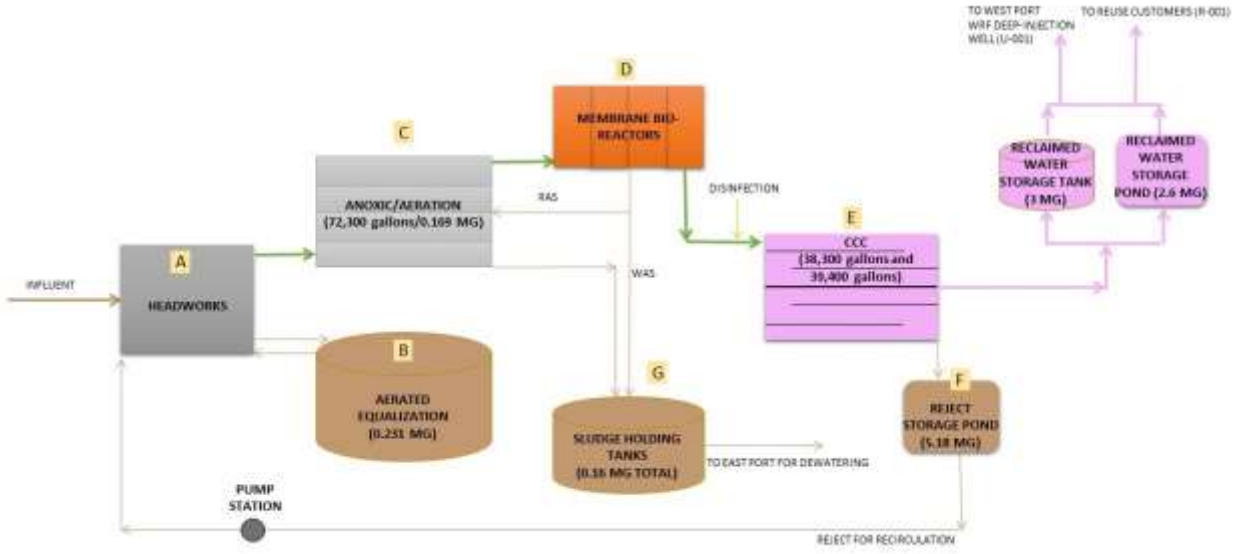
6.6 ROTONDA WRF

The Rotonda WRF is at 3740 Kendall Road, Rotonda West. This facility was purchased by Charlotte County from a private utility, Aqua Source, in 2000. The Rotonda WRF is permitted to distribute reclaimed-quality water to unrestricted-public-access reuse sites and to use the West Port WRF deep well injection system. Areas currently served by the Rotonda WRF include the inside of the circular Boundary Boulevard of the 7.5-square-mile Rotonda development; areas filling in the northeast and northwest corners outside the circular development; and adjacent areas along Cape Haze Boulevard, Pine Valley, White Marsh, Long Meadow, Broadmoor, Pinehurst, Pebble Beach, Oakland Hills, and Cape Haze neighborhoods.

A phased plant expansion was completed during FY 2009 and was cleared for service by FDEP on November 19, 2009. The expanded facility has a rated treatment capacity of 2.0 MGD AADF and a rated RCW disposal capacity of 1.005 MGD AADF. The Rotonda WRF uses activated sludge in a membrane bioreactor (MBR) configuration to treat wastewater.

Effluent can be distributed as RCW to the unrestricted-public-access master reuse system or transferred to West Port for injection into a deep well injection system. Figure 6-4 shows the Rotonda WRF process flow diagram. Two diesel-powered emergency generators in an on-site building have ATSs for providing emergency power to the WRF.

Figure 6-4 Rotonda WRF Process Flow Diagram



The Rotonda WRF treatment process consists of the following components.

A) Headworks: Raw wastewater from the West County service area enters the Rotonda WRF headworks for screening and grit removal. Two Baycor rotary drum fine screens

remove larger inorganic material. Grit removal is achieved in two grit concrete tanks immediately downstream of the rotary drum screens. Settled grit is pumped through two grit cyclones and one grit "snail" washer to remove organics. Solids removed by these two processes are collected and hauled to the landfill for disposal. Flows from the on-site lift station are introduced here.

B) Equalization: During peak flows, excess wastewater pours over a weir at the headworks and is diverted to a 300,000-gallon EQ tank. Pumps at the EQ tank return the wastewater to the system as influent flows return to average conditions. The EQ tank is equipped with two forced-air pumps to maintain the biological medium and prevent hypoxic conditions.

C) Biological Treatment for Organics and Nutrient Removal: Wastewater from the pretreatment structure enters two activated-sludge treatment trains that consist of an aerobic zone, anoxic zone, and a swing zone that can be an aeration or anoxic zone. This configuration allows the biodegradation of organics and removal of excess nitrogen. Blowers and fine-bubble diffusers are used to provide oxygen to the wastewater in the aeration zone.

D) Tertiary Treatment – Filtration: From the biological treatment process, the wastewater flows to the four MBR filtration trains. Each train contains three cassettes. Hollow-tube membranes housed in individual cassettes provide a high level of filtration and take the place of clarifiers and gravity filters used at the other WRFs. The cassettes are periodically submerged in cleaning tanks where liquid sodium hypochlorite is added. Sludge produced in the treatment process is pumped to two locations – to the aeration basins as RAS to support microbial activities and to the two sludge-holding/aerobic digestion tanks as WAS.

E) Tertiary Treatment – Disinfection: The filtered water enters the CCC splitter box that directs the flow into one of two CCCs. Three chlorine feed pumps introduce liquid sodium hypochlorite for RCW disinfection requirements. The chlorine is thoroughly mixed using a static mixer in the CCC influent pipe. The sodium hypochlorite is controlled by flow meters on the MBR effluent piping. The three sodium hypochlorite storage tanks have a total capacity of 5,500 gallons.

F) Effluent Reclaimed and Disposal Facilities: RCW enters the on-site 3.0-MG Ground Storage Tank (GST) and a 2.64-MG RCW storage pond. An on-site pump station provides flow to the RCW transmission system that is interconnected with the West Port WRF to increase RCW distribution in West Charlotte County. During wet weather, excess RCW can be disposed of in the West Port WRF deep injection well. If effluent does not meet the unrestricted-public-access RCW quality requirements, the flow can be diverted to an on-site lined storage pond and recirculated to the WRF headworks.

The Rotonda WRF also has a lined reject pond with a storage capacity of 5.182 MG. Water diverted to this pond does not meet RCW standards and thus must be retreated through the WRF.

G) Aerobic Digestion: WAS pumped to the two sludge-holding/aerobic digesters (170,000-gallon capacity) is gravity thickened and hauled to the East Port WRF for aerobic digestion and dewatering. The tanks are converted clarifiers with center

surface aerators. Decanted supernatant recirculates to the headworks. Thickened sludge is hauled to the East Port WRF for digestion, dewatering, and final disposal at a compost facility at the Charlotte County Zemel Road Landfill.

6.6.1 Regulatory Considerations

The Rotonda WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permit governs plant operations:

- Plant Operating Permit (FLA014098) Expiration Date: May 30, 2022.

6.6.2 Wastewater Flows and Loads

The Rotonda WRF's permitted capacity is 2.0 MGD AADF. In FY 2019, the AADF was 1.029 MGD and the Rotonda WRF was operating at 51 percent of the plant permit capacity. The maximum monthly average flow of 1.490 MGD occurred in August 2019. The highest TMADF of 1.203 MGD occurred in October 2018, which is 60 percent of the plant permit capacity demonstrating the influence of wet weather and infiltration and inflow on flows to the facility. Table 6-16 summarizes influent flows as reported on DMRs in FY 2019.

Table 6-16 Rotonda WRF Influent Flows in FY 2019

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max. Day (MGD)	TMADF Percent Capacity (%)
Oct-18	1.039	1.065	1.203	1.325	60
Nov-18	0.891	1.062	1.117	0.959	56
Dec-18	0.980	1.071	0.970	1.325	49
Jan-19	1.133	1.081	1.001	1.710	50
Feb-19	1.251	1.091	1.121	1.404	56
Mar-19	1.117	1.103	1.167	1.253	58
Apr-19	0.904	1.108	1.091	0.998	55
May-19	0.755	1.077	0.925	0.879	46
Jun-19	0.684	1.036	0.781	0.782	39
Jul-19	1.017	1.028	0.819	1.511	41
Aug-19	1.490	1.057	1.064	2.247	53
Sep-19	1.081	1.029	1.196	1.663	60

[1] Permitted plant capacity 2.0 MGD.

In FY 2019 the average annual influent load for CBOD5 was 85.4 mg/L and for TSS was 94.0 mg/L. The maximum monthly average for CBOD5 was 128.6 mg/L in April 2019 and for TSS was 151.4 mg/L in April 2019, which correspond with the dry season. Table 6-17 summarizes the wastewater characteristics of the Rotonda WRF influent in FY 2019.

Table 6-17 Rotonda WRF Influent Water Quality in FY 2019

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-18	59.8	102.3	84.9	126.6
Nov-18	72.5	99.5	74.5	123.2
Dec-18	89.0	96.5	83.0	119.5
Jan-19	90.3	93.3	96.0	113.7
Feb-19	87.9	89.4	69.5	104.5
Mar-19	113.3	86.6	114.6	98.3
Apr-19	128.6	86.4	151.4	97.4
May-19	113.0	87.4	124.0	97.0
Jun-19	84.1	86.6	82.1	94.0
Jul-19	71.3	86.2	89.0	93.5
Aug-19	52.2	91.9	63.5	91.9
Sep-19	62.8	85.4	95.2	94.0

6.6.3 Treatment Objectives and Effluent Quality

The Rotonda WRF is designed to treat wastewater to public-access reuse levels (CBOD5 = 20 mg/L and TSS = 5 mg/L), requiring high-level disinfection.

In FY 2019, the annual average effluent CBOD5 and TSS was 2.09 mg/L for each. The maximum effluent CBOD5 monthly average was 2.59 mg/L in September 2019. The monthly average maximum TSS concentration was 0.30 mg/L and occurred in April and July 2019. These CBOD5 and TSS concentrations are well within public-access standards. Table 6-18 summarizes the effluent water quality for the Rotonda WRF.

Table 6-18 Rotonda WRF Effluent Water Quality in FY 2018

Month	CBOD5			TSS			Fecal
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (No./100 mL)
Oct-18	2.00	2.05	97	0.00	0.00	-	-
Nov-18	2.00	2.05	97	0.10	0.20	100	<1
Dec-18	2.00	2.05	98	0.10	0.20	100	<1
Jan-19	2.00	2.05	98	0.00	0.10	100	<1
Feb-19	2.00	2.05	98	0.20	0.10	100	<1
Mar-19	2.00	2.05	98	0.10	0.10	100	<1
Apr-19	2.00	2.01	98	0.30	0.10	100	<1
May-19	2.00	2.01	98	0.10	0.10	100	<1
Jun-19	2.30	2.03	97	0.20	0.10	100	<1
Jul-19	2.00	2.03	97	0.30	2.03	100	<1
Aug-19	2.21	2.04	96	0.10	2.04	100	<1
Sep-19	2.59	2.09	96	0.20	2.09	100	<1

6.6.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the WRF on February 5, 2020. Our personnel met with Luke West, Chief Operator of the Rotonda WRF, to review plant conditions, operations, and records. Access to the facility is through a secure gate in a fence that surrounds the WRF and effluent storage ponds. The facility site is well maintained, and most equipment is less than 10 years old. Painted exterior walls and piping are beginning to show signs that repainting should be scheduled in a few years.

The plant operators continue to exercise all valves regularly. All compliance meters are calibrated every 6 months, and calibration tags were up to date at the time of the site visit.

Required documents maintained on site include:

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans (guidance book created in-house).
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium).
- Reports required to complete the last permit application (in process).
- Certification of the EPLAB.
- Sampling Plan.
- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain of custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility record drawings.
- Daily temperature logs.
- Spill protocol and record of spills.

The Cross-connection and Backflow Prevention Manuals are kept at the RCW Coordinator's office at the East Port WRF and at the Rotonda WRF Operations Building.

6.6.4.1 WRF Influent

The two main influent valves were scheduled to be replaced in 2019. However, it was deferred to FY 2020 to allow the facility to procure a manually operated slide gate for each valve for better isolation of the drum screens. An actuator was added to Screen No. 1 in FY 2019.

6.6.4.2 Headworks

The overall condition of the headworks is good but beginning to show signs of aging.

At the time of the site visit, both screens were operating. These screens are critical process units. Each screen rotates on four drum rollers that have been replaced several times on Screen No. 1 since installation in 2009. The drum rollers support the stainless-steel perforated screen as it rotates. The worn rollers were last replaced in 2016. The rate of rotation has been slowed to extend the life of mechanical components. In 2017, the drums were welded, and the roller wheels, chains, and drive gears were replaced. A wash water spray was added to the screening compactors, which improved operation and lengthened the life of the lower bearing units. The chain and sprockets of Screen No. 2 were replaced in FY 2019.

The drive motor on Screening Conveyor No. 2 was raised above the bottom bearings to prevent water from entering the motor when the seal bearing leaks. This motor location with its drive belt has proven to be a better location than the manufacturer's direct drive location. The drive motor of Screening Conveyor No. 1 was replaced in January 2019. These pieces of equipment are also monitored frequently for wear and operating efficiency.

The Chief Operator pointed out that Screen No. 2 has pin holes that created operational challenges during FY 2019.

The grit removal process operates as intended. The organic wastewater component of the pumped mixture is returned to the wet wells. The separated grit passes to a grit "snail" washer before being deposited into a dumpster bag. The grit "snail" washer includes a conveyor belt that allows the grit to shed water as it proceeds to the dumpster. The grit "snail" washer produces a dry grit that is deposited into a plastic grit bag. In 2017, Grit Pump No. 2 was replaced, and the cyclones are scheduled for replacement in 2020.

The screenings and grit dumpsters are emptied once per week. The dumpster area is clean and free of odors. The screening screw conveyor/compactor No. 1 and grit dewatering units are operating as intended. Screening screw conveyor/compactor No. 2 is not operating properly and is taken out of service. Screening screw conveyor/compactor No. 2 is bypassed to a temporary conveyance/dumpster system. The isolation valves for both screens are currently inoperable and in need of replacement.

6.6.4.3 Flow Equalization

The overall condition of the 0.3-MG EQ tank is good. The EQ tank, which attenuates high hourly flows, is filled through a gravity system initiated by an overflow weir at the headworks structure. The EQ tank contents are returned to the headworks for treatment at a steady flow over 24 hours using variable-speed pumps. This has proven to be a valuable asset to the operation of the facility. The Chief Operator noted that Lift Station No. 801 sends 1,500 gpm to the Rotonda WRF for about 20 minutes and then turns off for 20 to 30 minutes. The operation of the EQ tank has been adjusted to respond to the intermittent discharge from Lift Station No. 801. Dry pit submersible pumps are used to return EQ tank contents to the treatment stream. The EQ tank positive displacement blowers are run intermittently to save power. Oil sight glasses and fill ports were added by CCU to improve maintenance. The EQ tank was painted in FY 2019.

6.6.4.4 Activated Sludge Facilities

The overall condition of the activated sludge facilities is good. The aeration tanks operate in a plug flow regime with anoxic, aerobic, and swing zones. The anoxic zones and the use of automatic DO probes to control blower speeds have contributed to the high level of treatment

while conserving energy use. The aeration tanks are run at a mixed-liquor suspended-solids concentration of 3,500 to 4,000 mg/L. The two old aeration tanks were last drained for inspection in 2012. Very little grit was found in the bottom. The aeration basins were pressure-cleaned and painted in FY 2017.

The aeration system continues to supply adequate air to the aeration tanks. The facility has four multi-stage centrifugal Hoffman blowers to serve the aeration trains. Generally, one blower meets air requirements. Additional units are brought online during higher demands. Blower No. 2 has been repaired multiple times including a new motor in 2014 and new bearings in 2016; however, the blower motor was again repaired in 2017. During the site visit, we observed that Blower No. 1 was installed after it was repaired but not connected. Blower No. 2 was completely removed. Only Blower No. 4 and Blower No. 5 were in service. Blower No. 5 will be replaced after Blower No. 1 is put back in service. The blowers are well painted, and piping is marked.

One of the DO probes in the aeration basin was replaced in 2017. All four probes are functioning properly.

6.6.4.5 Membrane Bioreactor

The MBR system's overall condition is good, and it is well maintained. The MBR system continues to produce a high-quality effluent with minimal problems.

Four trains contain three cassettes each. The MBRs are cleaned once per week with a weak solution of bleach to maintain their treatment efficiency. The cassettes are cleaned in place with concentrated chlorine bleach twice a year and are removed once a year for deep cleaning.

The four MBR blowers and the four permeate pumps were running and in good condition.

In 2017, three mixed-liquor volatile suspended solids (MLVSS) return/recycle pump motors were replaced and are in good working order.

A turbidity sample is collected from the MBR effluent header pipe before the flow enters the CCC splitter box. All turbidity meters were replaced in 2018.

In May 2019 HDR engineering firm conducted a membrane evaluation. During the evaluation the following observations and/or recommendation were made:

- The membranes are in good condition except for some cracked potting headers.
- It is recommended that the slack be adjusted within the new few months.
- Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and installed module blanks in its place until new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of

the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.

- Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.

- Constantly monitor membrane permeability trend, especially for trains 3 and 4, which end of life is estimated to 2024 and 2026, respectively as this trend can either accelerate or decelerate.

- A year prior to scheduled replacement (currently estimated in 2023 for train 3), order membrane modules. Install new membranes modules in train 1. Do not install new membranes modules with existing membrane modules in the same train. Move the existing membrane modules from train 1 to train 4. Train 4 will then have 6 membrane cassettes, which will extend the life of the membranes.

6.6.4.6 Chlorination

The overall condition of the chlorination system is good. The two concrete CCCs are in good condition. Both CCCs are used alternately, but only one is required to meet the required contact time under current flows.

Wind from Hurricane Irma in September 2017 caused the UV filter cloth to be disconnected from the CCC. A new UV filter cloth of 90-percent UV block cover was installed in 2018 over the CCCs to conserve bleach and inhibit algae growth.

Replacement of Chlorine Storage Tank No. 3 began in 2017 and finished in 2018. Leaks were noted around chlorine pipe fittings due to the continuous exposure to sunlight.

Prominent feed pumps No. 1 and No. 3 were replaced in FY 2018. Prominent feed pump No. 2 was replaced in FY 2019. The two total chlorine analyzers were replaced in FY 2019.

The chlorine feed line from the in-plant road was replaced in 2018.

6.6.4.7 Solids Handling Facilities

The overall condition of the solids handling facilities is good.

The decant mechanism for the sludge-holding tanks was designed as telescoping valves, but the telescoping valves can only be lowered to one-half the depth of the tank. The operators have replaced the designed method of decanting by using bottom-feed submersible pumps suspended on ropes. A small winch should be added to each pump site for better control of the pump level. The Chief Operator does not see this as a high priority because decanting is done only two or three times per month.

Sludge load-out pumps were operating properly. They were repainted in FY 2019.

6.6.4.8 Effluent Storage and Disposal

The effluent disposal system consists of 1.005 MGD AADF slow-rate public-access RCW systems at two golf courses.

The Rotonda WRF can send RCW through the West Port/Rotonda WRF interconnection to serve both facilities' RCW users. It also enables excess reclaimed-quality effluent to be sent to West Port's RCW storage ponds or deep injection well (capacity 4.75 MGD) for final disposal. The

rate of water transfer to the West Port WRF is limited by the size of the transfer pipe, long distance, and concern for the condition of the old "class" pipe that is in use between the Rotonda WRF and the Palms Golf Course delivery system. The total head pressure has been reduced by installing an RCW booster pumping station at the intersection of CR 771 and Rotonda Boulevard East in 2014. This pumping station has increased the capacity of flow from the Rotonda WRF to RCW users and the deep well at the West Port WRF.

RCW-quality effluent can also be stored in the Rotonda WRF on-site RCW storage pond and the 3.0-MG GST. The GST was drained and cleaned in 2017. RCW from the GST can be pumped to pressurized reuse customers using two HSPs and one jockey pump. One of the two HSPs was replaced in FY 2019. The jockey pump was replaced in FY 2018.

The RCW storage pond is overgrown with vegetation, reducing the capacity of the pond. The storage pond is scheduled to be dug out and cleaned, the berm reinforced, and the pond lined in 2022.

6.6.4.9 Reclaimed Water Storage and Distribution

The Rotonda, West Port, and East Port WRFs are connected to an RCW transmission system that is permitted under a Master Reuse Permit.

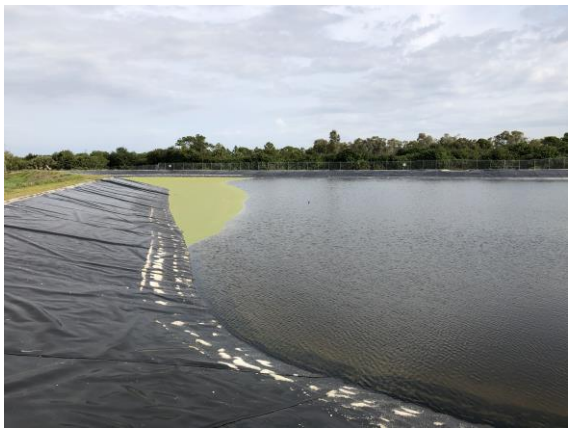
RCW meeting public-access water quality is currently used for irrigation at golf courses and for residential/commercial irrigation. The Rotonda WRF contains two sets of RCW pumps – a low-pressure set and a high-pressure set:

- The low-pressure pumping system is designated for distributing RCW to golf course storage ponds north of the Rotonda WRF. The low-pressure pumps are submersible pumps driven at varying speeds by VFDs. The golf course's high-pressure pumps increase pressure for irrigation system use.
- The high-pressure RCW pumps discharge directly to the Cape Haze Golf Course irrigation system. The motor of pump No. 2 was replaced in FY 2018. Pump No. 3 was replaced in FY 2019. This high-pressure system uses an old dual-pipe force main that serves the Cape Haze Golf Course. The thin-walled PVC pipe is subject to breaks due to its age, and a replacement pipeline is being installed. The high-pressure pumps were last painted in FY 2018.

Since the Phase 1 plant expansion was completed in 2009, the old percolation pond has been abandoned. The existing slow-rate public-access RCW system (R-002) remains in service and uses an existing 12-inch-diameter RCW transmission main that is interconnected with the West Port WRF. However, the Rotonda WRF RCW system was connected to a master transmission system in FY 2014 that can distribute RCW in Mid/West Charlotte County.

6.6.4.10 Reject Storage and Alternate Disposal

The on-site lined reject pond has a storage capacity of 5.182 MG. Water diverted to this pond does not meet RCW standards and must be retreated through the plant. A small pumping station pumps reject water back to the headworks. The pond is scheduled to be cleaned of algae in FY 2022.



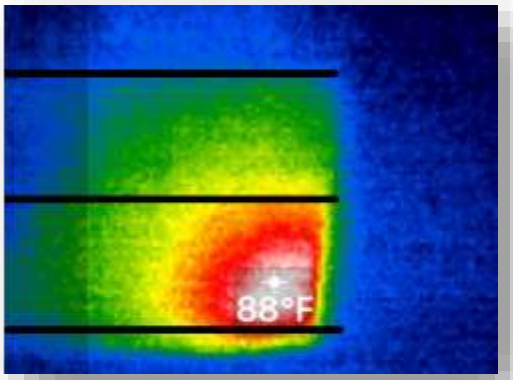
6.6.4.11 Wet-Weather Storage

The on-site RCW pond (2.64 MG), on-site GST (3.0 MG), and off-site Palms Pond (7.44 MG) are available for wet-weather storage of RCW.

6.6.4.12 Electrical Components and Circuitry

The incoming switchgear and distribution transformer appear in good condition. The plant is served from two 810-kW generators configured to operate in parallel. Last year, the Operations staff indicated several issues occurred with the generator switchgear and their operations, but these have now been resolved. Overall, the electrical equipment located in building MCC-1 is in good functioning condition based on information from the Operations staff. This equipment is labeled with the appropriate NFPA 70E arc flash warnings. Overall, the electrical equipment located in building MCC-2 is in good functioning condition based on information from the Operations staff. This equipment is also labeled with the appropriate NFPA 70E arc flash warnings.

The following deficiencies were noted:



- A two-pole circuit breaker in an unlabeled 480-V panel (breaker#28/30) showed during the thermal inspection that one of the two poles was reading a much higher temperature than the other. This is extremely uncharacteristic of a two-pole breaker system since the expected current between both sides of the breaker should be the same (see photograph). The imbalance in temperature between the two contact points may indicate that one of the sides of the breakers is failing or that the connection is loose or impaired. A loose or impaired connection may increase the potential for an arc flash failure.

6.6.5 Operations

The Rotonda WRF produces public-access RCW by means of an MBR process. This process yields an extremely high-quality effluent that receives high-level chlorination before being pumped to the RCW distribution system.

Plant operators staff the Rotonda WRF 16 hours per day, 7 days per week. The WRF can be continuously monitored by the East Port WRF operators through a County-wide telemetry system that allows the Rotonda WRF to continue to produce RCW 24 hours per day. The Wonderware SCADA software was upgraded in FY 2016. Alarms are evaluated, and operators or maintenance staff can be dispatched to the Rotonda WRF address issues, if necessary. Effluent not meeting RCW standards is automatically diverted to the reject storage pond for retreatment.

6.6.6 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed in accordance with the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors.

6.6.7 Review of Previous Annual Report Recommendations

Table 6-19 Rotonda WRF 2018 Recommendations and Status

Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation, which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.
Progress:	*Ongoing.*
Recommendation:	Replace the main influent valves at the headworks due to corrosion.
Progress:	*Ongoing.*
Recommendation:	Replace the grit cyclones of the headworks.
Progress:	*Ongoing.*
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Progress:	*Ongoing.*
Recommendation:	Complete the repairs of Blower No. 1 and put it back in service.
Progress:	*Ongoing.*
Recommendation:	Replace Blower No. 5 with the correct cubic-foot-per-minute (cfm)-capacity blowers to lower oxygen levels and improve Nitrogen removal.
Progress:	*Ongoing.*
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Progress:	*Cassettes are being monitored to determine replacement schedule.*
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 1.
Progress:	*Ongoing.*
Recommendation:	Replace hypochlorite feed pump No. 3.
Progress:	*Completed.*
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Progress:	*Ongoing.*
Recommendation:	Repaint sludge load-out pumps.
Progress:	*Completed.*
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Progress:	*Ongoing.*

Recommendation:	Clean the reject storage pond.
Progress:	*Ongoing.*
Recommendation:	Replace motherboard and refrigerator unit in the effluent sampler.
Progress:	*Completed.*
Recommendation:	Improve the operation of the generators, primarily Generator No. 2.
Progress:	*Ongoing.*
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities and assess potential anomalies that may affect long-term operation.
Progress:	*Not yet implemented.*

6.6.8 Summary and Recommendations

The Rotonda WRF serves the west side of the Placida Peninsula. The plant's permitted capacity is 2.0 MGD with space for expansion to increase the capacity to 3.0 MGD. The WRF consistently produces high-quality RCW due to the use of MBR units; however, the treatment process is more energy intensive than conventional secondary treatment with filtration and requires a higher level of operator attention and understanding to balance flow and load through the MBR units. The Operations staff has done an excellent job maintaining the facility and the MBR membranes.

The Rotonda WRF is permitted to provide RCW to the Master Reuse system. The existing reuse pond is not lined, and berms are badly overgrown with vegetation. Additional reuse pond storage at the facility or an ASR well would be beneficial to minimize the need to send excess reuse water to West Port WRF for disposal in the deep injection well. The pumping rate of RCW to West Port WRF is limited to 1,100 gpm through the RCW transmission main. Cleaning of the lined reject pond is recommended. Reviewing the electrical components at this facility shows that they are in good condition.

Table 6-20 Rotonda WRF 2019 Recommendations

Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation, which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.
Recommendation:	Complete the replacement of the two main influent valves at the headworks due to corrosion.
Recommendation:	Install a manually operated slide gate for each influent valve for isolation.
Recommendation:	Complete the repairs of Screen No. 2.
Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Replace screening screw conveyor/compactor No. 2.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Recommendation:	Connect Blower No. 1 back in service.
Recommendation:	Replace Blower No. 5 with the correct cfm-capacity blower to lower oxygen levels and improve nitrogen removal.
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.

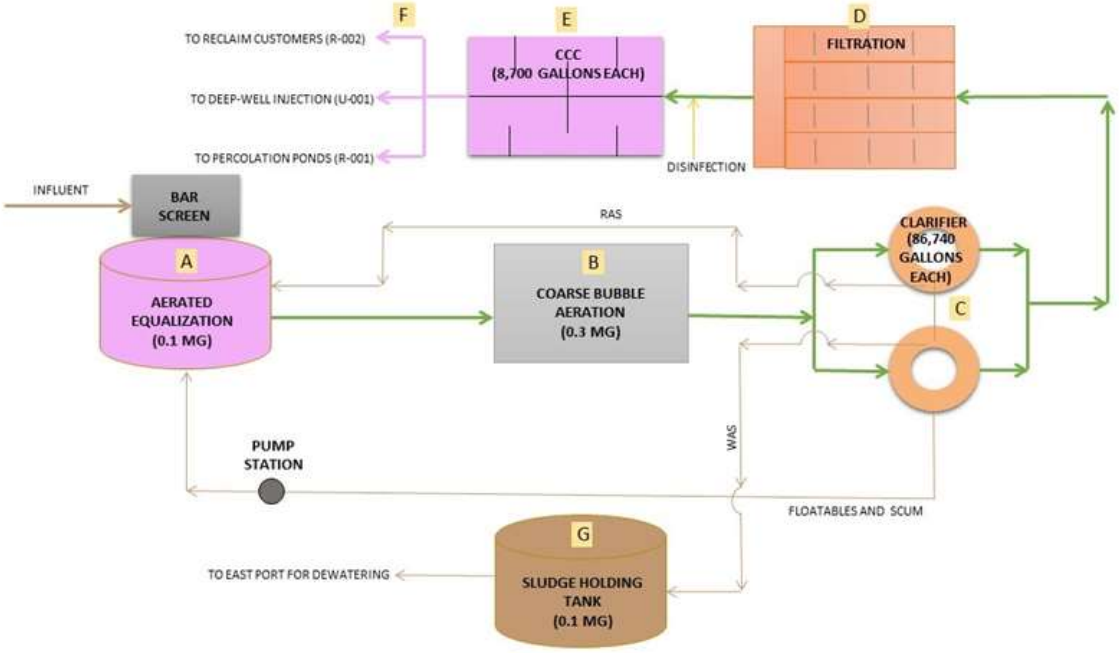
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 1.
Recommendation:	Add protection to chlorine storage tanks and piping from direct sun light.
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Recommendation:	Evaluate different aeration systems for the RCW storage pond.
Recommendation:	Clean the reject storage pond.
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and to the Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.
Recommendation:	Replace the isolation valves for both screens.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term operation.
Recommendation:	Investigate the temperature imbalance in the poles of 480 V panel, breaker#28/30 as soon as possible. Either repair the connection or replace the defective breaker.
Recommendation:	Adjust the membranes slack within the new few months
Recommendation:	Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and installed module blanks in its place until new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.
Recommendation:	Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.
Recommendation:	Constantly monitor membrane permeability trend, especially for trains 3 and 4, which end of life is estimated to 2024 and 2026, respectively as this trend can either accelerate or decelerate.
Recommendation:	A year prior to scheduled replacement (currently estimated in 2023 for train 3), order membrane modules. Install new membranes modules in train 1. Do not install new membranes modules with existing membrane modules in the same train. Move the existing membrane modules from train 1 to train 4. Train 4 will then have 6 membrane cassettes, which will extend the life of the membranes.

6.7 BURNT STORE WRF

The Burnt Store WRF was acquired December 12, 2003, when CCU purchased Florida Water Services' Burnt Store Division. Located in southwest Charlotte County on Burnt Store Road, the WRF serves six developments: Burnt Store Marina, Burnt Store Colony, Burnt Store Village, Burnt Store Lakes, Pirate Harbor community, and Heritage Landings.

The WRF uses conventional activated sludge with effluent filtration and high-level chlorine disinfection to produce RCW. The facility's permitted capacity is 0.5 MGD AADF. Effluent can be distributed as RCW to unrestricted-public-access reuse sites, injected into a deep well injection system, and applied to a slow-rate restricted-access land application system. The deep injection well system is shared with the adjacent Burnt Store RO WTP. Figure 6-5 shows the Burnt Store WRF process flow diagram.

Figure 6-5 Burnt Store WRF Process Flow Diagram



The Burnt Store WRF process consists of the following components:

A) Headworks and EQ Tank: Raw wastewater from the South County service area collection/transmission system enters the WRF manual bar screen and flows into the EQ tank. Blowers equipped with timers and coarse-bubble diffusers aerate the

wastewater and suspend solids. Internal plant flows from the on-site pump station are also pumped into the EQ tank.

The EQ transfer pumps are equipped with VFDs that operators periodically adjust based on season and historical trends. The EQ tank is equipped with ultra-sonic level sensors that turn off the pumps based on a low level and trigger an alarm condition if the EQ tank level gets above the high-level alarm.

B) Activated Sludge Treatment: The activated sludge treatment occurs in two steel-ring package treatment units. The wastewater from the EQ tank enters the outer ring of a package-type treatment basin equipped with coarse-bubble diffusers where it is combined with RAS flow from the settlers. The mixed liquor suspended solids (MLSS) are aerated to achieve extended aeration treatment, and the air flowrate of the diffusers is adjusted to achieve nitrogen removal.

The plant has three Gardner Denver centrifugal blowers: one dedicated to the aeration tanks, one dedicated to the sludge digestion tank, and one on stand-by. A fourth smaller blower provides air to the EQ tank.

C) Secondary Treatment – Sedimentation: The two-steel circular secondary clarifiers are within the center of each package treatment unit for gravity solids separation. The clarifiers are skimmed to remove floatables and scum before clarifier effluent flows over a circumferential weir to the tertiary filters. Sludge pumps convey settled solids to the activated sludge tank (RAS) or the sludge holding tank (WAS). The RAS pumps turn on 10 minutes before and turn off 10 minutes after the EQ pumps turn on and turn off. Scum is collected in a scum trough and sent to the plant lift station where it is returned to the EQ tank.

D) Tertiary Treatment – Filtration: Clarified water from the settlers enters four disk filters, each having 5-micron filter cloths. The disk filter unit is installed in a steel filter tank that allows water to flow from outside the disk filters into a manifold system of the filter unit.

E) Tertiary Treatment – Disinfection: The filtered water can be sent to two CCCs where liquid sodium hypochlorite is introduced for disinfection. Two chemical feed pumps are controlled by a chlorine analyzer to dose sodium hypochlorite. The chlorine analyzer measures chlorine concentration at the beginning of the CCC and adjusts the chlorine feed rates. A reagent-less analyzer measures the chlorine residual at the CCC discharge weir for compliance with regulatory limits. A mixing pump is provided at the chemical feed point, and the chambers are baffled and sized to meet disinfection requirements. Sodium hypochlorite is stored in two tanks with a total capacity of 2,200 gallons.

F) Effluent Reclaimed and Disposal Facilities: RCW is conveyed through the unrestricted-public-access RCW system via an HSP station. The HSP station consists of two large HSPs and two smaller jockey pumps. Two Class I deep injection wells and four percolation ponds are available for disposal of excess RCW or treated water that does not meet RCW standards.

IW-2 is currently being used as the primary means of effluent disposal, with the older well, IW-1, maintained as a backup. Currently, a maximum of 380 gpm can be diverted to the deep well. Effluent flow that exceeds the deep well flow setpoint is diverted to the percolation pond system by way of a splitter mechanism at the CCC. The deep injection wells are also used for disposal of concentrate from the Burnt Store WTP RO facilities. Flows from the WTP and WRF are combined in a wet well at the injection well pumping station. Two equally sized vertical turbine pumps are used to inject water into the injection well.

G) Aerobic Digestion: Three crescent-shaped sludge holding tanks are in one steel ring tank, providing a total capacity of nearly 300,000 gallons. Sludge is hauled to the East Port WRF and combined with the sludge from the other Charlotte County WRFs for digestion, dewatering, and final disposal at the compost facility at the County's Zemel Road Landfill. One blower is dedicated to the sludge holding/aerobic digestion tank.

6.7.1 Regulatory Considerations

The Burnt Store WRF operations are regulated by FDEP under the provisions of Chapter 403, Florida Statutes, and the applicable FAC rules. The following permits govern plant operations:

- Plant Operating Permit (FLA014083), Expiration Date: December 28, 2021.
  - A Capacity Analysis Report (CAR) was prepared for the Burnt Store WRF in December 2018. A yearly CAR will continue to be completed to determine the need for a schedule for expansion.
- IW-1 Permit (271367-004-UO), Expiration Date: March 2, 2019. New permit issued on May 14, 2019. The IW-1 permit expires in May 14, 2024.
- IW-2 Permit (271367-005-UO), Expiration Date: October 17, 2021.
  - The MIT was performed on IW-2 in 2018.

6.7.2 Wastewater Flows and Loads

The Burnt Store WRF's permitted capacity is 0.500 MGD AADF. In FY 2019, the AADF was 0.316 MGD and the Burnt Store WRF is operating at 53 percent of the plant permit capacity. The maximum monthly average flow of 0.408 MGD occurred in August 2019. The highest TMADF of 0.381 MGD occurred in March 2019, which is 76 percent of the plant permit capacity.

Table 6-21 summarizes influent flows as reported on the FY 2019 DMRs.

Table 6-21 Burnt Store WRF Influent Flows in FY 2019

Month	Monthly Avg. (MGD)	AADF (MGD)[1]	TMADF (MGD)	Monthly Max Day (MGD)	TMADF Percent Capacity (%)
Oct-18	0.266	0.305	0.294	0.371	58.8
Nov-18	0.272	0.305	0.282	0.291	56.4
Dec-18	0.289	0.305	0.276	0.352	55.2
Jan-19	0.353	0.307	0.305	0.517	61.0
Feb-19	0.407	0.312	0.350	0.476	70.0
Mar-19	0.384	0.316	0.381	0.418	76.2
Apr-19	0.310	0.318	0.367	0.378	73.4
May-19	0.204	0.309	0.299	0.256	59.8
Jun-19	0.295	0.308	0.270	0.421	54.0
Jul-19	0.344	0.312	0.281	0.502	56.2
Aug-19	0.408	0.320	0.349	0.760	69.8
Sep-19	0.265	0.316	0.339	0.329	67.8

Note: [1] Permitted plant capacity 0.500 MGD.

For FY 2019, the average annual influent load for CBOD5 was 108.6 mg/L and for TSS was 144.0 mg/L. The maximum monthly average for CBOD5 was 174.8 mg/L in February 2019. The TSS maximum monthly average was 199.8 mg/L occurring in January 2019, which corresponds with seasonal residents and the dry season. Table 6-22 summarizes the wastewater characteristics of the WRF influent.

Table 6-22 Burnt Store WRF Influent Water Quality in FY 2019

Month	CBOD5		TSS	
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)
Oct-18	85.9	121.1	130.0	154.0
Nov-18	109.4	123.1	148.4	155.5
Dec-18	151.3	122.5	187.0	155.4
Jan-19	167.6	122.7	199.8	155.1
Feb-19	174.8	121.6	182.3	152.4
Mar-19	127.0	115.6	123.8	144.8
Apr-19	138.3	112.3	189.5	143.5
May-19	110.3	112.2	161.0	144.0
Jun-19	70.9	111.5	125.7	144.8
Jul-19	49.6	108.9	72.3	141.7
Aug-19	49.6	107.7	106.1	141.9
Sep-19	68.5	108.6	101.8	144.0

6.7.3 WRF Treatment Objectives and Effluent Quality

The Burnt Store WRF is designed to treat wastewater to two effluent standards: one for disposal to the deep injection well and percolation pond systems (CBOD5 = 20 mg/L,

TSS = 20 mg/L), requiring basic disinfection; and the other for public-access reuse levels (CBOD5 = 20 mg/L, TSS = 5 mg/L), requiring high-level disinfection.

In FY 2019, the annual average effluent CBOD5 and TSS values were 1.0 mg/L and 0.58 mg/L, respectively. The CBOD5 maximum monthly average of 2.3 mg/L in March 2019. The TSS maximum monthly average of 3.65 mg/L occurred in October 2018. These CBOD5 and TSS concentrations are well within public-access reuse standards. Table 6-23 summarizes the water quality of the Burnt Store WRF effluent.

Table 6-23 Burnt Store WRF Effluent Water Quality in FY 2019

Month	CBOD5			TSS			Fecal Monthly Avg. (No./100 mL)
	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	Monthly Avg. (mg/L)	Annual Avg. (mg/L)	Percent Removal (%)	
Oct-18	1.0	1.0	98.8	3.65	0.60	97.2	0.5
Nov-18	1.0	1.0	99.1	0.12	0.30	99.9	0.5
Dec-18	1.0	1.0	99.3	0.23	0.60	99.9	0.5
Jan-19	1.0	1.0	99.4	0.24	0.54	99.9	0.8
Feb-19	1.0	1.0	99.4	0.33	0.5	99.8	0.5
Mar-19	2.3	1.0	98.2	0.65	0.52	99.5	0.5
Apr-19	1.0	1.0	99.3	0.68	0.56	99.6	0.5
May-19	1.0	1.0	99.1	0.42	0.57	99.7	0.5
Jun-19	1.0	1.0	98.6	0.23	0.57	99.8	1.0
Jul-19	1.0	1.0	98.0	0.08	0.57	99.9	0.5
Aug-19	1.0	1.0	98.0	0.30	0.58	99.7	1.0
Sep-19	1.0	1.0	98.5	0.08	0.58	99.9	0.5

6.7.4 Treatment Components and Condition Assessments

Jones Edmunds completed an on-site review of the plant on February 4, 2020. Our personnel met with John Thompson, Chief Operator of the Burnt Store WRF, to review plant conditions and operations and discuss records. Access to the facility is through a secure gate in a fence that surrounds the water and wastewater plants. The plant site is well kept and maintained including mowing and storage of used equipment in suitable locations.

Required documents maintained on site include:

- Operating permits for the treatment facility and deep injection well.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports.
- Annual Reuse Report.
- Pathogen Monitoring Report (Giardia and Cryptosporidium every 5 years per permit).
- Reports required to complete the last permit application.
- Certification of the EPLAB.
- Sampling Plan.

- Groundwater Monitoring Plan (contained in permit).
- Laboratory results.
- Flow meter calibrations.
- Chlorine and pH meter calibrations (one/day).
- Chain-of-custody forms for samples that are sent to laboratories.
- Monthly residual and marketing report (reported in dry tons/month).
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Reuse Operating Protocol.
- Facility Record Drawings.
- Daily temperature logs.
- Spill protocol and record of spills.

6.7.4.1 WRF Influent

The influent sample point is clearly marked, and the refrigerated influent composite sampler is in good operating condition. All sample points are at permit-required locations. All piping is painted and clearly marked.

6.7.4.2 Headworks

The headworks overall condition is fair. It consists of one manually cleaned bar rack. The headworks does not include grit removal and the influent manual screening system cannot prevent moderate-sized debris from entering the facility's EQ tank, pumping systems, and process tanks. Issues with the headworks include inadequate screening, lack of floatables removal, and no grit removal facilities. Currently, the only way to remove floatables that pass through the manual bar screen is by using a bucket to remove them from the EQ tank.

A mechanical fine screen and scum or floatables removal and grit removal systems are highly recommended. This issue is expected to be resolved as part of a future facility upgrade.

6.7.4.3 Flow Equalization

The Aquastore EQ tank is in good condition. Accumulation of grit (due to lack of headworks grit removal) in the EQ tank reduces treatment capacity. The grit in the EQ tank was removed by US Submergent Technologies in 2018.

The pumps are in poor condition and need to be replaced. The system is capable of pumping 400 gpm with one pump running at a time. The pumps send water to the splitter box and the raw effluent runs by gravity to the aeration basin. The flow does not reach a 2 ft per second velocity and the Operators have problems with the 12-inch feed pipes clogging. The system needs to be changed to pump directly to the aeration basin and keep the 12-inch pipe as overflow protection for the EQ tank.

The EQ tank has signs of rust around the upper steel rim. Removing rust and painting rusted areas was not done in 2019 as scheduled and is rescheduled for 2020. Internal piping is in poor condition with leaks at flanged fittings. The leaks do not pose an environmental hazard because they are inside the tank. The piping should be replaced as part of a plant upgrade.

A leak in the aeration header of the EQ tank blower was repaired in 2017. One of the drop diffusers inside the EQ tank is damaged.

The EQ tank can transfer flow to the treatment process train by gravity (gravity mode) and/or pumped using the EQ transfer pump station. The gravity mode allows diurnal loads to be equalized using the entire tank volume. The gravity mode uses a splitter box with gravity flow piping to split flow between the two activated sludge treatment basins. However, the capacity of the gravity piping is too small to pass the maximum daily flows. As such, Operations staff pump the raw wastewater from the EQ tank to the two aeration basins.

The lack of fine screening and grit removal creates operational and mechanical problems for the EQ tank and pumps. Staff clears the EQ transfer pumps weekly during the peak season and biweekly during the off-peak season. The staff also clears the pipelines of debris annually to remove clogs in the system. To help make this cleaning process safer, a permanent pump motor hoist system is installed over the EQ pumps to allow access to the pump volute.

Future plant upgrades should simplify the operation of the EQ tank to allow modes for flow and/or plant load equalization and to provide proper headworks treatment to reduce grit and screenings accumulation and wear in EQ tank and pumps.

6.7.4.4 Activated Sludge Facilities

The activated sludge facilities are steel-ring package plants consisting of two aeration tanks and two secondary clarifiers. The overall condition is good. The hinged sluice gates separating the two aeration tanks are not functioning as intended, allowing wastewater to flow to the adjacent tank during maintenance.

At the time of the site visit, the aeration basins appeared to have adequate air distribution throughout the tank. The tanks have minimum free-board (<1 foot), creating concerns of overflowing during high-flow conditions or if a downstream flow obstruction occurs. Rust was removed from the metal tanks and the tanks were painted in 2018.

All blowers were rebuilt in 2017. The operation of the blowers is based on timers. There are no DO sensors to adjust blower operation.

6.7.4.5 Sedimentation

The overall condition of the two clarifiers is good.

Clarifiers are in good working order. Clarifier No. 1 is cleaned of excessive algae growth on the weirs with a hose daily and brushed weekly. Clarifier No. 2 is cleaned less frequently and showed signs of algae growth during the site visit.

The two RAS/WAS pumps are in poor condition and operating at their end of lifetime. One of the pumps has an oil leak. Hence, the County ordered a pump replacement in FY 2019. A control valve is used to control RAS and WAS flows.

6.7.4.6 Filtration

Effluent filtration system is a cloth media disk filter housed in a painted carbon steel tank. The overall condition of the filtration system is good.

Two additional 5-micron cloth discs were installed in the two spare slots in 2017. The Chief Operator indicated that the filter is producing a good quality effluent; however, it backwashes frequently during periods of high flow. This may be because the backwash pumps are set for 10-micron cloth, but the filter has 5-micron cloth. The Chief Operator also indicated that the overflow line flows to the CCC instead of flowing back to the headworks. During the site visit, numerous mosquitoes were noticed attached to the steel tank.

6.7.4.7 Chlorination

The overall condition of the chlorination system is good. CCC No. 2 is not in service since it does not provide sufficient contact time due to the chlorine injection location.

The concrete CCCs are in good condition. A UV cover has been installed over CCC No. 1 and is scheduled to be replaced in FY 2020. A submersible mixing pump is used to enhance chlorine mixing. A sampling pump is used to pump CCC effluent to the chlorine analyzer for compliance monitoring. This replaced an old gravity feed system and improved reliability.

The two sodium hypochlorite tanks are well kept and meeting regulatory requirements. An emergency eyewash and shower are at the sodium hypochlorite storage tank and chemical feed pump area. A concrete containment wall has been constructed around the entire chlorine storage and pumping area. Two new diaphragm chlorine metering pumps were installed in FY 2019.

6.7.4.8 Solids Handling Facilities

The overall condition of the solids handling facilities is good. Two tanks are aerated to provide partial sludge stabilization and the third tank is normally used for thickening and decanting. Hook-up connections are provided for trucks to transport thickened sludge to East Port WRF for further processing. A bottom feed submersible pump suspended on a winch is used to decant supernatant back to the front end of the facility for treatment. The top ring of the sludge holding tank has minor rust.

During the site visit, Aerobic Digester No. 1 and Aerobic Digester No. 2 were connected using a temporary hose. The Chief Operator indicated the internal gate connecting the digesters is inoperable.

6.7.4.9 Effluent Storage and Disposal

The overall condition of the effluent disposal system is good.

Effluent HSPs and jockey pumps are well maintained and show no signs of deterioration. No means of measuring the RCW leaving the site is provided. The two large HSPs are no longer in use but they are working properly and are tested regularly. RCW is conveyed to the unrestricted-public-access RCW system using the two smaller jockey pumps.

No on-site RCW storage is available. Future large users must be serviced through direct distribution to the user's RCW holding facility or storage will be needed to meet these future demands.

In 2017, the wastewater operation room SCADA system was connected to the deep IW to monitor flows.

The deep IWs and percolation ponds are well maintained and in good working order.

Effluent flows by gravity from the plant discharge to the deep well pumping station and percolation ponds. The flow to the deep well pumping station wet well is through a 6-inch-diameter pipe, which is insufficient to move peak flows. Flow that does not reach the deep well overflows to the percolation ponds. This situation impacts the plant's ability to handle peak flows and makes it impossible to use the full capacity of the deep wells. The ability to transfer higher flows by gravity or pumping should be investigated as part of the plant upgrade design.

A smaller pump was installed to replace an existing pump in the deep well pumping station to match the current flows that flow by gravity to the wet well. The deep well pumps were repainted in FY 2017. One of the IW pumps was replaced in FY 2018.

IW-1 has a rated capacity of 0.564 MGD. IW-2 is designed for an ultimate capacity of 9.5 MGD. However, due to supply limitations associated with available test water, IW-2 was tested at a flow rate of 2.88 MGD. Thus, the initial capacity rating for IW-2 is 2.88 MGD. A

16-inch valve on the IW-2 inlet line was replaced in FY 2019. Operating personnel exercise IW-1 once per month for a minimum 24-hour period to maintain its integrity.

Four shallow monitoring wells around the IW-1 deep injection well were installed as part of the injection well construction. These wells should not be plugged because they may be needed if any rehabilitation work is performed on IW-1 or IW-2.

The percolation ponds are used to their maximum permitted capacity to encourage shallow groundwater recharge. The percolation ponds are alternately rested and allowed to dry. The pond bottoms are harrowed to enhance percolation. The interior of the ponds above the water line are mowed.

As part of the WRF upgrades, CCU intends to evaluate other means for transferring greater amounts of effluent flow to the deepwell, such as increasing the size of the piping. Currently the system is capable of sending up to 380 gpm to the deep well by gravity.

6.7.4.10 Reclaimed Storage and Distribution

In FY 2018, the RCW customers within the Burnt Store WRF service area were the Burnt Store Lakes, and the Burnt Store Colony mobile home park , which use a small amount of RCW for drip irrigation of landscaping along the development entranceways and common areas. Although the Burnt Store WRF has the capacity to pump 0.500 MGD AADF of RCW, these active users were permitted for only 0.0117 MGD. The addition of RCW users under a General Reuse Service Area (permit amendment March 2017) would allow the facility to provide up to 0.500 MGD of RCW. Two HSPs are mounted above a clear well following the CCCs but are not in use. Instead, one booster pump is used to satisfy the demand of the three customers.

Flow to the RCW pump station is monitored by an ultrasonic flow meter and primary weir device, which became obsolete when the WRF began transferring flow to the deep injection well system. A new flow meter will need to be installed on the RCW pump discharge line to measure RCW flow leaving the site. CCU intends to address this requirement as part of the plant upgrade.

6.7.4.11 Storage and Alternate Disposal

No reject storage is provided at the Burnt Store WRF. Alternate disposal of RCW is provided via IW-1 and IW-2 (3.444-MGD deep injection maximum daily flow permitted capacity), and the four on-site percolation reuse ponds (rated capacity of 0.250-MGD AADF). Currently, the Burnt Store WRF is under expansion plans that will increase the reclaimed flow to two new users by 0.200 MGD. This will require additional storage, additional filtration, and other redundancies to comply with the corresponding regulations.

Table 6-24 lists the average flow pumped into IW-1 and IW-2. In FY 2019, an average annual flow of 2.467 MG was sent to the deep injection wells and 1.394 MG was sent to the percolation ponds.

Table 6-24 Burnt Store WRF Injection Well Flows

Month	IW-1 (MG)	IW-2 (MG)	Total IW Flow (MG)
Oct-18	0.009	0.095	0.104
Nov-18	0.000	0.096	0.096
Dec-18	0.000	0.132	0.132
Jan-19	0.008	0.217	0.226
Feb-19	0.000	0.222	0.222
Mar-19	0.000	0.260	0.222
Apr-19	0.000	0.245	0.245
May-19	0.000	0.207	0.207
Jun-19	0.000	0.256	0.256
Jul-19	0.000	0.248	0.248
Aug-19	0.000	0.270	0.270
Sep-19	0.000	0.202	0.202
Annual Avg.	0.001	0.204	0.203

Note: Recall that the Burnt Store WRF IWs also receive the concentrate flows from the Burnt Store RO WTP.

6.7.4.12 Wet Weather Storage

Other than the limited storage capabilities of the on-site percolation ponds, no wet-weather storage is necessary for the Burnt Store WRF.

6.7.4.13 Electrical Components and Circuitry

The incoming switchgear and distribution transformer appear in fair-to-good condition. The incoming power company service transformer exhibits an extensive amount of surface rust, which may soon be impacting the transformer function. The existing primary distribution switchboard outside the MCC room is also exhibiting signs of degradation from the weather. The plant is served from a single generator of an undetermined size. The generator was in good condition but exhibited signs of residual diesel fuel on top of the diesel fuel tank. This may be indicative of additional issues. Overall, the electrical equipment in Building MCC-1 is in good functioning condition based on information from the Operations staff, except for the deficiencies listed below.

The following deficiencies were noted:

- The switchgear contains warning labels identifying parts and components as being energized. However, none of the equipment includes the appropriate arc flash labeling required by NFPA 70E.
- The fiberglass MCC building should be replaced with a concrete structure.
- The main breaker trips when two blowers are started simultaneously.

6.7.5 Operations

The Burnt Store WRF is continuously monitored by online instrumentation through SCADA. A new operations building, which is shared with the Burnt Store RO WTP staff, was completed in FY 2009. The operations building houses the WRF operating system which is used to monitor critical operations and maintain compliance with regulatory requirements.

Plant Operations staff manages the treatment process effectively and works to address maintenance items in a timely manner. The plant produces effluent meeting the requirements for RCW and injection well disposal. The flow EQ tank helps attenuate diurnal and extreme weather flows to enable proper treatment.

The Burnt Store WRF is staffed 6 hours per day, 7 days per week. The WRF can be continuously monitored by the East Port WRF operators through a County-wide telemetry system that allows the Burnt Store WRF to continue to produce RCW 24 hours per day.

6.7.6 Maintenance

Routine maintenance is performed on a scheduled basis. Rehabilitation of major pieces of equipment is completed according to the CIPs that are revised annually. Maintenance that is required to keep the WRF in compliance with regulations is performed immediately using in-house maintenance personnel or outside contractors. The entire facility was scheduled to be repainted in FY 2018. Painting of the facility was completed in FY 2019.

6.7.7 Review of Previous Report Recommendations

Table 6-25 Burnt Store WRF 2018 Recommendations and Status

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.
Progress:	*Pending plant upgrades.*
Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Progress:	*Ongoing.*
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.
Progress:	*Ongoing.*
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Progress:	*Completed.*
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.
Progress:	*Pending plant upgrades.*
Recommendation:	Scum removal from the treatment system is not being accomplished. Collected scum should be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.
Progress:	*Pending plant upgrades.*

Recommendation:	Install a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe. This will maximize the capacity of the deep injection wells' system when necessary.
Progress:	*Pending plant upgrades or if a significant RCW customer(s) connects.*
Recommendation:	Install new deep well injection pumps.
Progress:	*One pump was replaced. The other pump is still in operation.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.
Progress:	*Pending plant upgrades.*
Recommendation:	Evaluate the main breaker at the blowers to prevent tripping.
Progress:	*Pending plant upgrades.*
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard.
Progress:	*Not completed.*
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Progress:	*Not completed.*

6.7.8 Summary and Recommendations

The Burnt Store WRF serves south Charlotte County along Burnt Store Road and 2 square miles of residential golf course/marina in Lee County. The WRF shares the site with the Burnt Store RO WTP. The WRF produces RCW that meets public-access RCW requirements.

The Burnt Store WRF has reached a percent-of-capacity use that requires a CAR every year to assess the previous year flows and their impact on the capabilities of the plant to meet its permitted effluent requirements. However, the population growth in this part of southwest Florida stopped in 2009. Recently, a substantial population growth has been observed in this area. The WRF flow remains near the same flow level as it was in 2008. FDEP is allowing a phased increase in the capacity of the Burnt Store WRF plant to meet projected needs.

Reviewing the electrical components at this facility shows that they are in good-to-fair condition. The electrical switchgear has some issues as discussed previously; overall, these are not considered severe.

Table 6-26 lists the recommendations that should be addressed at the Burnt Store WRF. Many recommendations from prior annual reports such as those listed in Section 6.7.7 will be impacted as part of the plant upgrade. The items that should be reconsidered based on the design of the new Burnt Store WRF are indicated with an asterisk in the table below.

Table 6-26 Burnt Store WRF 2019 Recommendations

Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.*
Recommendation:	Remove rust from the top rim of the EQ tank and repaint.*
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.*
Recommendation:	Install EQ tank-level monitoring to adjust the transfer pump(s) flow rates.*
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.*
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.*
Recommendation:	Replace the UV cover attached to CCC No. 1.
Recommendation:	Scum removal from the treatment system is not being accomplished. Collected scum should be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.*
Recommendation:	Install an RCW meter on the discharge line from the RCW pumps. No means of measuring public-access RCW flow leaving the site is currently provided.*
Recommendation:	Install a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe. This will maximize the capacity of the deep injection wells' system when necessary.*
Recommendation:	Replace the old deep well injection pumps.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.*
Recommendation:	Evaluate the main breaker at the blowers to prevent tripping when three blowers are in operation.
Recommendation:	Evaluate filter back-wash pump operations, specifically during high-flow events.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.

*Note: Items to be re-evaluated as part of the Burnt Store WRF expansion project.

6.8 LEACHATE TREATMENT FACILITY (LTF)

The LTF is operated and maintained by CCU for the Charlotte County Municipal Solid Waste Management Department. Leachate generated by the Zemel Road Municipal Solid Waste Landfill is treated at the LTF and disposed of on site. The treatment facility and landfill share a 308-acre parcel in South County at 29751 Zemel Road, Punta Gorda, FL 33955.

The landfill is designed to contain and collect leachate to protect surrounding groundwater and lakes. Leachate is generated as water seeps down through the solid waste, picking up dissolved and suspended solids. A vertical bentonite (clay soil) slurry wall that blends below ground with the natural confining layer of soil surrounding the landfill separates the interior landfill leachate from the natural environment. A leachate collection system installed under the waste drains the liquid to a central location where it is pumped to the treatment facility.

6.8.1 REGULATORY CONSIDERATIONS

The LTF's construction permit was issued in 1991 as part of the Class I landfill to treat 0.25 MGD of leachate. In FY 2019, the monthly average daily flows ranged from 0.0647 MGD to 0.0873 MGD, and the AADF was 0.0747 MGD. Operation of the plant is impacted by the following permits, which have specific reporting and monitoring requirements. Regulatory items directly related to the LTF are listed below:

- Class 1 Landfill Permit Expiration Date: July 15, 2033.
- IW-I Permit (No. 191077-003-UO/1I) Expiration Date: October 25, 2024 (Permit renewal by Charlotte County Public Works)
    - New permit issued in October 25, 2019
    - Monthly Summary Reports submitted to FDEP.
    - Quarterly Specific Injectivity Tests completed and submitted to FDEP.
    - The MIT was performed in 2017, next MIT is due in 2022.

6.8.2 Leachate Treatment Overview

The LTF uses a Powdered-Activated Carbon Treatment (PACT) batch tank treatment system, which combines powdered-activated carbon (PAC) and activated sludge (aerobic bacteria) to simultaneously adsorb and metabolize the leachate contaminants to treat the leachate to an acceptable level for deep well injection disposal.

6.8.2.1 LTF Influent

Most of the LTF's influent comes from the landfill pumping station (PS-1), which has a capacity of 150 gpm. Landfill leachate combines with the plant office sanitary sewer and the landfill underdrains outside the slurry wall. The system is designed to maintain a 1-foot static head differential between the water level on the inside and outside of the landfill slurry wall that is greater than the landfill permit requires. This approach provides operational flexibility since leachate can be stored within the landfill cell in the event PS-1 is temporarily out of service.

Leachate from PS-1 combines with runoff from the co-composting program at the County's Zemel Road Landfill. The composting program combines dewatered biosolids from the East Port WRF with yard waste to create an organic soil conditioner. The composting operation is

on a concrete paved area near the LTF, and FDEP requires the runoff be captured and treated at the LTF.

PS-1 pumps leachate into the influent holding tank and records daily volume with the leachate influent plant flow meter. The plant pumping station (PS-2) transfers leachate from the influent holding tank to the batch treatment tank units Monday through Friday when operators are present. On weekends, the Chief Operator monitors PS-1 and the level in the influent tank via SCADA.

6.8.2.2 PACT Biological/Carbon Adsorption Treatment

The PACT system consists of three separate tanks using aerated activated sludge with carbon particle adsorption. Each PACT tank is a small package plant with a separate aeration system and pumps.

The carbon slurry used in the PACT process is made by combining bagged PAC with water. The carbon slurry is combined with the raw leachate and aerated. Aeration is periodically shut off to permit settling of the sludge. After settling is completed, the decant water is pumped to a decant storage tank, filtered for final polishing, and stored in a glass-lined steel tank. The PACT tanks are then refilled with raw leachate, which is combined with the MLSS, additional PAC is added (if necessary), and the aeration blower is restarted to begin the process again.

6.8.2.3 Solids Disposal

Weekly, after decanting the treated leachate, the remaining solids (mixed carbon/biological sludge) from the PACT tanks are transferred directly to outdoor sludge-drying beds for dewatering. A Bobcat loader is used for sludge removal for maximum maneuverability within the sludge drying beds. Grit is removed from the batch process tanks, as necessary, and dried with biosolids. The Bobcat removes and dumps dried solids into a dumpster that is hauled to the landfill for final disposal.

6.8.2.4 Effluent Disposal

Effluent is disposed of the same day it is treated. Most of the effluent is pumped into the deep injection well, with a small volume used for dust control at the landfill.

Unchlorinated effluent is pumped down the deep injection well to an approximate depth of 2,700 feet below ground surface into a confined saltwater aquifer. The deep injection well typically operates 6 days per week, but operation can be adjusted according to leachate production and effluent disposal requirements. Plant effluent can be stored and equalized in the Aquastore effluent storage tank so that the injection well down-hole flow does not exceed 320 gpm.

A program to operate the Zemel Road Landfill as a Landfill Bioreactor and recycle leachate to enhance landfill biogas production at the landfill has changed influent leachate flows and characteristics. However, the effluent leachate still meets or exceeds the final effluent standards required for disposal to the 0.460-MGD deep injection well system adjacent to the treatment plant. Table 6-27 summarizes the flows sent from the LTF to the deep injection well.

Table 6-27 LTF Deep Injection Well Flows – FY 2019

Month	To Deep Injection Well Monthly Avg. (MGD)	Injection Rate Monthly Average (gpm)	Wellhead Pressure (psi)
Oct-18	0.0704	226	17
Nov-18	0.0684	232	16
Dec-18	0.0702	225	15
Jan-19	0.0767	244	16
Feb-19	0.0733	246	16
Mar-19	0.0873	241	16
Apr-19	0.0829	237	17
May-19	0.0794	234	17
Jun-19	0.0763	238	18
Jul-19	0.0777	230	18
Aug-19	0.0701	238	18
Sep-19	0.0647	246	18

6.8.3 Treatment Components and Condition Assessments

Jones Edmunds conducted a site visit at the LTF on February 4, 2020, and met with Kirk Kettler, Chief Operator, to review plant conditions, operations, and records. Access to the facility is through a secure gate at the entrance to the landfill. The plant is isolated among landfill operation buildings and adjacent to the yard waste composting facility. The facility appears in good condition and staff does a good job maintaining the grounds and the facility appearance.

The facility is required to maintain plant documents on site. The following summarizes the types of documents generally found at treatment plants. Due to the nature of this facility and

since it is permitted under the landfill permit, some traditional documents may not be required for the LTF.

- Operating permits for the treatment facility and deep injection wells.
- Operator's licenses.
- Facility logbook.
- Facility Standard and Emergency Operating Plans.
- DMRs.
- Effluent Analysis Reports (N/A).
- Reports required to complete the last permit application.
- Certification of the laboratory used for sample analysis.
- Sampling Plan.
- Groundwater Monitoring Plan (N/A).
- Laboratory results.
- Chain-of-custody forms for samples that are sent to laboratories.
- Facility Operations and Maintenance Manuals.
- Maintenance records (EAMS electronic data system).
- Facility Record Drawings.
- Spill protocol and record of spills are kept by the owner of the plant, Charlotte County Public Works Department, and kept on file at the LTF office.

6.8.3.1 PACT Biological/Carbon Adsorption Batch Treatment Operation

The overall condition of the three PACT treatment units is good, and the facility is operating without any treatment or capacity issues. The tanks' exteriors and interior were partially painted in FY 2017 and completed in FY 2018. Surfaces were pressure washed and rust and lost paint were removed and primed before painting was completed.

6.8.3.2 Filtration

The sand media filter is in good condition. No back-up is provided for this critical piece of treatment equipment, which makes maintenance and repair work more difficult to coordinate. The installation of a second filter or provisions to provide temporary filtration connection should be investigated as needed based on plant operating conditions. The sand filter compressor is scheduled to be replaced in FY 2020.

6.8.3.3 Solids Handling Facilities

The sludge-drying beds are well maintained and sufficient drying bed area for dewatering of solids.

6.8.3.4 Effluent Storage and Disposal

The effluent disposal system is in fair condition, since the Aquastore storage tank has a hole that needs to be repaired. The effluent storage and disposal areas are properly maintained and meet the facility needs

LTF effluent is injected into the injection well by two dry-pit submersible pumps. The existing 12-HP pumps were installed by CCU personnel in 2015. The pumps are operating satisfactorily and not overheating on hot summer days.

6.8.3.5 Auxiliary Power

The LTF has no auxiliary standby power, and according to discussions with staff, power outages occur frequently. During off hours, the power supply is monitored through the high-level alarm at PS-1, which annunciates at the East Port WRF.

Power outages that stop the aeration process for more than a day severely impact the microorganisms and process treatment, resulting in the need for seed sludge to restart the biological process again.

6.8.3.6 Reject Storage and Alternate Disposal

All LTF effluent is disposed of into the deep injection well; no alternative disposal option is required.

6.8.3.7 Wet-Weather Storage

October to May of FY 2017 was dry with less than 15 inches of rain out of an annual average total of 67 inches County-wide. The single largest storm event was Hurricane Irma, which made landfall on September 10, 2017, and deposited approximately 8 inches of rain in the Charlotte County area. Even with the heavy rains and storm conditions, the LTF was able to sufficiently process the leachate using the storage within the landfill and influent EQ tank.

6.8.4 Operations

The LTF is operated as a batch sequence reactor currently treating leachate 5 days per week, Monday through Friday, during working hours and is manually controlled by staff. During wet-weather periods or following a maintenance or repair event, the Chief Operator may operate on weekends, as determined necessary to process the leachate volume. Adding maintenance Staff can support the efforts made by the Chief Operator to appropriately respond to unexpected events.

The overall system, from PS-1 to the injection well, has several capacity differences. If operated continuously, PS-1 has a pumping capacity of 0.22 MGD, the PACT process has a 0.250-MGD capacity, and the injection well has a 0.46-MGD capacity. In the event of excess flows, the operational treatment period could be extended to increase the volume treated per day. Alternately, the sludge digestion tank could be converted to a fourth PACT unit.

6.8.5 Maintenance

The Chief Operator and Assistant Operator complete routine maintenance on a scheduled basis. Emergency maintenance and/or and routine maintenance and repairs are performed using in-house Operations personnel or outside contractors to maintain regulatory compliance. A dedicated maintenance worker for the facility or scheduled maintenance worker at the facility during a specific number of days per week will mitigate issues with Operators having to focus on maintenance issues and perform the work. Rehabilitation or replacement of major pieces of equipment is included in the annual CIP updates.

6.8.6 Review of Previous Annual Report Recommendations

Table 6-28 LTF 2018 Recommendations and Status

Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Progress:	*Ongoing.*
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Progress:	*Ongoing.*

6.8.7 SUMMARY AND RECOMMENDATIONS

The LTF treats the Zemel Road Landfill leachate and associated side streams to a level suitable for deep well injection. The treatment process runs as a batch reactor with three parallel treatment units complete with aeration and liquid decanting capabilities. PAC is added to the biological sludge aeration tanks to achieve discharge permit limits for deep well injection. The biological waste and spent carbon solids are dried on sludge-drying beds and landfilled.

The LTF operational staff maintains the facility in good condition and schedule repair or replacements of existing equipment in a timely manner. The plant is owned by the Charlotte County Public Works Department and operated by CCU personnel. Capital improvements and maintenance are coordinated with Public Works and completed at their discretion. The following summarizes the recommendations.

Table 6-29 LTF 2019 Recommendations

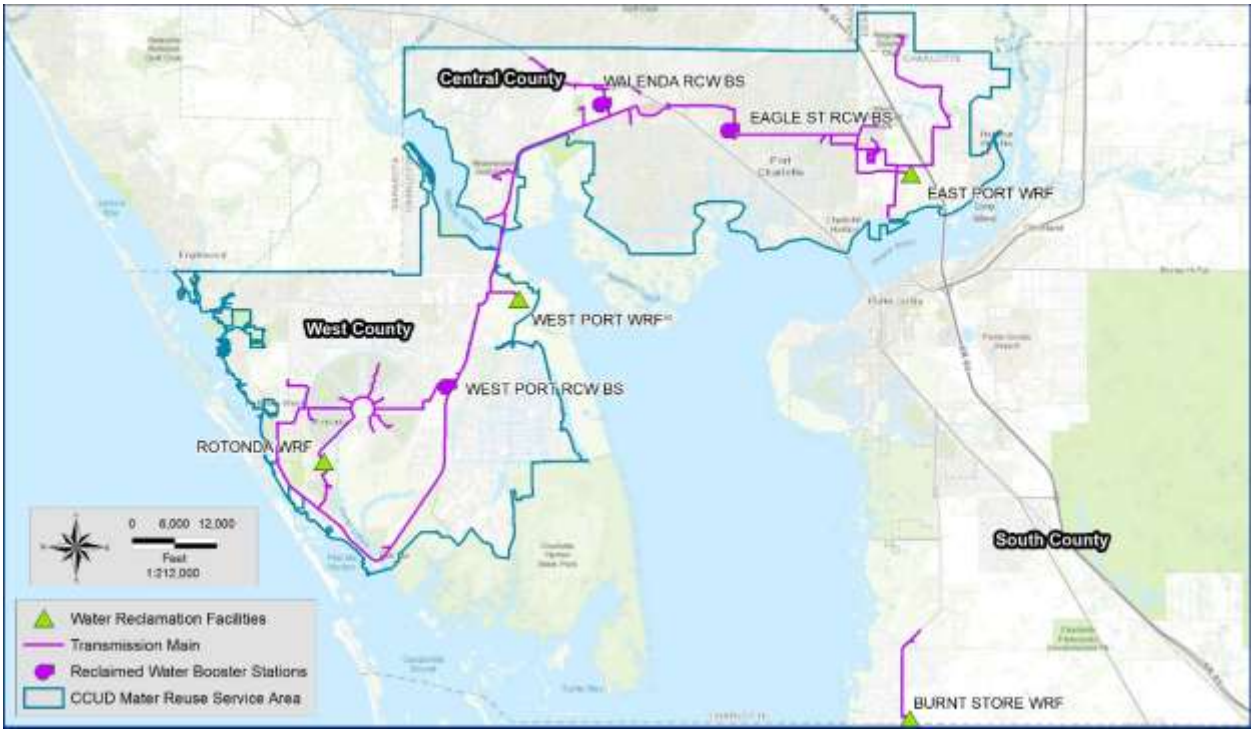
Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Recommendation:	Repair the hole in the Aquastore storage tank.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Recommendation:	Replace the sand filter compressor.

7 RECLAIMED WATER DISTRIBUTION SYSTEM

This Chapter presents the CCU RCW distribution system components and condition assessments of those system components. As discussed in Chapter 6, each of the CCU WRFs produces public-access-quality RCW. CCU's goal is to maximize the beneficial use of RCW and reduce the impact on other water resources. Currently, most RCW customers use the RCW for irrigation purposes and the County supplies RCW to a concrete plant in West County. CCU's RCW customers are a combination of bulk users who receive water through pond discharges then repump as needed for irrigation and pressurized customers whose irrigation systems are connected to the RCW system.

In 2008, CCU worked with SWFWMD on a cooperatively funded project to develop an RCW distribution system in Mid County. To maximize RCW use and share this resource, CCU worked with FDEP in 2014 to establish and permit a Master Reuse System for the East Port, West Port, and Rotonda WRFs once the Mid and West County systems were interconnected earlier that year. In South County, a developer constructed a 3-mile RCW transmission main from the Burnt Store WRF to a golf course. Figure 7-1 shows the County-wide RCW system.

Figure 7-1 CCU RCW Distribution System



7.1 MID/WEST COUNTY SYSTEM

The Mid/West County system, also referred to as the Master Reuse System, receives RCW from three WRFs – East Port, West Port, and Rotonda WRFs. The development of a Master Reuse System arose from an excess of RCW at the East Port WRF and high demands for irrigation water in the west portion of the County.

Before the interconnection, each WRF supplied water to separate RCW distribution systems and the existing or potential customers were assigned to the individual WRF FDEP operating permits. The existing Master Reuse System in Mid/West County has a permitted capacity of 9.2 MGD AADF based on flows from East Port WRF, West Port WRF, and Rotonda WRF (R-001). The County has signed agreements for current and future RCW customers equaling 6.3984 MGD of reuse in the Mid/West County system. Additionally, the restricted public access on the East Port WRF site's slow-rate irrigation system (R-002) provides up to 2.6 MGD of RCW disposal over approximately 187 acres. On-site irrigation in FY 2019 averaged 0.093 MGD.

In 2005, CCU began designing a customer-based RCW transmission system rather than WRF service-area-based system. Preliminary design began with preparing a computerized hydraulic model. The goal of the modeling effort was to identify the infrastructure needed to connect the three WRFs in Mid and West County into one RCW transmission system and to serve as many RCW customers as economically possible.

The first phase included system improvements that used hydraulic modeling to identify the need for two strategically placed 0.5-MG RCW storage tanks with booster stations. The storage tanks provide local storage and increase the total RCW storage within the system. The Phase 1 construction of 14 miles of 16-inch- and 12-inch-diameter transmission main was completed in 2009. The two booster stations, Eagle Street and Walenda, were completed at the same time. The expansion allowed a large golf course community and a major league baseball training complex to connect as well as numerous municipal and commercial properties along the transmission route.

The second phase included system improvements that used hydraulic modeling to evaluate expansions into West County. The complete system model identified the need for increased storage at the West Port WRF and the existing RCW ponds were expanded to 20 MG. CCU also undertook the development of a third booster pump station in West County to maximize delivery of RCW to West County. The West County RCW Booster Station, also known as the Rotonda East Booster Station, was funded through the County and SWFWMD. By early 2014, the transmission systems for all three WRFs were linked, allowing the West Port WRF storage ponds to be filled with RCW from the East Port, West Port, and the Rotonda WRFs.

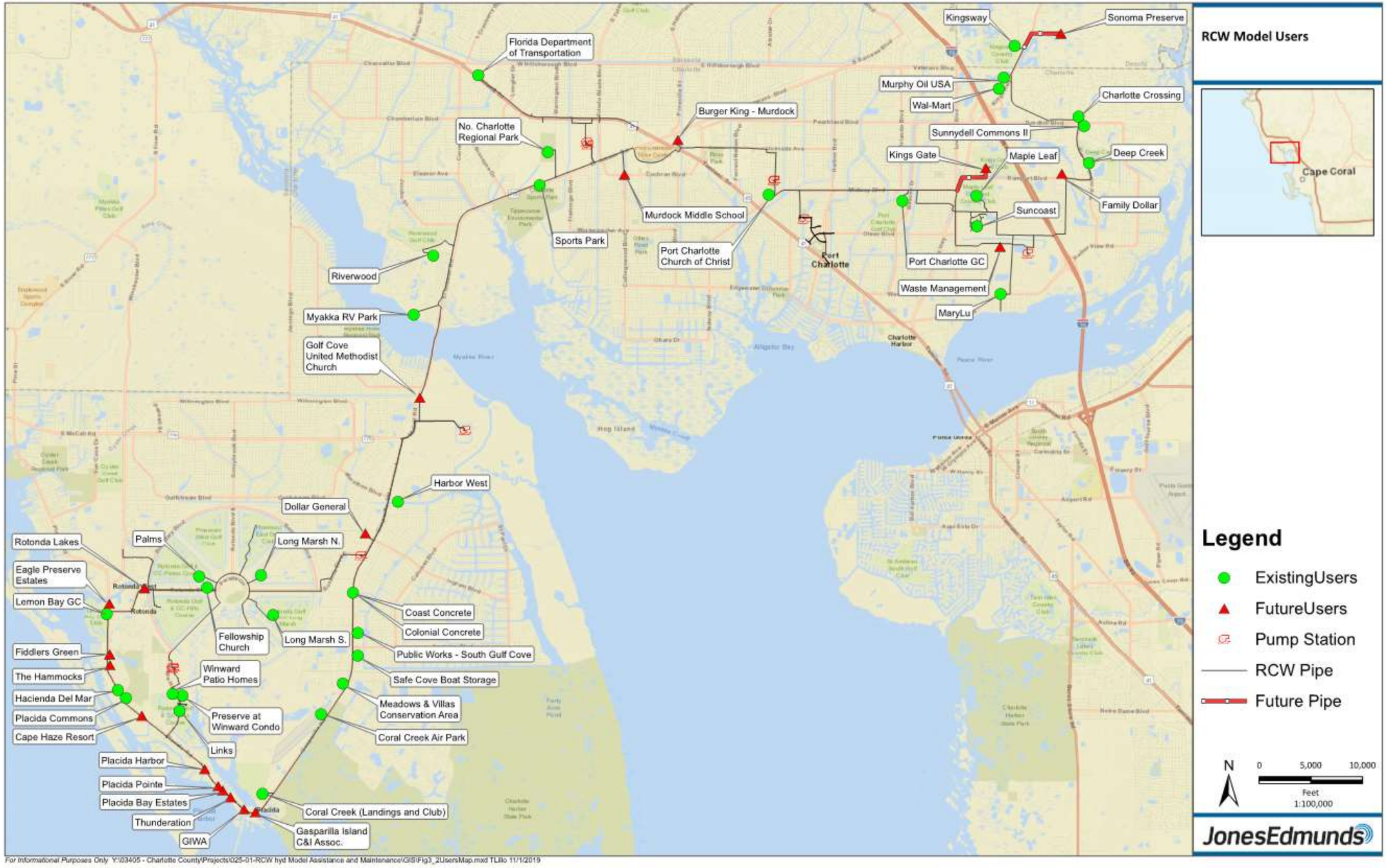
The final phase included installing a 16-inch transmission main on CR 771 in 2016. Other improvements included adding a 95 MG storage pond at the East Port WRF and connecting additional RCW users to the Master Reuse System. Table 7-1 lists the agreement amounts for current and future RCW users in Mid and West County, and the RCW current and future users in Mid and West County.

Table 7-1 Mid/West County Reclaimed Water Users

Reclaim Sites	Pond/ Pressurized	Current/ Future User	Agreement Amount (MGD)
Mid County Reclaim Sites			
Burger King – Murdock	Pressurized	Future	N/A
CC Parks Department Sports Park	Pond	Current	0.25
Charlotte Crossing	Pressurized	Current	0.0045
Deep Creek Golf Club	Pond	Current	0.18
Family Dollar	Pressurized	Future	0.00072
Florida Department of Transportation	Pressurized	Current	0.0007
Golf Cove United Methodist Church	Pressurized	Future	0.0014
Kings Gate GC	Pond	Future	0.13
Kingsway Country Club GC	Pond	Current	0.23
Maple Leaf Estates	Pond	Current	0.23
Marylou Homeowners Association	Pressurized	Current	0.038
Murdock Middle School	Pressurized	Future	0.0014
Murphy Oil USA	Pressurized	Current	0.00109
Myakka RV Park	Pressurized	Current	0.04
North Charlotte Regional Park	Pressurized	Current	0.05
Port Charlotte Golf Course	Pond	Current	0.613
Port Charlotte Church of Christ	Pressurized	Current	N/A
Riverwood GC	Pond	Current	1.2
Sonoma Preserve	Pond	Future	0.2599
Suncoast Lakes Homeowners	Pressurized	Current	0.067
Sunnydell Commons II	Pressurized	Current	0.004112
Wal-Mart	Pressurized	Current	0.018
Waste Management	Pressurized	Future	0.008
		Mid County Sub-Total	**3.3278**
West County Reclaim Sites			
Cape Haze Resort	Pressurized	Future	0.042
Coast Concrete	Pressurized	Current	0.06
Colonial Concrete	Pressurized	Current	0.006
Coral Creek Air Park	Pressurized	Current	N/A
Coral Creek Club	Pond	Current	0.308
Coral Creek Landings	Pressurized	Current	0.12
Dollar General	Pressurized	Future	N/A
Eagle Preserve Estates	Pressurized	Future	0.0835
Fellowship Church	Pressurized	Current	0.027
Fiddlers Green	Pressurized	Future	0.0374
Gasparilla Island C&I Association	Pressurized	Future	0.0373
Gasparilla Island Water Association	Pressurized	Future	0.16701

Reclaim Sites	Pond/ Pressurized	Current/ Future User	Agreement Amount (MGD)
Hacienda Del-Mar	Pressurized	Current	0.105
Harbor West	Pond	Current	0.14
Lemon Bay GC	Pond	Current	0.342
Meadows & Villas Conservation Area	Pressurized	Current	0.0015
Placida Bay Estates	Pressurized	Future	0.0588
Placida Commons	Pressurized	Future	0.0615
Placida Harbor	Pressurized	Future	0.0465
Placida Pointe	Pressurized	Future	0.0426
Preserve at Windward Condominium	Pressurized	Current	0.005
Public Works-South Gulf Cove	Pressurized	Current	0.00075
RGP Links Golf Club	Pressurized	Current	0.29
RGP Long Marsh North	Pond	Current	0.225
RGP Long Marsh South	Pond	Current	0.225
RGP Palms Golf Club	Pond	Current	0.29
Rotonda Lakes	Pressurized	Future	0.0215
Safe Cove Boat Storage	Pressurized	Current	0.0003
The Hammocks	Pressurized	Future	0.06
Thunderation	Pressurized	Future	0.0169
Windward Patio Homes	Pressurized	Current	0.25
	West County Sub-Total		**3.07056**
Total RCW Agreement Amount to Current and Future Customers			**6.3984**

Figure 7-2 RCW Model Users



For Informational Purposes Only Y:\03405 - Charlotte County\Projects\025-01-RCW hyd Model Assistance and Maintenance\GIS\Fig3_2UsersMap.mxd TLillo 11/1/2019

7.1.1 RCW Booster Stations

The Master Reuse System contains three RCW booster stations in the distribution system and is fed by three WRFs. The booster station components and condition assessments are discussed in this section. Jones Edmunds staff visited the Walenda RCW booster station on February 4, 2020.

7.1.1.1 Eagle Street RCW Booster Station

The Eagle Street RCW Booster Station, constructed in 2008, is approximately 5 miles west of the East Port WRF along the 16-inch RCW transmission main. The station is in a residential neighborhood near Tamiami Trail. Effective March 1, 2019, the Walenda Booster Station now operates a pressurized portion of the RCW system along US Highway 41 between Enterprise Boulevard and Cornelius Boulevard, allowing continuous pressurized service for reclaimed customers in the Eagle Street RCW Booster Station neighborhood.

The concrete GST has a capacity of 0.5 MG. The pumping station contains one 125-HP HSP and one 60-HP jockey pump. The HSP has a capacity of 1,440 gpm at 206 feet and 90 psi total dynamic head (TDH) but is currently set at 82 psi. The jockey pump capacity is 577 gpm at 206 feet (90 psi) TDH. Each pump is controlled by a VFD to maintain system pressure for instantaneous customer use. The pumps are in a concrete building with currently unused chemical feed pumps. The PLC and electrical control center are housed in a separate air-conditioned building. The buildings and the GST are in a fenced area with a locked gate. The facility can add chlorine to the RCW before storage and as it enters the distribution system. However, the chlorine chemical injection system, including pumps and bulk storage tank, is no longer needed because incoming water has sufficient chlorine.

An inline filter is downstream of the pumps; however, this filter mechanism is currently in bypass mode. The GST is equipped with a level sensor to regulate volume and a check valve to allow RCW to bypass the booster station. Pump operations, flow, and pressure are monitored 24 hours per day through a County-wide SCADA telemetry system.

The Eagle Street station is available for RCW pumping and storage; however, it currently operates in an as-needed mode by CCU staff based on system demands.

The following O&M improvements were completed over the past 3 years:

- The tank was painted in FY 2017.
- The tank was inspected in 2018.

Condition Assessment

The electrical room equipment, pump room equipment, and tank were found in good condition. The piping was painted purple and clearly marked. The outside paint on some brick surfaces of the electrical building was deteriorated. Removal of the on-site chlorine injection system is being evaluated. The grounds require constant maintenance, which is provided by a private contract.

7.1.1.2 Walenda RCW Booster Station

The Walenda RCW Booster Station is at 17177 Walenda Avenue, Port Charlotte, approximately 4.5 miles northwest of the Eagle Street RCW Booster Station. The station was constructed in 2008 and is within a proposed residential/commercial neighborhood known as Murdock Village.

The property contains RCW and potable water infrastructure including RCW and potable water GSTs. The RCW GST has a capacity of 0.5 MG. The station contains one 125-HP HSP and one 60-HP jockey pump, each equipped with VFDs. The main pump has a capacity of 1,440 gpm at 206 feet and 90 psi TDH but is currently operating at 75 psi. The jockey pump has a capacity of 577 gpm at 206 feet (90 psi) TDH. The PLC and electrical control center are housed in a separate air-conditioned building. The buildings and the GST are in a fenced area. The gate and buildings are kept locked. The facility can add chlorine to the RCW before and after the GST. However, the on-site chlorine chemical injection system, including pumps and bulk storage tank, are no longer needed because incoming and outgoing water have sufficient chlorine.

An inline filter is downstream of the pumps; however, this filter mechanism is currently in bypass mode. The GST is equipped with a level sensor to regulate volume and a check valve to allow RCW to bypass the system. Pump operations, flow, and pressure are monitored 24 hours per day through a SCADA telemetry system.

The Walenda station is available for RCW pumping and storage; however, it currently operates in an as-needed mode by CCU staff based on system demands. The hydraulic modeling for the RCW system indicates that the Walenda station will be an essential component for meeting the future RCW demands.

The following O&M improvement was completed over the past 2 years:

- The tank was inspected in FY 2018 and minor screen damage was repaired.

Condition Assessment

The electrical room equipment, pump room equipment, and tank are in good condition. The outside paint on some brick surfaces of the electrical building was deteriorated. The piping was painted purple and is clearly marked. Removal of the on-site chlorine injection system is being evaluated. The grounds are well maintained.

7.1.1.3 Westport RCW Booster Station

The Westport RCW Booster Station (also called Rotonda Blvd East RCW Booster Station) is on Rotonda Boulevard East just west of CR 771. The station was completed in FY 2014 and is an in-line booster station that does not contain a GST. The booster station was configured to allow operation in multiple modes, which include pumping from Mid County to West County, pumping from Rotonda WRF to West Port WRF, or pumping from West Port WRF to the West County customers. An architectural wall shields the station from the highway. The station is currently not used; however, it will be necessary as the County's RCW demands continue to increase in West County. CCU staff are working to improve the operational configurations and settings for this station.

A major upgrade to the RCW main heading to this station from East Port, was completed as part of a road-widening project in 2015/2016.

Condition Assessment

The physical condition of the Westport RCW Booster Station is excellent.

The following deficiencies were noted:

- This station remains unused due to complications during pump operations. This is a complex pump station with multiple operational configurations. The County is currently operating the station in manual mode to supply water from East Port to West county.
- The station's hydraulics must be evaluated to update the operating protocol and improve the usefulness of the station to operators.

7.1.2 STORAGE

RCW storage is provided by a combination of lined and unlined storage ponds at the WRFs and GSTs. Table 7-2 lists the storage capacity and type for each of the RCW storage sites. The ponds and tanks are filled during off-peak and low RCW demand periods, and then drawn from and pumped to customers as demand increases. Currently, Operations staff at the East Port WRF monitors RCW levels in the ponds and GSTs through SCADA.

Table 7-2 RCW Storage Capacity

Location	Storage Type	Storage Capacity (MG)
East Port WRF	Lined Pond	95.0
West Port WRF	Lined Pond	20.0
Rotonda WRF	GST Unlined Pond	3.0 2.4
Walenda BPS	GST	0.5
Eagle Street	GST	0.5
Total		121.4

The GSTs at the Walenda and Eagle Street sites are filled by system feed and used to maintain the desired RCW system pressure during peak demand. The GSTs provide the following functions for the CCU RCW water supply system:

- Minimize high pumping pressures at the WRFs.
- Provide local storage for nightly peak irrigation demands when the flows at the WRFs are lowest.

Condition Assessment

The unlined storage pond at the Rotonda WRF has a 2.4-MG capacity. However, the pond lost approximately 50 percent of its capacity due to high percolation because the pond is unlined. In 2018, the Rotonda WRF Chief Operator expressed concerns about the condition of part of the berm around one of the pond walls. This portion of the berm is weakened, and steps are being taken to evaluate and strengthen it.

7.1.3 OPERATIONS

7.1.3.1 Mid County

The Mid County RCW system consists of the following pump and storage systems to supply RCW to users:

- East Port WRF RCW HSP station and a 95-MG RCW pond.
- Walenda RCW Booster Station and a 0.5-MG GST.
- Eagle Street RCW Booster Station and a 0.5-MG GST.

The current and desired operations are discussed below.

East Port WRF

The East Port WRF has two RCW pumping stations – the existing HSP No. 1 and the newly constructed HSP No. 2.

CCU will use HSP No. 2 as the primary pumping station for delivering RCW from the East Port WRF to its customers. HSP No. 2 will be operated to deliver RCW 7 days per week and is capable of providing RCW at a flow rate of 9 MGD (6,250 gpm) at 108 psi. The station will be able to provide flow rates down to 500 gpm at 50 psi using a tank recirculation valve that discharges back to the pump wetwell. Pump speeds are varied using the VFDs to maintain the discharge pressure setpoint. CCU intends to operate the discharge pressure of HSP No. 2 at 80 psi. HSP No. 2 will convey water from the new 95-MG RCW pond and will be capable of supplying RCW to the Central County and West County RCW distribution system without any periods of supply shortage. CCU would like to maintain a pressurized system with a minimum pressure of 50 psi to all customers. The RCW from East Port WRF supplies current RCW users and fills the Walenda and Eagle Street GSTs based on system demands.

The existing RCW HSP No. 1 is at the CCCs No. 1 and No. 2 clearwell. HSP station No. 1 will remain in-service at the East Port WRF, and will continue to be used for the non-potable plant water system including yard hydrant washdown, backwash water for BFPs, pump seal water, dilution/carrier water for chlorine and polymer chemical feed systems, and unit process water that receives plant water from the 8-inch distribution header that loops the WRF site. HSP station No. 1 operates at a pressure setpoint range from 60 to 100 psi, with 70 to 80 psi as

a normal setpoint. HSP station No. 1 has three 100-HP HSPs operating on VFDs to match flow to demand over a range of 350 to 2,000 gpm firm capacity.

In addition, if HSP station No. 2 is temporarily taken off-line for maintenance, inspection, or repair, HSP station No. 1 can act as a backup HSP station to provide up to 2,000 gpm (2.9 MGD) for RCW to public access reuse customers and provide WRF plant water. If the existing HSP station No. 1 is to provide RCW to public access reuse customers, the existing valves that connect to the RCW discharge header that feeds the RCW distribution system (normally closed) need to be open. As noted, HSP station No. 1 can only provide approximately 2 MGD of RCW to public-access reuse customers, so using this system for backup should only be short-term to avoid RCW supply issues.

Walenda RCW Booster Station

The Walenda RCW Booster Station is available for RCW pumping; however, it currently operates as needed by CCU staff based on system demands. This site contains a 0.5-MG GST that is filled with RCW as needed from the East Port WRF. The pumps at this station run as needed and contain VFDs that are set to maintain a station discharge pressure setting of 80 psi. The station has a tank recirculation line. The recycle/recirculation valve open setpoint is set so that it opens when pump speed reduces to 70 percent and closes if the pump speed increases to 98 percent.

Eagle Street RCW Booster Station

The Eagle Street station is configured identically to the Walenda BPS and is operated the same fashion, except the station discharge pressure setting is 72 psi.

7.1.3.2 West County

The West County RCW water system includes the following pump and storage systems supplying RCW to users:

- West Port WRF RCW pump station and a 20-MG RCW pond.
- Rotonda WRF RCW pump stations No. 1 and No. 2 and a 3-MGD GST.
- Westport RCW Booster Station.

West Port WRF

West Port WRF RCW distribution pressures vary from 3 to 50 psi based on their current operating strategy. Between 7 AM and 10:30 PM, the pumps operate in the low-pressure mode, delivering RCW to bulk users with ponds. Between 10:30 PM and 7 AM, the pumps operate in a high-pressure mode. The other users within this system, except for Coast Concrete, have their own pumps to boost RCW pressure to their individual irrigation systems. The West County RCW system is currently shared by the West Port WRF and Rotonda PS #1. The system is operated together with constant communication by the County.

Rotonda WRF

The Rotonda WRF operates two different RCW systems, Rotonda PS #1 and Rotonda PS #2. The Rotonda PS #1 system is a low-pressure, flow-based system that conveys RCW from a storage pond at the Rotonda WRF to RCW users' ponds. This system usually operates 16 hours

per day, 7 days per week when an operator is present to oversee the system. The Rotonda PS #1 system is interconnected with the West Port WRF RCW system.

The Rotonda PS #2 system is pressure-based and conveys flow from a 3-MG GST at the Rotonda WRF to the system and maintains a discharge pressure of 90 psi. The pumps at PS #2 use VFDs to maintain the discharge setpoint. This system operates 24 hours per day, 7 days per week.

Westport Booster Station

Currently, the Westport RCW Booster Station remains unused. However, CCU staff is developing an updated operational protocol for this station in order to improve flow and pressure to West County RCW customers.

3.2.6.2 Pond Discharges

Many of the large RCW users are golf courses and golf course communities. Most receive water through pond discharge valve stations. These stations generally contain the following:

- A flow meter.
- Gate valves with motorized valve actuators.
- Pond-level indicators.
- Pressure-indicating transmitters.
- Isolation valves.
- Air-relief valves.
- Telemetry and SCADA.

A majority of the pond discharge stations include a valve with a motorized actuator that allows CCU to remotely open or close the valve via SCADA. Most of the motorized actuators also allow the valve to be partially opened to a specified percent-open setting, which throttles the RCW discharge to maintain either a set flow rate or system pressure. Motorized valves without a percent-open setting only have an open or closed setpoint, which does not allow control of flow or RCW system pressure. Table 7-3 summarizes the current pond discharge RCW customers and their control valve type.

Table 7-3 Existing Pond Discharges

RCW Customer	Pond Discharge Type
Central County Customers	
Riverwood Golf Course	Control Valve, Electronic Throttling
Port Charlotte Golf Course	Control Valve, Electronic Throttling
CC Parks Department Sports Park	Control Valve, Electronic Throttling
Maple Leaf Estates	Manual Valve, Manual Throttling
Deep Creek Golf Club	Control Valve, Electronic Throttling
Kingsway Country Club	Control Valve, Electronic Throttling
West County Customers	
Lemon Bay Golf Course	Control Valve, Electronic Throttling
Coral Creek Club	Control Valve, Electronic Throttling
RGP Palms Golf Course	Control Valve, Electronic Throttling
RGP Long Marsh South	Control Valve, Manual Throttling
RGP Long Marsh North	Control Valve, Manual Throttling
Harbor West	Control Valve, Electronic Throttling

7.1.4 Irrigation and Other RCW Applications

West County contains nine 18-hole golf courses and residential/commercial developments that have marginal access to good freshwater irrigation sources. Currently, five golf courses and a few small RCW customers are receiving RCW for irrigation. Service of RCW to the remaining golf courses was limited by the amount of RCW that is produced by the two wastewater treatment plants in west Charlotte County, the Rotonda WRF and the West Port WRF.

The ultimate capacity of the RCW system in the East Port WRF, West Port WRF, and Rotonda WRF service areas is extensive due to the number of residential developments, golf courses, and other RCW demands in the area.

Some community developments such as Kingsway Country Club and Maple Leaf Golf Course have stormwater storage lake systems (D-001 and D-002, respectively) that are also used for RCW storage. These lakes are equipped with level-monitoring devices and adjustable weir gates. Maintaining an adequate level in these lakes to avoid overflowing is a high priority for CCU staff. Lakes STM-001 and STM-002 intermittently overflow to stormwater ditches that ultimately drain into the Peace River.

7.2 South County System

The South County (Burnt Store WRF) RCW distribution system is designed to provide relatively low-pressure RCW to customers that have their own storage ponds and HSPs to pressurize water for irrigation. The two RCW pumps at the Burnt Store WRF are constant-speed pumps having a capacity of 900 gpm each. The wetwell at the Rotonda WRF is equipped with an ultrasonic flow meter and a primary weir device where the RCW cascades into the wetwell. However, the meter became obsolete when the WRF began transferring flow to the deep IW system. The RCW pumps discharge into a 3-mile-long 12-inch RCW transmission main that was originally designed to serve the community Heritage Landings (previously known as Tern Bay golf course) along Burnt Store Road.

The 12-inch RCW transmission main was constructed in 2006, but the golf course community has never received RCW because the community has not developed as expected. Three smaller users have benefited from the transmission main and receive low-pressure RCW from the Burnt Store WRF. The users are currently responsible for boosting pressure to supply their systems with in-line pumps.

In 2019, the County engaged the services of consultants McKim & Creed and Jones Edmunds to replace and expand the Burnt Store WRF. Several large developments are either underway or planned in the South County service area that will impact the wastewater treatment capacity and the RCW demands. The project encompasses a phased approach to expand and optimize the wastewater treatment capacity and the RCW distribution system.

Condition Assessment

Overall, the system is in good condition.

The following deficiencies and remarks were noted, which the CCU intends to address as part of the Burnt Store WRF replacement and expansion project:

- A new flow meter on the RCW discharge line is required to measure flow leaving the site.
- The Burnt Store WRF has no RCW storage, and the pumps are not capable of matching demand with flow. New customer development would require customer storage in the same manner as that proposed by the original golf course customer.
- New transmission mains are needed to serve the increasing population within the WRF service area.

7.3 Irrigation and Other RCW Applications

In 2005, CCU negotiated with the Tern Bay Development Company to supply RCW to a proposed 27-hole golf course north of the WRF along Burnt Store Road. However, the development was affected by financial difficulty resulting from the decline in the housing market. The proposed golf course was constructed, but not maintained. CCU's agreement with the Tern Bay Golf Course initially required CCU to provide an average of 300,000 gpd. A

portion of the 12-inch transmission main is now used to provide RCW to Burnt Store Lakes, Burnt Store Colony, and Burnt Store Villages. The current customers use a small amount of RCW for drip irrigation of landscaping along the development entranceways and common areas. CCU is pursuing other potential bulk RCW users, such as golf courses, that are irrigated using stormwater storage ponds. In the interim, excess RCW is diverted to the WRF's on-site percolation ponds or a deep IW that was constructed for that purpose. Table 7-4 lists future major RCW users within the Burnt Store WRF service area.

Table 7-4 Burnt Store WRF Future Major RCW Users

RCW User	Type of User	RCW Future Demand (MGD)
Burnt Store Marina & Golf Course	Landscape Irrigation	2.0
Heritage Landings Golf & Country Club	Landscape Irrigation	2.5
Burnt Store Lakes – Amenities	Landscape Irrigation	0.05
Heritage Landing Area	Landscape Irrigation	1.95
Seminole Lakes Golf & Country Club	Landscape Irrigation	0.5
Tranquility Lake RV Resort	Landscape Irrigation	0.07
	TOTAL	**7.07 MGD**

7.4 MAINTENANCE

The RCW distribution system is inspected and monitored daily to meet FDEP requirements. Monthly inspections highlight the distribution equipment that may need repair, calibration, or replacement. An important element of the program is that RCW sites are inspected yearly for possible cross-connections. The Backflow and Reclaimed Services staff coordinate with RCW customers to keep them updated on the RCW supply, inform them of operational problems, and provide information and guidance regarding FDEP and SWFWMD rules and regulations. The workgroup is also involved in documentation, inspection, and minor repairs of the RCW distribution system.

7.5 BACKFLOW AND CROSS-CONNECTION PREVENTION PROGRAM

The Backflow and Cross-Connection Prevention Program uses two types of surveys to monitor customer water use and type – basic backflow equipment survey and cross-connection control survey. The basic backflow equipment survey is used to verify the site information of each water user. The cross-connection survey provides information on possible cross-connections and health hazard levels. The information in the surveys is used to inform customers with the required description of the backflow prevention. A CCU database has been created that includes information on each water user, the backflow prevention measures in place at their site, backflow testing requirements, and communication with the customer. This information satisfies the FDEP requirements for implementation of a Backflow and Cross-Connection Prevention Program. CCU's Cross-Connection Control Manual provides the structure by which the program can be administered and a vehicle for changes as needed in the future. The program includes testing and repair of backflow devices at County-owned facilities. This part of the program will increase as the database of backflow information increases.

FY 2019 Program Statistics:

- Hydrant Meters Repairs/Tests: 14
- Cross-Connections Inspected: 3,811
- Charlotte County Backflow Tests: 185
- Potential Cross-Connections Corrected: 5

7.6 Review of Previous Annual Report Recommendations

Table 7-5 and Table 7-6 summarize the recommendations and status from the 2017/2018 Annual Reports for the Mid/West and South County distribution systems, respectively.

Table 7-5 Mid/West County RCW Distribution System –2017/2018 Recommendations

Recommendation:	Develop a comprehensive operating protocol for the entire RCW system to provide a reliable source of RCW to the CCU customer base.
Progress:	*Ongoing. The RCW system model has been updated and alternative analyses are being performed for operational and capital improvements.*
Recommendation:	Evaluate the addition of mechanical actuator on the system control valve at the West Port WRF to increase operational flexibility in transferring RCW between plants.
Progress:	*Completed. A motorized valve assembly at Cattle Dock Point Road and SR 776 was evaluated and recommended as a near-term improvement to the RCW system.*
Recommendation:	Add more large users to the combined RCW system.
Progress:	*Accomplished.*
Recommendation:	Evaluate adding another GST to provide storage in West County due to the large number of RCW bulk users.
Progress:	*Not accomplished, but feasibility analyses are ongoing.*
Recommendation:	Complete connection of Lemon Bay Golf Course as an RCW bulk user in West County.
Progress:	*Accomplished. Once the temporary moratorium is lifted, Lemon Bay Golf Course will start receiving RCW.*
Recommendation:	Evaluate adding piping connections (including controls, pumps, valves, meters, etc.) to increase the number of RCW small users in Mid County.
Progress:	*Ongoing.*
Recommendation:	Repair the weak berm around the pond wall at the Rotonda WRF.
Progress:	*Not accomplished, but feasibility analyses are ongoing.*

Table 7-6 South County RCW Distribution System –2017/2018 Recommendations

Recommendation:	Study the feasibility of creating RCW storage at the Burnt Store WRF as the growth in the area dictates.
Progress:	*Ongoing. The Burnt Store WRF is currently under expansion plans that include addition of RCW storage.*
Recommendation:	Acquire one large RCW customer in the South County service area as part of the facility expansion and addition of RCW storage.
Progress:	*Ongoing. A design project to expand the treatment capacity and increase the RCW customers in the Burnt Store WRF initiated in 2019.*
Recommendation:	Evaluate the treatment capacity against the future demands associated with rapid development in the area and saltwater intrusion in existing private wells.
Progress:	*Ongoing. A design project to expand the treatment capacity in the Burnt Store WRF initiated in 2019.*

Table 7-7 Backflow and Cross-Connection Prevention Program – 2018 Recommendations

Recommendation:	Evaluate the establishment of a program to track cross-connection inspections.
Progress:	*Not accomplished, but feasibility analyses are ongoing. CCU is planning to implement an asset management program to improve tracking and management of cross-connection inspections.*

7.7 Summary and Recommendations

Over the past decade, CCU has developed a Master Reuse System in Mid/West County to address irrigation demand and excess RCW supply at the East Port WRF. The Master Reuse System is fed by the East Port, West Port, and Rotonda WRFs. The Master Reuse System contains approximately 60 miles of transmission mains, three booster stations, two 0.5-MG GSTs, a 3-MG tank at Rotonda WRF, and 20 MG of additional storage capacity at the West Port WRF storage ponds. CCU has a hydraulic model of the system that is used to identify infrastructure requirements when expanding the system to additional customers. The infrastructure related to the Master Reuse System is in good condition and the primary focus of CCU is to continue to expand the system to serve additional customers.

The South County RCW distribution system consists of one 3-mile-long transmission main that is currently serving three customers. The infrastructure of the system is in good condition, although some improvements are required at the Burnt Store WRF. CCU intends to address the required improvements as part of the Burnt Store WRF expansion project, which will increase the functionality of the RCW system and allow CCU to add future customers. Table 7-8 lists the near-term and future recommendations for the Mid/West. Table 7-9 encompasses the recommendations for the South County distribution system. Table 7-10 addresses the recommendations made regarding the Backflow and Cross-Connection Prevention Program.

Table 7-8 Mid/West County RCW Distribution System – 2019 Recommendations

Recommendation:	Develop an operational protocol for the Mid/West County Master Reuse System once the East Port WRF HSP No. 2 is completed and online. CCU staff intend to operate the RCW system under a select number of operational configurations and coordinate with the hydraulic model to determine their preferred method for meeting all their RCW demands.
Recommendation:	Install throttling control valves at all current major RCW users with pond discharges in the Mid and West County areas.
Recommendation:	Install a motorized valve assembly in the easement on Cattle Dock Point Road east of SR 776 to provide RCW pumping and storage operational flexibility from West Port WRF.
Recommendation:	Installation of a pressure-reducing valve (PRV) near the intersection of Cape Haze Drive and Westwind Drive as part of the Cape Haze Road RCW project to allow Rotonda PS#2 to continue supplying its high-pressure service area and to send excess flow to the Placida Road Corridor RCW users.
Recommendation:	Install certified staff gauges for pond water surface elevations for all pond discharges to allow valve controls and level indicators to be accurately adjusted.
Recommendation:	Install elevation sensors on the weirs at Deep Creek, Kingsway, and Maple Leaf to alert CCU via SCADA when the discharge weir is adjusted.
Recommendation:	Develop an operational protocol for using the Westport RCW Pump Station for improving RCW delivery to West County customers.
Recommendation:	Upgrade the pump stations to contain pumps with a design point of 335 gpm at 60 psi (139 feet of head) and operate on VFDs to maintain the setpoint. This upgrade will allow the West Port WRF to contribute to meeting RCW user demands (flows) with increased pressures.
Recommendation:	Repair the weak berm around the pond wall at the Rotonda WRF.

Table 7-9 South County RCW Distribution System – 2019 Recommendations

Recommendation:	Create additional RCW storage at the Burnt Store WRF.
Recommendation:	Acquire one large RCW customer in the South County service area.
Recommendation:	Increase the treatment capacity in the Burnt Store WRF to supply future demands associated to increasing population and saltwater intrusion in existing private wells.

Table 7-10 Backflow and Cross-Connection Prevention Program – 2019 Recommendations

Recommendation:	Complete implementation of an asset management program, such as *Cityworks*, as a tool to track cross-connection inspections.

8 ENGINEERING

The Engineering Division is responsible for preparing and managing engineering reports, studies, and construction designs.

8.1 CAPITAL IMPROVEMENT PROGRAM

The CIP is designed to plan and construct improvements to the CCU water, wastewater, and RCW systems. As Charlotte County's population continues to grow, CCU's ability to develop plans that address the projected growth is vital. The following section summarizes CIP projects in progress or initiated in FY 2019. A project is considered major when the expenditure is over $100,000.

8.1.1 CIP PROJECTS – WATER SYSTEM

Table 8-1 lists the water system CIP projects initiated or in progress during FY 2019. The total FY 2019 budget was $9,731,000 and the total expenditure was $5,310,000. The largest expenditure was the installation of the Ingraham 24-inch water main.

Table 8-1 Water System CIP Projects in Progress or Initiated in FY 2019 ($ in Thousands)

Description	Funding Source[1]	Original FY 2019 Budget	2019 Expenditures	Percent of Budget Expended
Potable Water Line Extensions	L.E.	$127	$79	62%
Ingraham Potable Water	Conn-Wtr	$453	$3,513	775%
Ingraham Potable Water	SRF	$3,367	$0	0%
Hillsborough Potable Water Transmission	Conn-Wtr	0	$1	0%
Major Water Transmission Lines	Conn-Wtr	$628	$226	36%
Major Water Transmission Lines	R & R	$49	$1	2%
Myakka River 24-inch Water Main	Conn-Wtr	$441	$0	0%
Myakka River 24-inch Water Main	SRF Pending	$2,650	$0	0%
Myakka Potable Water Booster Station	SRF	$864	$0	0%
Myakka Potable Water Booster Station	Conn-Wtr	$1,152	$1,489	129%
	TOTAL	$9,731	$5,309	1,004%

[1] Funding sources: D.P. = Debt Proceeds; Oper = O&M Fund; L.E = Line Extension; R&R = Renewal & Replacement Fund; Sinking = Sinking Fund; Conn-Wtr = Water Connection Fee Fund.

8.1.2 CIP Projects – Wastewater System

Table 8-2 lists the wastewater system CIP projects initiated or in progress during FY 2019. The total wastewater budget allotted for FY 2019 was $50,185,000 and the total amount spent was $15,802,000.

Table 8-2 Wastewater System CIP Projects in Progress or Initiated in FY 2019 ($ in Thousands)

Description	Funding Source	Original FY 2019 Budget	2019 Expenditures	Percent of Budget Expended
Wastewater Force Mains	Oper	$41	$0	0%
Wastewater Force Mains	Conn-Swr	$354	$195	55%
Spring Lake MSBU WW Expansion	Oper	$1,006	$1,177	117%
Spring Lake MSBU WW Expansion	Grants	$500	$0	0%
Spring Lake MSBU WW Expansion	SRF	$2,398	$0	0%
Spring Lake MSBU WW Expansion	MSBU	$1,588	$426	27%
Wastewater Line Extensions	L.E.	$1,000	$477	48%
Wastewater Force Main Replacement – Deep Creek	R & R	$87	$24	28%
Wastewater Force Main Replacement – Deep Creek	Conn-Swr	$603	$19	3%
Wastewater Force Main Replacement – Deep Creek	SRF Pending	$1,800	$0	0%
Wastewater Force Main Replacement – Deep Creek	SRF Pending	$1,620	$0	0%
Master Lift Stations	Conn-Swr	$622	$171	27%
Grand Master LS - Loveland Blvd	U.C.P.F	$1,850	$10,951	592%
Grand Master LS – Loveland Blvd	SRF	$20,008	$0	0%
Burnt Store Phase 2	Conn-Wtr	$30	$19	63%
Burnt Store Phase 2	Conn-Swr	$37	$6	16%
Burnt Store Phase 2	R & R	$22	$3	14%
Burnt Store Phase 2	U.C.P.F.	$3,000	$0	0%

Description	Funding Source	Original FY 2019 Budget	2019 Expenditures	Percent of Budget Expended
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	BP	$239	$688	288%
Charlotte Harbor Water Quality Initiative Ph 2 – El Jobean	Oper	$0	$35	0%
Burnt Store WRF Expansion	Conn-Swr	$0	$25	0%
Cape Haze Sewer & Reclaim Transmission	Conn-Swr	$0	$33	0%
Cape Haze Sewer & Reclaim Transmission	R & R	$0	$8	0%
East Port WRF Reclaimed Pond Aeration	Oper	$0	$1	0%
Water Transmission/ Wastewater Collection Reimbursement	Conn-Wtr	$500	$0	0%
Water Transmission/ Wastewater Collection Reimbursement	Conn-Swr	$1,500	$0	0%
CCU Business Services Customer Software	Oper	$52	$0	0%
Midway Phase 3	D.P.	$121	$0	0%
09-0011 - Sewer - Edgewater Phase 2	D.P.	$0	$329	0%
Parkside Harbor – US 41 To Olean	U.C.P.F	$2,422	$644	27%
Parkside Gertrude Ave and Aaron St Imp	U.C.P.F.	$3,149	$29	1%
Parkside Olean Blvd (US 41 to Easy) Imp	U.C.P.F	$1,766	$0	0%
Central County Infrastructure	Conn-Swr	$395	$79	20%
Central County Infrastructure	SRF	$1,129	$0	0%
Central County Infrastructure	R & R	$217	$92	42%
CHWQI - Countryman & Ackerman	Oper	$121	$137	113%
CHWQI – Countryman & Ackerman	SRF	$1,269	$0	0%
Water & Sewer Waterway Crossings	R & R	$379	$111	29%

Description	Funding Source	Original FY 2019 Budget	2019 Expenditures	Percent of Budget Expended
Water & Sewer Waterway Crossings	Conn-Wtr	$180	$0	0%
Water & Sewer Waterway Crossings	Conn-Swr	$180	$0	0%
	TOTAL	$50,185	$15,679	1510%

[1] Funding sources: R&R = Renewal & Replacement Fund; Conn-Wtr = Water Connection Fee Fund; BP = British Petroleum; Oper = O & M Fund; SRF = State Revolving Fund; MSBU = Municipal Service Benefit Unit; S.T. = Sales Tax; Sinking = Sinking Fund; Grant = Grant Funding; Bond = Bond Funding; Conn-Swr = Sewer Connection Fee Fund; U.C.P.F. = Utility Capital Projects Fund; DEV = Developer Proceeds.

8.1.3 CIP Projects – Reclaimed Water System

Table 8-3 lists the RCW system capital improvement projects initiated or in progress during FY 2019. The total amount budgeted for FY 2019 was $4,826,000 and $812,000 was expended.

Table 8-3 RCW System CIP Projects in Progress or Initiated in FY 2019 ($ in Thousands)

Description	Funding Source	Original FY 2019 Budget	2019 Expenditures	Percent of Budget Expended
Reclaimed Water Lines	Conn-Swr	$970	$367	38%
Reclaimed Water Lines	R & R	$150	$0	0%
Reclaimed Water Service Connections County Facilities	Conn-Swr	$575	$0	0%
Reclaimed Water Expansion Phase 3	Conn-Swr	$112	$45	40%
Reclaimed Water Expansion Phase 3	R & R	$115	$400	348%
Reclaimed Water Expansion Phase 3	Grant	$1,452	$0	0%
Reclaimed Water Expansion Phase 3	SRF	$1,452	$0	0%
	TOTAL	$4,826	$812	388%

[1] Funding sources: R&R = Renewal & Replacement Fund; Conn-Wtr = Water Connection Fee Fund; C.P.F. = Capital Projects Fund; S.T. = Sales Tax; Grant = Grant Funding; Conn-Swr = Sewer Connection Fee Fund; DEV = Developer Proceeds; SRF = State Revolving Fund.

8.1.4 CIP – 5-Year Plan

CCU develops and maintains a 5-year CIP to plan for the growth in Charlotte County. Table 8-4 summarizes projects included in CCU's 5-year CIP for the water, wastewater, and RCW systems.

Table 8-4 Capital Improvement Program – 2019 and Future Water and Sewer Project Costs ($ in Thousands)

Project Names	Prior Years Actual	Actual FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Future Years	Total
Potable Water Line Extensions	$1,990	$79	$0	$0	$0	$0	$0	$0	$0	$2,069
Water Distribution Piping Line Extension	$0	$1	$500	$500	$500	$500	$500	$0	$5,700	$8,201
Ingram 24-inch Potable Water Transmission Main	$184	$3,513	$0	$0	$0	$0	$0	$0	$0	$3,697
Major Water Transmission Lines	$7,502	$226	$225	$225	$225	$250	$250	$0	4,000	$12,928
Wastewater Force Mains Expansionary	$4,423	$195	$250	$250	$250	$250	$250	$0	$3,750	$9,618
Reclaimed Water Lines	$149	$367	$150	$150	$150	$150	$150	$0	$2,100	$3,366
Spring Lake MSBU Wastewater Expansion	$15,528	$1,603	$159	$152	$144	$136	$129	$0	$921	$18,772
Wastewater Line Extensions	$1,412	$477	$0	$0	$0	$0	$0	$0	$0	$1,889
Wastewater Force Mains Replacement – Deep Creek	$2,560	$43	$0	$0	$0	$0	$0	$0	$0	$2,603
Master Lift Stations	$99	$171	$250	$250	$250	$250	$250	$0	$3,750	$5,270
Reclaimed Connections for County Facilities	$0	$0	$200	$0	$0	$0	$0	$0	$0	200
Reclaim Water Expansion Phase 3	$3,837	$445	$0	$0	$0	$0	$0	$0	$0	$4,282
Grand Master Lift Station & Gravity Interceptor – Loveland	$1,176	$10,951	$0	$0	$0	$0	$0	$0	$0	$12,127
Myakka River 24-inch Water Main	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Myakka Potable Water Booster Station	$123	$1,489	$0	$0	$0	$0	$0	$0	$0	$1,612
Burnt Store Phase 2	$412	$28	$0	$0	$0	$0	$0	$0	$0	$440
Charlotte Harbor Water Quality Initiative Phase 2 – EL Jobean	$78	$653	$0	$0	$0	$0	$0	$0	$0	$731
Burnt Store WRF Expansion	$0	$25	$0	$0	$0	$0	$0	$0	$0	$25

Project Names	Prior Years Actual	Actual FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Future Years	Total
Cape Haze Sewer & Reclaim Transmission	$0	$41	$0	$0	$0	$0	$0	$0	$0	$41
East Port WRF Reclaimed Pond Aeration	$0	$1	$0	$0	$0	$0	$0	$0	$0	$1
Water Transmission/Wastewater Collection Reimbursement	$231	$0	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$7,000	$13,231
CCU Business Services Customer Billing and Database	$1,482	$0	$799	$0	$800	$800	$800	$0	$4,000	$8,681
Midway Phase 3	$8,315	$0	$0	$0	$0	$0	$0	$0	$0	$8,315
Edgewater Phase 2	$0	$329	$0	$0	$0	$0	$0	$0	$0	$329
Parkside – Harbor Blvd – US 41 to Olean Improvements	$42	$644	$0	$0	$0	$0	$0	$0	$0	$686
Parkside - Gertrude and Aaron Street Improvements	$85	$29	$0	$0	$0	$0	$0	$0	$0	$114
Parkside – Olean Blvd (US 41 to Easy) Improvements	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Central County Infrastructure	$8,085	$171	$0	$0	$0	$0	$0	$0	$0	$8,256
Charlotte Harbor Water Quality Initiative Phase 2 – Countryman & Ackerman	$696	$137	$0	$0	$0	$0	$0	$0	$0	$833
Utility Equipment Replacements	$0	$193	$0	$0	$0	$0	$0	$0	$0	$193
Waterway Crossings for Public Works (Water & Sewer)	$4,010	$111	$120	$120	$120	$120	$120	$0	$2,340	$7,061
TOTALS	$62,419	$21,922	$3,653	$2,647	$3,439	$3,456	$3,449	$1,000	$33,561	$135,571

8.2 Review of Design, Reports, and Studies

The following describes reports and studies prepared by CCU Engineering or submitted by external engineering consultants in FY 2019. Prior year reports and annual reoccurring reports are also included for reference.

8.2.1 Annual Reports Completed in FY 2019

- Facilities Quarterly Reports, Stantec Consulting Engineers, 2019.

  Manchester Waterway Boat Lock Removal Plan in the Alligator Drainage Basin area – In FY 2018, CCU completed an annual compliance report on the status of sewer *connections* to satisfy a Net Ecosystem Benefit requirement in accordance with FDEP Permit No. 08-0210682-001.

- Quarterly Operations Report

  For Water Year 2019, quarterly updates of all compliance items and upcoming regulatory requirements for all permitted facilities were submitted. The quarterly update is based on DMRs and flow information provided to Stantec on a monthly basis. The quarterly report also highlights upcoming permit requirements and includes a completion schedule for required permit tasks.

8.2.2 Reports Completed in FY 2018

- Basis of Design Report Myakka Potable Water Booster Station Study

  In March 2018, Stantec Consulting Engineers submitted the final report for a 24-inch transmission main coming from the Walenda Water Booster Station and storage tank, across the Myakka River, to the Rotonda Booster Station in West Charlotte County.

- Charlotte County Utilities Department 2018 Annual Report

  The FY 2018 Annual Report was prepared and submitted for public access April 2019.

8.2.3 Annual Reports Completed in FY 2018

- Capacity Analysis Report – Burnt Store WRF

  A capacity analysis letter report was prepared for the Burnt Store WRF and submitted to FDEP in December 2018. The report compares daily wastewater flows for the preceding year to the design capacity of the plant. It also shows the effluent quality that had been produced during the same time period.

- Annual Burnt Store Wellfield Report

  In March 2018, RMA GeoLogic submitted the Annual Burnt Store Wellfield Report. This report is a comprehensive but concise annual report on the wellfield operation and assesses the hydrological and ecological system of the wellfield site. The report summarizes water use, water levels, water quality, chloride concentration trigger levels, and an environmental evaluation for the wellfield.

9 CONSOLIDATED RECOMMENDATIONS

9.1 PLANNING RECOMMENDATIONS

The following tables summarize the Planning Recommendations from Chapter 2. The information is presented based on operational functions.

Table 9-1 Administration Planning Recommendations

Recommendation:	Continue developing and updating standards for water and sewer construction to ensure the most effective use of capital improvement funds.
Recommendation:	Continue developing options for water, sewer, and RCW service in the County to meet a growing demand for municipal utility services.
Recommendation:	Continue developing the Utilities' Information System functions to update/replace software and computer equipment to increase operating efficiencies and cost savings.
Recommendation:	Continue exploring regional solutions to water and wastewater service needs for the mutual benefit of Charlotte County and adjoining counties and cities.
Recommendation:	Conduct a security assessment and update the security protocol plan.[1]
Recommendation:	Verify that Murdock Building meets Category 3 or higher building standards.[1]
Recommendation:	Develop emergency response plan (ERP) for WBS bypass and operations without laboratory and control room.[1]
Recommendation:	Develop/update the Business Continuity Plan (BCP).[1]
Recommendation:	Become a member of an intrastate mutual aid and assistance program.[1]
Recommendation:	Implement certain permissions/restrictions for accessing the CCU GIS data such as allowing Consultants and Contractors temporary access to the data while working for CCU on each project.[1]
Recommendation:	Recommend that USB port slots be removed from select desktops to limit the vulnerability of the SCADA system.[1]
Recommendation:	Develop a cybersecurity culture through training and internal programs.[1]
Recommendation:	Require equipment vendors for HMI, field controllers, field devices, etc. and software suppliers for data management to provide information on cybersecurity and updates for their product.[1]
Recommendation:	Weigh the options for automation in future designs to consider cyber threats and include manual components where applicable to increase infrastructure resilience.[1]
Recommendation:	Develop training on operational responses including conducting 'table-top' exercises regularly and evaluating performance on malevolent events and emergency response. Include exercises with local water utilities and local law enforcement to test contingency.[1]

[1] Recommendation from Risk and Resilience Assessment (RRA) Report (March 2020).

Table 9-2 Water System Planning Recommendations

Recommendation:	Continue to update the water system hydraulic computer model and use it as a planning tool for future water system improvements.
Recommendation:	Continue the fixed-base Water Meter Replacement Program.
Recommendation:	Continue the extension of the new 24-inch transmission main from the Myakka River Bridge to the Rotonda storage tank to serve the growing demand for water in west Charlotte County.
Recommendation:	Continue to integrate acquired utilities into the overall CCU water system to maximize reliability and reduce costs to CCU customers.
Recommendation:	Explore ways to augment the demands on the PRMRWSA treatment facility through economically feasible means including new water sources.
Recommendation:	Continue to make improvements at the water storage tank/booster pumping station facilities to increase reliability and control of the pumps to improve water distribution to customers.
Recommendation:	Plan for future water demands in the South County Service Area by analyzing the water distribution system using the computer water model completed in 2004 and most recently updated in 2014.
Recommendation:	Identify options to increase resilience of the South County system considering interconnects with neighboring utilities or alternative water supplies.[1]
Recommendation:	Identify options to increase resilience of the West County water supply (consider redundant water mains or capped wells).[1]
Recommendation:	Update SOP for chemical deliveries, require chain of custody forms, and verification system for proper chemical delivery.[1]
Recommendation:	Develop a wildfire ERP, identify fire hydrant locations, and coordinate with Fire Department for trainings for critical assets.[1]
Recommendation:	Update the ERP for pipe failure for all critical assets.[1]
Recommendation:	Identify a backup chemical and fuel supplier in the event of a chemical or fuel shortage.[1]
Recommendation:	Develop water quality models for each of their distribution systems.[1]
Recommendation:	Develop an ERP for operating without the support of SCADA.[1]
Recommendation:	Develop a procedure and obtain the equipment for transporting key chemicals (fuel and chlorine) from one site to another if required in an emergency.[1]
Recommendation:	Link contamination detection to SCADA to immediately shut down or lockout any pump in operation.[1]

[1] Recommendation from RRA Report (March 2020).

Table 9-3 Wastewater System Planning Recommendations

Recommendation:	Evaluate improvements and capacity upgrades for the Burnt Store WRF as outlined in the latest Capacity Analysis Report (CAR) and Operating Permit.
Recommendation:	Continue the scheduled repair of sanitary lift stations that have deteriorated due to age and hydrogen sulfide presence.
Recommendation:	Use the wastewater lift station and force main computer model to assess the need for upgrades to the system based on expected demand for services.
Recommendation:	Continue to televise and smoke test gravity sewers to locate source(s) of I/I. Repair gravity sewers and manholes as required to mitigate I/I and regain sewer and WRF capacity.
Recommendation:	Continue to provide for the disposal of septage at the East Port WRF.
Recommendation:	Install odor-control systems at lift stations where hydrogen sulfide concentrations cause odors and deteriorate structures.
Recommendation:	Continue to upgrade the East Port WRF to meet growth demands and septic-to-sewer conversions.
Recommendation:	Continue construction and plan for the next phases of sewer expansion in the Port Charlotte area in accordance with the 2017 Sewer Master Plan.

Table 9-4 RCW System Planning Recommendations

Recommendation:	Construct a 12-inch or 16-inch transmission main from the West Port WRF to the Rotonda East RCW Booster Pumping Station.
Recommendation:	Finalize construction of the East Port WRF Stage 5 RCW Improvements that includes a 95-MG RCW storage pond and providing a 9-MGD RCW pump station.
Recommendation:	Prepare a hydraulic model to predict the impact of future demand on the South County RCW transmission system.
Recommendation:	Determine the feasibility of creating RCW storage at the Burnt Store WRF.
Recommendation:	Seek ways to increase the use of public-access RCW currently produced by CCU WRFs including improving reliability and access for customers.
Recommendation:	Expand public-access RCW for the Burnt Store WRF.

9.2 CAPITAL IMPROVEMENTS

9.2.1 WATER TREATMENT PLANTS

The PRMRWSF is owned, operated, and maintained by the PRMRWSA, and therefore, CCU does not plan for capital improvements related to this facility. Table 9-5 summarizes CIP projects associated with the Burnt Store RO WTP.

Table 9-5 Burnt Store RO WTP – CIP Recommendations

Recommendation:	Determine the ultimate use of Well No. 15.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study will help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Recommendation:	Install a secondary site access gate in the event the main access gate roadway is inaccessible.[1]

[1] Recommendation from RRA Report (March 2020).

9.2.2 WATER DISTRIBUTION SYSTEM

Table 9-6 Mid/West County Distribution System – CIP Recommendations

Recommendations:	**WBS General** ▪ Perform a load study to identify any issues related to power quality, quantity, and capacity and to help identify deficiencies in the system, reserve capacities, and potential anomalies that may affect long-term maintenance and serviceability of the equipment. ▪ Apply appropriate arc flash labeling on appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendations:	**River Crossings** ▪ Install redundant water main across the Myakka River.[1] ▪ Install the Myakka WBS along State Route (SR) 776 to increase quantity of water that can be conveyed to West County from the SR 776 transmission main (in-progress).[1]
Recommendations:	**Port Charlotte Golf Course WBS** ▪ Evaluate the generator at the Port Charlotte Golf Course WBS to verify that Occupational Safety and Health Administration (OSHA) compliance is maintained and accessibility of the equipment is provided.
Recommendations:	**Walenda WBS** ▪ Replace the generator at the WBS with a properly sized generator to accommodate the loads and maintain reliable operation of the station. ▪ Upgrade chain link fencing as installed at other WBSs.[1]

Recommendations:	**Gulf Cove WBS** ▪ Continue to upgrade the WBS by further progressing the replacement project for the Myakka River pipe crossing that supplies water to the station. ▪ Replace the concrete pipe connecting the GST to the pump station at the WBS.[1] ▪ Conduct further analysis of the ATS based on the elevated temperatures of the primary and secondary conductors entering and leaving the drive to determine if this is a nominal temperature rise or if another condition exists that may be detrimental to the drive or the electrical system. ▪ Increase the size of the fuel tank to hold additional fuel.
Recommendations:	**Rotonda WBS** ▪ Conduct further analysis of the ATS based on the degradation of the enclosure to verify that it is functioning properly.

[1] Recommendation from RRA Report (March 2020).

Table 9-7 South County Distribution System – CIP Recommendations

Recommendation:	Continue replacing old "class" PVC pipe in the distribution system with new C-900 PVC pipe.
Recommendation:	Continue developing a computerized hydraulic model for the South County distribution system.
Recommendation:	Install interconnects with neighboring utilities.[1]

[1] Recommendation from RRA Report (March 2020).

Table 9-8 East Port Environmental Campus - CIP Recommendations

Recommendation:	Install full coverage bulletproof glass in the customer service and payment center.[1]
Recommendation:	Install keypad access gate to separate the Administration Building from the Operations Service Center area.[1]

[1] Recommendation from RRA Report (March 2020).

9.2.3 WASTEWATER COLLECTION SYSTEM

Table 9-9 Wastewater Collection System – CIP Recommendations

Recommendations:	Master Lift Station No. 309 – Bridgewater ▪ Provide a stationary generator. ▪ Replace concrete control panel posts with County aluminum standard. ▪ Replace/repair check valves. ▪ Replace pumps and other related equipment.
Recommendations:	Master Lift Station No. 801 – Field ▪ Evaluate the security of the site including securing stone footing underneath and around fence, and ensuring gates are locked at all times.

Recommendations:	Master Lift Station No. 816 – Rotonda Boulevard West ▪ Evaluate relocation or proper protection of the power equipment. ▪ Evaluate the adjacent lot for future lift station conversion.
Recommendations:	Lift Station No. 7 – Pure Oil ▪ Repair the roof overhang. ▪ Replace the glass windowpanes. ▪ Evaluate odor control opportunities. ▪ Perform thorough rehabilitation including the improvements listed above or replace the station with a modern submersible configuration and all new equipment. ▪ Evaluate providing a dedicated access to the station. ▪ Evaluate current pump performance to verify if it is operating efficiently. ▪ Remove existing aerial power supply and install underground supply.
Recommendations:	Lift Station No. 12 – Plaza ▪ Evaluate site lighting for lift station employee serviceability.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Re-line the wetwell or specifically address the exposed penetrations and seams. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Evaluate replacing the guide rails with a single rail of the correct length.
Recommendations:	Lift Station No. 113 – Kerrigan ▪ Replace the pipe supports.
Recommendations:	Lift Station No. 123 – KHW Walmart ▪ Evaluate further repair and secure the site with flowable fill or relocate the station to an adjacent site. ▪ Evaluate repairing the on-site infrastructure damaged by the former settling. ▪ Evaluate relocating the driveway.
Recommendations:	Lift Station No. 139 – Altoona ▪ Verify the odor control is tied into SCADA and evaluate the cause of the breaker tripping.

Recommendations:	Lift Station No. 143 – Harbor Vac ▪ Evaluate stairs or similar access to generator to return to conformance with the National Electric Code. ▪ Evaluate modifying the overhead crane to use a trolley for lateral movement. ▪ Evaluate a catwalk or ladder for accessing the top of the tank for maintenance. ▪ Evaluate either a portable hoist or dedicated overhead crane for easier access of the vacuum pumps. ▪ Verify the lift station site is in accordance with all OSHA and County safety and confined space requirements.
Recommendations:	Lift Station No. 303 – Constantine ▪ Install seal-offs and interlocks on electrical equipment and perform a detailed electrical code review to return to conformance with code. ▪ Evaluate the installation of a secondary standby pump. ▪ Prepare for construction of improved design noted by Operations staff.
Recommendations:	Lift Station No. 415 – Prada ▪ Evaluate replacing the valve vault with all above grade discharge piping for easier maintenance and to prevent any confined space concerns. ▪ Evaluate an upgrade to the electrical equipment including replacing the aging control panel, updating the conduit location, and generally bringing the system up to current standards. ▪ Evaluate replacing or fixing the leaking check valve.
Recommendations:	Lift Station No. 417 – Wonran ▪ Monitor the station as flows continue to increase. ▪ Evaluate replacing the guide rails with a single rail of the correct length. ▪ Evaluate if a smaller impeller diameter might be worth considering while the flow demands are still low.
Recommendations:	Lift Station No. 442 – Doredo 2 ▪ Evaluate an adjacent lot for future lift station conversion or install a method to allow generator access during a flooding event. ▪ Evaluate the installation of a secondary stand-by pump.
Recommendations:	Lift Station No. 817 – Bunker Road ▪ Repair the dead front panel or modify to bring back to conformance with OSHA, NEC, and County safety requirements. ▪ Evaluate the two proposed adjacent lots for future lift station conversion.
Recommendations:	Lift Station No. 818 – Harbor West ▪ Evaluate if a smaller impeller diameter might be worth considering while the flow demands are still low.

Recommendations:	Lift Station No. 828 – Sweetwater ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Evaluate fencing and odor control. ▪ Grout the valve vault at the appropriate slope for proper draining. ▪ Evaluate installation of SCADA or Omni-Beacon system for remote monitoring or control.
Recommendations:	Lift Station No. 884 – Wiltshire ▪ Evaluate lengthening the driveway to reduce slope or provide a smoother access point to prevent damage to vehicles or generators. ▪ Evaluate the benefit of either an uninstalled spare or keeping an emergency pump connection on site when only one pump is installed ▪ Evaluate if a smaller impeller diameter might be worth considering while the flow demands are still low.

9.2.4 WASTEWATER TREATMENT FACILITIES

Table 9-10 EPLAB – CIP Recommendations

Recommendation:	Evaluate staffing requirements and ability to provide additional sampling support to Operations staff.
Recommendation:	Evaluate hiring IT support that can work exclusively on the set-up and implementation of the LIMS or purchase a service package from the vendor to do the set-up of laboratory-specific forms and reports with remote installation.

Table 9-11 East Port WRF – CIP Recommendations

Recommendation:	Expand the East Port WRF to 9.0 MGD.
Recommendation:	Replace the chemical feed and effluent analyzer shed building as part of the plant upgrade.
Recommendation:	Evaluate the structural integrity of the offline digester walkways and the digester's ability to serve as an influent EQ tank.
Recommendation:	Add additional biosolids handling capacity (including aerobic digesters, BFP, and ancillary equipment) as part of the plant upgrade.
Recommendation:	Evaluate cost-effective disposal alternatives for dewatered biosolids other than hauling off to Synagro and the landfill as part of the plant upgrade.
Recommendation:	Replace septage receiving pre-treatment units when repair is no longer cost effective and modify to allow septage treatment in aerated sludge holding tank and/or pump to headworks.
Recommendation:	Evaluate the addition of a fourth sludge bay to the 2.05 MG aerated storage tank.
Recommendation:	Evaluate the addition of a biosolids dewatering press at East Port WRF.

Table 9-12 West Port WRF – CIP Recommendations

Recommendation:	Provide additional aerobic sludge-holding tank volume and decanting capacity to improve decant thickening.
Recommendation:	Resolve hydraulic constraints in the irrigation wet well for the injection well pumps to allow disposal of excess RCW from West Port during wet-weather events.
Recommendation:	Replace Rotary Screen Nos. 1, 2, 3, and 4.
Recommendation:	Replace electrical panel of Rotary Screen No. 4.
Recommendation:	Evaluate a DO or ORP control system to replace the pH control approach currently used in the aeration basins.
Recommendation:	Proceed with the scheduled repair and/or replacement and painting of Clarifier No. 4. Include leveling of clarifier overflow weirs.
Recommendation:	Replace the overflow weirs for all four clarifiers.
Recommendation:	Evaluate adding a flow EQ tank to improve plant operations.
Recommendation:	Install a galvanized metal frame and UV cover above each filter tank to prevent algae growth in the filters.
Recommendation:	Secure all electrical switchgear to prevent unauthorized access or inadvertent exposure to live parts.
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Perform a load study to identify any issues related to the system power quality, quantity, and capacity. The load study would help identify deficiencies in the system such as the issues related to the blowers unable to properly operate when energized by the generators. This study can support the efforts made by the County to identify reserve capacities and potential anomalies that may affect long-term maintenance and serviceability of the equipment.
Recommendation:	Complete replacement on Rotary Screen Nos. 1 and 2.

Table 9-13 Rotonda WRF – CIP Recommendations

Recommendation:	Complete the replacement of the two main influent valves at the headworks due to corrosion.
Recommendation:	Install a manually operated slide gate for each influent valve for isolation.
Recommendation:	Replace the grit cyclones of the headworks.
Recommendation:	Replace screening screw conveyor/compactor No. 2.
Recommendation:	Connect Blower No. 1 back in service.
Recommendation:	Replace Blower No. 5 with the correct cfm-capacity blower to lower oxygen levels and improve nitrogen removal.
Recommendation:	Add an MBR cassette to existing trains as capacity needs dictate.
Recommendation:	Add galvanized metal frame and UV shade cloth to CCC 1.

Recommendation:	Add protection to chlorine storage tanks and piping from direct sun light.
Recommendation:	Add a small winch to each decant pump in the sludge-holding tanks for better control of the pump level.
Recommendation:	Remove vegetation, clean, reinforce the berm, and evaluate lining the RCW storage pond to increase RCW storage capacity.
Recommendation:	Evaluate different aeration systems for the RCW storage pond.
Recommendation:	Clean the reject storage pond.
Recommendation:	Complete installation of RCW pipe to the Cape Haze Golf Course and to the Placida Corridor.
Recommendation:	Evaluate ASR for additional RCW storage.
Recommendation:	Replace the isolation valves for both screens.
Recommendation:	Improve the operation of the generators, primarily Generator No. 2.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term operation.
Recommendation:	Investigate the temperature imbalance in the poles of 480 V panel, breaker#28/30 as soon as possible. Either repair the connection or replace the defective breaker.
Recommendation:	Purchase a few module blanks for top and bottom headers and wait to observe membrane effluent turbidity spikes, which would indicate that one of the cracked potting headers has breached the membrane integrity. Remove the compromised membrane module and installed module blanks in its place until new purchased membrane module is received. Once the new membrane module is received, install the new membrane in the middle of the cassette and move an existing module where the compromised module was. This could prolong the new membrane module potting header life.
Recommendation:	A year prior to scheduled replacement (currently estimated in 2023 for train 3), order membrane modules. Install new membranes modules in train 1. Do not install new membranes modules with existing membrane modules in the same train. Move the existing membrane modules from train 1 to train 4. Train 4 will then have 6 membrane cassettes, which will extend the life of the membranes.

Table 9-14 Burnt Store WRF – CIP Recommendations

Recommendation:	Expand the Burnt Store WRF to 2.5 MGD.
Recommendation:	Install a mechanical screen (highest priority) and grit removal system (secondary priority) in a new headworks.*
Recommendation:	Install EQ tank-level monitoring to adjust the transfer pump(s) flow rates.*
Recommendation:	Replace aeration tank hinged sluice gates to provide adequate prevention of flow entering the adjacent tank during maintenance.*
Recommendation:	Replace the UV cover attached to CCC No. 1.

Recommendation:	Scum removal from the treatment system is not being accomplished. Collected scum should be sent directly to the digester for final disposal. The accumulation of scum and floatables in the aeration tanks and clarifiers will not be eliminated until fine, mechanical screens are added to the headworks.*
Recommendation:	Install an RCW meter on the discharge line from the RCW pumps. No means of measuring public-access RCW flow leaving the site is currently provided.*
Recommendation:	Install a pumping system that will pump effluent to the deep injection well pumping station or increase the capacity of the gravity pipe. This will maximize the capacity of the deep injection wells' system when necessary.*
Recommendation:	Replace the old deep well injection pumps.*
Recommendation:	Replace the fiberglass MCC building with a concrete structure.*
Recommendation:	Apply appropriate arc flash labeling on all appropriate switchgear in compliance with NFPA 70E to properly notify O&M personnel of the potential hazard.
Recommendation:	Perform a load study to identify any issues related to power quality, quantity, and capacity of the system. The load study would help identify deficiencies in the system, identify reserve capacities, and assess potential anomalies that may affect long-term maintenance and serviceability of the equipment.

*Note: Items to be re-evaluated as part of the Burnt Store WRF expansion project.

Table 9-15 Leachate Treatment Facility – CIP Recommendations

Recommendation:	Evaluate adding one additional maintenance staff member to meet increasing demands and minimize overtime.
Recommendation:	Repair the hole in the Aquastore storage tank.
Recommendation:	Add a generator to the treatment facility to keep the plant operational during power outages.
Recommendation:	Replace the sand filter compressor.
Recommendation:	Evaluate the installation of a sensor lift.

9.2.5 Reclaimed Water Distribution System

Table 9-16 Mid/West County RCW Distribution System – CIP Recommendations

Recommendation:	Develop an operational protocol for the Mid/West County Master Reuse System once the East Port WRF HSPS No. 2 is completed and on-line. CCU staff intend to operate the RCW system under a select number of operational configurations and coordinate with the hydraulic model to determine their preferred method for meeting all their RCW demands.
Recommendation:	Installation of throttling control valves at all current major RCW users with pond discharges in the Mid and West county areas.
Recommendation:	Installation of a motorized valve assembly in the easement on Cattle Dock Point Road east of SR 776 to provide RCW pumping and storage operational flexibility from West Port WRF.

Recommendation:	Installation of a pressure-reducing valve (PRV) near the intersection of Cape Haze Drive and Westwind Drive as part of the Cape Haze Road RCW project to allow Rotonda PS#2 to continue supplying its high-pressure service area and to send excess flow to the Placida Road Corridor RCW users.
Recommendation:	Install certified staff gauges for pond water surface elevations for all pond discharges to allow valve controls and level indicators to be accurately adjusted.
Recommendation:	Install elevation sensors on weirs at Deep Creek, Kingsway, and Maple Leaf to alert CCU via SCADA when the discharge weir is adjusted.
Recommendation:	Develop an operational protocol for utilizing the Westport RCW Pump Station for improving RCW delivery to West County customers.
Recommendation:	It is recommended that the PS is upgraded to contain pumps with a design point of 335 gpm at 60 psi (139 feet of head) and operate on VFDs to maintain the set-point. This upgrade will allow the West Port WRF to contribute to meeting RCW user demands (flows) with increased pressures.

Table 9-17 South County RCW Distribution System – CIP Recommendations

Recommendation:	Create RCW additional storage at the Burnt Store WRF.
Recommendation:	Acquire one large RCW customer in the South County service area.
Recommendation:	Increase the treatment capacity in the Burnt Store WRF to supply future demands and saltwater intrusion in existing private wells.

Table 9-18 Backflow and Cross-Connection Prevention Program – CIP Recommendations

Recommendation:	Complete implementation of an asset management program, such as *Cityworks* as a tool to track cross-connection inspections.

9.3 Operations and Maintenance

The following O&M items are recommended for FY 2019 and beyond.

9.3.1 Water Treatment Plants

Table 9-19 Burnt Store RO WTP – O&M Recommendations

Recommendation:	Perform yard maintenance around the perimeter fencing.[1]
Recommendation:	Continue to inspect and tighten the connections for the scale inhibitor, sodium hydroxide, sodium hypochlorite, and sulfuric acid pipes daily to prevent leakage.
Recommendation:	Install secondary containment under the chemical drums in the storage room.
Recommendation:	Scrape and paint the ceiling of the bulk storage containment area.
Recommendation:	Paint the concrete of the sodium hypochlorite secondary containment area.
Recommendation:	A small burrow was found under the concrete at Well No. 12, which should be filled to prevent future cracking.
Recommendation:	Replace multiple end caps that are leaking on Trains C and D.
Recommendation:	Install a cover over the transfer pumps and piping near the degasifier towers to prevent sun damage and prolong equipment life.
Recommendation:	Extend the cover of the analyzer panel attached to the wetwell to prevent water from contacting the equipment during rain events.
Recommendation:	Repair HSP C.
Recommendation:	Paint the concentrate disposal wetwell.
Recommendation:	Clean and paint GST A.
Recommendation:	Paint the outside of the MCC building.
Recommendation:	Paint the northwest inside wall of the MCC building.
Recommendation:	Pressure wash the outside of the Operations building.
Recommendation:	Apply appropriate arc flash labeling on all switchgear in compliance with NFPA 70E to properly notify operations and maintenance personnel of the potential hazard. This may require creating a complete and thorough arc flash model using the existing switchgear to determine the energy levels present. This information would appear on the appropriate arc flash labeling as required.
Recommendation:	Continue maintenance of controlled burns on the property to maintain shrub growth and fire buffer around wells.[1]
Recommendation:	Install bollards around the influent transformer box.[1]
Recommendation:	Install fire hose connections on well piping.[1]
Recommendation:	Develop an ERP for valve failure in the clearwell and begin exercising the valve.[1]

[1] Recommendation from RRA Report (March 2020).

9.3.2 WATER DISTRIBUTION SYSTEM

Table 9-20 Mid/West County Distribution System – O&M Recommendations

Recommendations:	**Interconnects** ▪ Lower the lighting under the canopy to illuminate the pumps and equipment at the EWD interconnect. ▪ Add intrusion alarm to CCU RTU panels.[1] ▪ Install bollards around the equipment.[1]
Recommendation:	**Port Charlotte Golf Course WBS** ▪ Perform yard maintenance around the perimeter fencing.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Evaluate the generator at the Port Charlotte Golf Course WBS to verify that OSHA compliance is maintained and accessibility of the equipment is provided. ▪ Label the switchgear to identify parts and components that could be energized.
Recommendation:	**Walenda WBS** ▪ Perform yard maintenance around the perimeter fencing.[1] ▪ Fix the leak on the seal of Pump 3. ▪ Repair the bonding and re-paint the GST. ▪ Replace the missing cover on the junction box. ▪ Trim tree limbs on the northwest corner of the pump room.[1] ▪ Install bollards around the WBS effluent pipe.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Add additional signage indicating "No Trespassing, Violators will be Prosecuted" along fencing.[1]
Recommendations:	**Gulf Cove WBS** ▪ Perform yard maintenance around the perimeter fencing. ▪ Paint the floor in the sodium hypochlorite chemical injection room to prevent concrete deterioration. ▪ Fix the leak on the influent pipe to the GST. ▪ Fix the leak on HSP No. 2. ▪ Pump out the water in the vault containing the HSP feed piping. ▪ Secure the electrical conduit for the gate camera. ▪ Provide additional support for the flex conduit bearing the video surveillance system. ▪ Repair conduit in the chemical feed system. ▪ Repair the two non-working cameras.[1] ▪ Clearly label chemical storage tanks.[1] ▪ Continue to monitor water quality entering the Gulf Cove WBS.[1]

	Rotonda WBS
Recommendation:	▪ Replace the VFD covers to eliminate gaps between the updated VFDs and the enclosures. ▪ Clean the small oil spill inside the generator enclosure. ▪ Paint the wall that contains the HMI in the pump room. ▪ Replace the incoming breaker as soon as possible. The failure of this specific device may render the station out of service for an extended period. ▪ Further recommend that the gaps surrounding the VFDs be mitigated to prevent potential contact with live parts. ▪ Install bollards around the monitoring equipment.[1] ▪ Clearly label chemical storage tanks and fill valves.[1] ▪ Develop an ERP for WBS bypass and operations without laboratory and control room.[1]
	Ingraham Disinfection Station
Recommendation:	▪ Repair the doorstep to the water quality testing and storage shed.

[1] Recommendation from RRA Report (March 2020).

9.3.3 WASTEWATER COLLECTION SYSTEM

Table 9-21 Wastewater Collection System – O&M Recommendations

Recommendations:	Master Lift Station No. 816 – Rotonda Boulevard West ▪ Coat the wetwell. ▪ Repair or rehabilitate the concrete top slab. ▪ Modify the valve vault to allow full access to the valves and to prevent them from being buried. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
Recommendations:	Lift Station No. 7 – Pure Oil ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
Recommendations:	Lift Station No. 12 – Plaza ▪ Install shocks or springs on existing hatch or evaluate replacing hatches.
Recommendations:	Lift Station No. 28 – Peachlove ▪ Replace concrete control panel posts with County aluminum standard. ▪ Correct the leak in the valve vault piping.
Recommendations:	Lift Station No. 303 – Constantine ▪ Coat the wetwell or repair some of the degraded concrete.

Recommendations:	Lift Station No. 415 – Prada ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.
Recommendations:	Lift Station No. 817 – Bunker Road ▪ Coat the wetwell and seal and repair the contents of the valve vault. ▪ Install interconnect and seal-offs on any electrical equipment within 10 feet of the wetwell to return to conformance with code.

9.3.4 WASTEWATER TREATMENT FACILITIES

Table 9-22 EPLAB - O&M Recommendations

Recommendation:	Continue implementation of the LIMS system.
Recommendation:	Continue working with sampling personnel on sampling protocols; in particular, sample labeling in the field, correct completion of chain-of-custody information, and sample submittal.

Table 9-23 Rotonda WRF – O&M Recommendations

Recommendation:	Continue to maintain and operate rotary fine screens at slower rotation, which is extending the life of the rollers. Monitor maintenance issues to determine if future replacement of rotary fine screens is necessary.
Recommendation:	Complete the repairs of Screen No. 2.
Recommendation:	Paint tanks, buildings, and pipes in the next 2 years.
Recommendation:	Adjust the membranes slack within the new few months.
Recommendation:	Continue monitoring and trending membrane permeability data and add temperature to the data collected weekly so permeability can be corrected with temperature to account for seasonal changes in water viscosity.
Recommendation:	Constantly monitor membrane permeability trend, especially for trains 3 and 4, which end of life is estimated to 2024 and 2026, respectively as this trend can either accelerate or decelerate.

Table 9-24 Burnt Store WRF – O&M Recommendations

Recommendation:	Remove rust from the top rim of the EQ tank and repaint.
Recommendation:	Repair leaking internal piping, aeration header, and fittings in EQ basin.
Recommendation:	Remove rust from the outer rim of the aeration basins and repaint flaking areas at welds.
Recommendation:	Evaluate the main breaker at the blowers to prevent tripping when three blowers are in operation.
Recommendation:	Evaluate filter back-wash pump operations, specifically during high-flow events.

9.3.5 Reclaimed Water Distribution System

Table 9-25 Mid/West County RCW Distribution System –O&M Recommendations

Recommendation:	Repair the weak berm around the pond wall at the Rotonda WRF.