January
2024

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GRU Wastewater Treatment Plan

January 2024

GRU℠

More than Energy

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1. Introduction

In 2020, the Florida Legislature passed Senate Bill 712, also known as the Clean Waterways Act, now Chapter 2020-150, Laws of Florida. The legislation carries water-quality protection provisions aimed at minimizing the impact of known sources of nutrient pollution and strengthening existing regulatory requirements. The rule requires the Florida Department of Environmental Protection (FDEP) to report on water quality monitoring in the area of each nutrient basin management action plan (BMAP) and to summarize the costs and benefits of BMAP wastewater projects.

A BMAP is a framework for water quality restoration that contains local and state commitments to reduce pollutant loading through current and future projects and strategies. BMAPs contain a comprehensive set of solutions, such as permit limits on wastewater facilities, urban and agricultural best management practices, and conservation programs designed to achieve pollutant reductions established by a total maximum daily load (TMDL).

Gainesville Regional Utilities (GRU) has developed and is submitting this wastewater treatment plan to meet the requirements in Subparagraph 403.067(7)(a)9 of the Florida Statutes. The plan is required because FDEP has identified domestic wastewater treatment facilities and/or onsite sewage treatment and disposal systems (OSTDS) as contributors of at least 20 percent of point source or nonpoint source nutrient pollution within the two BMAPs within GRU's service area.

GRU is a multi-service utility located in Alachua County owned by the City of Gainesville. GRU serves approximately 200,000 customers in Gainesville and surrounding areas, offering:

- Electric
- Natural gas
- Water
- Wastewater
- Telecommunications services

A significant part of GRU's service area is located within the Orange Creek Basin although some small portions of the north, along US 441, and the west are within the Santa Fe River basin (see Figure 1).

The Orange Creek Basin is located in Alachua County and northern Marion County and is part of the Ocklawaha River Basin. The Ocklawaha River Basin is a TMDL Group 1 Basin. The BMAP addresses seven Orange Creek Basin waterbodies verified as impaired.

The Santa Fe River Basin is a watershed centered around the Santa Fe, Ichetucknee, and New Rivers and Olustee Creek. The Santa Fe River Basin spans nine counties including parts of Alachua, Gilchrist, Suwannee, Columbia, Union, Bradford, Baker, Clay, and Putnam.

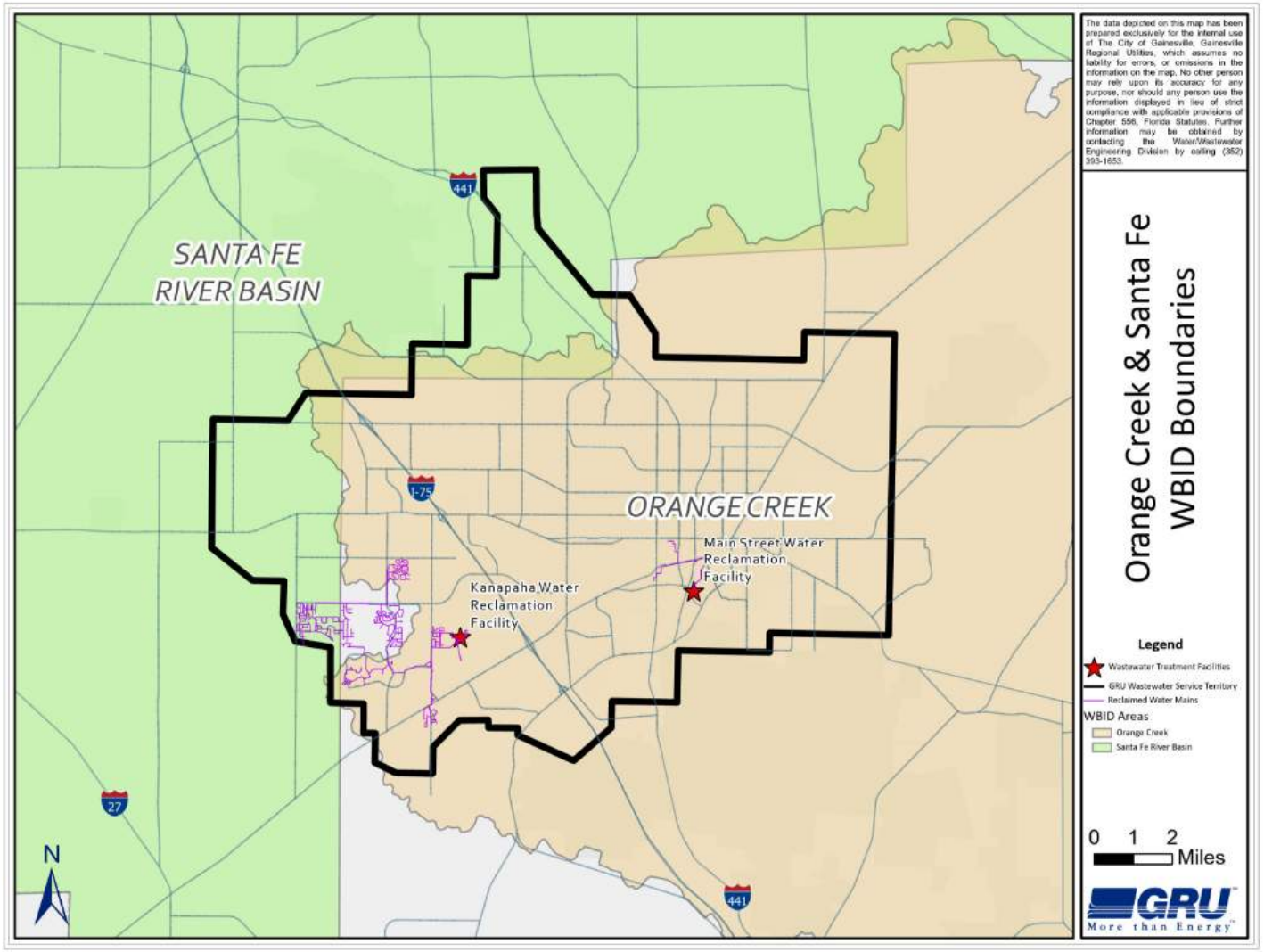


FIGURE 1 - ORANGE CREEK & SANTA FE WBID BOUNDARIES

2. GRU Water Reclamation Facilities

GRU has two water reclamation facilities to serve its community (see Figure 1 – Orange Creek & Santa FE WBID Boundaries). The Main Street Water Reclamation Facility (MSWRF) generally serves the east side of the greater Gainesville area, and the Kanapaha Water Reclamation Facility (KWRF) serves customers in the west. Both water reclamation facilities use a biological process to remove nutrients from the influent flow.

GRU operates a wastewater transfer pumping facility. The pumping facility allows transfer of collected wastewater between the KWRF and the MSWRF. The transfer pumping facility is remotely controlled and allows real time control of wastewater flows to each plant. This unique feature of GRU's wastewater collection system enables GRU to operate the system to allow the individual facility permitted capacities to collectively function as a combined permitted capacity for the system.

Additionally, GRU owns and maintains a wastewater system at the Cross Creek Mobile Home Park, located in Cross Creek, Florida.

2.1 Main Street Water Reclamation Facility

The MSWRF is located at the intersection of Main Street and SE 16th Avenue and operates under FDEP permit No. FL0027251. The MSWRF is a 7.5 million gallons per day (MGD) average annual daily flow (AADF) advanced secondary activated sludge domestic wastewater treatment facility. The plant includes pretreatment processes comprising of mechanical bar screens, grit removal units and odor control. The biological treatment process consists of three aeration basins and 11 surface aerators. The facility has three secondary clarifiers, sand filtration systems, and disinfection. Biosolids from the plant are treated via aerobic digestion, thickened, and hauled to the KWRF facility where they are combined with KWRF biosolids for beneficial reuse and/or disposal in accordance with state and local regulations.

Effluent from the MSWRF is discharged to the Sweetwater Branch (Class III fresh water, WBID 2711) and must meet requirements of the FDEP for discharge to Class III surface waters. The MSWRF has a Water Quality Based Effluent Limitations (WQBELs) to satisfy Numeric Nutrient Criteria ("NNC") Rule. More detailed information on the WQBEL is included in Section 5.2.1 of this plan. The MSWRF is in compliance with its National Pollutant Discharge Elimination System ("NPDES") permit. The MSWRF NPDES permit is a 5-year permit that will be renewed in 2025.

In addition, the MSWRF includes a reclaimed water pumping station and distribution system. GRU's MSWRF is located within the Orange Creek Basin.

2.2 Kanapaha Water Reclamation Facility

The KWRF operates a 14.9 MGD AADF under FDEP Permit No. FL0112895. The facility is located at the intersection of SW 63rd Boulevard and SW 41st Place and is the larger of the two WRFs serving the City of Gainesville and surrounding areas.

The plant includes influent screening, grit removal, activated sludge treatment, filtration and high level disinfection. The KWRF has two distinct treatment processes incorporated into its design: a modified Ludzack-Ettinger treatment process and a carrousel advanced wastewater treatment activated sludge system. The treatment processes conclude with filtration and disinfection prior to discharge into aquifer recharge wells and a reclaimed water distribution system. The disinfection system is required to meet more stringent regulatory limits than traditional wastewater treatment facilities. The system consistently meets the required primary and secondary drinking water standards for discharge to recharge wells. The KWRF NPDES permit is a 5-year permit that was issued on June 3, 2021 and will be renewed in 2026. The final effluent can be directed as follows:

- KWRF's Underground Injection Control (UIC) System - existing 10.0 MGD AADF Class V underground injection wells which discharge the final treated effluent to Class G-II groundwater.
- Land application: A 14.20 MGD AADF permitted capacity for slow-rate public access consisting of a portion of the Southwest Reuse Project and including golf courses, schools, residential lawns, parks, fire protection, landscape areas including Kanapaha Botanical Gardens and a reuse loading station (at the facility) for tanker trucks to obtain reuse water for pesticide application, dust control and other activities;
- For emergency use only, the facility is permitted to discharge 10.0 MGD of effluent to Lake Kanapaha (Class III fresh surface waters – WBID 2717B).

The biosolids are treated by aerobic digestion followed by dewatering and then transported by contractor to a FDEP permitted Biosolids Management Facility (BMF) for further treatment, marketing or landfill disposal.

While GRU's KWRF is located outside of the Santa Fe BMAP, a portion of the reclaimed water service area is within the BMAP, but outside of the Priority Focus Areas (PFAS) and springsheds.

2.3 Cross Creek

Cross Creek Mobile Home Park (MHP) is located more than 10 miles outside of GRU's service area, near 13910 SE 174th Pl in Cross Creek, Florida. The Cross Creek Mobile Home Park wastewater system consists of 1400 feet of wastewater collection system, a lift station, 5800 feet of force main, two (2) setting tanks and a remote drain field located on 0.75 acres of land. The FDOH permit number for the wastewater system is 4-263-89.

MHP was an independently run system when transferred to the Regional Utility Board (RUB) around 1970, the RUB was later reorganized as Gainesville Regional Utilities. The RUB inherited the Cross Creek MHP system along with several park systems and another mobile home park. All but Cross Creek MHP were later transferred to other agencies to manage. Given the geographical distance from GRU's System, increasing regulations, labor cost, and capital improvement projects, GRU is in the process of selling this facility.

3. Total Nitrogen and Total Phosphorus Loads and Permitted Capacity

MSWRF and KWRF's permitted total nitrogen (TN) and total phosphorus (TP) effluent limits for non-emergency discharge are shown in Tables 1 and 2. A summary of the facilities annual average TN and TP concentrations and loads over the past five years is also included in Table 1 and 2. Appendix A includes monthly data used to calculate annual averages.

On April 7 2023 FDEP issued a Final Order, which the US EPA accepted, establishing Level II Water Quality Based Effluent Limitations (WQBELs) for TN, TP, and Chlorophyll a (Chla) for discharges to Sweetwater Branch (see Appendix B). The Final Order establishes site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch as: 1) an annual load of 215,616 pounds/year (lbs/yr.) of TN; 2) an annual load of 16,038 lbs/yr. of TP; 3) an annual geometric mean TP concentration of 0.3 mg/L; and 4) an annual geometric mean Chlorophyll a concentration of 1.9 ug/L, not to be exceeded more than once in a three-year period for GRU's MSWRF and J.R. Kelly Generating Station's (KGS), Gainesville Stormwater Management Utility (SMU) and Florida Department of Transportation. The allocation specific to MSWRF is provided in Table 1 below. These site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch supersede and replace the otherwise applicable numeric nutrient criteria for Sweetwater Branch.

The limits established in the WQBEL in concert with the GRU/City of Gainesville Sweetwater Wetlands Park satisfy the Alachua Sink TMDL requirements for pollutant sources from the Sweetwater Branch watershed, which include MSWRF, GRU Kelly Generating Station, and non-point sources. The WQBEL limits also ensure that the Sweetwater Wetlands Park effluent requirements of TN $\leq$ 3 mg/l and TP $\leq$ 0.3 mg/l contained in the Environmental Resource Permit (ERP) for the project will be met. Furthermore, the development of the WQBEL provided assurance that all waters downstream of the GRU MSWRF and Kelly discharges will be protected.

KWRF's reclaimed water is required to be monitored for the primary and secondary drinking water standards contained in Chapter 62-550, F.A.C. Neither TN nor TP are part of the standards; however, nitrate plus nitrite, as N does have a 10.0 mg/L limit. Additionally, KWRF is authorized to discharge effluent from Outfall D-001 to Lake Kanapaha (Class III fresh Water – WBID 2717) during emergency conditions (emergency conditions are defined as 100-year, 24-hour storm events or cumulative storm events or an unforeseen event). Such discharge is limited and monitored. The permit only has TN and TP limits (29,619 lbs/yr and 1,461.2 lbs/yr respectively) under those conditions and not normal operation.

TABLE 1 -2018-2022 MSWRF TP AND TN EFFLUENT DATA (ANNUAL AVERAGE)

Year	Total Nitrogen		Total Phosphorus	
	mg/L	lb/yr	mg/L	lb/yr
2018	5.18	101,170	0.42	8,354
2019	5.45	96,950	0.37	6,410
2020	4.86	82,556	0.21	3,512
2021	5.09	89,947	0.22	3,981
2022	6.71	118,796	0.20	3,515
5-Yr Average	5.46	97,884	0.28	5,154
Permit Limit (WQBEL)	**--**	**182,646**	**0.3**	**11,644**

TABLE 2 -2018-2022 KWRF TP AND TN EFFLUENT DATA (ANNUAL AVERAGE)

Year	Total Nitrogen		Total Phosphorus	
	mg/L	lb/yr	mg/L	lb/yr
2018	5.27	182,014	1.51	53,226
2019	6.84	226,041	1.52	50,657
2020	5.17	166,332	1.04	33,934
2021	5.25	187,058	1.46	51,394
2022	6.50	218,037	1.21	40,174
5-Yr Average	5.80	195,896	1.35	45,877
Permit Limit	**Report Only**	**--**	**Report Only**	**--**

* KWRF Permit effluent limits:

- Emergency Surface Water Discharges: TN: 29,619 lbs/yr, TP: 1,461.2 lbs/yr
- Underground Injection Control Systems: TN Report only in monthly DMR, TP, report only in annual UIC report.
- Reuse and Land Application Systems: TN: monthly report, TP: annual report (quarterly sampling)

4. Capacity Analysis Report

GRU prepared and submitted its Capacity Analysis Report (CAR) in 2019 as part of GRU's KWRF permit renewal application. The 2019 report (provided in Appendix C) is the most recent analysis available.

GRU is in the process of re-evaluating its service area population growth projections. The CAR will be updated and included with the MSWRF NPDES permit renewal application by October, 2024. The information, considering future growth over the next 20 years will be available and provided at that time.

5. Wastewater System Planned Upgrades

The GRU MSWRF and KWRF meet all nutrient water quality requirements.

GRU has an overarching goal to reliably collect and treat all wastewater from the collection system and achieve 100 percent beneficial reuse. This goal is met with a combination of operation and maintenance (O&M) programs and capital projects.

5.1 O&M Programs

GRU has a dedicated focus on wastewater system operations and maintenance, reliability, and resiliency. GRU's goals are supported by inspection, maintenance, and capital improvement programs which include:

- Efficient and proactive inspection program to identify concerns in the wastewater collection system, WRFs and reclaim systems
- Analysis of inspection data and development a prioritized project list for maintenance, repair and replacement
- Reliable and resilient operation of the wastewater collection system, WRFs and reclaim systems

5.2 Completed and Upcoming Capital Improvements Projects

GRU has budgeted over $135 million over the next 3 years for capital improvements to the water reclamation facilities. The largest projects in the upcoming years include but are not limited to MSWRF upgrades (see section 5.2.2 of this plan for additional information), the groundwater recharge wetland system project (see section 5.2.3), power and reliability upgrades and treatment plant improvements.

Table 5 provides a summary of GRU's projected capital investments for the water reclamation facilities. *(will be completed for the August, 2024 report)*

5.2.1 MSWRF – Completed Projects

Alachua Sink was listed on Florida's verified list as being impaired for total nitrogen (TN) and Chlorophyll a under Florida's Impaired Waters Rule in 2002. A nutrient TMDL, designed to restore the designated use of the lake, was approved in 2006. As a contributor to the nitrogen load to Alachua Sink, GRU considered several alternatives for meeting the reductions required in the MSWRF discharge. GRU and the City of Gainesville Public Works Department partnered to design and construct the Sweetwater Wetlands Park project in collaboration with partners and stakeholders in order to meet GRU and Public Works' nutrient load reduction allocations under the TMDL. The project included upgrades to the MSWRF for phosphorus removal, optimization of nitrogen removal at MSWRF and the diversion of flow from Sweetwater Branch into the constructed enhancement wetland which discharges via sheetflow onto Paynes Prairie. This approach restored sheetflow to the prairie, thus restoring approximately 1,300 acres of wetlands, and now significantly reduces the nitrogen loads from Sweetwater Branch that may reach Alachua Sink. The project included collaboration and partnership with several agencies including FDOT, St. Johns River Water Management District (SJRWMD), FDEP, Florida Wildlife Commission, and Alachua County.

The Sweetwater Wetlands Park was completed in 2016 and is fully operational. In conjunction with the project, GRU worked with the FDEP to establish site specific criteria for the Sweetwater Branch in accordance with the Numeric Nutrient Criteria ("NNC") Rule. As discussed previously, the FDEP issued a Final Order for the adoption of these WQBEL nutrient criteria on April 7, 2023 (see Appendix B). The EPA issued a final acceptance of these criteria on June 7, 2023. These parameters will be incorporated into the MSWRF NPDES permit in early 2024. With the Sweetwater Wetlands Park in operation and the WQBEL in place, GRU is in full regulatory compliance for MSWRF.

5.2.2 MSWRF – Upcoming Projects

The MSWRF capacity and renewal upgrade project is scheduled to be completed over the next 5-10 years at an estimated cost of $160 million, and is part of the utility's capital improvement program. The MSWRF began treating wastewater in the 1920's and has undergone numerous expansions and upgrades. The MSWRF capacity and renewal upgrade will modify the treatment processes at the facility with multiple equipment and capacity upgrades. Phase 1 includes installation of a new master lift station, a new headworks structure to improve screening of debris, and grit removal. Phase 1 of the MSWRF capacity and renewal upgrade is partially funded by a $22.5 million grant from the FDEP Wastewater Grant Program. Phase 2 of the MSWRF project will replace the east aeration process with Membrane Bioreactor (MBR) treatment technology. The center and west aeration and clarification processes were built in the 1990s and will remain through the end of their useful life. Upgrades to the electrical primary and secondary will be coordinated with GRU's Energy Delivery department. Secondary electrical upgrades will also include whole-plant generation that will power the facility in the event of an emergency.

5.2.3 KWRF – Future Projects

GRU and its partners, the FDEP, Suwannee River Water Management (SRWMD) and Alachua County, are collaborating on a multipurpose park called the Southwest Nature Park. The future 75-acre park will be located on the west side of Parker Road, immediately north of Diamond Sports Park. Water in the constructed wetland will be naturally filtered to reduce nutrients to low levels before percolating into the soil and replenishing the groundwater below. This groundwater recharge process will boost aquifer levels and help support minimum flows and levels at the Santa Fe River and surrounding springs, and increase the beneficial reuse capacity of KWRF.

The groundwater recharge wetland system project will cost approximately $12 million. GRU is currently in the design and permitting process of this project.

5.2.4 Wastewater Collection System

GRU has budgeted over $85 million across the next 5 years for capital improvements to the wastewater collection system to replace aging infrastructure, increase capacity and improve resilience. These projects include, but are not limited to: the replacement and rehabilitation of piping, manholes and other wastewater collection system components, expansion of infrastructure, relocation of infrastructure in environmentally sensitive areas and a reduction of inflow and infiltration.

Table 3 provides an overview of spending for from October 1, 2022 through March 31, 2023. These projects include, but are not limited to:

- Lift Station 1 piping and generator replacement ($400,000)
- Lift Station Upgrades ($843,000)
- Lift Station SCADA Replacements ($900,000)
- Force main Air Relief Valve Replacement/Repair ($253,000)
- Gravity Main Cured In-place Lining Projects ($5,000,000)
- Manhole Replacement and Improvements ($825,000)
- Manhole Lining ($241,000)
- Cured In-place Lining for Service Laterals ($3,700,000)

In addition to capital improvements, GRU invests approximately $4 million per year for the operation and maintenance of the wastewater collection system. Table 3 actuals include the O&M investment for FY22 and FY23 (through March 2023). Table 4 provides a summary of GRU's projected capital and O&M investments in the wastewater collection system.

6. Conclusion

In order to serve our customers well, to meet regulatory compliance, and uphold public health and safety and environmental protection, it is essential for utilities to regularly evaluate critical infrastructure and develop reliability and resiliency strategies. This includes a thorough and regular analysis of operations and maintenance programs and strategic investment into infrastructure.

An overarching goal for GRU is to shift activities from “reactive” to “proactive” and therefore provide a high level of service to customers and reduce regulatory noncompliance. As discussed in detail within this document, GRU has made significant improvements to the operation and reliability of the water reclamation facilities and the wastewater collection system. These improvements enable GRU to work smarter and prioritize maintenance, repairs and replacement. GRU’s mission for its customers is to provide safe, reliable, competitively priced utility services in an environmentally responsible manner to enhance the quality of life in our community. Increasing the resiliency of the water reclamation facilities and the wastewater collection system supports GRU’s core mission and enables us to provide long-term sustainable service to our community.

TABLE 3 - OVERVIEW OF GRU'S WASTEWATER COLLECTION SYSTEM INVESTMENT, OCTOBER 1, 2022 THROUGH MARCH 31, 2023

Wastewater Area	Description of Project Category	FY 2022 YTD Actual	FY 2023 YTD Actual (P1 - P6)
Lift Stations - Maintenance	Includes planned and corrective lift station projects	1,038,317	480,340
Lift Stations - Operations	Includes day to day operations, administrative and technical support, as well as emergency response	1,102,961	575,808
Lift Stations - Pumping & Equipment	Includes lift station upgrades, repair, rehabilitation and replacement to improve system resiliency	394,287	322,022
Lift Stations - Safety Programs	Safety programs for lift station operation and maintenance	13,735	5,772
Lift Stations - Upgrades & Improvements	Lift station upgrades, improvements and replacements, including but not limited to meter replacements, general improvements, instrumentation and control improvements, electrical service upgrades, SCADA improvements, etc.	1,274,745	705,569
New Development – Oversizing for Lift Stations	Reflects GRU's oversizing costs for lift stations during the development process	93,429	14,747
New Development – Oversizing for Wastewater Collections Force Mains	Reflects GRU's oversizing costs for force mains during the development process	110,152	1,830
New Development – Oversizing for Wastewater Collections Gravity Systems	Reflects GRU's oversizing costs for gravity system infrastructure during the development process	335,088	75,749
Wastewater Collections - Engineering	Includes engineering support for wastewater collection system projects, master planning, compliance, permitting and emergency response	218,962	93,824
Wastewater Collections - Material Management Facility	Wastewater decant station to support cleaning and lining efforts	32,388	56,132
Wastewater Collections - Force Mains	Includes force main and air relief valve repair, replacement, operations, maintenance, relocations and septic to sewer conversions	742,656	406,663
Wastewater Collections - Gravity Systems	Includes gravity system repair and replacement, improvements, inflow and infiltration improvements,	6,082,514	2,624,090

	relocations, cured in-place lining, routine jetting and cleaning, as well as emergency response and remediation		
Wastewater Collections - Services	Includes service lateral installations, repairs, replacement, lining, customer stoppage and inspection services, jetting and cleaning and associated maintenance	3,922,994	1,391,125
Wastewater General Plant - Lift Stations	Includes large purchases associated with lift stations, pumps, generators, etc.		139,917
Wastewater General Plant - Wastewater Collections	Purchase of equipment in support of wastewater collection system operation and maintenance, such as vehicles, trailers, vacuum truck, drilling rig, etc.	1,156,879	167,205
Grand Total		**16,519,108**	**7,060,793**

This budget overview includes capital and operation and maintenance expenditures for FY 22 and FY23 periods 1 through 6. These figures include overheads, labor and non-labor expenses. These figures do not include contributions in aid of construction.

TABLE 4 -OVERVIEW OF GRU'S WASTEWATER COLLECTION SYSTEM CAPITAL AND OPERATION & MAINTENANCE BUDGET PROJECTIONS

Wastewater Collections: Capital	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
Lift Stations - Pumping & Equipment	1,650,000	4,000,000	3,500,000	5,500,000	3,500,000
Lift Stations - Upgrades & Improvements	1,870,000	1,870,000	1,620,000	1,370,000	1,320,000
New Development - Oversizing for Lift Stations	50,000	50,000	50,000	50,000	50,000
New Development - Oversizing for Wastewater Collection	400,000	400,000	450,000	450,000	450,000
Wastewater Collections - Material Management Facility	400,000	800,000	700,000		
Wastewater Collections - Force Mains	4,515,000	2,065,000	1,765,000	1,815,000	815,000
Wastewater Collections - Gravity Systems	7,450,000	5,800,000	5,950,000	7,300,000	6,250,000
Wastewater Collections - Services	1,570,000	1,570,000	1,670,000	1,670,000	1,670,000
Wastewater General Plant - Lift Stations	100,000	100,000	100,000	100,000	100,000
Wastewater General Plant - Wastewater Collections	500,000	500,000	500,000	500,000	500,000
Capital Total	**18,505,000**	**17,155,000**	**16,305,000**	**18,755,000**	**14,655,000**
Wastewater Collections: O&M	**FY24**	**FY25**			
Lift Stations - Maintenance	1,054,566	1,097,850			
Lift Stations - Operations	1,222,033	1,301,054			
Lift Stations - Safety Programs	8,013	8,013			

Wastewater Collections - Engineering	333,907	342,192			
Wastewater Collections - Force Mains	134,529	137,585			
Wastewater Collections - Gravity Systems	1,019,828	1,068,733			
Wastewater Collections - Services	251,898	261,488			
O&M Total	**4,024,773**	**4,216,914**			

This budget overview includes wastewater collection system capital projections through FY28 and Operation and Maintenance projections through FY25. These figures include overheads, labor and non-labor expenses. These figures do not include contributions in aid of construction.

TABLE 5 - TABLE 5. OVERVIEW OF GRU'S WATER RECLAMATION FACILITIES CAPITAL BUDGET PROJECTIONS

Water Reclamation Facilities: Capital	**FY24**	**FY25**	**FY26**	**FY27**	**FY28**
MSWRF Projects for Treatments and Disposal					
MSWRF RCW Programs					
KWRF Projects for Treatments and Disposal					
KWRF RCW Programs					
			38,000,000	**41,000,000**	**57,000,000**

APPENDIX A

2018-2022 TN & TP for MSWRF and KWRF

2018-2022 MSWRF Monthly TP and TN Data

Month/ Year	Month	Years	Flow, MGD	Flow, MG/mon	Total N, mg/L	Total N, lb/month	Total P, mg/L	Total P, lb/yr
Jan-18	1	2018	5.386	166.98	8.57	11,935	0.82	1,142
Feb-18	2	2018	6.659	180.54	5.03	7,574	0.26	391
Mar-18	3	2018	5.880	173.32	6.22	8,991	0.44	636
Apr-18	4	2018	7.468	210.42	4.96	8,704	0.29	509
May-18	5	2018	6.605	204.75	4.41	7,531	0.36	615
Jun-18	6	2018	7.968	239.05	3.65	7,277	0.36	718
Jul-18	7	2018	8.806	223.03	4.32	8,036	0.38	707
Aug-18	8	2018	7.938	238.48	5.14	10,223	0.43	855
Sep-18	9	2018	7.122	208.02	5.47	9,490	0.49	850
Oct-18	10	2018	5.887	174.57	4.86	7,076	0.49	713
Nov-18	11	2018	5.338	137.60	5.03	5,772	0.34	390
Dec-18	12	2018	7.330	230.72	4.45	8,563	0.43	827
Jan-19	1	2019	7.860	203.49	5.65	9,589	0.41	696
Feb-19	2	2019	7.183	192.83	6.28	10,100	0.18	289
Mar-19	3	2019	5.822	173.71	5.96	8,634	0.39	565
Apr-19	4	2019	5.454	158.58	6.57	8,689	0.60	794
May-19	5	2019	5.324	156.42	5.63	7,345	0.85	1,109
Jun-19	6	2019	6.045	174.69	4.82	7,022	0.58	845
Jul-19	7	2019	6.229	186.13	4.88	7,575	0.56	869
Aug-19	8	2019	7.920	239.37	4.15	8,285	0.16	319
Sep-19	9	2019	6.734	195.96	3.91	6,390	0.10	163
Oct-19	10	2019	5.610	168.86	4.97	6,999	0.19	268
Nov-19	11	2019	5.288	152.14	6.66	8,451	0.23	292
Dec-19	12	2019	5.367	160.50	5.88	7,871	0.15	201
Jan-20	1	2020	5.702	171.47	6.44	9,210	0.20	286
Feb-20	2	2020	6.005	150.79	6.16	7,747	0.21	264
Mar-20	3	2020	5.045	191.76	7.02	11,227	0.38	608
Apr-20	4	2020	4.809	139.60	5.77	6,718	0.33	384
May-20	5	2020	4.809	146.24	3.76	4,586	0.18	220
Jun-20	6	2020	7.394	212.84	3.00	5,325	0.14	249
Jul-20	7	2020	5.878	175.97	3.90	5,724	0.13	191
Aug-20	8	2020	5.681	176.75	4.37	6,442	0.21	310
Sep-20	9	2020	7.263	211.82	3.62	6,395	0.12	212
Oct-20	10	2020	5.889	181.30	4.08	6,169	0.17	257
Nov-20	11	2020	5.299	150.09	4.90	6,134	0.25	313
Dec-20	12	2020	5.007	154.78	5.33	6,880	0.17	219
Jan-21	1	2021	5.027	151.26	5.35	6,749	0.15	189
Feb-21	2	2021	5.796	157.43	4.05	5,318	0.14	184
Mar-21	3	2021	5.669	173.00	3.17	4,574	0.12	173
Apr-21	4	2021	5.930	177.40	5.39	7,975	0.19	281
May-21	5	2021	5.022	150.72	5.90	7,416	0.48	603
Jun-21	6	2021	5.727	165.53	5.60	7,731	0.44	607
Jul-21	7	2021	9.690	173.06	4.70	6,784	0.15	216
Aug-21	8	2021	8.078	244.44	6.30	12,843	0.39	795
Sep-21	9	2021	7.446	222.06	4.00	7,408	0.23	426
Oct-21	10	2021	5.842	178.08	4.51	6,698	0.16	238
Nov-21	11	2021	6.320	170.92	4.90	6,985	0.08	114
Dec-21	12	2021	5.884	156.35	7.26	9,467	0.12	154
Jan-22	1	2022	5.145	155.46	7.91	10,256	0.26	337
Feb-22	2	2022	5.021	140.59	7.36	8,630	0.34	399
Mar-22	3	2022	8.750	261.00	5.80	12,625	0.30	653
Apr-22	4	2022	8.101	238.59	5.37	10,685	0.15	298
May-22	5	2022	5.404	163.09	4.97	6,760	0.13	177
Jun-22	6	2022	4.892	144.30	5.20	6,258	0.20	241
Jul-22	7	2022	5.316	162.05	7.70	10,407	0.16	216
Aug-22	8	2022	6.012	187.98	6.70	10,504	0.10	157
Sep-22	9	2022	7.265	215.60	8.04	14,457	0.18	324
Oct-22	10	2022	5.336	166.05	7.36	10,193	0.33	457
Nov-22	11	2022	5.316	159.05	6.40	8,489	0.10	133
Dec-22	12	2022	4.897	148.45	7.70	9,533	0.10	124
Jan-23	1	2023	5.256	159.17	12.59	16,713	0.12	159
Feb-23	2	2023	5.227	144.30	9.35	11,252	0.22	265
Mar-23	3	2023	6.138	159.78	4.64	6,183	0.15	200
Apr-23	4	2023	5.161	150.57	3.60	4,521	0.14	176
May-23	5	2023	4.920	150.00	3.60	4,504	0.18	225
Jun-23	6	2023	6.487	187.74	4.80	7,516	0.16	251
Jul-23	7	2023	6.230	189.30	4.20	6,631	0.17	264
Aug-23	8	2023	6.095	184.91	4.05	6,246	0.21	324
Sep-23	9	2023	6.622	198.66	4.20	6,959	0.09	149
Oct-23	10	2023	5.789	178.88	5.00	7,459	0.13	194
Nov-23	11	2023	5.400	162.01	6.26	8,458	0.22	295
Dec-23	12	2023						

Source: MSWRF DMR Data

2018-2022 KWRF Monthly TP and TN Data

Month/ Year	Month	Years	Flow, MGD	Flow, MG/mon	Total N, mg/L	Total N, lb/month	Total P, mg/L	Total P, lb/yr
Jan-18	1	2018	10.63	318.90	5.24	13,942	1.02	2,713
Feb-18	2	2018	11.32	339.60	4.35	12,327	0.83	2,351
Mar-18	3	2018	10.54	316.20	5.77	15,216	1.64	4,325
Apr-18	4	2018	12.05	361.50	7.16	21,579	1.55	4,673
May-18	5	2018	11.48	344.40	7.91	22,708	1.94	5,572
Jun-18	6	2018	13.11	393.30	4.91	16,097	1.86	6,101
Jul-18	7	2018	13.01	390.30	5.39	17,552	2.08	6,771
Aug-18	8	2018	12.80	384.00	4.80	15,380	2.85	9,127
Sep-18	9	2018	11.63	348.90	3.71	10,803	1.05	3,055
Oct-18	10	2018	10.33	309.90	4.64	11,998	1.20	3,101
Nov-18	11	2018	9.86	295.80	4.95	12,218	1.60	3,947
Dec-18	12	2018	11.02	330.60	4.42	12,194	0.54	1,489
Jan-19	1	2019	11.75	364.20	5.79	17,593	0.86	2,612
Feb-19	2	2019	11.83	331.13	5.46	15,078	1.34	3,701
Mar-19	3	2019	10.82	335.46	5.02	14,038	2.19	6,127
Apr-19	4	2019	10.45	313.37	10.87	28,414	1.62	4,234
May-19	5	2019	9.80	303.80	10.97	27,801	2.83	7,170
Jun-19	6	2019	11.08	332.27	8.62	23,880	2.12	5,875
Jul-19	7	2019	10.94	338.99	8.58	24,252	1.27	3,576
Aug-19	8	2019	12.75	395.14	5.58	18,397	1.89	6,228
Sep-19	9	2019	11.48	344.41	5.20	14,936	1.07	3,059
Oct-19	10	2019	10.59	320.27	5.11	13,654	1.29	3,446
Nov-19	11	2019	10.23	307.01	5.80	14,851	0.90	2,304
Dec-19	12	2019	10.10	313.08	5.04	13,147	0.89	2,324
Jan-20	1	2020	10.60	328.63	5.66	15,506	0.91	2,494
Feb-20	2	2020	10.44	302.79	5.79	14,615	0.89	2,247
Mar-20	3	2020	10.06	311.84	5.35	13,904	1.03	2,679
Apr-20	4	2020	9.76	292.71	5.04	12,298	0.81	1,977
May-20	5	2020	9.80	303.67	3.84	9,725	0.93	2,355
Jun-20	6	2020	11.83	354.89	4.07	12,054	0.91	2,693
Jul-20	7	2020	10.68	331.06	4.64	12,804	1.21	3,341
Aug-20	8	2020	10.76	333.68	5.52	15,369	1.13	3,145
Sep-20	9	2020	12.00	359.86	4.62	13,854	1.28	3,842
Oct-20	10	2020	10.89	337.56	4.20	11,817	1.43	4,026
Nov-20	11	2020	10.53	315.79	5.40	14,229	1.27	3,345
Dec-20	12	2020	9.89	306.66	7.88	20,159	0.70	1,790
Jan-21	1	2021	10.00	309.95	6.77	17,507	0.96	2,482
Feb-21	2	2021	10.94	306.29	5.89	15,046	0.69	1,763
Mar-21	3	2021	10.70	331.65	5.88	16,258	0.96	2,655
Apr-21	4	2021	10.96	328.72	5.12	14,037	0.99	2,714
May-21	5	2021	10.07	312.28	5.98	15,581	3.95	10,287
Jun-21	6	2021	11.34	340.15	5.47	15,512	4.19	11,886
Jul-21	7	2021	15.58	482.97	5.08	20,452	0.79	3,162
Aug-21	8	2021	13.68	424.01	5.63	19,909	1.24	4,385
Sep-21	9	2021	13.55	406.35	4.75	16,081	1.93	6,541
Oct-21	10	2021	11.50	356.59	4.60	13,688	0.66	1,963
Nov-21	11	2021	12.18	365.34	4.22	12,870	0.59	1,798
Dec-21	12	2021	10.97	340.07	3.57	10,118	0.62	1,758
Jan-22	1	2022	10.57	327.67	4.18	11,430	0.63	1,722
Feb-22	2	2022	10.52	315.60	4.91	12,910	0.44	1,158
Mar-22	3	2022	11.88	368.28	7.37	22,624	0.66	2,027
Apr-22	4	2022	12.00	360.00	11.43	34,302	1.52	4,564
May-22	5	2022	10.28	318.68	7.84	20,848	1.65	4,385
Jun-22	6	2022	10.17	305.10	6.44	16,387	2.11	5,369
Jul-22	7	2022	10.47	324.57	6.84	18,515	1.75	4,737
Aug-22	8	2022	10.96	339.76	5.37	15,222	1.71	4,845
Sep-22	9	2022	12.45	373.50	5.85	18,230	1.02	3,177
Oct-22	10	2022	10.78	334.18	6.37	17,754	1.28	3,567
Nov-22	11	2022	10.58	317.40	5.79	15,316	0.80	2,118
Dec-22	12	2022	10.09	312.79	5.56	14,498	0.96	2,504
Jan-23	1	2023	10.32	319.92	4.41	11,772	0.82	2,188
Feb-23	2	2023	10.51	315.30	5.10	13,404	1.18	3,103
Mar-23	3	2023	10.40	322.40	4.52	12,153	1.45	3,899
Apr-23	4	2023	10.37	311.10	5.65	14,646	1.94	5,021
May-23	5	2023	10.08	312.48	7.27	18,936	2.39	6,229
Jun-23	6	2023	11.41	342.30	6.68	19,075	1.31	3,740
Jul-23	7	2023	10.25	317.75	7.61	20,167	1.54	4,081
Aug-23	8	2023	10.56	327.36	6.30	17,206	1.39	3,795
Sep-23	9	2023	10.57	317.10	5.79	15,299	1.14	3,015
Oct-23	10	2023	10.00	310.00	5.77	14,928	1.38	3,568
Nov-23	11	2023		0.00	5.38	0	0.86	0
Dec-23	12	2023		0.00				

APPENDIX B

- FDEP'S FINAL ORDER FOR WQBEL
- EPA'S APPROVAL OF H1 WQS

FLORIDA DEPARTMENT OF
Environmental Protection

Northeast District
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

April 7, 2023

Mr. Anthony L. Cunningham
Interim General Manager Gainesville Regional Utilities
301 Southeast 4th Avenue
Gainesville, Florida 32614-7117
Email: cunninghaal@gru.com

IN RE:

Adoption of Nutrient Water Quality Based Effluent Limitations for Discharges to Sweetwater Branch, Which Constitute Site-Specific Numeric Interpretations of the Narrative Nutrient Criterion Pursuant to Paragraph 62-302.531(2)(a), F.A.C.

OGC Case No. 22-2694

Enclosed is a Final Order for Water Quality Based Effluent Limitations (WQBELs) for nutrient surface water quality parameters, pursuant to the Level II WQBEL process in Rule 62-650.500, Florida Administrative Code (F.A.C.), for GRU's Main Street Water Reclamation Facility's (MSWRF) and J.R. Kelly Generating Station's (KGS) discharges to Sweetwater Branch.

A WQBEL is an effluent limitation that the Department has determined is necessary to ensure that water quality standards in the receiving body of water will not be violated, pursuant to Rule 62-650.200(14), F.A.C. An effluent limitation includes any restriction established by the Department on quantities, rates, or concentrations of chemical, physical, biological, or other constituents that are discharged from sources into the environment of the state, pursuant to subsection 62-650.200(8), F.A.C. As part of the Level II WQBEL process, site-specific studies are undertaken of the receiving waterbody and the discharges thereto. Paragraph 62-302.531(2)(a), F.A.C., authorizes Level II WQBELs to constitute site-specific numeric nutrient criteria for the receiving water.

This Final Order would establish the site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch as: 1) an annual load of 215,616 pounds/year (lbs/yr.) of TN, not to be exceeded; 2) an annual load of 16,038 lbs/yr. of TP, not to be exceeded; 3) an annual geometric mean TP concentration of 0.3 mg/L, not to be exceeded; and 4) an annual geometric mean Chlorophyll a concentration of 1.9 µg/L, not to be exceeded more than once in a three-year period. These site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch would supersede and replace the otherwise applicable numeric nutrient criteria for this particular surface water segment (WBID 2711). This Final Order would also allocate a portion of the total allowable nutrient loading to the Main Street WRF(FL0027251) as an effluent limitation of 182,646 lbs/yr. of TN, 11,644 lbs/yr. of TP; and to the John R. Kelly Generating Station (FL0026646) as an effluent limitation of 3,060 lbs/yr. of TN and 843 lbs/yr. of TP. This Final Order would also set an effluent limit of 0.3 mg/L TP as an annual geometric mean for Main Street WRF. The scientific and technical basis for the TN, TP, and Chlorophyl a Level II WQBELs identified herein is presented in the Hierarchy I Numeric Nutrient Criteria for Sweetwater Branch (Alachua County): Level II Water Quality Based Effluent Limitations for Gainesville

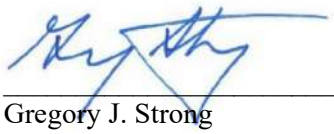
Regional Utilities' Main Street Water Reclamation Facility and Kelly Generating Station Report dated August 2021. This Final Order is issued under Chapter 403 of Florida Statutes (F.S.)

NOTICE OF RIGHTS

Any party to this order has the right to seek judicial review of it under Section 120.68, F.S., by the filing of a notice of appeal under Florida Rules of Appellate Procedure 9.110 and 9.190 with the Clerk of the Department of Environmental Protection in the Office of General Counsel (Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000) and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice must be filed within 30 days after this order is filed with the Clerk of the Department.

EXECUTION AND CLERKING

Executed in Jacksonville, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



Gregory J. Strong
District Director, Northeast District

Attachment(s)
1. Final Order (OGC Case No. 22-2694)

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this document and all attachments were sent on the filing date below to the following listed persons:

Richard H Hutton, P.E., huttonrh@gru.com
Regina G, Embry, P.E., embryrg@gru.com
Jennifer A McElroy, P.E., mcelroyja@gru.com
Alice I Rankeillor, rankeilloai@cityofgainesville.org
EPA Region IV, r4npdespermits@epa.gov
U.S. Fish and Wildlife Service, heath_rauschenberger@fws.gov
U.S. Army Corps of Engineers, corpsjaxreg-nj@usace.army.mil
Paula Presley, P.G., St. Johns River WMD, ppresley@sjrwmd.com
Florida Fish & Wildlife Conservation Commission, fwcconservationplanningservices@myfwc.com
U.S. Fish and Wildlife Service, heath_rauschenberger@fws.gov
Alachua County DEP, pmoran@alachuacounty.us
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Marc Harris, P.E., FDEP
Abel Agosto, FDEP
Thomas G. Kallemeyn, FDEP
Katie S. Miller, FDEP
D. Anh Vo, P.E., FDEP

FILING AND ACKNOWLEDGMENT

FILED, on April 7, 2023, pursuant to Section 120.52, F.S., with the designated Department Clerk, receipt of which is hereby acknowledged.

April 7, 2023
Date

FLORIDA DEPARTMENT OF
Environmental Protection

Northeast District
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

IN RE:

Adoption of Nutrient Water Quality Based Effluent Limitations for Discharges to Sweetwater Branch, Which Constitute Site-Specific Numeric Interpretations of the Narrative Nutrient Criterion Pursuant to Paragraph 62-302.531(2)(a), F.A.C.

OGC Case No. 22-2694

Final Order

Gainesville Regional Utilities (GRU) has requested that the Department establish Water Quality Based Effluent Limitations (WQBELs) for nutrient surface water quality parameters, pursuant to the Level II WQBEL process in Rule 62-650.500, Florida Administrative Code (F.A.C.), for GRU's Main Street Water Reclamation Facility's (MSWRF) and J.R. Kelly Generating Station's (KGS) discharges to Sweetwater Branch.

A WQBEL is an effluent limitation that the Department has determined is necessary to ensure that water quality standards in the receiving body of water will not be violated, pursuant to Rule 62-650.200(14), F.A.C. An effluent limitation includes any restriction established by the Department on quantities, rates, or concentrations of chemical, physical, biological, or other constituents that are discharged from sources into the environment of the state, pursuant to subsection 62-650.200(8), F.A.C. As part of the Level II WQBEL process, site-specific studies are undertaken of the receiving waterbody and the discharges thereto. Paragraph 62-302.531(2)(a), F.A.C., authorizes Level II WQBELs to constitute site-specific numeric nutrient criteria for the receiving water.

On April 26, 2022, the Department published a notice in the Florida Administrative Register (FAR) announcing a public hearing and identifying the Department's intent to establish Level II WQBELs for Total Nitrogen (TN), Total Phosphorus (TP), and Chlorophyll a (Chla) for Sweetwater Branch and the associated MSWRF and KGS discharges. The FAR notice explained that a portion of the WQBEL will become the Hierarchy 1 site-specific interpretation of the narrative nutrient criteria pursuant to sub-subparagraph 62-302.531(2)(a)1.d., F.A.C., for Sweetwater Branch, that will supersede otherwise applicable numeric nutrient criteria for this particular surface water segment. A public hearing was held on June 21, 2022, and the public was given the opportunity to provide comments on the draft Level II WQBELs for the facilities and the receiving waterbody, as well as the establishment of the site-specific numeric interpretations of the narrative nutrient criteria.

This Final Order establishes the site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch as: 1) an annual load of 215,616 pounds/year (lbs/yr.) of TN, not to be exceeded; 2) an annual load of 16,038 lbs/yr. of TP, not to be exceeded; 3) an annual geometric mean TP concentration of 0.3 mg/L, not to be exceeded; and 4) an annual geometric mean Chlorophyll a concentration of 1.9 µg/L, not to be exceeded more than once in a three-year period. These site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch supersede and replace the

otherwise applicable numeric nutrient criteria for this particular surface water segment (WBID 2711). This Final Order also allocates a portion of the total allowable nutrient loading to the Main Street WRF(FL0027251), as an effluent limitation of 182,646 lbs/yr. of TN, 11,644 lbs/yr. of TP; and to the John R. Kelly Generating Station (FL0026646) as an effluent limitation of 3,060 lbs/yr. of TN and 843 lbs/yr. of TP. This Final Order also sets an effluent limit of 0.3 mg/L TP as an annual geometric mean for Main Street WRF. The scientific and technical basis for the TN, TP, and Chlorophyll a Level II WQBEL identified herein is presented in the Hierarchy I Numeric Nutrient Criteria for Sweetwater Branch (Alachua County): Level II Water Quality Based Effluent Limitations for Gainesville Regional Utilities' Main Street Water Reclamation Facility and Kelly Generating Station Report dated August 2021.

The relevant portion of these effluent limits will be included in the next national pollutant discharge elimination system permit renewal or modification for each facility. THEREFORE, IT IS ORDERED that the water quality based effluent limitations, as described herein, are hereby established. Furthermore, the total load of TN and TP from all sources, in addition to the TP and Chla concentrations, are adopted as site-specific interpretations of the narrative nutrient criterion in paragraph 62-302.530 (48)(b), F.A.C., for Sweetwater Branch that supersede and replace the otherwise applicable numeric nutrient criteria for this particular surface water segment.

DONE AND ORDERED this 7th day of April 2023, in Jacksonville, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Gregory J. Strong
District Director, Northeast District

FILED ON THIS DATE PURSUANT TO § 120.52, FLORIDA STATUTES, WITH THE DESIGNATED DEPARTMENT CLERK, RECEIPT OF WHICH IS HEREBY ACKNOWLEDGED.

CLERK

April 7, 2023
DATE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303-3104

June 7, 2023

Ms. Kim Shugar
Director
Division of Environmental Assessment & Restoration
Florida Department of Environmental Protection
Mail Station 3000
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Ms. Shugar:

The U.S. Environmental Protection Agency has completed its water quality standards review of the document titled *Hierarchy I Numeric Nutrient Criteria for Sweetwater Branch (Alachua County): Level II Water Quality Based Effluent Limitations for Gainesville Regional Utilities' Main Street Water Reclamation Facility and Kelly Generating Station (WBID[1] 2711)*. The Florida Department of Environmental Protection (FDEP) submitted the Sweetwater Branch Water Quality Based Effluent Limitations (WQBELs), including the numeric nutrient criteria (NNC) for the subject water, in a letter to the EPA dated April 21, 2023 as WQBELs that would constitute new or revised water quality standards (WQS) with the necessary supporting documentation and certification by FDEP General Counsel, pursuant to Title 40 of the Code of Federal Regulations part 131.

As referenced in paragraph 62-302.531(2)(a), the FDEP intends for the submitted NNC to serve in place of the otherwise applicable criteria for streams set out in paragraph 62-302.531(2)(c). The total nitrogen and total phosphorus WQBELs for Sweetwater Branch, combined with concentration-based total phosphorus and chlorophyll *a* criteria would also constitute a site-specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), for this waterbody.

The FDEP submitted the Sweetwater Branch WQBELs to the EPA for review pursuant to Clean Water Act (CWA) section 303(c) since the WQBELs will also act as Hierarchy 1 (H1) site-specific interpretations of the state's narrative nutrient criterion pursuant to 62-302.531(2)(a)1.a. The enclosed WQS decision document summarizes the EPA's review and approval of the WQS contained in the submitted report. The EPA's decision document memorializes the EPA's review and approval of the WQS, in accordance with section 303(c) of the CWA. The FDEP will use this approved WQS to develop water quality based effluent limits in applicable NPDES permits.

[1] WBID refers to **w**ater**b**ody **id**entification

In accordance with section 303(c) of the CWA, I am hereby approving the revised WQS for total nitrogen, total phosphorus, and chlorophyll *a*. Any other criteria applicable to this waterbody remain in effect. The requirements of paragraph 62-302.530(48)(a) also remain applicable.

If you have any comments or questions relating to the approval of the H1 WQS, please contact me at (404) 562-9744, or have a member of your staff contact Dr. Katherine Snyder in the WQS program at (404) 562-9840.

Sincerely,

Cesar Zapata, Acting Director
Water Division

Enclosure

cc: Mr. Kenneth Hayman, FDEP
Ms. Nijole Wellendorf, FDEP
Ms. Kaitlyn Sutton, FDEP

Florida Numeric Interpretation of the Narrative Nutrient Water Quality Criterion Through Water Quality Based Effluent Limits (WQBELs) to Establish a Hierarchy 1 (H1): Water Quality Standards (WQS) Decision Document

H1: Nutrient WQBEL for Sweetwater Branch (**w**ater**b**ody **id**entification (WBID) 2711)

Location: Alachua County, Florida

Status: Final

Criteria Parameter(s): The site-specific numeric interpretations of the narrative nutrient criterion are:

- 1.9 µg/L chlorophyll *a,* expressed as an annual geometric mean (AGM) concentration not to be exceeded more than once in any consecutive three-year period and applied as a spatial average over the extent of Sweetwater Branch.
- 215,616 lbs/yr Total Nitrogen (TN) not to be exceeded in any year.
- 16,038 lbs/yr Total Phosphorus (TP) not to be exceeded in any year.
- 0.3 mg/L TP expressed as an AGM, not to be exceeded in any year and applied as a spatial average over the extent of Sweetwater Branch.

Background: The Florida Department of Environmental Protection (FDEP) submitted the final *Hierarchy I Numeric Nutrient Criteria for Sweetwater Branch (Alachua County): Level II Water Quality Based Effluent Limitations for Gainesville Regional Utilities' Main Street Water Reclamation Facility and Kelly Generating Station* (the WQBEL report) by letter dated April 21, 2023. The final WQBEL report dated August 2021 includes H1 target concentrations and loads and was received by the EPA on April 21, 2023. The draft WQBEL report for Sweetwater Branch is dated March 2021 and was received by the EPA on April 5, 2021.

The submission included:

- Submittal letter
- Hierarchy I Numeric Nutrient Criteria for Sweetwater Branch (Alachua County): Level II Water Quality Based Effluent Limitations for Gainesville Regional Utilities' Main Street Water Reclamation Facility and Kelly Generating Station
- Documents related to Public Hearing
- Documents related to Public Notice for Rulemaking and Rule Adoption
- Public Comments Received

This document explains how the submission meets the Clean Water Act (CWA) statutory requirements for the approval of WQS under section 303(c) and the EPA's implementing regulations in Title 40 of the Code of Federal Regulations (40 C.F.R.) part 131. The EPA's decision document memorializes the EPA's review and approval of the WQS, in accordance with section 303(c) of the CWA.

WQS REVIEWER: Katherine Snyder, WQS Coordinator, snyder.katherine@epa.gov

This document contains the EPA's review of the above-referenced H1. This review document includes WQS review guidelines that state or summarize currently effective statutory and regulatory requirements applicable to this approval action. Review guidelines are not themselves regulations. Any differences between review guidelines and the EPA's implementing regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the EPA's statutory and regulatory requirements for approvable H1s. The sections in regular type reflect the EPA's analysis of the state's compliance with these requirements.

I. WQS Decision – Supporting Rationale

Section 303(c) of the CWA and the EPA's implementing regulations at 40 C.F.R. part 131 describe the statutory and regulatory requirements for approvable WQS. Set out below are the requirements for WQS submissions, under the CWA and the regulations. The information identified below is necessary for the EPA to determine if a submitted WQS meets the requirements of the CWA and, therefore, may be approved by the EPA.

1. Use Designations

Section 131.10(a) provides that each state must specify appropriate water uses to be achieved and protected. The classification of the waters of the state must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the United States.

***Assessment**:* Sweetwater Branch is classified as Class III Freshwater (fish consumption; recreation; and propagation and maintenance of a healthy, well-balanced population of fish and wildlife).

2. Protection of Downstream Uses

Section 131.10(b) provides that in designating uses of a waterbody and the appropriate criteria for those uses, the state shall take into consideration the WQS of downstream waters and shall ensure that its WQS provide for the attainment and maintenance of the WQS of downstream waters.

Sweetwater Branch flows south to the Sweetwater Wetlands Park, then to Paynes Prairie, and eventually some of the discharge may reach Alachua Sink. Paynes Prairie is designated as an Outstanding Florida Water (OFW). The WQBEL was specifically designed to address downstream protection of Paynes Prairie as an OFW and for the TN TMDL of Alachua Sink. See Figures 1-1 and 1-2 of the WQBEL report for a map representation.

Chapter 62-302.700(1), F.A.C., states "It shall be the Department policy to afford the highest protection to Outstanding Florida Waters and Outstanding National Resource Waters. No degradation of water quality, other than that allowed in subsections 62-4.242(2) and (3), F.A.C., is to be permitted in Outstanding Florida Waters and Outstanding National Resource Waters, respectively, notwithstanding any other Department rules that allow water quality lowering." Baseline water quality in the OFW is determined by Chapter 62-4.242 (2)(c). F.A.C., which reads "For the purpose of this section the term "existing ambient water quality" shall mean (based on the best scientific information available) the better water quality of either (1) that which could reasonably be expected to have existed for the baseline year of an Outstanding Florida Water designation or (2) that which existed during the year prior to the date of a permit application. It shall include daily, seasonal, and other cyclic fluctuations, taking into consideration the effects of allowable discharges for which Department permits were issued or applications for such permits were filed and complete on the effective date of designation."

Therefore, the most constraining TN and TP loadings from the Main Street Water Reclamation Facility (MSWRF) to Paynes Prairie are those that were allowed by FDEP during the last NPDES permit, because those loadings represented a reduction from loadings that occurred when Paynes Prairie was designated an OFW in 1990. Note that the state Environmental Resource Program (ERP) permit also requires the discharge from the enhancement wetlands to achieve a TN concentration of 3 mg/L and a TP concentration of 0.3 mg/L (expressed as a 5-year rolling average). The TP concentration of 0.3 mg/L is included in this H1 site-specific criteria to provide assurance that downstream protection is achieved.

Table 1-2 in the WQBEL report compares the baseline OFW loads with the calculated future loads discharging from the enhancement wetland to Paynes Prairie based on the proposed WQBELs. For OFW purposes, the period of 2013 to 2016 was used to calculate the baseline nutrient loads to Paynes Prairie from the MSWRF and Kelly Generating Station (KGS), while stormwater loads (representing a wet year) were from the FDEP TMDL document for Alachua Sink (Gao et al., 2006). The future TP and TN loads to Paynes Prairie are reduced by 1,738 lbs/yr and 50,122 lbs/yr, respectively as compared to the OFW baseline.

Therefore, the project and associated WQBELs comply with OFW provisions for Paynes Prairie and the downstream TMDL for Alachua Sink.

Assessment: The H1 is providing use protection for the downstream waters.

3. Water Quality Criteria

Section 131.11(a) provides that states must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

The FDEP used the IWR Database to assess water quality impairments in Sweetwater Branch (WBID 2711). Sweetwater Branch is not impaired for nutrients (TN, TP, or chlorophyll *a*) during Group 1 Cycle 5 (approved by EPA July 26, 2022). Sweetwater Branch was listed for biology (SCI) during Group 1 Cycle 5; however, a stressor identification study was conducted as part of this WQBEL effort that was able to demonstrate that nutrients are not the causative pollutant. The responsible stressors are hydrologic modification, sediment movement, and habitat alterations.

Using phaeophytin-corrected Sweetwater Branch chlorophyll *a* data from IWR run 55 (downloaded 8-1-18), data previously assembled for this WQBEL report, and recent data provided by Alachua County, AGMs were calculated for years with four of more data points (see Section 3.3.2 of the WQBEL report). Using the same equation FDEP employed for promulgating estuary NNC, the 90th percentile prediction interval of the Sweetwater Branch chlorophyll *a* AGMs was calculated to be 1.9 µg/L (FDEP, 2012). An AGM of 1.9 µg/L is proposed as a site-specific chlorophyll *a* criterion for Sweetwater Branch not to be exceeded more than once in a three-year period.

The proposed WQBELs for the primary point source dischargers, MSWRF and KGS, were evaluated using a water quality model (QUAL2K). QUAL2K, a water quality model supported by EPA, is an appropriate tool to evaluate one-dimensional (longitudinal) river water quality in Sweetwater Branch. It employs steady-state hydraulics which allowed for the testing of conservatively protective flow scenario

simulations including a worst-case flow condition with higher nutrient pollutant loadings than the proposed WQBELs. The model was calibrated using water quality conditions observed during 2013-2016. Scenario modeling results demonstrated relative insensitivity of Sweetwater Branch eutrophic responses to simulated nutrient loading scenarios including the worst-case scenario. Simulated responses were notably comparable to the unimpaired floral condition in Sweetwater Branch. Based on the modeling, the proposed site-specific nutrient criteria for Sweetwater Branch will not cause floral or faunal imbalances, which complies with the narrative nutrient criterion at 62-302.530(48)(b), F.A.C. In addition, the modeling demonstrates that the Sweetwater Enhancement Wetlands would achieve the 3 mg/L TN and 0.3 mg/L TP limits as specified in the Sweetwater Enhancement Wetlands Project's Environmental Resource Permit (ERP).

Sweetwater Branch originates in downtown Gainesville, near Northeast 10th Ave. and Northeast 2nd St. The intent of the H1 numeric nutrient criteria (NNC) is to include Sweetwater Branch from its headwaters, terminating at the Sweetwater Enhancement Wetland adjacent to Paynes Prairie. The geographic extent of the site-specific criteria is shown in Figure 1-1 of the WQBEL report.

A WQBEL is recognized as the applicable interpretation of the narrative nutrient criteria if:

- The documentation for the WQBEL includes a site-specific numeric interpretation of the narrative criterion at Rule 62-302.530(48)(b), F.A.C., for the waterbody;
- The WQBEL is established pursuant to the Level II Process contained in Rule 62-650.500, F.A.C.; and
- The public notice for the WQBEL specifically states that the Level II WQBEL includes a site-specific interpretation of the narrative for the receiving waterbody.

As noted on page 10 of the WQBEL report, the developed WQBELs "are the site-specific numeric interpretations of the narrative nutrient criterion for Sweetwater Branch," and the Level II process and notice requirements were completed.

Assessment: The Sweetwater Branch site-specific NNC are:

- 1.9 µg/L chlorophyll *a,* expressed as an AGM concentration not to be exceeded more than once in any consecutive three-year period.
- 215,616 lbs/yr Total Nitrogen (TN) not to be exceeded in any year
- 16,038 lbs/yr Total Phosphorus (TP) not to be exceeded in any year
- 0.3 mg/L TP expressed as an AGM, not to be exceeded in any year and applied as a spatial average over the extent of Sweetwater Branch.

The TN target concentration of 6.0 mg/L is given for comparative purposes only. The TN criterion is expressed as a load. The resulting water quality will protect the designated uses for this waterbody. Per 62-302.531(2)(a)1.d, these site-specific criteria comprise the nutrient standard for Sweetwater Branch; the stream standard in 62-302.531(2)(c) no longer applies. Any other criteria applicable to this waterbody remain in effect.

4. Scientific Defensibility

Section 131.11(b) provides that, in establishing criteria, states should establish numerical values based on 304(a) guidance, 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods.

Sweetwater Branch is not impaired for nutrients (TN, TP, or chlorophyll *a*) during Group 1 Cycle 5 (approved by EPA July 26, 2022). Although there is a biology impairment, the responsible stressors are hydrologic modification, sediment movement, and habitat alterations. The WQBELs, which are site-specific interpretations of the narrative nutrient criterion, were derived using water quality-based modeling and the QUAL2K model. The derived loads included 215,616 lbs/yr TN and 16,038 lbs/yr TP, both expressed as not to be exceeded in any year. The loads were derived to achieve instream concentration targets of 0.6 mg/L TN, 0.3 mg/L TP, and 1.9 µg/L chlorophyll *a*. The TN concentration is for comparative purposes only. The TN criterion is expressed as a load. The 0.3 mg/L TP is incorporated from requirements in the state ERP to ensure downstream protection and expressed as an AGM for a spatial average and not to be exceeded in any year. The 1.9 µg/L chlorophyll *a* is expressed as an AGM, not to be exceeded more than once in a 3-year period.

Assessment: The EPA determined that the selection of 1.9 µg/L chlorophyll *a* as a response variable is appropriate and the technical approach to calculate nutrient loads is scientifically sound. Additional modeling detail is laid out in the WQBEL report.

5. Public Participation

Section 131.20(b) provides that states shall hold a public hearing when revising WQS, in accordance with provisions of state law and the EPA's public participation regulation (40 C.F.R. part 25). The proposed WQS revision and supporting analyses shall be made available to the public prior to the hearing.

A virtual public workshop/hearing was conducted by the FDEP on June 21, 2022, to obtain comments on the draft nutrient WQBELs for Sweetwater Branch. The public notice indicated the WQBELs will become the Hierarchy 1 site specific interpretations of the narrative nutrient criterion pursuant to sub-subparagraph 62-302.531(2)(a)1.d., F.A.C. for Sweetwater Branch, that will supersede otherwise applicable numeric nutrient criteria for this particular surface water segment.

Assessment: The FDEP has met the public participation requirements for this H1.

6. Certification by the State Attorney General

Section 131.6(e) requires that the state provide a certification by the state Attorney General or other appropriate legal authority within the state that the WQS were duly adopted pursuant to state law.

A letter from the FDEP General Counsel, Justin G. Wolfe, dated April 21, 2023, certified that the Sweetwater Branch H1 criteria were duly adopted as WQS pursuant to state law.

Assessment: The FDEP has met the requirement for Attorney General certification for this H1.

7. Endangered Species Act Section 7 Consultation

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the Services, to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The U.S. Fish and Wildlife Service online Information for Planning and Conservation (IPaC) tool did not identify any endangered or threatened aquatic species or critical habitat in the vicinity of Sweetwater Branch (WBID 2711). In addition, the area covered by the site-specific Sweetwater Branch NNC is an inland area and does not have any species covered by the National Marine Fisheries Service. Therefore, an ESA section 7 consultation for this standards action is not required.

Assessment: The EPA has met the ESA requirements for this action.

II. Conclusion

The EPA Region 4 Water Division Director is **APPROVING** the H1 NNC addressed by this decision document in accordance with section 303(c) of the CWA, as consistent with the CWA and 40 C.F.R. part 131.

The H1 NNC presented in this decision document will constitute the site-specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), F.A.C., that will replace the otherwise applicable numeric criteria for TN and TP in subsection 62-302.531(2)(c) for this particular water, pursuant to paragraph 62-302.531(2)(a)1.d., F.A.C. Based on the chemical, physical, and biological data presented in the development of the H1 NNC outlined above, the EPA concludes that the revised NNC for TN, TP, and chlorophyll *a* provide for and protect healthy, well-balanced, biological communities in the waters to which the NNC apply and are consistent with the CWA and its implementing regulations at 40 C.F.R. § 131.11.

Therefore, the revised nutrient criteria for TN and TP for Sweetwater Branch are 215,616 lbs/yr for TN and 16,038 lbs/yr for TP, not to be exceeded. In addition, a concentration-based TP criterion of 0.3 mg/L, expressed as an AGM not to be exceeded in any year and applied as a spatial average applies to Sweetwater Branch. The revised criterion for chlorophyll *a* is 1.9 µg/L, expressed as an AGM concentration not to be exceeded more than once in any consecutive 3-year period. All other criteria applicable to this waterbody remain in effect. The requirements of paragraph 62-302.530(48)(a), F.A.C. also remain applicable.

The EPA's decision document memorializes the EPA's review and approval of the water quality standard, in accordance with CWA section 303(c).

APPENDIX C

2019 Capacity Analysis Report

GAINESVILLE REGIONAL UTILITIES
CITY OF GAINESVILLE
ALACHUA COUNTY, FLORIDA

WASTEWATER TREATMENT AND DISPOSAL SYSTEM CAPACITY ANALYSIS REPORT FOR 2019

KANAPAHA WATER RECLAMATION FACILITY

FDEP Facility ID and Operating Permit No. FL0112895

MAIN STREET WATER RECLAMATION FACILITY

FDEP Facility ID Operating Permit No. FL0027251

Prepared by
GAINESVILLE REGIONAL UTILITIES
Water/Wastewater Planning Department
September 2019

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CERTIFICATION

CERTIFICATION BY PERMITTEE

Gainesville Regional Utilities (GRU), holder of Permits FL0112895 and FL0027251, certifies that the permittee is fully aware and intends to comply with the recommendations and schedules included in this Capacity Analysis Report.

Deborah D. Daugherty, P.E.
Water/Wastewater Engineering Director
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Deborah D Daugherty

Deborah D. Daugherty, P.E.

9/15/19

Date

CERTIFICATION

CERTIFICATION BY REPORT AUTHORS

The information contained in the 2019 Wastewater Treatment and Disposal System Capacity Analysis Report for the Kanapaha Water Reclamation Facility and Main Street Water Reclamation Facility is true and accurate to the best of my knowledge, and the findings, assumptions, and conclusions contained in this report have been reached through sound engineering principles, and results, recommendations, and schedules have been presented and discussed with authorized representatives for the permittee.

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9/17/19
Date

Kristen M. Sealey
9/17/19
76909

CHAPTER 1
INTRODUCTION

FLORIDA ADMINISTRATIVE CODE REQUIREMENTS

This Capacity Analysis Report is submitted to the Florida Department of Environmental Protection to comply with the Florida Administrative Code (F.A.C.) Chapter 62-600.405 requirements. The F.A.C. requires this report to include the following:

- Permitted capacity of wastewater treatment and disposal systems;
- Flows and loads including:
    - Monthly average daily flow (MADF) for previous ten years
    - Three-month moving average daily flow for previous ten years
    - Annual average daily flow (AADF) for previous ten years
    - Seasonal variations in flows
    - Flow projections for next ten years based upon population growth and future water use estimates
    - An estimate of the time required for the three-month average daily flow to reach the permitted capacity
    - Updated plant BOD, TSS, and TKN loads
- Recommendations for expansion (if required); and
- Detailed schedule showing dates for planning, design, permit application submittal, start of construction, and placing of new or expanded facilities into operation (if required).

WASTEWATER COLLECTION, TRANSMISSION, TREATMENT, AND DISPOSAL SYSTEM

Gainesville Regional Utilities (GRU) owns and operates two permitted wastewater treatment plants. The two wastewater treatment plants are:

1. Kanapaha Water Reclamation Facility (Operating Permit No. FL0112895); and
2. Main Street Water Reclamation Facility (Operating Permit No. FL0027251).

The two treatment plants receive wastewater from a wastewater collection and transmission system designed to "load share" between the plants, as shown in Figure 1-1. The "load share" concept has been implemented to optimize available permitted treatment and disposal capacity. As the "load share" feature allows the two plants to function essentially as a single facility, GRU will present the capacity analysis report for the combined wastewater treatment and disposal capacity provided by both plants.

THE KANAPAHA WATER RECLAMATION FACILITY

The Kanapaha Water Reclamation Facility (KWRF) employs extended aeration activated sludge, biological nitrification and denitrification, filtration, and disinfection to achieve primary and secondary drinking water standards for deep well aquifer recharge. The KWRF achieves a high quality effluent that meets all requirements for F.A.C. 62-610 Part III slow rate land application systems, public access areas, residential irrigation, and irrigation of edible crops. Waste activated sludge is aerobically digested. The digested solids are dewatered in a recently constructed dewatering facility. The dewatered biosolids are truck hauled from the facility by a third party vendor. The biosolids are primarily dried and converted to a fertilizer product. They may also be reused via Class B application or disposed via landfill. A unit process flow schematic is shown in Figure 1-2.

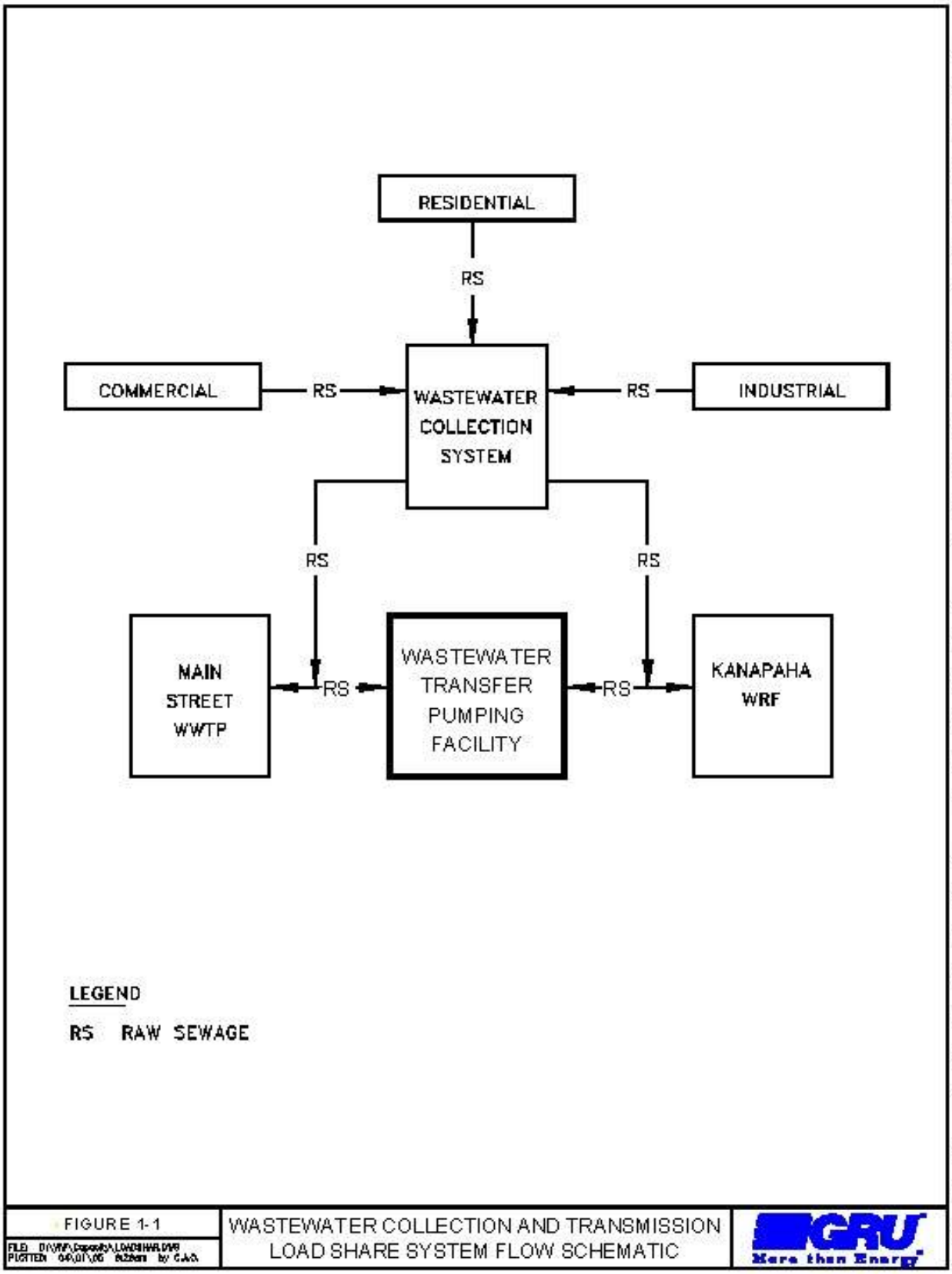

Figure 1-1. Wastewater Collection and Transmission Load Share System Flow Schematic

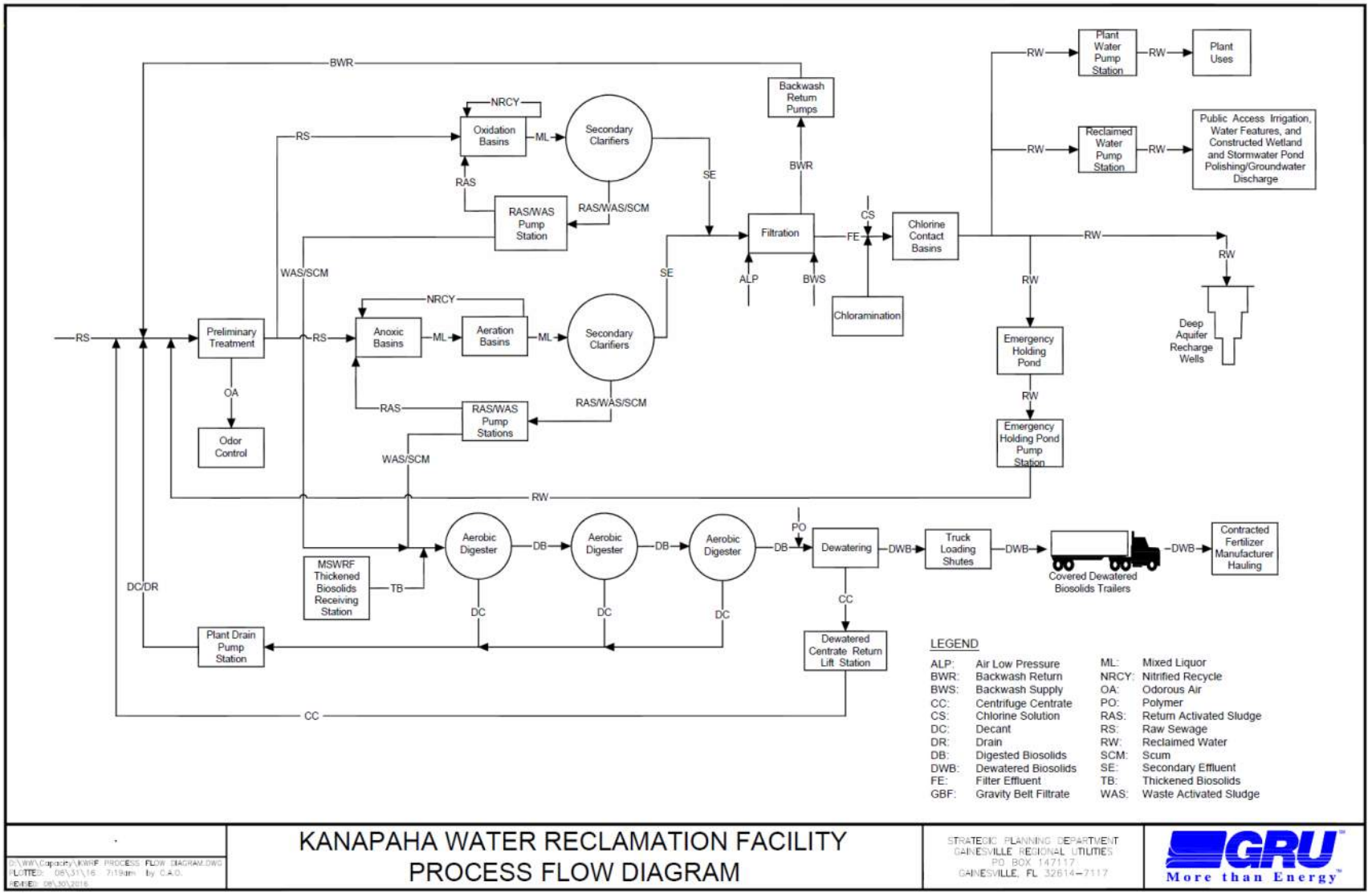

Figure 1-2. Kanapaha Water Reclamation Facility Flow Schematic

THE MAIN STREET WATER RECLAMATION FACILITY

The Main Street Water Reclamation Facility (MSWRF) employs activated sludge treatment, nitrification, denitrification, chemical addition, filtration, disinfection and dechlorination to produce a high quality effluent for release to the Sweetwater Branch and reuse water for slow-rate public access land application and industrial users. The Sweetwater Branch flows to a 125-acre constructed wetland, Sweetwater Wetlands Park, for additional nitrogen removal and then sheetflows onto Paynes Prairie.

Similar to the KWRF, waste activated sludge generated by the secondary treatment system is aerobically digested. The digested biosolids are thickened by gravity belt thickeners and truck hauled to KWRF and combined with KWRF biosolids for further digestion and reuse or disposal. A unit process flow schematic is shown in Figure 1-3.

BIOSOLIDS HANDLING

Prior to 2016 GRU reused it's biosolids via Class B land application. In early 2016, GRU ceased biosolids land application program and began utilizing a newly constructed centrifuge dewatering facility at KWRF. All MSWRF biosolids are digested, thickened and hauled to KWRF for further digestion with KWRF generated biosolids prior to dewatering at KWRF. The dewatering facility produces approximately 20 percent solids that are hauled offsite by a contractor that produces a fertilizer product with GRU combined biosolids. GRU currently employs Green Technologies to handle and haul the dewatered biosolids from KWRF. Approximately 3,380 metric dry tons of biosolids are produced per day on an annual basis.

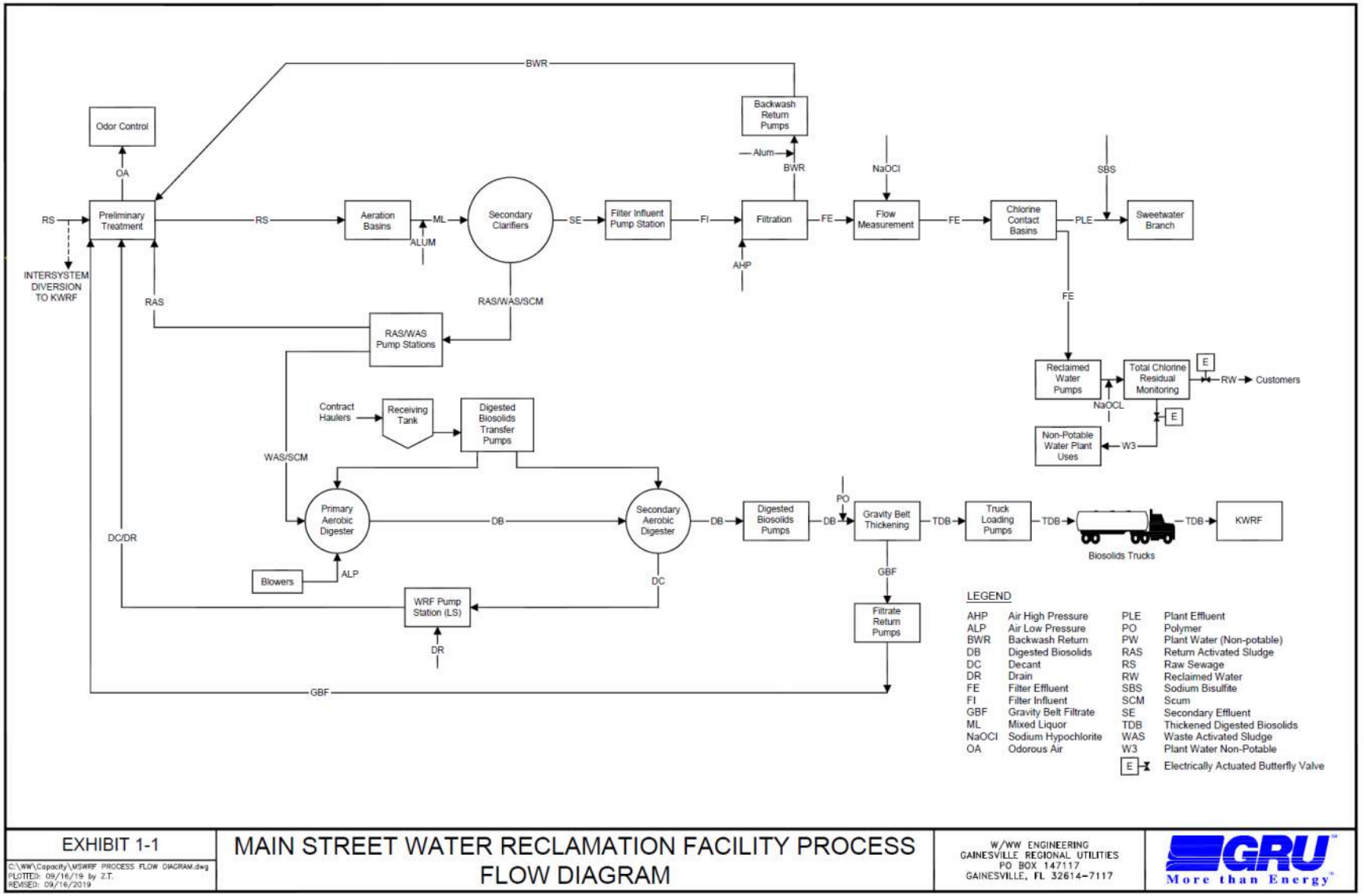

Figure 1-3. Main Street Water Reclamation Facility Flow Schematic

CHAPTER 2
EXISTING CONDITIONS

PERMITTED CAPACITIES

Kanapaha Water Reclamation Facility

On December 18, 2015, a five-year permit was issued for the KWRF operating under Operating Permit No. FL0112895. The plant was permitted to treat and discharge by deep recharge wells 10 MGD annual average daily flow (AADF). The KWRF also has an 11.94 MGD AADF effluent discharge capacity by unrestricted public access reuse systems incorporated in this permit. The reuse system consists of residential irrigation, recharge wetlands, aesthetic water features, a re-use loading station, and other uses.

Main Street Water Reclamation Facility

On March 19, 2015, a five-year permit was issued for the MSWRF operating under Operating Permit No. FL0027251. The MSWRF is permitted to treat and discharge to surface waters 7.5 MGD AADF. The MSWRF also has a 3.309 MGD AADF effluent discharge capacity by public access reuse systems.

Combined (Total) Permitted System Capacity

GRU operates a wastewater load share transfer pumping facility. This pumping facility allows transfer of collected wastewater between the KWRF and the MSWRF as shown in Figure 2-1. The transfer pumping facility is remotely controlled and allows real time control of wastewater flows to each plant. This unique feature of GRU's wastewater collection system enables GRU to operate the system to allow the individual facility permitted capacities to collectively function as a combined permitted capacity for the system.

The MSWRF is permitted to treat 7.5 MGD AADF and discharge up to 10.809 MGD AADF, and the KWRF is permitted to treat 14.9 MGD AADF and discharge up to 21.94 MGD AADF of treated effluent. Therefore, the combined permitted treatment capacity is 22.4 MGD AADF and the combined effluent discharge capacity is 32.749 MGD AADF.

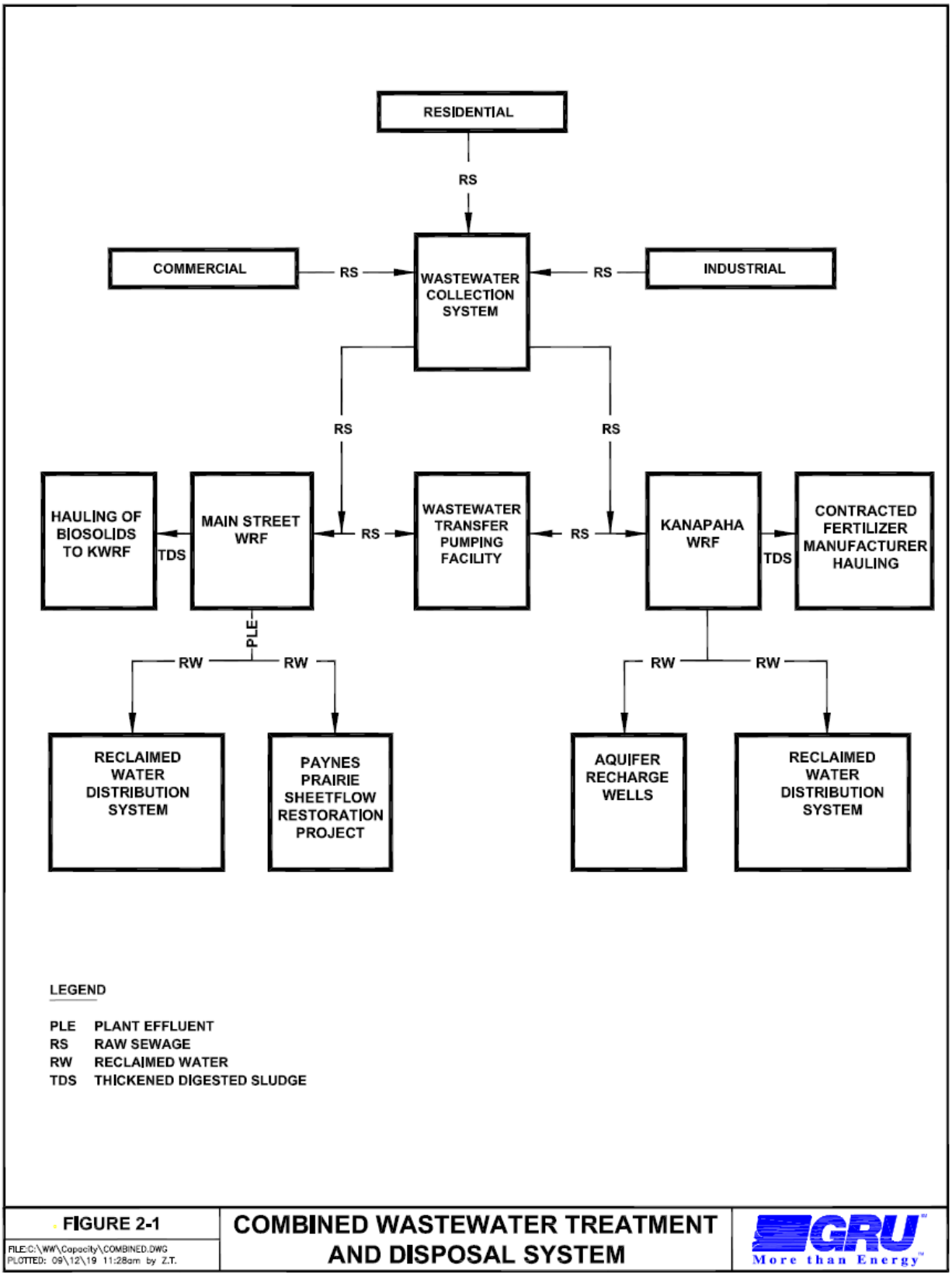

Figure 2-1. Combined Wastewater Treatment and Discharge System

MONTHLY AVERAGE, THREE-MONTH AND ANNUAL AVERAGE DAILY FLOWS

The AADF, monthly average daily flow (MADF), and three-month moving average daily flow data for the KWRF, MSWRF, and total system (combined) flows are provided in Table 2-1. This flow data is for the period between January 1, 2009 and December 31, 2018 and was obtained from monthly operating reports for each plant. The maximum total system three-month average daily flow values for each calendar year are shown in bold.

Total system flow data for the past five years (January 1, 2014 through December 31, 2018) is shown in Figure 2-2 to facilitate visualization of recent flow trends. The higher MADFs in the summer months of 2015 and 2017 are attributed to consecutive wet-months which caused the ground to become saturated and increased inflow and infiltration (I/I) into the wastewater system. The relationship between increased rainfall and increased flows can be seen in Figure 2-2. On-going efforts to address I/I are explained later in this chapter under the Seasonal Variations in Flow section.

Effluent flow is measured at the KWRF by a 36-inch diameter magnetic flow meter. Effluent flow is measured at the MSWRF by a sonic level detector and Parshall flume. Both of these flow meters are calibrated annually by GRU instrument technicians. A portion of the plant effluent flow at the KWRF is double counted. The KWRF flow data in Table 2-1 includes double counted in-plant reuse water. An in-plant flow meter was installed at the MSWRF in 1994. Consequently, the MSWRF flow data in Table 2-1 are actual plant effluent flows and do not include double counted in-plant reuse water.

Figure 2-3 is a schematic illustrating the in-plant water system in relation to the final effluent flow meter at the KWRF. The in-plant water system removes water after the final effluent flow meter and returns this water at various points upstream of the meter for plant uses. Therefore, the effluent flow meter is recording the plant effluent and the in-plant flow rate daily volumes, inflating the actual effluent flow rate being discharged from the facility by the amount of the in-plant flow.

Table 2-1. Historic Wastewater Flow Rates
Gainesville Regional Utilities

Monthly Average Daily Flow, Three-Month Average Daily Flow
and Annual Average Daily Flow

	Main Street WWTP		KWRF		Total GRU System	
Month-Year	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)
Jan-09	4.50	4.61	9.62	9.73	14.12	14.34
Feb-09	5.03	4.68	9.58	9.60	14.61	14.28
Mar-09	4.93	4.82	9.39	9.53	14.32	14.35
Apr-09	5.27	5.08	9.73	9.56	14.99	14.64
May-09	6.09	5.43	9.37	9.49	15.45	14.92
Jun-09	6.69	6.01	9.33	9.48	16.03	15.49
Jul-09	5.86	6.21	9.66	9.46	15.53	15.67
Aug-09	6.32	6.29	10.00	9.67	16.32	15.96
Sep-09	**6.07**	**6.08**	**10.32**	**9.99**	**16.39**	**16.08**
Oct-09	5.64	6.01	9.51	9.94	15.14	15.95
Nov-09	5.36	5.69	9.44	9.76	14.80	15.44
Dec-09	5.59	5.53	9.56	9.50	15.14	15.03
AADF-09	5.61		9.63		15.24	
Jan-10	5.80	5.58	9.83	9.61	15.62	15.19
Feb-10	6.70	6.03	10.13	9.84	16.82	15.86
Mar-10	6.37	6.29	10.04	10.00	16.42	16.29
Apr-10	5.66	6.24	9.93	10.03	15.58	16.27
May-10	5.69	5.91	9.50	9.82	15.18	15.73
Jun-10	6.77	6.04	9.15	9.52	15.91	15.56
Jul-10	7.36	6.61	9.58	9.41	16.94	16.01
Aug-10	**6.27**	**6.80**	**10.05**	**9.59**	**16.31**	**16.39**
Sep-10	5.52	6.38	10.37	10.00	15.88	16.38
Oct-10	5.53	5.77	9.61	10.01	15.13	15.78
Nov-10	5.51	5.52	9.32	9.76	14.83	15.28
Dec-10	5.74	5.59	8.52	9.15	14.26	14.74
AADF-10	6.08		9.67		15.74	

Table 2-1. Historic Wastewater Flow Rates
Gainesville Regional Utilities

Monthly Average Daily Flow, Three-Month Average Daily Flow
and Annual Average Daily Flow

	Main Street WWTP		KWRF		Total GRU System	
Month-Year	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)
Jan-11	6.62	5.96	8.26	8.70	14.88	14.66
Feb-11	6.97	6.44	9.22	8.67	16.19	15.11
Mar-11	7.23	6.94	8.78	8.75	16.01	15.69
Apr-11	**7.42**	**7.21**	**7.92**	**8.64**	**15.34**	**15.85**
May-11	6.46	7.04	8.00	8.23	14.46	15.27
Jun-11	6.98	6.95	7.44	7.79	14.42	14.74
Jul-11	7.12	6.85	7.66	7.70	14.78	14.56
Aug-11	7.44	7.18	7.95	7.69	15.39	14.87
Sep-11	6.75	7.10	8.51	8.04	15.26	15.14
Oct-11	6.67	6.95	8.72	8.39	15.39	15.35
Nov-11	6.99	6.80	8.56	8.59	15.55	15.40
Dec-11	6.80	6.82	8.30	8.53	15.10	15.35
AADF-11	6.95		8.28		15.23	
Jan-12	7.16	6.98	8.70	8.52	15.86	15.50
Feb-12	7.03	7.00	9.10	8.70	16.13	15.70
Mar-12	6.38	6.86	8.60	8.80	14.98	15.66
Apr-12	6.74	6.72	8.15	8.62	14.89	15.33
May-12	6.50	6.54	8.09	8.28	14.59	14.82
Jun-12	7.11	6.78	9.31	8.52	16.42	15.30
Jul-12	7.43	7.01	9.26	8.89	16.69	15.90
Aug-12	8.04	7.53	10.16	9.58	18.20	17.10
Sep-12	8.04	7.84	11.28	10.23	19.32	18.07
Oct-12	**6.49**	**7.52**	**10.91**	**10.78**	**17.40**	**18.31**
Nov-12	5.50	6.68	9.77	10.65	15.27	17.33
Dec-12	5.85	5.95	9.46	10.05	15.31	15.99
AADF-12	6.86		9.40		16.25	

Table 2-1. Historic Wastewater Flow Rates
Gainesville Regional Utilities

Monthly Average Daily Flow, Three-Month Average Daily Flow
and Annual Average Daily Flow

	Main Street WWTP		KWRF		Total GRU System	
Month-Year	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)
Jan-13	6.09	5.81	9.68	9.64	15.77	15.45
Feb-13	5.81	5.92	9.37	9.50	15.18	15.42
Mar-13	5.94	5.95	9.22	9.42	15.16	15.37
Apr-13	5.74	5.83	9.09	9.23	14.83	15.06
May-13	6.53	6.07	8.38	8.90	14.92	14.97
Jun-13	6.01	6.09	9.22	8.90	15.23	14.99
Jul-13	8.40	6.98	10.45	9.35	18.84	16.33
Aug-13	9.01	7.81	11.64	10.44	20.65	18.24
Sep-13	**6.77**	**8.06**	**10.38**	**10.82**	**17.15**	**18.88**
Oct-13	6.17	7.32	9.65	10.56	15.82	17.87
Nov-13	5.59	6.18	9.41	9.81	15.00	15.99
Dec-13	5.71	5.82	9.08	9.38	14.79	15.20
AADF-13	6.48		9.63		16.11	
Jan-14	7.68	6.33	10.35	9.61	18.03	15.94
Feb-14	7.10	6.83	11.26	10.81	18.36	17.64
Mar-14	8.16	7.65	13.01	11.54	21.17	19.19
Apr-14	7.48	7.58	11.53	11.93	19.01	19.52
May-14	6.32	7.32	10.09	11.54	16.41	18.87
Jun-14	6.51	6.77	10.49	10.70	17.00	17.47
Jul-14	8.28	7.41	11.42	10.67	19.70	18.08
Aug-14	7.66	7.48	10.64	10.85	18.30	18.33
Sep-14	**9.45**	**8.46**	**12.30**	**11.45**	**21.75**	**19.91**
Oct-14	7.65	8.25	11.13	11.36	18.78	19.61
Nov-14	6.37	7.82	9.95	11.13	16.32	18.95
Dec-14	6.26	6.76	9.68	10.25	15.94	17.02
AADF-14	7.41		10.99		18.40	

Table 2-1. Historic Wastewater Flow Rates
Gainesville Regional Utilities

Monthly Average Daily Flow, Three-Month Average Daily Flow
and Annual Average Daily Flow

	Main Street WWTP		KWRF		Total GRU System	
Month-Year	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)
Jan-15	6.78	6.47	10.18	9.94	16.96	16.41
Feb-15	6.83	6.63	10.72	10.19	17.55	16.82
Mar-15	6.35	6.65	10.17	10.36	16.52	17.01
Apr-15	6.16	6.45	10.21	10.37	16.37	16.81
May-15	5.61	6.04	9.55	9.98	15.16	16.01
Jun-15	5.56	5.77	9.92	9.89	15.48	15.67
Jul-15	5.77	5.65	10.52	10.00	16.29	15.64
Aug-15	8.94	6.76	12.71	11.05	21.65	17.81
Sep-15	10.05	8.26	14.25	12.49	24.30	20.75
Oct-15	**6.90**	**8.63**	**11.25**	**12.74**	**18.15**	**21.37**
Nov-15	6.40	7.78	10.46	11.99	16.86	19.77
Dec-15	6.08	6.46	10.11	10.61	16.19	17.07
AADF-15	6.79		10.84		17.62	
Jan-16	6.18	6.22	10.05	10.21	16.23	16.45
Feb-16	6.98	6.41	10.33	10.16	17.31	16.58
Mar-16	6.24	6.47	10.11	10.16	16.35	16.63
Apr-16	6.02	6.41	9.90	10.11	15.92	16.52
May-16	5.41	5.89	9.36	9.79	14.77	15.68
Jun-16	6.63	6.02	10.16	9.81	16.79	15.83
Jul-16	6.02	6.02	9.50	9.67	15.52	15.70
Aug-16	5.93	6.19	10.10	9.92	16.03	16.11
Sep-16	9.73	7.23	9.27	9.62	19.00	16.85
Oct-16	**6.34**	**7.33**	**10.11**	**9.83**	**16.45**	**17.16**
Nov-16	5.55	7.21	9.66	9.68	15.21	16.89
Dec-16	5.22	5.70	9.28	9.68	14.50	15.39
AADF-16	6.35		9.82		16.17	

Table 2-1. Historic Wastewater Flow Rates
Gainesville Regional Utilities

Monthly Average Daily Flow, Three-Month Average Daily Flow
and Annual Average Daily Flow

	Main Street WWTP		KWRF		Total GRU System	
Month-Year	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)	Monthly Average Daily Flow (MGD)	3 Month Average Daily Flow (MGD)
Jan-17	5.50	5.42	9.84	9.59	15.34	15.02
Feb-17	5.56	5.43	9.95	9.69	15.51	15.12
Mar-17	5.39	5.48	9.53	9.77	14.92	15.26
Apr-17	5.47	5.47	9.94	9.81	15.41	15.28
May-17	5.13	5.33	9.36	9.61	14.49	14.94
Jun-17	9.05	6.55	11.87	10.39	20.92	16.94
Jul-17	9.33	7.84	11.19	10.81	20.52	18.64
Aug-17	10.29	9.56	12.27	11.78	22.56	21.33
Sep-17	**11.93**	**10.52**	**15.51**	**12.99**	**27.44**	**23.51**
Oct-17	7.78	10.00	12.11	13.30	19.89	23.30
Nov-17	6.00	8.57	10.56	12.73	16.56	21.30
Dec-17	5.90	6.56	10.16	10.94	16.06	17.50
AADF-17	7.28		11.02		18.30	
Jan-18	5.39	5.76	10.61	10.44	16.00	16.21
Feb-18	6.45	5.91	11.35	10.71	17.80	16.62
Mar-18	5.59	5.81	10.56	10.84	16.15	16.65
Apr-18	7.01	6.35	12.02	11.31	19.03	17.66
May-18	6.60	6.40	11.49	11.36	18.09	17.76
Jun-18	7.97	7.20	13.11	12.21	21.08	19.40
Jul-18	8.56	7.71	12.99	12.53	21.55	20.24
Aug-18	**7.69**	**8.07**	**12.76**	**12.95**	**20.45**	**21.03**
Sep-18	6.90	7.72	11.62	12.46	18.52	20.17
Oct-18	5.63	6.74	10.33	11.57	15.96	18.31
Nov-18	5.17	5.90	9.86	10.61	15.04	16.51
Dec-18	7.01	5.94	11.02	10.40	18.02	16.34
AADF-18	6.66		11.48		18.14	

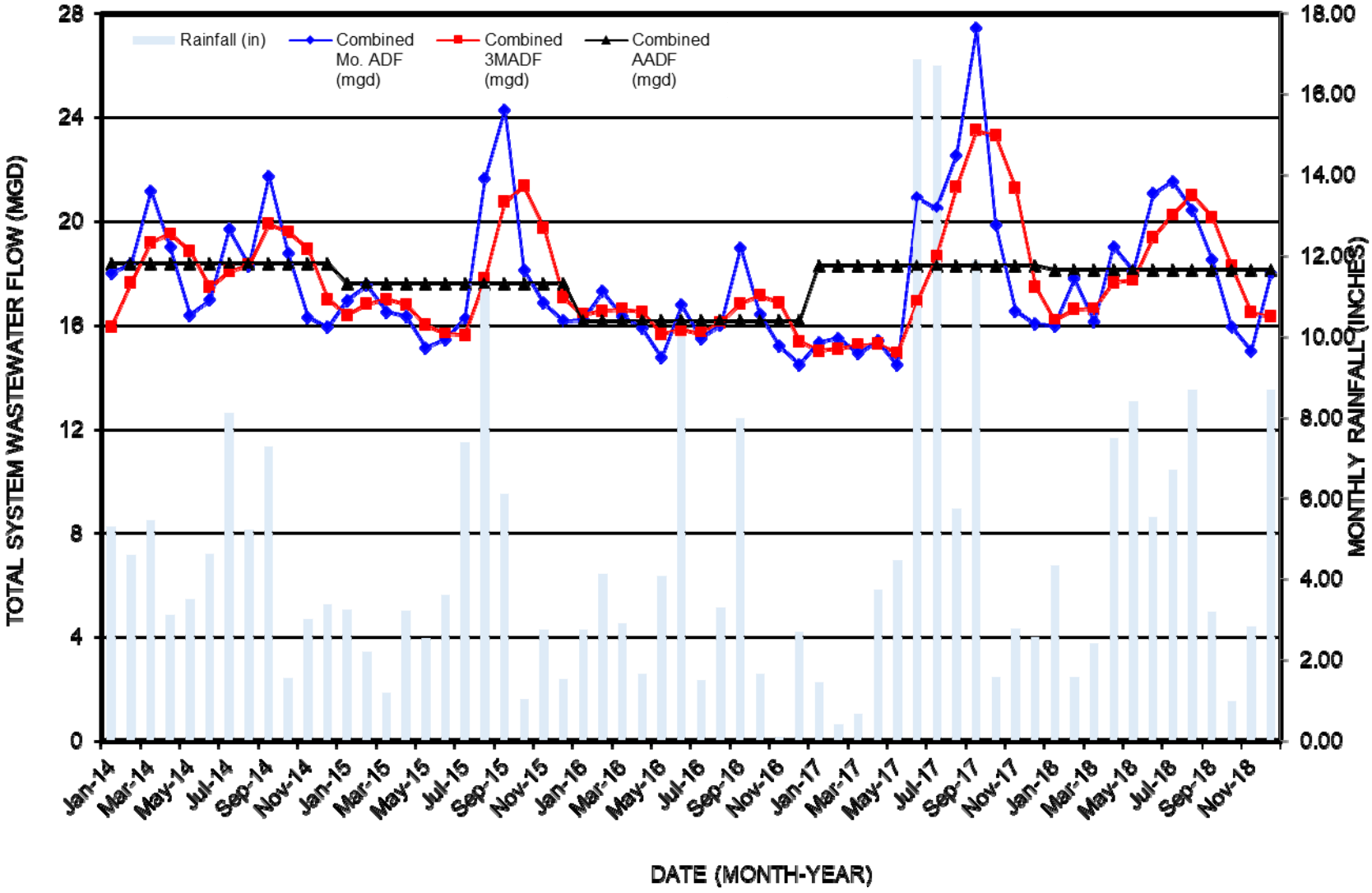

Figure 2-2. Historic Monthly Rainfall and Wastewater Flows: Monthly ADF, 3-Month ADF, and AADF

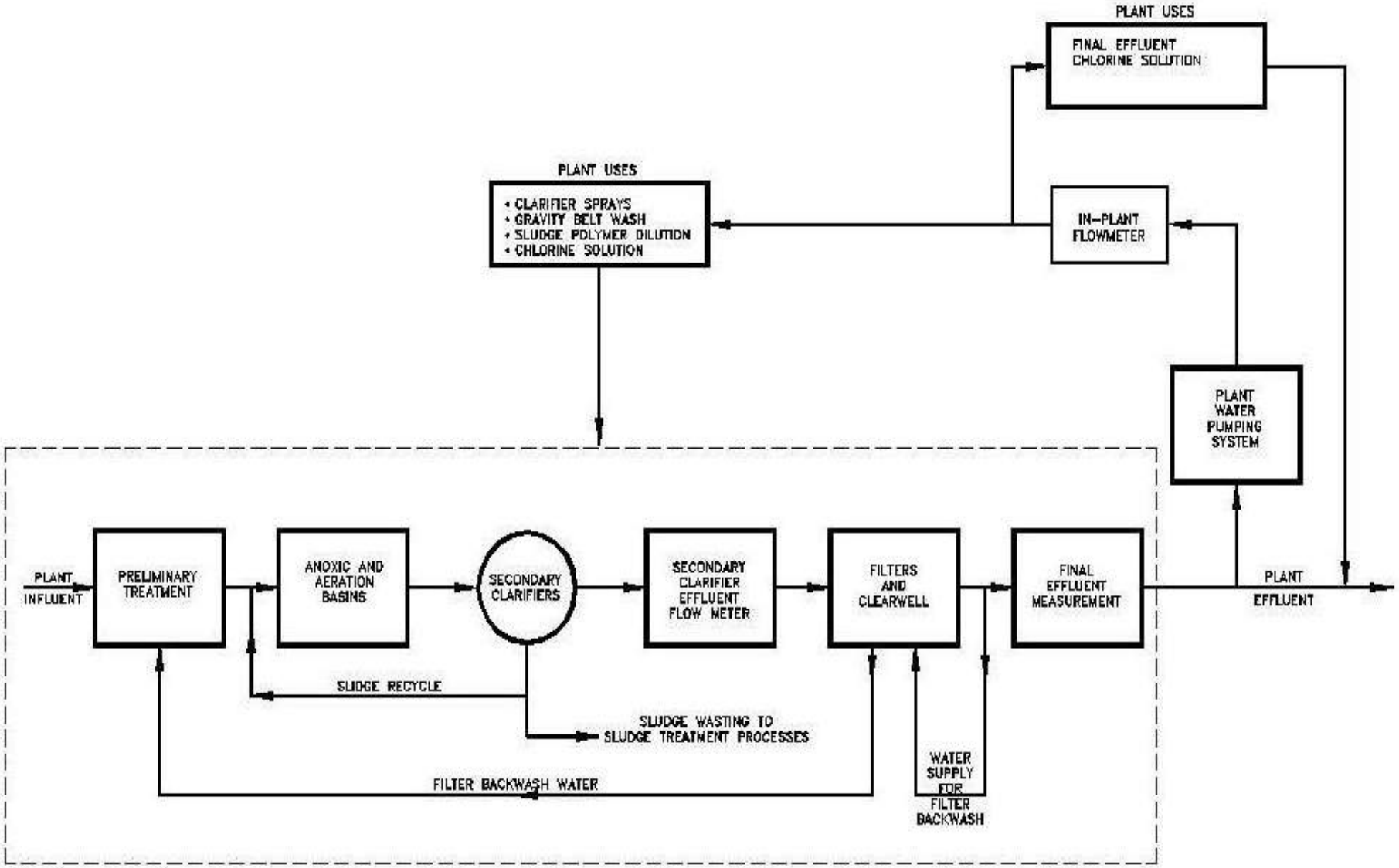

Figure 2-3. Kanapaha Water Reclamation Facility In-Plant Water Flow Schematic

SEASONAL VARIATIONS IN FLOW

This section reviews the historical flow variations in the GRU wastewater system. In Figure 2-4, the MADFs for the past ten years are plotted. Table 2-2 lists the historical AADF and the maximum three-month average daily flow for the period of 2009 through 2018. From Table 2-2 and Figure 2-4, the flows are generally highest during summer and early fall, which coincides with the Florida wet season.

The correlation of rainfall and plant flows shown in Figure 2-2 indicates that there is inflow and infiltration (I/I) in GRU's wastewater collection system. The system is impacted by I/I most significantly when there are sustained wet conditions that cause the soils to become saturated and the water tables to rise. High rainfall amounts during the 2015 summer months account for higher than normal MADFs for this record. The 2017 wet season was exceptionally wet; June, July, and August were the wettest months on record with the rainfall totaling 39 inches and were followed by Hurricane Irma in September. Hurricane Irma brought 70 mph winds and over 12 inches of rain to the Gainesville area. According to NOAA frequency estimates, the 24-hour rainfall was in excess of a 200-year event.

GRU has instituted programs to address sustained wet weather conditions and continues to aggressively pursue solutions to minimize wet weather impacts in the future. These projects include aggressive I/I identification and reduction, procurement of wet weather hauling services, and the development of a comprehensive wet weather operating protocols.

GRU has been addressing aging infrastructure, and has further increased these efforts over the past several years. Programs for sewer cleaning and inspection, smoke testing, and system monitoring have significantly increased. Additionally, GRU increased the capital budget for the renewal, replacement, and rehabilitation of the wastewater collection system. These programs are essential to extending the life of the facilities, reducing I/I, recovering system capacity, and reducing the risk of system failures.

While GRU has performed smoke testing in the past, the need to increase the effort was identified. To this end, GRU recently developed a systematic program to conduct smoke testing where potential inflow issues have been identified. Smoke testing results in the generation of maintenance work orders for the replacement of cleanout caps and installation of manhole rain pans, lining of manholes, lining of gravity mains and laterals, and sewer main cleaning. GRU has an internal crew that conducts smoke testing and performs the subsequent repairs on a regular basis.

Addressing aging infrastructure and I/I requires a substantial and sustained long-term investment. As such, GRU recognized the need for a comprehensive assessment of the collection system in order to ensure that the right amount of money is being spent on the right things at the right time. In 2018, GRU started a 3 year study to perform a comprehensive assessment of its wastewater collection system. This project is in addition to GRU's existing assessment and inspection programs, and includes a $1.8 million effort using consultants and contractors to develop short and long term plans to guide replacement and rehabilitation efforts to improve system reliability, improve capacity, reduce SSOs, and ensure long-term sustainability of operations. At the completion of the project, GRU will have an improved I/I Reduction Program that will more effectively identify, target and reduce I/I flows in the collection system.

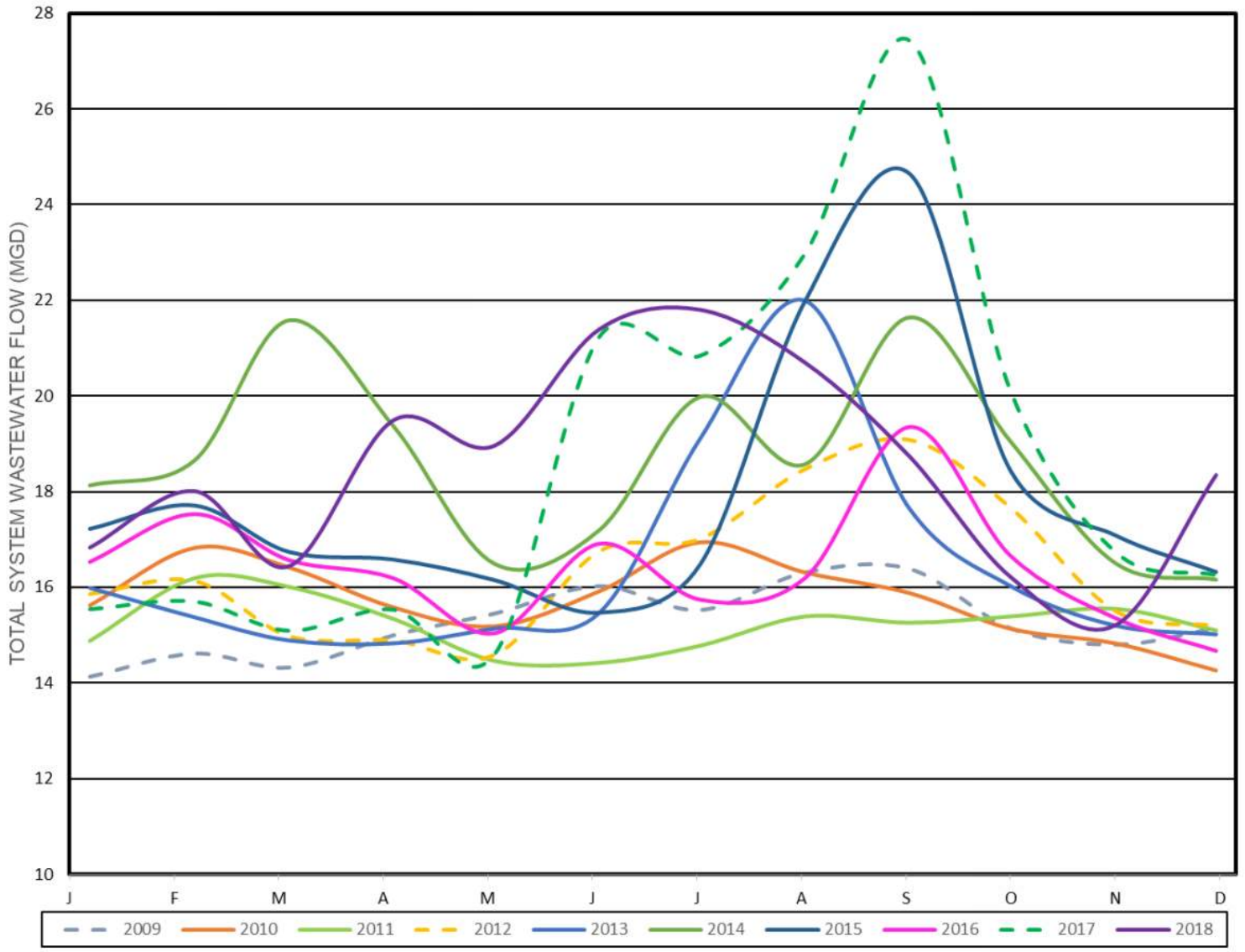

Figure 2-4. Seasonal Wastewater Flows: Monthly Average Daily Flow

Table 2-2. Seasonal Variations in Flow
Gainesville Regional Utilities

Maximum 3 Month Average Daily Flow (M3M),
Annual Average Daily Flow (AADF) and M3M/AADF Ratio

Year	Month	Annual Average Daily Flow (MGD)	Maximum 3 Month Average Daily Flow (MGD)	M3M/AADF Ratio
2009	Sept	15.24	16.08	1.06
2010	Aug	15.74	16.39	1.04
2011	Apr	15.23	15.85	1.04
2012	Oct	16.25	18.31	1.13
2013	Sept	16.11	18.88	1.17
2014	Sept	18.40	19.91	1.08
2015	Oct	17.62	21.37	1.21
2016	Oct	16.17	17.16	1.06
2017	Sept	18.30	23.51	1.28
2018	Aug	18.14	21.03	1.16

Note: Table 2-1 provides total GRU system flow which includes flow from the Kanapaha Water Reclamation Facility and the Main Street Wastewater Treatment Facility.

PROJECTED BOD, TKN, AND TSS LOADS

Projected BOD, TKN, and TSS loads at permitted plant capacity, and the original design loads are provided in Table 2-3. The original design loads are derived from the KWRF and MSWRF preliminary engineering design reports. Historical annual average, monthly maximum and peak day influent BOD, TKN and TSS loads were used to project the average, maximum monthly and peak day loads occurring at the design annual average daily flow.

The projected BOD loads at both KWRF and MSWRF are consistent with the original design loads. The projected loads for TSS at KWRF and the projected TKN and TSS loads at MSWRF are higher than the original design loads. Therefore, GRU further evaluated the capacity of each facility to handle the projected loads.

Table 2-3. Comparison of Original Design Loads versus Projected Loads at Permitted Capacity			
	Original Design Loads [a, b]	Projected Loads at Permitted Capacity [c]	Ratio of Projected to Design Loads
KWRF (14.9 MGD AADF)			
BOD Loads			
AADBOD, lb/d	--	20,233	--
MMADBOD, lb/d	30,353	23,553	0.78
PDBOD, lb/d	--	40,788	--
TKN Loads			
AADTKN, lb/d	--	4,806	--
MMADTKN, lb/d	5,552	5,694	1.03
PDTKN, lb/d	--	6,521	--
TSS Loads			
AADTSS, lb/d	--	25,820	--
MMADTSS, lb/d	24,813	32,965	1.33
MSWRF (7.5 MGD AADF)			
BOD Loads			
AADBOD, lb/d	--	7,279	--
MMADBOD, lb/d	12,500	8,668	0.69
PDBOD, lb/d	16,890	16,857	1.00
TKN Loads			
AADTKN, lb/d	--	1,813	--
MMADTKN, lb/d	--	2,288	--
PDTKN, lb/d	1,875	2,814	1.50
TSS Loads			
AADTSS, lb/d	--	8,089	--
MMADTSS, lb/d	10,950	12,731	1.16

[a] KWRF design loads – CH2M Hill, 2001

[b] MSWRF design loads -- CH2M Hill, 1987

[c] Loads projected based on median values for the 2009-2018 period.

BOD and TKN loads impact the required mixed liquor suspended solids (MLSS) to maintain a given sludge age, which in turn impacts the clarifier loads. Table 2-4 provides the MLSS, solids loading rate (SLR) and hydraulic loading rate (HLR) for each facility at the projected design loads and compares them to industry standard design ranges. For KWRF, based on maintaining an average sludge age of 10 days to ensure consistent nitrification at the projected loads, a minimum MLSS of approximately 3,196 mg/l would be required. This would result in an average SLR of 9.50 lb/ft^2-day and an average HLR of 356 gpd/ft^2 on the clarifiers. For MSWRF it is estimated that an MLSS of approximately 2,950 mg/l would be required to maintain a 10 day sludge age with the projected loads, which would result in an average clarifier SLR of 9.61 lb/ft^2-day and an average HLR of 391 gpd/ft^2. These parameters are within typical design ranges of 4.8-24 lb/ft^2-day and 200-400 gpd/ft^2 for SLR and HLR, respectively (Source: Metcalf and Eddy, Inc. (1991), *Wastewater Engineering Treatment, Disposal and Reuse*).

Table 2-4. Projected MLSS, Solids Loading Rate and Clarifier Loading at Permitted Capacity

	Industry Standard Design Ranges [(a)]	KWRF at Design Capacity	MSWRF at Design Capacity
Required MLSS, mg/l	-	3,196	2,950
Average Solids Loading Rate, lb/ft^2-day	4.8 - 24	9.50	9.61
Average Clarifier Hydraulic Loading Rate, gpd/ft^2	200 - 400	356	391

(a) Metcalf and Eddy, Inc. (1991), Wastewater Engineering Treatment, Disposal and Reuse

The aeration capacity is typically the limiting factor in handling peak day BOD and TKN loads. Table 2-5 provides a summary of the aeration capacity and the actual aeration requirement for the projected design loads at MSWRF and KWRF.

Table 2-5. Aeration Capacity and Projected Aeration Requirement at Permitted Capacity

	Actual Oxygen Transfer Rate [(a)] (O_2/day)	Projected Actual Oxygen Requirement (O_2/day)
KWRF (14.9 MGD AADF)	59,000	43,056
MSWRF (7.5 MGD AADF)	28,700	22,746

(a) These values are based on providing a minimum dissolved oxygen concentration of 1 mg/l at an operating temperature of 28°C.

At KWRF, the designed Modified Ludzack Ettinger (MLE) process trains include a total aeration horsepower of 1050 hp (one 200 hp, two 125 hp and one 75 hp aerator per train with two trains), with an estimated actual oxygen transfer capacity of 32,800 lb O_2/day. The carrousel system design provides a total aeration horsepower of 500 hp (two 125 hp aerators per basin with two basins) with an estimated actual transfer capacity of 26,200 lb O_2/day. This yields a total aeration capacity of 59,000 lb O_2/day (actual oxygen transfer rate (AOTR)). These values are based on providing a minimum dissolved oxygen concentration of 1 mg/l at an operating temperature of 28°C. Currently, a 125 hp aerator has been changed to a 75 hp aerator. GRU plans to restore the aerator to achieve the original oxygen transfer efficiency of the 125 hp. Based on the peak day BOD and TKN loads provided in Table 2-3, the KWRF actual oxygen requirement (AOR) at a permitted capacity of 14.9 MGD AADF is estimated at 43,056 lb O_2/day. Note that this value is conservative since it assumes peak day BOD and peak day TKN loads occur on the same day. Based on these values, the KWRF aeration capacity is adequate to handle the current 14.9 MGD design AADF.

For the MSWRF, the worst-case peak oxygen demand is estimated at 22,746 lb O_2/d. This estimate is based on the design peak day BOD and TKN loads in Table 2-3, assuming no oxygen credit for denitrification. Although denitrification is not required in order to meet the plant

permit conditions, denitrification is achieved in the plant. At present, the plant achieves effluent NO_3-N concentrations of approximately 5 mg/l. However, this level of denitrification should not be assumed under design peak load conditions, since these conditions will require the aerators to be operated at higher power levels than they are currently. Based on operating experience with all of the aerators running at full speed, effluent NO_3-N levels at MSWRF have consistently been below 10 mg/l, indicating that some denitrification is achieved in the aeration basin even with all of the aerators at full power. Based on assuming an oxygen credit corresponding to an effluent nitrate concentration of 10 mg/l, the peak aeration demand is reduced to 18,328 lb O_2/day. As with the KWRF, these estimates are conservative as it assumes that the peak day TKN load occurs on the same day as the peak BOD load. In 1998, GRU performed an evaluation of the oxygenation capacity at the MSWRF. Based on the oxygen transfer rates observed in that analysis, the system should have an oxygen transfer capacity of approximately 28,700 lb O_2/day with the aerators at full capacity. This estimate assumes maintenance of a 1 mg/l residual DO at 28°C. Based on comparing this value to the worst-case oxygen demand estimate of 22,746 lb O_2/d the MSWRF has adequate aeration capacity to handle the 7.5 MGD design AADF.

It should be noted that the load sharing capability of the collection system provides an extra margin of safety for peak load events for both of the plants in that some of the load can be diverted to the other treatment plant if necessary.

As part of the Paynes Prairie Sheetflow Restoration Project, GRU performed a detailed evaluation of the MSWRF which included evaluating and optimizing nitrogen removal capabilities, evaluating chemical phosphorus removal and further assessing aeration capacity. In 2008, GRU performed stress testing on the process trains at the plant and developed a computer model to predict performance at build-out. This analysis determined that MSWRF can meet an annual average total nitrogen concentration requirement of 10 mg/L and can meet the target average total phosphorous concentration of 0.3 mg/L. The 125 acre constructed wetland that is part of the Paynes Prairie Sheetflow Restoration Project is designed to achieve further reduction in nitrogen levels to a long term average of 3 mg/L. Additional nitrogen reduction will occur in the wetlands receiving this flow in order to meet the Total Maximum Daily Load requirement for Alachua Sink.

CHAPTER 3
FUTURE CONDITIONS

POPULATION AND FLOW PROJECTIONS

The methodology used to project future population and wastewater flows is described in this chapter. The history and forecast of GRU sewered population and wastewater system flow rates are provided in Table 3-1 and graphically displayed in Figure 3-1. GRU updates a forecast model annually that estimates the water supply and sewered populations and projects future populations, water demand and wastewater flows. The most current Fiscal Year 2019 forecast was used as the basis for the numbers presented in Table 3-1.

GRU serves less sewer customers than potable water supply customers; therefore, to determine the sewered population the median ratio of the actual water supply population and the sewered population from 2009 to 2018 was multiplied by the forecasted water supply population. Future AADF was derived using the median ratio of actual water supply flows and AADF from 2008-2019 and multiplying it by the projected water supply flows. The projected maximum 3 month ADF was calculated by taking the ten year median of the maximum 3 month ADF to AADF ratio and multiplying by the projected AADF value.

The majority of growth for GRU's wastewater collection system is new sewer service connections within surrounding unincorporated portions of the Gainesville metropolitan area and redevelopment projects in and around downtown and the University of Florida. Figure 3-2 taken from the 2011-2030 Alachua County Comprehensive Plan (effective date July 22, 2011), shows future land uses within the urban cluster area of unincorporated Alachua County. GRU is the primary provider of central wastewater services in the Gainesville metropolitan area and the Alachua County Comprehensive Plan allows for extension of wastewater facilities within the urban cluster line as shown in Figure 3-2.

Based upon the future flow projections in Table 3-1, the three-month average daily flow is projected to reach the current permitted capacity of 22.4 MGD in 2028. GRU anticipates the AADF will reach the permitted capacity in approximately 15 years. Currently (2019) GRU is in the process of soliciting a progressive design build team to address the overall condition of the MSWRF and to expand the system capacity to meet future wastewater flows. The design build effort is called the

Main Street Water Reclamation Facility Improvement Program and it will evaluate, design, replace and upgrade assets so the MSWRF can continue achieving consistent regulatory compliance. The improvements to the plant have a design goal of increasing the facility from a 7.5 MGD capacity to a 10 – 12 MGD AADF capacity facility. This will increase the combined system capacity to 24.9 – 26.9 MGD AADF. The improvements are expected to be complete within the next 10 years.

Table 3-1. Projected Sewer Service Area Population and Flows
Gainesville Regional Utilities

Year	Water Supply Pop (1)	Sewered Pop (2)	Sewered/ Water Supply Pop Ratio	Water Supply Flows (MGD) (3)	AADF Flows (MGD) (4)	Max 3 Month ADF (MGD) (5)	AADF/ Water Supply Ratio	M3M/ AADF Ratio
2009	186,300	172,500	0.93	25.0	15.2	16.1	0.61	1.06
2010	184,700	172,100	0.93	23.4	15.7	16.4	0.67	1.04
2011	184,800	172,400	0.93	24.9	15.2	15.9	0.61	1.04
2012	185,600	173,200	0.93	23.2	16.3	18.3	0.70	1.13
2013	186,700	174,100	0.93	22.1	16.1	18.9	0.73	1.17
2014	187,800	175,300	0.93	21.8	18.4	19.9	0.84	1.08
2015	189,300	176,800	0.93	22.1	17.6	21.4	0.80	1.21
2016	190,700	178,100	0.93	22.3	16.2	17.2	0.73	1.06
2017	192,000	179,900	0.94	23.4	18.3	23.5	0.78	1.28
2018	194,300	181,900	0.94	22.7	18.1	21.0	0.80	1.16
Median Ratio (2009-2018)			0.93				0.73	1.10
2019	196,632	183,519		23.0	18.4	20.3	-	-
2020	198,991	185,721		23.3	18.6	20.5	-	-
2021	201,379	187,950		23.6	18.8	20.7	-	-
2022	203,796	190,205		23.8	19.0	20.9	-	-
2023	206,241	192,488		24.1	19.2	21.2	-	-
2024	208,716	194,798		24.4	19.4	21.4	-	-
2025	211,221	197,135		24.7	19.6	21.6	-	-
2026	213,755	199,501		25.0	19.8	21.9	-	-
2027	216,320	201,895		25.3	20.0	22.1	-	-
2028	218,916	204,318		25.6	20.3	22.4	-	-

(1) Population estimates were based on GRU's forecast model that uses population estimates from the Bureau of Economic and Business Research (BEBR). Population projections were calculated using historical population growth rates, which are higher than the BEBR estimates.

(2) Historical sewered population represents the population within GRU's service area receiving wastewater service from GRU and does not include households on septic tanks. Forecasted sewer population is calculated using the median ratio of sewered population to the water supply population from 2009-2018 and the projected water supply population.

(3) Projected water supply flows are calculated using the expected gallons per day per capita demand, which is similar to the methodology used in the Consumptive Use Permit forecast.

(4) Projected AADF are derived by multiplying the incremental increase in projected water supply flows by the median ratio of AADF/Water Supply Flows from 2009-2018, and then adding the result to the AADF of the previous year.

(5) Forecasted Max 3 Month ADF = (Forecasted AADF) x (Median M3M/AADF Ratio for 2009 to 2018)

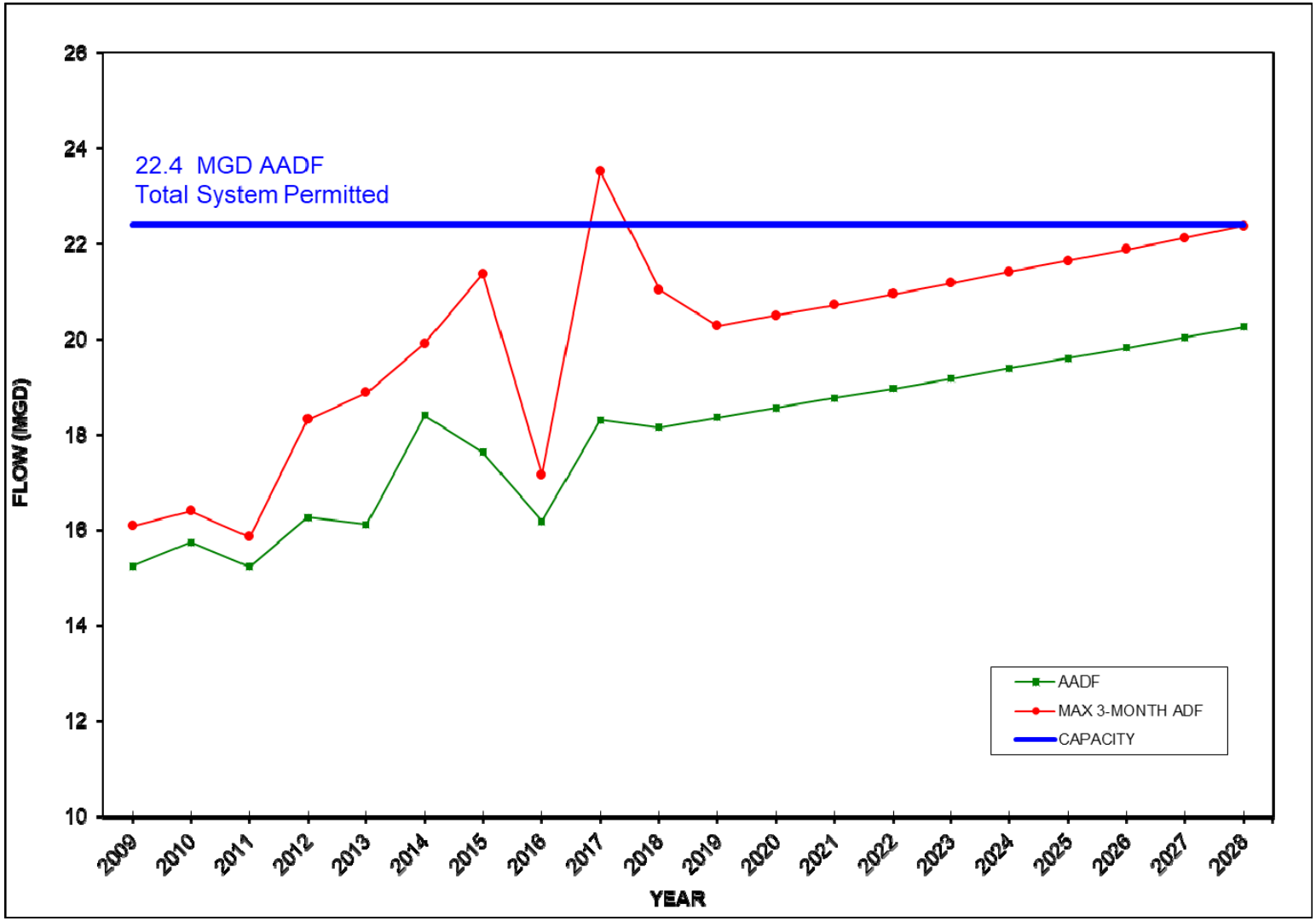

Figure 3-1. Historic and Future Total Wastewater System Flows

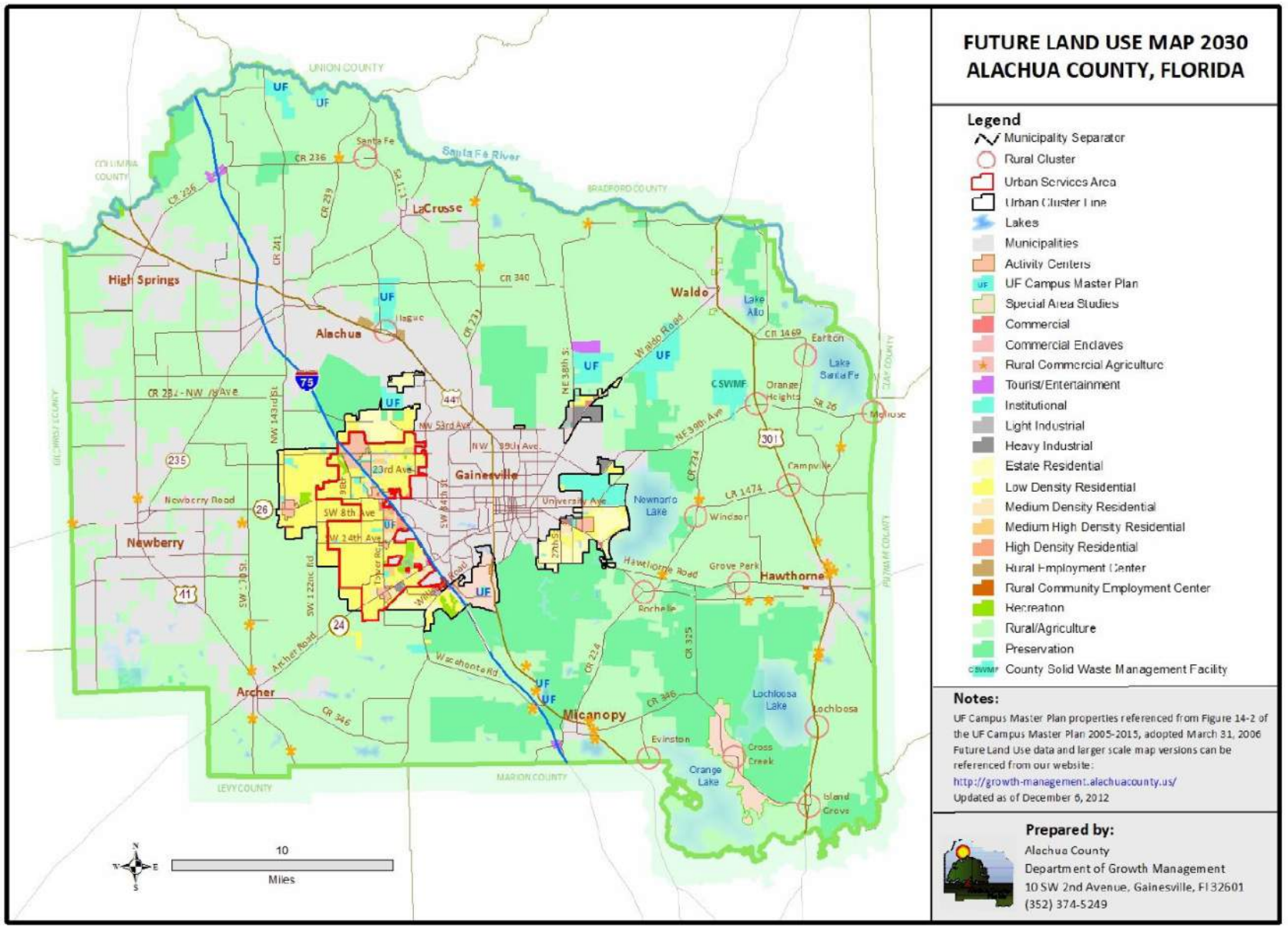

Figure 3-2. Urban Cluster Area – Future Land Use Map 2030 – Alachua County, Florida

CHAPTER 4
EFFLUENT REUSE

MSWRF

Most of the effluent from the MSWRF is discharged to Sweetwater Branch which flows to Sweetwater Wetlands Park for further treatment and discharge to Paynes Prairie. GRU also operates a reclaimed water pumping and distribution system from the MSWRF which provides reclaimed water for irrigation and industrial cooling. The reclaimed water pumping station and high level disinfection system at MSWRF provides a reclaimed water delivery capacity of 3.309 MGD, with the ability to expand in the future. Projects being served at this time include:

Public Access Irrigation
Shands Cancer Center (irrigation)
GRU South Energy Center (power plant cooling water)
I-District Chilled Water (chilled water)

The Basin Management Action Plan for the Total Maximum Daily Loads (TMDL) in the Orange Creek Basin includes the Alachua Sink TMDL. As a contributor to the nitrogen load to Alachua Sink, GRU considered several alternatives for meeting the reductions required in the MSWRF discharge. Working with partners and stakeholders, the Sweetwater Wetlands Park (formerly known as the Paynes Prairie Sheetflow Restoration Project) was designed and constructed to meet the TMDL. The project included upgrades to the MSWRF for phosphorus removal, optimization of nitrogen removal at MSWRF, and the diversion of flow from Sweetwater Branch into the constructed treatment wetland which discharges via sheetflow onto Paynes Prairie. This approach restored sheetflow to the prairie, thus restoring approximately 1,300 acres of wetlands, and now significantly reduces the nitrogen loads from Sweetwater Branch that may reach Alachua Sink. GRU worked in partnership with the City's stormwater utility, FDOT, St. Johns River Water Management District (SJRWMD) and the FDEP to complete this project. A memorandum of understanding between FDEP, SJRWMD and the City of Gainesville was executed and provided the necessary property rights and easements for construction and completion of Sweetwater Wetlands Park, a 125 acre man-made wetland habitat restoring natural water flow to more than 1,300 acres of formerly drained wetlands in Paynes Prairie.

GRU developed a plan of study (POS) for a Level II Water Quality Based Effluent Limit (WQBEL) and a site-specific interpretation of the Numeric Nutrient Criteria for Sweetwater Branch. FDEP approved the POS on September 12, 2014. In accordance with Administrative Order No. AO 136 NE for the Gainesville Regional Utilities (GRU) Main Street Water Reclamation Facility (MSWRF), FDEP Permit No. FL002725, GRU submitted on July 25, 2019 a cover letter and full technical report with appendices to the FDEP which provided the proposed Level II WQBELs for total nitrogen (TN) and total phosphorus (TP) to be used as primary site specific interpretation of Numeric Nutrient Criteria (NNC) for Sweetwater Branch in Gainesville, Florida. The proposed Level II WQBEL accommodates a MSWRF capacity increase to 12 MGD.

FDEP is currently reviewing the submittal documents. GRU will continue to work and support the FDEP as needed through this process. Steps moving forward are anticipated to include:

1. FDEP will review and approve the Level II WQBEL technical report, before moving forward with the Level II WQBEL.
2. FDEP will publish notice in the FAR that it intends to issue a Level II WQBEL that will constitute a change to water quality standards as Hierarchy 1 numeric nutrient criteria under rule 62-302.531, F.A.C., and announcing a public hearing on the draft WQBEL.
3. FDEP will hold a public hearing on the draft WQBEL.
4. FDEP will complete the 'Template Document/Summary' and forward it along with the technical report to EPA for their initial review.
5. Once FDEP receives informal comments from EPA, FDEP will issue a Notice of Final Order to GRU and to other parties substantially affected by the WQBEL. The notice will include a statement indicating the date by which compliance with the requirements of the final order must be achieved.
6. FDEP will submit the final order adopting the Level II WQBEL, with the technical report and "Template Document/Summary," to EPA as a change to water quality standards, for its review and approval.
7. EPA will review and approve, as appropriate, the Level II WQBEL as a change to Florida's water quality standards.

8. Once EPA has approved the change to water quality standards, FDEP will re-open the permit to revise it to include the new WQBEL.

KWRF

Effluent from KWRF is reused by deep aquifer recharge wells (permitted at 10 MGD AADF) and through GRU's reclaimed water distribution system. GRU's reclaimed water distribution program was initiated in 1993. GRU continues to expand its residential reuse program. Reclaimed water uses from the KWRF currently include irrigation of the Haile Plantation Golf Course, Kanapaha Botanical Gardens, Kanapaha Middle School, University of Florida TREEO Center, residential lawn irrigation, and aesthetic water features. Table 4-1 shows the current and projected reclaimed water flows and end uses for KWRF.

As part of its reuse portfolio GRU utilizes groundwater recharge wetlands. Groundwater recharge wetlands are constructed wetlands which receive reclaimed water and achieve simultaneous nitrogen removal and aquifer recharge. GRU is currently achieving 1.6 – 1.8 MGD of aquifer recharge with its existing recharge wetlands. GRU has demonstrated the nutrient removal capabilities of vegetated recharge wetlands through demonstration studies at the KWRF wetland site and at the Kanapaha Middle School wetland site.

GRU also developed a hybrid stormwater/reclaimed water recharge wetland located at the Kanapaha Middle School which has a recharge capacity of approximately 0.4 MGD. The project utilizes an existing stormwater retention basin, which was planted with wetland vegetation. Under dry conditions RCW is discharged into the basin to maintain a constant water level in order to support the wetland vegetation and provide simultaneous nutrient removal and recharge of the reclaimed water. During storm events, the reclaimed water flow is curtailed and the basin functions to retain, remove nutrients, and achieve aquifer recharge from stormwater entering the basin.

GRU is also pursuing construction of a larger scale wetland that will be approximately 30 to 40 acres in size and have a buildout capacity of 3 to 5 MGD. This project will allow GRU to continue to use the increased reclaimed water flows that occur with population growth for recharging the

aquifer. With the expansion of the reclaimed water distribution system and construction of recharge wetlands, there will be adequate reuse capacity for projected effluent flow increases for the next 20 years or more.

Table 4-1. KWRF Reclaimed Water Estimated Current and 20 Year Master Plan Flows

Use	Current Flows	Projected Flows (20 years)
Public Access Irrigation	1.31 MGD	1.80 MGD
Recharge Wetlands	1.71 MGD	4.81 MGD
Aquifer Recharge (deep wells)	8.36 MGD	8.01 MGD
Total	**11.39 MGD**	**14.62 MGD**

CHAPTER 5
SUMMARY AND CONCLUSIONS

F.A.C. 62-600.405 requires the permittee to provide an estimate of the time required for the three-month average daily flow to reach the permitted capacity. Based upon the future flow projections given in Table 3-1, the three-month average daily flow is projected to reach the current permitted capacity of 22.4 MGD in 2028. The AADF is projected to reach the current permitted capacity of 22.4 MGD in approximately 15 years. GRU has a progressive design build project that will increase the MSWRF facility from a 7.5 MGD capacity to a 10 – 12 MGD AADF capacity facility. The improvements are expected to be completed within the next 10 years. This facility upgrade will increase the combined system capacity to 24.9 – 26.9 MGD AADF.

As a part of this evaluation, the ability of the current wastewater treatment facilities to handle the projected loads at their design flow capacities was evaluated. It was determined that KWRF and MSWRF will be adequate to handle the current permitted flows of 14.9 MGD and 7.5 MGD, respectively.

GRU is continuing an aggressive reuse program that will include on-going expansion of both aquifer recharge reuse and irrigation in order to ensure that adequate reuse capacity will be available to meet both ADF requirements and wet weather needs for KWRF. The Sweetwater Wetland Park will beneficially reuse most of the effluent from MSWRF for environmental restoration. The proposed Level II WQBEL for Sweetwater Branch accommodates a MSWRF capacity increase to 12 MGD. GRU is also aggressively pursuing reuse from MSWRF.