



Clean Waterways Act Wastewater Treatment Plant Plan

AVO 054387.006
January 2024



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Section 1: Introduction

1.1 Background

The Clean Waterways Act – Senate Bill 712 (2020) subparagraph 403.067(7)(a)9 Florida Statutes requires all counties and municipalities within a Basin Management Action Plan (BMAP) to develop a wastewater treatment plant remediation plan to quantify nitrogen and phosphorus loading in the wastewater effluent and develop a list and ranking of improvement projects required to meet the nutrient removal goals of the BMAP, along with an implementation schedule.

The Silver Springs Basin Management Action Plan for Silver Springs, Silver Springs Group, and Upper Silver River encompasses the portion of the City of Wildwood located north of State Route 44 and east of Interstate Route 75. Wastewater treatment facilities located within the Silver Springs BMAP, but outside of the Marion County Primary Protection Zone, that have a capacity of 10,000 gallons per day or larger have a total nitrogen effluent standard of 6 mg/L as an annual average, or 10 mg/L for discharge to public access reuse systems. Phosphorus effluent standards are not included in the Silver Springs BMAP.

1.2 Wastewater Service Area

The City's wastewater service area includes both the area within the city limits, as well as portions of unincorporated Sumter County. Currently the majority of the City's connections are located in the northeastern portion of the service area, which includes the city limits, and is located within the BMAP. The southern and western portions of the service area are rural in nature, with large tracts of undeveloped land and few connections, although the service area is experiencing rapid growth. The limits of the City's current wastewater service area are presented in **Figure 1-1**.

Wastewater generated within the City's service area is treated at the Wildwood Water Reclamation Facility (WRF) and the Continental Country Club Wastewater Treatment Facility (WWTF).

Section 2: Wastewater Treatment Facilities

2.1 Wildwood Water Reclamation Facility

The Wildwood Water Reclamation Facility, located on Industrial Drive, treats the majority of the wastewater generated within the City's service area. Currently permitted by the Florida Department of Environmental Protection (FDEP) at an annual average daily flow (AADF) of 3.55 MGD, the current treatment processes at the WRF were not originally designed to provide high levels of nutrient removal. Wastewater is treated to public access reuse standards prior to being used for landscape irrigation in the City's service area or in the North Sumter Utility reclaimed water system within The Villages community. Rapid infiltration basins are used for the disposal of effluent during periods of wet weather or when water quality parameters are not met. A site plan of the Wildwood WRF is shown in **Figure 2-1**.

2.1.1 FDEP Permit Summary

The Wildwood WRF is currently operating under FDEP Permit Number FLA013497, a ten-year permit with an expiration date of January 22, 2027. Effluent total nitrogen, nitrate, and total phosphorus concentrations are required to be measured weekly. However, the only nutrient limit contained within the current permit is a 12.0 mg/L nitrate limit when discharging to the rapid infiltration basins. A summary of the FDEP permit limits for the Wildwood WRF are presented in **Table 2-1**.

Table 2-1: Summary of Permitted Wildwood WRF Discharge Limits

Parameter	Land Application R-001 Public Access Reuse	Land Application R-002 Rapid Infiltration Basins
Flow	3.30 MGD	1.25 MGD
BOD ₅	20 mg/L	20 mg/L
Total Suspended Solids	5 mg/L	20 mg/L
Fecal Coliform	75% Non-Detect	200 cfu/100mL
Nitrate	No Limit	12 mg/L
Total Nitrogen	Report	No Limit
Total Phosphorus	Report	No Limit
Total Residual Chlorine	1.0 mg/L Min.	0.5 mg/L Min.
pH	6.0 to 8.5	6.0 to 8.5

2.1.2 Historical Nutrient Loading

Discharge monitoring reports for the Wildwood WRF were reviewed for the period from January 2018 to November 2023. Effluent total nitrogen concentrations peaked at 11.6 mg/L, while averaging 2.6 mg/L. Total phosphorus concentrations in the effluent were generally higher, peaking at 7.5 mg/L, with an average of 3.7 mg/L. A summary of total nitrogen and total phosphorus loadings for the Wildwood WRF are presented in **Table 2-2**.

Table 2-2: Summary of Annual Nutrient Loadings for the Wildwood WRF

Year	Annual Average Daily Flow (MGD)	Total Annual Flow (MG/Yr)	Total Nitrogen (mg/L)	Total Nitrogen (lb/yr)	Total Phosphorus (mg/L)	Total Phosphorus (lb/yr)
2018	1.314	456.4	4.4	16,486	4.8	18,171
2019	1.330	569.2	3.3	17,614	2.0	8,624
2020	1.240	553.2	2.3	12,616	3.9	16,903
2021	1.458	524.8	2.1	10,704	4.2	18,533
2022	1.727	619.7	1.4	7,274	4.5	22,839
2023	1.839	607.3	2.0	10,129	2.6	13,059

Note: 2023 includes data from January through November

2.2 Continental Country Club Wastewater Treatment Facility

The Continental County Club Wastewater Treatment Facility, located on Continental Boulevard, treats wastewater generated by the Country Club. Currently permitted by FDEP at a three-month rolling average daily flow (3MRADF) of 0.200 MGD, the current treatment processes at the WRF were not originally designed to provide nutrient removal. Treated wastewater effluent is pumped to a 27.82 acre sprayfield for disposal.

2.2.1 FDEP Permit Summary

The Continental Country Club WWTF is currently operating under FDEP Permit Number FLA043699, a five-year permit with an expiration date of April 24, 2027. Effluent total nitrogen and total phosphorus concentrations are required to be measured quarterly, but are not limited in the permit. A summary of the FDEP permit limits for the Country Club WWTF are presented in **Table 2-3**.

Table 2-3: Summary of Permitted Wildwood WRF Discharge Limits

Parameter	Land Application R-001 Sprayfield
Flow	0.200 MGD
BOD ₅	20 mg/L
Total Suspended Solids	20 mg/L
Fecal Coliform	200 cfu/100mL
Nitrate	No Limit

Total Nitrogen	Report
Total Phosphorus	Report
Total Residual Chlorine	0.5 mg/L Min.
pH	6.0 to 8.5

2.2.2 Historical Nutrient Loading

Discharge monitoring reports for the Continental Country Club WWTF were reviewed for the period from January 2018 to November 2023. Effluent total nitrogen concentrations peaked at 31 mg/L, while averaging 13 mg/L. Total phosphorus concentrations in the effluent peaked at 12 mg/L, with an average of 5.2 mg/L. A summary of total nitrogen and total phosphorus loadings for the Continental Country Club WWTF are presented in **Table 2-4**.

Table 2-4: Summary of Annual Nutrient Loadings for the Continental Country Club WWTF

Year	Annual Average Daily Flow (MGD)	Total Annual Flow (MG/Yr)	Total Nitrogen (mg/L)	Total Nitrogen (lb/yr)	Total Phosphorus (mg/L)	Total Phosphorus (lb/yr)
2018	0.106	38.7	18.5	6,018	2.8	896
2019	0.103	37.5	17.3	8,159	4.3	1,301
2020	0.038	13.9	12.0	1,816	5.4	433
2021	0.139	50.6	10.4	4,430	6.5	2,736
2022	0.143	52.1	9.2	3,923	3.8	1,558
2023	0.284	94.9	11.7	9,660	8.3	5,875

Note: 2023 includes data from January through November

Section 3: Capacity Analysis

3.1 Historical Wastewater Flow

Historical wastewater flow data from 2018 to 2023 was reviewed in an effort to determine current wastewater flow in the City's service area as well as to establish a baseline for future growth. While flows decreased between 2018 and 2020, they have increased steadily since 2020 at an average rate of 19.2 percent over the last three years. A summary of the yearly average daily flows is presented in **Table 3-1**.

Table 3-1: Summary of 2018 to 2023 Wastewater Flows

Year	Wildwood WRF (MGD)	CCC WWTF (MGD)	Total Service Area (MGD)
2018	1.286	0.221	1.507
2019	1.346	0.122	1.468
2020	1.290	0.130	1.420
2021	1.461	0.167	1.628
2022	1.781	0.150	1.931
2023	2.210	0.190	2.400

3.2 Wastewater Flow Projections

3.2.1 Wildwood WRF

Wastewater flow projections developed in the City of Wildwood Utility System Master Plan in 2018 were compared to historical flows over the last five years to determine if the projections should be adjusted based upon actual growth. In 2020 and 2022 the flow projections exceeded observed flows by approximately 0.5 MGD. A summary of the wastewater flow projections from the 2018 Master Plan as compared to observed flows is presented in **Table 3-2**.

Table 3-2: 2018 Utility System Master Plan Flow Projections Versus Actual Flow

Year	Projected ERCs	2018 Master Plan Projection (MGD)	Observed Wastewater Flow (MGD)
2018	7,022	1.489	1.507
2020	8,912	1.942	1.420
2022	10,722	2.391	1.931
2037	25,241	5.725	N/A

The 2018 Utility Master Plan projected wastewater flows of 5.725 MGD in 2037, with the planning and preliminary design of the expansion of the Wildwood WRF projected to occur by 2032.

A Conceptual Design Report for the Wildwood WRF, prepared in 2022 by CPH, noted that wastewater flows within the City's service area had increased by over 44-percent over the previous six years, with a year over year increase in flows of 7.6-percent. As the growth rate of wastewater flows has accelerated since 2020, the Conceptual Design Report projects that flows will exceed the permitted capacity of the WRF in 3.2 to 3.4 years, or in approximately early 2026. Expansion of the Wildwood WRF to a capacity of 6.0 MGD is recommended in the report.

The Wildwood WRF's currently permitted capacity of 3.55 MGD is insufficient to meet the needs of the service area based upon on-going and projected growth. An ultimate capacity of 6.0 MGD was identified in both the 2018 Utility Master Plan, and the 2022 Conceptual Design Report. Development of a Preliminary Design Report for the expansion of the Wildwood WRF to an ultimate capacity of 8.0 MGD is currently on-going.

3.2.2 Continental Country Club WWTF

The Continental Country Club WWTF currently provides 0.200 MGD of capacity for the Continental Country Club. The City intends to decommission WWTF, and repump wastewater currently treated at the WWTF to the Wildwood WRF. Construction of a screening structure, lift station, and force main is currently on-going.

Section 4: Wastewater Treatment Facility Improvements

4.1 Wildwood Water Reclamation Facility

Improvements to the Wildwood WRF are planned in order to increase the capacity from the currently permitted 3.55 MGD to 8.0 MGD, as well as to upgrade the treatment processes to provide advanced nutrient removal. A five-stage Bardenpho treatment process is proposed as part of the improvements to produce effluent with less than 3.0 mg/L total nitrogen and less than 1.0 mg/L total phosphorus, lower concentrations than the required in the Silver Springs BMAP.

The expansion of the Wildwood WRF will include the following modifications and improvements:

- Conversion of the existing oxidation ditches from operation in series to operation in parallel.
- Hydraulic modifications dedicating each set of existing oxidation ditches to a set of existing clarifiers.
- Upgrades to the instrumentation within the existing oxidation ditches allowing for improved process control.
- Construction of a new headworks with mechanical screens and screening dewatering, as well as demolition of the existing headworks.
- Construction of a new on-site master lift station for the WRF.
- Improvements to the RAS pump stations including the installation of additional pumps and rerouting of RAS to the new headworks for odor control.
- Installation of a screw press for biosolids dewatering and demolition of the existing belt filter press system.
- Construction of two equalization basins and two equalization pump stations.
- Construction of four five-stage Bardenpho process trains each with a capacity of 2.0 MGD.
- Construction of four secondary clarifiers with RAS/WAS pump stations.
- Construction of four disc filters.
- Construction of an expanded chlorine contact chamber.
- Construction of a transfer pump station.
- Construction of a sodium hypochlorite storage and feed facility.
- Construction of four aerobic-facultative digestors, and a sludge thickening system.
- Construction of an electrical building and operations building.
- Construction of a back-up generator.

The conceptual opinion of probable construction cost for the expansion of the Wildwood WRF to 8.0 MGD is \$150 million as shown in **Table 4-1**.

Table 4-1: Wildwood WRF Improvements Conceptual Opinion of Probable Construction Cost

Item	Unit Cost	Total Cost
Expansion by 4.45 MG	\$30/gallon	\$133,500,000
Design and Permitting	3%	\$4,000,000
Contingency	10%	\$13,350,000
Total		\$150,850,000

The proposed improvements to the WRF are planned to be constructed in phases to provide incremental increases in capacity while keeping the WRF in service. A summary of the proposed phasing of the improvements is presented in **Table 4-2**.

Table 4-2: Wildwood WRF Improvements Phasing Plan

Phase	Improvements
1A	Hydraulic improvements including converting the existing oxidation ditches from operation in series to operation in parallel.
1B	Construction of a new headworks screening facility and master pump station. Demolition of the existing headworks.
2A	Construction of new clarifiers, disk filters, chlorine contact chambers, and an effluent pump station to support the increase in capacity.
2B	Construction of two five-stage Bardenpho process basins.
3	Construction of two five-stage Bardenpho process basins.

4.2 Continental Country Club Wastewater Treatment Facility

The Continental Country Club WWTF is scheduled to be decommissioned and removed from service, with all wastewater flows currently being treated at the WWTF being pumped to the Wildwood WRF. The proposed improvements to allow for the decommissioning of the Country Club WWTF will include:

- Construction of a screening structure with mechanical screen.
- Construction of a submersible wastewater lift station.
- Construction of 74 LF of 8" PVC gravity sewer.
- Construction 18,750 LF of 8" PVC wastewater force main.
- Decommissioning and demolition of the Continental Country Club WWTF.

The City has issued a construction contract for the screening structure with mechanical screen, lift station, gravity sewer, and force main on June 26, 2023 in the amount of \$3,434,899. A breakdown of the construction costs is presented in **Table 4-3**.

Table 4-3: Continental Country Club WWTF Decommissioning Construction Cost

Item	Total Cost
General Conditions	\$444,939
Screening Structure	\$395,000
Submersible Lift Station	\$927,760
Force Main	\$1,667,200
Total	\$3,434,899

Decommissioning and demolition of the Continental Country Club WWTF is estimated at \$200,000. The total estimated construction cost for rerouting flow from the Continental Country Club WWTF to the Wildwood WRF and decommissioning and demolishing the Continental Country Club WWTF is estimated at approximately \$3.7 million.

Section 5: Implementation Plan

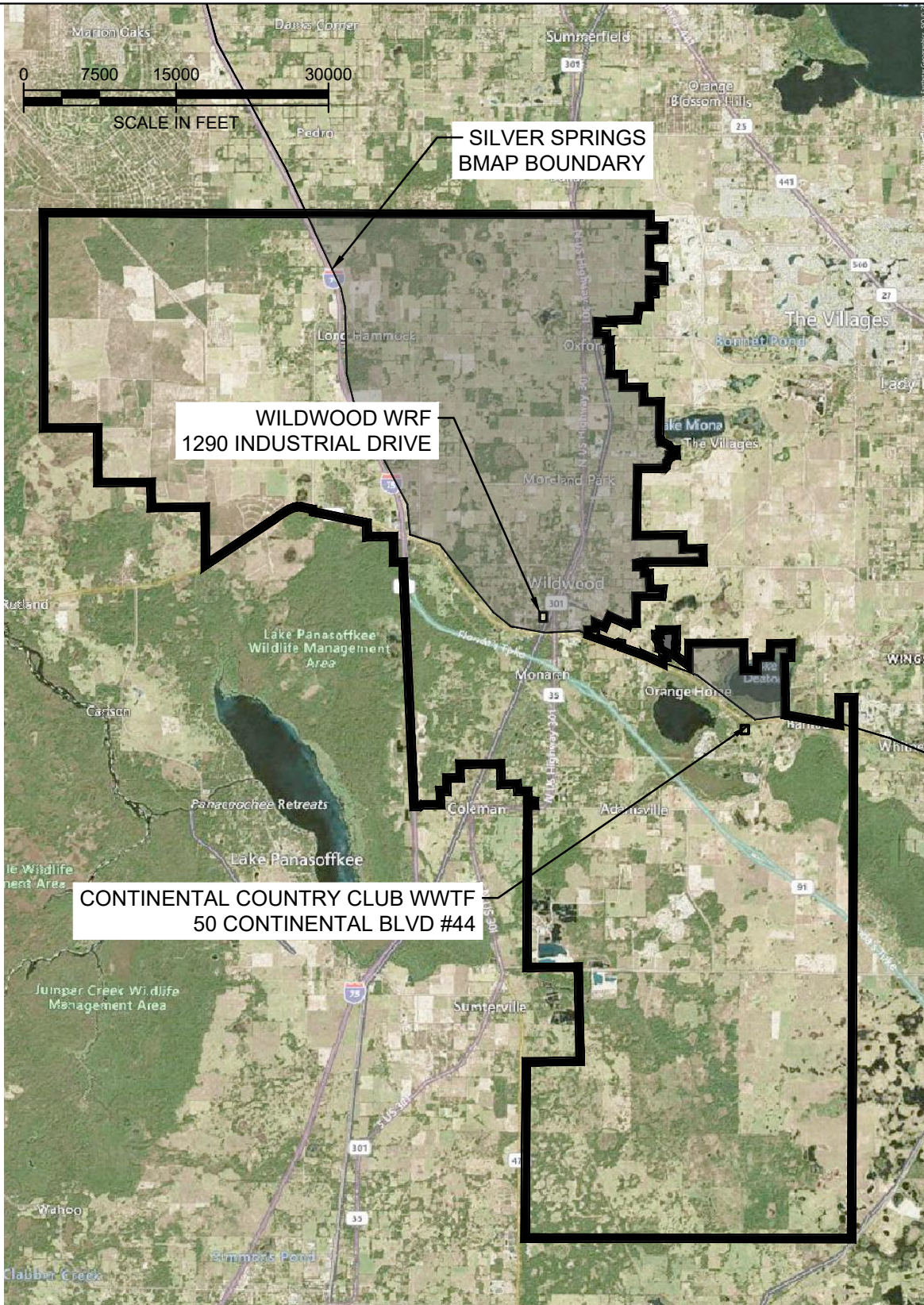
5.1 Implementation Plan Development

The proposed implementation plan includes nearly \$155 million over the next five years in new capital projects to provide additional capacity and enhanced nutrient removal capabilities at the Wildwood WRF while removing the Continental Country Club WWTF from service. The implementation plan was developed in January 2024 based upon information that is currently available. Changes in development patterns, rate of growth, or observed wastewater flow may necessitate changes to the phasing of the improvements. The proposed implementation plan for the City's wastewater treatment plants is presented in **Table 5-1**.

Table 5-1: Proposed Implementation Plan

Year	Project	Current Status
2023	Wildwood WRF Expansion Phase 1A	Complete
2025	Continental Country Club WWTF Decommissioning	In Construction
2025	Wildwood WRF Expansion Phase 2A	Under Design
2026	Wildwood WRF Expansion Phase 1B	Under Design
2027	Wildwood WRF Expansion Phase 1B	Under Design
2028	Wildwood WRF Expansion Phase 2B	Under Design
2029	Wildwood WRF Expansion Phase 3	Under Design

APPENDIX A



902 N. SINCLAIR AVE.
TAVARES, FLORIDA 32778
TEL. (352) 353-8481

CITY OF WILDWOOD CLEAN WATERWAYS ACT

WWTP PLAN
WASTEWATER SERVICE
AREA MAP

PROJECT NO.: 54387.006

ISSUED: 1-5-2024

SCALE: 1"=15,000'

SHEET TITLE: **FIGURE 1-1**



902 N. SINCLAIR AVE.
TAVARES, FLORIDA 32778
TEL. (352) 353-8481

CITY OF WILDWOOD CLEAN WATERWAYS ACT

WWTP SITE PLAN

PROJECT NO.: 54387.006

ISSUED: 1-5-2024

SCALE: 1"=200'

SHEET TITLE: **FIGURE 2-1**