

Capital Improvements Program



FISCAL YEARS 2021-2025



ORANGE WATER AND SEWER AUTHORITY

OWASA is Carrboro-Chapel Hill's not-for-profit public service agency delivering high quality water, reclaimed water, and wastewater services.



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Subject: Capital Improvements Program for Fiscal Years 2021-2025

I am pleased to present the Capital Improvements Program (CIP) for Fiscal Years 2021-2025.

The CIP is the culmination of an annual process of capital needs assessment and prioritization completed as part of OWASA's [Asset Management Program](#). This five-year CIP outlines a \$101 million plan for the community's investment in its water, wastewater, and reclaimed water infrastructure and represents OWASA's commitment to providing high quality and reliable service into the future.

The CIP includes over \$30 million for replacement of 15 miles of aging water mains and other improvements for the water distribution system, \$20 million for the evaluation, rehabilitation, and upsizing of 18 miles of wastewater collection (sewer) mains, \$18 million for rehabilitation work at our water treatment plant (WTP), wastewater treatment plant and wastewater pumping facilities (\$25 million), and water supply reservoirs (\$6 million), along with rehabilitation or replacement of other assets throughout the system which are nearing the end of their useful life. As in prior CIPs, the vast majority of the FY 2021-2025 CIP is dedicated to the rehabilitation of existing infrastructure (roughly 75% for the five-year period), as opposed to system growth (4%), or system enhancements (21%).

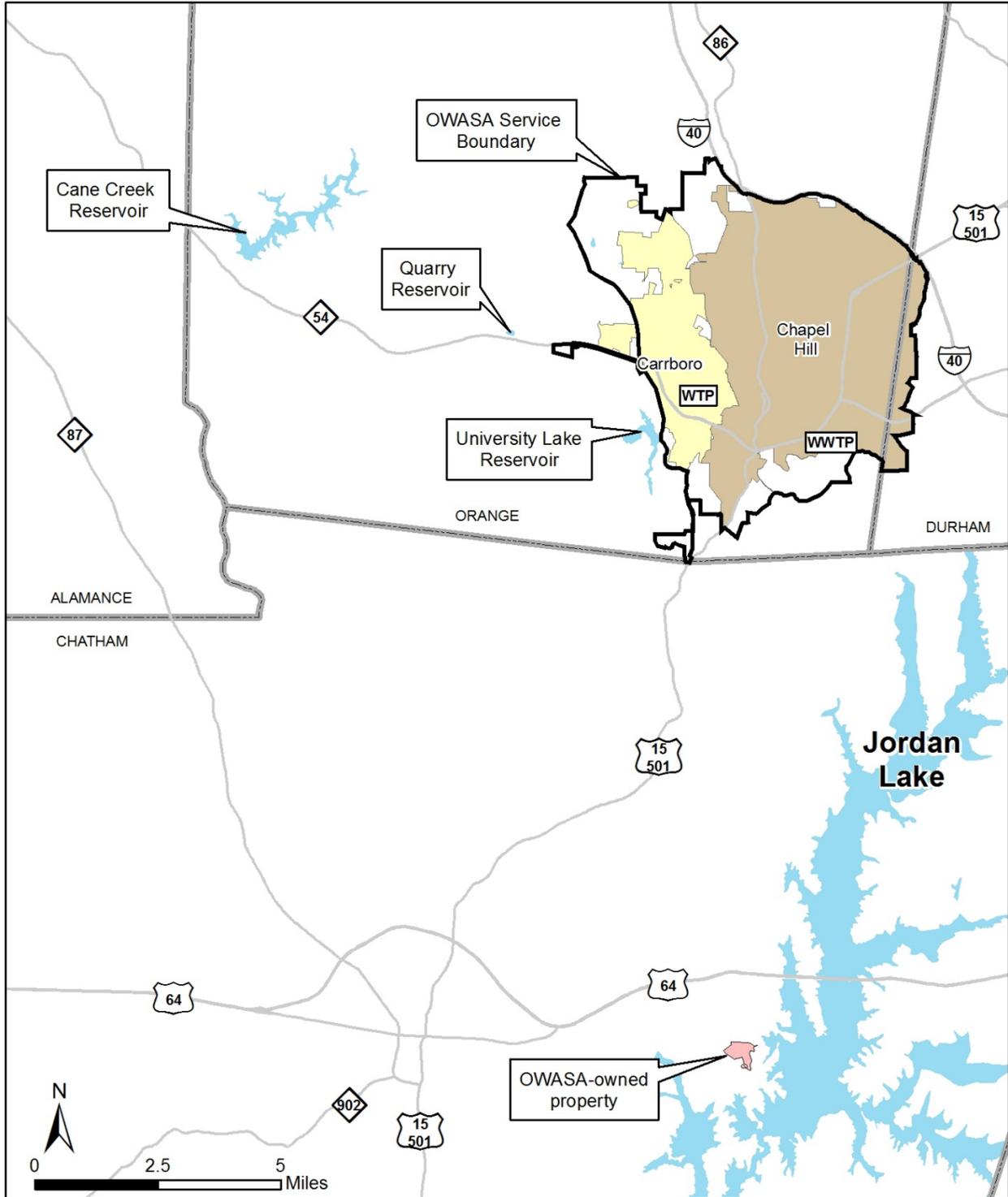
As implied by the subtotals above, renewal of the water distribution system continues to be a major focus of the CIP, and the upcoming years will see major water main replacement projects in construction along Cameron Avenue, Rosemary Street, Manning Drive, and in various neighborhoods throughout the service area. Other notable projects in this CIP include major risk and resiliency improvements to the chemical facilities, electrical distribution system, and water main systems at the WTP.

The CIP also includes funding for various needs assessments and planning efforts used to evaluate asset risks and to determine future capital investments required for the water distribution system, the wastewater collection system, water treatment plant, and the wastewater treatment plant.

We believe that the level of investment presented in this CIP leaves OWASA well-positioned to remain the sustainable, responsible, and environmentally focused organization that our community deserves and has come to expect.

Vishnu Gangadharan, P.E.
Engineering Manager – Capital Projects

Orange Water and Sewer Authority Service Area and Raw Water Supplies



**OWASA Capital Improvements Program
Fiscal Years 2021 - 2025
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Orange Water and Sewer Authority

Capital Improvements Program and Budget

Fiscal Years 2021-2025

Objective

This document summarizes OWASA's long-range Capital Improvements Program (CIP) and Budget for the 5-year period including Fiscal Years (FY) 2021 through 2025. Its objective is to help guide OWASA's efforts to meet the community's evolving needs for sustainable, reliable, and high quality water, wastewater (sewer), and reclaimed water services.

Background

OWASA is a public, non-profit water, wastewater, and reclaimed water agency established in 1977 to serve the Carrboro-Chapel Hill community. OWASA's service area is defined as the Urban Services Area delineated by the *Carrboro-Chapel Hill-Orange County Joint Planning Agreement* and adopted by Orange County and the Towns of Carrboro and Chapel Hill. OWASA provides service to approximately 83,300 residents through about 21,400 customer accounts. OWASA owns and maintains 3 raw water reservoirs, over 14 miles of raw water lines, the Jones Ferry Road Water Treatment Plant (WTP), 383 miles of drinking water lines, 6 drinking water storage tanks, 4 water booster pumping stations, 334 miles of wastewater collection lines (14 miles of this total are pressurized force mains), 21 wastewater pumping stations, the Mason Farm Wastewater Treatment Plant (WWTP), 5 miles of reclaimed water (RCW) lines, over 2,300 fire hydrants, over 13,000 valves, and over 10,900 manholes.

OWASA's current service area population has grown steadily from approximately 15,000 in 1960 to approximately 83,300 today. Utility service needs have increased accordingly and will continue to grow in the future.

Meeting the community's needs requires ongoing rehabilitation and periodic expansion of the water, wastewater, and reclaimed water systems. Carrying out these long-range improvements while maintaining the high level of service expected by OWASA's customers requires a substantial and sustained financial commitment. In addition to the funding requirements for the capital projects outlined in this document, adequate support is needed for annual operating expenses, such as treatment plant chemicals, maintenance, electricity and natural gas, general supplies, and personnel costs. Federal and State standards for drinking water, wastewater, and reclaimed water will likely continue to become even more stringent in the future, resulting in additional capital and operating costs.

Large amounts of energy are required to pump, treat, and deliver drinking water and reclaimed water to OWASA's customers, as well as to collect and treat the community's wastewater. OWASA recognizes the important link between water and energy and is committed to reducing energy use and greenhouse gas emissions associated with its operations. Critical to that effort is prioritizing energy efficiency and sustainability in the CIP. Installation of more efficient pumps and motors, heating and air conditioning systems, lights, and controls are planned for several areas of our operations and incorporated into a number of capital projects. To the extent practical, capital projects are designed to reduce future energy requirements and costs as well as OWASA's carbon footprint. In March 2019, OWASA updated its formal [Energy Management Plan](#) which outlined the use of energy in OWASA facilities and a plan for meeting specific objectives for using energy more efficiently, using renewable energy sources, and reducing our greenhouse gas (GHG) emissions. By reducing overall energy use and increasing the use of renewable

energy sources, the plan will help reduce the demand for water resources, improve environmental impact of OWASA's operations, reduce costs, and improve reliability.

Purpose of Capital Improvements Planning and Budgeting

Capital outlays differ from annual operating expenses. They are typically large in size and irregular in frequency and involve the construction of assets that last for decades. The effects of major capital decisions tend to be longer lasting than annual operating and maintenance decisions and require somewhat different planning and budgeting methods.

OWASA has prepared this CIP in response to those needs. This document includes water, wastewater, and reclaimed water projects anticipated to be needed during the next five years.

The CIP incorporates information and analyses from our [Asset Management Program](#) and other planning efforts. Projects are developed using the Asset Management Program's Rehabilitation and Replacement Forecast Model, hydraulic models and risk prioritization models for both the collection system and distribution system, the [Long Range Water Supply Plan](#), the WWTP hydraulic and treatment capacity study, the WTP and WWTP Reliability and Risk Assessment Evaluation and numerous other planning tools. These projects are then prioritized using a CIP Prioritization Model.

The Capital Improvements Budget (CIB) is the financing component for the program and is a major factor in OWASA's financial management decisions. To a significant extent, the CIB drives OWASA's periodic adjustment of rates and fees and affects the timing and extent of revenue bond initiatives, which enable OWASA to borrow money. Before issuing revenue bonds, OWASA must complete a financial feasibility evaluation, including a five-year projection of revenues, operating and maintenance expenses, debt service payments, and capital expenditures. The CIB is an important element of that analysis.

The preparation and annual update of the CIP/CIB accomplishes several important objectives:

1. It helps plan for the orderly repair and replacement of existing facilities; provides the ability to deal with a broad range of needs as a whole; and develops a balanced long-range program for meeting OWASA's objectives.
2. It helps provide adequate lead time for project planning, regulatory permitting, project design, land acquisition, construction, etc. in order to ensure that the necessary facilities are in place when they are needed.
3. It provides a framework for analyzing a wider range of acceptable (and less costly) alternatives than might otherwise be considered under a narrower and more time-limited evaluation.
4. It provides a long-term perspective for assessing the adequacy of rates and fees and the timing and amount of debt-financing (revenue bond issues, State revolving fund loans, etc.).
5. It provides a framework for identifying, ranking, and executing projects for which the needs are most urgent, thereby minimizing customer inconvenience, project delays, and unnecessary carrying costs, and enabling the targeting of limited funds to the highest priority projects.

Framework

The CIP book is organized into sections that provide descriptive information on OWASA's proposed capital improvements for FY 2021 through 2025. Projects have been grouped along functional lines into the following 11 major categories (numbered 270 through 280) which generally correspond to the overall movement of water through the OWASA system:

- 270 – Raw Water Supply Sources**
- 271 – Raw Water Transmission**
- 272 – Water Treatment Facilities**
- 273 – Drinking Water Pumping**
- 274 – Drinking Water Storage**
- 275 – Drinking Water Transmission and Distribution**
- 276 – Wastewater Collection Lines**
- 277 – Wastewater Pump Stations and Force Mains**
- 278 – Wastewater Treatment and Recycling**
- 279 – Reclaimed Water**
- 280 – Central Office and Operations**

Information within each project category generally is provided as follows: a general description of existing facilities; the need for additional or modified facilities; a summary table showing estimated costs of the suggested improvements; and specific information for each proposed project.

Assumptions

Major facility needs are based on demand forecasts developed in OWASA's [Long-Range Water Supply Plan](#) and subsequent updates. The basic assumptions that underlie these demand forecasts include the following:

1. OWASA's service area, which is defined as the Urban Services Area delineated by the *Carrboro-Chapel Hill-Orange County Joint Planning Agreement*, will remain unchanged.
2. Future demand projections will continue to be based on retail water sales within the Carrboro-Chapel Hill Urban Services Area, as delineated by the Towns of Carrboro and Chapel Hill. Future demands do not anticipate any retail or wholesale delivery outside of this service area.
3. Future demand projections are based on the growth projections developed for the regional Metropolitan Transportation Plan using the CommunityViz model. As part of this process, the Triangle J Council of Governments used the CommunityViz tool to estimate where population and employment growth would occur. Those growth projections included data for 2045 and for build-out conditions, which staff assumed would occur in 2070.
4. The regulatory environment for water and wastewater treatment will remain substantially as it is today.

Capital cost projections assume the continuation of existing OWASA policies; e.g., that OWASA funds will not be used for water/wastewater/reclaimed water extensions into new developments.

Future cost projections are escalated at an annual rate of 5%.

Many long range project needs and cost estimates are based on preliminary analyses that will be further refined in subsequent CIP/CIBs as projects enter the design/construction phase and the scope and cost estimates are refined.

Projected Expenditures

Summary Table 1 presents an overview of the entire five-year planning period and lists the total estimated costs of the capital projects proposed in each of the 11 major categories. Total projected expenditures are approximately \$101 million for the five-year period.

Financing

Guidance for funding the improvements outlined in this document is provided in OWASA's [Financial Management Policy](#). OWASA's capital improvement costs are funded almost exclusively through revenue received from customers: opportunities for Federal or State grants are very limited and are not expected to represent significant or recurring funding sources. Where possible, OWASA pursues grant funding and/or low- or no-interest loans through State and Federal revolving loan and grant programs.

Summary

The development, review, and continuous refinement of the CIP/CIB, as part of the overall planning and budgeting process, contributes significantly to OWASA's ability to take the proactive measures necessary to meet the needs and expectations of its customers today and in the future. While OWASA believes the plans outlined in this comprehensive document represent a prudent, disciplined approach to meeting the goals and objectives of the organization and, more importantly, meeting the expectations of the communities that OWASA serves, CIP planning efforts in the coming years will continue to present significant challenges for OWASA and the water/wastewater utility industry as a whole.

**Orange Water and Sewer Authority
Capital Improvements Program 2021-2025
Summary Table 1**

<u>By Category:</u>		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
270	Raw Water Supply Sources	\$ 220,000	\$ 2,230,000	\$ 760,000	\$ 584,000	\$ 2,528,000	\$6,322,000
271	Raw Water Transmission	\$ 100,000	\$ 25,000	\$ 75,000	\$ -	\$ -	\$200,000
272	Water Treatment Facilities	\$ 3,273,000	\$ 3,759,000	\$ 8,011,000	\$ 1,257,000	\$ 2,097,000	\$18,397,000
273	Drinking Water Pumping	\$ -	\$ -	\$ -	\$ -	\$ -	\$0
274	Drinking Water Storage	\$ -	\$ 100,000	\$ 100,000	\$ -	\$ -	\$200,000
275	Drinking Water Transmission and Distribution	\$ 6,243,000	\$ 8,415,000	\$ 6,755,000	\$ 5,629,000	\$ 3,544,000	\$30,586,000
276	Wastewater Collection	\$ 3,022,000	\$ 2,390,000	\$ 3,125,000	\$ 5,370,000	\$ 6,000,000	\$19,907,000
277	Wastewater Pump Stations and Force Mains	\$ 462,000	\$ 400,000	\$ -	\$ 365,000	\$ 100,000	\$1,327,000
278	Wastewater Treatment and Recycling	\$ 6,924,000	\$ 2,714,000	\$ 1,865,000	\$ 6,451,000	\$ 5,502,000	\$23,456,000
279	Reclaimed Water	\$75,000	\$225,000	\$100,000	\$0	\$0	\$400,000
280	Central Office and Operations	\$0	\$0	\$50,000	\$175,000	\$0	\$225,000
TOTALS		\$20,319,000	\$20,258,000	\$20,841,000	\$19,831,000	\$19,771,000	\$101,020,000

<u>By Funding Source:</u>		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
	Cash	\$13,907,000	\$7,025,000	\$5,669,000	\$4,135,000	\$3,067,000	\$33,803,000
	Potential Bonds/Loans	\$6,412,000	\$13,233,000	\$15,172,000	\$15,696,000	\$16,704,000	\$67,217,000
	Grants	\$0	\$0	\$0	\$0	\$0	\$0
TOTALS		\$20,319,000	\$20,258,000	\$20,841,000	\$19,831,000	\$19,771,000	\$101,020,000

Category 270: Raw Water Supply Sources

Background

Ninety percent of OWASA's water supply originates as rainfall and surface runoff from within Orange County. The remaining ten percent comes from nearby portions of our watersheds in Alamance and Chatham Counties. Because natural streamflow is not sufficient to meet customer demands at all times, OWASA relies on three storage reservoirs to capture and store excess water during periods of higher flow.



Cane Creek Reservoir

Existing Facilities

OWASA's existing raw water supplies are University Lake, Cane Creek Reservoir, and the Quarry Reservoir. OWASA also holds a storage allocation at the B. Everett Jordan Reservoir (Jordan Lake) in Chatham County. OWASA's oldest supply source is University Lake, which was impounded on Morgan Creek in 1932. It is located near Jones Ferry Road adjacent to the western corporate limits of Carrboro. This 212-acre reservoir drains a 30-square mile watershed and has a usable storage capacity of about 450 million gallons (MG). The lake and about 500 acres of adjacent lands are owned by the University of North Carolina (UNC). OWASA is entitled to use University Lake as a water supply source and controls all land within 100 feet of the shoreline through a contractual agreement with UNC.

The 540-acre Cane Creek Reservoir, completed in 1989, is located near NC Highway 54 about 11 miles west of Carrboro and can store approximately 3 billion gallons (BG) of water derived from its 32-square mile drainage area. More than 2,000 acres of surrounding watershed land is either owned by OWASA or protected through conservation easements.

OWASA's third existing water supply source is the Quarry Reservoir, located on NC 54 about 5 miles west of Carrboro in the University Lake watershed. It was acquired in 1979 to supplement raw water supplies during severe droughts or other emergencies. It can be filled with excess water from the Cane Creek Reservoir and currently has a usable storage volume of about 200 MG. OWASA purchased additional land around the quarry in 2000, which it leases to American Stone Company. Approvals were obtained in 2001 to expand the American Stone Company's quarrying operations in the direction of OWASA's Quarry Reservoir. Mining operations will cease by 2030 and the large remaining quarry pit will be available for use as raw water storage, providing a total storage volume of about 2 to 3 BG. Improvements completed in 2007 increased the pumping capacity from the Quarry Reservoir and provide additional operational flexibility for the overall water supply system.

Key findings of OWASA's 2010 Long Range Water Supply Plan (LRWSP) Final Report included the following: (1) OWASA's locally protected water supplies can meet most expected needs for the next 50 years, but it is essential that gains in water efficiency achieved since 2002 be sustained in the future; (2) expanding the Quarry Reservoir is the most cost-effective supply expansion strategy and will provide full local control of a substantial amount of high quality water; (3) Jordan Lake represents an essential "insurance policy" in the event of severe drought or other emergency; and (4) OWASA should develop water

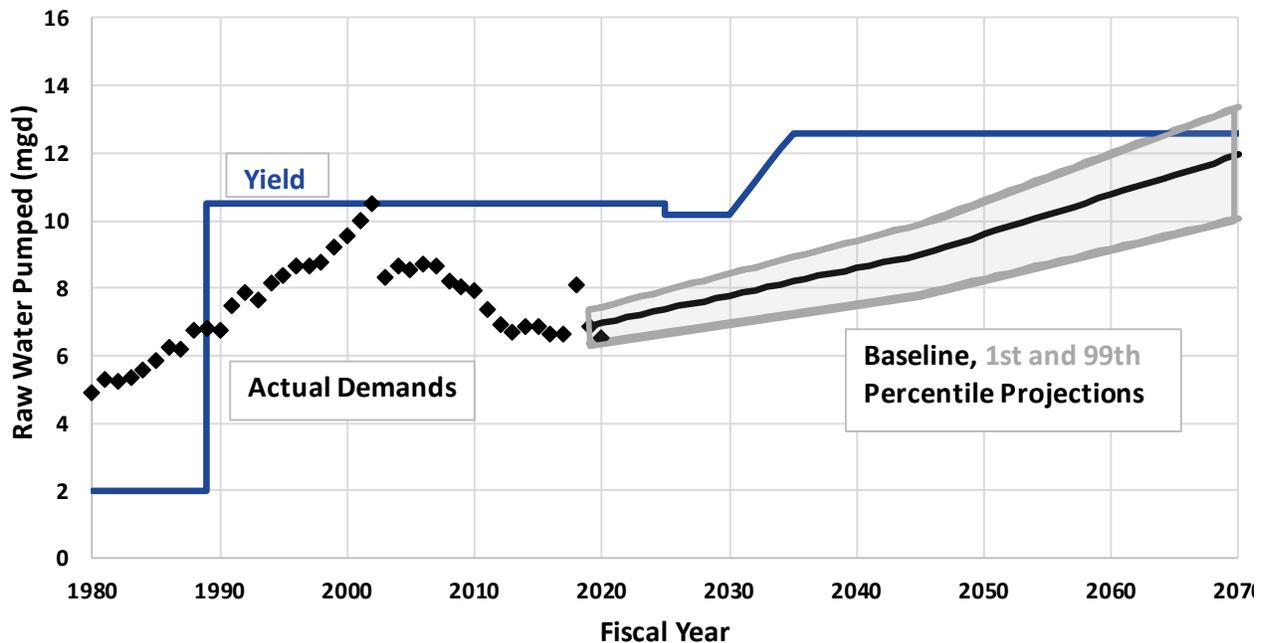
purchase/sale agreements with neighboring utilities that will secure the permanent ability to cost-effectively purchase water under appropriate conditions of supply and demand. OWASA is in the process of updating the LRWSP to ensure a reliable and high quality supply of water for the next 50 years.

Cane Creek Reservoir, University Lake, and the existing Quarry Reservoir receive sufficient streamflow and have enough storage and transmission capacity to support an average yield of approximately 10.5 million gallons per day (MGD) while still retaining an emergency storage reserve of 700 MG (~20% of capacity) under the worst drought of record conditions for OWASA (2001-2002). Expansion of the Quarry Reservoir will eventually provide a total system yield of 12.6 – 15.1 MGD depending on the quarry’s actual excavated volume when mining ends in 2030 and on additional capital improvements that may be needed to fully utilize the expanded storage volume.

Existing interconnections provide the capacity to receive approximately 7 MGD of treated drinking water from the City of Durham and 3 MGD from the Town of Hillsborough, but due to capacity constraints at Hillsborough’s WTP, the transfer ability may be limited to 1 or 1.5 MGD. OWASA also has an interconnection with Chatham County. OWASA can receive approximately 1 mgd through this connection. The combined capacity of our interconnections is about 9.5 mgd, which is about 143 percent of our Fiscal Year 2020 average-day drinking water demands and about 131 percent of our Fiscal Year 2020 water demands including reclaimed water.

OWASA is updating its [Long-Range Water Supply Plan](#) (LRWSP) to ensure we have water to meet our needs through 2070. In March 2019, the OWASA Board of Directors authorized the use of raw water demand projections, which include a range to capture uncertainty in demand projects, as the basis to evaluate water supply and demand management options to meet the community’s water needs. Projections of future demand developed as part of the LRWSP comprise a range of population growth, density, development, and water consumption scenarios that may occur through 2070. The figure below shows the updated raw water demand projections developed as part of that project.

OWASA has Sufficient Raw Water Under Most Conditions for Next 50 Years



The diamond-shaped data points in the figure above represent actual raw water demand since 1980. Because of the significant uncertainty in projecting growth and water demands out 50 years, a range of projections was developed (grey lines). Further information on the methodology is included in this [report](#). The dark blue line indicates the operational yield of OWASA's existing reservoir/quarry system, including the additional yield that will result from a 1.3 BG expansion of Quarry Reservoir storage. This amount is based on the least volume that would be available after 2030 per American Stone Company's minimum production commitment and would be accessible with OWASA's existing pumping facilities; i.e., with little or no need for major capital improvements. As noted above, eventual storage capacity and system yield could be substantially greater depending on the quarry's actual excavated volume in 2030 and on additional capital improvements that may ultimately be needed to fully utilize the expanded storage volume. Yield calculations assume that 20% of usable reservoir storage is held in reserve for extreme (emergency) drought conditions.

OWASA currently holds an allocation of 5% of Jordan Lake's water supply storage capacity, which can provide a yield of about 5 MGD. OWASA's allocation was converted from Level II (long-term future use) to Level I (nearer term use in the event of severe drought or water supply emergency) in March 2013. Although OWASA's goal is to maximize use of the Cane Creek Reservoir/University Lake/expanded Quarry Reservoir system, Jordan Lake represents an important supplemental source for meeting water demands under certain conditions of supply and demand, especially until the expanded Quarry Reservoir is available in the early 2030's.

OWASA and our utility neighbors must address the resiliency of water supply and storage, especially for periods of severe and extended droughts as well as the capacity of our reclaimed water system, which may face higher peak demands. OWASA worked with our utility neighbors through the Jordan Lake Partnership (JLP) to develop the Triangle Regional Water Supply Plan to ensure all Partners have sufficient and reliable water supply through 2070. The JLP also contracted a regional interconnection study to evaluate the interconnection capacity of our drinking water systems and to identify needed infrastructure improvements to meet future needs. In 2018, the JLP was replaced with the Triangle Water Supply Partnership (TWP). The TWP plans to build on the work of the JLP and use the interconnection model to run planning scenarios to identify strategies to improve the region's resiliency to planned and unplanned water supply challenges.

Planned Improvements

The CIP includes \$6.3 million to fund several projects to improve and ensure the long-term viability of the raw water supply system. At University Lake, notable near-term projects will add a chemical facility to address taste and odor concerns ([270-28](#)) and improve the recreational facilities ([270-29](#)). At Cane Creek Reservoir, the CIP provides funds for improvements at the pump station ([270-16](#)), dam ([270-30](#)), and paved surfaces ([270-31](#)).

Planned improvements are listed in the table on the following page.

Category 270: Raw Water Supply Sources

		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
270-04	Jordan Lake Raw Water Supply Allocation	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
270-09	Quarry Reservoir Development	\$15,000	\$15,000	\$15,000	\$15,000	\$65,000	\$125,000
270-11	University Lake Pump Station Improvements	\$80,000	\$0	\$0	\$0	\$0	\$80,000
270-16	Cane Creek Pump Station Improvements	\$0	\$0	\$23,000	\$227,000	\$2,041,000	\$2,291,000
270-22	Reservoir Storage Capacity Surveys	\$0	\$0	\$0	\$0	\$200,000	\$200,000
270-28	University Lake Permanganate Facility	\$0	\$1,943,000	\$0	\$0	\$0	\$1,943,000
270-29	University Lake Fishing Pier and Boat Launch	\$70,000	\$0	\$0	\$0	\$0	\$70,000
270-30	Cane Creek Dam Rehabilitation	\$0	\$50,000	\$500,000	\$0	\$0	\$550,000
270-31	Cane Creek Resurfacing	\$0	\$0	\$0	\$120,000	\$0	\$120,000
270-34	Western Intake Partnership Projects	\$50,000	\$217,000	\$217,000	\$217,000	\$217,000	\$918,000
270	Category Total	\$220,000	\$2,230,000	\$760,000	\$584,000	\$2,528,000	\$6,322,000

270-04 Jordan Lake Raw Water Supply Allocation

Description/Background:

OWASA currently holds an allocation of 5% of Jordan Lake's water supply storage capacity, which can provide a yield of about 5 MGD. OWASA's allocation was converted from Level II (long-term future use) to Level I (nearer term use in the event of severe drought or water supply emergency) in March 2013. Funding is provided for the annual operation and maintenance (O&M) costs associated with this allocation of water supply storage in Jordan Lake. Although OWASA's goal is to maximize use of the Cane Creek Reservoir/University Lake/expanded Quarry Reservoir system, Jordan Lake represents an important supplemental source for meeting water demands under certain conditions of supply and demand, especially until the expanded Quarry Reservoir is available in the early 2030's.

Benefits: increases reliability and reduces operational risk due to water shortages

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000

270-09 Quarry Reservoir Development

Description/Background:

In 2000, OWASA acquired the property north of NC Highway 54 and west of (Old) Bethel-Hickory Grove Church Road on which the American Stone Company's active quarry operations are currently located. The final land acquisition payment was made in FY 2006. Ongoing annual payments of \$15,000 are made to Orange County's "No-fault Well Repair Fund" in compliance with the Special Use Permit conditions under which OWASA will expand the Quarry Reservoir. The payments will end in FY 2030, which is when quarrying operations will cease. Additional funding is included in FY 2025 to conduct a planning study for the Quarry Reservoir expansion.

Benefits: required by permit for future quarry expansion

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$15,000	\$15,000	\$15,000	\$15,000	\$65,000	\$125,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$15,000	\$15,000	\$15,000	\$15,000	\$65,000	\$125,000

270-11 University Lake Pump Station Improvements

Description/Background:

This project includes replacement of the pump station roof and Pump Nos. 1 – 3, which are nearing the end of their useful life. After an FY 2018 planning study which evaluated alternative pump types and combinations, design commenced in FY 2018 for construction of two new horizontal split-case pumps with variable frequency drives (VFD's), other electrical improvements, roof replacement, controls, and mechanical (piping) improvements.

Construction began in late FY 2019 and will continue into early FY 2021.

Benefits: replaces aging assets; reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$75,000	\$0	\$0	\$0	\$0	\$75,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$5,000	\$0	\$0	\$0	\$0	\$5,000
TOTAL	\$80,000	\$0	\$0	\$0	\$0	\$80,000

270-16 Cane Creek Pump Station Improvements

Description/Background:

Funds are included in FY 2023 through FY 2025 for adding automatic generator transfer switchgear, building a permanent enclosure for the generator, and installing variable frequency drives (VFD). Planning and design are funded for FY 2023 and FY 2024, and construction is expected to occur in FY 2025. This work was identified by OWASA maintenance staff.

A related evaluation of the Cane Creek raw water transmission main ([271-05](#)) and any maintenance or replacement work identified by that study will be completed in advance of the pump station improvement project.

Benefits: replaces aging assets; reduces operational risk through safer and faster transfer to backup power; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$20,000	\$0	\$0	\$20,000
Design/Land	\$0	\$0	\$0	\$200,000	\$0	\$200,000
Construction	\$0	\$0	\$0	\$0	\$1,850,000	\$1,850,000
Inspection	\$0	\$0	\$0	\$0	\$93,000	\$93,000
Construction Admin	\$0	\$0	\$0	\$0	\$93,000	\$93,000
Contingency	\$0	\$0	\$3,000	\$27,000	\$205,000	\$235,000
TOTAL	\$0	\$0	\$23,000	\$227,000	\$2,241,000	\$2,291,000

270-22 Reservoir Storage Capacity Surveys

Description/Background:

The objective of this project is to obtain more accurate estimates of OWASA's reservoir storage capacities for use in drought management and water supply planning. As part of a Technical Memorandum (TM) developed for the 2010 Water Supply Plan update, Hazen and Sawyer estimated that the combined storage volume estimates for University Lake, Cane Creek Reservoir, and Stone Quarry Reservoir are accurate to approximately plus or minus 190 MG, or about 5 percent of the system's total storage capacity. The uncertainty is attributable to both the accuracy of the original survey data and subsequent losses in storage volume due to sediment deposition. The TM recommended that OWASA perform bathymetric surveys on each of the storage reservoirs every 10 to 20 years and that a detailed aerial topographic survey be performed on the expanded Quarry Reservoir prior to its impoundment (around 2030). Funding is included in FY 2025 for bathymetric surveys of University Lake and Cane Creek Reservoir.

Benefits: determines asset risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$180,000	\$180,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$20,000	\$20,000
TOTAL	\$0	\$0	\$0	\$0	\$200,000	\$200,000

270-28 University Lake Permanganate Facility

Description/Background:

A FY 2013 study of the existing dry potassium permanganate feed system recommended relocation of the permanent feed system from the WTP to the two raw water reservoirs, Cane Creek Reservoir and University Lake, in order to increase contact times. Furthermore, the study concluded that liquid sodium permanganate feed systems would be more economical and safer than equivalent dry potassium permanganate feed systems. The Cane Creek Reservoir permanganate facility was completed in FY 2018.

Design and permitting of a new permanganate facility at University Lake began in FY 2019 and is expected to be complete in late FY 2020, with construction funded for FY 2022. The new facility will include a chemical storage tank and containment area, a chemical storage and feed building, metering pumps, auxiliary building systems, and associated site, electrical, and piping improvements.

This project has been approved for a low interest loan under the Drinking Water State Revolving Fund program.

Benefits: reduces safety risk; increases reliability and reduces operational risk; increases performance

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$1,605,000	\$0	\$0	\$0	\$1,605,000
Inspection	\$0	\$81,000	\$0	\$0	\$0	\$81,000
Construction Admin	\$0	\$81,000	\$0	\$0	\$0	\$81,000
Contingency	\$0	\$176,000	\$0	\$0	\$0	\$176,000
TOTAL	\$0	\$1,943,000	\$0	\$0	\$0	\$1,943,000

270-29 University Lake Fishing Pier and Boat Launch

Description/Background:

Funding is provided in FY 2021 for the replacement of the existing fishing pier and boat launch dock. Work will be completed by the North Carolina Wildlife Resources Commission (NCWRC), Division of Engineering and Land Management. The new pier and boat launch will allow for greater loading capacity, and will improve the access to these facilities for visitors to University Lake. A similar project was completed by the NCWRC at Cane Creek Reservoir in FY 2015.

Benefits: reduces safety risk, enhances customer experience

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$64,000	\$0	\$0	\$0	\$0	\$64,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$6,000	\$0	\$0	\$0	\$0	\$6,000
TOTAL	\$70,000	\$0	\$0	\$0	\$0	\$70,000

270-30 Cane Creek Dam Rehabilitation

Description/Background:

This project provides for the replacement of joint sealant on the concrete spillway at the Cane Creek Dam as identified by a recent inspection of the dam and adjacent facilities. The need for this project was recommended in the engineer's final report.

Benefits: reduces operational risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$50,000	\$0	\$0	\$0	\$50,000
Construction	\$0	\$0	\$412,000	\$0	\$0	\$412,000
Inspection	\$0	\$0	\$21,000	\$0	\$0	\$21,000
Construction Admin	\$0	\$0	\$21,000	\$0	\$0	\$21,000
Contingency	\$0	\$0	\$46,000	\$0	\$0	\$46,000
TOTAL	\$0	\$50,000	\$500,000	\$0	\$0	\$550,000

270-31 Cane Creek Resurfacing

Description/Background:

This project includes the removal and replacement of the existing asphalt sidewalks and sealcoating of the asphalt access road from Highway 54 to the Cane Creek Reservoir office. The sidewalks have become badly cracked and need to be replaced to ensure the safety of both the public visiting the lake as well as staff. The main entrance road is also showing signs of deterioration with cracking along the length of the road. Sealing the cracks and placing a top sealcoating will extend the useful life of the roadway.

Benefits: reduces safety risk, extends useful life

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$110,000	\$0	\$110,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$10,000	\$0	\$10,000
TOTAL	\$0	\$0	\$0	\$120,000	\$0	\$120,000

270-34 Western Intake Partnership Projects

Description/Background:

OWASA's current allocation of water from Jordan Lake is 5 percent of the water supply pool, which is approximately 5 million gallons per day. The Towns of Cary and Apex currently own and operate the only water supply intake on Jordan Lake. OWASA can currently access its water supply allocation from Jordan Lake by purchasing drinking water from the Town of Cary and wheeling that water through the City of Durham through its mutual aid agreements with both entities. However, these mutual aid agreements do not guarantee OWASA's access to its Jordan Lake allocation.

OWASA has been working with the City of Durham, Chatham County, and Town of Pittsboro to explore a western intake and treatment plant on Jordan Lake and these entities are collectively known as the Western Intake Partners.

OWASA is currently updating its Long-Range Water Supply Plan and will be evaluating various supply and demand management alternatives which include a potential partnership in a new intake and water treatment plant on the west side of Jordan Lake. The OWASA Board of Directors recently approved participation in Memorandum of Agreement for the Western Intake Partnership, which does not obligate OWASA to participate in any future study but keeps options open while the Long-Range Water Supply Plan is being completed. Planning level funds are included in FY 2021 through FY 2025 based on the expected cost of preliminary planning and design for several related projects. Staff will not spend any of these funds without first receiving the Board's approval.

Benefits: reduces water supply risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$50,000	\$217,000	\$217,000	\$217,000	\$217,000	\$918,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$50,000	\$217,000	\$217,000	\$217,000	\$217,000	\$918,000

Category 271: Raw Water Transmission

Background

Water from OWASA's raw water supply storage reservoirs is pumped through transmission mains to the Water Treatment Plant (WTP). These mains, in combination, are sized to carry the maximum daily flow demands in the service area. Where economically feasible, transmission mains are also sized to maximize the available yield from the system and to provide redundant capacity.

Existing Facilities

Raw water is pumped from University Lake to the WTP in Carrboro by three electrically-driven pumps, each with variable frequency drives, and one diesel engine-driven pump, with a combined maximum effective operating capacity of 20 million gallons per day (MGD). Water is conveyed through two separate transmission mains: a 6,000 foot, 20-inch concrete main constructed in 1963 and a 7,000 foot, 42-inch ductile iron pipe (DIP) main built in 2003.

Water is pumped from the Cane Creek Reservoir by two 2-speed pumps, each originally capable of delivering 12 MGD at high speed, and 6 or 8 MGD at low speed. The pumps are not configured to operate simultaneously. Water is pumped through 33,300 feet of 24-inch DIP located along NC 54, where it can be diverted to either the Quarry Reservoir or University Lake via Phil's Creek. An additional 24,500 feet of 30-inch raw water transmission piping, completed in 1991, allows delivery of Cane Creek water directly to the WTP. The actual transmission capacity of the Cane Creek raw water line is 10.7 MGD.

The current Quarry Reservoir configuration provides 200 million gallons of additional storage capacity. The pump station completed in 2007 has a capacity of 4 to 6 MGD, depending on the water level in the quarry. The quarry water is delivered to the WTP through a connection to the Cane Creek raw water transmission main.

Planned Improvements

The CIP includes funding for condition assessments of raw water transmission mains from Cane Creek Reservoir ([271-05](#)) and University Lake Reservoir ([271-06](#)).

Category 271: Raw Water Transmission

		FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
271-05	Cane Creek Raw Water Transmission Main Study	\$100,000	\$0	\$0	\$0	\$0	\$100,000
271-06	University Lake Raw Water Main Assessment	\$0	\$25,000	\$75,000	\$0	\$0	\$100,000
271	Category Total	\$100,000	\$25,000	\$75,000	\$0	\$0	\$200,000

271-05 Cane Creek Raw Water Transmission Main Study

Description/Background:

Funding is provided in FY 2021 to test the friction coefficient in the existing 24-inch diameter raw water main from the Cane Creek Reservoir to the Quarry Reservoir in order to determine if the main needs to be cleaned to restore its carrying capacity. This study will be completed prior to initiation of design on the pump station improvements ([270-16](#)).

Benefits: determines asset risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$95,000	\$0	\$0	\$0	\$0	\$95,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$5,000	\$0	\$0	\$0	\$0	\$5,000
TOTAL	\$100,000	\$0	\$0	\$0	\$0	\$100,000

271-06 University Lake Raw Water Transmission Main Study

Description/Background:

Water from University Lake Reservoir is conveyed to the Jones Ferry Road Water Treatment Plant through two separate transmission mains: a 6,000 foot, 20-inch concrete main constructed in 1963 and a 7,000 foot, 42-inch ductile iron pipe (DIP) main built in 2003. As part of the University Lake Pump Station Improvements (270-11), the sections of these mains closest to the pump station were found to have some organic buildup within the pipes and fittings. Funding is provided in FY 2022 and FY 2023 for a condition assessment of both raw water transmission mains.

Benefits: determines asset risk

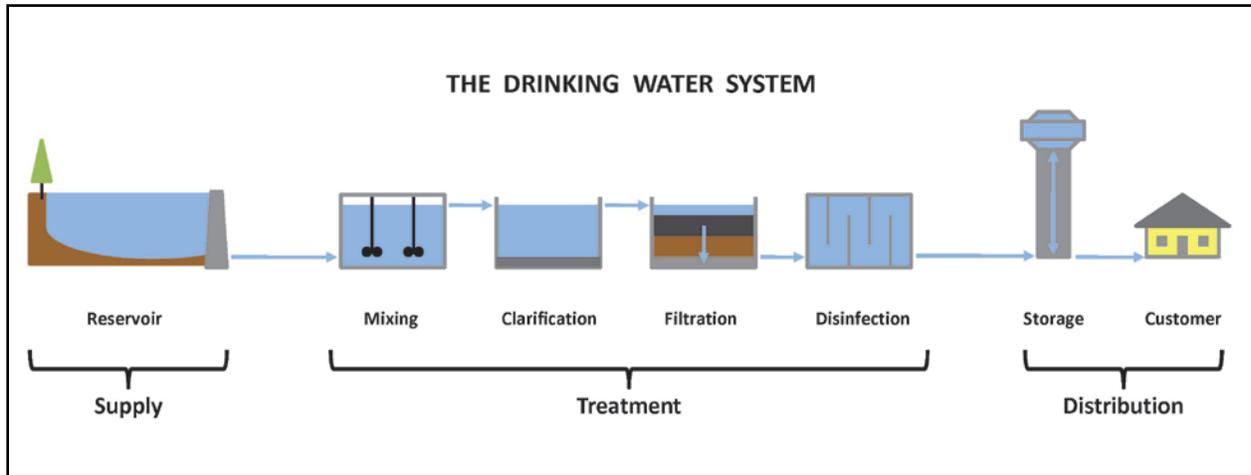
Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$22,000	\$68,000	\$0	\$0	\$90,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$3,000	\$7,000	\$0	\$0	\$10,000
TOTAL	\$0	\$25,000	\$75,000	\$0	\$0	\$100,000

Category 272: Water Treatment Facilities

Background

Raw water withdrawn from OWASA's water supply reservoirs is treated by chemical and physical processes at the Water Treatment Plant (WTP). Unlike our reservoirs, which are sized to meet average daily demand calculated over a year, the WTP must be able to meet the maximum or peak demand on any given day.



Existing Facilities

Water from University Lake, Cane Creek Reservoir, and the Quarry Reservoir is treated at the WTP, which is located on a 17-acre site on Jones Ferry Road in Carrboro. The WTP is configured with a chemical flash mixer followed by two parallel (independent) treatment trains:

1. Conventional coagulation/flocculation chamber followed by five gravity settling basins which can be operated at variable rates with a combined capacity of 10 million gallons per day (MGD).
2. Two upflow clarifiers with a combined capacity of an additional 10 MGD.

The two clarification processes are operated together to meet system demands. Clarified water is further treated through ten dual-media filters with a total surface area of 3,880 square feet. When operated at the permitted filtration rate of 4.0 gallons per square foot per minute the filters have a combined capacity of 22.3 MGD.

Chemicals used in the treatment process include ferric sulfate for coagulation, liquid caustic (sodium hydroxide) for pH control, sodium permanganate and powdered activated carbon for taste and odor control, a blend of orthophosphates and polyphosphates for corrosion control, sodium hypochlorite and ammonia (ammonium sulfate) for chloramine disinfection, and hydrofluosilicic acid for community-wide dental health. The 1.5 million gallon clearwell (underground water reservoir) stores drinking water at the WTP before it is pumped into the distribution system.

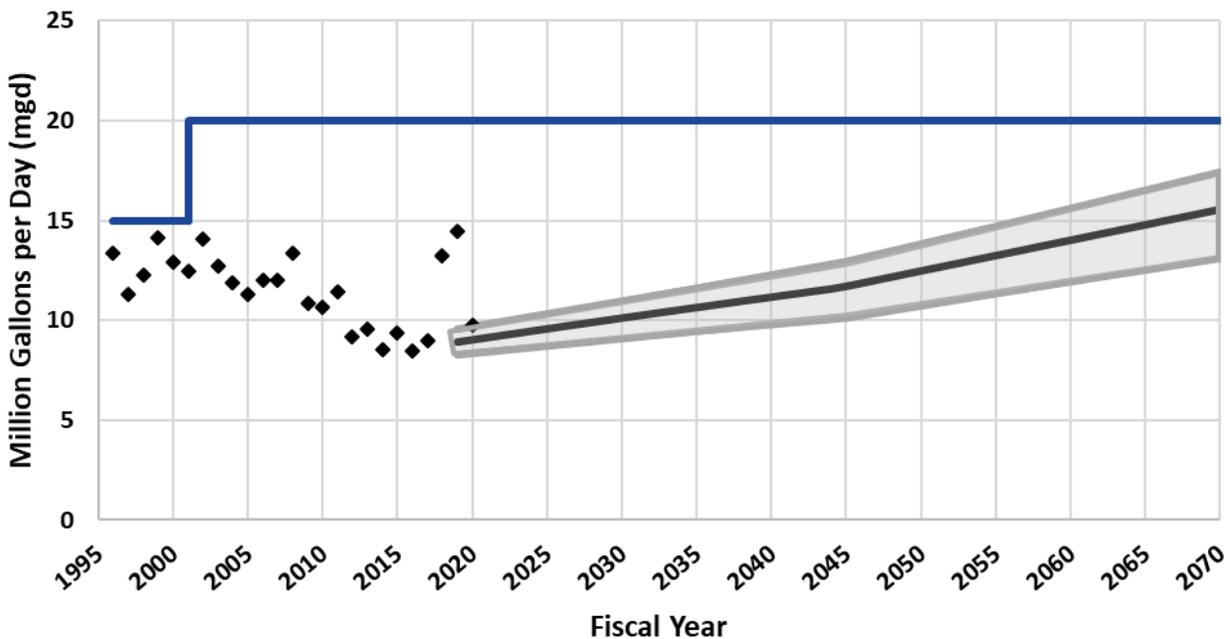
The WTP was originally built in 1948 with a capacity of 3 MGD and was expanded to 5 MGD and 10 MGD in 1963 and 1974, respectively. Upflow clarifiers added in 1990 increased the capacity to 12.5 MGD, and the addition of new filters, solids handling, and chemical feed facilities increased the capacity to 15 MGD in 1995. Curtain baffles were installed in the clearwell in 1999 to improve disinfectant contact time.

Additional solids handling facility improvements were completed in 2001 and increased the ability to support sedimentation solids and filter backwash requirements. Additional backwash storage and treatment facilities, along with the addition of a gravity thickener and a belt filter press provided the capacity to handle solids produced by a 20 MGD plant. This project was followed by a phased series of WTP improvements.

- Phase I improved the filter efficiency and provided new underdrains for the eight existing filters, as well as blowers for air scouring the filters.
- Phase II, completed in 2002, increased the drinking water pumping capacity from 15 to 18 MGD. This project also included installation of an ammonia feed system for chloramine disinfection, a process which decreases the concentration of disinfection byproducts (DBPs), provides more reliable compliance with state and federal DBP limits, and improves drinking water taste.
- Phase III was completed in 2002 and provided two new filters, which increased the total capacity of all 10 filters from 17.3 MGD to 22.3 MGD, thereby increasing the WTP overall “firm” capacity from 18 MGD to its current capacity of 20 MGD.
- Phase IV was completed in 2006 and included the installation of a permanent process water recycling system to enable the reuse of process water from the solids handling system and backwash clarifiers. This state-approved recycling system reduced raw water withdrawals from the reservoirs – and the associated use of electrical energy for raw water pumping – by 6 to 7 percent. Other Phase IV improvements included clearwell and bypass pumping modifications.

Following a fire at the WTP in August 2007, the 2,300-volt Drinking Water Pumps Nos. 1, 2, and 3 were replaced with a single 480-volt, 300 horsepower horizontal split-case pump (Pump No. 7) with a variable frequency drive (VFD). A new 1,000 kilowatt generator was installed in June 2013. Rehabilitation and upgrades were completed in 2014 to the two upflow clarifiers (pulsators) originally installed in 1990.

OWASA has Sufficient Capacity at its WTP for Next 50 Years



In the graph above, the peak-day drinking water demands are shown (black demands for historical demands, black and gray lines for future demands). Since FY 1999, the year with the highest peak day demand under normal operations, peak day drinking water demands have declined by 31 percent despite a 32 percent increase in customer accounts over that same period. Water conservation efforts by OWASA’s

customers, together with the University's use of reclaimed water commencing in 2009, have freed up water supply and treatment capacity to meet future needs, thereby enabling OWASA to substantially defer the need for additional water treatment capacity. (The significant increases in peak day drinking water demands in FY 2018 and FY 2019 are anomalies resulting from: in FY 2018, the provision of water to the City of Durham for an extended period of time; and in FY 2019, the large water main break in front of the WTP on November 5, 2018. Peak-day demands for those two years would be in line with historical amounts if not for those two events.)

Planned Improvements

Planned improvements for this category are shown in the table on the following page, and include a total of \$18.4 million within the five-year period. Notable projects include the upgrades at the WTP to the electrical distribution system ([272-52](#)) and various chemical facilities ([272-46](#)), and concrete rehabilitation of the clearwell ([272-55](#)).

Category 272: Water Treatment Facilities

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
272-10 Water Facility Asset Rehabilitation	\$0	\$50,000	\$0	\$1,257,000	\$1,997,000	\$3,304,000
272-35 WTP Flash Mix Basin Improvements	\$0	\$0	\$0	\$0	\$100,000	\$100,000
272-37 WTP Belt Filter Press Replacement	\$43,000	\$500,000	\$2,471,000	\$0	\$0	\$3,014,000
272-39 Water and Wastewater Facilities Concrete Condition Assessment	\$50,000	\$50,000	\$50,000	\$0	\$0	\$150,000
272-42 WTP Finished Water Pump Improvements	\$550,000	\$338,000	\$0	\$0	\$0	\$888,000
272-46 WTP Chemical Facility Improvements	\$2,200,000	\$1,121,000	\$0	\$0	\$0	\$3,321,000
272-49 WTP and WWTP SCADA Master Plan	\$150,000	\$0	\$0	\$0	\$0	\$150,000
272-51 HVAC Replacement Program	\$130,000	\$400,000	\$100,000	\$0	\$0	\$630,000
272-52 WTP Electrical Distribution Improvements	\$150,000	\$1,000,000	\$4,740,000	\$0	\$0	\$5,890,000
272-53 Rehabilitation of WTP Front Entry	\$0	\$200,000	\$0	\$0	\$0	\$200,000
272-54 Finished Water Pump #6	\$0	\$0	\$250,000	\$0	\$0	\$250,000
272-55 WTP Clearwell Rehab	\$0	\$100,000	\$400,000	\$0	\$0	\$500,000
272 Category Total	\$3,273,000	\$3,759,000	\$8,011,000	\$1,257,000	\$2,097,000	\$18,397,000

272-10 Water Facility Asset Rehabilitation

Description/Background:

CIP 272-10 provides funding for replacement and rehabilitation of the aging components of water supply, treatment, and storage facilities such as the reservoir facilities, WTP, booster pump stations, and storage tanks in order to maintain reliable, efficient performance. Placeholder funding in the fourth and fifth fiscal years of any given five-year CIP assures that capital investment decisions account for asset replacement in future years where specific projects are not yet identified. This is the primary mechanism used to estimate infrastructure replacement needs not only over the five-year CIP, but over a fifteen year financial planning horizon. Funding is based on estimates of remaining life and replacement costs for over 2,100 individual assets (pumps, motors, etc) within this asset class.

Benefits: replaces or extends useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$1,257,000	\$1,997,000	\$3,304,000
TOTAL	\$0	\$0	\$0	\$1,257,000	\$1,997,000	\$3,304,000

272-35 WTP Flash Mix Basin Improvements

Description/Background:

The WTP's two flash mix basins, one for each of the two treatment trains, are where coagulation chemicals are added to the raw water entering the WTP. The basins are designed with the ability to be isolated from each other in order to allow for different chemical dosages, if needed, for each treatment train. The existing valves will need to be replaced because they are malfunctioning such that the flash mix basins cannot be isolated from each other. A planning study completed in FY 2018 recommended timing for the replacement along with additional structural, mechanical, electrical, and instrumentation improvements to this process unit. Funds are included in FY 2025 for the design of the recommended improvements.

BENEFITS: replaces or extends useful life of aging assets, improves operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$90,000	\$90,000
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$10,000	\$10,000
TOTAL	\$0	\$0	\$0	\$0	\$100,000	\$100,000

272-37 WTP Belt Filter Press Replacement

Description/Background:

Belt filter presses (BFP) are used to dewater solids from the treatment process prior to transport to a composting facility for beneficial reuse as a soil amendment. The WTP has two BFP's: BFP No.1 is no longer operational or serviceable and needs to be replaced to ensure reliability and redundancy of this essential treatment plant process. BFP No.2 was rehabilitated in FY 2020.

A FY 2019 planning study evaluated several project options, including alternative dewatering technologies. Recommended improvements include the replacement of BFP No.1, replacement of the solids conveyor system, and installation of new control system improvements. Funds are included in FY 2021 for the completion of design and permitting. Construction is planned to occur in FY 2022 and FY 2023.

This project has been approved for a low interest loan under the Drinking Water State Revolving Fund program.

Benefits: replaces or extends useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$39,000	\$0	\$0	\$0	\$0	\$39,000
Construction	\$0	\$412,000	\$2,041,000	\$0	\$0	\$2,453,000
Inspection	\$0	\$21,000	\$103,000	\$0	\$0	\$124,000
Construction Admin	\$0	\$21,000	\$103,000	\$0	\$0	\$124,000
Contingency	\$4,000	\$46,000	\$224,000	\$0	\$0	\$274,000
TOTAL	\$43,000	\$500,000	\$1,237,000	\$0	\$0	\$3,014,000

272-39 Water and Wastewater Facilities Concrete Condition Assessment

Description/Background:

This project involves a comprehensive and prioritized evaluation of concrete facilities (process tanks/pads, building components, sidewalks, other concrete features) throughout OWASA facilities to establish the extent and type of degradation and remaining service life.

Funds are included for the continuation of condition assessments begun in FY 2018. Funding under this project or separate CIP projects may be added for future years as assessment is completed. For efficiency, both water and wastewater facilities are included in the project; project expenditures related to facilities other than the WTP will be reallocated to the appropriate asset category during project closeout.

Benefits: replaces or extends useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$45,000	\$45,000	\$45,000	\$0	\$0	\$135,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$5,000	\$5,000	\$5,000	\$0	\$0	\$15,000
TOTAL	\$50,000	\$50,000	\$50,000	\$0	\$0	\$150,000

272-42 WTP Finished Water Pump Improvements

Description/Background:

The WTP uses four pumps (Finished Water Pumps Nos. 4 through 7) to send drinking water from the plant into the distribution system. Finished water pumping is the largest consumer of electrical energy at the WTP. Pumps Nos. 4, 6 and 7 utilize variable frequency drives (VFD) and have pumping capacity ranges from 6 to 10 MGD, from 7 to 12 MGD, and from 3 to 7 MGD, respectively. Pump No. 5 does not have a VFD and has a capacity of 10 MGD.

A planning study recommended the installation of a VFD and a more efficient motor for Pump No. 5, replacement of Pump No. 5 internal components, and electrical upgrades. The project was designed and bid in FY 2020, and construction is expected to occur in FY 2021 and FY 2022.

Benefits: replaces and rehabilitates aging assets; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$454,000	\$280,000	\$0	\$0	\$0	\$734,000
Inspection	\$23,000	\$14,000	\$0	\$0	\$0	\$37,000
Construction Admin	\$23,000	\$14,000	\$0	\$0	\$0	\$37,000
Contingency	\$50,000	\$30,000	\$0	\$0	\$0	\$80,000
TOTAL	\$500,000	\$338,000	\$0	\$0	\$0	\$888,000

272-46 WTP Chemical Facility Improvements

Description/Background:

As part of a 2018 Reliability and Risk Evaluation, the evaluation of chemical feed systems at the WTP identified the need to rehabilitate and make improvements to several of the critical systems. Preliminary engineering completed in FY 2020 further refined the scope of the improvements to include:

- Improvements to the current bulk storage chemical area
- a new bulk storage area for ferric sulfate
- caustic feed system reliability and efficiency improvements
- sodium hypochlorite feed system reliability improvements
- ammonia feed system improvements
- powdered activated carbon system improvements
- eyewash and safety shower improvements
- temporary chemical feed station installation for future backup and resiliency, and
- miscellaneous site, electrical, and instrumentation improvements.

Funds are included for design and start of construction in FY 2021, with construction completion in FY 2022.

Benefits: increases operational efficiency; reduces operational risk; replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$1,818,000	\$925,000	\$0	\$0	\$0	\$2,743,000
Inspection	\$91,000	\$47,000	\$0	\$0	\$0	\$138,000
Construction Admin	\$91,000	\$47,000	\$0	\$0	\$0	\$138,000
Contingency	\$200,000	\$102,000	\$0	\$0	\$0	\$302,000
TOTAL	\$2,200,000	\$1,121,000	\$0	\$0	\$0	\$3,321,000

272-49 WTP and WWTP SCADA Master Plan

Description/Background:

This project will evaluate the entire SCADA (Supervisory Control and Data Acquisition) system at the WTP and other water facilities to identify deficiencies, potential improvements, and the development of a phased master plan to ensure optimal performance.

FY 2021 funds are included to assess the current condition and functionality of the WTP SCADA system components including:

- Programmable Logic Controller (PLC) hardware, software, and cabinets
- SCADA software and servers
- Ethernet switches
- Control philosophies
- Reports
- Alarm management
- Energy management

Benefits: identifies capital projects; reduces operational risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$135,000	\$0	\$0	\$0	\$0	\$135,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$15,000	\$0	\$0	\$0	\$0	\$15,000
TOTAL	\$150,000	\$0	\$0	\$0	\$0	\$150,000

272-51 HVAC Replacement Program

Description/Background:

An assessment conducted through the Energy Management Program recommended the replacement of aging, inefficient HVAC units with more efficient units once they have reached the end of their rated life. The project provides scheduled funding for the replacement of identified HVAC units which are over the rated service life (typically 15 years) with units rated at or above 15 SEER (seasonal energy efficiency ratio). Existing units identified for replacement are listed below:

<u>Unit Location</u>	<u>Potential Energy Savings</u>
Warehouse Office	1,000 kWh/year
WWTP Lab	27,000 kWh/year
WWTP Filter Building	24,000 kWh/year

For efficiency, both water and wastewater facilities are included in the project; project expenditures related to facilities other than the WTP will be reallocated to the appropriate asset category during project closeout.

In addition, funds are included in FY 2021 for replacement of outdated HVAC control systems at the Operation Center and WTP Administration building at Jones Ferry Road. The new control systems will provide staff the ability to remotely monitor, adjust, and troubleshoot HVAC operations.

Benefits: reduces energy use, replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$120,000	\$350,000	\$90,000	\$0	\$0	\$560,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$10,000	\$50,000	\$10,000	\$0	\$0	\$70,000
TOTAL	\$130,000	\$400,000	\$100,000	\$0	\$0	\$630,000

272-52 WTP Electrical Distribution Improvements

Description/Background:

The 2018 Risk and Reliability Study identified a high priority need to convert the remainder of plant electrical distribution system to an updated voltage standard (a majority of the system already uses the updated standard) and to provide closed transition transfer capabilities for both generators.

The improvements planned under [CIP 272-42](#) will switch over the last equipment unit operating on the outdated standard; however, substantial improvements within the distribution system are needed to minimize failure risks during loss of utility power and other failure scenarios. Design commenced in FY 2020 and is expected to be complete in FY 2021. Construction is currently funded for FY 2022 and FY 2023.

Benefits: reduces operational risk; reduces safety risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$135,000	\$0	\$0	\$0	\$0	\$135,000
Construction	\$0	\$825,000	\$3,917,000	\$0	\$0	\$4,742,000
Inspection	\$0	\$42,000	\$196,000	\$0	\$0	\$238,000
Construction Admin	\$0	\$42,000	\$196,000	\$0	\$0	\$238,000
Contingency	\$15,000	\$91,000	\$431,000	\$0	\$0	\$537,000
TOTAL	\$150,000	\$1,000,000	\$4,740,000	\$0	\$0	\$5,890,000

272-53 Repair/Rehabilitation of WTP Front Entry

Description/Background:

Design was completed in FY 2020 for improvements to the deteriorating brick façade and staircase support walls at the entrance to the WTP. Construction of the improvements is funded for completion in FY 2022.

Benefits: replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$163,000	\$0	\$0	\$0	\$163,000
Inspection	\$0	\$9,000	\$0	\$0	\$0	\$9,000
Construction Admin	\$0	\$9,000	\$0	\$0	\$0	\$9,000
Contingency	\$0	\$19,000	\$0	\$0	\$0	\$19,000
TOTAL	\$0	\$200,000	\$0	\$0	\$0	\$200,000

272-54 Finished Water Pump #6 Improvements

Description/Background:

The WTP uses four pumps (Finished Water Pumps Nos. 4 through 7) to send drinking water from the plant into the distribution system. Finished water pumping is the largest consumer of electrical energy at the WTP. Pumps Nos. 4, 6 and 7 utilize variable frequency drives (VFD) and have pumping capacity ranges from 6 to 10 MGD, from 7 to 12 MGD, and from 3 to 7 MGD, respectively. A VFD is being installed on Pump No. 5 as part of an ongoing project ([272-42](#)).

The existing VFD for Finished Water Pump No. 6 was installed in 2000. Repair parts for the unit are becoming increasingly difficult to obtain, and recent maintenance problems indicate the need for near-term replacement. Funds are included in FY 2023 for this replacement.

Benefits: replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$200,000	\$0	\$0	\$200,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$50,000	\$0	\$0	\$50,000
TOTAL	\$0	\$0	\$250,000	\$0	\$0	\$250,000

272-55 Clearwell Rehabilitation

Description/Background:

An inspection completed in FY 2020 determined that the concrete walls of the structure were in overall good condition, and identified some areas of spalling and cracking within the concrete roof requiring repair. Design is funded for FY 2022 with construction occurring the following fiscal year. Rehabilitation of the clearwell roof is programmed to occur prior to the installation of a rooftop solar photovoltaic system (not included in this project).

Benefits: extends service life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$90,000	\$0	\$0	\$0	\$90,000
Construction	\$0	\$0	\$329,000	\$0	\$0	\$329,000
Inspection	\$0	\$0	\$17,000	\$0	\$0	\$17,000
Construction Admin	\$0	\$0	\$17,000	\$0	\$0	\$17,000
Contingency	\$0	\$10,000	\$37,000	\$0	\$0	\$47,000
TOTAL	\$0	\$100,000	\$400,000	\$0	\$0	\$500,000

Category 273: Drinking Water Pumping

Background

Following treatment at the Water Treatment Plant (WTP), drinking water must be pumped into OWASA's distribution system for delivery to and use by our customers. The WTP is located at an elevation of 470 feet above mean sea level (MSL); however, many parts of our service area are located at higher elevations. To maintain adequate water pressure throughout the service area, drinking water must be pumped up into elevated storage tanks, where it then flows by gravity to our customers. The topography of our service area varies widely; therefore, we have divided our distribution system into areas of similar elevation and therefore pressures. These areas are called "pressure zones." Most of the distribution system is in the 642-foot pressure zone (the maximum water storage level in elevated tanks is set at 642 feet MSL). The north-central and northwestern portions of OWASA's distribution system are in the 740-foot pressure zone (the maximum storage level in elevated tanks is set at 740 feet MSL).



I-40 Booster Pump Station

The pumping capacity needed for water distribution is based on peak daily and hourly demands, plus requirements for fire protection. In order to provide uninterrupted service during equipment outages, pumps are sized and configured to satisfy maximum demands with the largest pump at each particular location out of service.

To ensure the reliability of drinking water service to the community, OWASA maintains water system interconnections with the City of Durham, the Town of Hillsborough, and the Chatham County water systems. We have booster pump stations at several of our interconnections to ensure adequate flow and pressure during periods of water transfers.

(Please note that this section of the CIP does not address the drinking water pumps located at the WTP, which are discussed in Category 272.)

Existing Facilities

OWASA's pump station at the base of the 740-foot zone elevated tank on Nunn Mountain contains two pumps rated at 3 million gallons per day (MGD) to transfer water from the 642-foot pressure zone ground level storage tank on Nunn Mountain up to the adjacent 740-foot pressure zone elevated tank.

A drinking water booster pump station was added in 1987 to the 16-inch water main along Old NC 86 at the intersection of Old Fayetteville Road and Hillsborough Road south of Calvander.

In FY 2003, OWASA completed a hydraulic study that evaluated the existing and potential capability to transfer drinking water from the City of Durham to OWASA through the two existing interconnections with the Durham system. Transfers of drinking water may occur either under planned or emergency conditions, when OWASA supply, treatment, and/or distribution facilities cannot meet drinking water demands within

the service area.

In accordance with the study recommendations, OWASA replaced the existing booster pump station at Old Chapel Hill Road and I-40; removed the Cooper Street and Ephesus Church Road pump stations in FY 2008; and installed a new 16-inch diameter water transmission line along Old Durham Road. Together, these improvements have resulted in an increased transfer capacity from approximately 3.5 MGD to approximately 7 MGD. In December 2012 and January 2013, OWASA participated with Durham in a coordinated full-scale field test to confirm the two-way water transfer capacities of the existing OWASA-Durham interconnections.

The second pump station is located along NC Highway 54 at Finley Golf Course Road (see Planned Improvements below).

Detailed hydraulic studies of the 740-foot and 642-foot pressure zones were completed in FY 2006 and FY 2011. FY 2006 study results were incorporated into the FY 2011 study, which provided a calibrated system-wide hydraulic model. The FY 2011 study confirmed that upgrades would be needed at the Calvander Pump Station by FY 2021 to meet projected future water demands in the 740-foot pressure zone.

A subsequent study and modeling effort identified system improvements needed to enable us to temporarily take the Nunn Mountain ground and elevated storage tanks off-line for maintenance. In accordance with the study recommendations, improvements to the Calvander Pump Station were completed in FY 2014. That project satisfied the Nunn Mountain tank’s maintenance needs and the hydraulic needs identified in the FY 2011 study. No other capital improvements to the drinking water pumping system were identified by the study.

Planned Improvements

A 2002 interconnection capacity study recommended the installation of a new booster pump station at Barbee Chapel Road to replace the station at NC Highway 54 and Finley Golf Course Road, as well as accompanying transmission line improvements along Stancell Drive. Those improvements are expected to increase the total drinking water transfer capacity from Durham to OWASA to approximately 8.5 MGD.

No funding is provided within Category 273, as the need, timing, and scope of the above project will be evaluated as part of the update to the distribution system hydraulic model ([275-53](#)).

Category 273: Drinking Water Pumping

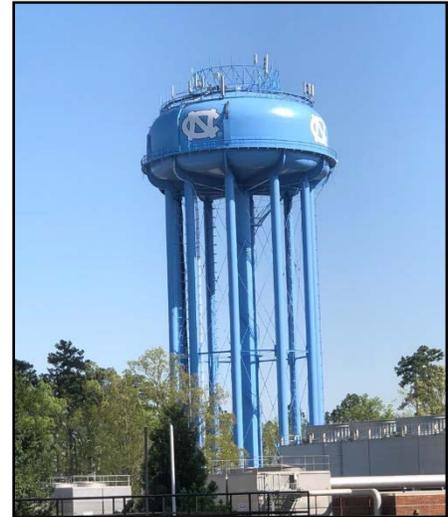
	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
273 Category Total	\$0	\$0	\$0	\$0	\$0	\$0

Category 274: Drinking Water Storage

Background

An essential component of the drinking water distribution system is the capacity to store drinking water to maintain adequate flows and pressure throughout the system during all demand conditions. By absorbing or "dampening" short-term variations in demand, drinking water storage provides important system-wide benefits, including:

- the ability to operate the water treatment plant (WTP) and pumping facilities at more stable and uniform rates. Among other benefits, this helps optimize facility operations and reduce energy costs;
- the ability to maintain adequate and uniform pressure throughout the system during periods of peak demand; and
- the availability of adequate emergency reserves for contingencies such as fire suppression, water treatment plant maintenance, or water main breaks.



Manning Drive Elevated Storage Tank

Drinking water storage facilities typically include clearwells, ground level tanks, and elevated tanks. Clearwells are usually located at a WTP and are sized to help maintain relatively constant production of treated water and to provide sufficient contact time for disinfection. Ground storage tanks are built at ground level, oftentimes at higher elevations than the surrounding service area. After it is pumped into ground storage tanks, drinking water often is available by gravity flow without the need for re-pumping. Elevated storage tanks are used when natural elevations are not high enough for ground storage to provide for gravity flow. Both types of storage help maintain stable flow and operating pressures throughout the distribution system.

State of North Carolina regulations require that the combined elevated and ground storage capacity meet at least 50 percent of the average annual daily demand of the service area. OWASA's existing drinking water storage facilities have a total capacity of 8 million gallons (MG). OWASA's system storage exceeds the State requirement, as average daily drinking water demand (finished water pumped to the distribution system) in calendar year 2019 was only about 6.7 million gallons per day (MGD).

Existing Facilities

OWASA's existing facilities include the 1.5 MG underground clearwell at the WTP and five storage tanks located throughout the distribution system in Chapel Hill and Carrboro.

- A 3 MG ground level tank with an overflow elevation of 642 feet above mean sea level (MSL) was built in 1977 on OWASA's 27-acre tract at Nunn Mountain.
- A 0.5 MG elevated tank with an overflow of 740 feet MSL was built at the Nunn Mountain site in 1984, which enabled the establishment of the 740-foot pressure zone to improve water pressure in the northern portion of the service area.

- An elevated tank on Manning Drive near the University of North Carolina (UNC) Hospitals provides 1 MG of storage capacity. This tank was built in 1957 with an overflow elevation of 642 feet MSL.
- A fourth tank, built in 1976 and located off of Old Fayetteville Road south of Hillsborough Road near McDougle School in Carrboro, provides 0.5 MG of storage at an elevation of 642 feet MSL.
- A fifth tank, located on OWASA’s 17-acre parcel near McCauley Street (Hilltop Tank), was built in 1998 and provides 1.5 MG of storage in the 642-foot pressure zone.

This information is summarized in the following table:

Tanks	Size (MG)	Pressure Zone (ft)
1. Clearwell at Water Plant	1.5	-----
2. Nunn Mountain Ground Storage Tank	3.0	642
3. Nunn Mountain Elevated Tank	0.5	740
4. Carrboro Elevated Tank	0.5	642
5. Hilltop Elevated Tank	1.5	642
6. Manning Drive Tank	1.0	642
Total Storage	8.0	

Planned Improvements

Funding is included for the installation of water quality monitors at all storage tanks and upgrades to control systems at the Hilltop, Manning, and Carrboro storage tanks.

Category 274: Drinking Water Storage						
	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
274-14 Storage Tank Water Quality Monitors	\$0	\$0	\$100,000	\$0	\$0	\$100,000
274-15 Storage Tank PLC Upgrades	\$0	\$100,000	\$0	\$0	\$0	\$100,000
274 Category Total	\$0	\$100,000	\$100,000	\$0	\$0	\$200,000

274-14 Storage Tank Water Quality Monitors

Description/Background:

This project will provide real time, continuous water quality monitoring and incident detection at water storage tanks, and will also help to optimize operations and support Partnership for Safe Water goals. Communication upgrades will also allow for additional site security improvements.

Funding is provided FY 2023 for Programmable Logic Controller (PLC) improvements, programming, and installation of water quality monitors at all tank sites. Some PLC improvements may be completed as part of [272-15](#).

Benefits: reduces operational risk, increases operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$90,000	\$0	\$0	\$90,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$10,000	\$0	\$0	\$10,000
TOTAL	\$0	\$0	\$100,000	\$0	\$0	\$100,000

274-15 Storage Tank Controls Improvements

Description/Background:

The Hilltop, Manning, and Carrboro elevated water storage tanks currently utilize outdated and obsolete communications equipment. This project will install new Programmable Logic Controller (PLC) cabinets at each of these tank sites and convert to cellular communications for standardization and increased data transmission capacity. Funds are included in FY 2022 for these installations.

Benefits: replaces aging assets; increases operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$90,000	\$0	\$0	\$0	\$90,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$10,000	\$0	\$0	\$0	\$10,000
TOTAL	\$0	\$100,000	\$0	\$0	\$0	\$100,000

Category 275: Drinking Water Transmission and Distribution

Background

The drinking water transmission and distribution system is designed to deliver an adequate volume of high quality water at sufficient pressures to meet all demands of the service area, including adequate flows for fire protection.

Existing Facilities

OWASA's drinking water is distributed through approximately 383 miles of water mains and lines ranging from 2 to 24 inches in diameter. Various pipe materials have been used over the years, including cast-iron (CI), ductile iron (DI), polyvinyl chloride (PVC), galvanized steel, copper, and asbestos-cement (AC). The distribution system also includes about 2,300 fire hydrants and over 13,000 valves.

Since beginning operations in 1977, OWASA has utilized a systematic replacement program for aging water distribution mains. Under this program, projects are identified or triggered by the following conditions:

- where existing pipe conditions impair water quality;
- where there are serious risks to water service reliability;
- where the costs of repairing pipes and leaks have become excessive;
- where line breaks may result in major damage; and
- where capacity is no longer adequate.

OWASA catalogs the risk conditions listed above using the following three sources: a system hydraulic model, a risk-based pipe prioritization model:

- In 2011, a hydraulic model of the water distribution system was developed to identify and prioritize any areas of capacity and/or pressure concerns that need to be addressed in OWASA's water system through 2030. It determined that OWASA's distribution system has relatively few hydraulic deficiencies, and that near term investment requirements are not significant.
- In 2020, as part of a comprehensive Distribution System Management Plan Update, OWASA updated its detailed distribution system prioritization model, which systematically evaluates and prioritizes water mains for replacement. This model relies on a statistical analysis of historical breaks to define pipe deterioration drivers for water main failures and determine potential failure patterns. The detailed understanding of failure patterns was combined with criteria regarding



Paving over the water main installation at night in South Estes Drive

the consequence of specific main failures to develop the risk prioritization framework to guide decisions on replacement projects

Recent Improvements

An average of 1.9 miles per year of new or replacement water mains have been installed over the past 10 years. This total does not include new or replacement water mains installed as “system development” projects. (System development projects are those that are not paid for and completed by OWASA or its contractors.)

Planned Improvements

The CIP includes \$30.6 million within this category for improvements to increase the reliability of the water system and to ensure a sufficient water supply at adequate pressure to areas undergoing development. This total is nearly one-third of the entire five-year CIP funding, and reflects a continued emphasis on addressing this asset class.

OWASA continues to seek opportunities to work with the North Carolina Department of Transportation (NCDOT), the Town of Chapel Hill, and the Town of Carrboro to replace water mains in conjunction with roadway construction and other planned public and private improvement projects. This approach, funded under [CIP 275-15](#) helps minimize disturbances in local neighborhoods and reduces project costs through economies of scale.

OWASA crews and private contractors will replace 15 miles of aging water mains (or just under 4% of the system) in the five-year period through the projects funded in this category, including some notable projects at West Rosemary Street ([275-95](#)), Legion Road ([275-94](#)), West Cameron Avenue ([275-52](#)), Oakwood-Rogerson Drive neighborhood and Scarlett-Copper neighborhood (both part of [275-21](#)) The resiliency improvements to the water mains at the Jones Ferry Road WTP are funded as part of [275-92](#).

The update to the Distribution System Hydraulic Model ([275-53](#)), in conjunction with updated projections of future demand conditions as part of the [Long Range Water Supply Plan](#) Update, will identify any recommended improvements to improve hydraulic conditions within the system.

In addition, as a result of the recently completed Distribution System Management Plan Update, the CIP now includes funding for condition assessment activities ([275-99](#)) to support a comprehensive and risk-based approach to the long-term management of this asset class.

Category 275: Drinking Water Transmission and Distribution

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
275-15 Reimbursement for Distribution System Improvements	\$204,000	\$1,001,000	\$0	\$0	\$0	\$1,205,000
275-20 Water Distribution System Rehabilitation	\$465,000	\$1,347,000	\$768,000	\$1,319,000	\$1,450,000	\$5,349,000
275-21 Water Main Replacement Program FY 2018-2023	\$759,000	\$2,000,000	\$2,801,000	\$0	\$0	\$5,560,000
275-46 Dobbins Drive Water Main Replacement	\$312,000	\$0	\$0	\$0	\$0	\$312,000
275-52 West Cameron Avenue Water Main Replacement	\$1,085,000	\$2,292,000	\$0	\$0	\$0	\$3,377,000
275-53 Distribution System Hydraulic Model	\$30,000	\$230,000	\$230,000	\$30,000	\$30,000	\$550,000
275-88 Kensington Drive Water Main Replacement	\$1,453,000	\$0	\$0	\$0	\$0	\$1,453,000
275-91 MLK Boulevard Water Main Abandonment	\$0	\$0	\$0	\$100,000	\$300,000	\$400,000
275-92 Jones Ferry Rd Water Main Replacements	\$1,500,000	\$1,155,000	\$0	\$0	\$0	\$2,655,000
275-93 Bolinwood Bridge Water Main Replacement	\$250,000	\$0	\$0	\$0	\$0	\$250,000
275-94 Legion Road Water Main	\$25,000	\$200,000	\$2,319,000	\$0	\$0	\$2,544,000
275-95 West Rosemary Water Main Replacement	\$0	\$50,000	\$222,000	\$1,600,000	\$0	\$1,872,000
275-96 Water Main Replacements - Group II	\$60,000	\$40,000	\$140,000	\$2,230,000	\$1,300,000	\$3,770,000
275-99 Distribution System Condition Assessment Program	\$100,000	\$100,000	\$275,000	\$350,000	\$464,000	\$1,289,000
275 Category Total	\$6,243,000	\$8,415,000	\$6,755,000	\$5,629,000	\$3,544,000	\$30,586,000

275-15 Reimbursement for Distribution System Improvements

Description/Background:

Funds are allocated in this project to reimburse other entities (NCDOT, Town of Chapel Hill, Town of Carrboro, private developers) for constructing improvements to the distribution system at OWASA’s request in conjunction with external projects. The improvements consist of upgrading pipe materials, increasing the water main size, extending the limits of replacement, etc. above and beyond the requirements of the external project. Installation is accomplished through construction by the other party, and OWASA reimburses the incremental cost per the terms of negotiated agreements. Many of the agreements listed are still being negotiated, and the anticipated scope and timing of funds is based on information available at time of budget development.

Anticipated project funding:

<u>Location</u>	<u>Project Owner</u>	<u>System Improvements</u>
Estes Drive at North Greensboro Street	NCDOT	Water system improvements
Mt Carmel Church Road roundabout B5854	NCDOT	Water system improvements
Fordham Apartments	RRPIV	Water main installation
Elliott Road Extension	Town of Chapel Hill	Water main and sewer main installations and upsizing
Old Durham Chapel Hill Road Improvements	NCDOT	Water main upsizing
Park Apartments (Ephesus Road to Fordham Blvd)	Park Apartments	Water main upsizing

Benefits: replaces aging assets, increases operational reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$204,000	\$1,001,000	\$0	\$0	\$0	\$1,205,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$204,000	\$1,001,000	\$0	\$0	\$0	\$1,205,000

275-20 Water Distribution System Rehabilitation

Description/Background:

This line item consists of ongoing water main, isolation valve, and meter vault replacement projects, as well as long term funding for distribution system recapitalization purposes. CIP 275-20 is composed of the following three elements:

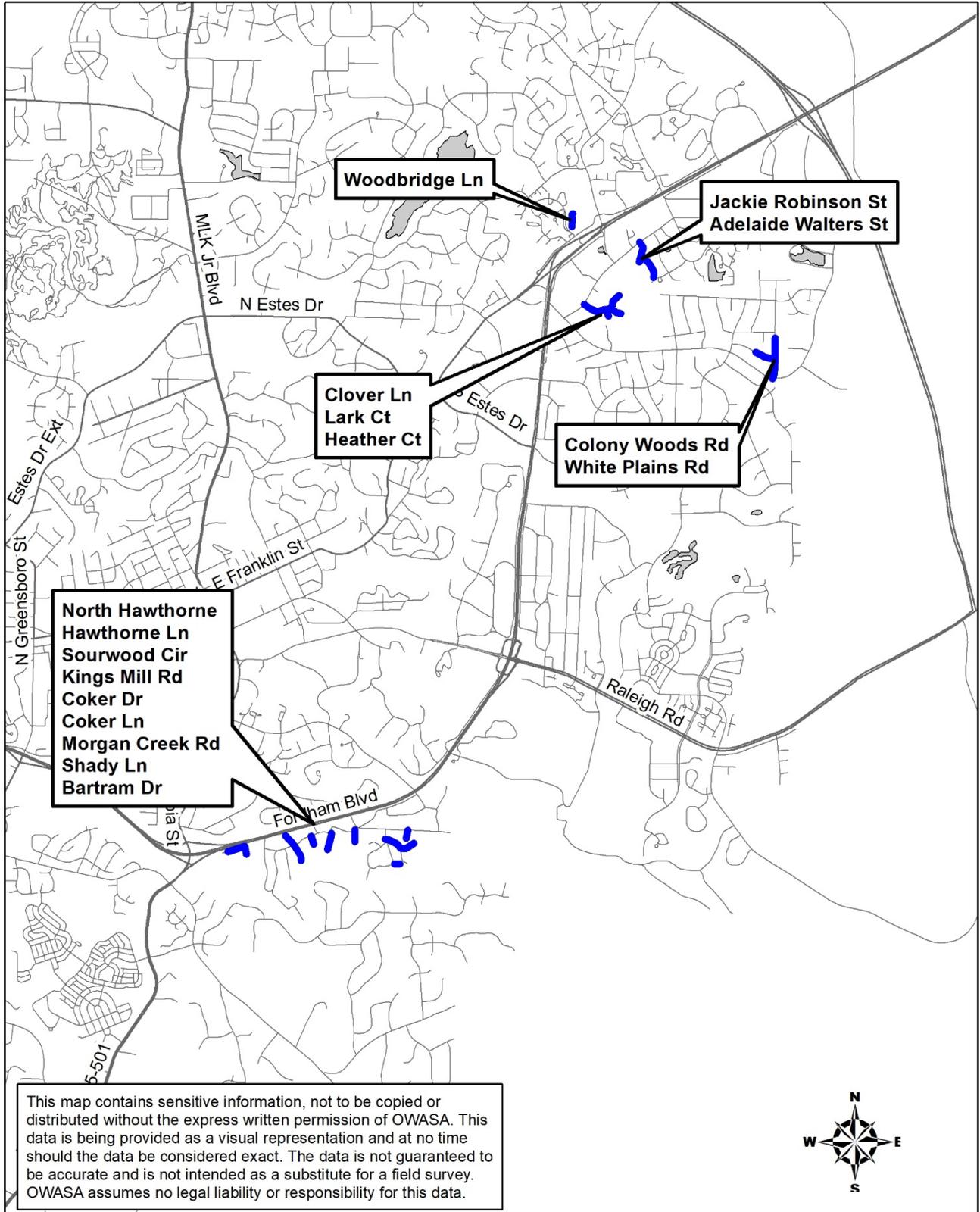
1. **Water main replacements:** Most of the funding in FY 2021 through FY 2025 for this project line is dedicated to the replacement of aging water mains by OWASA construction crews. These mains were identified for replacement through the consideration of their consequence and likelihood of failure as determined through the Water Main Prioritization Model. Streets identified for FY 2021 water main replacement projects include: Woodbridge Lane, Hawthorne Lane, Sourwood Circle, Kings Mill Road, Coker Drive, Coker Lane, Morgan Creek Road and Bear Lane, Shady Lane, Bartram Drive, and Foxcroft Drive.
2. **Water isolation valve installations:** The Water Main Prioritization Model update, completed in FY 2020, identified several opportunities throughout the distribution system where installation of isolation valves would be of particular benefit. FY 2021 includes funding for the installation of isolation valves in locations at Culbreth Road, North Greensboro Street, and Boundary Street; installation will be completed by OWASA construction crews.
3. **Large meter vault installations:** Funding is provided in FY 2022 and FY 2023 for the replacement of deteriorating vaults for large meters in several locations, including Estes Park Apartments, Royal Park Apartments, and East Rosemary Street at NCNB Alley.

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$35,000	\$102,000	\$58,000	\$100,000	\$110,000	\$405,000
Construction	\$350,000	\$1,020,000	\$580,000	\$1,000,000	\$1,098,000	\$4,048,000
Inspection	\$18,000	\$51,000	\$29,000	\$50,000	\$55,000	\$203,000
Construction Admin	\$18,000	\$51,000	\$29,000	\$50,000	\$55,000	\$203,000
Contingency	\$44,000	\$123,000	\$72,000	\$119,000	\$132,000	\$490,000
TOTAL	\$465,000	\$1,347,000	\$768,000	\$1,319,000	\$1,450,000	\$5,349,000

275-20 Water Main Replacement Projects – FY 2021-2025



275-21 Water Main Replacement Program FY 2018-2023

Description/Background:

This program is composed of water main replacements in critical locations as identified by either the Distribution System Prioritization Model or staff input. This multi-year program represents 5.5 miles of water main replacement at nine locations; five of the locations have already been completed and design on the remaining sites is mainly complete. The program was initiated early in FY 2018.

<u>Project</u>	<u>Length (feet)</u>	<u>Pipe size (inches)</u>	<u>Estimated Construction Cost</u>
Scarlett-Cooper Neighborhood Water Mains	3,259	8	\$570,000
Fordham Blvd at Ephesus Church Road Water Main	1,250*	12	\$250,000
Foxcroft Drive Water Main	1,600	12	\$240,000
Rogerson-Oakwood Neighborhood Water Mains	10,842	8	\$3,811,000
TOTALS	16,951		\$4,871,000

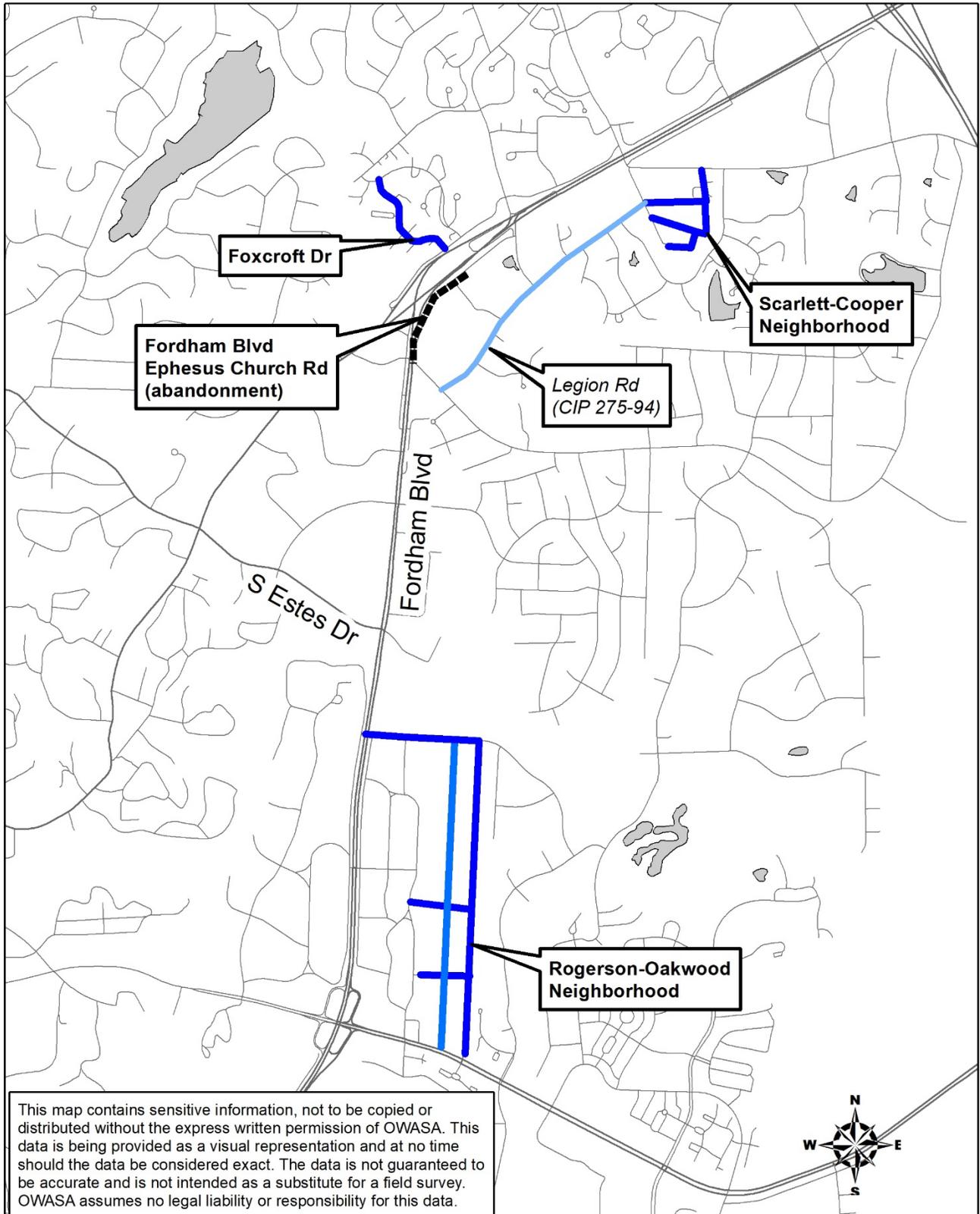
*main abandonment and service reconnection

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$27,000	\$0	\$0	\$0	\$0	\$27,000
Construction	\$650,000	\$1,772,000	\$2,449,000	\$0	\$0	\$4,871,000
Inspection	\$30,000	\$83,000	\$101,000	\$0	\$0	\$214,000
Construction Admin	\$30,000	\$83,000	\$101,000	\$0	\$0	\$214,000
Contingency	\$22,000	\$62,000	\$150,000	\$0	\$0	\$234,000
TOTAL	\$759,000	\$2,000,000	\$2,801,000	\$0	\$0	\$5,560,000

275-21 Water Main Replacement Program FY 2018-2023 (active projects)



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275-46 Dobbins Drive Water Main Replacement

Description/Background:

This project involves replacing approximately 2,355 LF of 12-inch AC water distribution main with 16-inch DIP along the Fordham Boulevard service road (Dobbins Drive) from Erwin Road to East Franklin Street. The project was identified and prioritized by the Distribution System Prioritization Model, and is being completed in coordination with the Dobbins Drive Interceptor Replacement ([276-48](#)).

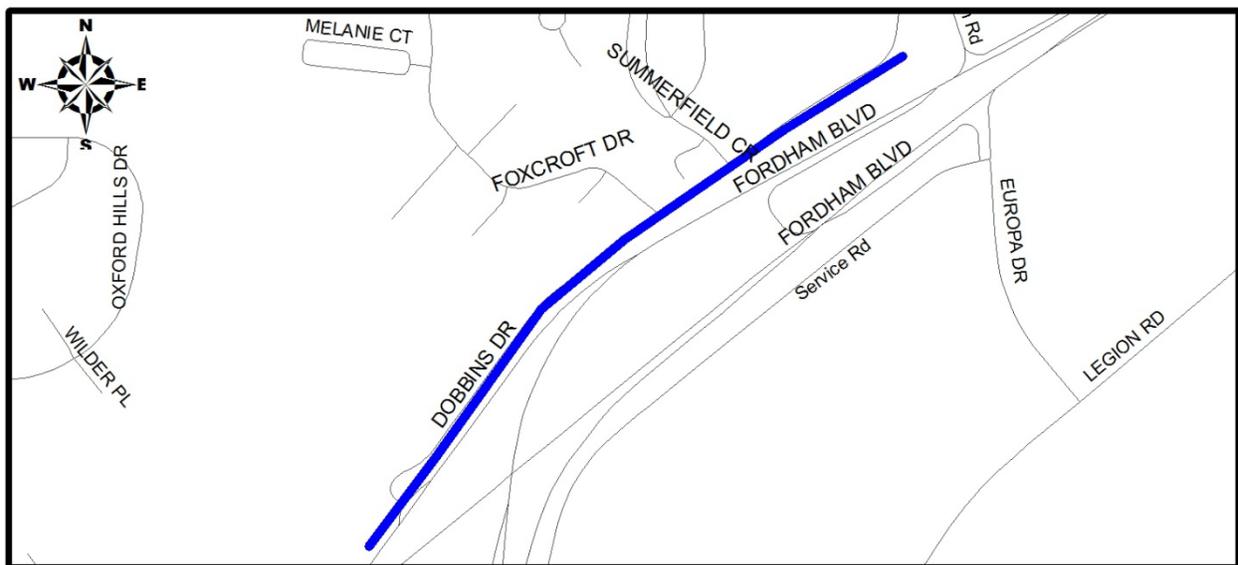
Design was completed in FY 2019. Construction started in FY 2020 and will be completed in FY 2021.

This project has been approved for a \$1.5 million low-interest loan as part of the State Reserve Project Loan program.

Benefits: replaces aging assets, improves service reliability, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$257,000	\$0	\$0	\$0	\$0	\$257,000
Inspection	\$13,000	\$0	\$0	\$0	\$0	\$13,000
Construction Admin	\$13,000	\$0	\$0	\$0	\$0	\$13,000
Contingency	\$29,000	\$0	\$0	\$0	\$0	\$29,000
TOTAL	\$312,000	\$0	\$0	\$0	\$0	\$312,000



275-52 West Cameron Avenue Water Main Replacement

Description/Background:

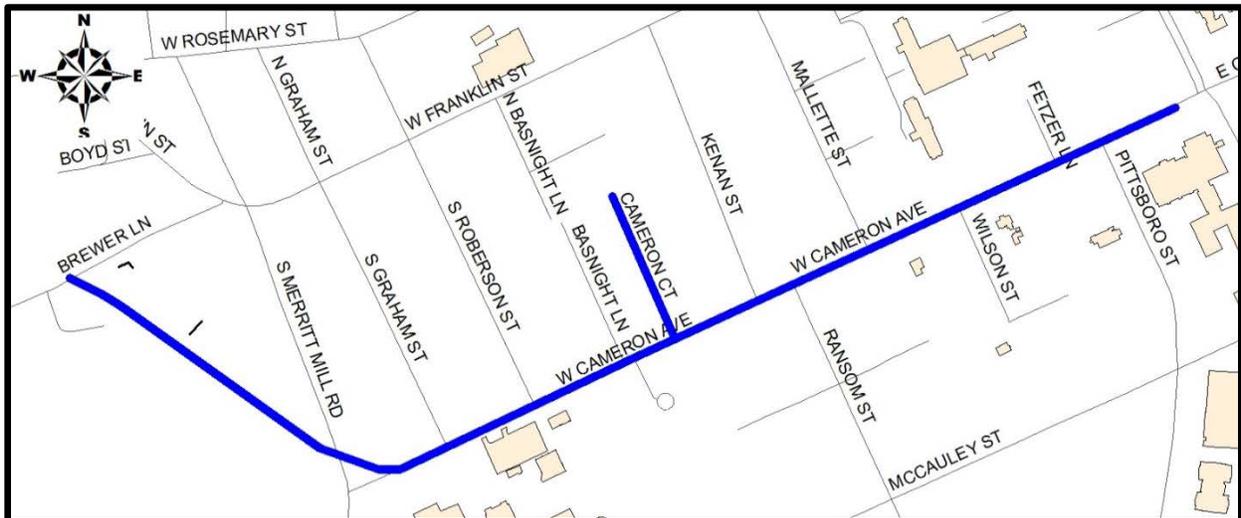
This project includes replacement, rehabilitation, or abandonment of several mains within the West Cameron Avenue corridor in Chapel Hill and Carrboro, as indicated by the Distribution System Prioritization Model.

The project includes the rehabilitation or replacement of approximately 3,000 LF of existing 12-inch asbestos cement pipe along Cameron Avenue from South Columbia Street to Merritt Mill Road. The project also includes the abandonment of approximately 1,100 LF of existing 12-inch asbestos cement pipe along the railroad tracks between Merritt Mill Road and Brewer Lane. A portion of the work within and near South Columbia Street was accelerated for completion in Summer 2020. Design of the remainder of the project will be completed in FY 2021 with construction planned to start in late FY 2021 and continue into FY 2022.

Benefits: extends useful life of aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$25,000	\$0	\$0	\$0	\$0	\$25,000
Construction	\$875,000	\$1,893,000	\$0	\$0	\$0	\$2,768,000
Inspection	\$44,000	\$95,000	\$0	\$0	\$0	\$139,000
Construction Admin	\$44,000	\$95,000	\$0	\$0	\$0	\$139,000
Contingency	\$97,000	\$209,000	\$0	\$0	\$0	\$306,000
TOTAL	\$1,085,000	\$2,292,000	\$0	\$0	\$0	\$3,377,000



275-53 Distribution System Hydraulic Model

Description/Background:

Water distribution system hydraulic models are used to simulate current and projected future conditions in the system in order to plan and design pumps, pipes, and storage tanks. OWASA first developed a water distribution system model in 1982. The model was a “skeletonized” model including only 12-inch diameter and larger transmission pipes and key 8-inch diameter pipes in addition to pumping and storage facilities. The model was updated in 1992 and again in 2000 as part of the Comprehensive Water and Sewer Master Plan. OWASA began developing an “all pipes” distribution system model as part of the Unidirectional Flushing project completed in 2004. That project combined OWASA’s GIS and the hydraulic model so that all of the water pipes are represented in the model. The full pipe model was calibrated under current water demand conditions in 2006 and long-range water demand projections were added to the 740 pressure zone. In FY 2011, long-range water demand projections were added for the 642-foot pressure zone.

- Placeholder funding is included in FY 2021 through FY 2025 for on call hydraulic modeling of the distribution system
- Funding in FY 2022 and FY 2023 supports the development and calibration of a full pipe model to account for pipes replaced or added to the system, changed demand conditions and demand projections from the ongoing update of the [Long-Range Water Supply Plan](#). Additionally, placeholder funds are included each fiscal year for modeling simulations that may be required to support capital projects.

This hydraulic modeling effort will also revisit the desirability, conceptual alternatives, cost and timing of any potential improvements to the distribution system interconnection with the City of Durham’s distribution system along the Highway 54 corridor near Barbee Chapel Road. A new booster pump station in this area would replace the existing booster pump station on Highway 54 near Finley Golf Course Road, and is expected to increase transfer capacity from Durham from 7.0 to 8.5 million gallons per day. Additional pipeline improvements would be required to serve the new pump station.

Benefits: determines asset risk; identifies future capital investments

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$30,000	\$205,000	\$205,000	\$30,000	\$30,000	\$500,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$25,000	\$25,000	\$0	\$0	\$50,000
TOTAL	\$30,000	\$230,000	\$230,000	\$30,000	\$30,000	\$550,000

275-88 Kensington Drive Water Main Replacement

Description/Background:

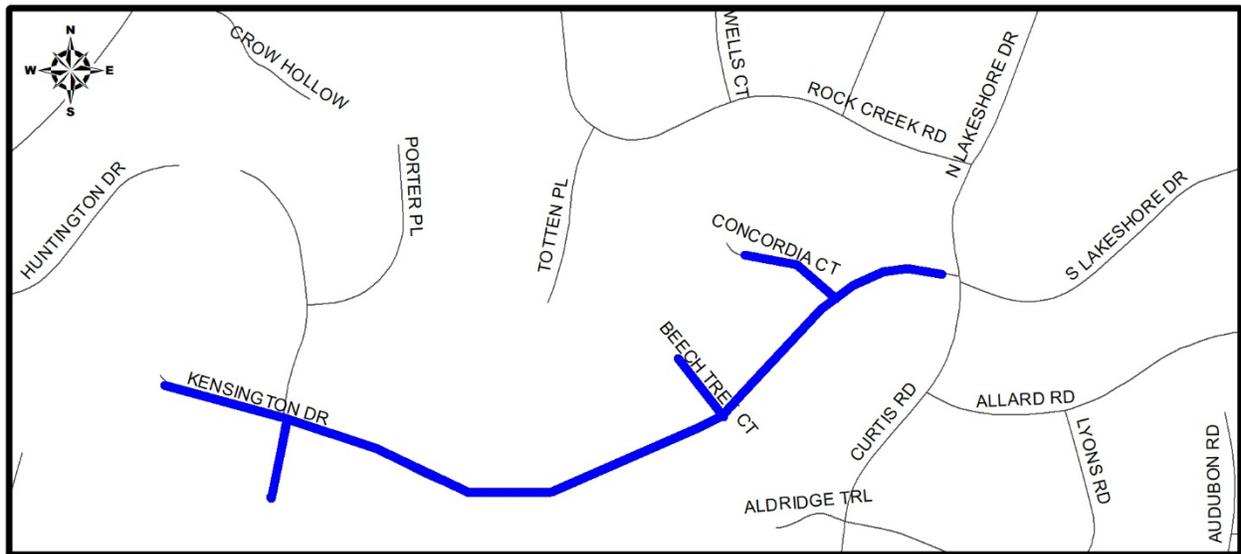
This project includes the replacement of approximately 3,500 linear feet of asbestos cement water main located along Kensington Drive and the Beech Tree Court, Concordia Court, and Wellington Drive cul-de-sacs.

The project was identified by the Distribution System Prioritization Model and accelerated from future years due to recent history of main breaks. Design was completed in FY 2019. Construction began late in Spring 2020 and is expected to be complete in Fall 2020.

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$1,200,000	\$0	\$0	\$0	\$0	\$1,200,000
Inspection	\$60,000	\$0	\$0	\$0	\$0	\$60,000
Construction Admin	\$60,000	\$0	\$0	\$0	\$0	\$60,000
Contingency	\$133,000	\$0	\$0	\$0	\$0	\$133,000
TOTAL	\$1,453,000	\$0	\$0	\$0	\$0	\$1,453,000



275-91 Martin Luther King Jr Boulevard Water Main Abandonment

Description/Background:

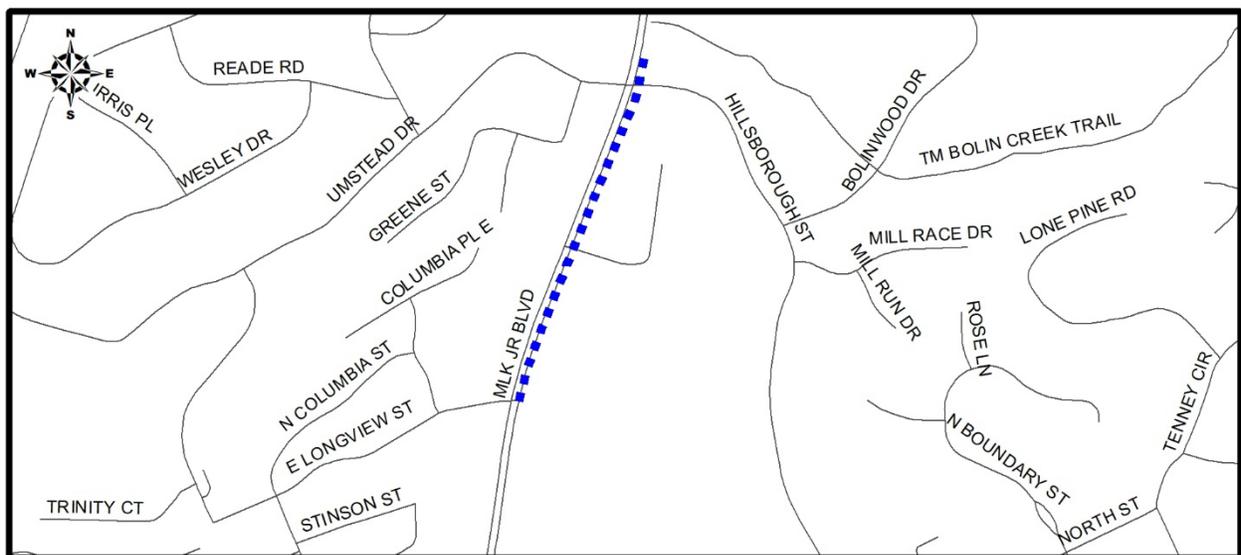
This project will abandon an aging 6-inch water main (installed in 1940) along the east side of Martin Luther King Jr Boulevard and relocate the fire protection and domestic services to the 12-inch main on the west side of the roadway. The 6-inch main was identified as a risk due to its age, low amount of water demand, and high criticality (consequence of failure).

Funding is provided in FY 2024 and FY 2025 for the completion of this project.

Benefits: reduces operational risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$91,000	\$0	\$91,000
Construction	\$0	\$0	\$0	\$0	\$246,000	\$246,000
Inspection	\$0	\$0	\$0	\$0	\$13,000	\$13,000
Construction Admin	\$0	\$0	\$0	\$0	\$13,000	\$13,000
Contingency	\$0	\$0	\$0	\$9,000	\$28,000	\$37,000
TOTAL	\$0	\$0	\$0	\$100,000	\$300,000	\$400,000



275-92 Jones Ferry Road Water Main Improvements

Description/Background:

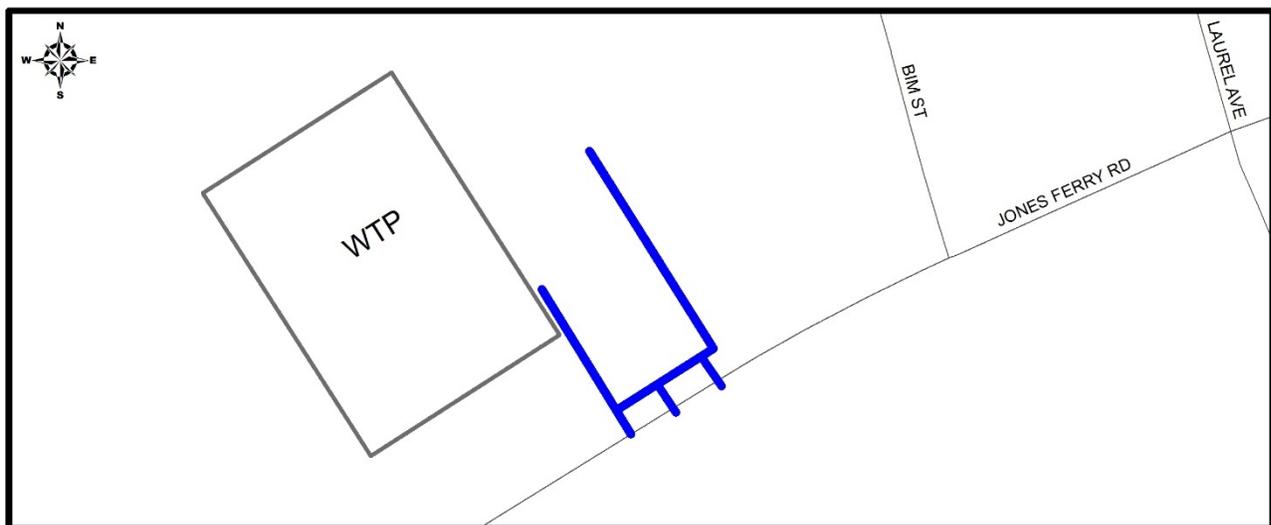
This project began in FY 2019 in response to the November 2018 water emergency in order to address the risks associated with aging isolation valves and a complex piping network at and adjacent to the WTP, and to provide additional redundancy and resiliency for the distribution system in this area. A failure analysis completed in FY 2019 identified primary and secondary failure scenarios for a comprehensive portion of the distribution system immediately adjacent to the WTP clearwell and finished water pumps. Completion of project preliminary engineering in early FY 2020 refined the scope of the improvements, and design was completed in FY 2020.

Construction will begin in FY 2021 and is expected to be completed in FY 2022.

Benefits: reduces operational risk, replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$1,251,000	\$974,000	\$0	\$0	\$0	\$2,225,000
Inspection	\$62,000	\$48,000	\$0	\$0	\$0	\$110,000
Construction Admin	\$62,000	\$48,000	\$0	\$0	\$0	\$110,000
Contingency	\$125,000	\$85,000	\$0	\$0	\$0	\$210,000
TOTAL	\$1,500,000	\$1,155,000	\$0	\$0	\$0	\$2,655,000



275-93 Bolinwood Bridge Water Main Replacement

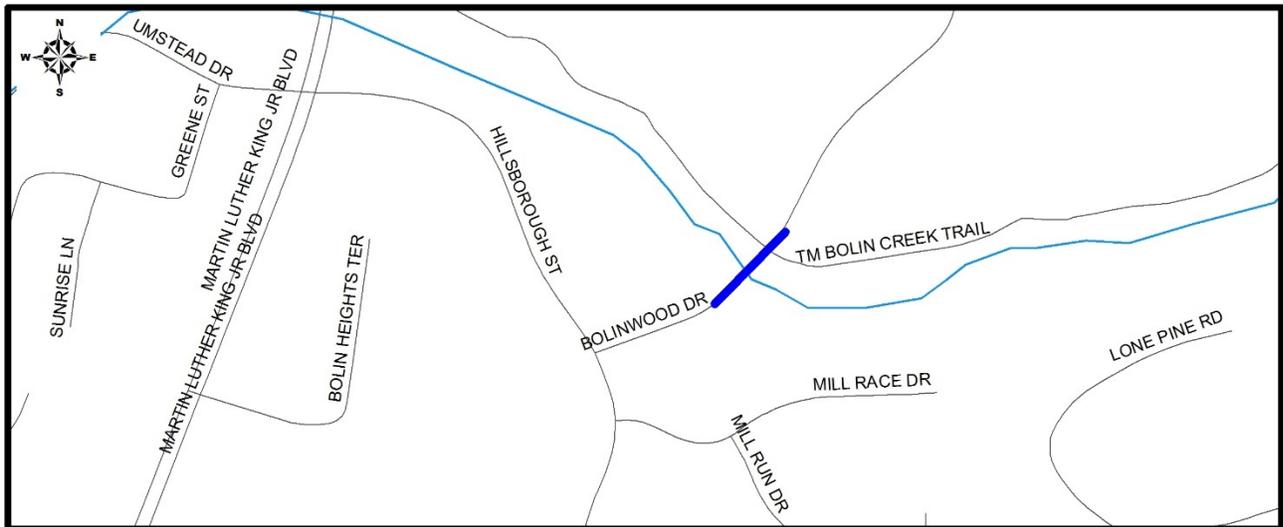
Description/Background:

In September 2018, impacts of Hurricane Florence led to the break and loss of a water main segment suspended from the bridge on Bolinwood Drive. This project will provide for the replacement of the water main in order to reestablish the pipe network along Bolinwood Drive. This project received approval for reimbursement from the Federal Emergency Management Agency (FEMA).

Benefits: reduces operational risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$30,000	\$0	\$0	\$0	\$0	\$30,000
Construction	\$175,000	\$0	\$0	\$0	\$0	\$175,000
Inspection	\$15,000	\$0	\$0	\$0	\$0	\$15,000
Construction Admin	\$15,000	\$0	\$0	\$0	\$0	\$15,000
Contingency	\$15,000	\$0	\$0	\$0	\$0	\$15,000
TOTAL	\$250,000	\$0	\$0	\$0	\$0	\$250,000



275-94 Legion Road Water Main Replacement

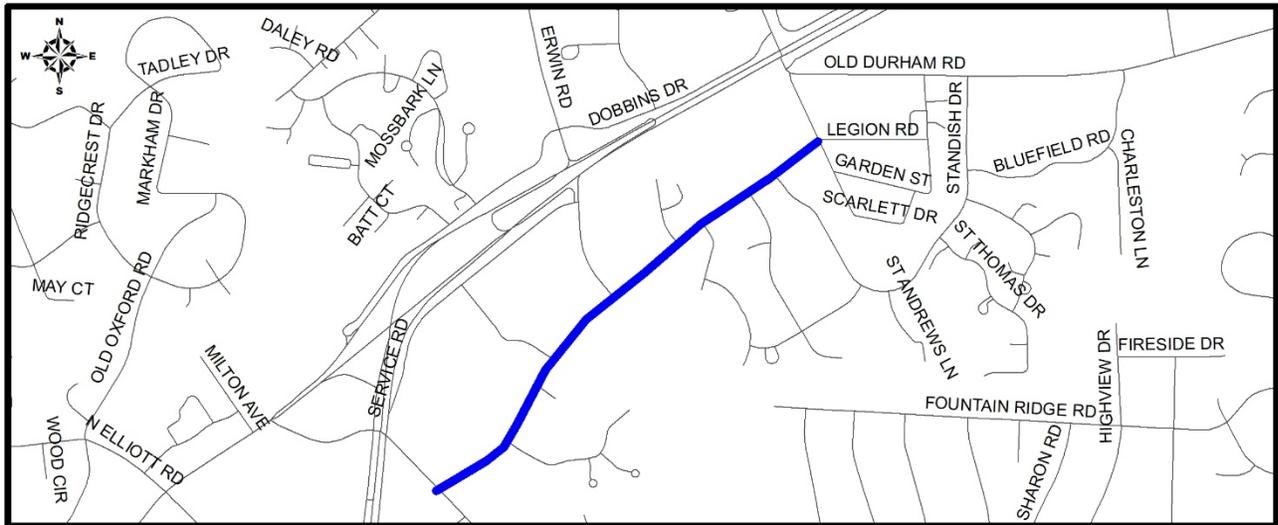
Description/Background:

This project includes the replacement of existing 8-inch diameter asbestos cement water main with new 8-inch or 12-inch ductile iron for 4,240 feet along Legion Road from Scarlett Drive to Ephesus Church Road. The construction timing will be coordinated to avoid overlaps with certain adjacent development projects as well as water main replacements in the Scarlett-Cooper neighborhood (275-21). The project was identified by the Distribution System Prioritization Model. Construction is expected to occur in FY 2023, in advance of roadway restoration of this corridor by the Town of Chapel Hill.

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$20,000	\$0	\$0	\$0	\$0	\$20,000
Design/Land	\$0	\$182,000	\$0	\$0	\$0	\$182,000
Construction	\$0	\$0	\$1,915,000	\$0	\$0	\$1,915,000
Inspection	\$0	\$0	\$96,000	\$0	\$0	\$96,000
Construction Admin	\$0	\$0	\$96,000	\$0	\$0	\$96,000
Contingency	\$5,000	\$18,000	\$212,000	\$0	\$0	\$235,000
TOTAL	\$25,000	\$200,000	\$2,319,000	\$0	\$0	\$2,544,000



275-95 West Rosemary Street Water Main Replacement

Description/Background:

This project includes the replacement of existing 12-inch diameter asbestos cement water main with new 12-inch ductile iron for 1,300 feet along West Rosemary Street from Church Street to Mitchell Lane. The project was identified by the Distribution System Prioritization Model. Construction is expected to occur in FY 2024.

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$40,000	\$0	\$0	\$0	\$40,000
Design/Land	\$0	\$0	\$201,000	\$0	\$0	\$201,000
Construction	\$0	\$0	\$0	\$1,321,000	\$0	\$1,321,000
Inspection	\$0	\$0	\$0	\$67,000	\$0	\$67,000
Construction Admin	\$0	\$0	\$0	\$67,000	\$0	\$67,000
Contingency	\$0	\$10,000	\$21,000	\$145,000	\$0	\$176,000
TOTAL	\$0	\$50,000	\$222,000	\$1,600,000	\$0	\$1,872,000



275-96 Water Main Replacements – Group II

Description/Background:

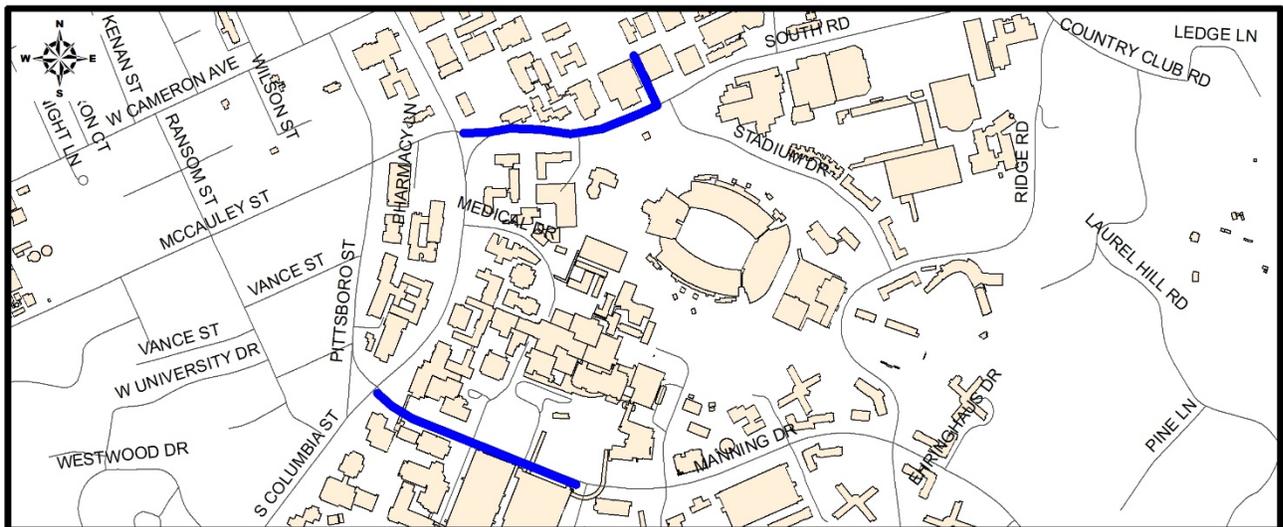
This project includes funding for three components:

- Installation of a isolation valve in the 12-inch asbestos cement water main in Manning Drive in front of the Dogwood parking deck. This work is funded to occur in FY 2021.
- The replacement of 1,160 feet of 12-inch asbestos cement water main in South Road from South Columbia Street to east of Wilson Library, and 250 feet of 12-inch asbestos cement water line running along the eastern side of Wilson Library. This work is planned to be constructed in FY 2024.
- The replacement of approximately 1,300 of 12-inch asbestos cement water main in Manning Drive from South Columbia Street to New East Drive. This work is planned to be constructed in FY 2025.

Benefits: replaces aging assets, improves service reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$35,000	\$0	\$0	\$0	\$35,000
Design/Land	\$0	\$0	\$127,000	\$0	\$0	\$127,000
Construction	\$45,000	\$0	\$0	\$1,841,000	\$1,073,000	\$2,959,000
Inspection	\$0	\$0	\$0	\$93,000	\$54,000	\$147,000
Construction Admin	\$0	\$0	\$0	\$93,000	\$54,000	\$147,000
Contingency	\$15,000	\$5,000	\$13,000	\$203,000	\$119,000	\$355,000
TOTAL	\$60,000	\$40,000	\$140,000	\$2,230,000	\$1,300,000	\$3,770,000



275-99 Distribution System Asset Management

Description/Background:

A recently completed Distribution System Management Plan Update provided a framework for the long-term incorporation of condition assessment activities for this asset class. Funding is provided for the following components:

- **Opportunistic Condition Assessment** - When a water main is exposed for any reason (e.g. service tap, break, valve replacement, water main replacement), it provides a cost-effective opportunity to gather pipe samples and soil samples for assessment since roughly 90% of the cost of testing is in accessing the pipe.
- **Proactive Condition Assessment** – The study developed a long-term framework and decision logic for the cost-effective use of proactive condition assessment to assess pipe risk and inform replacement decisions. However, detailed analysis of the application to the distribution system raised logistical concerns including in-line valves and tapping locations for the insertion and extraction of the condition assessment tools. Additionally, the OWASA distribution system has relatively few candidate pipes for proactive condition assessment, and even fewer that would not pose a significant risk to the overall distribution system should the tool become stuck or need emergency extraction. The funding below reflects a ramped approach to the use of proactive condition assessment, starting with non-invasive condition assessment methods and then moving towards the use of in-pipe technologies with the expectation that logistical concerns will be addressed over time and the continued development of in-pipe technologies.

Additional elements of the recommended condition assessment program may be added in future years as technology developments, pricing, and budget constraints allow.

Benefits: determines asset risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$90,000	\$90,000	\$250,000	\$318,000	\$422,000	\$1,170,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$10,000	\$10,000	\$25,000	\$32,000	\$42,000	\$119,000
TOTAL	\$100,000	\$100,000	\$275,000	\$350,000	\$464,000	\$1,289,000

Category 276: Wastewater Collection Lines

Background

The wastewater (sewer) collection system represents a significant portion of the total investment in OWASA's wastewater infrastructure. Particular care is given to the materials and techniques of collection line construction as well as planning and design to accommodate long-term needs within the service area. OWASA carefully reviews plans for new development, enforces detailed standards and specifications, and inspects the construction of all new collection system components.

Existing Facilities

The collection system serving Chapel Hill and Carrboro includes approximately 334 miles of pipe ranging in size from 6- to 60-inches in diameter, of which more than 80% is 8-inch diameter pipe. Ductile iron and vitrified clay represent more than 90% of pipe material by length, however the collection system also contains pipe materials such as reinforced concrete, cast iron, polyvinyl chloride (PVC), cured-in-place pipe (CIPP), and various other materials. The collection system also includes about 10,900 manholes and is configured in a network that generally provides gravity flow to the Wastewater Treatment Plant (WWTP) through four drainage basins: Bolin Creek, Booker Creek, Little Creek, and Morgan Creek. Flow from the Booker Creek, Little Creek, and Bolin Creek basins is conveyed to the Rogerson Drive Pump Station and pumped to the WWTP. Flow from the Morgan Creek basin is conveyed to the Morgan Creek Pump Station (located at the WWTP) and pumped to the plant headworks. The largest gravity line is a 60-inch diameter interceptor flowing into the Morgan Creek Pump Station. (An interceptor is a large collection line that receives wastewater from smaller collection lines throughout the drainage basin.)



Morgan Creek Aerial Crossing with Pedestrian Barricades

Recent Improvements

OWASA completed a collection system master planning study earlier in 2020 which identified and prioritized sewer system rehabilitation and replacement needs. The study included the development of a calibrated hydraulic model of the interceptors and critical collector pipes in the system, utilizing temporary flow monitors throughout the system, establishment of a revised design storm, and wastewater demand projections in alignment with the Long-Range Water Supply Plan Update projections. The study's recommendations were the basis for most of the projects shown in the FY 2021 – 2025 CIP for this asset class.

A preliminary condition assessment (done as part of a FY 2011 planning study) assigned priority rankings to all sewer mains for ongoing field-based condition evaluation. Field-based evaluations are being performed on targeted sewer mains (in priority order) to determine whether rehabilitation or replacement is warranted.

Planned Improvements

The CIP includes nearly \$20 million in planned improvements for this category. Projects are grouped into

three general categories:

- Improvements to repair deteriorated pipe and reduce sources of stormwater inflow and groundwater infiltration; the majority of this funding is included in the Gravity Sewer Rehabilitation Program (276-18) and reflects efforts to reduce inflow and infiltration in sewer basins upstream of Knolls pump station (Pope Road), upstream of Eastowne pump station, and a basin upstream of the Bolin Creek Interceptor. OWASA typically repairs existing, deteriorated lines by installing cured-in-place pipe (CIPP) liners or replacing individual segments between manholes. The combination of manhole rehabilitation and CIPP installation is an ongoing program at OWASA intended to reduce peak flows at the WWTP associated with stormwater infiltration into the collection system.
- Improvements needed to accommodate present flows; and
- Improvements to OWASA’s “backbone” infrastructure as necessary to accommodate future flows resulting from anticipated growth. Notable capacity projects in the five-year CIP include Bolin Creek Interceptor at Pathway Drive (276-60), Morgan Creek Interceptor at Bartram Drive (276-59), and the Bolinwood Drive Interceptor (276-45).

Other notable projects in the five-year plan include upgrades to stream crossings to improve vehicular access for the operation and maintenance of our sanitary sewer interceptors (276-53) and improvements to the Rocky Branch interceptor to accommodate expected increases in process water discharge from the WTP.

Category 276: Wastewater Collection Lines

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
276-18 Gravity Sewer Rehabilitation Program	\$1,235,000	\$350,000	\$1,350,000	\$4,350,000	\$5,850,000	\$13,135,000
276-45 Bolinwood Interceptor Replacement	\$200,000	\$1,005,000	\$0	\$0	\$0	\$1,205,000
276-46 Willow Drive Branch Interceptor Replacement	\$0	\$0	\$125,000	\$0	\$0	\$125,000
276-48 Dobbins Drive Interceptor Replacement	\$1,390,000	\$0	\$0	\$0	\$0	\$1,390,000
276-52 Rocky Branch Interceptor Replacement	\$62,000	\$300,000	\$400,000	\$0	\$0	\$762,000
276-53 Creek Crossing Access Improvements	\$50,000	\$500,000	\$0	\$0	\$0	\$550,000
276-58 Prince Street Service Replacement	\$25,000	\$0	\$0	\$0	\$0	\$25,000
276-59 Morgan Creek Interceptor Replacement (at Bartram Drive)	\$0	\$150,000	\$1,000,000	\$0	\$0	\$1,150,000
276-60 Bolin Creek Interceptor (at Pathway Drive)	\$0	\$25,000	\$90,000	\$400,000	\$0	\$515,000
276-61 Brigham Rd Interceptor Replacement	\$0	\$0	\$100,000	\$600,000	\$0	\$700,000
276-62 Willow Drive Bridge Sewer Replacement	\$0	\$0	\$0	\$20,000	\$150,000	\$170,000
276-99 Collection System Asset Management	\$60,000	\$60,000	\$60,000	\$0	\$0	\$180,000
276 Category Total	\$3,022,000	\$2,390,000	\$3,125,000	\$5,370,000	\$6,000,000	\$19,907,000

276-18 Gravity Sewer Rehabilitation

Description/Background:

OWASA rehabilitates and repairs the wastewater collection system in order to maintain the integrity and reliability of the system and to reduce stormwater inflow and groundwater infiltration. These rehabilitation projects may include emergency sewer replacements or the correction of defective manholes and laterals, as well as rehabilitation of sewer mains and manholes shown to be warranted through inspections. Sewer rehabilitation and replacement design, construction, and inspection services may be performed by OWASA staff or by consultants and contractors.

Funding is provided in FY 2020 and FY 2021 for the rehabilitation of over 6 miles of sewer mains that were identified through prior inspections.

Funding in FY 2023 through FY 2025 is provided for the inspection and rehabilitation of specific sewer basins recommended by the Collection System Master Plan:

- Minibasin 23 (30,000 linear feet in Pope Road / Knolls Pump Station basin) – funding provided in FY 2023 and FY 2024
- Minibasin 12 (24,000 linear feet in Pacifica / Bolin Creek basin) – funding provided in FY 2024 and FY 2025
- Minibasin 6 (75,000 linear feet in Eastowne Pump Station basin) – funding provided in FY 2024 and FY 2025

Benefits: reduces inflow and infiltration into collection system; maintains permit compliance through reduction of sanitary sewer overflows; replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$103,000	\$330,000	\$443,000	\$876,000
Construction	\$1,020,000	\$288,000	\$1,021,000	\$3,294,000	\$4,430,000	\$10,053,000
Inspection	\$51,000	\$15,000	\$52,000	\$165,000	\$222,000	\$505,000
Construction Admin	\$51,000	\$15,000	\$52,000	\$165,000	\$222,000	\$505,000
Contingency	\$113,000	\$32,000	\$122,000	\$396,000	\$533,000	\$1,196,000
TOTAL	\$1,235,000	\$350,000	\$1,350,000	\$4,350,000	\$5,850,000	\$13,135,000

276-45 Bolinwood Interceptor Replacement

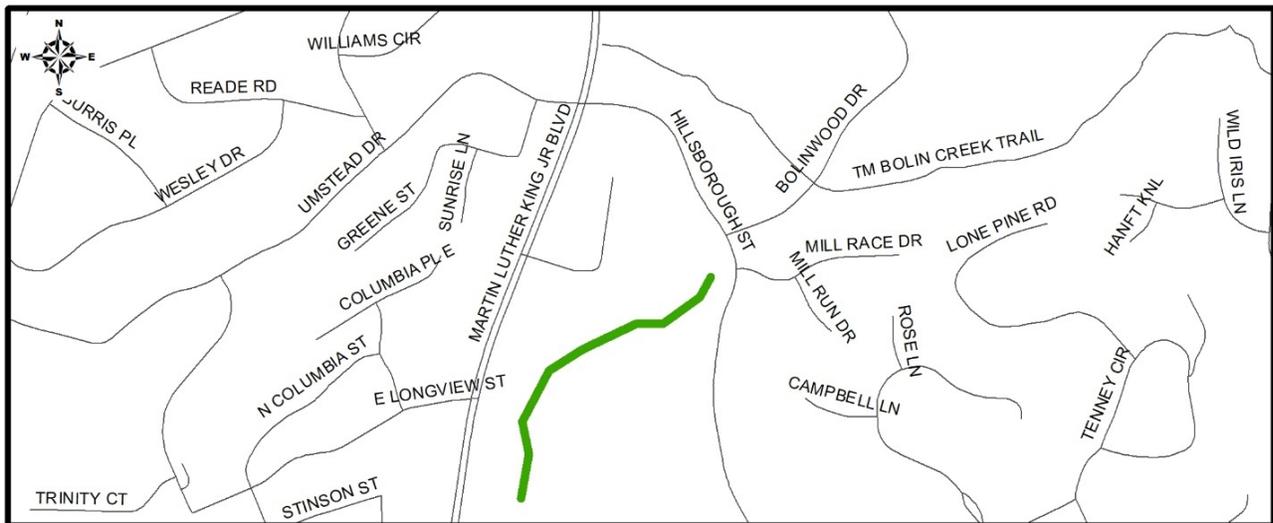
Description/Background:

This project will address surcharging issues along a portion of the Bolinwood Drive Interceptor from north of Hillsborough Street and Mill Run Drive to the Mill Creek Apartments. The need for the project was initially identified as a result of flow monitoring conducted during the Sanitary Sewer Service Area Study completed in 2011. Preliminary engineering was completed in FY 2018. Funds are provided in FY 2021 for completion of design and FY 2022 for construction.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$163,000	\$829,000	\$0	\$0	\$0	\$992,000
Inspection	\$9,000	\$42,000	\$0	\$0	\$0	\$51,000
Construction Admin	\$9,000	\$42,000	\$0	\$0	\$0	\$51,000
Contingency	\$19,000	\$92,000	\$0	\$0	\$0	\$111,000
TOTAL	\$200,000	\$1,005,000	\$0	\$0	\$0	\$1,205,000



276-46 Willow Drive Interceptor Replacement

Description/Background:

This project will address predicted surcharging from manhole facility ID 2552 to manhole facility ID 2779 in order to meet the projected increase in wastewater flow in the Booker Creek drainage basin. Planning, design, and construction will be coordinated with ongoing development in the area, including the possibility of completing a portion of this project through a reimbursement agreement.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$101,000	\$0	\$0	\$101,000
Inspection	\$0	\$0	\$6,000	\$0	\$0	\$6,000
Construction Admin	\$0	\$0	\$6,000	\$0	\$0	\$6,000
Contingency	\$0	\$0	\$12,000	\$0	\$0	\$12,000
TOTAL	\$0	\$0	\$125,000	\$0	\$0	\$125,000



276-48 Dobbins Drive Interceptor Replacement

Description/Background:

This project will replace 3,000 LF of 12-inch gravity sewer with a 24-inch pipe along the Dobbins Drive Interceptor from Erwin Road to East Franklin Street to address predicted surcharging and accommodate expected future growth in the upstream service area. Additional flow monitoring completed in FY 2015 confirmed the need for this project. Design and construction are being coordinated with the Dobbins Drive Water Main Replacement project ([275-46](#)).

This project has been approved for a \$1.7 million low-interest State Reserve Project Loan.

Benefits: reduces inflow and infiltration into collection system; maintains permit compliance through reduction of sanitary sewer overflows; replaces aging assets, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$1,147,000	\$0	\$0	\$0	\$0	\$1,147,000
Inspection	\$58,000	\$0	\$0	\$0	\$0	\$58,000
Construction Admin	\$58,000	\$0	\$0	\$0	\$0	\$58,000
Contingency	\$127,000	\$0	\$0	\$0	\$0	\$127,000
TOTAL	\$1,390,000	\$0	\$0	\$0	\$0	\$1,390,000



276-52 Rocky Branch Interceptor Replacement

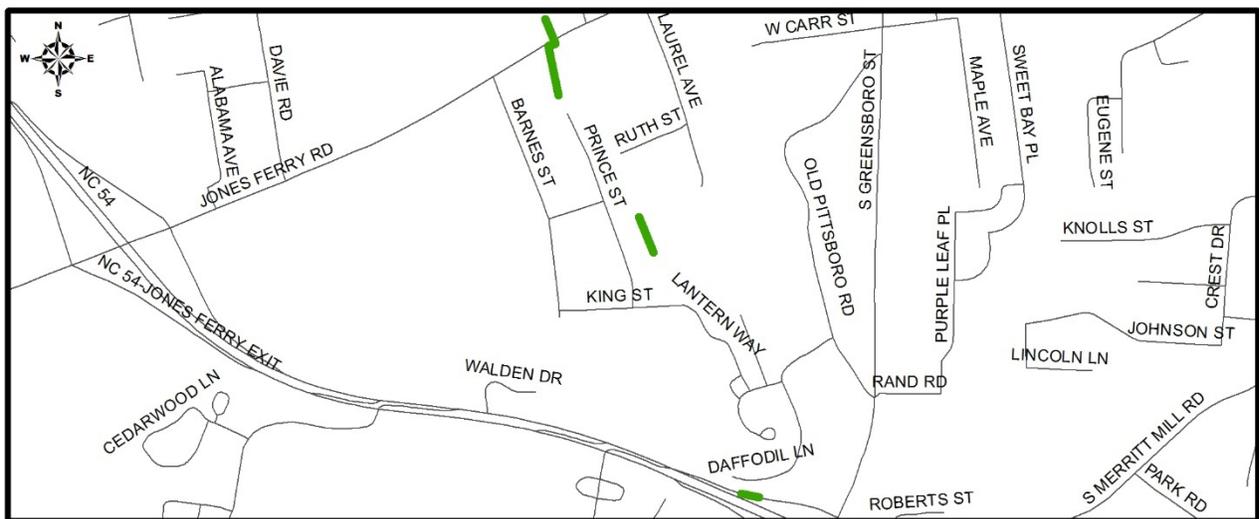
Description/Background:

Funding is provided in FY 2021 and FY 2022 to increase pipe capacity at certain locations in the Rocky Creek Interceptor to allow for process water discharges from the WTP of up to 1,000 gpm. The timing for this project is dependent upon WTP production rates and process operations and may be accelerated or delayed from the schedule shown below. Prior to initiating the detailed design for the project, the sanitary sewer mains downstream of the Rocky Branch Interceptor will be modeled to ensure that they have sufficient capacity for process water discharges up to 1000 gpm. If not, improvements will be made as warranted.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$56,000	\$0	\$31,000	\$0	\$0	\$87,000
Construction	\$0	\$246,000	\$301,000	\$0	\$0	\$547,000
Inspection	\$0	\$13,000	\$16,000	\$0	\$0	\$29,000
Construction Admin	\$0	\$13,000	\$16,000	\$0	\$0	\$29,000
Contingency	\$6,000	\$28,000	\$36,000	\$0	\$0	\$70,000
TOTAL	\$62,000	\$300,000	\$400,000	\$0	\$0	\$762,000



276-53 Creek Crossing Access Improvements

Description/Background:

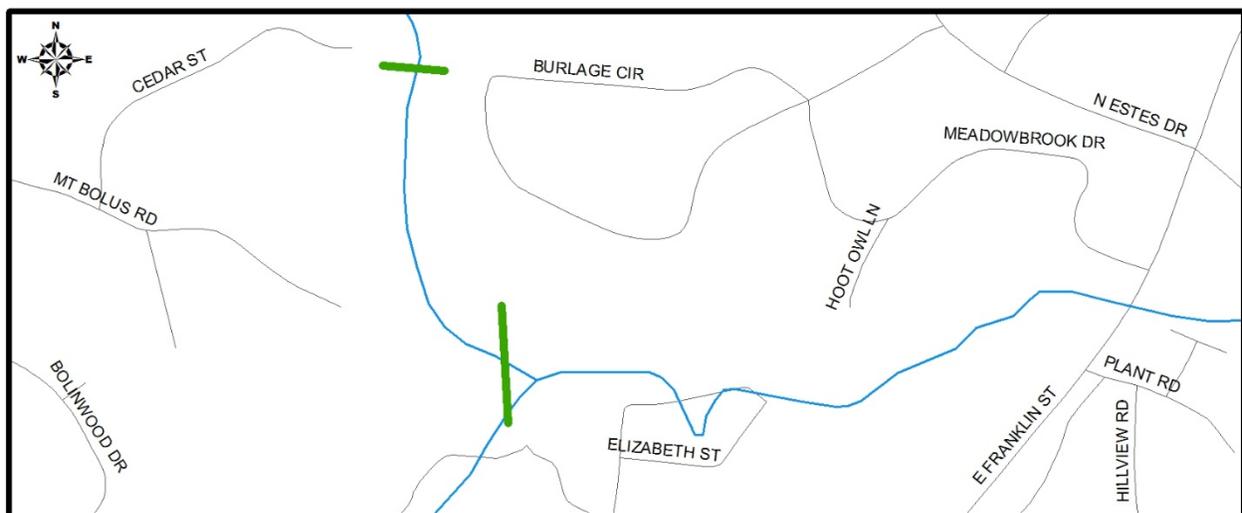
Streambank erosion from heavy rain events make it difficult for OWASA crews to safely cross area streams with equipment used to maintain the sewer collection system. This project will develop solutions to improve “at grade” creek crossings adjacent to existing gravity sanitary sewer creek crossings so crews/contractors can cross the creeks safely and with minimal environmental impacts.

Design is nearly complete for six (6) creek crossings identified by OWASA staff: three (3) along Morgan Creek, two (2) off Burlage Circle, and one (1) between 601 and 603 Brookview Drive. Following additional stakeholder engagement, easement acquisition, and completion of design and permitting in FY 2021, construction is programmed to be completed in FY 2022.

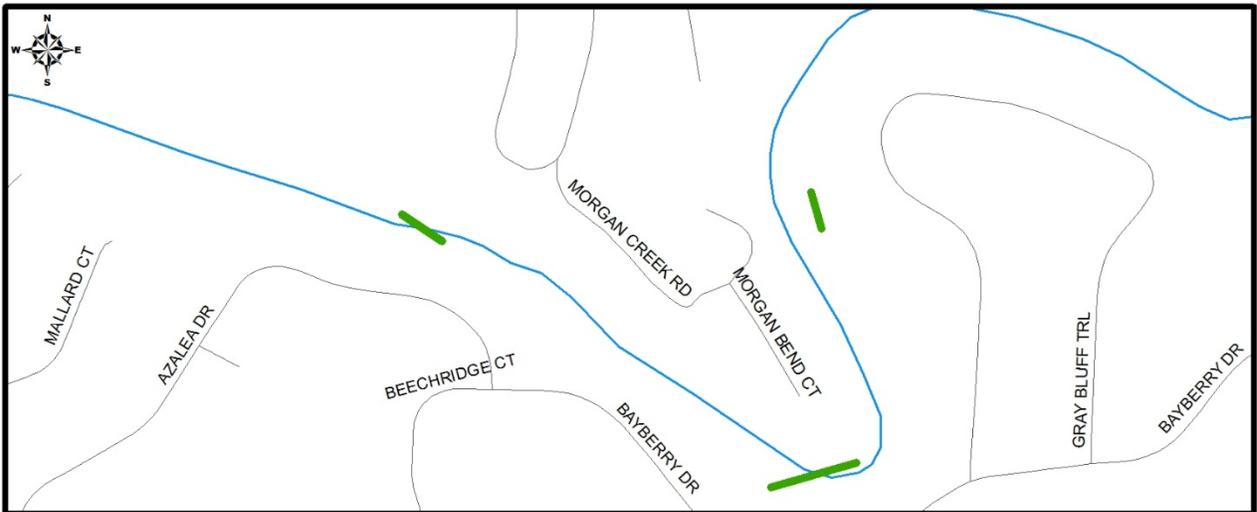
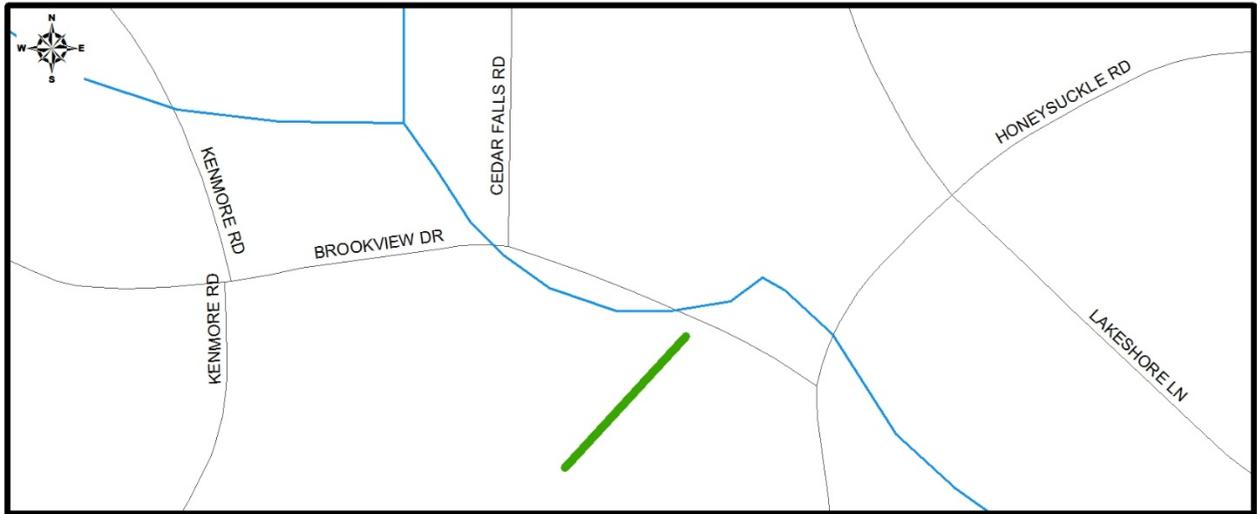
Benefits: reduces operational risk by improving vehicular access for maintenance purposes

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$45,000	\$0	\$0	\$0	\$0	\$45,000
Construction	\$0	\$412,000	\$0	\$0	\$0	\$412,000
Inspection	\$0	\$21,000	\$0	\$0	\$0	\$21,000
Construction Admin	\$0	\$21,000	\$0	\$0	\$0	\$21,000
Contingency	\$5,000	\$46,000	\$0	\$0	\$0	\$51,000
TOTAL	\$50,000	\$500,000	\$0	\$0	\$0	\$550,000



276-53 Creek Crossing Access Improvements (Continued)



276-58 Prince Street Service Replacement

Description/Background:

This project will replace approximately 300 feet of a 4-inch common service lateral with an 8-inch main in easement from the west side of 209 Prince Street out to the Prince Street right of way. Three homes are connected to this line.

Design was completed in FY 2020 and construction will be completed by OWASA staff in FY 2021.

Benefits: prevents sewer overflows

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$20,000	\$0	\$0	\$0	\$0	\$20,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$5,000	\$0	\$0	\$0	\$0	\$25,000



276-59 Morgan Creek Interceptor Replacement at Bartram Drive

Description/Background:

This project was identified by the recently completed Collection System Master Plan, and will upscale 2,000 LF of 24-inch gravity sewer to 30-inch pipe in the Morgan Creek Interceptor from MH 64410 to MH 7475 in order to eliminate surcharging conditions at 21 manholes under existing peak wet weather conditions. Construction is expected to occur in FY 2023.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$135,000	\$0	\$0	\$0	\$135,000
Construction	\$0	\$0	\$825,000	\$0	\$0	\$825,000
Inspection	\$0	\$0	\$42,000	\$0	\$0	\$42,000
Construction Admin	\$0	\$0	\$42,000	\$0	\$0	\$42,000
Contingency	\$0	\$15,000	\$91,000	\$0	\$0	\$106,000
TOTAL	\$0	\$150,000	\$1,000,000	\$0	\$0	\$1,150,000



276-60 Bolin Creek Interceptor Replacement at Pathway Drive

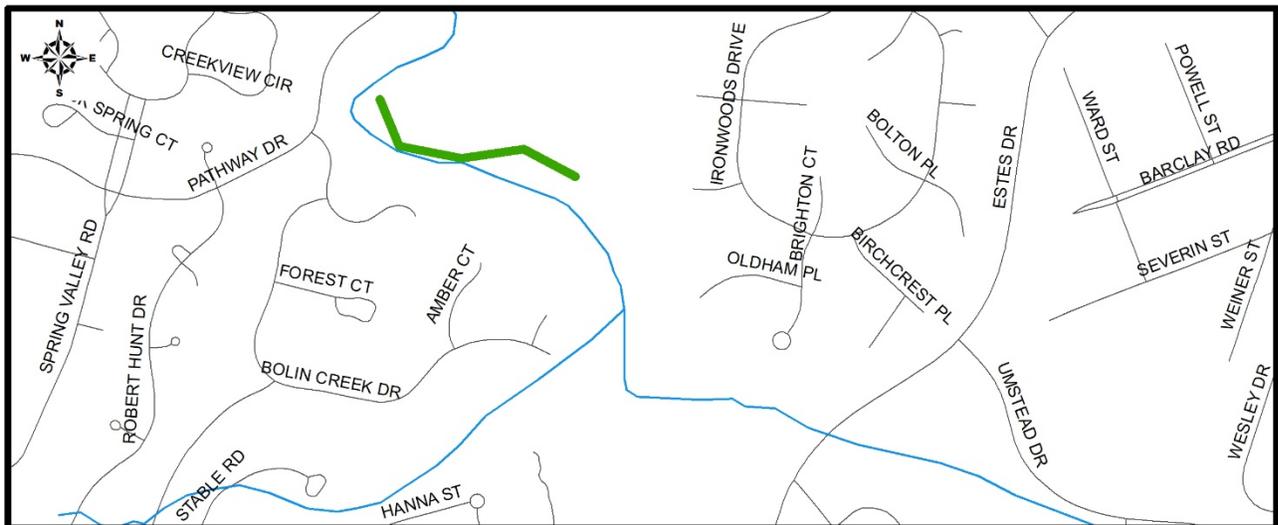
Description/Background:

This project was identified by the recently completed Collection System Master Plan, and will upsize 1,200 LF of 15-inch sewer to 18-inch pipe in the Bolin Creek Interceptor from MH 3197 to MH 3365 in order to eliminate surcharging conditions at six manholes under existing peak wet weather conditions. Construction is expected to occur in FY 2024.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$20,000	\$0	\$0	\$0	\$20,000
Design/Land	\$0	\$0	\$81,000	\$31,000	\$0	\$112,000
Construction	\$0	\$0	\$0	\$301,000	\$0	\$301,000
Inspection	\$0	\$0	\$0	\$16,000	\$0	\$16,000
Construction Admin	\$0	\$0	\$0	\$16,000	\$0	\$16,000
Contingency	\$0	\$5,000	\$9,000	\$36,000	\$0	\$50,000
TOTAL	\$0	\$25,000	\$90,000	\$400,000	\$0	\$515,000



276-61 Brigham Road Sewer Replacement

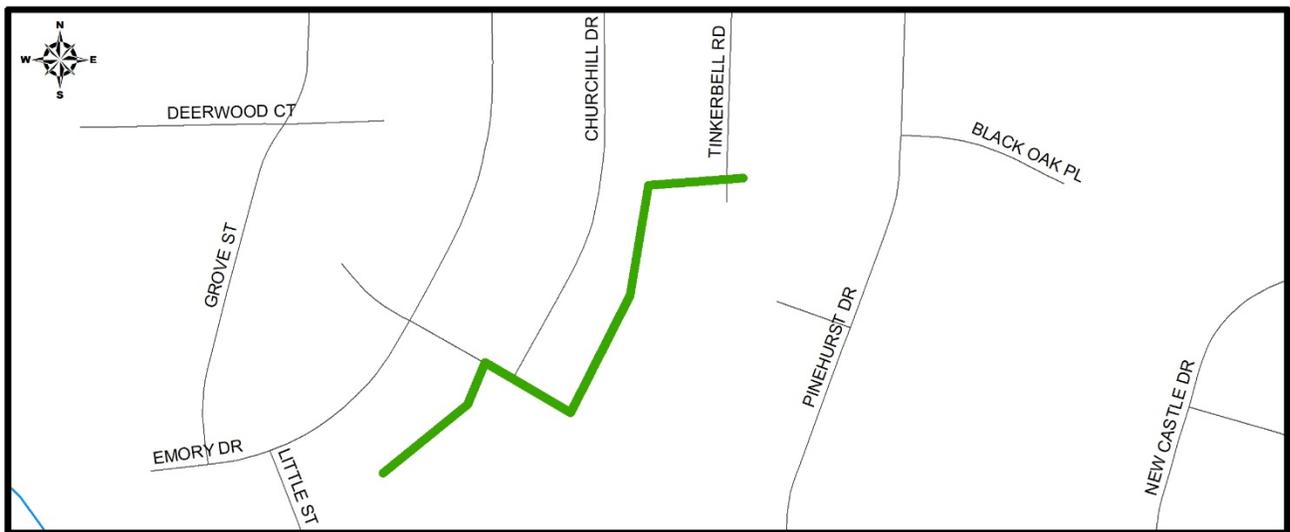
Description/Background:

This project will address surcharging during existing peak wet weather conditions by upsizing 1,500 LF of 12-inch sewer to 16-inch pipe from MH 3905 to MH 4256 along the Little Creek Interceptor. Construction is expected to occur in FY 2024.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$91,000	\$0	\$0	\$91,000
Construction	\$0	\$0	\$0	\$495,000	\$0	\$495,000
Inspection	\$0	\$0	\$0	\$25,000	\$0	\$25,000
Construction Admin	\$0	\$0	\$0	\$25,000	\$0	\$25,000
Contingency	\$0	\$0	\$9,000	\$55,000	\$0	\$64,000
TOTAL	\$0	\$0	\$100,000	\$600,000	\$0	\$700,000



276-62 Willow Drive Bridge Sewer Replacement

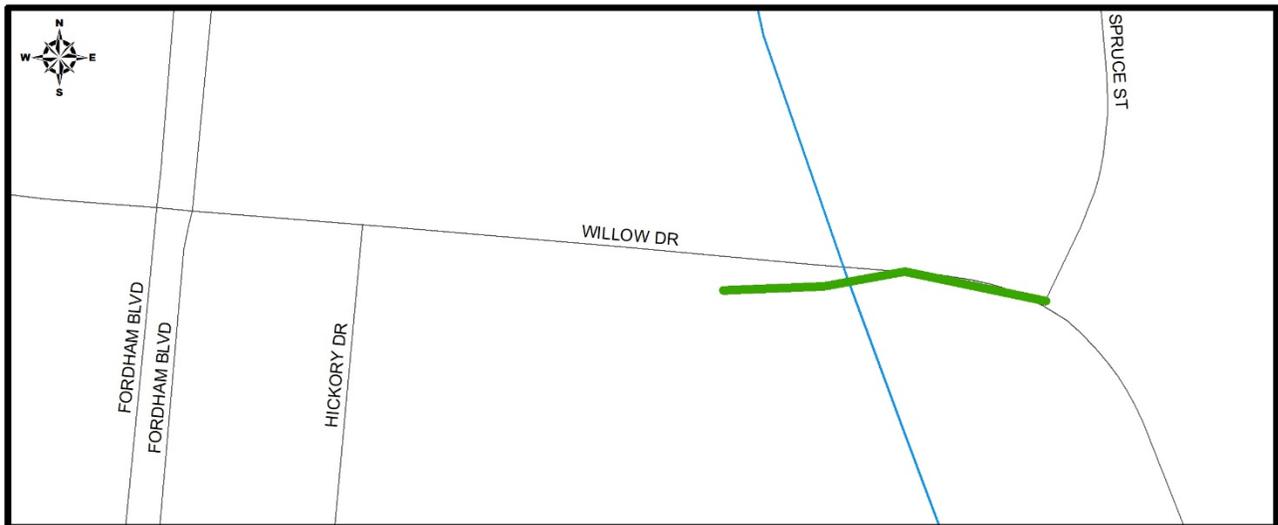
Description/Background:

This project will address predicted surcharging through the upsizing of 500 LF of 10-inch sewer to 12-inch pipe from MH 2901 to MH 2897.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$20,000	\$0	\$20,000
Construction	\$0	\$0	\$0	\$0	\$122,000	\$122,000
Inspection	\$0	\$0	\$0	\$0	\$7,000	\$7,000
Construction Admin	\$0	\$0	\$0	\$0	\$7,000	\$7,000
Contingency	\$0	\$0	\$0	\$0	\$14,000	\$14,000
TOTAL	\$0	\$0	\$0	\$20,000	\$150,000	\$170,000



276-99 Collection System Asset Management

Description/Background:

This project provides funding for the installation of two permanent flow monitors in the collection system in FY 2021 (Morgan Creek Interceptor and Meeting of the Waters Interceptor), and four additional permanent flow monitors in FY 2022 and FY 2023 (Friday Center Interceptor, Bolin Creek Interceptor, Booker Creek Interceptor, Little Creek Interceptor). Additional funding is included in FY 2021 through 2023 for minor rehabilitation items identified in the Collection System Master Plan, typically to be completed by OWASA staff.

Benefits: maintains permit compliance through reduction of sanitary sewer overflows; replaces aging infrastructure, increases system capacity

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$50,000	\$50,000	\$50,000	\$0	\$0	\$150,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$10,000	\$10,000	\$10,000	\$0	\$0	\$30,000
TOTAL	\$60,000	\$60,000	\$60,000	\$0	\$0	\$180,000

Category 277: Wastewater Pump Stations and Force Mains

Background

Where feasible, wastewater collection lines are constructed with a downhill slope to allow wastewater to flow by gravity to the Wastewater Treatment Plant (WWTP). Where collection mains encounter a hill or become prohibitively deep, a pump station raises the wastewater to a level where it can flow again by gravity to the WWTP. Pump stations are essential for moving wastewater out of areas where gravity configurations are not feasible. Pump stations discharge wastewater to force mains, which are pressurized pipes that transmit wastewater to a gravity collection main or to the WWTP.



Rogerson Drive Pump Station

OWASA's goal is to reduce the number of wastewater pump stations and force mains to the lowest practical number. Where these facilities are necessary, OWASA strives to achieve 100 percent reliability.

Existing Facilities and Recent Improvements

There are 21 pump stations and 14 miles of force mains in the service area. The pump stations at Rogerson Drive and Morgan Creek are the largest. The Rogerson Drive pump station collects all wastewater generated in the Bolin Creek, Booker Creek, and Little Creek drainage basins and conveys it via force main to the WWTP. The Morgan Creek pump station located at, and considered to be part of, the WWTP delivers all wastewater collected from the Morgan Creek basin into the plant.

Most of OWASA's wastewater pump stations are supported by permanent on-site electrical generators to provide standby power during outages. Two of these (in the Heritage Hills and Rangewood neighborhoods) are located in the University Lake watershed. Our five largest pump stations – Rogerson Drive, Morgan Creek, Eastowne, Countryside, and Meadowmont 1 – all have permanent standby generators.

Two pump stations with permanent generators (Eubanks Road and Meadowmont 2) were added to the OWASA system in 2003. Permanent generators were also installed at many of the smaller pump stations from FY 2003 through FY 2005. Most recently, a permanent generator was installed at the Tinkerbell pump station when it was reconstructed in FY 2014. Other reliability improvements have included the installation of standardized outlets to enable quick connection of portable generators during power outages, and the installation of pipes and valves to enable bypass pumping.

The Morgan Creek pump station was constructed as part of the 14.5 MGD Upgrade and Expansion Project for the WWTP in FY 2008. It includes four submersible pumps rated at 9.5 MGD each and has a firm pumping capacity of 30 MGD. All four pumps have variable frequency drives (VFDs) that allow adjustment of the pumping rate and help reduce the amount of electrical energy used for pumping. This station lies within the WWTP site and improvements are typically funded under [Category 278](#).

Other projects completed within the past 15 years include the expansion and upgrade of several existing facilities and the elimination (“phase out”) of other pump stations through the construction of additional

gravity sewer mains. The Heritage Hills pump station was improved in FY 2005 with a new wet well, new pumps, and controls. The North Forest Hills pump station was phased out in FY 2006, and the Piney Mountain pump station was replaced in FY 2007. The Lloyd Street and Starlite Drive pump stations were phased out in FY 2008, and the Cleland Drive pump station was phased out in FY 2009. The removal of these four wastewater pumping stations reduced OWASA's electrical energy use by about 17,000 kilowatt-hours per year.

Improvements to the Countryside pump station and the Forest Creek pump station were completed in FY 2012, while improvements at the Oaks 3 and Tinkerbell pump stations were completed in FY 2014.

The 8-inch diameter asbestos cement (AC) force main serving the Heritage Hills subdivision was replaced with an 8-inch diameter polyvinyl chloride (PVC) pipe in FY 2014. A FY 2016 study found the Manning Drive force main to be in good condition. Construction of improvements at Piney Mountain pump station, which is located outside of OWASA's service area, were completed in FY 2017. (The Piney Mountain Homeowners' Association, as the sole beneficiary of OWASA's Piney Mountain pump station and force main, pays all associated CIP, operational and maintenance expenses.)

Construction of improvements to the pump stations at Eastowne, Eubanks Road, and Meadowmont 1, as well as the rehabilitation of a portion of the Rogerson Drive Force Main between NC Highway 54 and South Hamilton Road were completed in FY 2018, as was an evaluation of potential redundancy alternatives for the Rogerson Drive Force Main.

A two-phased project to upgrade the electrical and HVAC systems and install channel grinders and odor control at the Rogerson Drive Pump Station was completed in FY 2020. The emergency repair of the Rogerson Drive Force Main along Rogerson Drive, and across and along the south side of Raleigh Road was also completed in FY 2020.

Planned Improvements

The CIP includes \$1.3 million for this asset class, primarily in asset assessments and rehabilitation of components at several smaller pump stations.

Category 277: Wastewater Pump Stations and Force Mains						
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
277-21 Force Main Condition Evaluation	\$0	\$50,000	\$0	\$50,000	\$0	\$100,000
277-40 Wastewater Pump Station Operational and Needs Assessments	\$80,000	\$0	\$0	\$0	\$0	\$80,000
277-43 Rogerson Drive Force Main and Pump Station Program Services	\$147,000	\$100,000	\$0	\$0	\$0	\$247,000
277-44 Rogerson Drive Pump Station Capacity Upgrade	\$0	\$0	\$0	\$0	\$100,000	\$100,000
277-45 Wastewater Pump Station Rehabilitation	\$235,000	\$250,000	\$0	\$315,000	\$0	\$800,000
277 Category Total	\$462,000	\$400,000	\$0	\$365,000	\$100,000	\$1,327,000

277-21 Force Main Condition Evaluation

Description/Background:

This project includes field condition evaluation of collection system force mains as identified by a FY 2011 master plan. The extent of any rehabilitation is uncertain until the field work is performed, and any capital needs will be funded under separate line items. Condition evaluation may consist of a combination of ultrasonic testing, coupon extraction, leak detection, and/or other technologies suitable for pressure pipe condition assessment.

Evaluations are scheduled in FY 2022 for the Rangewood force main and in FY 2024 for the Countryside and Eubanks Road force mains.

Benefits: replaces or extends useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$45,000	\$0	\$45,000	\$0	\$90,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$5,000	\$0	\$5,000	\$0	\$10,000
TOTAL	\$0	\$50,000	\$0	\$50,000	\$0	\$100,000

277-40 Wastewater Pump Station Operational and Needs Assessments

Description/Background:

This project was identified through the Energy Management Program and includes condition assessment and performance testing for several identified wastewater pump stations.

FY 2021 funding is provided for completion of assessments for various wastewater pump stations throughout the service area; performance testing may include various operational parameters relating to flow, pressure, and power.

Benefits: improves operational efficiency, replaces or extends the life of aging infrastructure

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$72,000	\$0	\$0	\$0	\$0	\$72,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$8,000	\$0	\$0	\$0	\$0	\$8,000
TOTAL	\$80,000	\$0	\$0	\$0	\$0	\$80,000

277-43 Rogerson Drive Force Main and Pump Station Program Services

Description/Background:

The 2-mile long Rogerson Drive force main runs from the wastewater pump station north of Cleland Drive southward across North Carolina Highway 54 (NC 54), to Prestwick Road and then continues to the Mason Farm Wastewater Treatment Plant (WWTP). The northern section of the force main, including the crossing under NC 54, does not have a parallel line for redundancy, whereas the portion from Prestwick Road nearly to the WWTP site does.

The force main has experienced two failures in the past 3 years. Failure of the pipe at a spot along Prestwick Road in September 2016 led to the CIPP rehabilitation of approximately 700 feet of 24" and 30" force main surrounding that location. Failure of the pipe at a spot along Rogerson Drive in April 2019 led to emergency repair completed in FY 2020.

While several risk studies and capital projects related to the pump station and force main system have been completed since 2013, CIP 277-43 was developed as the long term facility planning effort for this critical part of the collection system, with the following major objectives:

- Determine the temporal and spatial dynamics of flow through the force main through a range of operating conditions; determine any recommended improvements to operating schemes;
- Determine the likelihood of failure for key portions of the force main, including through the use of appropriate condition assessment technologies;
- Complete the rehabilitation/replacement of high risk portions of the force main;
- Determine the optimal route for a future redundant force main.

Benefits: replaces or extends the life of aging infrastructure

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$133,000	\$91,000	\$0	\$0	\$0	\$224,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$14,000	\$9,000	\$0	\$0	\$0	\$23,000
TOTAL	\$147,000	\$100,000	\$0	\$0	\$0	\$247,000

277-44 Rogerson Drive Pump Station Capacity Upgrade

Description/Background:

The Rogerson Drive Pump Station is the largest wastewater pump station in the collection system, collecting wastewater flow from about half of the service area. The collection system master plan completed in FY 2020 identified a potential near-term capacity restriction for this pump station based on hydraulic modeling of the system. Funding is included in FY 2025 to begin planning efforts for the capacity project. The efficacy of the gravity sewer rehabilitation program (CIP 276-18) in identifying and reducing sources of inflow and infiltration into the system will directly impact the need and timing of this project.

Benefits: meets expected future wastewater demand

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$91,000	\$91,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$9,000	\$9,000
TOTAL	\$0	\$0	\$0	\$0	\$100,000	\$100,000

277-45 Wastewater Pump Station Rehabilitation FY 2021-2024

Description/Background:

This project provides funding for a series of improvements needed at several smaller wastewater pump stations in the collection system:

- Replacement and upgrade of control system at Rangewood Pump Station and North Lakeshore Pump Station (FY 2021)
- Replacement of pumps at Meadowmont I Pump Station (FY 2021)
- Conversion of Chapel Hill North Pump Station to a submersible (FY 2021 design and FY 2022 construction)
- Capacity improvements at North Lakeshore Pump Station (FY 2024)

Benefits: replaces aging infrastructure, meets expected future wastewater demand

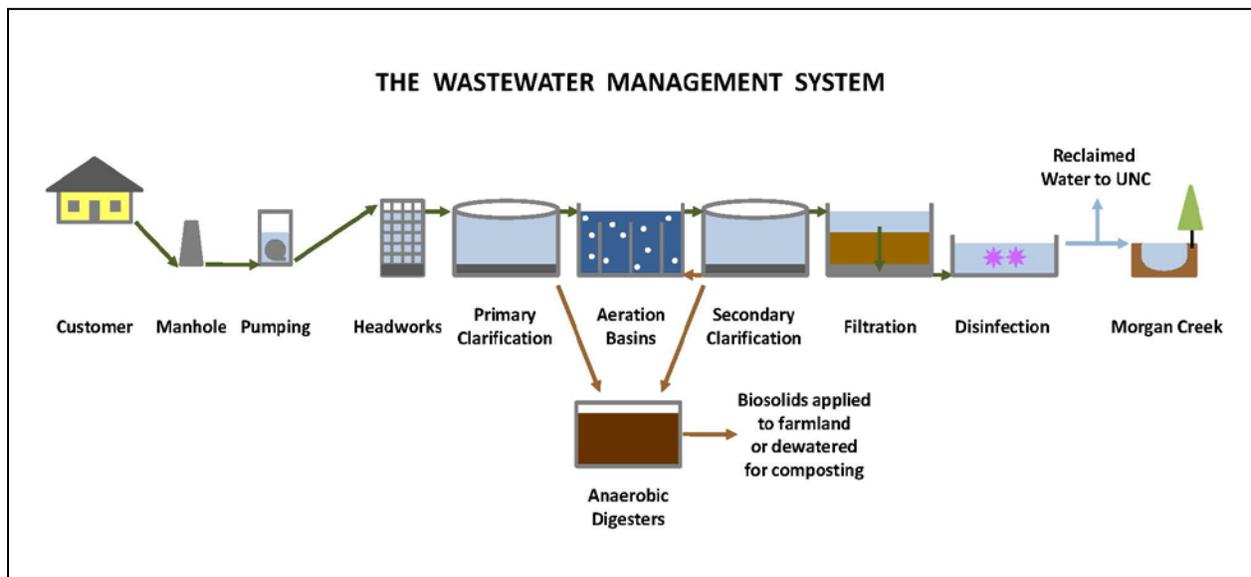
Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$68,000	\$0	\$0	\$24,000	\$0	\$92,000
Construction	\$145,000	\$205,000	\$0	\$238,000	\$0	\$588,000
Inspection	\$0	\$11,000	\$0	\$12,000	\$0	\$23,000
Construction Admin	\$0	\$11,000	\$0	\$12,000	\$0	\$23,000
Contingency	\$22,000	\$23,000	\$0	\$29,000	\$0	\$74,000
TOTAL	\$235,000	\$250,000	\$0	\$315,000	\$0	\$800,000

Category 278: Wastewater Treatment and Recycling

Background

After collection and conveyance from sources throughout the community, wastewater is treated at the Mason Farm Wastewater Treatment Plant (WWTP). A portion of the treated wastewater is reused as reclaimed water (RCW) for non-drinking purposes on the UNC campus and elsewhere, and the remainder is discharged to Morgan Creek, which is a tributary to Jordan Lake. The WWTP employs biological, chemical and physical processes to treat the wastewater. Solids separated from the wastewater are treated and recycled as biosolids. Biosolids are beneficially recycled at multiple agricultural sites in Orange, Alamance and Chatham Counties or sent for composting at a privately-owned facility in Chatham County.



The WWTP is OWASA's largest energy-consuming facility, typically using about half of OWASA's total electrical energy used in any given year. The energy intensity (amount of energy required for every wastewater unit treated) has declined by about 40% since the installation of a fine bubble diffused aeration system, energy efficient blowers and mixers in 2014.

Existing Facilities

The WWTP is located on Old Mason Farm Road next to UNC's Finley Golf Course. When first placed in service in 1948, the WWTP had a capacity of 2.25 million gallons per day (MGD). Secondary treatment was achieved through one primary clarifier followed by a trickling filter and final clarifier. Solids particles were digested anaerobically. Some of the original facilities are still in service today.

Treatment capacity was increased to 4.5 MGD in 1968 with a doubling of existing facilities. Included in this expansion was the addition of two anaerobic digesters and a centrifuge to dewater the biosolids. Improvements completed in 1978 increased treatment capacity to 5.5 MGD and included the construction of an activated sludge basin for ammonia-nitrogen removal and a chlorine contact chamber for effluent disinfection. A 1983 expansion and renovation project, partially funded through a 201 Wastewater Facilities

Grant from the United States Environmental Protection Agency (USEPA), increased the treatment capacity to 8 MGD. This project included two additional activated sludge basins, major improvements to the aeration equipment, two new final clarifiers, a new chlorine contact chamber, and other major renovations throughout the plant. It also included the acquisition and preparation of the first tract of OWASA-owned land for our biosolids land application program.

Additional improvements were completed in 1991 to meet the State's phosphorus effluent limit, as well as a new limit on the amount of chlorine that could be discharged. Other key improvements included aeration basin tie-ins and an engine-driven air blower system capable of using methane gas produced in the digesters. These improvements and others enabled full time use of a biological phosphorus removal process developed and patented by OWASA.

A 0.9 MG off-site liquid biosolids storage tank was constructed in 1994 on OWASA's Headwaters property, located west of Carrboro, to provide approximately 30 days of biosolids storage capacity. This improvement allowed a re-rating of the plant capacity from 8 to 9 MGD.

An additional 3 MGD of treatment capacity was provided through the FY 2000 expansion and renovation project, thereby increasing the plant's permitted capacity to 12 MGD. This project included construction of a new headworks, Primary Clarifier No. 3, Aeration Basins Nos. 4A and 4B, Secondary Clarifier No. 4, two 250 horsepower (HP) Electric Blowers for the aeration basins, a new Solids Handling Building that included two new Gravity Belt Thickeners, two new boilers, and Anaerobic Digesters Nos. 3 and 4. A 2,000-kilowatt (kW) electrical generator was installed in FY 2001 to improve reliability during power outages. Two 6 MGD diesel powered pumps were installed in 2002 at Intermediate Pump Station No. 2 to provide additional reliability and redundancy.

Another 1.5 MG off-site biosolids storage tank was constructed in FY 2003 to provide adequate biosolids storage capacity needed during extended periods when land application of biosolids was not possible.

The WWTP was upgraded and expanded to a capacity of 14.5 MGD as part of a 3-year, \$50 million construction project completed in 2007. This project provided six new deep-bed denitrification filters, an ultraviolet (UV) disinfection system, new headworks, new influent sewers and influent pump station (Morgan Creek pump station), new Secondary Clarifier No. 5, and major improvements to the aeration basins. In addition, the project converted digester covers from floating to fixed, installed a new digester gas storage system, added chemical storage tanks, and installed a 2,700 kW generator and new switchgear. The denitrification filters will help meet future, more stringent, total nitrogen permit limits required by the State's Jordan Lake Nutrient Management Rules. The filters will also enhance our ability to meet the stringent total phosphorus limit as plant flows increase.

Biosolids are processed in a series of four anaerobic digesters and then either recycled in liquid form as a low strength fertilizer and soil amendment via land application to local farmlands, or dewatered and transported for composting. The land application sites include both privately-owned sites and one OWASA-owned site. OWASA has both "Class A" and "Class B" permits for the land application of biosolids. A rotary press was installed in 2007 to provide onsite biosolids dewatering to about 20% solids content.

As a result of a FY 2007 odor study, phased projects were recommended to help achieve OWASA's odor control objectives. The first phase was completed in 2007 and included covering and treating foul air from the primary clarifier splitter boxes, the intermediate pump station wetwells, and the aeration basin influent channel. The second phase, completed in FY 2010, covered the primary clarifiers and treated the foul air emanating from them. The third phase (as part of CIP 278-40), completed in FY 2015, covered and treated the air from 10 of the 16 aeration basin cells and included installation of three new scrubbers. Going

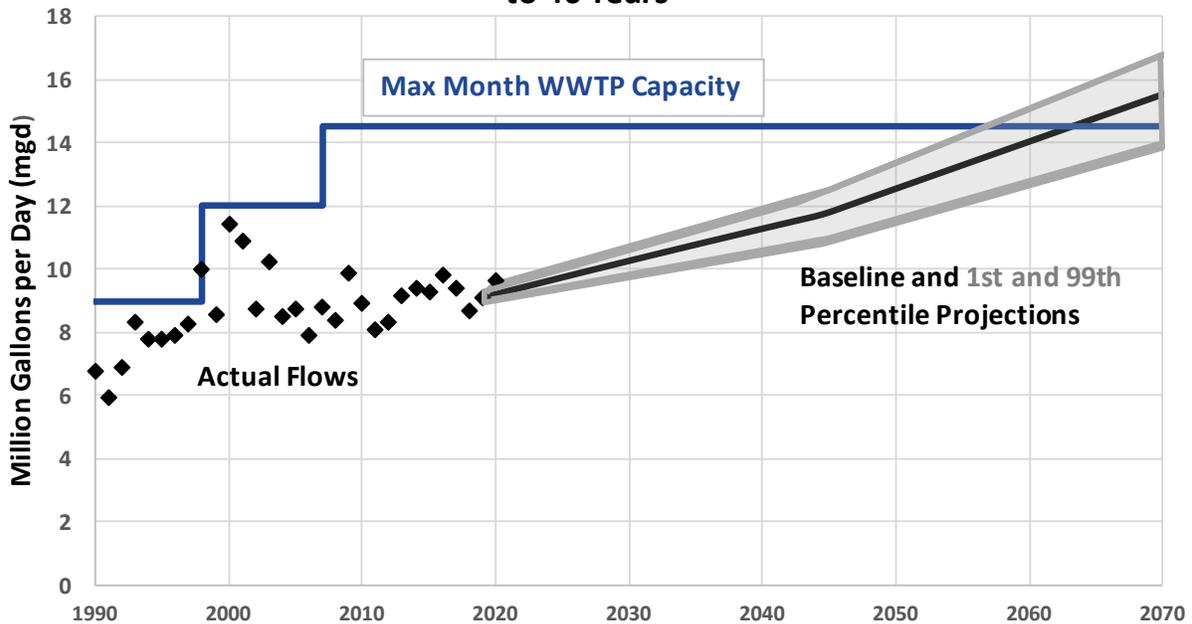
forward, odor control will be addressed on a project by project basis.

In 2009 RCW facilities (storage tank, pumping, distribution pipe, etc.) were completed and put into service, and an upgrade of the Digester Complex electrical system was completed. Improvements to the existing flood protection system, including work on the berm around the WWTP site, stream bank stabilization to Morgan Creek adjacent to the WWTP berm, and rehabilitation of the existing stormwater pumps were completed in FY 2014.

A 2010 engineering study recommended that to improve treatment process performance, meet more stringent nutrient limits, and reduce energy use and costs, the existing blowers, aeration system, and mixers be replaced with more efficient fine-bubble diffusers, new blowers, and new mixers. As noted above, that project was completed in FY 2015 in conjunction with the third phase of odor control improvements. The new blowers, aeration system, and mixers reduced electricity use at the WWTP by about 40 percent and energy costs by about \$300,000 in 2015.

The 2010 engineering study also recommended certain operational changes for optimizing existing processes as well as other capital improvements to address future capacity limitations. Implementation of several of these operational recommendations resulted in immediate and significant benefits through reduced operating costs. The study's main findings were significant in that the plant is now expected to be able to meet the more stringent future permit limits for total nitrogen without additional capital facilities, assuming flow conditions associated with the WWTP's permitted capacity of 14.5 MGD. Major capacity expansion of the WWTP is not expected to be required for several decades based on OWASA's current flow projections.

OWASA has Sufficient Hydraulic Capacity at its WWTP for the next 35 to 40 Years



Planned Improvements

The five-year CIP includes \$23.5 million for this asset class. Notable projects include the conversion of Secondary Clarifier #4 ([278-20](#)), the completion of the improvements at the Solids Handling Facility ([278-51](#)) and Secondary Clarifiers #2 and 3 ([278-72](#)), and rehabilitation and improvements to all three Primary

Clarifiers (278-86). In addition, a master plan for the facility completed over the next fiscal years is expected to inform future capital investment.

Category 278: Wastewater Treatment							
		FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Five-Year Total
278-11	Wastewater Facility Asset Rehabilitation	\$150,000	\$0	\$0	\$1,778,000	\$4,212,000	\$6,140,000
278-20	WWTP Clarifier #4 Conversion	\$125,000	\$1,782,000	\$0	\$0	\$0	\$1,907,000
278-50	WWTP Warehouse	\$0	\$0	\$83,000	\$663,000	\$0	\$746,000
278-51	WWTP Solids Thickening Improvements	\$3,879,000	\$0	\$0	\$0	\$0	\$3,879,000
278-61	WWTP Pavement Improvements	\$0	\$0	\$25,000	\$0	\$0	\$25,000
278-68	Water and Wastewater Facilities Building Envelope Rehabilitation	\$450,000	\$400,000	\$400,000	\$400,000	\$0	\$1,650,000
278-72	WWTP Secondary Clarifier Rehabilitation	\$1,017,000	\$0	\$0	\$0	\$0	\$1,017,000
278-75	WWTP Facilities Planning	\$100,000	\$200,000	\$250,000	\$0	\$0	\$550,000
278-78	WWTP Fermenter Improvements	\$540,000	\$0	\$0	\$0	\$0	\$540,000
278-80	WWTP Miscellaneous Rehabilitation	\$400,000	\$100,000	\$400,000	\$0	\$0	\$900,000
278-82	WWTP Headworks Rehabilitation	\$113,000	\$0	\$0	\$0	\$0	\$113,000
278-84	WWTP Security Improvements	\$50,000	\$150,000	\$25,000	\$0	\$0	\$225,000
278-86	WWTP Primary Clarifier Rehabilitation	\$0	\$0	\$430,000	\$3,010,000	\$0	\$3,440,000
278-87	WWTP Flow Monitoring	\$0	\$0	\$25,000	\$125,000	\$0	\$150,000
278-88	Offsite Biosolids Storage Improvements	\$75,000	\$0	\$0	\$0	\$0	\$75,000
278-89	WWTP RAS Pumping Improvements	\$0	\$0	\$0	\$175,000	\$765,000	\$940,000
278-90	WWTP Admin Bldg Planning Study	\$25,000	\$30,000	\$0	\$0	\$0	\$55,000
278-91	WWTP Scum Pump Station Rehabilitation	\$0	\$52,000	\$177,000	\$0	\$0	\$229,000
278-92	WWTP Stormwater Pump Station to IPS	\$0	\$0	\$50,000	\$300,000	\$0	\$350,000
278-93	Intermediate Pump Station (IPS) Pump/Motor Replacements	\$0	\$0	\$0	\$0	\$525,000	\$525,000
278	Category Total	\$6,924,000	\$2,714,000	\$1,865,000	\$6,451,000	\$5,502,000	\$23,456,000

278-11 Wastewater Facility Asset Rehabilitation

Description/Background:

This project provides funding for replacement, rehabilitation, or improvement of components of wastewater facilities such as the WWTP, wastewater pump stations, and offsite biosolids storage facility in order to maintain reliable, efficient performance. There are three main elements of this project funding:

- Funding is provided in FY 2021 for the replacement of pressure relief valves on the methane gas storage system, as well as contingency funding for unidentified urgent capital needs.
- Funding is provided in the fourth and fifth fiscal years of any given five-year CIP to assure that capital investment decisions account for some rate of asset replacement in future years where specific projects are not yet identified. This placeholder funding is the primary mechanism used to gauge infrastructure replacement needs not only over the five-year CIP, but over a fifteen year financial planning horizon. Funding is based on estimates of remaining life and replacement costs for over 3,800 individual assets (pumps, motors, etc) within this asset class. The funding totals are adjusted to account for rehabilitation projects funded elsewhere in this category (278 – Wastewater Treatment and Disposal).

Benefits: renews or extends the useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$136,000	\$0	\$0	\$0	\$0	\$136,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$14,000	\$0	\$0	\$1,778,000	\$4,212,000	\$6,004,000
TOTAL	\$150,000	\$0	\$0	\$1,778,000	\$4,212,000	\$6,140,000

278-20 WWTP Secondary Clarifier No. 4 Improvements

Description/Background:

The WWTP has five secondary clarifier units of various capacities, ages, and features. Maintenance of Secondary Clarifier No.4 has been a concern for staff for many years. The inboard effluent launder design has not performed as well as the other 4 clarifiers with exterior launders. This limits the overall operational flexibility of secondary clarification (especially during wet weather flows).

Preliminary engineering was completed in FY 2019. Funds are provided in FY 2021 and FY 2022 for the rehabilitation of this clarifier, including its conversion to an exterior launder design.

Benefits: replaces or extends the useful life of aging assets; improves operational flexibility and efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$113,000	\$77,000	\$0	\$0	\$0	\$190,000
Construction	\$0	\$1,401,000	\$0	\$0	\$0	\$1,401,000
Inspection	\$0	\$71,000	\$0	\$0	\$0	\$71,000
Construction Admin	\$0	\$71,000	\$0	\$0	\$0	\$71,000
Contingency	\$12,000	\$162,000	\$0	\$0	\$0	\$174,000
TOTAL	\$125,000	\$1,782,000	\$0	\$150,000	\$0	\$1,907,000

278-50 WWTP Warehouse

Description/Background:

Maintenance and control of spare parts and equipment is essential to the WWTP's effective operation and maintenance. A central WWTP warehouse will enhance tracking, replacement, and access to parts and equipment, including during emergency situations. Currently, WWTP staff stores these materials in several decentralized locations both at the plant and at offsite locations such as wastewater pump stations.

Funds are included in FY 2023 to design, and in FY 2024 to construct, an on-site WWTP warehouse for storage of critical spare parts and equipment.

Benefits: increases operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$75,000	\$0	\$0	\$75,000
Construction	\$0	\$0	\$0	\$546,000	\$0	\$546,000
Inspection	\$0	\$0	\$0	\$28,000	\$0	\$28,000
Construction Admin	\$0	\$0	\$0	\$28,000	\$0	\$28,000
Contingency	\$0	\$0	\$8,000	\$61,000	\$0	\$69,000
TOTAL	\$0	\$0	\$83,000	\$663,000	\$0	\$746,000

278-51 WWTP Solids Thickening Improvements

Description/Background:

Prior to the anaerobic digestion process, the WWTP uses equipment that thickens or concentrates the solids that are produced in various parts of the treatment process. This step helps to reduce the volume of solids treated in the anaerobic digestion process. The current thickening units are gravity belt thickeners (GBTs) which have reached the end of their useful life.

A FY 2018 evaluation found that replacement of the GBTs with rotary drum thickeners (RDTs) would be more reliable, generate less odors and be more cost effective to operate and maintain. The RDT's will have a notable reduction in washwater, generate more concentrated solids, and may result in between 25,000 and 70,000 kWh of electrical energy savings (largely depending on final commissioning).

In addition to installation of RDTs, the project scope also includes the improvement of a number of auxiliary systems including the waste activated solids (WAS) pumping, primary solids pumping, and odor control systems.

Due to proximity of the project sites and the need to coordinate temporary process modifications and bypasses, the construction of this project was contracted in conjunction with the rehabilitation of the concrete at the plant Headworks ([278-82](#)). Construction began in FY 2019 and is expected to be complete in FY 2021.

Benefits: replaces aging assets; increases operational efficiency; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$3,204,000	\$0	\$0	\$0	\$0	\$3,204,000
Inspection	\$161,000	\$0	\$0	\$0	\$0	\$161,000
Construction Admin	\$161,000	\$0	\$0	\$0	\$0	\$161,000
Contingency	\$353,000	\$0	\$0	\$0	\$0	\$353,000
TOTAL	\$3,879,000	\$0	\$0	\$0	\$0	\$3,879,000

278-61 WWTP Pavement Improvements

Description/Background:

Funds are provided in FY 2023 for a comprehensive pavement assessment for the WWTP site and sequencing plan to minimize the impacts to plant vehicular traffic.

Benefits: extends useful life of aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$25,000	\$0	\$0	\$25,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$0	\$0	\$25,000	\$0	\$0	\$25,000

278-68 Water and Wastewater Facilities Building Envelope Rehabilitation

Description/Background:

This project includes the rehabilitation of building envelope systems (roofs, walls, windows, etc.) at a prioritized set of OWASA's buildings and structures as recommended by a FY 2017 condition assessment. For efficiency, both water and wastewater facilities are included in the project; project expenditures related to facilities other than wastewater treatment will be reallocated to the appropriate asset category during project closeout.

Funding is provided in FY 2021 for the construction of a roof replacement for the OWASA Administration Building. Funding is provided in FY 2022 through FY 2024 for design and construction of roof replacements at several buildings identified by the prioritized condition assessment.

Benefits: extends the useful life of aging assets; reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$31,000	\$31,000	\$31,000	\$0	\$93,000
Construction	\$371,000	\$301,000	\$301,000	\$301,000	\$0	\$1,274,000
Inspection	\$19,000	\$16,000	\$16,000	\$16,000	\$0	\$67,000
Construction Admin	\$19,000	\$16,000	\$16,000	\$16,000	\$0	\$67,000
Contingency	\$41,000	\$36,000	\$36,000	\$36,000	\$0	\$149,000
TOTAL	\$450,000	\$400,000	\$400,000	\$400,000	\$0	\$1,650,000

278-72 WWTP Secondary Clarifier Nos. 2 and 3 Rehabilitation

Description/Background:

The WWTP has five secondary clarifier units of various capacities, ages, and features. Due to a variety of aging infrastructure and maintenance challenges, Secondary Clarifiers Nos. 2 and 3 are rarely in operation. This serves not only to limit the overall operational flexibility of secondary clarification (especially during wet weather flows) but also is accelerating the continued deterioration of surface coatings in the clarifiers.

Design was completed in FY 2019 and construction began in FY 2020. Funds are provided in FY 2021 for the completion of the rehabilitation of internal mechanical drive mechanisms, coatings, and other rehabilitation needs for Secondary Clarifiers Nos. 2 and 3.

Benefits: replaces or extends the useful life of aging assets; improves operational flexibility and efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$840,000	\$0	\$0	\$0	\$0	\$840,000
Inspection	\$42,000	\$0	\$0	\$0	\$0	\$42,000
Construction Admin	\$42,000	\$0	\$0	\$0	\$0	\$42,000
Contingency	\$93,000	\$0	\$0	\$0	\$0	\$93,000
TOTAL	\$1,017,000	\$0	\$0	\$0	\$0	\$1,017,000

278-75 WWTP Facilities Planning

Description/Background:

The most recent hydraulic and treatment capacity evaluation of the WWTP was completed in 2010 and determined that the next WWTP capacity upgrade to 18.5 million gallons per day (MGD) would cost \$59 million (2010 dollars) but would not be required until at least 2030.

Funds are provided in FY 2021 through FY 2023 to perform an updated capacity evaluation and facility master plan for the WWTP. Of particular interest will be the required timing for the 18.5 MGD plant capacity upgrade.

Benefits: determines asset risk; identifies future capital investment needs

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$91,000	\$182,000	\$227,000	\$0	\$0	\$500,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0	\$0
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$9,000	\$18,000	\$23,000	\$0	\$0	\$50,000
TOTAL	\$100,000	\$200,000	\$250,000	\$0	\$0	\$550,000

278-78 WWTP Fermenter Improvements

Description/Background:

The settled solids from the primary clarifiers are pumped into the fermenter tank where they undergo fermentation under anaerobic conditions. The fermentation process breaks down some of the more complex organic molecules to form short-chain volatile fatty acids (SCVFAs) – mainly acetic and propionic acids. Using thickening equipment, the fermented product is separated into a solid and liquid components; the latter is then pumped to the Nitrified Sludge (NSL) cells to serve as a food source for the biological process.

In FY 2019, the draining, cleaning, and inspection of the primary sludge fermenter found the interior lining of the tank to be in relatively good condition, but recommended improvements to the mixing system. Funding is included in FY 2021 for completion of design and construction of an improved mixing system and related improvements.

Benefits: restores useful life

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$445,000	\$0	\$0	\$0	\$0	\$445,000
Inspection	\$23,000	\$0	\$0	\$0	\$0	\$23,000
Construction Admin	\$23,000	\$0	\$0	\$0	\$0	\$23,000
Contingency	\$49,000	\$0	\$0	\$0	\$0	\$49,000
TOTAL	\$540,000	\$0	\$0	\$0	\$0	\$540,000

278-80 WWTP Miscellaneous Rehabilitation Projects

Description/Background:

A study completed in FY 2018 defined the scope of three rehabilitation projects at various locations throughout the WWTP:

- Spray water system for the aeration process:** Funding is included in FY 2021 for completion of construction, including installation of new non-potable water system piping with appropriate materials of construction, insulation and heat-trace; installation of hose reels installed at strategic locations along the activated sludge process tanks, primary and secondary clarifiers, effluent filters, bar screens and Morgan Creek influent pump station.
- Chemical Building and Bulk Chemical Tank area:** replacement of exterior piping, which is severely degraded and has experienced many leaks/repairs; full rehabilitation of the chemical feed building, including floor coatings, electrical panel, ventilation system, lighting, and re-orientation of chemical feed pump areas and eyewash station. In addition, several building envelope components will need to be addressed. Completion of design commenced in FY 2022 will be by construction in FY 2023.

Benefits: replaces aging infrastructure, increases operational efficiency, identifies capital investment needs, reduces safety risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$91,000	\$0	\$0	\$0	\$91,000
Construction	\$329,000	\$0	\$329,000	\$0	\$0	\$658,000
Inspection	\$17,000	\$0	\$17,000	\$0	\$0	\$34,000
Construction Admin	\$17,000	\$0	\$17,000	\$0	\$0	\$34,000
Contingency	\$37,000	\$9,000	\$37,000	\$0	\$0	\$83,000
TOTAL	\$400,000	\$100,000	\$400,000	\$0	\$0	\$900,000

278-82 WWTP Headworks Rehabilitation

Description/Background:

The WWTP Headworks was constructed in 2007 with aluminum covers above all tank and channel areas in order to capture and treat any objectionable odors emanating from the process. Air beneath the covers is exhausted to a chemical odor scrubber for treatment. An assessment of the structure performed under the Concrete Condition Assessment program ([272-39](#)) revealed that corrosive gases remaining beneath the covers at a limited but extremely critical portion of the Headworks had led to severe localized deterioration of the concrete. This section of the Headworks conveys the full influent flow entering the WWTP. Immediate steps were taken to improve the ventilation of the headspace, and design was completed in FY 2019 for rehabilitation of the concrete, including provisions for the bypass of the full plant flow.

Due to proximity of the project sites and the need to coordinate temporary process modifications and bypasses, the construction of this project was contracted in conjunction with [CIP 278-51 WWTP Solids Thickening Improvements](#). Construction began in FY 2020 and will be completed in FY 2021.

Benefits: extends service life, increases reliability

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$92,000	\$0	\$0	\$0	\$0	\$92,000
Inspection	\$5,000	\$0	\$0	\$0	\$0	\$5,000
Construction Admin	\$5,000	\$0	\$0	\$0	\$0	\$5,000
Contingency	\$11,000	\$0	\$0	\$0	\$0	\$11,000
TOTAL	\$113,000	\$0	\$0	\$0	\$0	\$113,000

278-84 WWTP Security Improvements

Description/Background:

A comprehensive site security assessment was completed in FY 2019 to evaluate environmental, physical, operational, and technological/electronic security threats and recommended countermeasures for the WWTP. Major recommendations addressed as part of this project include lighting, card readers, cameras, and an upgraded video management system including analytics and alarms.

Benefits: reduces operational risk, reduces safety and security risks

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$45,000	\$136,000	\$22,000	\$0	\$0	\$203,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$5,000	\$14,000	\$3,000	\$0	\$0	\$22,000
TOTAL	\$50,000	\$150,000	\$25,000	\$0	\$0	\$225,000

278-86 WWTP Primary Clarifier Rehabilitation

Description/Background:

The WWTP has three primary clarifiers and two flow distribution boxes, all of which were covered between 2007 and 2009. Corrosion of several internal components has been accelerated due to covering of the clarifiers and inadequate foul air removal by the odor scrubber systems. Due to this corrosion, concrete rehabilitation is needed in the primary influent and effluent flow distribution boxes and the effluent troughs of Primary Clarifiers Nos. 1 and 2. These two clarifiers also require rehabilitation or replacement of internal rake arms. In addition, the scum pump stations for all three clarifiers are in need of rehabilitation to address electrical safety concerns and improved pumping.

Solids from the primary clarifiers are pumped via pumps located in the basement of Old Lab Building. A study completed in FY 2018 found that construction of a new pump station was preferable due to the high cost of rehabilitating the existing equipment and structure. The new facility will provide improved access for operations and maintenance, improved redundancy, and better pumping performance. Design and location of the new facility will be coordinated with findings from [CIP 278-75 WWTP Facilities Planning](#).

Funding is provided in FY 2023 through FY 2024 for design and construction of these improvements.

Benefits: reduces operational risk, replaces aging assets, reduces safety risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$390,000	\$0	\$0	\$390,000
Construction	\$0	\$0	\$0	\$2,486,000	\$0	\$2,486,000
Inspection	\$0	\$0	\$0	\$125,000	\$0	\$125,000
Construction Admin	\$0	\$0	\$0	\$125,000	\$0	\$125,000
Contingency	\$0	\$0	\$40,000	\$274,000	\$0	\$314,000
TOTAL	\$0	\$0	\$430,000	\$3,010,000	\$0	\$3,440,000

278-87 WWTP Flow Monitoring

Description/Background:

Existing flow meters are located at the plant headworks and post-aeration basin to provide flow data for influent and effluent flow. This project provides for funding in FY 2023 and FY 2024 for installation of supplemental flow metering at several locations internal to the WWTP treatment process, including return activated sludge (RAS) flow, Mixed Liquor Suspended Solids (MLSS) distribution channels, and filter influent channels. Flow meter data will be integrated with plant SCADA system, and the supplemental flow information will allow for optimized operation.

Benefits: increases operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$23,000	\$0	\$0	\$23,000
Construction	\$0	\$0	\$0	\$102,000	\$0	\$102,000
Inspection	\$0	\$0	\$0	\$6,000	\$0	\$6,000
Construction Admin	\$0	\$0	\$0	\$6,000	\$0	\$6,000
Contingency	\$0	\$0	\$2,000	\$11,000	\$0	\$13,000
TOTAL	\$0	\$0	\$25,000	\$125,000	\$0	\$150,000

278-88 Offsite Biosolids Storage Improvements

Description/Background:

Funding is provided in FY 2021 for two improvement projects at the biosolids storage facility located on NC Highway 54 near Orange Grove Road:

- An evaluation of potential alternative mixing systems for the storage tanks will be used as the basis for a future CIP project request for replacement of the current inefficient and energy-intensive mixing pumps.
- Upgrades to process monitoring equipment, replacement of an existing control panel, and improvements to the existing Supervisory Control and Data Acquisition (SCADA) program will provide for increased safety, security, and process optimization for this facility.

Benefits: increases operational efficiency; increases safety

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$34,000	\$0	\$0	\$0	\$0	\$34,000
Construction	\$34,000	\$0	\$0	\$0	\$0	\$34,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$7,000	\$0	\$0	\$0	\$0	\$7,000
TOTAL	\$75,000	\$0	\$0	\$0	\$0	\$75,000

278-89 WWTP Return Activated Sludge (RAS) Pumping Improvements

Description/Background:

A FY 2018 evaluation of the WWTP RAS pumping system made several recommendations to improve the reliability of the system:

- Replace aging and obsolete RAS pumps for secondary clarifiers No.1, 2 and 3 with larger design flows.
- Installation of piping to allow for rapid connection of a backup diesel pump (to be purchased through future Capital Equipment budget)
- Install new RAS piping between Clarifier Nos. 2 and 3 and the nitrified sludge (NSL) tanks

Funds are included in FY 2024 and FY 2025 for completion of the recommended improvements.

Benefits: increases operational efficiency and redundancy

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$159,000	\$0	\$159,000
Construction	\$0	\$0	\$0	\$0	\$631,000	\$631,000
Inspection	\$0	\$0	\$0	\$0	\$32,000	\$32,000
Construction Admin	\$0	\$0	\$0	\$0	\$32,000	\$32,000
Contingency	\$0	\$0	\$0	\$16,000	\$70,000	\$86,000
TOTAL	\$0	\$0	\$0	\$175,000	\$765,000	\$940,000

278-90 WWTP Administration Building Renovations

Description/Background:

Funds are provided in FY 2021 for the updating of the building entrance to accommodate accessibility requirements. Funds are provided in FY 2022 for the evaluation of space utilization and improvements to address lack of storage, office, meeting space, and deteriorated and/or outdated features.

Benefits: replaces aging assets; corrects code deficiencies; reduces safety risk

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$27,000	\$0	\$0	\$0	\$27,000
Design/Land	\$0	\$0	\$0	\$0	\$0	\$0
Construction	\$23,000	\$0	\$0	\$0	\$0	\$23,000
Inspection	\$0	\$0	\$0	\$0	\$0	\$0
Construction Admin	\$0	\$0	\$0	\$0	\$0	\$0
Contingency	\$2,000	\$3,000	\$0	\$0	\$0	\$5,000
TOTAL	\$25,000	\$30,000	\$0	\$0	\$0	\$55,000

278-91 WWTP Scum Pump Station Rehabilitation

Description/Background:

The existing scum pump station is subject to increased maintenance due to various outdated features. A preliminary engineering study was completed in FY 2018 which recommended the scope for this project. Funding is provided in FY 2022 and FY 2023 for the rehabilitation of existing pumps, electrical, and controls.

Benefits: replaces aging assets

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$47,000	\$0	\$0	\$0	\$47,000
Construction	\$0	\$0	\$144,000	\$0	\$0	\$144,000
Inspection	\$0	\$0	\$8,000	\$0	\$0	\$8,000
Construction Admin	\$0	\$0	\$8,000	\$0	\$0	\$8,000
Contingency	\$0	\$5,000	\$17,000	\$0	\$0	\$22,000
TOTAL	\$0	\$52,000	\$177,000	\$0	\$0	\$229,000

278-92 WWTP Stormwater Pump Station Bypass

Description/Background:

Much of the WWTP is situated within a flood protection berm to prevent storm events from affecting plant operation. A stormwater pump station is used to pump accumulated runoff collecting within the berm area. Spills (chemical or wastewater) at the WWTP are typically contained within the stormwater wet well. During such events the contents of the wet well cannot be discharged into surface waters and must be pumped out and directed back into the plant. This project will evaluate options to provide a connection from the stormwater pump station back into the treatment process to facilitate this activity. Funds are provided in FY 2023 and 2024 for the design and construction of these improvements.

Benefits: increases operational efficiency

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$45,000	\$0	\$0	\$45,000
Construction	\$0	\$0	\$0	\$246,000	\$0	\$246,000
Inspection	\$0	\$0	\$0	\$13,000	\$0	\$13,000
Construction Admin	\$0	\$0	\$0	\$13,000	\$0	\$13,000
Contingency	\$0	\$0	\$5,000	\$28,000	\$0	\$33,000
TOTAL	\$0	\$0	\$50,000	\$300,000	\$0	\$350,000

278-93 WWTP Intermediate Pump Station Rehabilitation

Description/Background:

A 2016 engineering study evaluated potential options for replacement or relocation of the intermediate pump stations. A portion of the equipment replacement scope was completed in FY 2019 with critical rehabilitation of electrical, controls, and ventilation. The remainder of the scope includes the replacement of six electric pumps and motors and the replacement of the 3 diesel pumps, piping, valves, and fittings. Timing of this \$3.5 million project is dependent on the remaining useful life of the pumps; currently, the project is funded to commence design and some construction in FY 2025.

Benefits: replaces aging assets; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$0	\$0	\$257,000	\$257,000
Construction	\$0	\$0	\$0	\$0	\$200,000	\$200,000
Inspection	\$0	\$0	\$0	\$0	\$10,000	\$10,000
Construction Admin	\$0	\$0	\$0	\$0	\$10,000	\$10,000
Contingency	\$0	\$0	\$0	\$0	\$48,000	\$48,000
TOTAL	\$0	\$0	\$0	\$0	\$525,000	\$525,000

Category 279: Reclaimed Water

Background

In April 2009, OWASA began operating a reclaimed water (RCW) system that provides non-drinking water for certain uses that were previously met with drinking water. RCW is the highly treated water produced through advanced treatment at the Wastewater Treatment Plant (WWTP). Disinfection is provided by ultraviolet light and chlorine.

Among other benefits, the RCW system:

- enables OWASA to meet non-drinking water needs in a cost-effective manner while freeing up the community's drinking water supply and treatment capacities to meet essential needs;
- lowers the risk of a water shortage for all customers during drought conditions;
- defers or eliminates the need for costly water supply and/or treatment facilities; and
- requires about 35% less energy per 1,000 gallons of water supplied compared to our drinking water system.



Reclaimed Water System

Following the record drought of 2001/2002, OWASA and the University of North Carolina at Chapel Hill (UNC) partnered to develop the RCW system to meet certain non-drinking water demands on campus. In April 2006, OWASA and UNC entered into a contract in which UNC agreed to pay the entire cost of building the RCW system, and OWASA agreed to operate and maintain the system. Capital and operating costs for the RCW system are paid for solely by OWASA's RCW customers, rather than by the entire customer base.

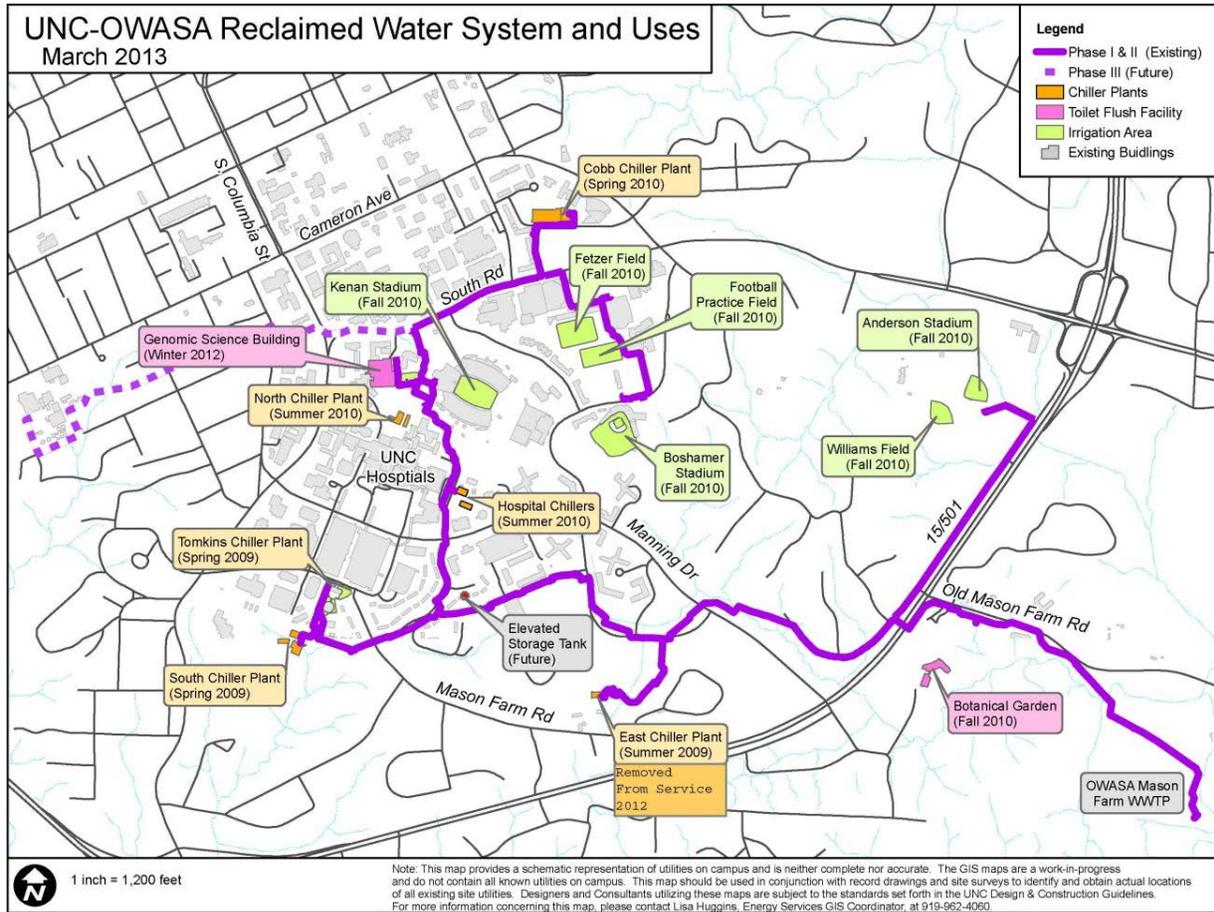
OWASA received \$1.6 million in grant funds from the North Carolina Clean Water Management Trust Fund to pay for engineering design and permitting costs and a \$625,500 grant from the U.S. Environmental Protection Agency to help pay for construction of the RCW pump station and storage tank. The system was completed in 2009 at a cost of about \$14 million.

RCW is used by UNC and UNC Hospitals as make-up water for the cooling towers at the five major chilled water plants on the main campus. It is also used for irrigating athletic fields and for toilet flushing at the Genomic Sciences Building and NC Botanical Gardens Visitor Education Center. In 2011, OWASA began providing RCW to a nearby private customer (St. Thomas More School) for irrigating an all-purpose athletic field and toilet flushing.

Existing Facilities

The RCW system consists of a 600,000 gallon RCW storage tank and pumping station at the WWTP, a bulk-fill facility for loading RCW into tank trucks, and about five miles of RCW pipe ranging in size from 6 to 24 inches in diameter.

The RCW system currently is configured to meet a total peak day demand of 3 million gallons per day (MGD). The system was designed and constructed to allow for cost-effective expansion to about 5 MGD in the future. RCW average demands are projected to be about 0.80 MGD in FY 2021 and to increase to about 0.82 MGD by 2025 based on the latest information provided by UNC. The system's current configuration will meet projected RCW demands for the foreseeable future.



Planned Improvements

The CIP includes the funding of the replacement of eight flanged coupling adapters along the reclaimed water main.

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
279-13 Reclaimed Water Coupling Replacement	\$75,000	\$225,000	\$100,000	\$0	\$0	\$400,000
279 Category Total	\$75,000	\$225,000	\$100,000	\$0	\$0	\$400,000

279-13 Reclaimed Water Coupling Replacements

Description/Background:

A flanged coupling adapter (FCA) on the Reclaimed Water (RCW) main failed in 2019, requiring shutdown of the system to replace the component. Investigation revealed that the welds on flanged coupling adapters (FCA) had failed due to internal corrosion, and that proactive inspection and replacement of further similar FCA's was warranted. Preliminary visual inspection was conducted in 2019. Remaining scope includes the phased replacement of FCA's at eight locations within the system.

Benefits: replaces aging assets; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$25,000	\$0	\$0	\$0	\$0	\$25,000
Design/Land	\$45,000	\$0	\$0	\$0	\$0	\$45,000
Construction	\$0	\$185,000	\$81,000	\$0	\$0	\$266,000
Inspection	\$0	\$10,000	\$5,000	\$0	\$0	\$15,000
Construction Admin	\$0	\$10,000	\$5,000	\$0	\$0	\$15,000
Contingency	\$5,000	\$20,000	\$9,000	\$0	\$0	\$34,000
TOTAL	\$75,000	\$225,000	\$100,000	\$0	\$0	\$400,000

Category 280: Central Office and Operations

Background

OWASA employs approximately 135 people. The majority work at the Jones Ferry Road Administration Building and the Operations Center. A safe, functionally efficient workplace is vital to maintaining high employee productivity; top notch customer service; the ability to store essential vehicles, equipment and materials; and maintenance of critical infrastructure.



Jones Ferry Road Administration Building

Existing Facilities

OWASA's administrative offices, warehouse, and storage facilities are located at the 17-acre site on Jones Ferry Road in Carrboro. The Administration Building, completed in 1990, is about 22,300 square feet (SF) in size and includes a large general-purpose room for public use by community groups. The 36,000 SF Operations Center, which was completed in FY 2004, houses the Water Distribution and Wastewater Collection Department, warehouse operations, fleet maintenance, material and equipment storage, and a vehicle wash facility.

Recent Improvements

Renovations to the Administration Building completed in FY 2005 included reconfiguring into office space the areas vacated by the Water Distribution and Wastewater Collection Department, including the warehouse, after it was relocated to the Operations Center. This increased the amount of finished office space in the Administration Building from 19,900 to 22,300 SF and provided a new roof, repaired the exterior facade and exterior canopy on the employee entrance, and relocated the rear entrance.

Planned Improvements

The CIP includes funding for an upgrade of the locker room / public restroom areas on the first floor of the Administration Building.

Category 280: Central Office and Operations

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Five-Year Total
280-13 Administration Building Locker Room Improvements	\$0	\$0	\$50,000	\$175,000	\$0	\$225,000
280 Category Total	\$0	\$0	\$50,000	\$175,000	\$0	\$225,000

280-13 Administration Building Locker Room Improvements

Description/Background:

A planning study completed in FY 2019 evaluated several options to address existing functionality, safety, and customer service issues with the configuration of the locker room / public restrooms in the Administration Building. Funding is provided in FY 2023 and FY 2024 for the completion of the recommended improvements.

Benefits: replaces aging assets; potentially reduces energy use

Funding:

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	5-Year Total
Planning	\$0	\$0	\$0	\$0	\$0	\$0
Design/Land	\$0	\$0	\$45,000	\$0	\$0	\$45,000
Construction	\$0	\$0	\$0	\$143,000	\$0	\$143,000
Inspection	\$0	\$0	\$0	\$8,000	\$0	\$8,000
Construction Admin	\$0	\$0	\$0	\$8,000	\$0	\$8,000
Contingency	\$0	\$0	\$5,000	\$16,000	\$0	\$21,000
TOTAL	\$0	\$0	\$50,000	\$175,000	\$0	\$225,000

Abbreviations

BG	Billion Gallons	MLSS	Mixed Liquor Suspended Solids
CIB	Capital Improvements Budget	MSL	Mean Sea Level
CIP	Capital Improvements Program	PLC	Programmable Logic Controller
FY	Fiscal Year	PV	Photovoltaic
GHG	Greenhouse Gas	RAS	Return Activated Sludge
GIS	Geographic Information System	RCW	Reclaimed Water
gpm	gallons per minute	SCADA	Supervisory Control and Data Acquisition
HVAC	Heating, Venting, and Air Conditioning	UNC	University of North Carolina
JLP	Jordan Lake Partnership	VFD	Variable frequency drive
kW	Kilowatt	WTP	Jones Ferry Water Treatment Plant
MGD	Million gallons per day	WWTP	Mason Farm Wastewater Treatment Plant