

# Capital Improvement Plan Fiscal Years 2021 – 2025 Drafted May 2020



Glenmore Secondary Clarifier Coating



Upper Schenks Branch Interceptor

## OUR MISSION

Our professional team of knowledgeable and engaged personnel serve the Charlottesville, Albemarle, and UVA community by providing high quality water treatment, refuse, and recycling services in a financially and environmentally responsible manner.



Observatory Water Treatment Plant



Moore's Creek AWRRF



Sugar Hollow Dam

Rivanna Water & Sewer Authority  
695 Moore's Creek Lane  
Charlottesville, Virginia 22902



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## Introduction

The Capital Improvement Plan (CIP) for Fiscal Years 2021-2025 has been prepared as a strategic and financially responsible plan for the Rivanna Water and Sewer Authority (RWSA) to complete major infrastructure construction projects. The projects included in the CIP are necessary to achieve the RWSA's core mission of providing safe, high-quality drinking water and environmentally responsible wastewater treatment services for the City of Charlottesville and the Albemarle County Service Authority (ACSA). The CIP is a 5-year planning document which provides an estimated budget and schedule for projects as they advance through the design and construction process.

The infrastructure requirements of the Capital Improvement Plan are developed through our Asset Management and Master Planning programs to address water and wastewater capacity demands, regulatory mandates and rehabilitation needs. Each year, these projects are reviewed and prioritized by the RWSA management team and brought forth for review by the Board of Directors.

During the past year, several capital projects were completed, and as such are being removed from the 2021-2025 CIP. These projects account for approximately \$5.1 million or 5.2% of FY 2020-2024 CIP. These projects include:

- 5 Birdwood Golf Course Waterline
- 9 Piney Mountain Tank Rehabilitation
- 11 Water Demand Projection and Safe Yield Study
- 21 Buck's Elbow Ground Storage Tank Chlorination System
- 23 Scottsville WTP Finished Water Flow Meter
- 43 Glenmore WRRF Secondary Clarifier Coating

The total 5-year 2021-2025 CIP is approximately \$132.5 million, with the previous expenditures on active projects totaling approximately \$5.4 million, leaving a net proposed 5-year projected expenditure of \$127.1 million.

There are eleven new projects added to the CIP this year. The total estimated expenditures for the projects equal \$4.61 million from 2021-2025 and include:

- 18 Crozet Ground Storage Tank Leak Repair (\$0.1 million)
- 19 Buck's Elbow Tank and Waterball Painting (\$0.083 million)
- 21 Scottsville WTP Lagoon Liner Replacement (\$0.315 million)
- 29 Interceptor Sewer and Manhole Repair (Phase 2) (\$0.7 million)
- 41 Moores Creek AWWRF Inplant Clarifier and Lime Silo Demolition (\$0.65 million)
- 42 Moores Creek AWWRF Generator Fuel Storage Expansion (\$0.1 million)
- 43 Moores Creek AWWRF Meter and Valve Replacements (\$0.66 million)
- 44 Moores Creek AWWRF Facility Renovations (\$0.375 million)
- 45 Moores Creek AWWRF 5kV Electrical System Upgrade (\$0.5 million)
- 46 Moores Creek AWWRF Lighting Upgrade (\$1.0 million)
- 48 Scottsville WRRF Generator and ATS (\$0.13 million)

An additional seven projects that were in the previous 10-year plan that are now transitioning into the 5-year horizon. These projects equal \$3.04 million from 2021-2025 and include:

- 27 Albemarle-Berkley Pump Station Upgrade (\$0.04 million)
- 31 Moores Creek AWRRF Engineering and Administration Building (\$0.25 million)
- 35 Moores Creek AWRRF Mechanical Thickener Improvement (\$0.1 million)
- 37 Moores Creek AWRRF Gas Sphere Rehabilitation (\$0.08 million)
- 38 Moores Creek AWRRF Cogeneration Upgrades (\$1.9 million)
- 39 Moores Creek AWRRF Maintenance Building (\$0.1)
- 40 Moores Creek AWRRF Structural Modifications (\$0.57 million)

There are several projects where the proposed budgets have been modified based on the anticipated project requirements and necessitate funding adjustments. The projects with changes include:

- 5 Observatory WTP Improvements (\$19.7 million existing / \$26 million proposed)
- 6 Sugar Hollow Dam Rubber Crest Gate Replacement (\$1.14 million existing / \$1.7 million proposed)
- 7 Valve Repair and Replacement – Phase 2 (\$0.883 million existing / \$1.13 million proposed)
- 9 South Rivanna River Crossing (\$5.34 million existing / \$2.8 million proposed)
- 10 Airport Road Pump Station and North Rivanna Transmission Main (\$2.3 million existing / \$5.85 million proposed)
- 13 South Rivanna WTP Improvements (\$15 million existing / \$17 million proposed)
- 15 North Rivanna WTP Upgrade (\$2.35 million existing / \$1.35 million proposed)
- 16 Beaver Creek Dam and Pump Station Improvements (\$9.04 million existing / \$20.76 million proposed)
- 20 Scottsville WTP LT2 Improvements (\$0.10 million existing / \$0.16 million proposed)
- 24 Crozet Interceptor (\$0.62 million existing / \$0.73 million proposed)
- 26 Crozet WW Pump Station 1, 2, 3 Rehabilitation (\$0.54 million existing / \$0.59 million proposed)
- 32 Moores Creek AWRRF Digester Sludge Storage Improvements (\$0.31 million existing / \$0.55 million proposed)
- 33 Moores Creek AWWRF Aluminum Slide Gate Replacement (\$0.47 million existing / \$0.675 million proposed)
- 50 Radio Upgrades (\$0.65 million existing / \$0.40 million proposed)
- 51 Asset Management (\$0.50 million existing / \$1.12 million proposed)
- 52 Security Enhancements (\$1.0 million existing / \$2.73 million proposed)

**FINANCIAL SUMMARY**  
**MAJOR SYSTEM CATEGORIES**

## FINANCIAL SUMMARY

### Major System Categories – Water

System Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress
	Current CIP	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
<b>Urban Water (UW)</b>										
Community Water Supply Plan	\$6,182,000	\$6,160,000	\$1,710,249	\$584,751	\$535,000	\$1,506,000	\$2,216,000	\$5,790,000	\$12,342,000	\$301,054
Observatory WTP & Ragged Mountain/Sugar Hollow Reservoir System	\$20,840,000	\$6,860,000	\$3,118,198	\$5,811,802	\$15,170,000	\$3,600,000	\$0	\$0	\$27,700,000	\$618,880
Finished Water Storage/Distribution	\$10,875,914	\$4,110,000	\$2,961,914	\$1,834,000	\$4,122,000	\$2,493,000	\$725,000	\$2,850,000	\$14,985,914	\$312,274
South & North Fork Rivanna Water System	\$18,950,000	\$1,000,000	\$10,056,415	\$7,353,585	\$2,540,000	\$0	\$0	\$0	\$19,950,000	\$746,112
<b>Subtotal (UW)</b>	\$56,847,914	\$18,130,000	\$17,846,776	\$15,584,138	\$22,367,000	\$7,599,000	\$2,941,000	\$8,640,000	\$74,977,914	\$1,978,320
<b>Non-Urban Water (NUW)</b>										
Crozet Water System	\$17,536,000	\$11,905,000	\$9,051,000	\$892,000	\$1,050,000	\$6,435,000	\$6,010,000	\$6,003,000	\$29,441,000	\$1,526,851
Scottsville Water System	\$100,000	\$375,000	\$100,000	\$60,000	\$0	\$140,000	\$175,000	\$0	\$475,000	\$0
<b>Subtotal (NUW)</b>	\$17,636,000	\$12,280,000	\$9,151,000	\$952,000	\$1,050,000	\$6,575,000	\$6,185,000	\$6,003,000	\$29,916,000	\$1,526,851
<b>WATER TOTAL</b>	\$74,483,914	\$30,410,000	\$26,997,776	\$16,536,138	\$23,417,000	\$14,174,000	\$9,126,000	\$14,643,000	\$104,893,914	\$3,505,171

## FINANCIAL SUMMARY

### Major System Categories – Wastewater

System Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress
	Current CIP	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
<b>Urban Wastewater (UWW)</b>										
Wastewater Interceptors and Pumping Stations	\$11,303,330	\$1,005,000	\$6,757,945	\$3,740,385	\$855,000	\$205,000	\$45,000	\$735,000	\$12,338,330	\$716,848
Moores Creek AWRRF	\$3,449,632	\$6,732,000	\$3,026,632	\$2,975,000	\$2,410,000	\$510,000	\$475,000	\$785,000	\$10,181,632	\$1,007,383
<b>Subtotal (UWW)</b>	\$14,752,962	\$7,737,000	\$9,784,577	\$6,715,385	\$3,265,000	\$715,000	\$520,000	\$1,520,000	\$22,519,962	\$1,724,231
<b>Non-Urban Wastewater (NUWW)</b>										
Scottsville WRRF	\$210,000	\$125,000	\$65,000	\$145,000	\$0	\$125,000	\$0	\$0	\$335,000	\$0
Glenmore WRRF	\$65,000	\$0	\$0	\$65,000	\$0	\$0	\$0	\$0	\$65,000	\$0
<b>Subtotal (NUWW)</b>	\$275,000	\$125,000	\$65,000	\$210,000	\$0	\$125,000	\$0	\$0	\$400,000	\$0
<b>WASTEWATER TOTAL</b>	\$15,027,962	\$7,862,000	\$9,849,577	\$6,925,385	\$3,265,000	\$840,000	\$520,000	\$1,520,000	\$22,919,962	\$1,724,231
<b>All Systems Security &amp; Technology</b>	\$2,596,000	\$2,099,000	\$1,971,000	\$1,014,000	\$480,000	\$640,000	\$550,000	\$40,000	\$4,695,000	\$167,637
<b>TOTAL</b>	\$92,107,876	\$40,371,000	\$38,818,353	\$24,475,523	\$27,162,000	\$15,654,000	\$10,196,000	\$16,203,000	\$132,508,876	\$5,397,039

## **PROJECT DETAILS**

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## Completed Projects

During fiscal year 2020, several capital improvement projects were completed, were advanced to the final phases of close-out, or were determined to be no longer necessary. As such they will be removed from consideration in future planning documents. Presented in the table below are the six (6) completed projects, pertinent information on the adopted budgets, as well as the projected final costs and any anticipated savings. There was a total completed projects cost savings of \$0.9 million.

5. Birdwood Golf Course Waterline: RWSA and the UVA Foundation chose to expedite construction of the portion of the future South Rivanna to Ragged Mountain 36-inch raw water main through the Birdwood property. This enabled pipeline work to proceed just ahead of the planned golf course reconstruction project to prevent subsequent disruption to the property and adjacent neighbors, as well as mitigate future increased water line construction costs. The golf course reconstruction project began in November 2018. This work was completed within budget in the summer of 2019 and included installation of approximately 5,900 linear feet of 36-inch raw water main along the eastern property boundary of the golf course.
9. Piney Mountain Tank Rehabilitation: The 700,000-gallon Piney Mountain Tank serves the North Rivanna pressure band. A routine inspection of the Piney Mountain Tank revealed several deformed roof rafters, indicating the potential for structural deficiency. An in-depth structural inspection was performed and a list of recommended roof repairs provided. This project included consultant services for design and bidding of necessary roof repairs and other ancillary items, as well as construction, construction administration, and inspection services. Long term plans for the Rt. 29 service area include the modification or elimination of this facility. The improvements included in this project are needed to maintain the existing tank in service for at least the next 10 years. The tank repairs were substantially complete in July of 2019 and the project was closed out in November 2019.
11. Water Demand Projection and Safe Yield Study: In January 2012, the City of Charlottesville, Albemarle County Service Authority, and RWSA entered into the Ragged Mountain Dam Project Agreement. Within the agreement are provisions to monitor the bathymetric capacity of the Urban water reservoirs as well as a requirement to conduct reoccurring demand analysis, demand forecasting and safe yield evaluations. The bathymetric survey of the South Rivanna Reservoir and the Ragged Mountain Reservoir were funded in the FY2019 O&M Budget. Subsequent to collecting the reservoir survey data, this study evaluated and calculated current and future demands and present safe yield. Per the project agreement, these analyses shall be completed by calendar year 2020.
21. Buck's Elbow Ground Storage Tank Chlorination System: The 2,000,000-gallon Buck's Elbow Ground Storage Tank provides finished water storage for the Crozet Area. Due to the water age that is currently present in the Buck's Elbow Ground Storage Tank, RWSA Water Department staff performs constant monitoring on the chlorine residuals in the tank. When chlorine residuals drop, staff must manually feed chlorine into the tank. Currently, this requires staff to bring all required pumping infrastructure to the site and climb the tank to access the injection point(s). To enhance the efficiency and safety of this process, a chemical feed station will be

installed at the Buck's Elbow Ground Storage Tank site. The need for staff to climb the tank will be negated, and all pumping infrastructure will remain on site in a secured area. An active mixing system will also be installed in order to supplement the existing passive mixing system and further decrease water age inside of the tank. Installation of the active mixing system and construction of the chlorine feed station at the Buck's Elbow Ground Storage Tank began in Fall 2019, and completed in early 2020.

23. Scottsville WTP Finished Water Flow Meter: The Scottsville Water Treatment Plant provides potable drinking water to Albemarle County Service Authority customers in the Scottsville service area. After water has been treated at the plant, it is collected in an existing clearwell which was constructed with the original facility. From the clearwell, the water is pumped into the distribution system by one of two high service pumps. The flow from these pumps is not metered. In order to keep a record of the total flow entering the Scottsville distribution system, plant operators must periodically conduct draw-down tests to verify the pumping rate of each of the two pumps. The total flow is then calculated based on the run time of each pump. Based on these procedures, this method of measuring flow may not be fully representative of the flow entering the system as the pumping rate will vary based on the clearwell level and the hydraulic grade line of the distribution system. In addition, the Virginia Department of Health has indicated that the flow should be metered during recent conversations related to the disinfection profile calculation throughout the plant. To resolve this issue, this project modified the high service pump discharge piping to allow for the installation of a finished water meter.
  
43. Glenmore WRRF Secondary Clarifier Coating: The secondary clarifiers at the Glenmore facility were painted over 10-years ago. The clarifier environment is a particularly harsh environment subject to corrosive gasses, grit abrasion and mechanical wear. Based on observations by operations staff, the coating system was in need of replacement to prevent deterioration and failure of the underlying metal superstructure. This project included the cleaning and full coating of the metal portions of the clarifier and installation of new sweeps.

## Completed Projects

Five-Year Capital Program					
Line No.	Project Description	Adopted Budget 5/2019	Previous Expenditures (6/30/2019)	Final Projected Costs/Close Out	Savings
5	Birdwood Golf Course Waterline	\$4,000,000	\$2,714,728	\$3,086,000	\$914,000
9	Piney Mountain Tank Rehabilitation	\$570,000	\$88,585	\$484,413	\$85,587
11	Water Demand Projection and Safe Yield Study	\$167,000	\$79,106	\$167,000	\$0
21	Buck's Elbow Ground Storage Tank Chlorination System	\$239,000	\$6,643	\$230,000	\$9,000
23	Scottsville Water Treatment Plant Finished Water Flow Meter	\$145,000	\$12,128	\$134,979	\$10,021
43	Glenmore WRRF Secondary Clarifier Coating	\$160,000	\$1,100	\$138,751	\$21,249
<b>TOTAL</b>		\$5,096,000	\$2,902,290	\$4,241,143	\$854,857

CIP 20-24 Total	CIP 21-25 Completed	CIP 21-25 Remaining	CIP 21-25 New Funding	CIP 21-25 New Total
\$97,203,876	\$5,096,000	\$92,107,876	\$40,371,000	\$132,508,876

## Community Water Supply Plan

The Community Water Supply Plan represents the program developed with substantial community input to fulfill RWSA's contractual obligation to the City of Charlottesville (City) and the Albemarle County Service Authority (ACSA) to provide adequate drinking water for their future needs. An initiative started in 2003 to find a long-term solution that could achieve both local support and meet federal and state requirements. After multiple community meetings, updates with local officials, and frequent consultations with federal and state agencies, local support was obtained to apply for federal and state permits to expand the Ragged Mountain Reservoir and build a future pipeline between the South Rivanna and Ragged Mountain Reservoirs, with stream and wetlands mitigation to be provided through property in the Buck Mountain Creek area and property adjacent to a lower reach of Moores Creek near its confluence with the Rivanna River. Federal and state permits were granted in 2008, and amended in 2011.

The first phase of this long-term program centered around the expansion of the Ragged Mountain Reservoir, a project that would simultaneously address a legal obligation to correct safety deficiencies on the existing site. Through a combination of technical investigations, engineering evaluations, and continued public discussion, a decision was reached in February 2011 through the City Council and Board of Supervisors to build the new dam as an earthen dam, with the initial phase raising the reservoir pool height by 30 feet. The decision also outlined an objective of the further pursuit of water conservation through the City and ACSA, and the pursuit of opportunities for dredging of the South Rivanna Reservoir, with the second phase of reservoir expansion in the future as necessary.

### Project Descriptions:

1. South Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way: The approved 50-year Community Water Supply Plan includes the future construction of a new raw water pipeline from the South Rivanna River to the Ragged Mountain Reservoir. This new pipeline will replace the Upper Sugar Hollow Pipeline along an alternative alignment to increase raw water transfer capacity in the Urban Water System. The project includes a detailed routing study to account for recent and proposed development and road projects in Albemarle County and the University of Virginia. Preliminary design, preparation of easement documents, and acquisition of water line easements along the approved route will also be completed as part of this project. Prior expenditures also covered a previous review of the 2009 conceptual design that was requested by the Board.
2. South Rivanna Reservoir Dredging: The South Rivanna Reservoir stores raw water for treatment at the South Rivanna Water Treatment Plant and in the future, is proposed to provide water for transfer to the enlarged Ragged Mountain Reservoir. River flow into the reservoir is from a drainage area, almost entirely within Albemarle County, of approximately 259 square miles. Soil erosion from natural events, from land use in the agricultural area, from land disturbances in the developed areas, and from re-suspension of flood plain deposits created during the 19th century (stream bank erosion), are likely the causes of sediment becoming trapped within the reservoir. The initial design of the reservoir anticipated the accumulation of

these sediments, and a significant portion of the total storage volume was designated for this purpose. Currently the sediment stored does not exceed the available sediment storage capacity.

The January 2012 Ragged Mountain Dam Project Agreement outlines that “the City and ACSA agree to direct, and RWSA agrees, to perform such dredging projects at the South Fork Rivanna Reservoir as may be specified jointly by the City and ACSA pursuant to the Water Cost Allocation Agreement.” The Cost Allocation Agreement stipulates that target maintenance dredging shall be performed, and that the dredging be market driven, cost effective, and opportunistic and shall not exceed \$3.5M. In 2012 and 2013, RWSA, via the Public-Private Education Facilities and Infrastructure Act (PPEA) process, solicited proposals to provide maintenance dredging. In July 2013, the one qualified PPEA proposer withdrew its proposal, citing difficulties in obtaining necessary land agreements.

Future Board decisions on the project contracting approach will dictate the next steps. This project remains in the CIP as the fulfillment of a contractual obligation from the January 2012 Ragged Mountain Dam Cost Allocation Agreement, and RWSA counsel has offered an opinion that consent to amend the Agreement from the City and ACSA is required before the RWSA Board can amend or cancel the project. The project has been moved to FY 2026.

3. Ragged Mountain Reservoir to Observatory Water Treatment Plant Raw Water Line: Raw water is transferred from the Ragged Mountain Reservoir (RMR) to the Observatory Water Treatment Plant by way of two 18-inch cast iron pipelines, which have been in service for more than 110 and 70 years, respectively. The increased frequency of emergency repairs and expanded maintenance requirements are one impetus for replacing these pipelines. The proposed water line will be able to reliably transfer water to the expanded Observatory plant, which will have the capacity to treat 10 million gallons per day (mgd). The new pipeline is expected to be constructed of 36-inch ductile iron and approximately 14,000 feet in length.
4. Ragged Mountain Reservoir to Observatory Raw Water Pump Station: The Ragged Mountain Reservoir (RMR) to Observatory WTP raw water pump station is planned to replace the existing Stadium Road and Royal pump stations, which in part have exceeded their design lives or will require significant upgrades with the Observatory WTP expansion. The pump station will pump up to 10 mgd to the Observatory WTP. The new pump station will be integrated with the planned South Rivanna Reservoir (SRR) to RMR pipeline in the interest of improved operational and cost efficiencies. An integrated pump station will also include the capacity to transfer up to 16 million gallons per day (mgd) of raw water from RMR back to the SRR WTP. The location of this pump station will be determined and the required property purchased as part of the SRR to RMR raw water main preliminary design and right of way acquisition, which is currently underway.

## Community Water Supply Plan

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)	
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025			
1	South Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way	\$2,295,000		\$1,710,249	\$584,751						\$2,295,000	\$301,054
2	South Rivanna Reservoir Dredging	\$10,000	(\$10,000)								\$0	
3	Ragged Mountain Reservoir to Observatory Water Treatment Plant Raw Water Line	\$3,217,000	\$4,280,000			\$325,000	\$1,186,000	\$1,706,000	\$4,280,000		\$7,497,000	
4	Ragged Mountain Reservoir to Observatory Water Treatment Plant Raw Water Pump Station	\$660,000	\$1,890,000			\$210,000	\$320,000	\$510,000	\$1,510,000		\$2,550,000	
	TOTAL	\$6,182,000	\$6,160,000	\$1,710,249	\$584,751	\$535,000	\$1,506,000	\$2,216,000	\$5,790,000		\$12,342,000	\$301,054

## **Observatory WTP and Ragged Mountain/Sugar Hollow Reservoir System**

The Observatory Water Treatment Plant (WTP) and Ragged Mountain/Sugar Hollow Reservoir System is comprised of the water treatment facility on Observatory Mountain and the associated raw water infrastructure that stores and conveys source water to the plant. The raw water storage system includes the new Ragged Mountain Dam (constructed in 2014, with a useable raw water storage capacity of 1.44 billion gallons) and the Sugar Hollow Dam (originally constructed in 1947, upgraded in 1999 and downstream discharge improvements completed in September 2014, with a useable raw water storage capacity of 339 million gallons as updated by a 2015 bathymetric survey). The system also includes 17.6 miles of 18-inch raw water cast-iron mains, originally installed in 1908, 1922, and 1946. The Sugar Hollow Raw Water Main historically conveyed water from the Sugar Hollow Dam to the Observatory Water Treatment Plant, however, as a result of the New Ragged Mountain Dam project, the main now discharges directly into Ragged Mountain Reservoir. The remaining downstream section of the Sugar Hollow main now conveys raw water from the Ragged Mountain Reservoir to the treatment plant. The line crosses the Mechums River (where an abandoned pumping station is sited) on its way to Ragged Mountain Reservoir, and eventually passes through the Royal Pumping Station and terminates at the Observatory WTP. The Ragged Mountain Raw Water Main conveys water from the Ragged Mountain Reservoir through the Stadium Road Pumping Station and terminates at the Observatory Water Treatment Plant.

### **Project Descriptions:**

5. Observatory Water Treatment Plant Improvements: The Observatory Water Treatment Plant was originally constructed in the mid-1950s, and since very little has been replaced or upgraded at the facility, much of the original equipment remains. As a result, that equipment is inefficient, prone to unexpected failure, and does not have readily accessible replacement parts. Based on a Needs Assessment Study, the plant would undergo a wholesale upgrade including improvements to the flocculators, sedimentation basins, filters, and chemical feed facilities to enhance future reliability. In addition, the existing reinforced concrete flume, which conveys treated water from the sedimentation basins to the filters, is in need of replacement, filter control valves and piping will be replaced, and electrical and SCADA control systems upgraded. A portion of this project was completed during the Granular Activated Carbon (GAC) project, where the flocculator systems were upgraded with new mechanical and electrical equipment, including variable speed drives for optimal efficiency.

In addition to providing needed equipment upgrades, these improvements will increase the plant's capacity from 7.7 million gallons per day to 10 million gallons per day based on a feasibility analysis performed during the Preliminary Engineering phase of the project. It was determined that the capacity upgrades could be performed economically and would provide needed reliability and redundancy in the Urban System. As part of this capacity increase, it was also determined that the plant's GAC treatment capacity should increase as well. As a result, this project also includes efforts required for the addition of four GAC contactors.

It should be noted that the Observatory Water Treatment Plant is sited on land leased to RWSA by the University of Virginia. The terms of the existing lease expire on April 17, 2021. The new lease is currently under negotiation.

6. Sugar Hollow Dam Rubber Crest Gate Replacement: In 1998 the Sugar Hollow Dam underwent a significant upgrade to improve structural stability and spillway capacity. The original metal spillway gates were replaced with a manufactured five-foot-high inflatable rubber dam that is bolted to the existing concrete structure. This rubber dam allows for the normal storage of water in the reservoir with the ability to be lowered during extreme storm events. The rubber dam has an approximate service life of twenty years and is therefore now due for replacement. The aging intake tower structure has been evaluated as part of the project for necessary repairs and improvements. Repairs may include components of the intake gate valves and tower walls, including repair or replacement of intake trash racks, and sealing/grouting of minor concrete wall cracks.



## Observatory Water Treatment Plant and Ragged Mountain/Sugar Hollow Reservoir System

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year						
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
5	Observatory Water Treatment Plant Improvements	\$19,700,000	\$6,300,000	\$2,648,198	\$5,051,802	\$14,700,000	\$3,600,000			\$26,000,000	\$618,880
6	Sugar Hollow Dam Rubber Crest Gate Replacement	\$1,140,000	\$560,000	\$470,000	\$760,000	\$470,000				\$1,700,000	
	TOTAL	\$20,840,000	\$6,860,000	\$3,118,198	\$5,811,802	\$15,170,000	\$3,600,000	\$0	\$0	\$27,700,000	\$618,880

## **Finished Water Storage/Transmission – Urban System**

The urban finished water storage and transmission system serves to provide transmission of treated water from the three RWSA water plants (Observatory, South Rivanna, and North Rivanna) to the distribution networks of the Albemarle County Service Authority, the City of Charlottesville, and the University of Virginia. The system includes approximately 40 miles of pipeline, six water storage tanks: Avon Street (2 MG), Pantops (5 MG), Piney Mountain. (0.7 MG), Stillhouse (0.7 MG), Observatory (3 MG), and Lewis Mountain (0.5 MG), and the Alderman Road and Stillhouse pumping stations.

### **Project Descriptions:**

7. Valve Repair & Replacement (Phase 2): Isolation valves are critical for normal operation of the water distribution system and timely emergency response to water main breaks. Staff continuously reviews results from an ongoing valve exercising and condition assessment program performed by the RWSA Maintenance Department. This project will repair any valves identified during the condition assessment as having a repairable deficiency and replace the highest priority valves that are inoperable and/or unrepairable. This phase of the Valve Repair- Replacement Project will include the repair of an existing valve on the Southern Loop Waterline and replacement of valves on the North Rivanna, South Rivanna, Pantops, and Crozet Waterlines. Completion of Phase 2 of the Valve Repair- Replacement Project is anticipated in Summer 2020.
8. Central Water Line: The southern half of the Urban Area water system is currently served by the Avon Street and Pantops storage tanks. The Avon Street tank is hydraulically well connected to the Observatory Water Treatment Plant while the Pantops tank is well connected to the South Rivanna Water Treatment Plant. The hydraulic connectivity between the two tanks, however, is less than desired, creating operational challenges and reducing system flexibility. In 1987, the City and ASCA developed the Southern Loop Agreement, outlining project phasing and cost allocations, as envisioned at the time. The first two phases of the project were constructed shortly thereafter. The third phase, known as the “Eastern Branch” is the subject of the current project. The initial funding for this project was used for route alignment determination, hydraulic modeling, and preliminary design. Due to the complicated nature of our finished water systems, it was decided at the August 2018 Board meeting that a more comprehensive approach is warranted and we should complete the Finished Water Master Plan prior to moving forward with final design and construction of the Avon to Pantops Water Main.
9. South Fork Rivanna River Crossing: RWSA has previously identified through master planning that a 24-inch water main will be needed from the South Rivanna Water Treatment Plant (SRWTP) to Hollymead Town Center to meet future water demands. Two segments of this water main were constructed as part of the VDOT Rt. 29 Solutions projects, including approximately 10,000 LF of 24-inch water main along Rt. 29 and 600 LF of 24-inch water main along the new Berkmar Drive Extension, behind the Kohl’s department store. To complete the connection between the SRWTP and the new 24-inch water main in Rt. 29, there is a need to construct a new river crossing at the South Fork Rivanna River. Acquisition of right-of-way will be required at the river crossing.

10. Airport Rd. Pump Station and North Rivanna Transmission Main: The Rt. 29 Pipeline and Pump Station master plan was developed in 2007 and originally envisioned a multi-faceted project that reliably connected the North and South Rivanna pressure bands, reduced excessive operating pressures, and developed a new Airport pressure zone to serve the highest elevations near the Airport and Hollymead Town Center. The master plan was updated in 2018 to reflect the changes in the system and demands since 2007. This project, along with project above will provide a reliable and redundant finished water supply to the North Rivanna area. The proposed pump station will be able to serve system demands at both the current high pressure and a future low pressure condition. These facilities will also lead to future phase implementation which will include a storage tank and the creation of the Airport pressure zone.

To complete the connection between the new 24-inch water main in Rt. 29 and the pump station, construction will include two “gap” sections of 24-inch water main between the already completed sections in the vicinity of Kohl’s. Much of the new water main route is within VDOT right-of-way; however, acquisition of right-of-way will be required on the Kohl’s Property at Hollymead Town Center.

11. Finished Water System Master Plan: As identified in the 2017 Strategic Plan, the Authority has a goal to plan, deliver and maintain dependable infrastructure in a financially responsible manner. Staff has identified asset master planning as a priority strategy to improve overall system development. There are asset classes where comprehensive and ongoing plans exist or are in development (e.g. wastewater collection, raw water supply, Crozet water, etc.). In the case of the urban finished water system, many of the previously identified capital projects are in design or construction. As such, staff have identified a need to develop a current and ongoing finished water master plan. This work will utilize the demand forecasting from the Water Demand Project and Safe Yield Study.

## Finished Water Storage/Transmission – Urban System

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year						
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
7	Valve Repair & Replacement (Phase 2)	\$882,914	\$250,000	\$1,132,914						\$1,132,914	\$154,218
8	Central Water Line	\$2,100,000	\$2,850,000	\$1,375,000				\$725,000	\$2,850,000	\$4,950,000	\$137,749
9	South Fork Rivanna River Crossing	\$5,340,000	(\$2,540,000)		\$260,000	\$922,000	\$1,618,000			\$2,800,000	
10	Airport Rd. Pump Station and North Rivanna Transmission Main	\$2,300,000	\$3,550,000	\$201,000	\$1,574,000	\$3,200,000	\$875,000			\$5,850,000	
11	Finished Water System Master Plan	\$253,000		\$253,000						\$253,000	\$20,307
	<b>TOTAL</b>	<b>\$10,875,914</b>	<b>\$4,110,000</b>	<b>\$2,961,914</b>	<b>\$1,834,000</b>	<b>\$4,122,000</b>	<b>\$2,493,000</b>	<b>\$725,000</b>	<b>\$2,850,000</b>	<b>\$14,985,914</b>	<b>\$312,274</b>

## South and North Rivanna Water Systems

The South Rivanna Water System is comprised of the source water, storage, conveyance and treatment infrastructure currently serving the urban area from the South Fork Rivanna River. The system includes the South Fork Rivanna Reservoir and Dam (built in 1966). The Dam is co-located with the raw water intake and pump station, as well as a small hydroelectric generation facility. The source water from the South Rivanna Reservoir is treated at the South Rivanna treatment plant (12-mgd rated capacity).

The North Rivanna Water System is comprised of a river intake and raw water pumping station on the North Fork of the Rivanna River, as well as the North Fork Water Treatment Plant (2-mgd rated capacity built in 1973). The North Rivanna System provides water to the ACSA service area located along US Route 29, between Forest Lakes subdivision and Piney Mountain Road.

### Project Descriptions:

12. South Rivanna Hydropower Plant Decommissioning: The South Fork Hydropower Plant is a small hydroelectric generating facility constructed in 1987. The plant has historically operated intermittently, as river flows allow. The generated power is used at the South Rivanna Water Treatment Plant, thereby reducing power purchased off the electric grid. During an effort to troubleshoot and repair the turbine, a large rain and lightning event caused unexpected flooding into the facility. Insurance paid damages to more recent improvements, but not the pre-existing needs to repair the turbine. Engineering investigations in 2013 associated with the failed mechanical equipment and flood event confirmed the need for further disassembly and inspection of the turbine shaft and blade linkages from a remote factory location.

Due to the complexity of possible rehabilitation, the associated Federal Energy Regulatory Commission (FERC) dam permitting, and the numerous variables in the economic analysis, proposals were solicited from national hydropower experts to initiate a feasibility study to determine the cost effectiveness of rehabilitating the hydropower plant while making sure to account for FERC-related costs and issues. The feasibility study was completed in May 2016 and determined that rehabilitation of the facility had a small likelihood for a positive return on investment. This conclusion was brought to the Board of Directors along with a recommendation to initiate the surrender of the exemption to licensure and decommission the facility. The Board approved this recommendation and staff has begun the exemption surrender process. The budget includes regulatory support as well as physical improvements such as removing defunct electrical components, abandoning components of the turbine and re-establishment of the penstock as a reservoir drain.

13. South Rivanna Water Treatment Plant Improvements: The South Rivanna Water Treatment Plant recently completed upgrades as part of the Urban Granular Activated Carbon project. Over the course of that project, several other significant needs were identified and assembled into a single project within this Capital Plan. The project components include, but are not limited to, the following: a new alum and fluoride storage facility; installation of two additional filters to meet firm capacity needs and new filter control panels; building around the lime storage facilities; the addition of a second variable frequency drive at the Raw Water Pump Station as well as other general pump station improvements; the relocation for the

electrical gear from a sub terrain location at the Sludge Pumping Station to a new aboveground enclosure; a new administration building on site for additional office, meeting, and storage space; high service pump improvements and the addition of variable frequency drives to three of the pumps; sedimentation basin improvements; replacement of filter inlet valves and actuators; remodeling of the existing filter building for better lab and control space and painting throughout; new clarifier drives; and incoming electrical system improvements for the facility. Currently this facility operates at 80-90% of capacity and the identified upgrades will improve reliability and resiliency, particularly at higher flow rates.

14. South Rivanna Dam – Gate Repairs: The South Rivanna Dam, originally constructed in 1965, is equipped with two 36-inch diameter slide gates and conduits, one each on the north and south abutments of the dam, which can be utilized to dewater the facility or to meet minimum instream flow (MIF) requirements when the dam is not spilling. These gates are original to the dam and while they are operable and are exercised regularly, they can no longer provide a complete seal, therefore allowing some leakage through the dam. RWSA has protocols in place to temporarily stop leakage through the gates when necessary to conserve water; however, there is a desire to repair or replace the gates and components as needed to restore full functionality. The project includes other repairs to the facility, including improvements to the concrete wall adjacent to the raw water pump station and improvements to the north dam tower to provide safer and more secure access by staff.
15. North Rivanna Water Treatment Plant Upgrade: The North Rivanna Water Treatment Plant was recently upgraded with Granular Activated Carbon (GAC) treatment. While components of the plant's electrical system were upgraded during the GAC project, the remaining equipment and process controls are original to the plant and in need of upgrades. As a result, a needs assessment for the plant was updated to identify potential improvements and the associated costs. At the same time, future regulatory impacts to the plant are being evaluated which may limit the benefit of investing those significant dollars in plant upgrades. In order to clarify this process, this project will include an abandonment and alternatives analysis which will evaluate the costs and implications of maintaining operations at the North Rivanna Water Treatment Plant versus adjusting our Urban System operational guidelines in an attempt to maintain our overall withdrawal and finished water production capabilities should the plant be taken out of service.

## South and North Rivanna Water Systems

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
12	South Rivanna Hydropower Plant Decommissioning	\$725,000		\$725,000						\$725,000	\$127,081
13	South Rivanna Water Treatment Plan Improvements	\$15,000,000	\$2,000,000	\$8,046,415	\$7,353,585	\$1,600,000				\$17,000,000	\$619,031
14	South Rivanna Dam - Gate Repairs	\$900,000		\$900,000						\$900,000	
15	North Rivanna Water Treatment Plant Upgrade	\$2,325,000	(\$1,000,000)	\$385,000		\$940,000				\$1,325,000	
	<b>TOTAL</b>	<b>\$18,950,000</b>	<b>\$1,000,000</b>	<b>\$10,056,415</b>	<b>\$7,353,585</b>	<b>\$2,540,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$19,950,000</b>	<b>\$746,112</b>

## Crozet Water System

The Crozet Water System includes the source water, raw water conveyance, finished water treatment, transmission and storage infrastructure for the Crozet community in western Albemarle County. The source water for this system is the Beaver Creek Reservoir and Garnett Dam which were built in 1964 with a current useable storage capacity of 521 million gallons. Raw water is treated at the Crozet Water Treatment Plant (1.0 mgd rated capacity) and provides finished water to the Albemarle County Service Authority. The system includes the Crozet Elevated (Waterball) Tank (0.05 MG) for water treatment plant backwash; the Crozet Ground Storage Tank (0.5 MG) and pump station, and the Buck's Elbow Storage Tank (2.0 MG).

### Project Descriptions:

16. Beaver Creek Dam & Pump Station Improvements: RWSA operates the Beaver Creek Dam and reservoir as the sole raw water supply for the Crozet Area. In 2011, an analysis of the Dam Breach inundation areas and changes to Virginia Department of Conservation and Recreation (DCR) *Impounding Structures Regulations* prompted a change in hazard classification of the dam from Significant to High Hazard. This change in hazard classification requires that the capacity of the spillway be increased. Following the completion of an updated alternatives analysis by Schnabel Engineering in 2018, staff decided to proceed with design of a labyrinth spillway and chute through the existing dam with a bridge to allow Browns Gap Turnpike to cross over the new spillway. Work for this project will be coordinated with the new relocated raw water pump station and intake.

The Drinking Water Infrastructure Plan for the Crozet water service area recommends installation of a new Raw Water Pump Station and Intake at the Beaver Creek Dam in order to meet new minimum instream flow requirements and provide adequate raw water pumping capacity to serve the growing Crozet community for the next 50 years. The pump station will be moved out of its existing location at the toe of the dam to a new location, to be determined during design. The new intake structure will include enhanced controls as well as a Hypolimnetic Oxygenation System that will serve to enhance water quality within the reservoir.

17. Crozet Water Treatment Plant Expansion: The Crozet water treatment system is currently permitted and rated to supply up to 1.0 mgd of water to the ACSA distribution system. Over the past several years, average day usage of water has increased steadily, with maximum day demand approaching plant capacity. In addition, much of the existing plant systems are the same as when the plant was constructed in the 1960's.

Expanding the plant capacity at Crozet WTP will require a new Virginia Department of Environmental Quality Water Withdrawal Permit and will include possible stream release requirements. In order to fully analyze all aspects of the design required for this project a Preliminary Engineering Report (PER), plant field testing, preliminary permitting work and coordination with pertinent regulators were completed. The results of the PER stated that the current treatment plant can be upgraded, and the capacity increased, through installation of newer, and more technologically advanced equipment into the existing footprint of the filter plant. Work associated with this project includes general building rehabilitation, filter



improvements, sedimentation expansion and improvements, chemical feed improvements, flocculator expansion, alum storage/containment improvements and waste sludge handling and removal improvements.

18. Crozet Ground Storage Tank Leak Repair: The 500,000-gallon Crozet Ground Storage Tank serves as the wet well for the finished water pumps at the Crozet Water Treatment Plant as well as one of two water storage tanks in the Crozet Service Area. In late 2017, a small leak at the base of the tank was discovered, and a subsequent inspection by a remotely operated vehicle (ROV) in February of 2018 confirmed that the leak was likely in the floor of the tank near the tank inlet-outlet pipe. The tank will need to be drained and cleaned, damaged sections assessed and repaired, and floor coating restored prior to putting back in service. Repair work is anticipated to take place in fall of 2020 or spring of 2021 following the completion of upgrades to the Crozet Water Treatment Plant.
  
19. Buck's Elbow Tank and Waterball Painting: The 2,000,000-gallon Buck's Elbow Ground Storage Tank provides finished water storage for the Crozet Area while the 50,000-gallon Crozet Waterball Tank serves as filter backwash storage at the Crozet Water Treatment Plant (CZWTP). Routine inspections of these tanks in 2012 indicated that the tanks would require recoating by 2020. The current coating system has lasted beyond this initial prediction and as such was moved to 2025. The project includes recoating the interior and top-coating the exterior of both tanks to prevent corrosion. Minor repairs and improvements to both tanks will also be included in this work, such as foundation repairs and safety enhancements.

## Crozet Water System

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
16	Beaver Creek Dam & Pump Station Improvements	\$9,036,000	\$11,722,000	\$1,007,000	\$336,000	\$1,050,000	\$6,435,000	\$6,010,000	\$5,920,000	\$20,758,000	\$288,134
17	Crozet Water Treatment Plant Expansion	\$8,500,000		\$8,044,000	\$456,000					\$8,500,000	\$1,238,717
18	Crozet Ground Storage Tank Leak Repair		\$100,000		\$100,000					\$100,000	
19	Buck's Elbow Tank and Waterball Painting		\$83,000						\$83,000	\$83,000	
	TOTAL	\$17,536,000	\$11,905,000	\$9,051,000	\$892,000	\$1,050,000	\$6,435,000	\$6,010,000	\$6,003,000	\$29,441,000	\$1,526,851

## Scottsville Water System

The Scottsville Water System is comprised of the raw water conveyance, finished water treatment, transmission and storage infrastructure for the Town of Scottsville in southern Albemarle County. The source water for this system is the Totier Creek Intake, and the backup supply is the Totier Creek Reservoir, which was built in 1971 with a current useable capacity of 182 million gallons. Raw water is treated at the Scottsville Water Treatment Plant (0.25 mgd rated capacity) and provides finished water to the Albemarle County Service Authority. The system includes the Scottsville Storage Tank (0.25 MG).

### Project Description:

20. Scottsville Water Treatment Plant LT2 Improvements: RWSA conducts routine regulatory sampling of the raw water from Totier Creek and Totier Creek Reservoir for compliance with the EPA Long Term 2 Enhanced Surface Water Treatment Rule (LT2). The rule provides risk based guidance on the needed level of treatment for the deactivation of microbial pathogens. This project includes the design and construction of additional of ultraviolet (UV) disinfection to the treatment process in Scottsville.
21. Scottsville Water Treatment Plant Lagoon Line Replacement: The Scottsville Water Treatment Plant has two waste lagoons that receive filter backwash water, filter-to-waste water and flow from the sedimentation basin sludge collectors. These basins also receive drainage flows from the flocculator and sedimentation basins. The lagoons were initially lined in 2007, but that liner has now reached the end of its useful life and is showing sections of wear and degradation. In order to maintain the integrity of the lagoons, new HDPE liners need to be installed.

## Scottsville Water System

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
20	Scottsville Water Treatment Plant LT2 Improvements	\$100,000	\$60,000	\$100,000	\$60,000					\$160,000	
21	Scottsville Water Treatment Plant Lagoon Liner Replacement		\$315,000				\$140,000	\$175,000		\$315,000	
	TOTAL	\$100,000	\$375,000	\$100,000	\$60,000	\$0	\$140,000	\$175,000	\$0	\$475,000	\$0

## Wastewater Interceptors/Pumping Stations

The RWSA wastewater interceptors and pumping stations convey wastewater from the collection systems of the City of Charlottesville and Albemarle County Service Authority to the Moores Creek Advanced Water Resource Recovery Facility (MCAWRRF). This grouping includes: the Crozet Interceptor and four associated pumping stations; the Moores Creek Interceptor and Relief Sewer; the Morey Creek, Maury Hills, Powell Creek, Meadow Creek, Schenks Branch, Woodbrook and Rivanna Interceptors; as well as the Albemarle-Berkley Interceptor and associated Albemarle Pumping Station. Also included in this system are the two primary pump stations into the MCAWRRF, the Rivanna and Moores Creek Pump Stations.

### Project Descriptions:

22. Upper Schenks Branch Interceptor: The Schenks Branch Interceptor is located in the eastern part of the City of Charlottesville and ties into the Meadowcreek Interceptor. The interceptor was constructed in the mid-1950s of 21-inch clay and concrete pipe. The existing interceptor is undersized to serve present and future wet weather flows as determined by the City, and is to be upgraded to 30-inch pipe. The Upper Schenks Branch Interceptor consists of two sections along McIntire Road. Both of these sections have been designed with the first phase of this project located in the City's Schenks Branch Greenway, completed in early 2016. The second phase of the Upper Schenks Interceptor will be replaced by RWSA in coordination with the City of Charlottesville's sewer upgrades once easement negotiations with Albemarle County are complete (or the City authorizes the second phase project be constructed under McIntire Road).
23. Interceptor Sewer and Manhole Repair – Phase 1: This project is used to conduct assessments of various interceptors as well as rehabilitation of interceptors that do not have a separate CIP project. Planned projects to complete Phase 1 include the continuation of rehabilitation efforts along the Morey Creek Interceptor, as well as evaluation of the Upper Rivanna Interceptor. Rehabilitation of the Moores Creek, Moores Creek Relief, Powell Creek, and Upper Rivanna Interceptors will take place during subsequent phases. A sewer rehabilitation contract has been developed under this project which procured a dedicated contractor for all evaluation and rehabilitation work. The intent of this project is to complete a condition assessment of all RWSA interceptors (except those replaced during the period with new pipe) by 2021 and complete this phase of repairs as defects are identified. Such periodic assessment of all sewer pipe reflects industry best practices and the maintenance expectations of federal and state regulators as a part of avoiding sanitary sewer overflows.
24. Crozet Interceptor: The Crozet Interceptor is located in western Albemarle County and serves the Crozet area. Flow metering indicated that the interceptor experienced substantial inflow and infiltration and requires rehabilitation. In order to minimize future infrastructure improvements, ACSA and RWSA have agreed to rehabilitate this interceptor and the sewers that flow to the interceptor. The initial phase of rehabilitation to repair defects in manholes and pipelines contributing to the inflow and infiltration in the interceptor upstream of Crozet Pump Station No. 4 has been completed. The current budget accounts for rehabilitation needs for the lower portions of the interceptor based upon previously completed condition assessments. While wet weather flows have moderately improved based on the initial phase of work, the

ACSA and RWSA continue to investigate and remediate deficiencies along the entire interceptor.

The force main component of the Crozet Interceptor was installed in 1986, and it conveys wastewater from Crozet to the RWSA Urban Wastewater system through an 18” ductile iron pipeline and a series of four (4) pumping stations. Air Release Valves (ARVs) are strategically placed along the force main in order to prevent air-locking and continue conveyance of wastewater at full capacity. Over time, several of the tapping saddles that allow the ARVs to be mounted to the force main have degraded, which could lead to the ARVs becoming separated from the force main and subsequent sanitary sewer overflows. The overall goal of this project is to replace the highest-priority ARVs and/or tapping saddles along the force main. This project is slated to start immediately after the Crozet Flow Equalization Tank (FET) has come online in March 2021. The FET will allow for the force main to be taken offline for up to two (2) days, permitting the ARV assembly repairs to be performed in a safe manner and in a more feasible timeframe.

25. Crozet Flow Equalization Tank: Rehabilitation work in the RWSA and ACSA sewer systems is on-going to meet the Inflow and Infiltration (I/I) reduction goals in the Crozet Interceptor. This is based on the flow metering and modeling results of the Comprehensive Sanitary Sewer Model & Study conducted in 2006 and as part of the Crozet Interceptor CIP project. The results of the 2006 study were updated in 2016 to evaluate I/I reduction goals and future capital project needs. The need to proceed with construction of a flow equalization tank in the Crozet area was confirmed as a result of this study update, which took in to account recent flow monitoring data that had been collected following previous I/I reduction efforts. Based on those results, a preliminary engineering evaluation and siting analysis of a flow equalization tank upstream of Crozet Pump Station No. 4 was completed to ensure that the facility could be designed, permitted, constructed and ready for operation to meet projected two-year storm flow targets.
26. Crozet Pump Station 1, 2, 3 Rehabilitation: The Crozet Interceptor Pump Stations were constructed in the 1980’s and many of the components are still original. This project includes the replacement of pumps and valves at Pump Station 2 in order to improve pumping capabilities at this location and provide spare parts for the pumps at Pump Station 1. It also includes roof replacements at all four pump stations, siding replacement for the wet well enclosure at Pump Station 3, and installation of new water wells at Pump Stations 3 and 4.
27. Albemarle-Berkley Pump Station Upgrade: The Albemarle-Berkeley Pump Station was constructed in 1975 and conveys flows from several Albemarle County Public Schools and other ACSA customers into RWSA’s gravity Albemarle-Berkeley Interceptor. Recently, the pump station’s run times have increased, with the pumps running nearly continuously for some periods. It is anticipated that much of the pumping infrastructure has reached or exceeded its expected lifespan, and that the equipment may be in need of replacement.  
Under this project, staff will work with a consultant to perform a Capacity Analysis for the pump station, which will help quantify the current and future flows into the pump station, based upon the present and anticipated population served by the pump station. Once the capacity analysis is complete, staff will review the results, and utilize consultant assistance in order to

formulate a set of bidding documents that will include the installation of bypass pumping, demolition of the existing pump station, and construction of a new pumping station that is sized to meet the current and future flows as determined by the Capacity Analysis.

28. Albemarle-Berkley Pump Station – Basin Demolition: Historically, the Albemarle Berkley Pump Station was located adjacent to an open-air basin that occasionally collected sewage during power outages. With the addition of a back-up power generator, the basin no longer serves a technical purpose. Given the proximity of the deteriorating structure to school property, this project serves to demolish and fill the area of the existing basin to allow for a more beneficial use of the property. Preliminary design of the basin demolition began in Fall 2019, and the demolition is scheduled to be completed by Summer 2020.
  
29. Interceptor Sewer and Manhole Repair – Phase 2: This project is used to conduct assessments of various interceptors as well as rehabilitation of interceptors that do not have a separate CIP project. Phase 1 of the Interceptor Sewer and Manhole Repair Project included the completion the baseline evaluation of all RWSA interceptors (except those replaced with new pipe), as well as rehabilitation of the Upper Morey Creek Interceptor, and beginning of rehabilitation on the Lower Morey Creek and Powell Creek Interceptors. Planned projects for Phase 2 include continuation of rehabilitation on the Lower Morey Creek and Powell Creek Interceptors, as well as rehabilitation along the Moores Creek, Moores Creek Relief, and Upper Rivanna Interceptors. Similar to Phase 1, a sewer rehabilitation contract will be developed under this project in order to procure a dedicated contractor for any evaluation and rehabilitation work specified. Rehabilitation of existing sanitary sewer pipe and manholes reduces Inflow & Infiltration (I & I) in the system, thus reducing the chance for sanitary sewer overflows (SSOs) during high flow events.

## Urban Wastewater Interceptors/Pumping Stations

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
22	Upper Schenks Branch Interceptor	\$3,985,000		\$120,000	\$3,180,000	\$685,000				\$3,985,000	\$11,187
23	Interceptor Sewer and Manhole Repair (Phase 1)	\$1,088,330		\$1,088,330						\$1,088,330	\$268,367
24	Crozet Interceptor	\$625,000	\$225,000	\$394,615	\$395,385	\$90,000				\$880,000	\$181,975
25	Crozet Flow Equalization Tank	\$4,860,000		\$4,860,000						\$4,860,000	\$255,319
26	Crozet Pump Station 1, 2, 3 Rehabilitation	\$545,000	\$45,000	\$295,000		\$45,000	\$205,000	\$45,000		\$590,000	
27	Alb. Berkley PS Upgrade		\$40,000						\$40,000	\$40,000	
28	Alb. Berkley PS - Basin Demolition	\$200,000			\$165,000	\$35,000				\$200,000	
29	Interceptor Sewer and Manhole Repair (Phase 2)		\$695,000						\$695,000	\$695,000	
	<b>TOTAL</b>	<b>\$11,303,330</b>	<b>\$1,005,000</b>	<b>\$6,757,945</b>	<b>\$3,740,385</b>	<b>\$855,000</b>	<b>\$205,000</b>	<b>\$45,000</b>	<b>\$735,000</b>	<b>\$12,338,330</b>	<b>\$716,848</b>



## **Moores Creek Advanced Water Resource Recovery Facility**

The Moores Creek Advanced Water Resource Recovery Facility (MCAWRRF) is the largest wastewater treatment facility within the RWSA system. The plant was originally constructed in 1958 and upgraded and expanded in 1981 and 1982, and currently has a rated capacity of 15 mgd. From 2009 thru 2012 the facility was upgraded to provide enhanced nutrient removal, and increased wet weather pumping and treatment capacity. This site includes the infrastructure for the wastewater treatment process as well as the RWSA administration facilities.

### **Project Descriptions:**

30. Moores Creek AWWRF Odor Control Phase 2: As part of the implementation of the next phase of the 2007 Odor Control Master Plan at the MCAWRRF, operations audits were performed, liquid and vapor phase sampling was conducted, and a computerized dispersion model was developed from 2013 to 2014. Recommendations for odor control improvements that would significantly control odors from traveling beyond the MCAWRRF fence line were presented to the RWSA Board of Directors in December 2014 and the CIP project was approved at the January 2015 Meeting, with subsequent increases due to project challenges. The final design for odor control improvements includes covering the head works and screening channels, installing grit facilities, constructing a bypass line through one equalization basin, covering the primary clarifiers, building additional odor scrubbing facilities to treat the foul air from the covered sources, removing the post-digestion clarifiers from service, modifying the handling, and hauling and storage of bio solids, all of which has been recently completed in Odor Control Improvements Project. The remaining odor control work included in the current CIP budget includes cleaning the equalization basins and holding ponds which is anticipated to be bid this spring and coating the interior of the digesters which is ongoing.
31. Moores Creek AWWRF Engineering and Administration Building: RWSA currently has its administrative headquarters in two buildings on the grounds of the Moores Creek Advanced Water Resource Recovery Facility. The two-story Administration Building was constructed in the early 1980's and houses offices, IT server space, meeting space and a full service laboratory. The second building is a series of four trailers installed in between 2003-2010 that house the engineering department. The Administration building is located at the head of the wastewater treatment plant and is surrounded by underground piping and process functions that may conflict with existing parking and/or the building in a future plant expansion. There is currently a need to house additional staff; increase office and meeting space; plan for the replacement of the trailers; bring the IT server workrooms to modern standards; provide classroom space for education outreach. This project is currently planned to begin after the completion of the MCAWRRF Master Plan is complete.
32. Moores Creek AWWRF Digester Sludge Storage Improvements: The sole sludge storage tank at the MCAWRRF was constructed in 1959 of reinforced concrete and is in need of repairs. The scope of work would include piping modifications, hydraulic improvements, tank safety improvements such as handrail and lights, and structural improvements to the existing sludge storage tank roof.

33. Moore's Creek AWWRF Aluminum Slide Gate Replacement: Several large aluminum slide gates are located at the influent side of the Moore's Creek Pump Station. These gates allow staff to stop or divert flow to perform maintenance activities. After repeated attempts to access and repair the gates, it is now necessary to replace and modify the gate arrangement. The replacement includes new gates for greater flexibility and resiliency as well as significant flow bypass pumping. Likewise, there are several gates at the Ultraviolet disinfection facility that leak water, causing a reduced capacity of the facility. Replacement of these gates will restore the process to full capacity. Two additional gates in the holding pond pump station from the original 1977 Moore's Creek facility construction are broken and non-operational and will be replaced as part of this work. In addition, motor operated valves at the headworks will improve wet weather operations related to the new grit facility.
34. Moore's Creek AWWRF Master Plan: The majority of the Moore's Creek Water Resource Recovery Facility was constructed in the early 1980's. At the time, the plant layout was developed with space held open for future process expansion. With the Enhanced Nutrient Removal (ENR) project in 2009, the operation and layout of the plant was fundamentally altered, as needed to meet the new regulation. The project did anticipate the need for future expansion and some of the processes have readily available space. However, a full expansion plan was not developed at the time. As identified in the Strategic Plan, the Authority has a goal to plan, deliver and maintain dependable infrastructure in a financially responsible manner. Staff has identified asset master planning as a priority strategy to improve overall system development. As such, this project will serve to evaluate and plan for future space and process needs to accommodate capacity expansion and/or anticipated regulatory changes.
35. Moore's Creek AWWRF Mechanical Thickener: During the design of the Moore's Creek AWWRF Phase 2 Odor Control project, the consultants conducted a detailed evaluation of all facility odor sources. One of the key sources identified, was the post-digestion clarifiers. These clarifiers are two round open-topped tanks of digested wastewater sludge, located on the north side of the plant. During the ENR upgrade, the characteristics of the post-aeration sludge changed. This change has led to less predictable sludge handling through the existing gravity thickeners. This change in the post-aeration sludge characteristics has made obtaining a clear thickener overflow more difficult without chemical addition. Removing the post-digestion clarifiers from service combined with solids carryover from the existing gravity thickeners create a number of downstream consequences in primary clarification, sludge digestion and solids dewatering. Removing these facilities from service reduces the sludge thickness and therefore the plant's ability to adequately process it. This project includes the design and installation of a mechanical thickener prior to digestion that will increase plant solids processing reliability and capacity.
36. Moore's Creek AWWRF Compost Shed Roof Rehabilitation: In the early 1980's a large metal-framed shed roof was constructed to house the biosolids composting operations. Subsequent to stopping composting at Moore's Creek AWWRF, the shed serves as an equipment maintenance yard, solids handling facility and material storage lock-up. The shed roof is exhibiting signs of rafter deterioration and ongoing drainage issues. This project will evaluate and perform remediation needs at this facility.

37. Moore's Creek AWWRF Gas Sphere Rehabilitation: The gas sphere was constructed in 1980 and is used to house pressurized methane gas as part of the boiler and cogeneration system at the plant. The sphere was inspected in 2005 and it was determined that the coating system was near the end of its serviceable life and the tank should be recoated in addition to some minor grout repairs and safety improvements. This project will include additional inspections to update the needed improvements, a recoating of the exterior of the tank, repairs to the grout around the concrete ring wall, installation of a safety climb on the exterior of the tank and other minor repairs.
38. Moore's Creek AWWRF Cogeneration Upgrades: The MCAWWRF has an existing cogeneration facility that was constructed in 2011. The purpose of the facility was to provide a beneficial purpose for using the gas produced by the digester process at the plant, and in doing so provide both process heating fluid to the digester tanks and electrical energy to the plant's electrical distribution system. Unfortunately, the existing cogeneration facility requires expensive recurring maintenance services, has proprietary equipment which further complicates servicing needs, and has had a number of operational issues that have impeded the benefit this facility was intended to provide. As a result, a Cogeneration System Analysis was performed to determine a recommended approach for proceeding with improvements to the existing facility, installation of a new cogeneration facility without the issues of the previous facility or removing the cogeneration facility altogether and providing a backup boiler. This project includes costs of installation of a new cogeneration facility as described in the Cogeneration System Analysis.
39. Moore's Creek AWWRF Maintenance Building Space: The Moore's Creek Maintenance Department facilities are undersized to serve the current staffing; parts storage and oil and grease storage needs. The Moore's Creek Master Plan is currently evaluating plant needs into the future and will provide specific recommendations for the Maintenance Department. Preliminarily, this project will increase personal spaces such as offices and a locker room. Additionally, the project will construct a new oil and grease storage facility that will meet all current best practices for safety and fire suppression. Lastly, the project will address the need for additional conditioned parts storage.
40. Moore's Creek AWWRF Structural Modifications: The aeration basins located at Moore's Creek are a series of chambers that each have uniquely controlled oxygen and nutrient loading conditions. Mid way thru the basins are ten nitrogen recycle (NCRY) pumps. Due to the corrosive atmosphere, these submersed pumps require being pulled and rebuilt frequently. To remove the pumps, staff must currently hire a long boom crane. This project will provide the means to pull, move, and load the pumps during maintenance activities.

Two of the six pumps in the New Rivanna Pump Station are smaller and were designed to be replaced if future average day flows warrant increased capacity. The current configuration resulted in several valves being located approximately 40 feet above the pump floor level. Valve maintenance activities have been challenging due to their height. A project is proposed to install a catwalk from the upper mezzanine level to each valve to provide a safer, walkable access to each valve.

41. Moore's Creek AWWRF In-plant Clarifier and Lime Silo Demolition: The two in-plant clarifiers were constructed in the late 1950's and were taken out of service as a result of the Odor Control Project at the plant. Due to the age of the tanks, various components have significantly deteriorated over time and no additional uses for these tanks have been identified. In addition, due to their out-of-service status, they remain empty and a safety concern for plant staff and visitors. There is also an abandoned lime silo currently located adjacent to the Solids Handling Building. Lime was previously used with the old plat and frame presses before centrifuges were installed for sludge dewatering purposes. This project will include the complete demolition of the in-plant clarifiers by removing all existing components, backfilling the area and returning the area to open space and removing the lime silo from the plant and properly disposing of it.
42. Moore's Creek AWWRF Generator Fuel Storage Expansion: The Moore's Creek AWWRF south side electrical facilities have a single large system back-up power generator that was installed between 2009-2012 during the ENR plant upgrade. The generator has a belly tank that allows for approximately 22 hours of operation. This project will install an ancillary fuel tank that will allow for approximately three days of operation.
43. Moore's Creek AWWRF Meter and Valve Replacements: As part of the Odor Control Phase II Project, the post digestion clarifiers were eliminated from use and the gravity thickener overflow was diverted through existing piping directly to the Moore's Creek Pump Station at the head of the treatment facility. This resulted in less odor generation, however, the gravity thickener overflow lost its metering location at the post digestion clarifiers. A new metering manhole location was installed near the Moore's Creek Pump Station where several plant recycle flows come together. Unfortunately, this meter location has been problematic and is subject to backwater flows from the pump station and meter fouling from grease and solids. This project involves installation of individual meters on each recycle flow at locations that will provide less operation and maintenance problems.

The circulation of Waste Activated Sludge (WAS) and Return Activated Sludge (RAS) is important in the wastewater process to maintain a healthy balance of microorganisms. The existing WAS and RAS flow meters are original to the 1980's construction of the facility and are nearly 40 years old. These meters can no longer be calibrated and replacement parts are not available. Replacement of these meters is necessary for process and operational efficiency

44. Moore's Creek AWWRF Facility Renovations: The RWSA Administration Building Board Room finishes are generally original to the facility. The proposed project will update the wall and floor coverings, alter the shelving and update the room furnishings in order to create a more modern and useable meeting space.

The Duty Pump Station was constructed in 1958 and no longer functions as an actual pump station. It currently houses electrical equipment that serves the plant, but otherwise has available space that could be beneficially used for other purposes. RWSA has a need for additional office space and has evaluated repurposing portions of the Duty Pump Station for office and work space in order to make use of all available space at the plant before proceeding with more significant administrative expansions. This project includes demolition of a select

portion of the interior of the station, cleaning and sanitizing of the areas to be repurposed, and an interior upfit of the space to provide additional office and work space.

45. Moore's Creek AWRRF 5kV Electrical System Upgrade: Much of the original 5kV wire at Moore's Creek AWRRF was replaced with the Enhanced Nutrient Removal (ENR) Upgrades and the New Rivanna Pump Station Project and brought up to current codes. Several portions of the original 50 year old wire and switchgear remain in the blower building and feed critical portions of the facility. This project will replace the remaining 5kV wire and increase the reliability of the facility.
46. Moore's Creek AWRRF Lighting Upgrade: The lighting at the 80-acre MCAWRRF consists of over 300 fixtures installed over the entire life of the facilities presence at Moore's Creek. In 2019, Albemarle County investigated the lighting plan at the facility and issued a Zoning Notice of Violation.

RWSA and Albemarle County staff have been working together to best address the issue. A photo metric plan of existing lighting was submitted to the county for review. RWSA is currently compiling a minor site plan amendment and Architectural Review Board submission that will include a large scale replacement of non-compliant fixtures as well as address industrial lighting standards for the entire facility.

## Moores Creek Advanced Water Resource Recovery Facility

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
30	Moores Creek AWWRF Odor Control - Phase 2	\$2,216,632		\$2,216,632						\$2,216,632	\$1,000,530
31	Moores Creek AWWRF Engineering and Administration Building		\$250,000					\$250,000		\$250,000	
32	Moores Creek AWWRF Digester Sludge Storage Improvements	\$313,000	\$237,000	\$265,000	\$285,000					\$550,000	
33	Moores Creek AWWRF Aluminum Slide Gate Replacements	\$470,000	\$205,000	\$470,000	\$205,000					\$675,000	\$6,853
34	Moores Creek AWWRF Master Plan	\$250,000	\$25,000	\$75,000	\$200,000					\$275,000	
35	Moores Creek AWWRF Mechanical Thickener Improvement		\$100,000						\$100,000	\$100,000	
36	Moores Creek AWWRF Compost Shed Roof Rehabilitation	\$200,000				\$200,000				\$200,000	
37	Moores Creek AWWRF Gas Sphere Rehabilitation		\$80,000						\$80,000	\$80,000	
38	Moores Creek AWWRF Cogeneration Upgrades		\$1,865,000		\$245,000	\$1,620,000				\$1,865,000	
39	Moores Creek AWWRF Maintenance Building		\$105,000						\$105,000	\$105,000	
40	Moores Creek AWWRF Structural Modifications		\$575,000				\$350,000	\$225,000		\$575,000	
41	Moores Creek AWWRF In-plant Clarifier and Lime Silo Demolition		\$655,000		\$185,000	\$470,000				\$655,000	

## Moores Creek Advanced Water Resource Recovery Facility (Continued)

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
42	Moores Creek AWWRF Generator Fuel Storage Expansion		\$100,000		\$100,000					\$100,000	
43	Moores Creek AWWRF Meter and Valve Replacements		\$660,000		\$380,000	\$120,000	\$160,000			\$660,000	
44	Moores Creek AWWRF Facility Renovations		\$375,000		\$375,000					\$375,000	
45	Moores Creek AWWRF 5kV Electrical System Upgrade		\$500,000						\$500,000	\$500,000	
46	Moores Creek AWWRF Lighting Upgrade		\$1,000,000		\$1,000,000					\$1,000,000	
	<b>TOTAL</b>	\$3,449,632	\$6,732,000	\$3,026,632	\$2,975,000	\$2,410,000	\$510,000	\$475,000	\$785,000	\$10,181,632	\$1,007,383

## **Scottsville Wastewater System**

The Scottsville Wastewater System includes the influent pumping station, the water resource recovery facility constructed in 1983, and the historical treatment lagoon (now incorporated into the plant operation). The water resource recovery facility has a rated capacity of 0.2 mgd.

### **Project Descriptions:**

47. Scottsville WRRF Grinder and Air Control Improvements: This project will evaluate methods to automate air control for the biological treatment process. The current method of air control produces inconsistent results, adversely impacting treatment and operations.
48. Scottsville WRRF Whole Plant Generator and ATS: The current back-up power generator at the Scottsville Water Treatment Plant does not power the entire plant, serving only the facilities needed to send flow to the lagoons. This project will provide for a plant-wide generator and automatic transfer switch. This project will offer greater treatment flexibility and monitoring capability for the operations staff; particularly when the plant is unmanned and monitored remotely.



## Scottsville Water Resource Recovery Facility

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
47	Scottsville WRRF Air Control Improvements	\$210,000		\$65,000	\$145,000					\$210,000	
48	Scottsville WRRF Whole Plant Generator and ATS		\$125,000				\$125,000			\$125,000	
	TOTAL	\$210,000	\$125,000	\$65,000	\$145,000	\$0	\$125,000	\$0	\$0	\$335,000	\$0

## **Glenmore Wastewater System**

The 0.381-mgd water resource recovery facility, located within the Glenmore subdivision, is operated by RWSA. The facility includes an influent pumping station located immediately adjacent to the treatment facility.

### **Project Descriptions:**

49. Glenmore WRRF Influent Pump & VFD Addition: The Glenmore WRRF is predicted to see additional dry and wet weather flows as construction within the service area continues. Future wet weather flows will require higher influent pumping capacity and an additional pump and electrical variable frequency drive will be required to maintain firm capacity.

## Glenmore Water Resource Recovery Facility

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
49	Glenmore WRRF Influent Pump and VFD Addition	\$65,000			\$65,000					\$65,000	
	TOTAL	\$65,000	\$0	\$0	\$65,000	\$0	\$0	\$0	\$0	\$65,000	\$0

## All Systems

### Project Descriptions:

50. Radio Upgrades: The regional 800 MHz Public Safety Communication System, in which the Rivanna Water and Sewer Authority participates to provide internal and emergency radio communication, is nearing the end of its service life. Because of technology changes (software and hardware) the Charlottesville-UVA-Albemarle County Emergency Communications Center (ECC) will need to upgrade or replace the system to keep it useable. This project plans for the upgrade or replacement of major technology components and equipment of the existing system include: electronic components at all tower sites and the prime site at the ECC facility; new console equipment at the regional ECC; equipment such as tower site generators and UPS systems; an additional tower site (to improve service in southern Albemarle County); microwave backbone; and replacement of the system recording facilities. RWSA is being apportioned a part of the \$18.8M project cost proportionately based on the number of radios (2.4% of the total project cost). In addition to this assessment from the ECC, the Authority will also be required to undertake upgrades to its fleet of portable radios.
51. Asset Management: Asset management is the practice of managing our infrastructure to minimize the total cost of owning and operating these assets while providing desired service levels. In doing so, it is used to make sure planned maintenance activities take place and that capital assets are replaced, repaired or upgraded at the right time, while ensuring that the resources necessary to perform those activities is available. RWSA has some components of an asset management program in place (i.e. GIS, work order system), but has identified the need to further develop the program as part of our Strategic Planning process. In order to continue to build the program, a consultant was procured to assist with a three-phase process that will include facilitation and development of an asset management strategic plan, development and management of a pilot study where the results of the strategic plan will be applied to a specific facility, and assistance through a full implementation process. Procurement of a software package to facilitate the overall program are also included in this project.
52. Security Enhancements: As required by the federal Bioterrorism Act of 2002, water utilities must conduct vulnerability assessments (VA) and have emergency response plans. RWSA recently completed a VA of its water system in collaboration with other regional partners and identified a number of security improvements that could be applied to both its water and wastewater systems. The purpose of this project will be to install security improvements at RWSA facilities such as an enhanced access control program, industrial strength door and window components, security gate and fencing modifications, an improved lock and key program, facility signage, closed circuit television (CCTV) enhancements, intrusion detection systems (IDS), additional security lighting, mass emergency notification systems, and emergency call stations/panic buttons. In order to implement an access control system at Authority-owned facilities, staff has procured an Implementer that will finalize system design/requirements, procure all necessary equipment, and install the chosen system. Implementation of the access control system at Authority-owned facilities began in Winter 2019-2020.

53. IT Master Plan – Software: Staff is currently updating an IT Master Plan which assessed and benchmarked current software and business practices. Work is currently underway to reconfigure the Network infrastructure and to install and implement major software initiatives. This project will continue to address those Authority wide needs.

## All Systems

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
50	Radio Upgrades	\$646,000	(\$246,000)	\$521,000	(\$121,000)					\$400,000	\$75,352
51	Asset Management	\$500,000	\$615,000	\$300,000	\$435,000	\$215,000	\$130,000	\$35,000		\$1,115,000	\$92,285
52	Security Enhancements	\$1,000,000	\$1,730,000	\$1,000,000	\$550,000	\$115,000	\$510,000	\$515,000	\$40,000	\$2,730,000	
53	IT Master Plan - Software	\$450,000		\$150,000	\$150,000	\$150,000				\$450,000	
	<b>TOTAL</b>	<b>\$2,596,000</b>	<b>\$2,099,000</b>	<b>\$1,971,000</b>	<b>\$1,014,000</b>	<b>\$480,000</b>	<b>\$640,000</b>	<b>\$550,000</b>	<b>\$40,000</b>	<b>\$4,695,000</b>	<b>\$167,637</b>

**APPENDICES**

**CIP Financial Summary**

**Water System Summary**

**Wastewater System Summary**

**All Systems Summary**

## CIP Financial Summary

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)	
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025			
1	South Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way	\$2,295,000	\$0	\$1,710,249	\$584,751						\$2,295,000	\$301,054
2	South Rivanna Reservoir Dredging	\$10,000	(\$10,000)	\$0							\$0	\$0
3	Ragged Mountain Reservoir to Observatory Water Treatment Plant Raw Water Line	\$3,217,000	\$4,280,000	\$0		\$325,000	\$1,186,000	\$1,706,000	\$4,280,000	\$7,497,000	\$0	\$0
4	Ragged Mountain Reservoir to Observatory Water Treatment Plant Raw Water Pump Station	\$660,000	\$1,890,000	\$0		\$210,000	\$320,000	\$510,000	\$1,510,000	\$2,550,000	\$0	\$0
5	Observatory Water Treatment Plant Improvements	\$19,700,000	\$6,300,000	\$2,648,198	\$5,051,802	\$14,700,000	\$3,600,000			\$26,000,000	\$618,880	\$618,880
6	Sugar Hollow Dam Rubber Crest Gate Replacement	\$1,140,000	\$560,000	\$470,000	\$760,000	\$470,000				\$1,700,000	\$0	\$0
7	Valve Repair & Replacement (Phase 2)	\$882,914	\$250,000	\$1,132,914						\$1,132,914	\$154,218	\$154,218
8	Central Water Line	\$2,100,000	\$2,850,000	\$1,375,000				\$725,000	\$2,850,000	\$4,950,000	\$137,749	\$137,749
9	South Fork Rivanna River Crossing	\$5,340,000	(\$2,540,000)	\$0	\$260,000	\$922,000	\$1,618,000			\$2,800,000	\$0	\$0
10	Airport Rd. Pump Station and North Rivanna Transmission Main	\$2,300,000	\$3,550,000	\$201,000	\$1,574,000	\$3,200,000	\$875,000			\$5,850,000	\$0	\$0
11	Finished Water System Master Plan	\$253,000	\$0	\$253,000						\$253,000	\$20,307	\$20,307



## CIP Financial Summary (Continued)

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
12	South Rivanna Hydropower Plant Decommissioning	\$725,000	\$0	\$725,000						\$725,000	\$127,081
13	South Rivanna Water Treatment Plant Improvements	\$15,000,000	\$2,000,000	\$8,046,415	\$7,353,585	\$1,600,000				\$17,000,000	\$619,031
14	South Rivanna Dam - Gate Repairs	\$900,000	\$0	\$900,000						\$900,000	\$0
15	North Rivanna Water Treatment Plant Upgrade	\$2,325,000	(\$1,000,000)	\$385,000		\$940,000				\$1,325,000	\$0
16	Beaver Creek Dam & Pump Station Improvements	\$9,036,000	\$11,722,000	\$1,007,000	\$336,000	\$1,050,000	\$6,435,000	\$6,010,000	\$5,920,000	\$20,758,000	\$288,134
17	Crozet Water Treatment Plant Expansion	\$8,500,000	\$0	\$8,044,000	\$456,000					\$8,500,000	\$1,238,717
18	Crozet Ground Storage Tank Leak Repair	\$0	\$100,000	\$0	\$100,000					\$100,000	\$0
19	Buck's Elbow Tank and Waterball Painting	\$0	\$83,000	\$0					\$83,000	\$83,000	\$0
20	Scottsville Water Treatment Plant LT2 Improvements	\$100,000	\$60,000	\$100,000	\$60,000					\$160,000	\$0
21	Scottsville Water Treatment Plant Lagoon Liner Replacement	\$0	\$315,000	\$0			\$140,000	\$175,000		\$315,000	\$0
22	Upper Schenks Branch Interceptor	\$3,985,000	\$0	\$120,000	\$3,180,000	\$685,000				\$3,985,000	\$11,187

## CIP Financial Summary (Continued)

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
23	Interceptor Sewer and Manhole Repair - Phs 1	\$1,088,330	\$0	\$1,088,330						\$1,088,330	\$268,367
24	Crozet Interceptor	\$625,000	\$225,000	\$394,615	\$395,385	\$90,000				\$880,000	\$181,975
25	Crozet Flow Equalization Tank	\$4,860,000	\$0	\$4,860,000						\$4,860,000	\$255,319
26	Crozet Pump Station 1, 2, 3 Rehabilitation	\$545,000	\$45,000	\$295,000		\$45,000	\$205,000	\$45,000		\$590,000	\$0
27	Alb. Berkley Pump Station Upgrade	\$0	\$40,000	\$0					\$40,000	\$40,000	\$0
28	Alb. Berkley Pump Station - Basin Demolition	\$200,000		\$0	\$165,000	\$35,000				\$200,000	\$0
29	Interceptor Sewer and Manhole Repair - Phs 2	\$0	\$695,000	\$0					\$695,000	\$695,000	\$0
30	Moores Creek AWWRF Odor Control Phase 2	\$2,216,632	\$0	\$2,216,632						\$2,216,632	\$1,000,530
31	Moores Creek AWWRF Engineering and Administration Building	\$0	\$250,000	\$0				\$250,000		\$250,000	\$0
32	Moores Creek AWWRF Digester Sludge Storage Improvements	\$313,000	\$237,000	\$265,000	\$285,000					\$550,000	\$0
33	Moores Creek AWWRF Aluminum Slide Gate Replacements	\$470,000	\$205,000	\$470,000	\$205,000					\$675,000	\$6,853

## CIP Financial Summary (Continued)

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
34	Moores Creek AWWRF Master Plan	\$250,000	\$25,000	\$75,000	\$200,000					\$275,000	\$0
35	Moores Creek AWWRF Mechanical Thickener Improvement	\$0	\$100,000	\$0					\$100,000	\$100,000	\$0
36	Moores Creek AWWRF Compost Shed Roof Rehabilitation	\$200,000		\$0		\$200,000				\$200,000	\$0
37	Moores Creek AWWRF Gas Sphere Rehabilitation	\$0	\$80,000	\$0					\$80,000	\$80,000	\$0
38	Moores Creek AWWRF Cogeneration Upgrades	\$0	\$1,865,000	\$0	\$245,000	\$1,620,000				\$1,865,000	\$0
39	Moores Creek AWWRF Maintenance Building	\$0	\$105,000	\$0					\$105,000	\$105,000	\$0
40	Moores Creek AWWRF Structural Modifications	\$0	\$575,000	\$0			\$350,000	\$225,000		\$575,000	\$0
41	Moores Creek AWWRF In-plant Clarifier and Lime Silo Demolition	\$0	\$655,000	\$0	\$185,000	\$470,000				\$655,000	\$0
42	Moores Creek AWWRF Generator Fuel Storage Expansion	\$0	\$100,000	\$0	\$100,000					\$100,000	\$0
43	Moores Creek AWWRF Meter and Valve Replacements	\$0	\$660,000	\$0	\$380,000	\$120,000	\$160,000			\$660,000	\$0
44	Moores Creek AWWRF Facility Renovations	\$0	\$375,000	\$0	\$375,000					\$375,000	\$0
45	Moores Creek AWWRF 5kV Electrical System Upgrade	\$0	\$500,000	\$0					\$500,000	\$500,000	\$0

## CIP Financial Summary (Continued)

Line No.	Project Description	Five-Year Capital Program			Projected Future Expenses by Year					Recommended CIP	Work-in-Progress (Prev. Expenses 6/30/2019)
		Current CIP Adopted 5/2019	Proposed Changes	Current Capital Budget	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025		
46	Moores Creek AWWRF Lighting Upgrade	\$0	\$1,000,000	\$0	\$1,000,000					\$1,000,000	\$0
47	Scottsville WRRF Air Control Improvements	\$210,000		\$65,000	\$145,000					\$210,000	\$0
48	Scottsville WRRF Whole Plant Generator and ATS	\$0	\$125,000	\$0			\$125,000			\$125,000	\$0
49	Glenmore WRRF Influent Pump & VFD Addition	\$65,000	\$0	\$0	\$65,000					\$65,000	\$0
50	Radio Upgrades	\$646,000	(\$246,000)	\$521,000	(\$121,000)					\$400,000	\$75,352
51	Asset Management	\$500,000	\$615,000	\$300,000	\$435,000	\$215,000	\$130,000	\$35,000		\$1,115,000	\$92,285
52	Security Enhancements	\$1,000,000	\$1,730,000	\$1,000,000	\$550,000	\$115,000	\$510,000	\$515,000	\$40,000	\$2,730,000	\$0
53	IT Master Plan - Software	\$450,000	\$0	\$150,000	\$150,000	\$150,000				\$450,000	\$0
<b>Total</b>		\$92,107,876	\$40,371,000	\$38,818,353	\$24,475,523	\$27,162,000	\$15,654,000	\$10,196,000	\$16,203,000	\$132,508,876	\$5,397,039

# Water System Summary

Urban Water System	Summary		Current Capital Budget	Projected Future Expenses by Year					Recommended CIP	Work-in -Progress
	Current CIP	Proposed Changes		FY21	FY22	FY23	FY24	FY25		
<b>PROJECT COSTS</b>										
Community Water Supply Plan	\$ 10,182,000	\$ 6,160,000	\$ 1,710,249	\$ 584,751	\$ 535,000	\$ 1,506,000	\$ 2,216,000	\$ 5,790,000	\$ 12,342,000	\$ 301,054
Observatory WTP/Ragged Mtn/Sugar Hollow Systems	20,840,000	6,860,000	3,118,198	5,811,802	15,170,000	3,600,000	-	-	27,700,000	618,880
Finished Water Storage/Distribution - Urban System	11,529,914	4,238,000	2,961,914	1,834,000	4,122,000	2,493,000	725,000	2,850,000	14,985,914	312,274
South & North Fork Rivanna WTP and Reservoir System	18,950,000	2,000,000	10,056,415	7,353,585	2,540,000	-	-	-	19,950,000	746,112
<b>Total Projects Urban Water Systems</b>	<b>\$ 61,501,914</b>	<b>\$ 19,258,000</b>	<b>\$ 17,846,776</b>	<b>\$ 15,584,138</b>	<b>\$ 22,367,000</b>	<b>\$ 7,599,000</b>	<b>\$ 2,941,000</b>	<b>\$ 8,640,000</b>	<b>\$ 74,977,914</b>	<b>\$ 1,978,320</b>
<b>FUNDING SOURCES URBAN SYSTEM - TO DATE</b>										
Work-in-Progress			\$ 1,978,300	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,978,300	
Debt Proceeds Available 2015B			14,838,000	-	-	-	-	-	14,838,000	
Capital Funds Available			1,030,476	2,162,524	-	-	-	-	3,193,000	
SUBTOTAL			17,846,776	2,162,524	-	-	-	-	20,009,300	
<b>FUNDING SOURCES URBAN SYSTEM - NEEDS</b>										
Future Cash reserve transfer to Capital Fund				\$ 1,000,000	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ 500,000	\$ 6,000,000	
New Debt Needed			-	12,421,614	20,867,000	6,099,000	1,441,000	8,140,000	48,968,614	
SUBTOTAL			-	13,421,614	22,367,000	7,599,000	2,941,000	8,640,000	54,968,614	
<b>TOTAL URBAN WATER FUNDING</b>			<b>\$ 17,846,776</b>	<b>\$ 15,584,138</b>	<b>\$ 22,367,000</b>	<b>\$ 7,599,000</b>	<b>\$ 2,941,000</b>	<b>\$ 8,640,000</b>	<b>\$ 74,977,914</b>	<b>\$74,977,914</b>
<b>Estimated Bond Issues</b>					<b>\$33,288,600</b>		<b>\$15,680,000</b>			

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Non-Urban Water System	Summary		Current Capital Budget	Projected Future Expenses by Year					Recommended CIP	Work-in -Progress
	Current CIP	Proposed Changes		FY21	FY22	FY23	FY24	FY25		
<b>PROJECT COSTS</b>										
Crozet Water System	\$ 17,723,000	\$ 11,957,000	\$ 9,051,000	\$ 892,000	\$ 1,050,000	\$ 6,435,000	\$ 6,010,000	\$ 6,003,000	\$ 29,441,000	\$ 1,526,851
Scottsville Water System	245,000	655,000	100,000	60,000	-	140,000	175,000	-	475,000	5,485
<b>Total Rural Water Systems</b>	<b>\$ 17,968,000</b>	<b>\$ 12,612,000</b>	<b>\$ 9,151,000</b>	<b>\$ 952,000</b>	<b>\$ 1,050,000</b>	<b>\$ 6,575,000</b>	<b>\$ 6,185,000</b>	<b>\$ 6,003,000</b>	<b>\$ 29,916,000</b>	<b>\$ 1,532,336</b>
<b>Non-URBAN FUNDING SOURCES</b>										
Work in Progress			\$ 1,532,300	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,532,300	
Capital Funds Available			334,300						334,300	
Debt Proceeds 2018 Bond			7,284,400	952,000	1,050,000	1,641,701	-	-	10,928,101	
Future Cash reserve transfer to Capital Fund				280,000	170,000	100,000	100,000	100,000	750,000	
New Debt Needed			-	(280,000)	(170,000)	4,833,299	6,085,000	5,903,000	16,371,299	
<b>TOTAL NON-URBAN WATER FUNDING</b>			<b>\$ 9,151,000</b>	<b>\$ 952,000</b>	<b>\$ 1,050,000</b>	<b>\$ 6,575,000</b>	<b>\$ 6,185,000</b>	<b>\$ 6,003,000</b>	<b>\$ 29,916,000</b>	
<b>Estimated Bond Issues</b>				<b>\$ (450,000)</b>			<b>16,821,300</b>			

# Wastewater System Summary

Urban Wastewater System	Summary		Current Capital Budget	Projected Future Expenses by Year					Recommended CIP
	Current CIP	Proposed Changes		FY21	FY22	FY23	FY24	FY25	
<b>PROJECT COSTS</b>									
Wastewater Interceptor/Pumping Stations	\$ 11,303,330	\$ 1,290,000	\$ 6,757,945	\$ 3,740,385	\$ 855,000	\$ 205,000	\$ 45,000	\$ 735,000	\$ 12,338,330
Moore's Creek WWTP	3,449,632	7,782,000	3,026,632	2,975,000	2,410,000	510,000	475,000	785,000	10,181,632
<b>Total Urban Wastewater Systems</b>	<b>\$ 14,752,962</b>	<b>\$ 9,072,000</b>	<b>\$9,784,577</b>	<b>\$6,715,385</b>	<b>\$3,265,000</b>	<b>\$715,000</b>	<b>\$520,000</b>	<b>\$1,520,000</b>	<b>\$22,519,962</b>
<b>FUNDING SOURCES URBAN SYSTEM - IN PLACE</b>									
Work-in-Progress			\$ 1,724,231	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,724,231
Debt Proceeds - 2018			3,722,700	-	-	-	-	-	3,722,700
Capital Funds Available			4,089,000	-	-	-	-	-	4,089,000
<b>SUBTOTAL</b>			<b>9,535,931</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>9,535,931</b>
<b>FUNDING SOURCES URBAN SYSTEM - NEEDS</b>									
Future Cash Reserves			\$ -	\$ 1,500,000	\$ 1,000,000	\$ 500,000	\$ 500,000	\$ -	\$ 3,500,000
New Debt Needed			248,646	5,215,385	2,265,000	215,000	20,000	1,520,000	9,484,031
<b>SUBTOTAL</b>			<b>248,646</b>	<b>\$6,715,385</b>	<b>3,265,000</b>	<b>715,000</b>	<b>520,000</b>	<b>1,520,000</b>	<b>12,984,031</b>
<b>TOTAL URBAN WASTEWATER FUNDING</b>			<b>\$ 9,784,577</b>	<b>\$ 6,715,385</b>	<b>\$ 3,265,000</b>	<b>\$ 715,000</b>	<b>\$ 520,000</b>	<b>\$ 1,520,000</b>	<b>\$ 22,519,962</b>
<b>Estimated Bond Issues</b>					<b>\$ 7,729,000</b>		<b>\$ 1,755,000</b>		<b>\$ 9,484,000</b>

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Non-Urban Wastewater System	Summary		Current Capital Budget	Projected Future Expenses by Year					Recommended CIP	Work-in-Progress
	Current CIP	Proposed Changes		FY21	FY22	FY23	FY24	FY25		
<b>PROJECT COSTS</b>										
Glenmore WWTP	\$ 175,000	\$ 50,000	\$ -	\$ 65,000	\$ -	\$ -	\$ -	\$ -	\$ 65,000	\$ -
Scottsville WWTP	210,000	125,000	65,000	145,000	-	125,000	-	-	335,000	-
<b>Total Rural Wastewater Systems</b>	<b>\$385,000</b>	<b>\$175,000</b>	<b>\$ 65,000</b>	<b>\$ 210,000</b>	<b>\$ -</b>	<b>\$ 125,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 400,000</b>	<b>\$ -</b>
<b>FUNDING SOURCES RURAL SYSTEM - NEEDS</b>										
Capital Funds Available			\$ 46,000	\$ -					46,000	
Future Cash Reserve			-	100,000	-	-			100,000	
New Debt Needed			19,000	110,000	-	125,000	-	-	254,000	
<b>TOTAL RURAL WASTEWATER FUNDING</b>			<b>\$ 65,000</b>	<b>\$ 210,000</b>	<b>\$ -</b>	<b>\$ 125,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 400,000</b>	
<b>Estimated Bond Issues</b>					\$ 254,000					

## All Systems Summary

Shared Projects - All Rate Centers	Summary		Current Capital Budget	Projected Future Expenses by Year					Recommended CIP	Work-in - Progress
	Current CIP	Proposed Changes		FY21	FY22	FY23	FY24	FY25		
<b>PROJECT COSTS</b>										
Asset management/Security/IT Master Plan	\$ 2,596,000	\$ 2,099,000	\$ 1,971,000	\$ 1,014,000	\$ 480,000	\$ 640,000	\$ 550,000	\$ 40,000	\$ 4,695,000	\$ 167,637
<b>Total Projects Urban Water Systems</b>	<b>\$ 2,596,000</b>	<b>\$ 2,099,000</b>	<b>\$ 1,971,000</b>	<b>\$ 1,014,000</b>	<b>\$ 480,000</b>	<b>\$ 640,000</b>	<b>\$ 550,000</b>	<b>\$ 40,000</b>	<b>\$ 4,695,000</b>	<b>\$ 167,637</b>
Completed or Closed Projects	-	-								
<b>FUNDING SOURCES</b>										
Work in Progress			\$167,637						\$ 167,637	
Possible Future Reserves			\$200,000	\$100,000					\$300,000	
New Debt Needed			\$ 1,603,363	\$ 914,000	\$ 480,000	\$ 640,000	\$ 550,000	\$ 40,000	\$ 4,227,363	
									-	
<b>TOTAL URBAN WATER FUNDING</b>			<b>\$ 1,971,000</b>	<b>\$ 1,014,000</b>	<b>\$ 480,000</b>	<b>\$ 640,000</b>	<b>\$ 550,000</b>	<b>\$ 40,000</b>	<b>\$ 4,695,000</b>	
<b>Estimated Bond Issues</b>					<b>\$4,227,363</b>					

	<b>2021 - 2025</b> <i>Draft Proposed</i> <u>CIP</u>	<b>2020 - 2024</b> <b>Adopted</b> <u>CIP</u>	<u>Change \$</u>
<b>Project Cost</b>			
Urban Water Projects	\$ 74,977,900	\$ 61,501,900	\$ 13,476,000
Urban Wastewater Projects	22,520,000	14,753,000	7,767,000
Non-Urban Projects & Shared	35,011,000	20,949,000	14,062,000
<b>Total Project Cost Estimates</b>	<b><u>\$ 132,508,900</u></b>	<b><u>\$ 97,203,900</u></b>	<b><u>\$ 35,305,000</u></b>
<b>Funding in place</b>			
Work-in-Progress (paid for)	\$ 5,402,500	\$ 2,943,110	2,459,390
Debt Proceeds Used	29,488,800	35,354,000	(5,865,200)
Cash-Capital Available	7,686,300	6,767,470	918,830
	<u>\$ 42,577,600</u>	<u>\$ 45,064,580</u>	<u>\$ (2,486,980)</u>
<b>Financing Needs</b>			
Possible Future Reserves	\$ 10,630,000	7,530,000	3,100,000
New Debt	79,301,300	44,609,320	34,691,980
	<u>\$ 89,931,300</u>	<u>\$ 52,139,320</u>	<u>\$ 37,791,980</u>
<b>Total Funding</b>	<b><u>\$ 132,508,900</u></b>	<b><u>\$ 97,203,900</u></b>	<b><u>\$ 35,305,000</u></b>
Percentage of funding in place	32.1%	46.4%	
Ratio of debt to expense	86.2%	85.3%	
Ratio of cash to expense	13.8%	14.7%	



Rivanna Water and Sewer Authority  
 CIP 2021-2025  
 Summary Information

5/21/2020

Detail by Major Systems	<b>Total Draft CIP</b>	<b>Urban Water Projects</b>	<b>Urban Wastewater Projects</b>	<b>Shared Projects</b>	<b>Water Non-Urban Projects</b>	<b>Wastewater Non-Urban Projects</b>
<b><u>Project Cost</u></b>						
Urban Water Projects	\$ 74,977,900	\$ 74,977,900	\$ -		\$ -	\$ -
Urban Wastewater Projects	22,520,000	-	22,520,000		-	-
Non-Urban Projects & Shared	35,011,000	-	-	4,695,000	29,916,000	400,000
<b>Total Project Cost Estimates</b>	<b>\$ 132,508,900</b>	<b>\$ 74,977,900</b>	<b>\$ 22,520,000</b>	<b>\$ 4,695,000</b>	<b>\$ 29,916,000</b>	<b>\$ 400,000</b>
<b><u>Funding in place</u></b>						
Work-in-Progress (paid for)	\$ 5,402,500	\$ 1,978,300	\$ 1,724,300	\$ 167,600	\$ 1,532,300	\$ -
Debt Proceeds available	29,488,800	14,838,000	3,722,700	-	10,928,100	-
Cash-Capital Available	7,686,300	3,193,000	4,089,000	-	334,300	70,000
Subtotal	\$ 42,577,600	\$ 20,009,300	\$ 9,536,000	\$ 167,600	\$ 12,794,700	\$ 70,000
<b><u>Financing Needs</u></b>						
Possible Future Reserves	\$ 10,630,000	6,000,000	3,500,000	300,000	750,000	80,000
New Debt	79,301,300	48,968,600	9,484,000	4,227,400	16,371,300	250,000
Subtotal	\$ 89,931,300	\$ 54,968,600	\$ 12,984,000	\$ 4,527,400	\$ 17,121,300	\$ 330,000
<b>Total Funding</b>	<b>\$ 132,508,900</b>	<b>\$ 74,977,900</b>	<b>\$ 22,520,000</b>	<b>\$ 4,695,000</b>	<b>\$ 29,916,000</b>	<b>\$ 400,000</b>
Percentage of funding in place	32.1%	26.7%	42.3%	3.6%	42.8%	17.5%
Ratio of debt to expense	86.2%	85.1%	58.6%	90.0%	91.3%	62.5%
Ratio of cash to expense	13.8%	12.3%	33.7%	6.4%	3.6%	37.5%

	<u>Urban Water</u>	<u>Urban Wastewater</u>	<u>Non-Urban</u>	<u>Shared</u>	<u>Total</u>
Current Adopted CIP 2020 - 2024	\$ 61,501,900	\$ 14,753,000	\$ 18,353,000	\$ 2,596,000	\$ 97,203,900
<u>Changes:</u>					
Completed or Closed Projects	(4,654,000)	-	(442,000)	-	(5,096,000)
Adjustments on existing Projects	18,130,000	3,782,000	11,782,000	2,099,000	35,793,000
New Projects	-	3,985,000	623,000	-	4,608,000
Total Changes	13,476,000	7,767,000	11,963,000	2,099,000	35,305,000
Total Draft CIP 2021 - 2025	\$ 74,977,900	\$ 22,520,000	\$ 30,316,000	\$ 4,695,000	\$ 132,508,900

Rivanna Water and Sewer Authority  
 CIP 2021-2025  
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5/5/2020

		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
<b>City of Charlottesville Charges</b>								
<b>Urban Water</b>								
Operating Rate	Per 1000 gal.	2.07	2.095	2.095	2.493	2.692	2.854	3.025
	% Change		1.2%	0.0%	19.0%	8.0%	6.0%	6.0%
Debt Service Charge	Per month	\$ 181,008	\$ 193,580	193,580	236,827	257,545	278,220	298,856
			6.9%	0.0%	22.3%	8.7%	8.0%	7.4%
Revenue Requirements:								
Operating Rate Revenue	Annual	\$ 3,587,700	\$ 3,630,500	\$ 3,630,500	\$ 4,320,295	\$ 4,665,919	\$ 4,945,874	\$ 5,242,626
Debt Service Revenues	Annual	2,172,100	2,323,000	2,323,000	2,841,923	3,090,542	3,338,643	3,586,271
<b>Total</b>		<b>\$ 5,759,800</b>	<b>\$ 5,953,500</b>	<b>\$ 5,953,500</b>	<b>\$ 7,162,218</b>	<b>\$ 7,756,461</b>	<b>\$ 8,284,517</b>	<b>\$ 8,828,897</b>
	\$ Change		\$ 193,700	\$ -	\$ 1,208,718	\$ 594,243	\$ 528,056	\$ 544,380
	% Change		3.4%	0.0%	20.3%	8.3%	6.8%	6.6%
<b>Urban Wastewater</b>								
Operating Rate	Per 1000 gal.	2.146	2.369	2.369	2.653	2.812	2.981	3.160
	% Change		10.4%	0.0%	12.0%	6.0%	6.0%	6.0%
Debt Service Charge	Per month	\$ 408,260	\$ 407,588	407,588	410,168	413,088	416,038	420,868
			-0.2%	0.0%	0.6%	0.7%	0.7%	1.2%
Revenue Requirements:								
Operating Rate Revenue	Annual	\$ 3,711,300	\$ 4,016,800	\$ 3,936,500	\$ 4,408,880	\$ 4,673,413	\$ 4,953,818	\$ 5,251,047
Debt Service Revenues	Annual	4,899,100	4,891,100	4,891,100	4,922,015	4,957,055	4,992,455	5,050,415
<b>Total</b>		<b>\$ 8,610,400</b>	<b>\$ 8,907,900</b>	<b>\$ 8,827,600</b>	<b>\$ 9,330,895</b>	<b>\$ 9,630,468</b>	<b>\$ 9,946,273</b>	<b>\$ 10,301,462</b>
	\$ Change		\$ 297,500	\$ (80,300)	\$ 503,295	\$ 299,573	\$ 315,805	\$ 355,189
	% Change		3.5%	-0.9%	5.7%	3.2%	3.3%	3.6%
<b>Total all Rate Centers</b>								
Operating Rate Revenue		\$ 7,299,000	\$ 7,647,300	\$ 7,567,000	\$ 8,729,175	\$ 9,339,331	\$ 9,899,691	\$ 10,493,673
Debt Service Revenues		7,071,200	7,214,100	7,214,100	7,763,938	8,047,597	8,331,098	8,636,686
<b>Total City All Revenues</b>		<b>\$ 14,370,200</b>	<b>\$ 14,861,400</b>	<b>\$ 14,781,100</b>	<b>\$ 16,493,113</b>	<b>\$ 17,386,928</b>	<b>\$ 18,230,789</b>	<b>\$ 19,130,359</b>
	\$ Change		\$ 491,200	\$ (80,300)	\$ 1,712,013	\$ 893,815	\$ 843,861	\$ 899,569
	% Change		3.4%	-0.5%	11.6%	5.4%	4.9%	4.9%
<b>Additional for 10-Year CIP</b>								
Total Estimated Charge		\$ 14,370,200	\$ 14,861,400	\$ 14,781,100	\$ 16,661,640	\$ 17,836,003	\$ 18,970,247	\$ 20,180,767
	% Change		3.4%	-0.5%	12.7%	7.0%	6.4%	6.4%

Rivanna Water and Sewer Authority  
 CIP 2021-2025  
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5/5/2020

		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
<b>ACSA Charges</b>								
<b>Urban Water</b>								
Operating Rate	Per 1000 gal.	2.07	2.095	2.095	2.493	2.692	2.854	3.025
	% Change		1.2%	0.0%	19.0%	8.0%	6.0%	6.0%
Debt Service Charge	Per month	\$ 307,598	\$ 321,303	321,303	379,826	406,054	433,785	458,080
			4.5%	0.0%	18.2%	6.9%	6.8%	5.6%
Revenue Requirements:								
Operating Rate Revenue	Annual	\$ 3,447,000	\$ 3,488,100	\$ 3,488,100	\$ 4,150,839	\$ 4,482,906	\$ 4,751,880	\$ 5,036,993
Debt Service Revenues	Annual	3,691,200	3,855,600	3,855,600	4,557,906	4,872,642	5,205,424	5,496,963
<b>Total</b>		<b>\$ 7,138,200</b>	<b>\$ 7,343,700</b>	<b>\$ 7,343,700</b>	<b>\$ 8,708,745</b>	<b>\$ 9,355,548</b>	<b>\$ 9,957,304</b>	<b>\$ 10,533,956</b>
	\$ Change		\$ 205,500	\$ -	\$ 1,365,045	\$ 646,803	\$ 601,756	\$ 576,652
	% Change		2.9%	0.0%	18.6%	7.4%	6.4%	5.8%
<b>Urban Wastewater</b>								
Operating Rate	Per 1000 gal.	2.146	2.369	2.369	2.653	2.812	2.981	3.160
	% Change		10.4%	0.0%	12.0%	6.0%	6.0%	6.0%
Debt Service Charge	Per month	\$ 246,308	\$ 278,174	278,174	298,484	307,364	316,274	322,674
			12.9%	0.0%	7.3%	3.0%	2.9%	2.0%
Revenue Requirements:								
Operating Rate Revenue	Annual	\$ 3,565,800	\$ 4,016,800	\$ 4,097,100	\$ 4,588,752	\$ 4,864,077	\$ 5,155,922	\$ 5,465,277
Debt Service Revenues	Annual	2,955,700	3,338,100	3,338,100	3,581,812	3,688,372	3,795,292	3,872,092
<b>Total</b>		<b>\$ 6,521,500</b>	<b>\$ 7,354,900</b>	<b>\$ 7,435,200</b>	<b>\$ 8,170,564</b>	<b>\$ 8,552,449</b>	<b>\$ 8,951,214</b>	<b>\$ 9,337,369</b>
	\$ Change		\$ 833,400	\$ 80,300	\$ 735,364	\$ 381,885	\$ 398,765	\$ 386,155
	% Change		12.8%	1.1%	9.9%	4.7%	4.7%	4.3%
<b>Non-Urban Rate Centers</b>								
Operating Rate Revenue	Annual	\$ 2,075,300	\$ 2,229,100	2,229,100	2,623,428	2,780,834	2,947,684	3,124,545
Debt Service Revenues	Annual	1,134,400	1,453,300	1,453,300	1,880,800	2,101,800	2,322,800	2,543,800
<b>Total</b>		<b>\$ 3,209,700</b>	<b>\$ 3,682,400</b>	<b>\$ 3,682,400</b>	<b>\$ 4,504,228</b>	<b>\$ 4,882,634</b>	<b>\$ 5,270,484</b>	<b>\$ 5,668,345</b>
				\$ -	\$ 821,828	\$ 378,406	\$ 387,850	\$ 397,861
				0.0%	22.3%	8.4%	7.9%	7.5%
<b>Total all Rate Centers</b>								
Operating Rate Revenue		\$ 9,088,100	\$ 9,734,000	\$ 9,814,300	\$ 11,363,019	\$ 12,127,817	\$ 12,855,486	\$ 13,626,815
Debt Service Revenues		7,781,300	8,647,000	8,647,000	10,020,518	10,662,814	11,323,516	11,912,855
<b>Total ACSA All Revenues</b>		<b>\$ 16,869,400</b>	<b>\$ 18,381,000</b>	<b>\$ 18,461,300</b>	<b>\$ 21,383,537</b>	<b>\$ 22,790,631</b>	<b>\$ 24,179,002</b>	<b>\$ 25,539,670</b>
	\$ Change		\$ 1,511,600	\$ 80,300	\$ 2,922,237	\$ 1,407,094	\$ 1,388,371	\$ 1,360,668
	% Change		9.0%	0.4%	15.8%	6.6%	6.1%	5.6%
<b>Additional for 10-Year CIP</b>								
Total Estimated Charge		\$ 16,869,400	\$ 18,381,000	\$ 18,461,300	\$ 21,655,289	\$ 23,467,441	\$ 25,278,331	\$ 27,122,423
	% Change		9.0%	0.4%	17.3%	8.4%	7.7%	7.3%

Rivanna Water and Sewer Authority  
 CIP 2021-2025  
 Summary Information

5/5/2020

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
<b>RWSA</b>							
<b>Operations Revenues</b>							
Urban Water	\$ 7,034,700	\$ 7,118,600	\$ 7,118,600	\$ 8,471,134	\$ 9,148,825	\$ 9,697,754	\$ 10,279,619
Urban Wastewater	7,277,100	8,033,600	8,033,600	8,997,632	9,537,490	10,109,739	10,716,324
Other Rate Centers	2,075,300	2,229,100	2,229,100	2,623,428	2,780,834	2,947,684	3,124,545
Total	<u>\$ 16,387,100</u>	<u>\$ 17,381,300</u>	<u>\$ 17,381,300</u>	<u>\$ 20,092,194</u>	<u>\$ 21,467,148</u>	<u>\$ 22,755,177</u>	<u>\$ 24,120,488</u>
Change \$		994,200	-	2,710,894	1,374,954	1,288,029	1,365,311
Change %		6.1%	0.0%	15.6%	6.8%	6.0%	6.0%
<b>Debt Service Charge Revenues</b>							
Urban Water	5,863,300	6,178,600	6,178,600	7,399,829	7,963,184	8,544,067	9,083,234
Urban Wastewater	7,854,800	8,229,200	8,229,200	8,503,827	8,645,427	8,787,747	8,922,507
Other Rate Centers	1,134,400	1,453,300	1,453,300	1,880,800	2,101,800	2,322,800	2,543,800
Total	<u>\$ 14,852,500</u>	<u>\$ 15,861,100</u>	<u>\$ 15,861,100</u>	<u>\$ 17,784,456</u>	<u>\$ 18,710,411</u>	<u>\$ 19,654,614</u>	<u>\$ 20,549,541</u>
Change \$		1,008,600	-	1,923,356	925,955	944,203	894,927
Change %		6.8%	0.0%	12.1%	5.2%	5.0%	4.6%
<b>Total RWSA Customer Revenues</b>	<u><b>\$ 31,239,600</b></u>	<u><b>\$ 33,242,400</b></u>	<u><b>\$ 33,242,400</b></u>	<u><b>\$ 37,876,650</b></u>	<u><b>\$ 40,177,559</b></u>	<u><b>\$ 42,409,791</b></u>	<u><b>\$ 44,670,029</b></u>
Change \$		<u>\$ 2,002,800</u>	<u>\$ -</u>	<u>\$ 4,634,250</u>	<u>\$ 2,300,909</u>	<u>\$ 2,232,232</u>	<u>\$ 2,260,238</u>
Change %		<u>6.4%</u>	<u>0.0%</u>	<u>13.9%</u>	<u>6.1%</u>	<u>5.6%</u>	<u>5.3%</u>
<b>Additional for 10-Year CIP</b>							
Total Estimated Charge	<u>\$ 31,239,600</u>	<u>\$ 33,242,400</u>	<u>\$ 33,242,400</u>	<u>\$ 38,316,929</u>	<u>\$ 41,303,444</u>	<u>\$ 44,248,578</u>	<u>\$ 47,303,190</u>
% Change		<u>0.0%</u>	<u>0.0%</u>	<u>15.3%</u>	<u>8.9%</u>	<u>9.9%</u>	<u>11.1%</u>