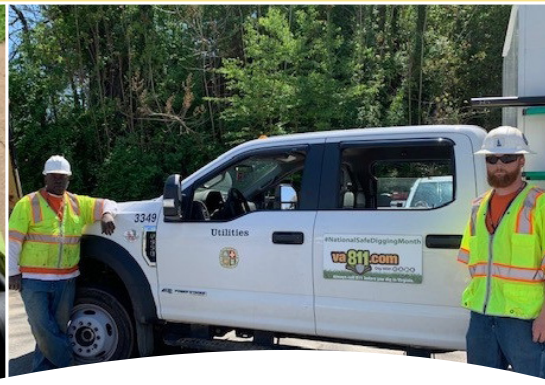
CITY OF CHARLOTTESVILLE
Utility Rate Report

Utilities
City of Charlottesville

PROPOSED - FY2020

Prepared by

the Department of Finance & Department of Utilities



CITY OF CHARLOTTESVILLE
VIRGINIA

To Be One Community
Filled With Opportunity

1. EXECUTIVE SUMMARY

The purpose statement for Charlottesville Utilities is:

> *To provide the Charlottesville community with safe and reliable natural gas, drinking water, wastewater and stormwater service at a reasonable cost in an environmentally responsible manner.*

Utilities operate and maintain the water, wastewater, stormwater, and natural gas systems. The goal of Utilities is to provide authorized service in a safe, reliable, responsive, and cost-effective manner. Utilities support the following goals of the City's Strategic Plan:

- 3.2 Provide reliable and high-quality infrastructure.
- 3.4 Be responsible stewards of natural resources.
- 5.1 Integrate effective business practices and strong fiscal policies.

The Gas, Water, Wastewater, and Stormwater budgets are funded by utility rates and charges and include funding for administration, operations, and maintenance of the four systems as well as funding for infrastructure improvements, technology advances, environmental and debt service payments.

The Department of Utilities is able in Fiscal Year FY 2020 (FY'20) to move all operating expenses associated with the Stormwater General Fund to the Stormwater Enterprise Fund. This change will permit the Department to fund all operating expenses through utility fee collection without requesting additional funds from the City General Fund. No stormwater utility fee increase is forecast in the coming fiscal year as a result of this change and the level of service provided to residents will be improved with the change and additional staff positions.

The billing/collection functions of the City's utilities are completed by the Finance Department's Utility Billing Office with the exception of stormwater utility billing which is performed by the Treasurer's Office. The utility budgets are separate from the General Fund and not supported by taxes. These budgets and the respective rates and charges are considered and adopted by the City Council in May and June of each year.

This section of the FY'20 Proposed Utility Rates report provides a summary of the staff recommendations for each utility. Additional detailed information for each utility is provided in subsequent chapters.

1.1 WATER AND SEWER

In FY'19, a three-year transition plan for UVA from the 1981 Water Agreement to the City rates for water and wastewater was adopted. FY'20 will introduce the second phase of that transition plan.:

A description of the 1981 Water Agreement with UVA and the transition plan are discussed below:

1.1.1 Three-year transition from the UVA-City 1981 Water Agreement

The 1981 Water Agreement between the City and the University includes the following:

- Rivanna Water and Sewer Authority (RWSA) lease for Observatory Water Treatment Plant.
- Water rates: For water delivered to the University's distribution system, the University pays a rate equal to the RWSA wholesale rate plus 25% of the City's maintenance and operations retail rate. For water supplied directly to University-owned facilities from the City's water distribution system, payment will be at the City's rate.

- Sewer rates: For wastewater service, the Water Service Agreement provides that the University will pay the RWSA rate plus 50% of the City's operations and capital cost components of the rate for wastewater that enters the City's system from a University-owned collector system. For wastewater service the City provides directly to UVA facilities, UVA pays the City's retail rate.

The 1981 Agreement has been replaced with a new agreement with UVA. RWSA and UVA are coordinating a new lease for the Observatory Water Treatment Plant. RWSA has spent approximately $5 million on recent improvements and plans for an upcoming upgrade that will cost approximately $20 million to the Observatory Hill Water Treatment plant.

The University has recently begun undertaking new development in the City's utility service area. The February 2018 agreement signed as part of Brandon Avenue discussions stated that all UVA facilities brought online or modified after 1/1/18 will pay full City rates. The February 2018 agreement also states UVA and the City will establish a plan for transitioning the water and wastewater rates charged to UVA, for University's buildings/ facilities constructed and occupied prior to 1/1/2018, to an updated rate structure supported by a professional water rate study. The City had already commenced a professional water and sewer rate study in June 2017. Best practice is that such studies are done every five (5)-years. The City has not had such a study for several years (10+).

The City has had multiple meetings with representatives from the University to discuss a plan for utilities services for the new UVA developments and a new water and wastewater rate. The transition plan includes:

Over the next three years, the University would:

- July 1, 2018 – pay 25% of the difference between 1981 Agreement rates and City rates (completed)
- July 1, 2019 – pay 50% of the difference between 1981 Agreement rates and City rates (in addition to 25% from previous year)
- July 1, 2020 - pay 25% of the difference between 1981 Agreement rates and City rates (in addition to 75% from previous year and rate will be equal to the City rate)
- July 1, 2021 – pay City rates
- Beginning July 1, 2018, the University started paying the full monthly service charge for its 14-inch water meter.

By FY'21, the University will pay the City rate set as part of the annual rate setting process.

1.1.2 Proposed FY'20 Water and Sewer Rates

Based on the projected revenue requirements to operate and maintain each utility, the proposed water and sewer rates for FY'20 (beginning July 1, 2019) are as follows:

Exhibit 1: Proposed Water and Sewer Rates FY'20

	Current	Proposed FY'20	$ Change	% Change
WATER (per 1,000 CF)				
Summer	$64.66	$65.31	$0.65	1.0%
Winter	$49.74	$50.24	$0.50	1.0%
SEWER (per 1,000 CF				
	$78.57	$80.14	$1.57	2.0%

1.2 NATURAL GAS

The revenue requirements to operate and maintain the natural gas system are projected to increase by an average of 7.0% for firm customers in FY'20. The single largest expenditure for Charlottesville Gas is the purchase of natural gas from BP, the City's wholesale supplier. The projected price of gas for FY'20 is higher than the current year. The gas rates for FY'20 are as follows:

Exhibit 2: Proposed Gas Rates for FY'20

	FY'19 (Adopted 7/1/18)	Proposed FY'20	$ Change	% Change
FIRM				
Customer Charge (Minimum)	$10.00	$10.00	$0.00	0.0%
First 3,000 Cu Ft, Per MCF	$8.3944	$9.0706	$0.676	8.1%
Next 3,000 Cu Ft, Per MCF	$7.8907	$8.5264	$0.636	8.1%
Next 144,000 Cu Ft, Per MCF	$7.0513	$7.6193	$0.568	8.1%
Over 150,000 Cu Ft, Per MCF	$6.8834	$7.4379	$0.555	8.1%
INTERRUPTIBLE				
Customer Charge (Minimum)	$60.00	$60.00	$0.00	0.0%
First 600 MCF, Per MCF	$6.1065	$7.3874	$1.281	21.0%
Over 600 MCF, Per MCF	$5.1210	$6.5720	$1.451	28.3%
Annual Minimum (MCF)	1,200			
AIR CONDITIONING				
All Gas Used, Per dth	$7.3471	$7.4271	$0.080	1.1%
GAS LIGHT				
Charge per Month	$17.51	$17.51	$0.00	0.0%
TRANSPORTATION				
Small Volume Customer				
Monthly Service Charge	$150.00	$150.00	$0.00	0.0%
Rate per dth	$3.4853	$3.2293	-$0.256	-7.3%
Large Volume customer - 35,000 mcf/per month				
Monthly Service Charge	$600.00	$600.00	$0.00	0.0%
Rate per dth	$2.0379	$1.8842	-$0.154	-7.5%

1.3 STORMWATER

The Stormwater Utility fee was adopted in March 2013 at a rate of $1.20/500 square feet of impervious surface per month. The fee has remained flat for the period FY'14-FY'19. No increase is proposed in FY'20. The Stormwater Utility fee is re-evaluated annually, in conjunction with the budget development process.

Exhibit 3: Proposed Stormwater Utility Fee Rate FY'20

	Current	Proposed FY'20	$ Change	% Change
STORMWATER (per 500 sq. ft. impervious area)				
	$1.20	$1.20	$0.00	0.0%

1.4 IMPACT ON CUSTOMER

The table below illustrates the impact on a City residential customer using 400 cubic feet (cf) of water and wastewater, owning a property with approximately 2,440 square feet of impervious surface, and using 4,600 cf of gas per month. This information is based on utility rates and charges proposed for July 1, 2019.

Exhibit 4: Impact of Proposed FY'20 Rates and Charges on an Average Customer

	Current (based on rates adopted 7/1/18)	Proposed (Effective 7/1/19)	$ Change	% Change
Water [1]	$27.38	$27.61	$0.23	0.82%
Sewer [1]	$36.43	$37.06	$0.63	1.71%
Natural Gas [1]	$47.81	$50.85	$3.04	6.36%
Stormwater [2]	$5.86	$5.86	$0.00	0.00%
TOTAL	$117.48	$121.38	$3.89	3.31%

(1) Rates include monthly service charge.
(2)The budget impact shown reflects a residential monthly average fee and provides consistency with other utilities. Stormwater fees are rounded to the next whole billing unit and are billed to property owners biannually.

2. WATER

2.1 OVERVIEW

The City distributes potable water within its municipal boundaries and the University of Virginia. The City has approximately 14,331 water customers using 1.6 billion gallons of water annually or 4.3 million gallons daily. The City's water distribution system has 183 miles of pipes (enough to stretch from Charlottesville to Virginia Beach) ranging in size from 2" to 18" in diameter. The system also includes 1,100 fire hydrants and 3,400 water valves.

2.2 RIVANNA WATER AND SEWER AUTHORITY

The Rivanna Water and Sewer Authority (RWSA) provides wholesale water supply, as well as drinking water for the City of Charlottesville and the Albemarle County Service Authority (ACSA). The City's share of RWSA's budget for water totals $5,953,500 for FY'20 including operations costs and debt service for infrastructure. This is a proposed increase to the City of 3.4% ($193,700,) over the approved FY'19 budget. Operating expenses include personnel costs (staff salaries and benefits), general services costs (professional fees, utilities, insurance, permits, and data and voice communications), and operation and maintenance costs (chemicals, building repairs, equipment maintenance, technology and communications). Debt Service provides funding to construct and renew major infrastructure including water treatment plants, pumping stations, piping systems and reservoir dams.

2.2.1 RWSA FY'20 Water Budget Objectives

The budget increases will support existing and planned water programs to effectively address the service expectations of the growing community:

Strategic Plan Implementation
This budget supports the implementation of RWSA's six Strategic Goals. It continues the efforts to attract, retain, and reward exceptional employees, while providing essential enhancements to their safety program. Operational optimization and dependable infrastructure are also fundamental aspects of their budget.

Granular Activated Carbon (GAC) Filter Operations
The recently completed GAC systems have been doing a great job removing organic material from the water to prevent formation of undesirable disinfection byproducts at five of the drinking water treatment plants. They will continue to monitor the service life of the GAC material under differing raw water conditions and operating procedures to optimize the treatment process. In addition, recent EPA investigations of emerging manmade contaminants called per-and polyfluoroalkyl substances (PFAS), indicate GAC filters remove these contaminants. They recently tested raw water from our reservoirs and did not find any PFAS. However, they will continue to consider PFAS reduction in the service life optimization assessment for the GAC media.

Urban Drinking Water Management
Water supply, reliability, and resiliency will be improved by:

- Renovating and increasing drinking water treatment capacity at the Observatory plant

- Renovating the largest drinking water treatment plant at South Rivanna
- Acquiring easements for a pipeline to connect the South Rivanna and Ragged Mountain Reservoirs, and completing a one-mile long section of this pipeline on the Birdwood property
- Updating the Risk and Resilience Assessment, and the Emergency Response Plan, as required by the federal America's Water Infrastructure Act of 2018

Instrumentation Systems

Use of complex instrumentation systems continues to grow as they leverage technology to achieve operational efficiencies. Additional support is programmed to calibrate and maintain new wholesale meters and their data transmission system, calibrate water treatment plant meters, and replace existing wastewater meters.

2.2.2 Infrastructure

RWSA's Capital Improvement Plan (CIP) for water for Fiscal Years 2020-2024 has been prepared as a strategic and financially responsible plan 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 for the City of Charlottesville and ACSA. The CIP is a five (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 CIP are developed through RWSA's Asset Management and Master Planning programs to address 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 very near completion or are no longer needed, and as such are being removed from the 2020-2024 CIP. Water projects include:

- Interconnect Lower Sugar Hollow and Ragged Mountain Raw Water Mains
- Flow Meter and Auto Valve on Sugar Hollow to Ragged Mountain Transfer
- Urban Water GAC and Water Treatment Plant Improvement
- Wholesale Water Master Metering – Urban

The total five (5) -year 2020-2024 CIP for water is approximately $49.3 million. This includes projects already in previous CIPs which have been modified as well as new projects.

Exhibit 5: RWSA Water Infrastructure Projects to Serve City

Project	FY'20-FY'24 Total (millions)
New Projects	
South Rivanna Dam – Gate Repair	$.9M
IT Master Plan Software	$.45M
NEW PROJECTS SUBTOTAL	**$1.35M**
Existing Projects	
Ragged Mountain Reservoir to Observatory WTP Raw Waterline	$3.2M
Birdwood Golf Course Waterline	$1.6M
Ragged Mountain Reservoir to Observatory WTP Pump Station	$.7M
South Fork Rivanna River Crossing and North Rivanna Transmission	$5.3M
Observatory WTP Improvements	$17.0M
Sugar Hollow Dam Rubber Crest Gate Replacement	$1.1M
South Rivanna Water Treatment Plan Improvements	$14.81M
Avon to Pantops Water Main	$3.5
South Rivanna Hydropower Plant Decommissioning	$.3M
South Rivanna Reservoir to Ragged Mountain Reservoir Water Line Right-of-Way	$1.45M
EXISTING PROJECT, MODIFIED SUBTOTAL	**$47.95M**
TOTAL	**$49.3M**

2.2.3 Actual Water Flows

The City portion of Urban Area operation rates and charges are based on water usage (flows). The estimated flows for the City will remain unchanged for the FY'20 budget.

Exhibit 6: RWSA Water Usage Allocation

	FY'19	FY'20	% Change
City	51%	51%	0%
ACSA	49%	49%	0%

2.2.4 City Share of RWSA Water Costs

The FY'20 budget increases the budget by $42,800 in Operating expenses and an increase of $150,900 in Debt Service charges for a total budget increase of approximately $193,700, or 3.4% above the FY'19 budget. RWSA's costs to the City for water are planned to increase as follows:

- Operating expenses are to increase $0.025 per 1,000 gallons (1.21%) for water
- Debt Service charges for the City are to increase 6.95% for water

2.3 WATER QUALITY AND SAFETY

Protecting public health is a core function for the Department of Utilities. Since the early 1900's the City has diligently planned, developed, and operated a complex system that provides affordable, clean, safe, and great-tasting water. The City works closely with the ACSA, the RWSA, the Virginia Department of Health, and the Virginia Department of Environmental Quality to ensure superior water quality.

2.3.1 Water Treatment

RWSA collects, stores, and treats the water. The City then buys the treated water and distributes the water through their distribution system. Although drinking water supplies in the United States are among the safest in the world, RWSA employs various technologies and methods of water treatment to prevent contamination and to remove disease-causing agents. Common steps used in water treatment that can be found within the RWSA's process include:

Coagulation and Flocculation
Coagulation and flocculation are often the first steps in water treatment. Chemicals with a positive charge are added to the water. The positive charge of these chemicals neutralizes the negative charge of dirt and other dissolved particles in the water. When this occurs, the particles bind with the chemicals and form larger particles, called floc.

Sedimentation
During the sedimentation process, floc settles to the bottom of the water supply, due to its weight. This settling process is called sedimentation.

Filtration
Once the floc has settled to the bottom of the water supply, the clear water on top will pass through filters of varying compositions (sand, gravel, and charcoal) and pore sizes, in order to remove dissolved particles, such as dust, parasites, bacteria, viruses, and chemicals. As smaller, suspended particles are removed, cloudiness diminishes, and clear water emerges.

Disinfection
As protection against any bacteria, viruses, ad other microbes that might remain, disinfectant is added before the water is released into the distribution system and into your home or business.

The City carefully monitors the amount of disinfectant added to maintain quality water at the farthest reaches of the system.

2.4 WATER QUALITY TESTING

The City takes water quality testing very seriously. Much has been discussed about lead in the United States, and since the 1970's, Charlottesville has taken a proactive stance by testing at risk homes, using corrosion inhibitors added to the water to coat the pipes, and having only lead-free pipes installed to carry drinking water. In 2018, the RWSA collected and tested hundreds of hourly, daily, weekly, monthly, quarterly, and annual samples to ensure the quality of our water. Sample sources included the rivers and reservoir from which the water treatment plants draw water, the water treatment plants themselves, and numerous locations in the City's distribution system. Contaminants that the City routinely tests for include:

- Turbidity
- Total Coliform and E. Coli Bacteria
- Combined Radium and Alpha* and Beta Particles
- Barium
- Fluoride
- Lead
- Copper
- Nitrate
- Trihalomethanes and Haloacetic Acids
- Chlorine

*Alpha Particle levels are not included in the Consumer Confidence Report

2.5 BACKFLOW/CROSS CONTAMINATION PROTECTION

Cross-contamination presents a serious hazard to our water supply. The situation in which water flows in a direction that is opposite from the intended flow is called backflow and can potentially put the drinking water supply in danger by allowing the undesirable reversal of flow, such that non-potable water moves into the potable water system. The location at which this backflow occurs, where a customer's water line and the main supply line are joined, is called a point of cross-connection. As part of the City's strategy, certain businesses, such as medical facilities, laboratories, food processing plants, chemical plants, high-rise buildings, or other facilities where a potential for backflow or cross-connection hazard may exist, are required to install and maintain cross-connection or backflow prevention devices. The City's Department of Utilities currently inspects over 1,200 backflow devices to maintain and provide the highest quality water to the City residents

For more information about the City's water quality please visit www.charlottesville.org/waterquality

2.6 WATER CONSERVATION AND WATER LOSS PROGRAMS

The City of Charlottesville is focused both on management of the water distribution system to reduce water loss and partners with City customers to conserve water. Highlights of the program include the distribution of over 11,000 free indoor water conservation kits since 2008, the development and dissemination of how to find and fix leaks, water smart outside information, indoor water conservation information, and a low-flow toilet rebate program which has replaced over 6,300 high consumption toilets since 2003.

The water conservation program also continues to maintain an extensive public outreach campaign. This includes educational activities at summer camps, educating the public during Fix a Leak Week, distributing water- saving information and promotional items at dozens of community events every year, such as Kid*Vention and the Earth Day EcoFair. The City's water conservation message has also been conveyed via the internet (online ads, mobile apps, and social media), mailings, newsletters, print, radio, and television. The water conservation program partners with community partners including the Local Energy Alliance Program (LEAP), UVA Sustainability, ACSA, and RWSA. In addition, we have continued to be an active participant in the American Water Works Association (AWWA), the Alliance for Water Efficiency (AWE) and the Environmental Protection Agency's (EPA) WaterSense program. In 2018, our Water Conservation Program Coordinator was named the AWE Education and Outreach Committee Co-Chair. In 2018, the City of Charlottesville was recognized for their water conservation efforts supporting the WaterSense program, and for the fourth year in a row, received the 2018 Sustained Excellence Award for the excellent water conservation efforts performed in 2017, the highest honors given out by the WaterSense program.

The exhibit below outlines the City's current water conservation efforts.

Exhibit 7: Water Conservation Activities

Program Initiatives	Description
Rebates: Low Flow, WaterSense Labeled Toilets and Rain Barrels	Low flow toilet rebates issued in FY2018 totaled 263; a revised program to rebate only EPA WaterSense labeled toilets began in July 2012. Rain barrel rebates issued in FY2018 totaled 20, and rebates issued to date totaled 760. The City promotes the rain barrel workshops and opportunities offered by community partners, such as the TJSWCD.
Public Awareness Campaign for Free Indoor Water Conservation Kits	Multiple giveaway events were held during FY2018 and additional events are planned for the FY2019 and FY2020 calendar. The City partnered with LEAP to distribute water conservation kits as part of their home energy check-ups; approximately 500 kits are distributed per year at various water conservation events and from the Office of Utility Billing. These resources are promoted through various marketing outlets including utility billing inserts, print, radio, online, TV, and social media.
Water Conservation Education	The water conservation program goes to summer camps, schools, and small groups to teach the importance of conserving water and ways they can accomplish this effort. Information pamphlets, resources, and water saving fixtures are provided at all events with tips on how to save water both inside and outside their home. A new educational activity was developed in 2018 that has kids match WaterWise and WaterUse issues displayed on cards and discuss why these WaterWise practices are important. Educational information is also provided on the Water Conservation website explaining ways to save water and money for all types of water needs and usage, and in 2018 we received over 8,000 page views.
Water-Wise Landscaping	Education and outreach in forms of print ads, radio ads, and social media to inform the community on appropriate lawn watering and water conscious (drought tolerant) landscapes. In the summers of 2016 through 2018, the water conservation program used weather specific target ads in weather.com mobile and tablet apps to ensure educational information was appropriately conveyed and targeted. The water conservation program also promoted WaterSense's "Sprinkler Spruce Up" and "When in Drought" campaigns during the summer months.
Online Residential Water Use Calculator	This online tool, available on the city website, is designed specifically for Charlottesville residents to better understand their water usage.
Water Efficient Businesses	The water conservation program provides businesses with specific information and resources on how they can save water. For example, the free "Commercial Kitchen Water Use Efficiency and Best Practices Guides" developed by AWE and, which has very relevant and current information on how commercial kitchens can save water and money, is provided to City businesses upon request.
Carwash Certification	Continued the joint efforts of the City and Albemarle County Service Authority so more businesses will sign up for water conservation carwash certification.
Regular Ad Campaign, Year-Round- "Check, Twist, Replace"	The water conservation program runs yearly ad campaigns using social media, print, television, radio, and online ads to promote the current EPA WaterSense sponsored water conservation campaign: "Check, Twist, Replace".
#WaterTipWednesday	The Charlottesville Water Conservation Facebook Page utilizes social media to connect and reach the community using community based social marketing methods by posting regularly each Wednesday for #WaterTipWednesday. This initiative conveys important information, resources, events, and highlights about the program. In 2018, the Facebook page made 127 posts, received 62 new page likes, reached over 27,000 people, and saw over 1,300 engagements on the Facebook page.
Multi-Family Homes' Toilet Retrofits	This program has been in existence since June 2011; since then, over sixteen apartment buildings have received rebates to replace their high consumption toilets. In FY2015, 212 low flow, WaterSense labeled toilets were replaced in a large multi-family complex. In FY2018, 45 toilets were replaced with low flow, WaterSense labeled toilets in a large apartment complex that typically houses UVA students.
Fix a Leak Family 5k & Fix a Leak Week	The annual race to highlight EPA WaterSense's nationwide Fix a Leak Week was scheduled for March 2018 at Pen Park. This race is nationally recognized by the EPA. The race was a huge success attracting a large group of participants. The next Fix a Leak Family 5K is scheduled to occur as part of a larger event, Rivanna Riverfest, on May 11, 2019 at Darden Towe Park.
Water Conservation Community Outreach	The water conservation program participated in numerous community events. At each event, materials are tailored to the audience and information on how to save water, and toilet and rain barrel rebate materials are available. For FY2018, water conservation outreach occurred during Kid*Vention, UVA events, Earth Day EcoFair, Touch a Truck, Festival of the Home, neighborhood community events, and at City Hall tabling. In 2018 we handed out over 500 WaterSense labeled faucet aerators and leak detection dye tablets to community members at events. In addition, the water conservation program mentored a high school intern during the summer as part of the Community Attention Youth Internship Program (CAYIP), where the intern provided essential support with water conservation outreach.
Imagine a Day without Water	The water conservation program held the 4th Imagine a Day without Water campaign in 2018 that involved a student art contest asking students "How Do You Save Water?". The campaign and contest, co- sponsored with ACSA and RWSA, was a huge success with 266 poster entries with representation from City Public Schools. Artwork was displayed around Charlottesville including City Hall. The campaign included an event on the Downtown Mall, and an awards ceremony for all award winners and participants.

Replacing water distribution mains and service lines is an important component in water loss prevention and conservation. Aging pipes are a primary cause of lost water in a system. Since FY'09, the City has been replacing aged water lines and service lines, which reduces leaks and supports improving infrastructure. The City has also performed annual system-wide leak detection surveys. With over 238 miles of water lines (mains and services), 10 leaks were detected and repaired during the 2018 testing, resulting in an estimated loss of 68,000 gallons per day through various methods. The City aims to respond and repair leaks expeditiously to minimize water loss and service impacts. Leak audit surveys were completed in 13 of the past 15 years and will continue annually. The next survey is scheduled for Fall 2019 and will be consistent with past years covering 100% of the distribution system.

The American Water Works Association (AWWA) recommends that all utilities perform a water audit every year. This audit is intended to identify sources of non-revenue water and to focus efforts in reducing those water losses. Initial audits from FY'10 through FY'12 resulted in improved recordkeeping of water use by City contractors and more detailed procedures for annual fire hydrant testing. Water audits completed for FY'13 – FY'17 have used the same process and resulted in improved data collection procedures specifically quantifying unbilled and unmetered water usage. In addition, in FY'14 – FY'17, water loss was quantified by more accurate calculations of loss from water leaks, and water meter error. The City will continue to minimize water loss by outreach, system repair and replacement, and improved leak detection technologies.

Based on the water audit recommendations, a water meter calibration and replacement programs were implemented starting in FY'14. In FY'14, the City tested 5% of 5/8-inch meters, 15% of 1-inch meters, 17% of 1.5-inch meters, 17% of 2-inch meters, 60% of 3-inch meters, 44% of 4-inch meters, and 100% of 6-inch meters. Results from this meter testing and calibration effort indicated that all meters need to be regularly tested with intervals determined by the meter size. Moving forward, the City plans on testing 10% of all large meters (1.5-inch and larger) currently in circulation on an annual basis. Using spatial analysis tools, annual testing will allow the City to coordinate maintenance efforts to ensure the highest possible service while minimizing water loss due to mechanical failures.

The meter replacement program also revealed a need to upgrade meter vaults on many of the large meters to improve access and meet current standards. In 2014, the City began a program to upgrade infrastructure (service line, meter setter, and vault) associated with 2-inch water meters. In 2018, the meter replacement program expanded to include all meters 1.5-inch and above. The program replaced 84 large water meters in 2018 and over 231 since the project's inception in 2014. The success of the program has led to increased momentum with approximately 80 meters projected to be replaced in FY'20. As part of the meter replacement program, the City is evaluating customer consumption to verify that the meters are appropriately sized. Because conventional water meters less accurately measure low flow rates, starting in 2017, highly sensitive "low-flow" ultrasonic meters are being installed in all applications.

2.7 TOILET AND RAIN BARREL REBATE PROGRAMS

In support of water conservation efforts, the City adopted a Toilet Replacement Rebate Program in 2003 and a Rain Barrel Rebate Program in 2009. Currently the program provides a rebate of up to $100 to any City water customer who purchases and installs an EPA WaterSense toilet to replace older high flow models. WaterSense models use significantly less water, resulting in water savings, thus dollar savings, every year. Residential customers may replace up to three (3) toilets at a given residence built before 1994. Owners of multi-unit apartment complexes can replace two (2) toilets per unit. Commercial

property owners may replace up to two (2) toilets and receive up to $80 per replacement. The following chart shows the participation since adoption of the program.

Exhibit 8: Participation in Toilet Rebate Program Since Inception

Fiscal Year	# of Customers	# of Rebates	$ Rebated	Average Rebate/Customer
2018	165	263	$25,023	$152
2017	185	246	$24,153	$131
2016	186	223	$22,218	$119
2015	189	460	$40,555	$215
2014	219	305	$29,544	$135
2013	358	573	$54,113	$151
2012	258	544	$54,186	$210
2011	363	599	$61,865	$170
2010	386	367	$36,401	$94
2009	219	310	$31,086	$142
2008	180	302	$30,372	$169
2007	194	232	$23,845	$123

The Rain Barrel Rebate Program was started to encourage City homeowners to use harvested rainwater for numerous outside uses like washing a car, watering plants, and irrigating landscapes. The program provides up to two (2) $30 rebates for rain barrels purchased per service address. The City has provided 760 rebates since the program started in FY'09 including 20 rebates in FY'18. The City also provides rain barrel workshops periodically to help City residents construct rain barrels for their use and educates them about the importance of rain water harvesting and water conservation.

2.8 WATER ASSISTANCE PROGRAM

The Water Assistance Program (WAP) was started in FY'12 by City Council to assist City water customers experiencing hardship in making timely or full payments of their water utility bill. The WAP is intended only for residential customers, whether owners or renters of property. It is not intended for landlords or commercial property accounts and is administered in a fashion similar to the established Gas Assistance Program (GAP). The maximum allotment per household per year is $150 or three (3) times the customer's average monthly bill, whichever is less.

In FY'18, 66 customers benefited from the WAP in receiving a total of $5,307.84. The water budget for the next fiscal year includes $7,500 for WAP. The WAP also has carry-over funds available from previous fiscal years. Comparable assistance has begun in the wastewater fund through the Wastewater Assistance Program (WWAP).

2.9 INFRASTRUCTURE

The City's water distribution system contains over 1,100 fire hydrants, 3,400 water valves and 183 miles of water main line ranging in size from 2-inch to 18-inch in diameter. About 16.5 miles of that pipe is

three (3) inches or less in diameter. These undersized mains are evaluated for capacity, location, and frequency of breaks, and will be added to the replacement schedule as necessary. The majority of the 16.5 miles of main are galvanized steel, several decades old, and serving multiple customers. Not only are they severely corroded but can often result in low pressure and significantly reduce the quality of service to customers.

A Water Prioritization Study was completed in 2009, which identified 48 projects to be completed. Since 2009, additional projects were identified and added to the list and work has been completed on 73 water projects. These projects aim to improve fire protection, reduce main breaks, improve overall water quality and address undersized lines. Total length of pipe replaced to date for water projects is approximately 14.8 miles (78,313 linear feet) averaging about two (2) miles (10,000 linear feet) per year. To date, $16 million has been spent. This work is continuing in FY'20.

Additionally, the Department of Utilities began a supplemental water main replacement schedule in the summer of 2017 that included five large projects. The remaining projects to be completed include the following:

Rugby Road Water Meter Replacement/ Gentry Lane Water Main Installation

The first phase of the project consisted of installing 1,300-feet of 8-inch water main in Gentry Lane from the intersection of Diary Road and Gentry Lane to the intersection of Greenleaf Drive and Gentry Lane. Before the replacement project, 19 water services along Gentry Lane were served by a dead-end 6-inch line in the road, while 11 water services were served by a dead-end 2-inch line in the backyards of the properties on the north side of Gentry Lane. The new 8-inch line now serves all the properties allowing the existing 6-inch and 2-inch lines to be abandoned, reducing maintenance and removing City infrastructure from private properties. The new line increased capacity, while improving fire flow for the area, including the Walker Upper Elementary School/ Charlottesville City Schools Administration Office complex. The second phase, which consisted of 1,300-feet of 8-inch water main from Greenleaf Lane to the northeast intersection of Diary Road and Gentry Lane, was completed in the summer of 2018.

There are currently two water mains (one 12-inch and one 6-inch that reduces to a 4-inch) in Rugby Road from University Avenue to Route 250. The third phase of the project will move all existing water services from the smaller water line to the larger water line. This will allow for the smaller water line to be abandoned reducing the maintenance needed in Rugby Road. This phase of the project is intended to be constructed in the Fall of 2019.

Emmet Street/ Ivy Road Water Main Replacement

This project is currently under construction and is scheduled to be completed by the end of Spring 2019. Two 6-inch lines ran in parallel in Emmet Street and Ivy Rd from the intersection of McCormick Road to the City/ County line on Ivy Rd. A contractor procured by Utilities will use a combination of two methods to replace the two existing lines – pipe bursting and open trenching. Where feasible, one of the existing 6-inch lines was burst in place and upsized to an 8-inch ductile iron pipe. The pipe bursting technology reduced the impact on traffic around the area during construction. The contractor was also able to take advantage of the UVA winter break and close a portion of Emmet Street while classes were not in session. This allowed the contractor to leave the work area staged with equipment and material to take full advantage of working hours. Where pipe bursting was not an option, a new 8-inch ductile iron pipe will be installed by the open trenching method. Upon completion of the project, one 8-inch line will replace the parallel 6-inch lines from McCormick Rd to St. Anne's Belfield.

High Street Water Main Replacement
In an effort to improve utilities ahead of a large paving and streetscape project, Utilities will implement a project to replace approximately 5,400-feet of 6-inch diameter water main with 12-inch diameter piping. This will greatly reduce maintenance while providing capacity for future development along the High Street corridor. The Department of Utilities is currently coordinating with the Department of Neighborhood Development Services and the Rivanna Water and Sewer Authority on the design. This project is currently being designed with a construction date of early FY'21.

West Main Street Water Main Replacement
The purpose of the project is to replace an existing 18-inch water main that is a major feed to the City. This project will be completed in phases; the first phase includes relocation of the line that currently goes under the railroad tracks just south of 9th Street SW. The new line will be installed in W. Main Street from 9th Street SW, turn south on Roosevelt Brown Blvd, and connect to the existing line at Grove Street. Design for this project is complete and the project will be advertised for bid in the Fall of 2019.

Most of the City's service lines (the lines from the mains to the water meters) are galvanized steel and were installed during residential construction. Many are now severely corroded with a tendency to fail at the worst times – nights, weekends, and inclement weather events. The City is continuing its service line replacement program as part of the upgrading and replacement of water mains. To date, over 6 miles (32,000 linear feet) of water service lines have been replaced.

The current capital projects in the City's five-year capital plan are listed below. The City updates its capital plan annually with the five year capital plan being FY'20 – FY'24.

Exhibit 9: City Five-Year Capital Improvement Plan for Water

Project	Five-Year Total
Water Line replacement (Annual Service Contract)	$11,250,000
Water Meter Replacement	$3,750,000
Large Waterline Replacements Projects	$5,225,000
TOTAL	**$20,225,000**

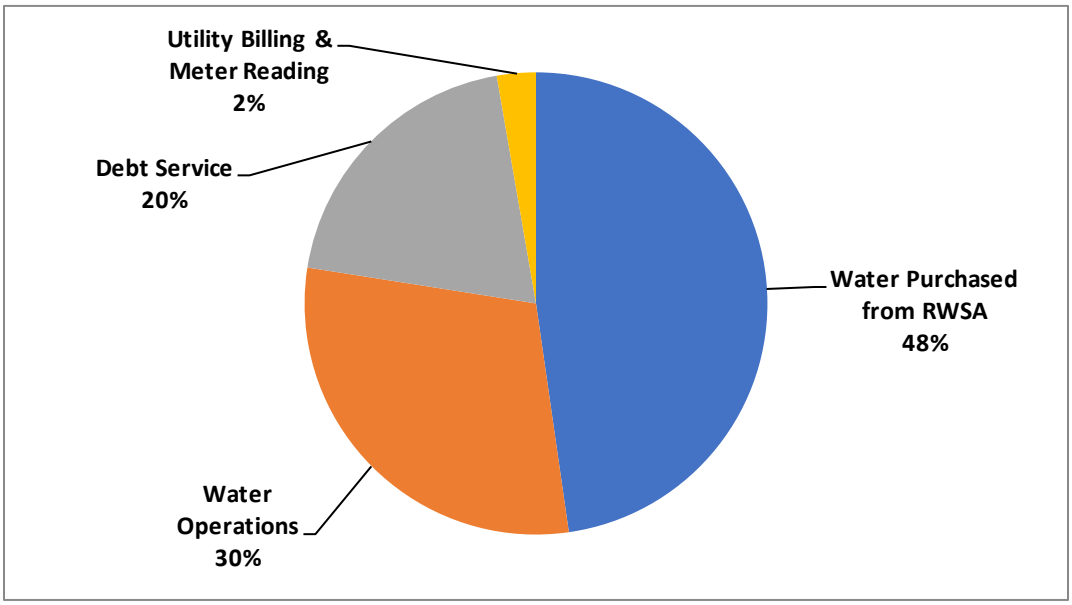
2.10 REVENUE REQUIREMENTS

This section of the report outlines the current and projected costs of operating and maintaining the City's water system which constitute the revenue requirements (i.e., the amount of revenue required to be collected from customers).

2.10.1 Current Revenue Requirements (FY'20)

The FY'20 budget for the water utility totals $12,472,990. The graphic below shows the major categories of expenses, the largest being the purchase of water from RWSA (51% of the FY'20 budget).

Exhibit 10: Water Utility FY'20 Revenue Requirements



The projected FY'20 budget for the water utility is $708,386 (6.8%) higher than the FY'19 budget. Debt service includes payments on existing bonds and new bonds to be issued to finance the utility's capital improvement plan. Excluding water purchase from RWSA and debt service, the cost to operate and maintain the water utility is increasing by approximately $35,000, less than 1%.

Exhibit 11: Comparison of Water Revenue Requirements FY'19 to FY'20

Revenue Requirements	FY'19	FY'20	$ Change	% Change
Water Purchased from RWSA	$5,759,800	$5,953,500	$193,700	3.4%
Water Operations	$3,403,518	$3,464,794	$61,276	1.8%
Debt Service	$1,989,084	$2,469,116	$480,032	24.1%
Utility Billing Office	$305,810	$290,025	($15,785)	-5.2%
Water Conservation	$175,917	$153,424	($22,493)	-12.8%
Vehicle Replacement - Water	$73,029	$73,029	$0	0.0%
Meter Reading	$47,446	$49,102	$1,656	3.5%
Water Assistance Program	$10,000	$10,000	$0	0.0%
Toilet Rebate Program	$0	$10,000	$10,000	N/A
TOTAL	**$11,764,604**	**$12,472,990**	**$708,386**	**6.0%**

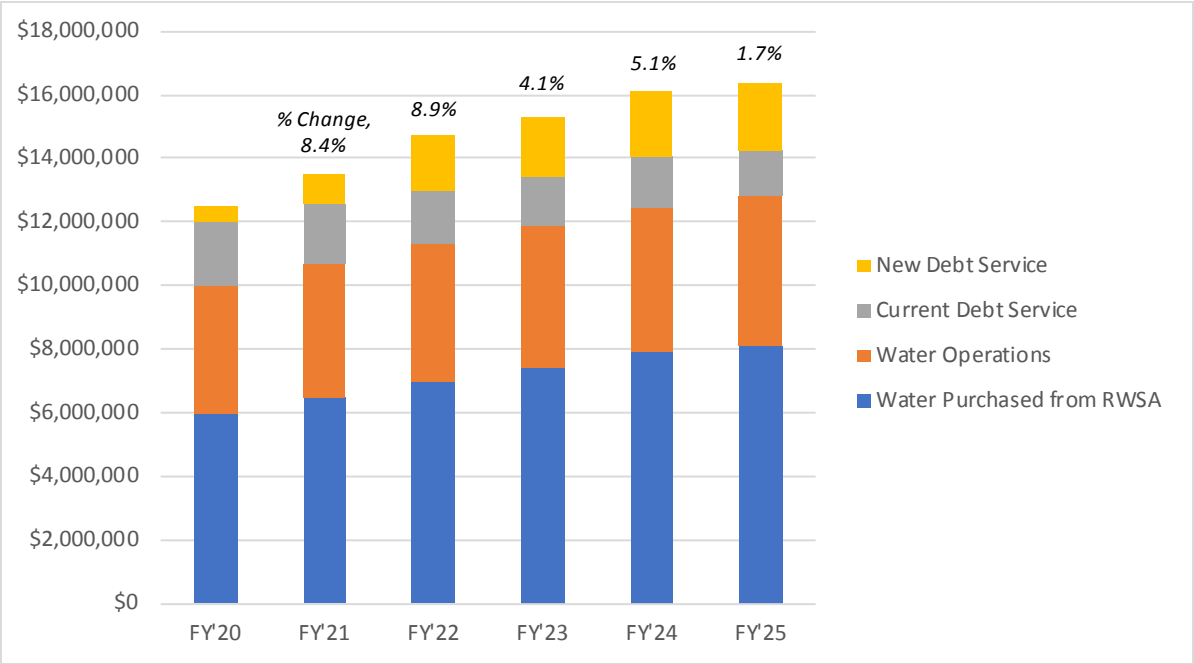
2.10.2 Projected Water Revenue Requirements (FY'21 – FY'25)

To project operating expenses for FY'21-FY'25, the FY'20 water budget line items are escalated using a 3.0% escalation rate except for the cost to purchase water from RWSA which is based on projected rate increases. In addition to operating expenses, annualized capital costs are included. The City issues bonds to fund water capital projects to mitigate the financial burden on existing customers and improve equity by spreading the costs of long-term assets over all customers who will use and benefit from the assets. The City is currently paying debt service for bonds previously issued and plans to issue bonds to fund its

water CIP.

The revenue requirements (with percentage change from the previous year) for FY'21 through FY'25 are shown below.

Exhibit 12: Projected Water Revenue Requirements FY'21-FY'25



2.11 CUSTOMERS AND USAGE

The City currently provides water service to just over 14,331 customers. The exhibit below provides a breakdown of current water customers by water meter size. Residential customers (5/8 water meters) comprise most the City's water customers (94.3%).

Exhibit 13: Current Water Customers by Meter Size

Water Meter Size (inches)	# of Customers	% of Customers
5/8	13,520	94.3%
1	277	1.9%
1.5	244	1.7%
2	232	1.6%
3	41	0.3%
4	15	0.1%
6	1	0.01%
14	1	0.01%
TOTAL	**14,331**	

The City's water service area corresponds with the municipal boundary and thus is fixed. The City has been adding water customers the last several years as a result of redevelopment and infill development. It is difficult to project the number of future water customers; thus, no growth is factored into the planning period.

Customers are currently charged water rates based on their metered water usage (billed monthly in 1,000 cubic feet). The City adopted summer and winter water rates in 2004 to promote conservation. The exhibit below provides a breakdown of current annual billed water usage in cubic feet by time of year.

Exhibit 14: Current Water Usage

Usage	Total (cubic feet)
Summer (May 6 to Oct 5)	96,019,892
Winter (Oct 6 to May 5)	113,823,622
TOTAL	**209,843,514**

Like the number of customers, current water usage has been held constant over the planning period.

2.12 1981 UVA-CITY WATER AGREEMENT

The 1981 Water Agreement between the City and the University includes the following:

- Rivanna Water and Sewer Authority (RWSA) lease for Observatory Water Treatment Plant.
- Water rates: For water delivered to the University's distribution system, the University pays a rate equal to the RWSA wholesale rate plus 25% of the City's maintenance and operations retail rate. For water supplied directly to University-owned facilities from the City's water distribution system, payment will be at the City's rate.

The 1981 Agreement has been replaced with new agreements with UVA. RWSA and UVA is coordinating a new lease with RWSA for the Observatory Water Treatment Plant. RWSA has spent approximately $5 million on recent improvements and plans for an upcoming upgrade that will cost approximately $20 million to the Observatory Hill Water Treatment plant.

The University has recently begun undertaking new development in the City's utility service area. The February 2018 agreement signed as part of Brandon Avenue discussions stated that all UVA facilities brought online or modified after 1/1/18 will pay full City rates. The February 2018 agreement also states UVA and the City will establish a plan for transitioning the water and wastewater rates charged to UVA, for University's buildings/ facilities constructed and occupied prior to 1/1/2018, to an updated rate structure supported by a professional water rate study. The City had already commenced a professional water and sewer rate study in June 2017. Best practice is that such studies are done every five (5)-years. The City has not had such a study for several years (10+).

The City had multiple meetings with representatives from the University to discuss a plan for utilities services for the new UVA developments and a new water and wastewater rate. The transition plan includes the following over the next three years:

- July 1, 2018 – pay 25% of the difference between 1981 Agreement rates and City rates (completed)
- July 1, 2019 – pay 50% of the difference between 1981 Agreement rates and City rates (in addition to 25% from previous year)
- July 1, 2020 - pay 25% of the difference between 1981 Agreement rates and City rates (in addition to 75% from previous year and rate will be equal to the City rate)
- July 1, 2021 – pay City rates
- Beginning July 1, 2018, the University started paying the full monthly service charge for its 14-inch water meter.

By FY'20, the University will pay the City rate set as part of the annual rate setting process.

2.13 MONTHLY SERVICE CHARGE

The Monthly Service Charge for water and sewer funds a portion of the fixed and infrastructure costs associated with being a customer of the water utility. The charge is proportionate to the size of a water meter. The size of a water meter regulates the amount of water that can pass through the meter thus provides a proportionate measure of the different impact of customers. For example, one 1-inch meter uses as much water as two and a half 5/8-inch meters.

There are no changes being proposed for the monthly service charges for FY'20.

Exhibit 15: Proposed Monthly Service Charge for FY'20 for Water

Water Meter Size (inches)	Current	Proposed	$ Change	% Change
5/8	$5.00	$5.00	$0.00	0.0%
1	$12.50	$12.50	$0.00	0.0%
1.5	$25.00	$25.00	$0.00	0.0%
2	$40.00	$40.00	$0.00	0.0%
3	$80.00	$80.00	$0.00	0.0%
4	$125.00	$125.00	$0.00	0.0%
6	$250.00	$250.00	$0.00	0.0%
14	$1,637.40	$1,637.40	$0.00	0.0%

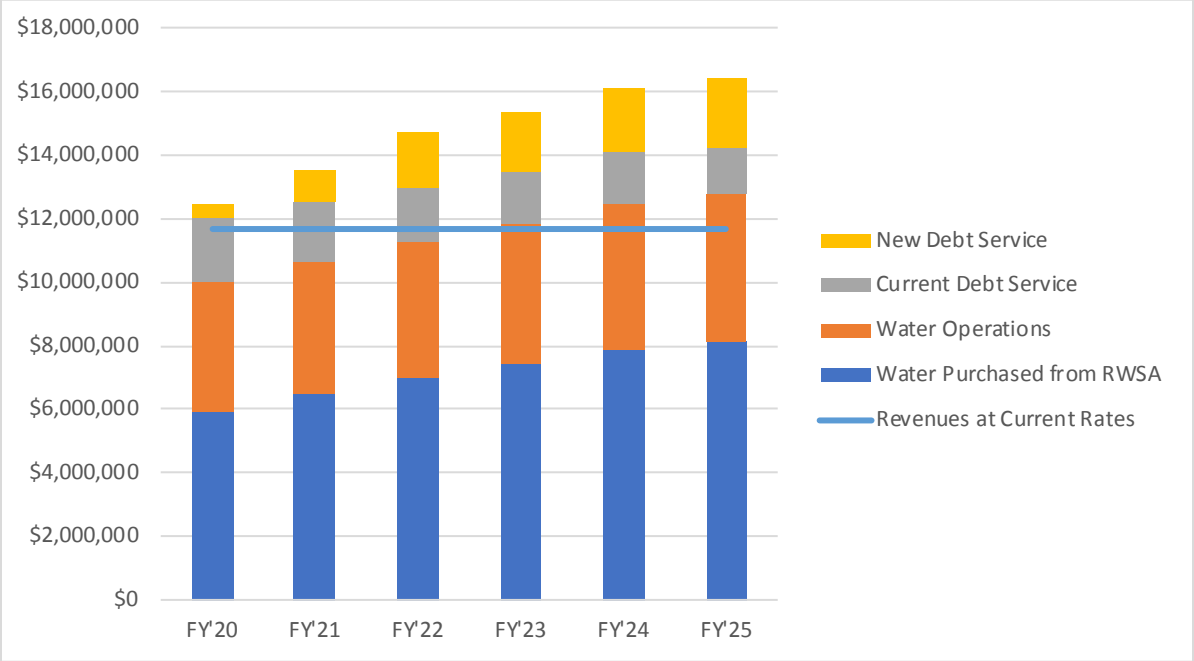
2.14 PROPOSED WATER RATES

2.14.1 Total Revenue Projections at Current Rates

The projected cost (revenue requirements) of the system are combined with the projected water customers and usage to determine an appropriate financial plan and set water rates for the planning period.

The adequacy of revenues from current rates is evaluated in order to determine if existing rates are enough to recover the revenue requirements. As shown in the exhibit below, current water rates are not enough to meet the projected revenue requirements.

Exhibit 16: Water Revenue Requirements and Revenue at Current Rates



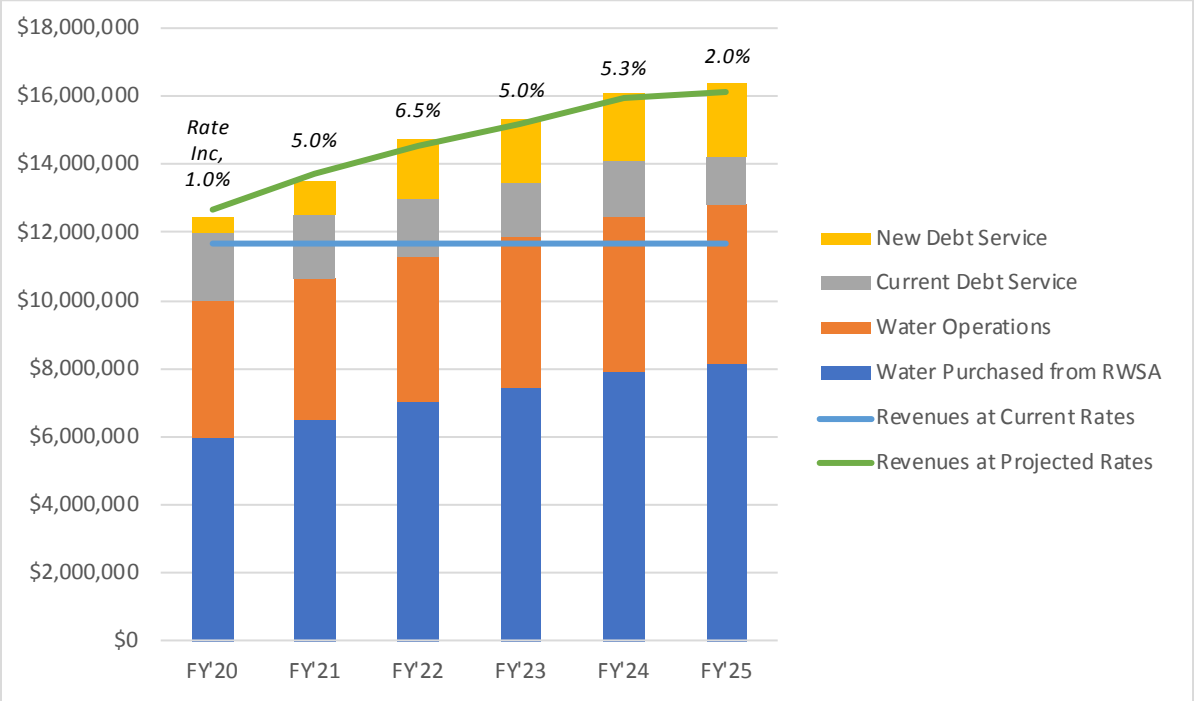
2.14.2 Total Revenue Projections at Current and Proposed Rates

In order to maintain the financial health of the City's Water Fund over the planning period, revenue needs to be increased. In addition to covering the revenue requirements, revenue must also be enough to satisfy the City's long-term financial policies.

To address these shortfalls, rates will need to be adjusted on a multi-year basis. Note: water rates are evaluated and adopted on an annual basis. A multi-year approach helps manage rate increases over the planning period and allows for proper planning and adjustment by customers and the City.

The exhibit below compares the revenue requirements (with percent change from the previous year) with total revenue projections at current rates as well as total revenue projected at proposed rates for FY'20 and the years of the planning period for water.

Exhibit 17: Water Revenue Requirements, Revenue at Current Rates and Revenue at Proposed Rates



2.14.3 Water Rate Design

There are no recommendations to change the City's current seasonal water rate design.

2.14.4 Proposed Water Rates FY'20

Water rates are recommended to increase by 1.0% for FY'20.

Exhibit 18: Proposed Water Rates FY'20

	Current	Proposed FY'20	$ Change	% Change
Summer	$64.66	$65.31	$0.65	1.0%
Winter	$49.74	$50.24	$0.50	1.0%

2.14.5 Projected Water Rates FY'21-FY'25

Based on the projected revenue requirements for FY'21-FY'25 and customer usage, the projected water rates for this planning period are shown below.

Exhibit 19: Projected Water Rates FY'21-FY'25

	Current	Proposed FY'20	Projected FY'21	Projected FY'22	Projected FY'23	Projected FY'24	Projected FY'25
Summer	$64.66	$65.31	$68.58	$73.04	$76.99	$80.75	$82.37
Winter	$49.74	$50.24	$52.75	$56.18	$58.99	$62.11	$63.36
Summer $ Change		$0.65	$3.27	$4.46	$3.95	$3.76	$1.62
Summer % Change		1.0%	5.0%	6.5%	5.4%	4.9%	2.0%
Winter $ Change		$0.50	$2.51	$3.43	$2.81	$3.12	$1.25
Winter % Change		1.0%	5.0%	6.5%	5.0%	5.3%	2.0%

2.15 CUSTOMER IMPACTS

The table below illustrates the average monthly water bill for customers based on water meter size with the recommended water rate increases and Monthly Service Charge.

Exhibit 20: FY'20 Customer Impacts from Proposed Water Rates and Charges

Water Meter Size	Median Water Usage/Month (cf)	FY'19 Ave. Monthly Bill	FY'20 Ave. Monthly Bill	$ Increase	% Increase
5/8	400	$27.38	$27.61	$0.23	0.82%
1	1,760	$110.98	$111.97	$0.99	0.89%
1 1/2	3,410	$215.81	$217.73	$1.92	0.89%
2	5,680	$357.83	$361.03	$3.20	0.89%
3	11,750	$737.49	$744.10	$6.61	0.90%
4	43,720	$2,571.43	$2,596.02	$24.59	0.96%

3 SEWER

3.1 OVERVIEW

The City operates and maintains the sanitary sewer collection system within its boundaries which consists of about 171 miles of pipe and 5,700 manholes. The collection system was constructed over a period of many decades using several different types of materials – terra cotta (clay), PVC, ductile iron, and concrete. The pipes vary in age from about 15 to 100 years old and range in size from 6-inch to 30-inch in diameter. Manholes are either brick or pre-cast concrete. The flows from the City's system join flows from Albemarle County and empty into RWSA interceptors. These combined flows are carried to RWSA's Moores Creek Advanced Wastewater Treatment Plant.

3.2 RIVANNA WATER AND SEWER AUTHORITY

The Rivanna Water and Sewer Authority (RWSA) provides wastewater treatment services for the City of Charlottesville and the Albemarle County Service Authority (ACSA). The City's share of the FY'20 wastewater budget totals $8,907,900 including operating expenses and debt service costs. This is an increase of 3.5% over the FY'19 budget. Operating expenses include personnel costs (staff salaries and benefits), general services costs (professional fees, utilities, insurance, permits, and data and voice communications), and operation and maintenance costs (chemicals, building repairs, equipment maintenance, technology and communications). Debt service charges provide funding to construct and renew major infrastructure including wastewater treatment plants, pumping stations, and piping systems.

3.2.1 RWSA FY'20 Wastewater Budget Objectives

The proposed budget increases will support existing and planned wastewater programs to effectively address the service expectations of the growing community. A brief description of those programs follows:

Strategic Plan Implementation
This budget supports the implementation of RWSA's six Strategic Goals. It continues the efforts to attract, retain, and reward exceptional employees, while providing essential enhancements to their safety program. Operational optimization and dependable infrastructure are also fundamental aspects of their budget.

Urban Wastewater Management
The recently completed Odor Control systems have been doing an effective job reducing odors at the Moores Creek wastewater treatment facility, as well as in the wastewater piping. The new Rivanna Sewer Pumping Station and tunnel have helped to essentially eliminate sanitary sewer overflows from the system, despite the record amount of rainfall in 2018.

Instrumentation Systems
Use of complex instrumentation systems continues to grow as they leverage technology to achieve operational efficiencies. Additional support is programmed to calibrate and maintain new wholesale meters and their data transmission system, calibrate water treatment plant meters, and replace existing

wastewater meters.

3.2.2 Infrastructure

RWSA's Capital Improvement Plan (CIP) for wastewater for Fiscal Years 2020-2024 has been prepared as a strategic and financially responsible plan to complete major infrastructure construction projects. The projects included in the CIP are necessary to achieve the RWSA's core mission of providing wastewater treatment services for the City of Charlottesville and ACSA. The CIP is a five – 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 CIP are developed through RWSA's Asset Management and Master Planning programs to address 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 very near completion or are no longer needed, and as such are being removed from the FY2020-2024 CIP. Wastewater projects include:

- Moores Creek AWRRF Bridge Repairs
- Moores Creek AWRRF Odor Control – Phase 2
- Moores Creek AWRRF Roof Replacements
- Moores Creek AWRRF Second Centrifuge

The total five-year 2020 – 2024 CIP for sewer is approximately $5.85 million. This includes projects already in previous CIPs which have been modified. There are no new wastewater capital projects proposed in the FY'20 budget.

Exhibit 21: RWSA Sewer Projects for City

Project	FY'20-FY'24 Total (millions)
Existing Projects	
Upper Schenks Branch Interceptor	$4.0M
Digester Sludge Storage Improvements	$.5M
Moores Creek AWRRF Master Plan	$.25M
Compost Shed Roof Rehabilitation	$.2M
Radio Upgrades	$.1M
Security Enhancements	$.8M
TOTAL	**$5.85M**

3.2.3 Actual Wastewater Flows

The City portion of Urban Area operation rates and charges are based on wastewater production (flows). The estimated flows for the City will decrease for FY'20 budget levels by 1%.

Exhibit 22: RWSA Sewer Production Allocation

	FY'19	FY'20	% Change
City	51%	50%	-1%
ACSA	49%	50%	1%

3.2.4 City Share of RWSA Wastewater Costs

The FY'20 budget increases by the amount of $305,500 in operating expenses and a decrease of $8,000 in debt service charges for a total budget increase of $297,500 or 3.5% above the FY'19 budget. RWSA's costs to the City for wastewater are planned to change:

- Operating expenses will increase $0.223 per 1000 gallons (10.39%) for wastewater
- Debt Service charges will decrease 0.16 % for wastewater

3.3 INFRASTRUCTURE

The City has several challenges within the sewer collection system; sewer lines that are undersized, points in the system that restrict flow, and sewer lines that run near and under structures. Also, most of the existing system was installed prior to 1970. The goal of reducing inflow and infiltration (I&I) to the sewer system continues. The terms "inflow" and "infiltration" apply to excess water that enters the sanitary sewer system. Inflow is surface water that flows into the system from various sources, such as defects in manhole covers and improperly connected roof drains. Infiltration is ground water that seeps into the system through pipe cracks, broken joints and deteriorated manholes. Rainfall events often cause excess water to enter the system. These rain events can result in overflows from manholes, which must be corrected to protect public health and the local environment. The excess water into the sewer network also taxes the capacity of the wastewater treatment plant, which can lead to major investments to expand the treatment facilities. There is also an indication of broken pipes and open joints in the network where wastewater can potentially leave the system. The I&I rehabilitation program identifies needed repairs to restore the integrity of the system which are necessary to reduce the amount of inflow and infiltration into the sewer system.

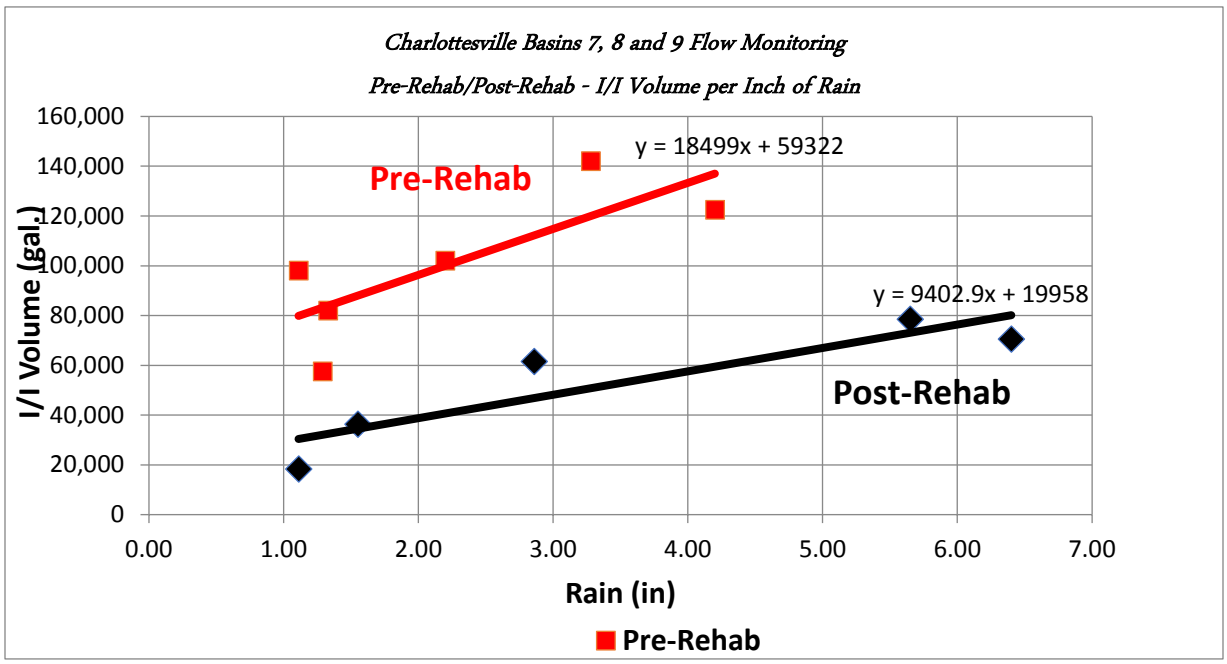
In 2009, the City awarded a multi-year, multi-million dollar contract utilizing a "find-and-fix" approach for sewer repair and rehabilitation. The work encompasses the rehabilitation of sewer manholes and sewer lines, as well as completion of particularly difficult or time-consuming sewer replacement projects. In addition, crews have been performing CCTV (closed-circuit televising) and smoke testing throughout the City system. Any deficient pipes or structures are immediately added to the list for rehabilitation/replacement under the same contract.

"Find-and-fix" rehabilitation projects are unique projects. The exact work is not known at the time of bidding, so all potential work items must be included in the bid form (bid form includes over 200 bid items). The contractor performs the evaluation work during construction, primarily TV inspections,

submits the evaluation to the Engineer for review, and the Engineer then decides on the final rehab work within seven days. The work is fast-paced and allows for emergency situations to be addressed within 48 hours. The City estimates savings of over $2 million following this find-and-fix approach.

Initial work was centered on the Schenks Branch area (City Basins 7, 8, and 9), which was identified as a high priority in previous studies. Exhibit 3.3.1 is a table that demonstrates the success that the program has had with removing infiltration and inflow around the Schenks Branch area. The associated graph in the Exhibit shows the reduction in post-rehab flow levels of I&I per inch of rain as being close to half of the pre-rehab flows. Due to this success, work has since continued into other areas of the City where similar results have been observed. Over the last several years, the rehabilitation work has been focused in the southern part of the City in the Fifeville, Ridge Street, and Belmont neighborhoods. To date, 44.1 miles or 232,915 linear feet of sewer lines have been replaced or rehabilitated and $19 million has been spent.

Exhibit 23: Basins 7, 8, and 9 Flow Monitoring Results



The current capital projects in the City's five-year capital plan are listed below.

Exhibit 24: City Five-Year Capital Improvement Plan for Wastewater

Project	Five-Year Total
Rehabilitation/Replacement Program	$10,000,000
TOTAL	**$10,000,000**

3.4 FATS, OILS, AND GREASE (FOG)

The City of Charlottesville prohibits the discharge of fats, oils, and grease (FOG) down the drain. In excessive amounts, these contaminants will cause or contribute to a blockage in the sanitary sewer

collection system. FOG accumulates in sewer pipes, and over time, can build up and restrict the flow in the pipe, causing untreated wastewater to back up into businesses or homes, or cause manholes to overflow in the street (commonly referred to as sanitary sewer overflow or SSO). This SSO can potentially enter a storm drain and contaminate local waters. In an effort to prevent these events, the City of Charlottesville maintains an active FOG program that routinely inspects and advises best management practices to over 300 city restaurants on an annual basis on how to properly dispose of FOG.

3.5 NEW WASTEWATER STAFFING NEEDS

Due to the increase of development throughout the City, and the demand for increased infrastructure capacity, the Department is creating a new position and will hire an additional Utilities Construction Inspector. This position will be responsible for overseeing all aspects of the installation of public utility lines by private contractors to ensure that they are installed in compliance with local, state, and federal standards. This position will also assist in the inspection of capital improvement projects, as needed.

3.6 WASTEWATER ASSISTANCE PROGRAM

A Wastewater Assistance Program (WWAP) was created by City Council in FY'12 to assist customers who had difficulty paying their bills due to extreme circumstances. It is recommended that $10,000 be budgeted in FY'20 in combination with existing funds to fund the WWAP. 65 customers received assistance in FY'18, totaling $5,262.50. This program will continue to operate in conjunction with the WAP. The program will be administered by the Utility Billing Office in a similar fashion as the established Gas Assistance Program.

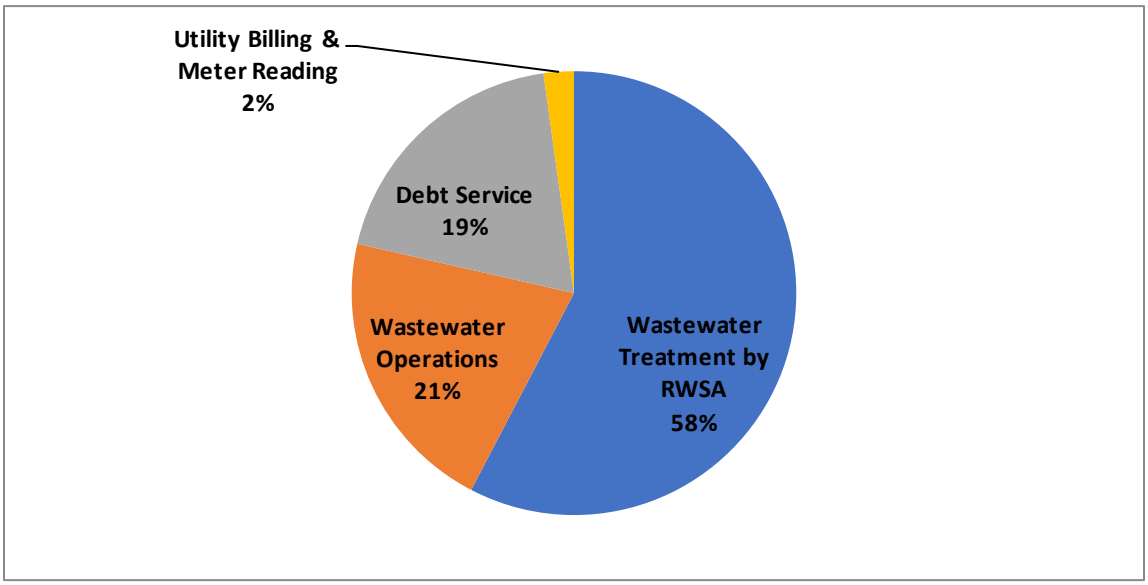
3.7 REVENUE REQUIREMENTS

This section of the report outlines the current and projected costs of operating and maintaining the City's sewer system which constitute the revenue requirements (i.e., the amount of revenue required to be collected from customers).

3.7.1 Current Revenue Requirements (FY'20)

The FY'20 budget for the sewer utility totals $15,451,187, the largest component being the purchase of wastewater treatment from RWSA (58% of the budget).

Exhibit 25: Sewer Utility FY'20 Revenue Requirements



The revenue requirements for wastewater are 4.1% higher than the previous year. The City's cost to purchase wastewater treatment from RWSA is both the single largest expenditure in the wastewater budget and is projected to be the largest increase ($297,500) in the FY'20 sewer budget. The increase in operations costs includes the additional Utilities Construction Inspector mentioned above.

Exhibit 26: Comparison of Sewer Revenue Requirements FY'19 to FY'20

Revenue Requirements	FY'19	FY'20	$ Change	% Change
Wastewater Treatment by RWSA	$8,610,400	$8,907,900	$297,500	3.5%
Wastewater Operations	$2,983,427	$3,148,830	$165,403	5.5%
Debt Service	$2,806,467	$2,972,296	$165,829	5.9%
Utility Billing Office	$305,810	$290,025	($15,785)	-5.2%
Vehicle Replacement - Wastewater	$73,606	$73,606	$0	0.0%
Meter Reading	$47,446	$49,102	$1,656	3.5%
Wastewater Assistance Program	$10,000	$10,000	$0	0.0%
TOTAL	**$14,837,156**	**$15,451,759**	**$614,603**	**4.1%**

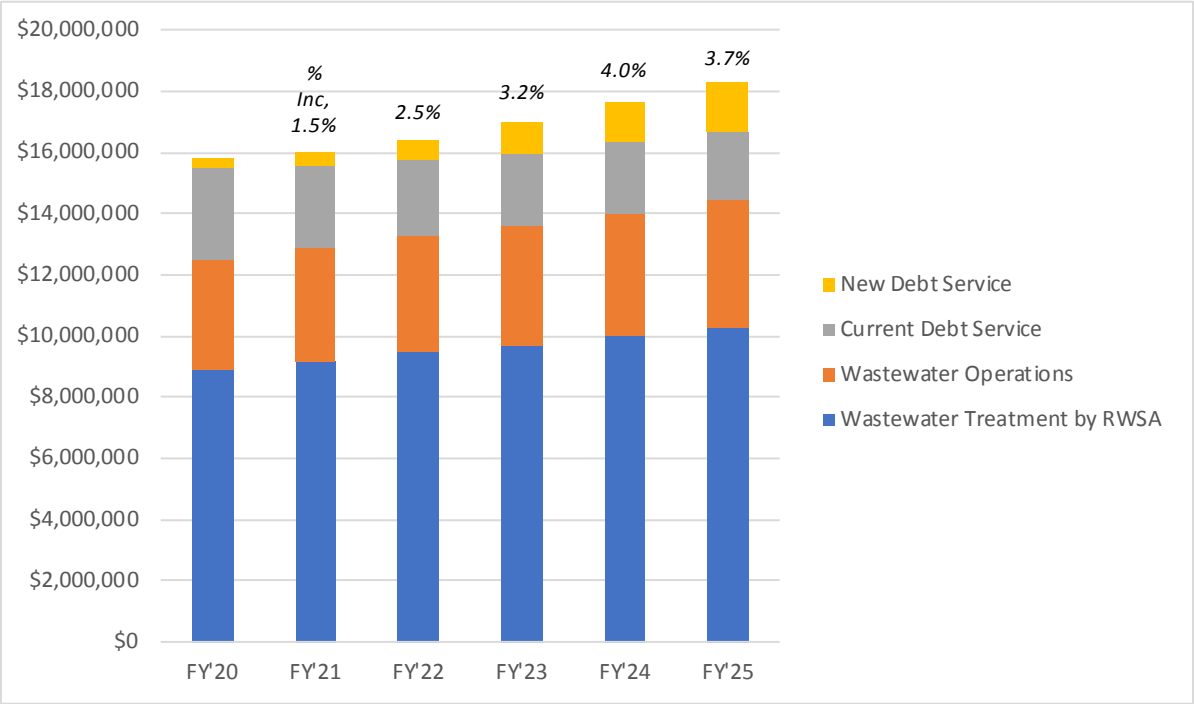
3.7.2 Projected Revenue Requirements (FY'21-FY'25)

To project operating expenses for FY'21-FY'25, the FY'20 sewer budget line items are escalated using a 3.0% escalation rate except for the cost to purchase wastewater treatment from RWSA which is based on projected rate increases. In addition to operating expenses, annualized capital costs are included. The City issues bonds to fund sewer capital projects to mitigate the financial burden on existing customers and improve equity by spreading the costs of long-term assets over all customers who will use and benefit from the assets. The City is currently paying debt service for bonds previously issued and plans to issue bonds to fund its sewer CIP.

The projected revenue requirements (with percentage change from the previous year) for FY'21 through

FY'25 are shown below.

Exhibit 27: Projected Sewer Revenue Requirements FY'21-FY'25



3.8 CUSTOMERS AND USAGE

The City currently provides sewer service to 14,189 customers. The exhibit below provides a breakdown of current sewer customers by water meter size. Residential customers (5/8 water meters) comprise the majority of the City's sewer customers (94.4%).

Exhibit 28: Current Sewer Customers by Meter Size

Water Meter Size (inches)	# of Customers	% of Customers
5/8	13,397	94.4%
1	268	1.9%
1.5	238	1.7%
2	229	1.6%
3	40	0.3%
4	15	0.1%
6	1	0.01%
14	1	0.01%
TOTAL	**14,189**	

The City's sewer service area corresponds with the municipal boundary and thus is fixed. The City has been adding sewer customers the last several years as a result of redevelopment and infill development.

It is difficult to project the number of future sewer customers; thus no growth is factored into the planning period.

Customers are currently charged sewer rates based on their metered water usage (billed monthly in 1,000 cubic feet). Unlike the seasonal water rates, the City's sewer rate is the same year-round. The exhibit below provides a breakdown of current annual sewage production in cubic feet based on billed water usage.

Exhibit 29: Current Sewage Production

Usage	Total (cubic feet)
All Customers	**182,408,231**

Like the number of customers, current sewage production has been held constant over the planning period.

3.9 1981 UVA-CITY WATER AGREEMENT

The 1981 Water Agreement between the City and the University includes the following:

- Sewer rates: For wastewater service, the Water Service Agreement provides that the University will pay the RWSA rate plus 50% of the City's operations and capital cost components of the rate for wastewater that enters the City's system from a University-owned collector system. For wastewater service the City provides directly to UVA facilities, UVA pays the City's retail rate.

As noted earlier in the Water chapter, the 1981 Agreement is currently in the process of being replaced. The City has recommended a transition plan away from the 1981 Agreement to the University paying City sewer rates.

3.10 MONTHLY SERVICE CHARGE

Like water, the City assesses a monthly service charge sewer to recoup the fixed costs of providing utility services such as customer service, billing, meter services, and infrastructure. Also, as with the water monthly service charge, the sewer monthly service charge is proportionate to water meter size.

There are no changes proposed for the monthly service charge for sewer.

Exhibit 30: Proposed Monthly Service Charge for FY'20 for Sewer

Water Meter Size (inches)	Current	Proposed	$ Change	% Change
5/8	$5.00	$5.00	$0.00	0.0%
1	$12.50	$12.50	$0.00	0.0%
1.5	$25.00	$25.00	$0.00	0.0%
2	$40.00	$40.00	$0.00	0.0%
3	$80.00	$80.00	$0.00	0.0%
4	$125.00	$125.00	$0.00	0.0%
6	$250.00	$250.00	$0.00	0.0%
14	$1,637.40	$1,637.40	$0.00	0.0%

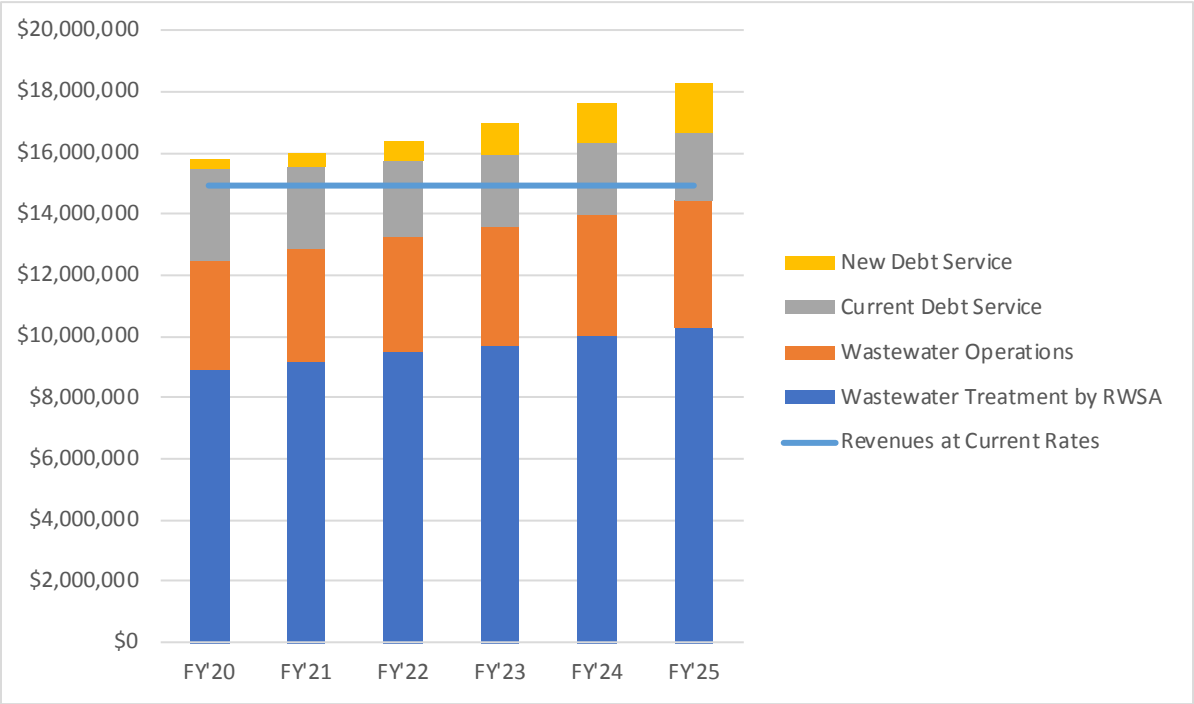
3.11 PROPOSED SEWER RATES

3.11.1 Total Revenue Projections at Current Rates

The projected costs (revenue requirements) of the system are combined with the projected sewer customers and usage to determine an appropriate financial plan and set sewer rates for the planning period.

The adequacy of revenues from current rates is evaluated in order to determine if existing rates are enough to recover the revenue requirements. As shown in the exhibit below, current sewer rates are not enough to meet the projected revenue requirements.

Exhibit 31: Sewer Revenue Requirements and Revenue at Current Rates



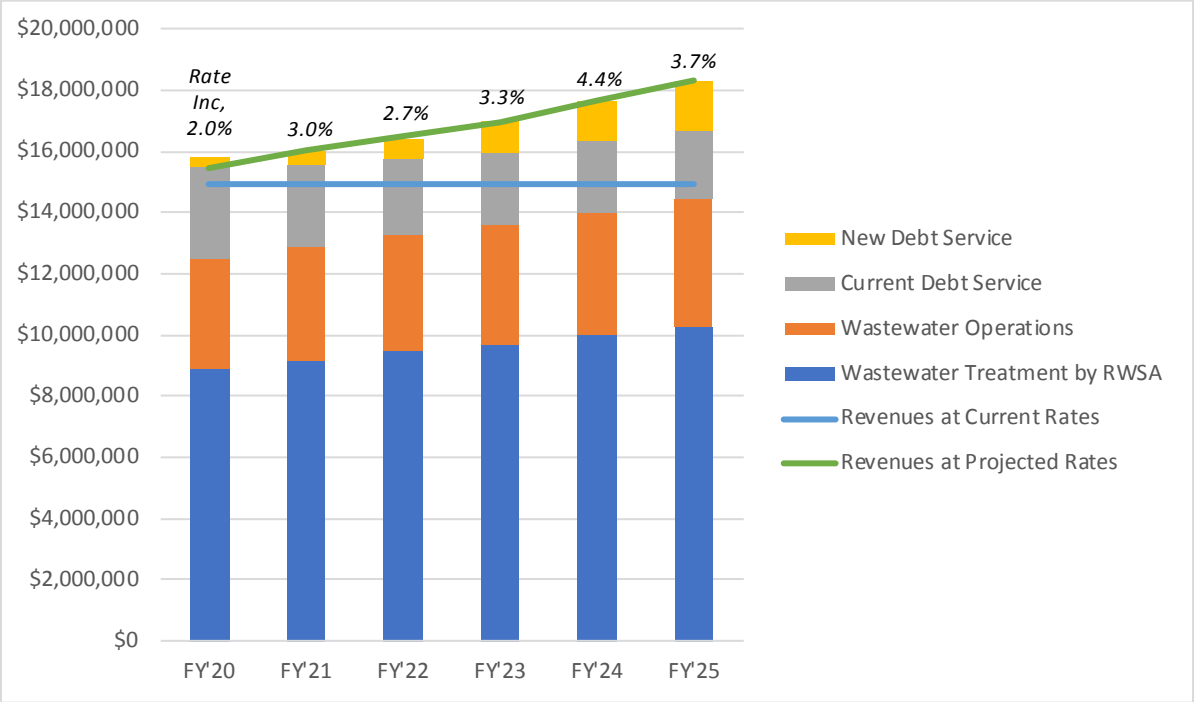
3.11.2 Total Revenue Projections at Current and Proposed Rates

In order to maintain the financial health of the City's Sewer Fund over the planning period, revenue needs to be increased. In addition to covering the revenue requirements, revenue must also be enough to satisfy the City's long-term financial policies.

To address these shortfalls, rates will need to be adjusted on a multi-year basis. Note: sewer rates are evaluated and adopted on an annual basis. A multi-year approach helps manage rate increases over the planning period and allows for proper planning and adjustment by customers and the City.

The exhibit below compares the revenue requirements (with percent change from the previous year) with total revenue projections at current rates as well as total revenue projections at proposed rates for FY'20 and the years of the planning period for sewer.

Exhibit 32: Sewer Revenue Requirements, Revenue at Current Rates and Revenue at Proposed Rates



3.11.3 Sewer Rate Design

There are no recommendations to change the City's current sewer rate design.

3.11.4 Proposed Sewer Rates FY'20

Proposed sewer rates for FY'20 are to increase by 2.0%

Exhibit 33: Proposed Sewer Rates FY'20

Current	Proposed FY'20	$ Change	% Change
$78.57	$80.14	$1.57	2.0%

3.11.5 Projected Sewer Rates FY'21-FY'25

Based on the projected revenue requirements for FY'21-FY'25 and customer usage, the projected sewer rates for this planning period are shown below.

Exhibit 34: Projected Sewer Rates FY'21 – FY'25

	Current	Proposed FY'20	Projected FY'21	Projected FY'22	Projected FY'23	Projected FY'24	Projected FY'25
	$78.57	$80.14	$82.54	$84.77	$87.57	$91.42	$94.80
$ Change		$1.57	$2.40	$2.23	$2.80	$3.85	$3.38
% Change		2.0%	3.0%	2.7%	3.3%	4.4%	3.7%

3.12 CUSTOMER IMPACTS

The table below illustrates the average monthly sewer bill for customers based on water meter size with the proposed sewer rate increases and monthly service charge.

Exhibit 35: Customer Impacts from Proposed FY'20 Sewer Rates and Charges

Water Meter Size	Median Sewer/Month (cf)	FY'19 Ave. Monthly Bill	FY'20 Ave. Monthly Bill	$ Increase	% Increase
5/8	400	$36.43	$37.06	$0.63	1.72%
1	1,760	$150.78	$153.55	$2.76	1.83%
1 1/2	3,410	$292.92	$298.28	$5.35	1.83%
2	5,680	$486.28	$495.20	$8.92	1.83%
3	11,750	$1,003.20	$1,021.65	$18.45	1.84%
4	43,720	$3,560.08	$3,628.72	$68.64	1.93%

4 NATURAL GAS

4.1 OVERVIEW

Charlottesville's natural gas utility is one of three municipally owned gas utilities in the Commonwealth of Virginia and has provided service for over 150 years. It operates on a self-supporting basis and is not designed to operate at a profit. Rates are set annually at a break-even point. However, due to various factors (winter weather and the number of gas customers); the utility can generate a profit or loss in any given year.

The Charlottesville gas system currently provides service to an area that includes all of Charlottesville and parts of Albemarle County and consists of 333 miles of main. The system currently serves approximately 20,287 customers (12,156 in the City and 8,135 in the County). An example of the expansion programs which have provided a substantial capacity for growth, allowing the gas system to compete for business in a growing service area.

Natural gas is domestically abundant with 95% of the natural gas used in the United States coming from North America. There are more than 100 years of availability of natural gas in the U.S. alone, plus gas reserves that have not been touched assuring availability for many years to come. Natural gas is also the cleanest burning fossil fuel. Because the combustion process for natural gas is almost perfect, very few impurities are emitted into the atmosphere as pollutants. Also, with the introduction of new technologies, nitrogen oxide, a pollutant targeted by the Clean Air Act, can be significantly reduced. The combustion of natural gas results in fewer greenhouse gases than coal or oil because when it is burned completely, the principal products of combustion are carbon dioxide and water vapor, thus reducing our carbon footprint. Unlike other energy sources, natural gas provides instant heat as soon as it is turned on, so natural gas can keep an entire residence comfortable by providing instant heat from your furnace, fireplace, stove and water heater.

It is also one of the lowest cost and most efficient energy sources available. Households that use natural gas appliances for heating, water heating, cooking and clothes drying spend an average of $500 less per year than homes using electrical appliances. Thus, natural gas is preferred by many people, but the market area is restricted to those geographic areas that are served by distribution lines, as natural gas is piped directly into your residence. To obtain maximum sales from new developments, it is important to have mains in place before construction begins. If a customer has installed equipment that uses another fuel, conversion to natural gas takes place over an extended time period and diminishes the economic feasibility of line extensions. Therefore, it is essential to work with potential gas customers as they are making their initial decisions, via an active marketing effort, if the City wishes to continue to add new customers.

Five levels of service are provided to meet the needs of various customer classes: Firm, Interruptible, Small Volume Transportation, and Large Volume Transportation. Most consumers are firm customers, with a priority for gas use at all times. Currently, there are 10 customers with interruptible service who are not assured of continuous service; they must maintain an alternate fuel system and be prepared to switch to that alternate fuel within several hours of notification. This customer class is vital to the system because it allows the City to stay within the volume requirements of the firm transportation entitlement and still meet the gas needs of firm customers in peak demand periods. Interruptible

customers pay lower rates than firm customers because they have no assurance of service in peak demand periods. Therefore, they do not share in the cost of providing peak period supply. Transportation customers are those who purchase their own gas from independent suppliers and transport it through the City's distribution system to their location. All transportation service is on an interruptible basis. There are currently two transportation customers, one small volume and one large volume.

4.2 SAFETY

Natural gas is one of the safest, most reliable and environmentally friendly fuels currently in use, but leaks can occur. Charlottesville Gas has a robust safety awareness program including the following:

"Dig with Care" Program – Although most commercial excavators are aware of the "call VA811 before digging" law, the number of third-party excavation damage to our gas lines is on the rise. Part of the problem lies with excavators not following the dig with care guidelines. "No Reasonable Care" gas line damage jumped from 28% in 2012 to 50% in 2013. To tackle the situation, we launched the Education Program "Dig with Care" featuring the following elements:

- **Marty's Minute** – A series of radio spots with the contractor Marty. Our well-intended fictitious character shares his wisdom of years of experience in construction and the importance of digging with care. These spots have been aired during the early morning drive hours on a local Country Radio station.
- **VA 811 Day Distribution** – On August 11th, Charlottesville Gas partnered with a local ice cream truck company to distribute VA811 kits to local excavators and construction workers. Staff visited new construction sites and offered free ice cream to workers in addition to the kits which contained a VA811 t-shirt, bumper sticker and safe excavation guide
- **Excavation Safety Training** – We hosted a special training session for local excavators, plumbers and building inspectors. The 1½-hour presentation was led by Frank Hudik of the State Corporation Commission (SCC).

Since the "Dig with Care" program was launched, we experienced a 54% reduction in gas line damage caused by third party excavators (from 2.83/1000 Miss Utility tickets in 2013 to 1.32/1000 Miss Utility tickets in 2017).

TV Spot - Two Sing-A-Long safety commercials featuring our Flicker the Flame jingle were produced and began airing in 2012. The first spot focuses on the smell of gas and what to do if you suspect a leak. The second spot highlights calling Miss Utility before digging. Both commercials featured City employees and local children and were produced by Charlottesville Newsplex. These spots have aired on local network channels (NBC, CBS, CW, FOX, ABC), cable TV channels (BET, Bravo, E!, Food Network, ABC Family, Hallmark Channel, Nickelodeon, Cartoon Network, DIY Channel, ESPN, ESPN2, Golf Channel, HGTV, NBC Sports) and before film screenings at Stonefield Regal Movie Theater.

Online Campaign for Young Adults - On the 2014 Public Awareness follow-up survey, we noticed a gap of knowledge regarding gas safety with young adults. Part of the issue is this audience is not easily reached by traditional media (TV and Radio). To address the matter, we partnered with Comcast's online streaming platform to showcase our ads through their 'On Demand' service.

Improved Gas Safety Flyer - This bilingual bill stuffer featured a more user-friendly layout and a natural

gas scent scratch-n-sniff square. A contest was launched on our webpage to measure effectiveness.

Intensified Outreach Programs - We targeted events with high attendance such as UVA baseball and Soccer games, KidVention, Holiday Heritage Parade and the Touch-a-Truck. Flicker even had the honor of throwing out the first pitch at an UVA Baseball ACC series game.

Expansion of the Flicker @ Your Classroom Program - During the 2018 school year, the Flicker @ Your Classroom and Summer Camp programs reached over 450 children.

Outsource Utility Location - In 2014, we outsourced the utility locating process resulting in an increase in utility marking accuracy and reducing damage.

Targeting Commercial Customers – To ensure commercial information is seen by a larger amount of staff, we created a postcard with a magnet attached so businesses can display the information in a visible area for more people to read.

Flicker Sing-along Jingle Contest – In 2018, we launched a new contest in conjunction with CBS19. Utilities asked the participants to help us promote gas safety in our community by submitting a video singing our Flicker's jingle for a chance to win a $1,000 prize. This user-generated content campaign had over 213,000 views on Flicker the Flame Facebook page and generated 4,258 engagement (post, clicks, shares, comments and reactions). We received some excellent entries and then we asked the community to vote for their favorite. A total of 2,378 people voted which is more participation than the CBS19 station have ever received for a single contest.

In March of 2018, the State Corporation Commission (SCC) performed a meticulous and thorough audit of our Public Awareness Program in accordance with federal regulations. The SCC inspectors did not note any findings which is uncommon in Virginia. The Deputy Director of SCC was so impressed with our program that he invited the City of Charlottesville to headline the presentation "A Path to a Successful Public Awareness Program" at the 2018 SCC Damage Prevention Conference.

4.3 MARKETING EFFORTS

Based on a recent customer survey, we found that a significant share of our audience were unaware that natural gas has a competitive edge over other energy fuels. We also noticed a lack of knowledge of our free installation offer (up to 150-feet of gas lines installed with a qualified appliance). In the spring of 2015, we launched a new TV spot "Charlottesville Gas: The Right Choice." The new commercial was created in-house, and its goal was to promote the unique benefits of natural gas in an effort to acquire new customers requesting to have natural gas lines installed to their homes. We also highlighted the free installation offer. In this ad, our mascot Flicker the Flame is the host of a "Jeopardy!" style quiz game show "Know Your Energy." In the commercial, natural gas is always the right answer for all your home's needs. Since the airing of the new commercial has begun, we noticed that several inquiries are referring to the new TV ad and asking for more information about the free installation offer.

In addition to working closely with developers and builders, some of the City's marketing activities included:

- Conducting gas main extension surveys to existing neighborhoods located nearby our service area;

- Developing and mailing various brochures targeting specific businesses; and
- Developing and mailing postcards for potential customers with gas mains in front of their homes.

In the fall of 2017, we used print and online methods to target non-gas customers located in our service area. GIS was used to create a list of homes with no gas service within 100-feet of our main gas lines. The following traditional and online methods were used:

- Postcards including our free installation offer were mailed to the homes
- An online campaign was created and delivered to computers with the IP addresses in our mailing list

In November 2010, we launched the Flicker the Flame Facebook page. By April 2019, the page had 888 friends. With this initiative, we hope to create an open dialogue with our customers as well as with our Flicker fans

4.4 REGULATORY COMPLIANCE

Charlottesville Gas is required by the Pipeline & Hazardous Materials Safety Administration (PHMSA) to maintain an Operator Qualification Plan that adheres to federal regulations. These regulations require Charlottesville Gas employees to demonstrate their competence in regard to a variety of different tasks that are performed on any Charlottesville Gas pipeline. The typical Charlottesville Gas employee must satisfactorily pass over 40 Operator Qualification (OQ) tests. Charlottesville Gas is required, by code, to retain these training and test records for a minimum of five years. In December 2018, the State Corporation Commission (SCC) on behalf of PHMSA audited the Charlottesville Gas Operator Qualification Plan and testing records. The Commission found no probable violations or recommendations in regard to the Plan or the associated OQ records. The Charlottesville Gas Utility takes pride in staffing a trained and informed workforce, and the State Corporation Commission's inspection only validated the City's efforts.

Charlottesville Gas is required by PHMSA to monitor and address any potential leak threats to the natural gas system through a Distribution Integrity Management Program (D.I.M.P.). Examples of potential threats include excavator damages, corrosion and material defects. Included in the City's D.I.M.P Plan are procedures that have been put in place to mitigate potential threats to the gas system. Not only must this plan be in place, but operators must demonstrate that the procedures are being implemented and that potential threats are being reduced. As part of the Program, Utilities have been working with the City's IT Department to develop an application to track and survey risks and threats to the natural gas system. Using the Utility GIS Viewer and tablets, Gas employees are able to track and document the location, cause, severity and response time associated with each leak. In March 2019, the State Corporation Commission on behalf of PHMSA performed a thorough audit of the City's Distribution Integrity Management Program (DIMP). The Commission found no pipeline safety violations in regards to the documentation or implementation of the City's Distribution Integrity Management Program.

4.5 NEW BUSINESS

Yearly home sales for 2018 in Greater Charlottesville were up 5.7% compared to 2017 sales. This marked the fifth consecutive year with gains in sales as the 3,894 homes sold in 2018 achieved the highest level since 2006. The overall median price for 2018 increased 4.6 percent to an average price of $308,498 compared to last year, according to a year-end real estate report from the Charlottesville Area Association of Realtors (CAAR).

Most of our gas installations comes from new homes. Ryan Homes and Southern Development are responsible for 70% of all new residential gas installation requests received in 2018. The home improvement market is another niche where Charlottesville Gas has been concentrating sales efforts. The large difference in energy cost between natural gas and oil/propane helps homeowners to offset the initial cost of conversion. This market accounted for 11% of applications for residential gas service in 2018.

Exhibit 36: New Gas Service Completed

Project	City or County
Residential	
Avinity Estates – 100 townhouses	County
Belvedere 2nd Phase – 120 lots	County
Briarwood – 665 residences	County
Belmont Station – 39 townhouses	City
Cascadia - 258 units	County
Community Service Housing	City
Dunlora Gates – 20 units	County
Dunlora Park – 33 lots	County
Free State Run – 27 lots	County
High Street Development – 10 units	City
Hyland Park – 19 single homes	County
Lochlyn Hill – 56 lots	City
Naylor Street Subdivision – 7 lots	City
Oaklawn Subdivision – 16 lots	City
Outbounds Farm – 20 lots	County
Sunset Overlook – 41 lots	County
Wellington Drive Main Extension	County
Commercial	
550 Water Street (apartments & retail)	City
CVS at Emmet Street	City
CHS Fieldhouse	City
Fairfield Inn and Suites by Marriott – Hotel	City
Jefferson Scholar Foundation	City
Keswick Hotel Addition	County
Malloy Ford	County
Rosewood Village Addition	County
Shops at Riverside Village	County
Staybridge Suites - Hotel	County
The Blake - Retirement Community	County

The Standard – mixed used	City
UVA Fontaine Medical Park Addition	County
UVA Thornton Hall	City
Volvo dealer	County

Exhibit 37: New Gas Service Planned

Project	City or County
Residential	
Belmont Point – 25 single family homes	City
Brookhill – 800 to 1,550 units	County
North Pointe – mixed-use residential	County
Payne's Mill – 25 single family homes	City
Spring Hill Villages – 100 single family homes attached	County
Willow Glen – 175 single family homes	County
Commercial	
29th Place Addition – retail	County
323 2nd St – mixed-used	City
5th Street Commercial Development – retail, restaurant and daycare	County
Belvedere Station – retail and restaurant	County
Birdwood Mansion – club house	County
Brookhill – 130,000 sq. ft. commercial	County
Caliber Collision – Body Shop	County
Code Building – Offices	City
Fulton Bank	City
Landmark Hotel	City
Longhorn Steakhouse – restaurant	County
Quirk Hotel	City
St. Thomas Aquinas Church	City
UVA - Ivy Mountain Musculoskeletal Center	County
Wawa @ Profit Road	County
Wawa @ Pantops	County

4.6 GAS CONSERVATION PROGRAM AND INCENTIVES

Charlottesville Gas encourages customers to find ways to conserve energy. Conservation tips for savings on gas bills are presented on the Utility Billing webpage and along with a guide that presents Energy Efficiency Tips addressing ways to keep the cold out, strategies to use energy wisely, and suggestions for long-term efficiency improvements.

To support efficiency, the Gas Utility offers two rebates:

Natural Gas Water Heater
The City offers a $200 rebate to gas customers who switch from an electric, propane or natural gas tank water heater to an energy saving tankless natural gas water heater. In the case where a customer switches from an electric or propane water heater to a natural gas tank water heater, a $100 rebate is available. According to the U.S. Department of Energy, water heating is the third largest energy use in homes. By heating water only when it's needed, natural gas tankless water heaters cut water heating expenses by 30%, while also providing continuous hot water delivery. This technology also produces less CO_2 and NOx than conventional gas or electric tank water heaters.

Programmable Thermostat
This rebate (up to $100) can be used to cover the cost of a new programmable thermostat or any expenses incurred installing it. The thermostats can be used to automatically lower the temperature in a building at night or while a resident is away at work, vacation or the like, and to raise the temperature at pre-set times. By setting a thermostat back 10° to 15° at night for 8 hours, it is estimated that a customer can reduce his or her heating bills by 5% to 15%. Over the past year, 123 customers have received rebates totaling $13,313. Next year's budget includes no funding for this program as there is enough carryover funds from previous years.

Specific requirements associated with these rebates are provided on the City website.

The Gas Utility works closely with the Local Energy Alliance Program (LEAP), a local community-based nonprofit that offers a variety of energy efficiency resources. Since 2014, a Home Energy Check-Up (HECU) is available to residential gas customer. This program is funded through a combination of a Charlottesville Gas contribution and a small fee of $45 from the residents. During the HECU, a LEAP Energy Coach performs direct installs of energy saving measures. The LEAP Energy Coach can select the most appropriate measures to install based on the resident's home and potential efficiency gain.

For 2019, the Gas Utility and LEAP are developing a new pilot program offering energy efficiency upgrades at no cost to income-qualified households. This program has the primary goal of reducing greenhouse gas emissions by saving energy. These improvements will also enhance low-income household conditions while reducing living expenses for residents. LEAP will combine the Gas Utility funds with existing resources from other community organizations to ensure that the depth and impact of each retrofit is maximized and any incidental needs are addressed at the same time (health and safety, for example). LEAP will model the estimated energy savings of each job and compare it to actual usage after 12 months from the project completion date.

4.7 GAS ASSISTANCE PROGRAM

The City's Gas Assistance Program (GAP) provides financial assistance to local residents who need help to pay heating bills. This fund supplements assistance that is available to many people under other programs and may be the assistance available for some residents who need help but do not qualify under the guidelines of other programs. In FY'18, the City has provided 110 households with over $21,241.78 in assistance. Contributions from area businesses and residents help to supplement the amount of money that is available for assistance. The FY'20 budget includes no new funding since there is sufficient funding in carryovers from prior years to fund the program in FY2020.

4.8 FY'20 REVENUE REQUIREMENTS

The FY'20 budget for the Gas utility totals $27,155,398. The table below shows the major categories of expenses.

Exhibit 38: Gas Utility FY'20 Revenue Requirements

Revenue Requirements	FY'20	%
Purchase of Gas (BP)	$11,008,930	40.5%
Operations and Maintenance	$8,907,410	32.8%
Payment in Lieu of Taxes	$3,981,395	14.7%
Infrastructure	$1,633,166	6.0%
Utility Billing and Meter Reading	$1,624,497	6.0%
TOTAL	**$27,155,398**	**100.0%**

4.8.1 Cost of Gas

The single largest cost of the gas utility is the purchase of gas from BP. The average cost per dekatherm is projected to be 12.6% higher in FY'20 than the current year.

Exhibit 39: Comparison of Cost to Purchase Gas FY'19 to FY'20

Revenue Requirements	FY'19	FY'20	$ Change	% Change
Purchase of Gas (ave. cost per dth)	$3.4739	$3.9111	$0.4372	12.6%

When setting the base rate each July 1, the City uses data from the preceding March 1 to project the cost. However, natural gas is a commodity that is traded daily and whose value fluctuates based on factors beyond the City's control (weather, politics, conflict, etc.). As noted above, the gas utility operates on a breakeven basis. To account for the fluctuation in gas prices, the City calculates a monthly Purchase Gas Adjustment (PGA) to adjust the base rate up or down. This ensures that utility is generating sufficient revenues to cover its costs and that customers are not being over- or undercharged.

4.8.2 City Operations Cost

Operations costs are projected to increase by $297,634 or 1.9% due primarily to increases in salaries and benefits costs. The Payment in Lieu of Taxes is based on a formula of 23% of prior year budgeted expenses less cost of purchasing gas. It is a payment from the utilities to the City's General Fund and represents the taxes the utilities would pay the City if they were a private company. Infrastructure cost are projected to go down due to lower debt service costs and reduced expenses for new construction.

Exhibit 40: Comparison of City Operations Cost FY'19 to FY'20

Revenue Requirements	FY'19	FY'20	$ Change	% Change
Operations and Maintenance	$8,555,898	$8,907,410	$351,512	4.1%
Payment in Lieu of Taxes	$3,577,427	$3,981,395	$403,968	11.3%
Infrastructure	$2,353,460	$1,633,166	-$720,294	-30.6%
Utility Billing and Meter Reading	$1,362,049	$1,624,497	$262,448	19.3%
TOTAL	**$15,848,834**	**$16,146,468**	**$297,634**	**1.9%**

4.9 PROPOSED GAS RATES

The City is projecting to collect $27,155,398 to operate the gas utility in FY'20. $25,106,998 is projected to be collected from gas rates through sales. Approximately $1.7 million of fund balance will be used for appropriate one-time expenses or projects which will provide benefits for multiple years.

Exhibit 41: Gas Rate Calculations

Revenue Requirement	FY'20
Purchase of Gas (BP)	$11,008,930
Operations and Maintenance	$8,907,410
Payment in Lieu of Taxes	$3,981,395
Infrastructure	$1,633,166
Utility Bill New Construction Projects	$1,624,497
TOTAL REVENUE REQUIRED	**$27,155,398**
Less Other Funding Sources:	
Fund Balance	$1,714,900
Rate Stabilization	$0
Other Revenue	$333,500
Subtotal	*$2,048,400*
Revenue to be Collected Through Rates	
Air Conditioning	$73,400
Transportation fees	$1,316,380
Firm Sales	$19,831,681
Interruptible Sales	$3,885,537
Subtotal	*$25,106,998*
TOTAL REVENUE TO BE COLLECTED	**$27,155,398**

The proposed gas rates for FY'20 are shown below compared to the rates adopted for FY'19.

Exhibit 42: Proposed FY'20 Gas Rates

	FY 19 (Adopted 7/1/18)	Proposed FY 20	$ Change	% Change
FIRM				
Customer Charge (Minimum)	$10.00	$10.00	$0.00	0.0%
First 3,000 Cu Ft, Per MCF	$8.3944	$9.0706	$0.676	8.1%
Next 3,000 Cu Ft, Per MCF	$7.8907	$8.5264	$0.636	8.1%
Next 144,000 Cu Ft, Per MCF	$7.0513	$7.6193	$0.568	8.1%
Over 150,000 Cu Ft, Per MCF	$6.8834	$7.4379	$0.55	8.1%
INTERRUPTIBLE				
Customer Charge (Minimum)	$60.00	$60.00	$0.00	0.0%
First 600 MCF, Per MCF	$6.1065	$7.3874	$1.28	21.0%
Over 600 MCF, Per MCF	$5.1210	$6.5720	$1.45	28.3%
Annual Minimum (MCF)	1,200	1,200		
AIR CONDITIONING				
All Gas Used, Per dth	$7.3471	$7.4271	$0.080	1.1%
GAS LIGHT				
Charge per Month	$17.51	$17.51		
TRANSPORTATION				
Small Volume Customer				
Monthly Service Charge	$150.00	$150.00	$0.00	0.0%
Rate per dth	$3.4853	$3.2293	-$0.256	-7.3%
Large Volume customer - 35,000 mcf/per month				
Monthly Service Charge	$600.00	$600.00	$0.00	0.0%
Rate per dth	$2.0379	$1.8842	-$0.154	-7.5%

4.10 IMPACTS ON CUSTOMERS

The table below illustrates the impacts of the proposed FY'20 rates customer's monthly bill at various usage rates. Note: applicable monthly service charges are included in the calculations.

Exhibit 43: Customer Impacts from Proposed FY'20 Gas Rates and Charges

FIRM CUSTOMERS		FY'19 (Adopted 7/1/18)	Proposed FY'20	$ Change	% Change
4,000	CU. FT.	$43.07	$45.74	$2.67	6.2%
4,600	CU. FT.[1]	$47.81	$50.85	$3.04	6.3%
20,000	CU. FT.	$157.57	$169.46	$11.89	7.5%
60,000	CU. FT.	$439.63	$474.23	$34.60	7.9%

1. Average residential customer.

INTERRUPTABLE CUSTOMERS		FY'19 (Adopted 7/1/18)	Proposed FY'20	$ Change	% Change
100,000	CU. FT.	$670.65	$798.74	$128.09	19.1%
500,000	CU. FT.	$3,113.25	$3,753.70	$640.45	20.6%
1,000,000	CU. FT.	$5,772.30	$7,121.24	$1,348.94	23.4%
2,000,000	CU. FT.	$10,893.30	$13,693.24	$2,799.94	25.7%

5 STORMWATER

5.1 OVERVIEW

The Stormwater Utility was created by City Council in 2013. The Stormwater Utility is the dedicated funding source for the City's Water Resources Protection Program (WRPP). The WRPP is designed to rehabilitate the City's aging stormwater conveyance system, comply with federal and state stormwater regulations, address drainage problems, and pursue environmental stewardship.

Charlottesville's stormwater conveyance system is integrated throughout the City's municipal boundary and consists of approximately 130 miles of pipe and 8,250 structures. The pipes range in age, size, and material type. Pipe materials include vitrified clay (VC), corrugated metal (CMP), reinforced concrete (RCP), ductile iron (DI), polyvinyl chloride (PVC), and high-density polyethylene (HDPE). The exact age of most pipes is unknown, but most are generally understood to be between 0-80 years old. The size of pipes in the system range from 4 to96-inches in diameter. Structures in the system include junction boxes, drainage inlets, and catch basins. Structures are typically constructed of brick, cinder block, precast concrete, or cast in place concrete.

The City owns and maintains the stormwater conveyance system located within the public street right-of-way, on City-owned land, and within City-held easements on private property. The City does not own or maintain the stormwater conveyance system owned by other public entities or that which is located on privately-owned land without an easement. Approximately 54% of the stormwater pipes and 28% of the stormwater structures within the municipal boundary are City-owned. The entire stormwater conveyance network ultimately discharges to local streams, rivers, drainage ways, floodplains, and low-lying areas. Approximately 13 miles of the stormwater conveyance system conveys streams that have been piped.

The combination of an integrated and co-mingled privately and publicly owned stormwater conveyance system that ranges widely in age, condition, and material type presents many challenges to infrastructure and asset management. The deterioration of both City and privately-owned stormwater infrastructure can cause many problems, including sinkholes, clogged pipes, and drainage and erosion issues. Pipes constructed of VC and CMP materials are often older and more prone to deterioration due to age and the natural lifecycle of these construction materials.

The rehabilitation, replacement, and repair of VC and CMP pipes and associated structures located in the City right-of-way and on City-owned parcels comprises much of the work of the Stormwater Utility. The City has also utilized Rehabilitation Program contractors to replace and rehabilitate stormwater conveyance infrastructure in the City right-of-way, under easement to the City, and in limited cases, in privately-owned conveyance systems. This work is performed to address deteriorating stormwater infrastructure and drainage issues. In addition, non-routine repairs are completed in a timely manner, as they arise, often in response to subsidence in and around City streets and sidewalks.

The Utilities Department also completes routine maintenance and repairs to the stormwater conveyance system. Materials are paid for with Stormwater Utility enterprise or capital funds, depending on the size and scope of the project. To date, approximately 10 miles of pipe have been rehabilitated (90% were VC and CMP), and 250 structures have been installed, rehabilitated, or replaced

at a cost of $7 million.

5.2 CREDIT PROGRAM AND CHARLOTTESVILLE CONSERVATION ASSISTANCE PROGRAM

The Stormwater Utility Fee Credit Program and Charlottesville Conservation Assistance Program (CCAP) were adopted by City Council in FY'14. The Credit Program is required by state law as a component of a municipal stormwater utility. Under the program, property owners who install and maintain structural stormwater management facilities which permanently reduce stormwater runoff and pollution may apply for and receive credit toward their stormwater utility fee. Credits range from 20%-100% minus one billing unit for the impervious area treated by the facility. The Credit Program is budgeted at $50,000 per year.

The CCAP is provided in partnership with the Thomas Jefferson Soil and Water Conservation District and provides a one-time cost share for property owners who install eligible water resources stewardship practices on their property (i.e., conservation landscaping, rain gardens, etc.). The cost share can reimburse homeowners up to 75% of the cost incurred for project implementation. For a description of the program and a full list of eligible practices, please go to: https://www.tjswcd.org/best-management-practices-homeowners/. The CCAP is budgeted at $32,000 per year.

5.3 FINANCIAL RELIEF PROGRAM

City Council adopted a financial relief program in February 2014 to assist homeowners who experience hardship in paying their stormwater utility fee. The program is budgeted at $25,000 per year and is paid from the General Fund. The program provides a reduction in the stormwater utility fee for residents who are eligible for at least 60% Real Estate Tax Relief, with the stormwater utility fee reduction matching the percentage received in real estate tax relief. The program also provides a 25% stormwater utility fee reduction for residents who are approved for the Charlottesville Housing Affordability Program (CHAP).

5.4 INFRASTRUCTURE

The Charlottesville Water Resources Master Plan was developed in 2016 and published in 2017. The goal of the Master Plan is to apply criteria to select and prioritize capital projects that improve water quality and/or resolve drainage issues. The final Master Plan is comprised of a drainage improvement capital improvement plan (CIP) and a water quality CIP.

Projects included in the drainage improvement CIP address a combination of historic and more recently identified drainage issues, while projects in the water quality CIP focus on the implementation of stormwater best management practices and facility retrofits designed to improve water quality. Projects were selected for the water quality CIP based on cost effectiveness and eligibility to provide pollutant reductions which the City can use toward meeting its Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan nutrient reduction requirements.

The City's TMDL Action Plan is a requirement of its Municipal Separate Storm Sewer System (MS4) discharge permit issued by the Virginia Department of Environmental Quality (DEQ). The Virginia DEQ has added the Action Plan as a requirement in order to meet statewide Chesapeake Bay regulatory obligations to the United States Environmental Protection Agency (EPA). The TMDL Action Plan is an addition to the minimum control measures the City has been required to implement since first being

issued a Phase II MS4 permit in 2003.

Stormwater Utility funds are also used to implement small to medium water quality and drainage improvement projects and to maintain select stormwater management facilities identified in the City's TMDL Action Plan.

The Stormwater Utility Capital Plan was adopted by Council when the Stormwater Utility Ordinance was approved in March of 2013. The first five-year Capital Plan for the Stormwater Utility covered the period FY'14–FY'18 and continued into FY'19. Moving into FY'20, the Stormwater Utility Capital Plan will be evaluated on a yearly basis, in conjunction with the utility rate development process.

Exhibit 44: Five-Year Capital Improvement Plan for Stormwater

Project	5 Year Total
Design/Permitting for Drainage/ Stormwater Improvement Projects	$1,000,000
Water Resources Master Plan	$250,000
Major Capital Drainage Improvement Project Construction	$7,350,000
Stormwater Quality Retrofit Project Construction	$1,000,000
Neighborhood Drainage Improvements	$250,000
Rehabilitation Program	$5,000,000
TOTAL	**$14,850,000**

5.5 NEW STORMWATER STAFFING NEEDS

In order to continue proper maintenance of the system and keep up with the increased workload of the Stormwater Utility, three (3) new positions will be created in FY'20. These new positions will make up and provide an additional maintenance crew. The positions will include:

- One (1) Motor Equipment Operator
- Two (2) Maintenance Workers

These positions will be responsible for the day-to-day routine maintenance of the stormwater conveyance system, as well as provide three additional personnel to the Department for on-call duties. The Utilities Department can move all operating expenses, including another four (4) positions currently funded by the General Fund, seven (7) positions in all, to the Stormwater Utility Enterprise Fund. This move is accomplished by reducing cash funding to the capital improvements budget in favor of low interest long term bond funding. In FY'20, cash funding to the capital improvement budget will be reduced from $1,220,000 to $550,000. This reduction represents a figure that is more in line with actual annual expenditures since the inception of the utility. The move also ensures adequate staffing is available to meet regulatory requirements established in the City's MS4 permit while maintaining a high level of service to the system.

5.6 REVENUE REQUIREMENTS

The total Stormwater Utility expenditures of approximately $3.289 million are not projected to increase from FY'19 to FY'20. The projected FY20 operating budget for the stormwater utility is -$835,384 less than the FY19 budget. In FY20, all operating expenses in the general fund associated with the Stormwater Utility will be transferred to the Stormwater Enterprise Fund. This change results in a reduction of cash funding to the Stormwater Capital Projects Program in favor of low interest long term bond funding. The level of service to City residents will be improved without requiring an increase to the stormwater utility fee.

Exhibit 45: Comparison of Stormwater Budgets FY19 to FY20

Revenue Requirements	FY'19 Budget	FY'20 Budget	$ Change	% Change
Salaries & Benefits	$344,503	$793,888	$449,385	130.44%
Other Expenditures	$318,453	$500,684	$182,231	57.22%
Capital Projects	$2,970,000	$1,500,000	($1,470,000)	-49.49%
Debt Service	$119,039	$119,039	$0	0.00%
TOTAL	**$3,751,995**	**$2,913,611**	**($835,384)**	**-22.35%**

5.7 PROPOSED STORMWATER UTILITY FEE FOR FY'20

The Stormwater Utility fee rate was adopted in March 2013 at $1.20/500 sq. ft. of impervious surface on a property per month. Infrastructure costs for the Stormwater Utility are paid through a combination of fee revenues and bond sales. No stormwater utility fee increase is forecast in the coming fiscal year as a result of stormwater operating expenses being transferred to the Stormwater Enterprise Fund, and the level of service provided to residents will be improved with the change and additional staff positions.

Exhibit 46: Proposed Stormwater Utility Fee Rate FY'20

	Current	Proposed FY'20	$ Change	% Change
STORMWATER (per 500 sq. ft. impervious area)				
	$1.20	$1.20	$0.00	0.0%

6 GLOSSARY

Base Rate – The gas rate as set each year as of July 1, consisting of budgeted operating costs and current wholesale gas prices; it is adjusted each month to reflect changes in the cost of wholesale gas through the PGA.

Basin – A geographical area of the City wastewater collection system.

Carry-over – the City Council directive by which unobligated funds remaining at the end of a budget year may be carried forward to the next budget year to cover costs.

CCTV – Closed circuit televising – Technology in which a camera, driven via remote control through the sanitary sewer, allows the operator to view blockages/breakages, etc., in the line and to schedule necessary maintenance accordingly.

Cubic foot – 7.48 gallons of water – The standard measure of water usage chosen by the City of Charlottesville.

Debt Service – The amount required to pay the annual principal and interest payments on long term debt, such as bonds.

Degree Day – The measure of relative heating requirements determined by subtracting the average temperature for the day from 65 degrees. The higher the number of degree days, the lower the temperature and, therefore, the higher the heating need.

dth – Dekatherm; a measurement of gas that is 1,000,000 BTU (British thermal units) of heat. A metered volume of gas (mcf) is converted by the thermal factor, which varies with the temperature, to a constant heat value (dth) for billing purposes. Both purchases and sales are measured and priced by dth.

Facility Fee – The charge that the City of Charlottesville imposes for a new water or wastewater connection for the proportionate share of use of the water and wastewater infrastructure capacity. The charge is made when there is no service provided to the area prior to the request or if the existing connection is smaller than is required.

Indirect Cost - Local governments have overhead and administrative costs essential to operating the government and providing services to the public. Examples include costs incurred for a city manager, human resources, financial management, and information technology. Although these services typically reside in the General Fund, they also support departments in other funds, such as utilities. The indirect cost associated with these services and then charged to other funds is calculated, typically annually, based on a standard methodology of cost allocation.

mcf – 1,000 cf; a volumetric measurement of water flows. One mcf of water is approximately 7,480 gallons.

NYMEX – New York Mercantile Exchange - The City purchases gas from its supplier based on closing

monthly prices from this exchange.

Payment In Lieu Of Taxes (PILOT) – An annual payment to the City's General Fund. The formula for water and wastewater used each year to calculate the amount of transfer is based on the prior year budgeted revenues from sales. The formula for gas is prior year expenses less cost of sales.

PGA – Purchased Gas Adjustment; the change in the annual base rate. It is calculated monthly to reflect the change in wholesale gas costs.

Rate of Return – The discount or interest rate that is used to calculate the maximum investment that the City will make to assess a potential gas line extension project, based on an expected flow of income.

Rate Stabilization – Money that has been set aside in prior years for the specific purpose of offsetting all or a portion of a potential utility rate increase.

Water Loss Factor – The difference between the amount of water purchased by the City from Rivanna Water and Sewer Authority for distribution and the amount that is billed to City customers. The loss may result from leaks, inaccurate meters, firefighting and other unmetered uses.

Working Capital – Current assets (cash and other liquid assets) less liabilities due within one year or net liquid assets available for use in current operations.

Working Capital Requirement – A formula used to calculate the amount needed to pay operating expenses for 60 days for water, wastewater, and for gas. This formula is used to ensure that there are adequate cash balances maintained to pay all obligations on time, without borrowing from the City's General Fund.