City of Charlottesville

Fiscal Year

2023 Utility Rate Report

Prepared by the Department of Finance and the Department of Utilities

Utilities
City of Charlottesville

1. EXECUTIVE SUMMARY

The purpose statement for the City of Charlottesville Department of Utilities (Utilities) is:

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

Utilities operates and maintains the water, wastewater, and natural gas systems. In addition, Utilities manages the Capital Improvement Program for the stormwater conveyance system. The goal of Utilities is to provide authorized service in a safe, reliable, responsive, and cost-effective manner.

Utilities supports 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, and debt service payments.

The billing and 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 are not supported by taxes. These budgets and the respective rates and charges are considered and adopted by the City Council in June of each year.

During COVID, the City received and distributed approximately $558,000 of utility bill assistance funds from ARP and CARES from the Commonwealth for utility bill assistance. CARES funds totaling $198,568 was distributed to 489 accounts. ARP funds totaling $359,879 were applied to 946 residential customer accounts.

A new and improved online bill payment service was launched in October 2021. Responding to feedback from the Customer Satisfaction Survey, Utilities now offers customers paperless billing, pay-by-text, and enhanced automatic payment options. These expanded bill pay services provide features that deliver convenient, secure, and environmentally friendly means to pay utility bills, and remain informed of account activity. Managed by Invoice Cloud, the new portal acts as the customer's account hub, giving them the ability to view and manage their utility account 24/7/365. More than 5,960 customers have already signed up for paperless billing, and have made the move to a simplified, secure, and resource conscious way to pay their utility bills. One account on paperless billing saves almost $6.00 per year, equaling to more than $35,000 in savings year to date.

In July of 2021, a Carbon Offset Program to offset 25% of the emissions associated with system-wide gas usage was added to the Greenhouse Gas (GHG) Reduction Program. Charlottesville Gas was motivated to take advantage of this globally recognized carbon reduction pathway in order to further align itself with the City of Charlottesville's climate action goals, which include a 45% reduction in citywide greenhouse gas emissions by 2030 and carbon neutrality by 2050. According to the 2019 City of Charlottesville GHG Inventory by Sector and Fuel Type Report (Released 2022), there has been a reduction of natural gas emissions in our community of 30% compared to the baseline emissions reported in 2011. This reduction is consistent with the City-wide GHG reduction.

The Department of Utilities has implemented an aggressive Capital Improvement Program (CIP) to address aging infrastructure. Prior to 2008, very little replacement or rehabilitation had been completed to address the issues relating to the utility systems, with the exception of the natural gas utility. As the City continued to grow in population and development continued to increase, it was recognized that not only did the utility infrastructure need increased capacity, but the systems also needed to be improved to ensure that public health would not be compromised and to alleviate property damage.

Although the four (4) utility systems have vastly different components and functionalities, they are all treated similarly in the respect that the Department of Utilities acts aggressively through the CIP to continue to improve the operability of the utilities. Without this aggressive approach, the systems could easily and quickly fall into disrepair, similar to the situation experienced prior to 2008, which is not in the best interest of the City of Charlottesville and its customers.

This section of the FY'23 Utility Rate 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

1.1.1 FY'23 Water and Sewer Rates

Based on the projected revenue requirements to operate and maintain each utility, the water and sewer rates for FY'23 (beginning July 1, 2022) are as follows:

Exhibit 1: Water and Sewer Rates for FY'23

Rates (per 1,000 cf)	FY' 22	Adopted FY'23	$ Change	% Change
WATER				
Summer	$70.08	$80.59	$10.51	15.0%
Winter	$53.91	$62.00	$8.09	15.0%
SEWER	$81.34	$83.80	$2.46	3.0%

1.1.2 Updating Water and Sewer Facility Fees to Align with Capacity of Meters

Water and sewer facility fees are based on the customer's water meter size, or the number of equivalent residential connections (ERC). The water and sewer facility fees are based on ERC or the flowrate that corresponds to a normal residential water meter. The base water meter size for the City is a 5/8-inch meter, and the water meter's capacity is considered one ERC, which is 20 gallons per minute (GPM). Larger water meters have greater capacity, and the water and sewer facility fees are correspondingly larger to reflect the greater capacity. In recent years, the City has begun using ultrasonic water meters. With the implementation of new ultrasonic water meters, it has been recognized that these meters, particularly larger than 2-inches, have greater capacity for the same size meter.

The table below reflects the previous facility fees and updated facility fees associated with each meter size.

Exhibit 2: Water and Sewer Facility Fees

WATER FACILITY FEES

Water Meter Size (Inches)	Previous ERC	Updated ERC	Previous Fee	Updated Fee	$ Change	% Change
⅝	1	1	$3,100	$3,100	$0	0.0%
1	2.5	2.5	$7,750	$7,750	$0	0.0%
1 ½	5	5	$15,500	$15,500	$0	0.0%
2	8	8	$24,800	$24,800	$0	0.0%
3	15	25	$46,500	$77,500	$31,000	66.7%
4	25	50	$77,500	$155,000	$77,500	100.0%
6	50	80	$155,000	$248,000	$93,000	60.0%

SEWER FACILITY FEES

Water Meter Size (Inches)	Previous ERC	Updated ERC	Previous Fee	Updated Fee	$ Change	% Change
⅝	1	1	$5,350	$5,350	$0	0.0%
1	2.5	2.5	$13,375	$13,375	$0	0.0%
1 ½	5	5	$26,750	$26,750	$0	0.0%
2	8	8	$42,800	$42,800	$0	0.0%
3	15	25	$80,250	$133,725	$53,475	66.6%
4	25	50	$133,725	$267,500	$133,775	100.0%
6	50	80	$267,500	$428,000	$160,500	60.0%

1.2 NATURAL GAS

The FY'23 revenue requirements for the gas utility is increasing 13.5%. The single largest expenditure for Charlottesville Gas is the purchase of natural gas from British Petroleum (BP), the City's wholesale supplier. The cost of natural gas for FY'23 has increased significantly over the last year. However, gas rates are projected to decrease for all natural gas customers In FY'23. For the average residential gas customer, gas rates are proposed to decrease 1.58%. The gas rates for all customer classes for FY'23 are as follows:

Exhibit 3: Gas Rates for FY'23

Customer Class	FY'22 (Adopted 7/1/21)	FY' 23 (Adopted 7/1/22)	$ Change	% Change
FIRM				
Customer Charge (Minimum)	$10.00	$10.00	$0.00	0%
First 3,000 Cu Ft, Per MCF	$8.9908	$8.8087	($0.18)	-2.03%
Next 3,000 Cu Ft, Per MCF	$8.5198	$8.3559	($0.16)	-1.92%
Next 144,000 Cu Ft, Per MCF	$8.0489	$7.9031	($0.15)	-1.81%
Over 150,000 Cu Ft, Per MCF	$7.5779	$7.4504	($0.13)	-1.68%
INTERRUPTIBLE				
Customer Charge (Minimum)	$60.00	$60.00	$0.00	0%
First 600 MCF, Per MCF	$7.2178	$7.0120	($0.21)	-2.85%
Over 600 MCF, Per MCF	$6.6937	$6.5125	($0.18)	-2.71%
Annual Minimum Usage (MCF)	1,200	1,200	0	0%
AIR CONDITIONING				
All Gas Used, Per DTH	$7.3471	$7.3471	$0.00	0%
GAS LIGHT				
Charge, Per Month	$17.51	$17.51	$0.00	0%
TRANSPORTATION				
Small Volume Customer				
Monthly Service Charge	$150.00	$150.00	$0.00	0%
Rate, Per DTH	$2.6462	$2.6287	($0.02)	-0.66%

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'22. No increase is proposed in FY'23. The Stormwater Utility fee is re-evaluated annually in conjunction with the budget development process.

Exhibit 4: Stormwater Utility Fee Rate FY'23

Rate (per 500 ft^2 of impervious area)	FY' 22	Adopted FY'23	$ Change	% Change
STORMWATER	$1.20	$1.20	$0.00	0.00%

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 for July 1, 2022.

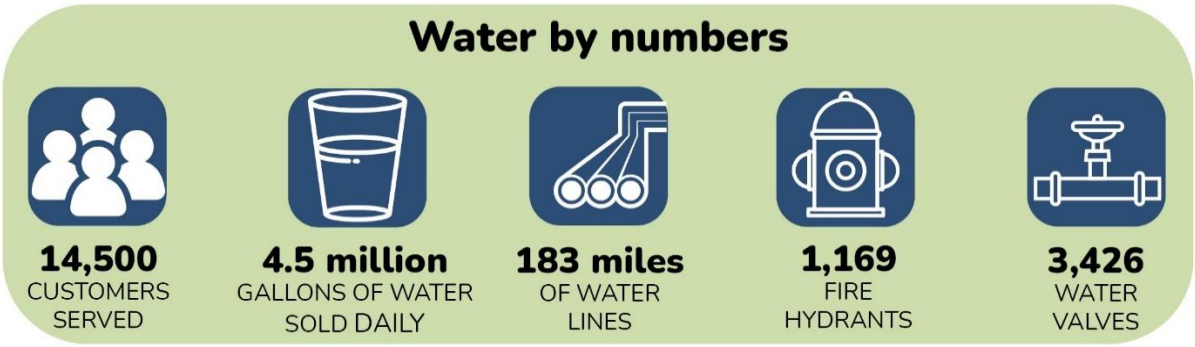
Exhibit 5: Impact of FY'23 Rates and Charges on an Average Customer

	Current Monthly Bill	FY'23 Monthly Bill	$ Change	% Change
Water	$29.76	$33.40	$3.64	12.2%
Wastewater	$38.04	$39.02	$0.98	2.6%
Gas	$50.60	$49.80	($0.80)	-1.6%
Stormwater	$5.86	$5.86	$0.00	0.0%
TOTAL	**$124.26**	**$128.08**	**$3.82**	**3.1%**

2. WATER

2.1 OVERVIEW

The City distributes potable water within its municipal boundaries and the University of Virginia. The City has approximately 14,500 water customers using 1.6 billion gallons of water annually or 4.5 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 1,169 fire hydrants and 3,426 water valves.



The City's water distribution system operates off of three (3) different pressure zones- the South Rivanna Pressure Zone, also known as the Urban Zone, the Lambeth Pressure Zone, and the Alderman Pressure Zone. These three zones have varying pressures based upon topography, incoming pressure available, and volume of flows needed in the areas. The hydraulic grade lines (HGL) of the three (3) zones vary- South Rivanna operates at 652', Lambeth operates at 750.5', and Alderman operates at 751'.

2.1.1 Customer Satisfaction Survey

In February 2022, the Department of Utilities conducted an online customer satisfaction survey to gain feedback about our services. Over 320 responses reflect high levels of satisfaction with the reliability, value, and safety of the services we provide. Among respondents, 99% are satisfied and neutral about the reliability of water service, with 95% of respondents rating the value of their water service as fair and above (good and excellent). Additionally, 95% of respondents are satisfied and neutral regarding the safety of their drinking water.

2.2 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 Albemarle County Service Authority (ACSA), the Rivanna Water and Sewer Authority (RWSA), the Virginia Department of Health (VDH), and the Virginia Department of Environmental Quality (DEQ) to ensure superior water quality.

2.2.1 Water Treatment

The Rivanna Water and Sewer Authority (RWSA) collects, stores, and treats the water. The City then buys the treated water and distributes the water through the 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-causingagents. 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 removed dissolved particles, such as dust, parasites, bacteria, viruses, and chemicals. As smaller, suspended particles are removed, cloudiness diminishes, and clear water emerges.

Granular Activated Carbon (GAC)

Treatment that removes man-made and naturally occurring contaminants that can impact taste and odor in the finished water. This treatment also removes organic chemicals or disinfection byproducts that are regulated by the Environmental Protection Agency.

Disinfection

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

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

2.3 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
- Perfluoroalkoxy alkane
- Chlorine

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

2.4 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. This 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. All new buildings are scrutinized during the design and permitting process to ensure the proper installation of backflow devices. Additionally, the Department of Utilities currently maintains inspection records for over 900 backflow devices to provide the highest quality water to the City residents. The Cross-Connection Plan is reviewed annually and updated if necessary to reflect changes to the Virginia Waterworks Regulations.

2.5 WATER CONSERVATION

The City of Charlottesville is focused on the management of the water distribution systems to reduce water loss, and partners with City customers to conserve water. Highlights of the Water Conservation Program (WCP) include the distribution of over 11,810 free indoor water conservation kits since 2008, the development and dissemination of guidance on how to find and fix leaks, water smart

information, and indoor water conservation information. Additionally, a low-flow toilet rebate program has supported the replacement of over 7,234 high consumption toilets since 2003, and a rain barrel rebate program that has issued 853 rebates since 2009.

The WCP continues to conduct an extensive public outreach campaign. Typically, this includes educational activities at summer camps, educating the public during Fix a Leak Week, and distributing water-saving information and promotional items at dozens of community events every year, such as Kid*Vention and the Westhaven Community Day.

COVID-19 significantly impacted the City's in-person water conservation program's outreach and engagement in FY'21. In response to the pandemic, the WCP pivoted from in-person events to virtual outreach events in FY'21. 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 WCP partners with community organizations including UVA Sustainability, Rivanna Conservation Alliance, the Local Energy Alliance Program (LEAP), Charlottesville City Schools, ACSA, and RWSA. In addition, the program has continued to be an active participant in the American Water Works Association (AWWA), the Alliance for Water Efficiency (AWE), and the EPA's WaterSense program. In 2021, the City of Charlottesville was recognized for water conservation efforts supporting the WaterSense program, receiving the 2021 Sustained Excellence Award; this is the highest honor given out by the WaterSense program and makes the seventh year in a row the program has received a WaterSense award.

In 2021, the City continued its focus on internal performance and efficiency through the City's Energy and Water Management Program. The WCP supports the water side of these efforts by managing the water usage of facilities managed by the City, educating staff and users of the facilities on how to be more efficient and reduce water usage, and supporting water efficient improvements.

A key partnership with Charlottesville City Schools continues to focus on how to make school buildings more efficient and encourage the staff and students to implement good saving behaviors.These efforts are in line with Charlottesville's work towards meeting the climate goals adopted in 2019 of reducing greenhouse gas emissions by 45% by 2030 and becoming carbon neutral by 2050. Learn more about the City's energy and water performance and program initiatives in the FY2021 Energy and Water Performance Report.

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

Exhibit 6: Water Conservation Activities

Program Initiatives	Description
Free Incentives: Water Conservation Kits, Toilet Flappers, and Other Resources	The WCP offered free water conservation kits to City residents. Kits include a WaterSense labeled showerhead, WaterSense labeled faucet aerators, and toilet leak detection dye tablets. These conservation kits were available for pick up at City Hall and at various public outreach events. In FY'21, only 10 water conservation kits were given out to the community (see note below). These materials are promoted heavily in billing inserts, paid advertising, and social media. • The City partnered with a local nonprofit, LEAP, to distribute fixtures that are included in the conservation kits during their Home Energy Check-Ups. The City provided LEAP with 300 bathroom aerators, 200 kitchen aerators, 100 showerheads, 100 toilet leak detection dye tabs, 10 toilet flappers, and 15 plumbing handbooks. • Water saving fixtures were provided to community groups to give out at various community events during the year. In FY'21, 100 toilet leak detection dye tabs, 50 bathroom aerators, 30 rain gauges, and 50 utility rebate brochures were provided to Rivanna Conservation Alliance to have at their annual Rivanna RiverFest event. • In FY'20, the program started to offer universal toilet flappers and a practical plumbing handbook to City residents. Toilet flappers were available at City Hall for pick up and the plumbing handbook was available upon request. These materials will be made available at community events in the future. • These free resources are marketed using billing inserts, social media, and paid advertising. *Note: In FY'20 due COVID-19, City Hall was closed, and customers were not able to pick up conservation kits and other free resources at City Hall.*
Water Conservation Education	• Through the Energy and Water Management Program and local partners, the WCP provided 400 toilet leak detection dye tablets and directions to check their toilet for leaks to the 5th grade class at Walker Upper Elementary in Climate Action Activity Kits for Earth Day. • Educational information provided on the Water Conservation website explains ways to save water and money for all types of water needs and usage. In FY'21, the water conservation page received over 5,500 page views.
Energy and Water Management Program andSchool Outreach	An Energy and Water Management Program (EWMP) was recently formalized to provide consistent tracking of internal municipal utility usage, research and review of facilities' performance, and implementation of various programs and initiatives aimed at energy and water management. • The EWMP published their FY'21 Energy and Water Performance Report detailing the actions that contributed to improve energy and water performance of municipal facilities. • In FY'21, the EWMP started the process of pursuing an energy saving performance contract, an alternative method for financing and implementing efficiency projects, for City facilities. • In FY'21, the EWMP started to work directly with Charlottesville City Schools to educate staff and students on saving energy and water at school (and at home). The program published quarterly educational materials with customized themes, tips, and messages. • In June 2021, the City was one of the winners in the 2020-2021 Better Business Challenge for improving energy and water performance and education at City managed facilities. • Summer 2020 – present, the EWMP developed quarterly student activity sheets that could be usedas students pivoted to online learning and utilize for in-person classes. Each activity sheet has students learn about the message and tips provided through a series of activities that can be applied at home and at school.
Water Conservation Community Outreach	• In FY'21, the WCP engaged UVA students through the University's Internship Placement Program, who worked on the City's EWMP including WCP initiatives. During COVID-19, these internships continued remotely.

Fix a Leak Campaign	To celebrate the national Fix a Leak efforts of the EPA WaterSense program, the WCP holds an annual fun run, the Fix a Leak Family 5K. Billing inserts, paid ads, radio ads, and social media focused on the importance of finding and fixing leaks in your home were also used to support the campaign. • In FY'21, Fix a Leak events were delivered in a virtual format due to COVID-19 and were focused for the entire month of March. Event participation was were made free to the Charlottesville and Albemarle County community. There were three events hosted by the City, Albemarle County Service Authority (ACSA), and Rivanna Water and Sewer Authority (RWSA). The Home Scavenger Hunt asked the community to get to know their water fixtures and check their homes for leaks by filling out a worksheet. The River Scavenger Hunt encouraged the community to head to the river to learn about their water supply and how to conserve water by walking along the Rivanna River and filling out a worksheet with missing information that was conveyed on yard signs. Lastly, the Virtual Fix a Leak Family 5K encouraged the community to "stop that running toilet" by going on their own 5K run and provided them with information on how to fix leaks.
Imagine a Day without Water Campaign	The WCP holds an annual art contest, co-sponsored with ACSA and RWSA, as part of the Imagine a Day without Water campaign. • In FY'21, the 6th annual Imagine a Day without Water Art Contest was held (even during COVID-19) asking youth to consider, "What Water Means to Me". The contest was modified to allow for easier submissions of art and relaxed rules. The contest had 120 art submissions and had 870 online votes to help select the fan favorite winner. Due to COVID-19, there were no in-person events, but winners were honored during a Cville360 TV segment and through an official City press release. • In FY'22, the 7th annual Imagine a Day without Water Art Contest asked youth to share why they "Love Our Water". The contest continued to support the community during COVID-19 by making it accessible, allowing full digital submissions and without in-person events. The contest had 224 art submissions and had 1,033 fan favorite online votes. Along with press releases, videos were developed to kick off the contest and announce the art contest winner.
Water-Wise Landscaping	The WCP put out 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. The program promoted WaterSense's "Sprinkler Spruce Up", "When in Drought", "Smart Irrigation", and other WaterSense outdoor campaigns and resources during the summer months. • In the summer of 2019, the program used a local TV's weather page (computer, tablet, app, phone) during the summer months to bring attention to being water smart outside.
Water Efficient Businesses	• The WCP provided businesses with specific information and resources on how they can save water. A free "Commercial Kitchen Water Use Efficiency and Best Practices Guides" has very relevant and current information on how commercial kitchens can save water and money. This literature is provided to City businesses upon request. • The program continues joint efforts with the City and Albemarle County Service Authority for the Carwash Certification Program.
Year-Round Ad Campaign: "Check, Twist, Replace" andSaving Water Indoors	The WCP runs yearly ad campaigns using social media, print, television, radio, and online ads to promote the EPA WaterSense sponsored water conservation campaign: "Check, Twist, Replace". This messaging encourages the community to find and fix leaks in their home and check out the City's water conservation rebates and incentives.
Social Media and #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 (#WTW). This initiative conveys important information, resources, events, and highlights about the program. • In FY'21, the WCP Facebook page had 123 posts, reached over 24,700 people, and saw over 865 engagements. The program also posts similar messages on the Twitter account, Charlottesville-A Green City Facebook Page, and Charlottesville-A Green City Instagram Page.

2.6 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 Toilet Rebate 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 labeled toilets use significantly less water and function as well as standard toilets, resulting in water (and dollar) savings every year. Residential customers may replace up to three (3) toilets at a given residence built before 1994. Commercial property owners may replace up to two (2) toilets and receive up to $80 per replacement. Owners of multi-unit apartment complexescan replace two (2) toilets per unit. A special program targeted at toilet retrofits for large multifamily properties was started in 2011. Since then, over 17 apartment buildings have received rebates to replace their high consumption toilets. Low flow WaterSense labeled toilet rebates issued in FY'20 totaled 177 and 156 in FY'21. The total number of toilet rebates issued to date is 6,547, saving the City a cumulative 60 million gallons of water. Rebates are marketed using social media, e-newsletter and paid advertising. The following chart shows the participation in the toilet rebate program for the past 15 years.

Exhibit 7: Participation in Toilet Rebate Program since 2007

Fiscal Year	# of Customers	# of Rebates	$ Rebated	Average Rebate/Customer
2021	116	156	$15,428	$133
2020	136	177	$17,696	$130
2019	178	247	$24,092	$135
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 is aimed at encouraging City homeowners to use harvested rainwater for outside uses like washing a car, watering plants, and irrigating landscapes. The program provides upto two (2) $30 rebates for rain barrels purchased per service address. The City has provided 795 rebates since the program started in FY'09 including 35 rebates in FY'19 and 26 rebates in FY'20. The City promotes rain barrel workshops and opportunities offered by community partners, such as the Thomas Jefferson Soil and Water Conservation District (TJSWCD). Rebates are marketed using billing inserts, social media, and paid advertising.

2.7 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'20, 53 customers benefited from the WAP receiving a total of $5,248. In FY'20, 43 customers received a total of $5,531. The water budget for the next fiscal year includes $10,000 for WAP. The WAP also has funds ($15,694) available from previous fiscal years. Comparable assistance is available in the wastewater fund through the Wastewater Assistance Program (WWAP).

2.8 WATER INFRASTRUCTURE ASSET MANAGEMENT

The City's water distribution system contains 183 miles of water main 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. The majority of the 16.5 miles of water main are galvanized steel, several decades old, and serve multiple customers. Not only can the water mains be severely corroded but they can often result in low pressure and significantly reduce the quality of service to customers. The system also includes 1,169 fire hydrants and 3,426 water valves.

2.8.1 Water Distribution System

In 2010, the Department of Utilities determined that the water distribution system needed major attention and remediation for deficiencies. These deficiencies included: water main breaks, low water pressure, poor water quality, insufficient fire flow, and fire hydrant placement not within standards. After a comprehensive analysis of the system was completed, the development of 45 projects (known as the Priority List) was created. These projects would replace or rehabilitate existing water mains and install new water mains to create loops within the system to eliminate the deficiencies.

In order to determine project prioritization, criteria were used and a ranking number system developed and applied to all projects. The criteria were categorized into the following groups:

1. Physical Consideration criteria assesses the integrity of the pipes which comprise the water system.
2. System Consideration criteria addresses water quality, pressure, and fire limitations within the water system.
3. Environmental/Historic Consideration criteria addresses natural conditions which may be impacted by a construction project.
4. Public Impact criteria assesses the potential disruption to City residents.
5. Planning criteria assesses the potential to incorporate construction projects into areas to be developed within the City.
6. Area Construction criteria evaluates the potential to incorporate proposed construction projects into areas to be developed within the City.
7. Cost/Benefit Ratio assesses the cost required to achieve the overall benefit for the improvement.

Each of the criteria was evaluated as to its importance versus the other criteria. A weighting valuewas given to each criteria. The weighting values ranged from 10 being the most important to 1 which was least important. The following is a summary of the weighting values and associated criteria:

Weighted Value	Criteria
10	Water Quality Issues, Low Fire Flow
8	Water Main Breaks
7	Water Age
6	Paving, Sewer Main Replacement, Cost/Benefit Ratio
5	Low Pressure
4	Traffic, Location
2	Wetlands, Natural Landmarks, Development Area
1	Service Line Repairs

In order to achieve success, the Department created a contract with over 200 individual bid items representing water system components to address the initial list of projects. Examples of these bid items include various sizes of pipe, fittings, valves, meters, services, fire hydrants, and site restoration.

In 2011, the Annual Water System Contract was awarded and construction began. Contractors were required to provide two (2) crews which would work simultaneously on the projects. Contractors were provided the list of projects, but no specific designs as to the extent of the projects. The annual contract was awarded with the potential for two (2) single-year renewals. Since this initial contract, there have been four (4) contracts awarded over 10 years with achievements and lessons learned every year and from every project.

This Priority List has had several iterations over the past 11 years and the Department has seen 101 completed projects totaling over 98,596 linear feet (LF) (18.67 miles) of water mains replaced. This equates to 10.2% of the entire water system being replaced under this contract. To complete these projects, the Department has spent $23,613,949 to date with an average of $2,043,454 being spent in a contract year. It is the intent of the Department to average approximately two (2) miles of main replacement per year which equates to an average of approximately $257 per linear foot of pipe installed.

In the current contract year, at $257/LF, at the expected footage of pipe installed, which is two (2) miles, the construction budget for this project would be $2,713,920. However, past contracts have varied between $1,542,768 and $2,817,456 per contract year. This value can change depending on the size and location of projects, weather, and unknowns that are encountered during construction.

As part of looking at the water system as a whole, there are some projects that need to be bid separately from the Annual Water System Contract. The earliest project that was bid separately was a 12" water main extension in Jefferson Park Avenue. The area from Maywood Lane to Monroe Lane was served by a single 6-inch main and was severely under capacity for the area it served. The contract included 1,500 feet of 12, 8, and 6-inch ductile iron water main installation. The project was completedat a contract price of $369,673.

The second standalone project that has been completed was the Emmet Street/Ivy Road Water Main Replacement. Two (2) 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 used a combination

of two (2) methods to replace the two (2) existing lines – pipe bursting and open trenching.

Where feasible, one (1) 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 closed 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 was installed by the open trenching method. Upon completion of the project, one (1) 8-inch line replaced the parallel 6-inch lines from McCormick Rdto St. Anne's Belfield. The final project construction cost was $2,329,943.

Another completed standalone project was the 18" West Main Street Water Main Replacement. The project began construction in October 2019 and was completed in April 2021. The project description was to replace an existing 18-inch water main that is a major feed to the City. The new line was installedin West Main Street from 9th Street SW, turned south on Roosevelt Brown Blvd, and connected to the existing line at Grove Street. The final project construction cost for the project was $1,149,797.

An additional completed standalone project was the Rugby Road Water Meter Replacement/Gentry Lane Water Main Installation, Phases 1 and 2. The first phase of the project consisted of installing 1,300-feet of 8-inch water main in Gentry Lane from the intersection of Dairy 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 total construction costs for Phase 1 were $533,174. The second phase, which consisted of 1,300-feet of 8-inch water main from Greenleaf Lane to the northeast intersection of Dairy Road and Gentry Lane, was completed in the summer of 2018. The total construction costs for Phase 2 were $226,188.

Currently there are three (3) other standalone projects that will be completed by the Department in coming fiscal years. They are as follows:

Rugby Road Water Meter Replacement/ Gentry Lane Water Main Phase 3 Installation
Currently there are two (2) water mains (one (1) 12-inch and one (1) 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 main to the larger water main. This will allow for the smaller water main to be abandoned reducing the maintenance needed in Rugby Road. This phase of the project is intended to be constructed in the fall of 2023. This final phase of the three (3) phase project has an estimated construction cost of $475,000.

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 Public Works and the Rivanna Water and Sewer Authority on the design. This project is currently being designed with a construction date of FY'23 and has an estimated cost of $1,780,000 for construction.
Locust Avenue Water Main Replacement

Locust Avenue from East High Street to Locust Lane is served by an approximately 1.2 mile 6-inch water main installed in 1924. The water main has experienced many breaks over the years. In addition, suspended from the bridge which spans Route 250 are two 6-inch water mains. One of the water mains has been abandoned since its support has failed. The project has been divided into two phases. The first phase consists of installing an 8-inch water main from East High Street to the Route 250 Bridge. The estimated construction cost of Phase 1 is $1,975,000 with an anticipated start in the summer of 2023. Phase 2 consists of installing an 8-inch water main from the Route 250 Bridge to Locust Lane, and replacing the two 6-inch water mains under the bridge with new supports. The estimated construction cost of Phase 2 is $2,783,000 with an anticipated start of the summer of 2024.

While the Department has several large projects and programs underway that address water mains, the water services are still a focus for replacement. Most of the City's water services (the pipes 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 water service replacement program as part of the upgrading and replacement of water mains. To date, approximately 9 miles (47,513 linear feet) of water service lines have been replaced.

2.8.2 Lambeth Field Pump Station

The Department owns and operates one (1) pump station- the Lambeth Field Pump Station (LFPS). The LFPS is located adjacent to Rugby Road and provides water to a closed-loop high pressure zone. The pump station is designed to provide a firm capacity of 3.38 million gallons per day (MGD) and is currently outfitted with two (2) 0.65 MGD low capacity pumps and one (1) 2.2 MGD high capacity pump. The pump station also has a natural gas back-up high capacity pump that is capable of handling the 3.38 MGD firm capacity. The natural gas pump was installed since the City operates the natural gas utility and natural gas was readily available to the pump station. The zone that the LFPS services is known as the Lambeth Pressure Zone and consists of the northern halves of the Venable and Barracks/ Rugby Neighborhoods. This pressure zone serves approximately 800 connections and provides fire protection to the area.

In 2009, the City recognized that this pressure zone was inadequate and unreliable, especially when a power outage occurred at the LFPS. When electrical power was lost, City crews would operate isolation valves between the Lambeth Pressure Zone and the South Rivanna Pressure Zone to allow water to bleed into the Lambeth Zone. This not only caused discolored water issues, but it also put the zone at high-risk due to low pressures and low fire flows.

The Department made the decision to evaluate the Lambeth Pump Station to address the known deficiencies. Upon review, there were several upgrades that needed to occur to provide safe drinking water and fire flows to the pressure zone. In addition to the mechanics of the pump station, the building also needed upgrades to provide structural integrity and longevity.

In 2011, after approval from the Virginia Department of Health (VDH), the Department issued an IFB for construction services. The contract was awarded and the following improvements were made:

- Supervisory Control and Data Acquisition (SCADA) and pressure transducers installed allowing the Department to track trends, water flows, pressure drops;
- An Autodialer was installed to alert the Department of any issues, including pressure drops or power failures;
- Building improvements including installing security fencing and lighting, installing interior lighting and repainting, and door, window, and roof replacement; and
- Installation of Variable Frequency Drive (VFD) motor-driven centrifugal pumps to control flows for energy and cost savings at times of decreased demand.

The upgrade was completed in 2012 and the total construction cost was $442,000.

In 2021 the Department evaluated the SCADA System and decided, along with needed exterior improvements, replacement of the programmable logic controller (PLC) was required. A project was designed that included the following:

- Replacement of the PLC and rewiring to control the natural-gas powered pump;
- A concrete pad in from of the exterior electrical panels;
- An aluminum canopy over the electrical panels and concrete pad;
- Drainage structures and piping.

The project was advertised and construction will occur during the summer of 2022 for a contract price of $305,000.

2.8.3 Water Loss Management

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), 6 leaks were detected and repaired during the 2020 testing, resulting in an estimated loss of 141,120 gallons per day through various methods. The yearly leak detection survey was performed again in 2021 with 13 leaks being found with an estimated total loss of 534,240 gallons per day. The City aims to respond and repair leaks expeditiously to minimize water loss and service impacts. Leak audit surveys were completed in 14 of the past 16 years and will continue annually. The next survey is scheduled for fall 2022 and will be consistent with past years covering 100%of the distribution system.

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 – 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, 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. Using this data, the Department tests 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.

Furthermore, the Department is addressing the need to replace large meters (1.5-inch and larger) through a Large Meter Replacement Program. Through this program, the Department has issued three (3) contracts since 2014 in an effort to install all of the large meters through the City in meter setters and vaults that are easily accessible for maintenance and testing purposes. Similar to the Annual Water System Contract, the contract has over 200 individual bid items representing water system components, and has an annual budget of $750,000 per year.

To date, the program has replaced 323 water meters since its inception in 2014. The success of the program has led to increased momentum with the focus now shifting from 1.5" and 2" meters to the larger, more complicated 3" and 4" meters. The latest replacement contract was awarded in 2021 and a total of $2,762,978 has been spent on upgrading the infrastructure.

As part of the meter replacement program, the City is evaluating customer consumption to verify thatthe 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.

The current capital projects in the City's five-year capital plan are listed below. The costs include construction and professional services. The City updates its capital plan annually.

Exhibit 8: City Five-Year Capital Improvement Plan for Water

Project	Five-Year Total
Water Line Replacement (Annual Service Contract)	$5,000,000
Water Meter Replacement	$2,500,000
Large Waterline Replacements Projects	$2,500,000
TOTAL	**$10,000,000**

2.9 RIVANNA WATER AND SEWER AUTHORITY

The 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 $7,675,600 for FY'23 including operations costs and debt service for infrastructure. This is a proposed increase to the City of 11.9% ($815,300) over the approved FY'22 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.

2.9.1 Infrastructure

RWSA's Capital Improvement Plan (CIP) for water for Fiscal Years 2023-2027 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, capital projects were very near completion or are no longer needed, and as such are being removed from the FY'23-FY'27 CIP. These projects include:

- Sugar Hollow Dam Rubber Crest Gate Replacement

The total five-year CIP for water is approximately $64.77 million. This includes projects already in previous CIPs which have been modified, as well as new projects.

Exhibit 9: RWSA Water Infrastructure Projects to Serve City

Project	FY'23-FY'27 Total (millions)
Ragged Mountain Reservoir to Observatory WTP Raw Waterline	$16.53 M
Ragged Mountain Reservoir to Observatory WTP Pump Station	$8.63 M
South Rivanna to Ragged Mountain Reservoir Raw Waterline – Birdwood to Old Garth	$1.81 M
South Reservoir to Ragged Mountain Intake Facilities	$2.90 M
Observatory WTP Improvements	$5.45 M
Central Waterline	$22.16 M
Emmet Street Betterment	$1.90 M
South Rivanna Water Treatment Plant Improvements	$2.80 M
North Rivanna Water Treatment Plant Decommissioning	$2.04 M
TOTAL	**$64.22 M**

2.9.2 Actual Water Flows

The City portion of Urban Area operation rates and charges are based on water usage or flows. The estimated flows for the City remain the same at 49% for the FY'23 budget.

Exhibit 10: RWSA Water Usage Allocation

	FY'22	FY'23	% Change
City	49%	49%	0%
ACSA	51%	51%	0%

2.9.3 City Share of RWSA Water Costs

The FY'23 budget increases the budget by $511,300 in operating expenses and an increase of $304,000 in debt service charges for a total budget increase of approximately $815,300, or 11.9% above the FY'22 budget. RWSA's costs to the City for water are:

- $2.653 per 1,000 gallons for operating expenses.
- $271,527 per month for debt service charges.

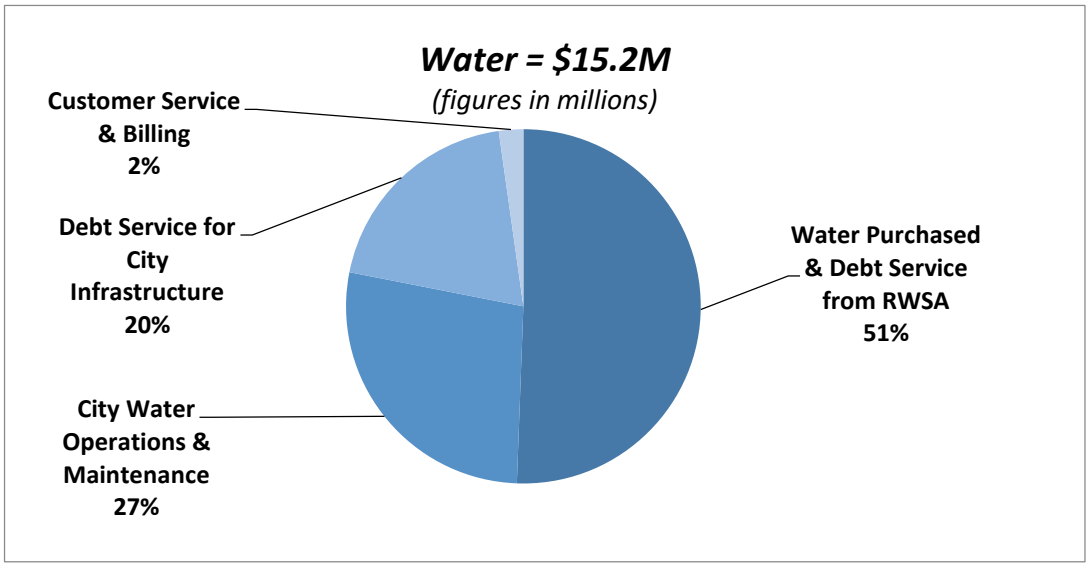
2.10 REVENUE REQUIREMENTS

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 tobe collected from customers).

2.10.1 Current Revenue Requirements (FY'23)

The FY'23 revenue requirements for the water utility totals $15,172,395. The graphic below shows the major categories of expenses, the largest being the purchase of water and debt service from RWSA (51% of the FY'23 budget).

Exhibit 11: Water Utility FY'23 Revenue Requirements



The revenue requirements for the water utility are $1,267,466 (9.1%) higher than the current year. Debt service includes payments on existing bonds and new bonds to be issued by the City to finance the utility's capital improvement plan. Excluding water purchase from RWSA and debt service, the cost to operateand maintain the water utility is increasing by approximately $198,000.

Exhibit 12: Comparison of Water Revenue Requirements FY'22 to FY'23

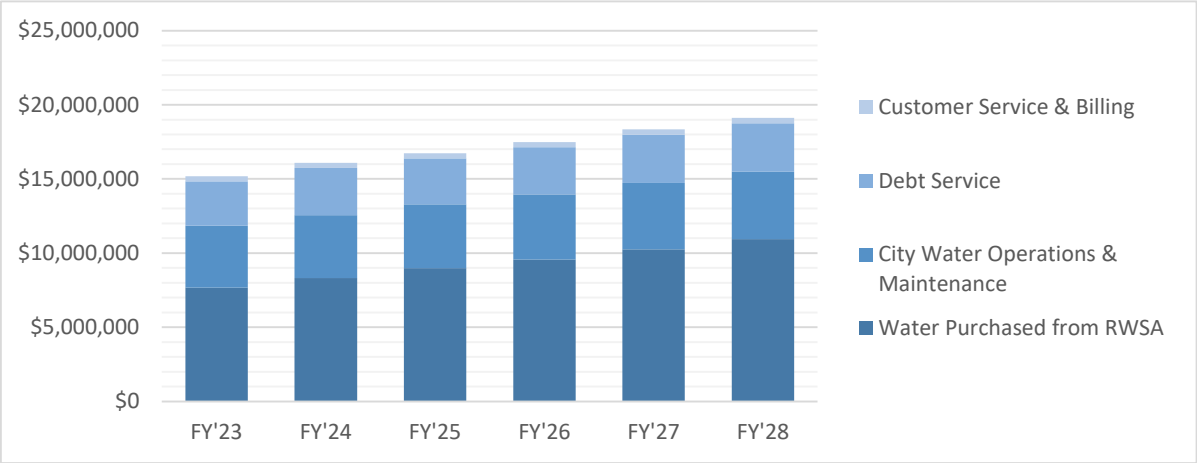
Revenue Requirements	FY'22	FY'23	$ Change	% Change
Water Purchased & Debt Service from RWSA	$6,860,300	$7,675,232	$814,932	11.9%
City Water Operations & Maintenance	$4,008,030	$4,172,730	$164,700	4.1%
Debt Service for City Infrastructure	$2,731,683	$2,986,050	$254,367	9.3%
Customer Service & Billing	$304,916	$338,383	$33,467	11.0%
TOTAL	**$13,904,929**	**$15,172,395**	**$1,267,466**	**9.1%**

2.10.2 Projected Water Revenue Requirements (FY'23 – FY'28)

To project operating expenses for FY'23-FY'28, the FY'23 water revenue requirements are escalated using historic averages 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 plansto issue bonds to fund its water CIP.

The revenue requirements for FY'23 through FY'28 are shown below. The average annual increase is 4.7%.

Exhibit 13: Projected Water Revenue Requirements FY'23-FY'28



2.11 CUSTOMERS AND USAGE

The City currently provides water service to just over 14,800 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 (94.2%).

Exhibit 14: Current Water Customers by Meter Size

Water Meter Size	# of Customers	% of Customers
5/8	13,954	94.2%
1	298	2.0%
1.5	259	1.8%
2	237	1.6%
3	41	0.3%
4	15	0.1%
6	1	0.01%
14	1	0.01%
TOTAL	**14,807**	

The exhibit below provides a projection of water usage for the upcoming fiscal year in cubic feet.

Exhibit 15: Projected FY'23 Water Usage

Usage	Cubic Feet
Projected FY'23 Total	190,350,019

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 and water usage; thus, no growth is factored into the planning period.

2.12 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 is no change to the monthly services charge for FY'23.

Exhibit 16: Monthly Service Charge for FY'23 for Water

Water Meter Size (inches)	Monthly Service Change
5/8	$5.50
1	$13.75
1.5	$27.50
2	$44.00
3	$88.00
4	$137.50
6	$275.00
14	$1,801.25

2.13 Updating Water Facility Fees to Align with Capacity of Meters

Water Facility Fees were developed and established for the City in 2008. Facility fees are one-time charges levied to offset existing or planned future capital costs necessary to meet the service needs of City water customers. These fees are assessed when new water service is requested where none has previously been provided, or an increase in capacity where service already exists, water facility fees are charged for this new increased demand for system capacity.

Water facility fees are based on the customer's water meter size, or the number of equivalent residential connections (ERC) and are detailed in Chapter 31 of City Code. The original 2008 water facility fees were based on an ERC or the flowrate that corresponds to a normal residential water meter. The base water meter size for the City is a 5/8-inch meter, and the water meter's capacity is considered one ERC, which is 20 gallons per minute (GPM). Larger water meters have greater capacity, and the water facility fees are correspondingly larger to reflect the greater capacity. For example, a 2-inch water meter has 8 times the capacity of a 5/8-inch water meter, therefore the ERC for a 2-inch water meter is 8. In 2013, the City increased the facility fees per ERC to more accurately reflect the actual cost to provide increased system capacity for new development.

In recent years, the City has begun using ultrasonic water meters. Ultrasonic water meters have no moving parts, are more accurate, and are less susceptible to mechanical failure. Previously, the City utilized positive displacement meters which rely on moving parts that can wear out. With the implementation of new ultrasonic water meters, it has been recognized that these meters, particularly larger than 2-inches, have greater capacity for the same size meter. For example, a 3-inch ultrasonic meter provides the same

capacity as a 4-inch positive displacement meter.

The exhibit below illustrates the changes to the ERC values and water facility fees for meters 3-inches and larger.

Exhibit 17: Water Facility Fee Changes for FY'23

Water Meter Size (Inches)	Previous ERC	Updated ERC	Previous Fee	Updated Fee	$ Change	% Change
⅝	1	1	$3,100	$3,100	$0	0.0%
1	2.5	2.5	$7,750	$7,750	$0	0.0%
1 ½	5	5	$15,500	$15,500	$0	0.0%
2	8	8	$24,800	$24,800	$0	0.0%
3	15	25	$46,500	$77,500	$31,000	66.7%
4	25	50	$77,500	$155,000	$77,500	100.0%
6	50	80	$155,000	$248,000	$93,000	60.0%

Of note, the new ultrasonic 5/8 inch water meters do have a slightly greater capacity of 25 GPM compared to the old positive displacement meters that had a capacity of 20 GPM. As the original ERC was based on 20 GPM, the City is not changing the base flowrate per ERC or the facility fee per ERC. Meters 2-inches and smaller retain the same facility fee for both water and sewer; only larger meters have larger fees based on their significant increase in capacity.

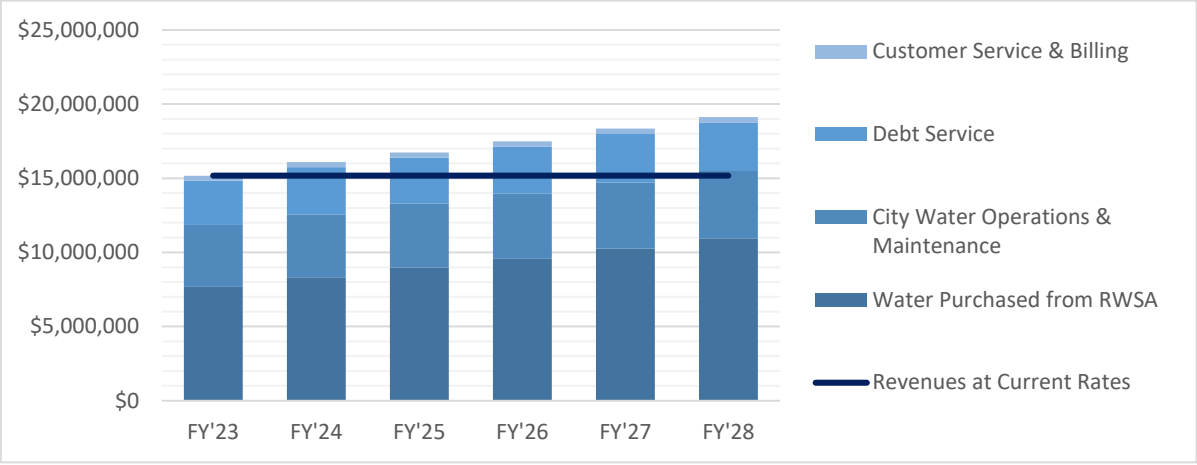
2.14 WATER RATES

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 following exhibit, current water rates are not enough to meet the projected revenue requirements.

Exhibit 18: Water Revenue Requirements and Revenue at Current Rates



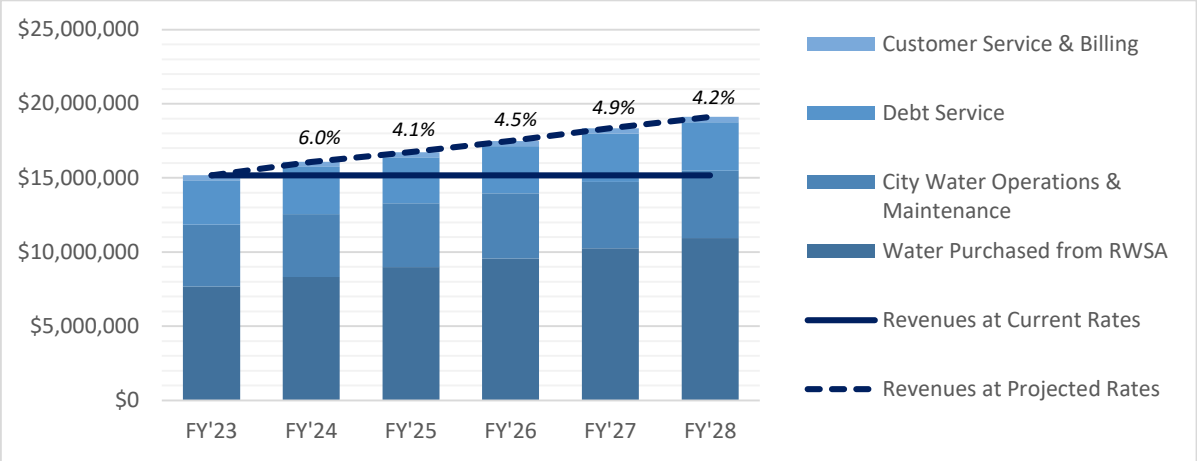
2.14.2 Revenue Projections at Current and Projected Rates

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 enoughto 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 new rates forFY'23 and the years of the planning period for water.

Exhibit 19: Water Revenue Requirements, Revenue at Current Rates andRevenue at Projected Rates



2.14.3 Water Rate Design

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

2.14.4 Water Rates FY'23

Water rates are recommended to increase by 15.0% for FY'23.

Exhibit 20: Water Rates FY'23

Rates (per 1,000 cf)	Previous	New	$ Change	% Change
Water – Summer	$70.08	$80.59	$10.51	15.0%
Water – Winter	$53.91	$62.00	$8.09	15.0%

2.14.5 Projected Water Rates FY'24-FY'28

Based on the projected revenue requirements for FY'24-FY'28 and customer usage, the projected water rates for this planning period are shown below.

Exhibit 21: Projected Water Rates FY'24-FY'28

			----------PROJECTED----------				
	FY'22	FY'23	FY'24	FY'25	FY'26	FY'27	FY'28
Summer	$70.08	$80.59	$85.41	$88.92	$92.89	$97.44	$101.55
Winter	$53.91	$62.00	$65.71	$68.40	$71.46	$74.96	$78.12
Summer $ Change		$10.51	$4.82	$3.50	$3.98	$4.54	$4.11
Summer % Change		15.0%	6.0%	4.1%	4.5%	4.9%	4.2%
Winter $ Change		$8.09	$3.71	$2.70	$3.06	$3.50	$3.16
Winter % Change		15.0%	6.0%	4.1%	4.5%	4.9%	4.2%

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.

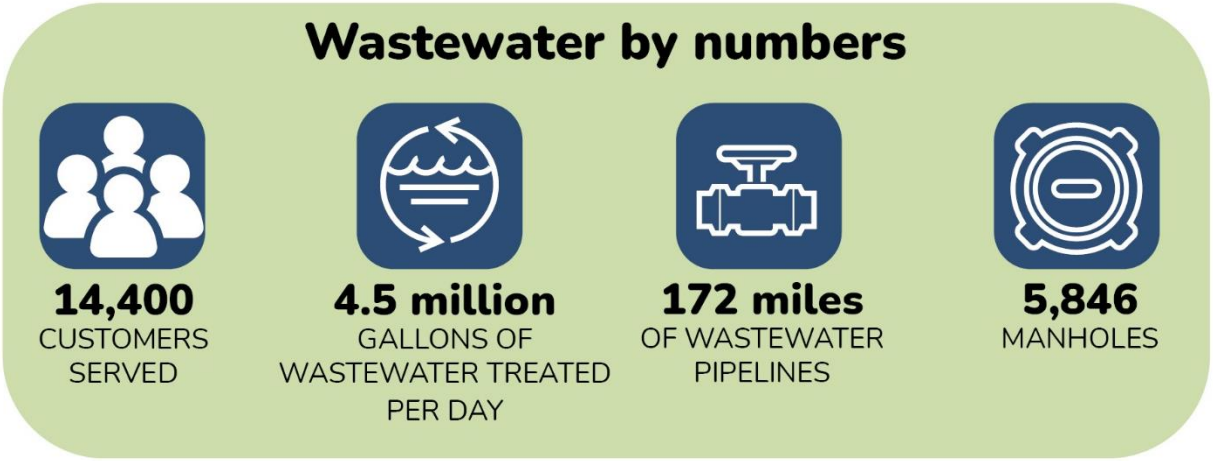
Exhibit 22: Customer Impacts at FY'23 Water Rates and Charges

Water Meter Size	Water Median Usage/Month (cf)	FY'22 Avg. Monthly Bill	FY'23 Avg. Monthly Bill	$ Increase	% Increase
5/8	400	$29.76	$33.40	$3.64	12.23%
1	1,760	$120.49	$136.50	$16.01	13.29%
1.5	3,410	$234.31	$265.32	$31.02	13.24%
2	5,680	$388.48	$440.14	$51.66	13.30%
3	11,750	$800.61	$907.48	$106.88	13.35%
4	43,720	$2,789.01	$3,186.68	$397.67	14.26%

3. SEWER

3.1 OVERVIEW

The City operates and maintains the sanitary sewer collection system within its boundaries which consists of about 172 miles of pipe and 5,846 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 (1.8 billion gallons per year or 4.5 million gallons per day) join flows from Albemarle County and empty into RWSA interceptors. These combined flows are carried to RWSA's Moores Creek Advanced Water Resource Recovery Facility.



3.1.1 2022 Customer Satisfaction Survey

Results of the 2022 Utilities Customer Satisfaction Survey show high levels of satisfaction with the reliability and value of our wastewater services. Of those surveyed, 99% are satisfied and neutral about the reliability of wastewater service, and 92% of respondents rate the value of their wastewater service as fair and above (good and excellent).

3.2 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.

3.3 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'23 in combination with existing funds ($27,152) to allocate to the WWAP. Fifty-four customers received assistance in FY'20, totaling $5,431. In FY'21, 43 customers received $5,530 from the WWAP. This program will continue to operate in conjunction with the WAP. The program is administered by the Utility Billing Office in a similar fashion as the established Gas Assistance Program (GAP).

3.4 WASTEWATER INFRASTRUCTURE ASSET MANAGEMENT

The City has several challenges within the sewer collection system, such as 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. In 2008, the Department of Utilities began planning and budgeting for a substantial long-term sewer system evaluation and rehabilitation program. The need for such a program arose to address the system as it continued to age and deteriorate. This deterioration allows for infiltration and inflow (I/I) to enter the sewer system. 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. I/I causes sanitary sewer overflows (SSOs) and increasing costs from unnecessary wastewater treatment, root intrusion causing blockages, partial to full collapses of pipe, and increased emergency repair situations. Since there was only operational maintenance performed to keep the system "working" and very little work completed towards system-wide improvement, a large backlog of difficult work was produced. In order to address the backlog, and to keep this situation from continuing to happen, the Department created a rigorous rehabilitation program.

3.4.1 Sanitary Sewer Rehabilitation

In 2009, the City awarded a multi-year, multi-million dollar contract utilizing a "find-and-fix" approach for sewer repair and rehabilitation. The 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. 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 rehabilitation work needed within seven (7) days. The work is fast-paced and allows for emergency situations to be addressed within 48 hours. The City estimates savings of exceeding $5 million following this find-and-fix approach as well as taking half the time to complete a project compared to the traditional design-bid-build process.

To date, under this contract, the Department has completed:

- 517,561 linear feet (LF) (98.0 miles) of CCTV
- 229,727 LF (43.5 miles) of CIPP, 6" to 21" in diameter
- 22,107 LF (4.2 miles) of pipe replacement, 6" to 18" in diameter
- 234 point repairs
- 5,575 vertical feet (VF) (1.1 miles) of manhole rehabilitation
- 199 manhole replacements
- 589 frame and covers replaced

In order to complete this amount of work, the Department has issued five (5) contracts over 13 years and spent a total of $22,236,632 on construction. The footage of pipe rehabilitation or replacements completed to date totals 251,834 LF, or 47.69 miles, which equates to 27.7% of the City's total system.

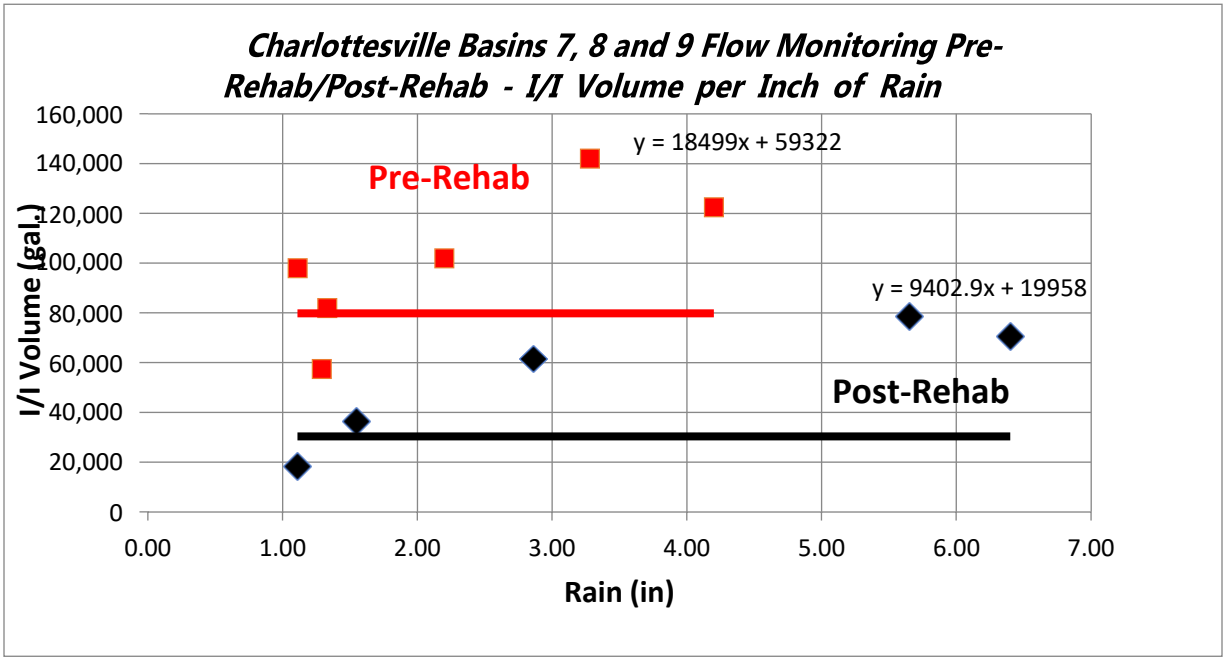
As stated above, approximately 27.7% of the sanitary sewer system has been rehabilitated or replaced, and two (2) basins have had comprehensive rehabilitation. The remaining 22 sewer basins have all had rehabilitation performed which has addressed major defects. As the program continues, we will work through the City for comprehensive rehabilitation through all 24 basins.

The rehabilitation program will continue into FY'23 utilizing available proceeds from the previous bond issues to fund the needs in the upcoming fiscal year. Historically, on a yearly contract timeline, this budget has allowed an average of:

- 50,000 LF of CCTV
- 21,000 LF of CIPP
- 1,900 LF of pipe replacement
- 22 point repairs
- 19 manhole replacements
- 500 VF of manhole rehabilitation
- 63 frame and cover replacements

The 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 23 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.

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	$8,000,000
TOTAL	**$8,000,000**

3.5 RIVANNA WATER AND SEWER AUTHORITY

RWSA provides wastewater treatment services for the City ofCharlottesville and ACSA. The City's share of the FY'23 wastewater budget totals $8,861,500 including operating expenses and debt service costs. This is a decrease of 2.0% over the FY'22 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.

3.5.1 Infrastructure

RWSA's Capital Improvement Plan (CIP) for wastewater for Fiscal Years 2023-2027 has been prepared asa 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 FY'23- FY'27 CIP. Wastewater projects include:

- Moores Creek AWRRF In-Plant Clarifier and Lime Silo Demolition
- Moores Creek AWRRF Generator Fuel Storage Expansion
- Moores Creek AWRRF Lighting Upgrade
- Interceptor Sewer and Manhole Repair (Phase 1)

The total FY'23-FY'27 CIP for sewer is approximately $28.28 million. This includes projects already in previous CIPs which have been modified.

Exhibit 25: RWSA Sewer Projects for the City

Project	FY'23-FY'27 Total (millions)
Upper Schenks Branch Interceptor	$0.74 M
Interceptor Sewer and Manhole Repair (Phase 2)	$0.97 M
Moores Creek Engineering and Administration Building	$8.5 M
Moores Creek Facility Improvements	$15.6 M
Moores Creek Operations and Maintenance Building	$2.47 M
TOTAL	**$28.28 M**

3.5.2 Actual Wastewater Flows

The City portion of Urban Area operation rates and charges are based on wastewater treatment (flows). The estimated flows for the City will decrease for FY'23 budget levels by 1%.

Exhibit 26: RWSA Sewer Production Allocation

	FY'22	FY'23	% Change
City	48%	47%	-1%
ACSA	52%	53%	1%

3.5.3 City Share of RWSA Wastewater Costs

The City's share of RWSA costs for FY'23 decreased by $181,900. This is the result from a mid-year rate change during the current fiscal year. RWSA's wastewater rates for the City are:

- $2.664 per 1,000 gallons for operating expenses.
- $384,637 per month for debt service charges.

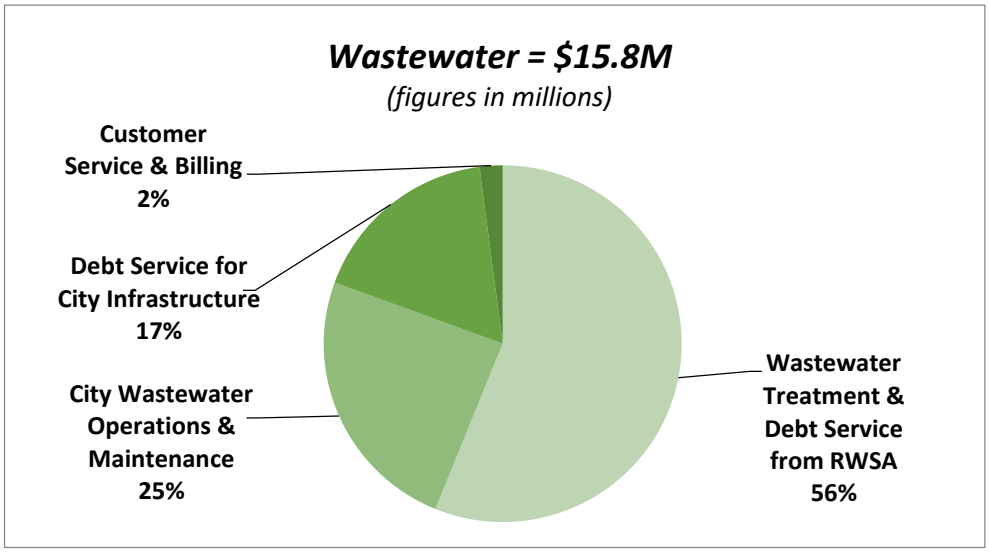
3.6 REVENUE REQUIREMENTS

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 tobe collected from customers).

3.6.1 Current Revenue Requirements (FY'23)

The FY'23 revenue requirements for the sewer utility totals $15,785,453, the largest component being the purchase of wastewater treatment from RWSA (56% of the budget).

Exhibit 27: Sewer Utility FY'23 Revenue Requirements



The revenue requirements for wastewater are 1.7% lower than the current year. As noted earlier, charges from RWSA decreased as result of a mid-year rate change. The City's debt service costs are decreasing, as there are no new bond issues for wastewater planned in FY'23. The cost increases for City operations and maintenance and utility billing includes fully funding a mid-FY'21 market adjustment for salaries and a July 1 cost-of-living-adjustment (COLA) for employee salaries and related benefits.

Exhibit 28: Comparison of Sewer Revenue Requirements FY'22 to FY'23

Revenue Requirements	FY'22	FY'23	$ Change	% Change
Wastewater Treatment & Debt Service from RWSA	$9,043,400	$8,861,500	($181,900)	-2.0%
City Wasteater Operations & Maintenance	$3,720,871	$3,857,544	$136,673	3.7%
Debt Service for City Infrastructure	$2,989,894	$2,738,026	($251,868)	-8.4%
Customer Service & Billing	$304,916	$328,383	$23,467	7.7%
TOTAL	**$16,059,081**	**$15,785,453**	**($273,628)**	**-1.7%**

3.6.2 Projected Revenue Requirements (FY'23-FY'28)

To project operating expenses for FY'23-FY'28, the FY'23 wastewater revenue requirements are escalated using historic averages 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 wastewater 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 plansto issue bonds to fund its wastewater CIP.

The revenue requirements for FY'23 through FY'28 are shown below. The average annual increase is3.5%.

Exhibit 29: Projected Sewer Revenue Requirements FY'23-FY'28

3.7 CUSTOMERS AND USAGE

The City currently provides sewer service to 14,719 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 (94.5%).

Exhibit 30: Current Sewer Customers by Meter Size

Water Meter Size	# of Customers	% of Customers
5/8	13,913	94.5%
1	293	2.0%
1.5	238	1.6%
2	219	1.5%
3	39	0.3%
4	16	0.1%
6	1	0.01%
14	1	0.01%
TOTAL	**14,719**	

The exhibit below provides a projection of sewage production for the upcoming fiscal year in cubic feet.

Exhibit 31: Projected FY'23 Sewage Production

Usage	Cubic Feet
Projected FY'23 Total	167,371,410

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 and sewage production; thus no growth is factored into the planning period.

3.8 MONTHLY SERVICE CHARGE

Like water, the City assesses a Monthly Service Charge for 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.

Exhibit 32: Monthly Service Charge for FY'23 for Sewer

Water Meter Size (inches)	Monthly Service Charge
5/8	$5.50
1	$13.50
1.5	$27.50
2	$44.00
3	$88.00
4	$137.50
6	$275.00
14	$1,801.25

3.9 Updating Sewer Facility Fees to Align with Capacity Meters

Sewer Facility Fees were developed and established for the City in 2008. Facility fees are one-time charges levied to offset existing or planned future capital costs necessary to meet the service needs of City sewer customers. These fees are assessed when new sewer service is requested where none has previously been provided, or an increase in capacity where service already exists, sewer facility fees are charged for this new increased demand for system capacity.

Similar to the water facility fees, sewer facility fees are based on the customer's water meter size, or the number of ERC and are detailed in Chapter 31 of City Code. The original 2008 sewer facility fees were based on an ERC or the flowrate that corresponds to a normal residential water meter. The base water meter size for the City is a 5/8-inch meter, and the water meter's capacity is considered one ERC, which is 20 gallons per minute (GPM). Larger water meters have greater capacity, and the sewer facility fees are correspondingly larger to reflect the greater capacity. For example, a 2-inch water meter has 8 times the capacity of a 5/8-inch water meter, therefore the ERC for a 2-inch water meter is 8. In 2013, the City increased the facility fees per ERC to more accurately reflect the actual cost to provide increased system capacity for new development.

In recent years, the City has begun using ultrasonic water meters. Ultrasonic water meters have no moving parts, are more accurate, and are less susceptible to mechanical failure. Previously, the City utilized positive displacement meters which rely on moving parts that can wear out. With the implementation of new ultrasonic water meters, it has been recognized that these meters, particularly larger than 2-inches, have greater capacity for the same size meter. For example, a 3-inch ultrasonic meter provides the same capacity as a 4-inch positive displacement meter.

The exhibit below illustrates the changes to the ERC values and sewer facility fees for meter 3-inches and larger.

Exhibit 33: Sewer Facility Fee Changes for FY'23

Water Meter Size (Inches)	Previous ERC	Updated ERC	Previous Fee	Updated Fee	$ Change	% Change
⅝	1	1	$5,350	$5,350	$0	0.0%
1	2.5	2.5	$13,375	$13,375	$0	0.0%
1 ½	5	5	$26,750	$26,750	$0	0.0%
2	8	8	$42,800	$42,800	$0	0.0%
3	15	25	$80,250	$133,725	$53,475	66.6%
4	25	50	$133,725	$267,500	$133,775	100.0%
6	50	80	$267,500	$428,000	$160,500	60.0%

Of note, the new ultrasonic 5/8 inch water meters do have a slightly greater capacity of 25 GPM compared to the old positive displacement meters that had a capacity of 20 GPM. As the original ERC was based on 20 GPM, the City is not changing the base flowrate per ERC or the facility fee per ERC. Meters 2-inches and smaller retain the same facility fee for both water and sewer; only larger meters have larger fees based on their significant increase in capacity.

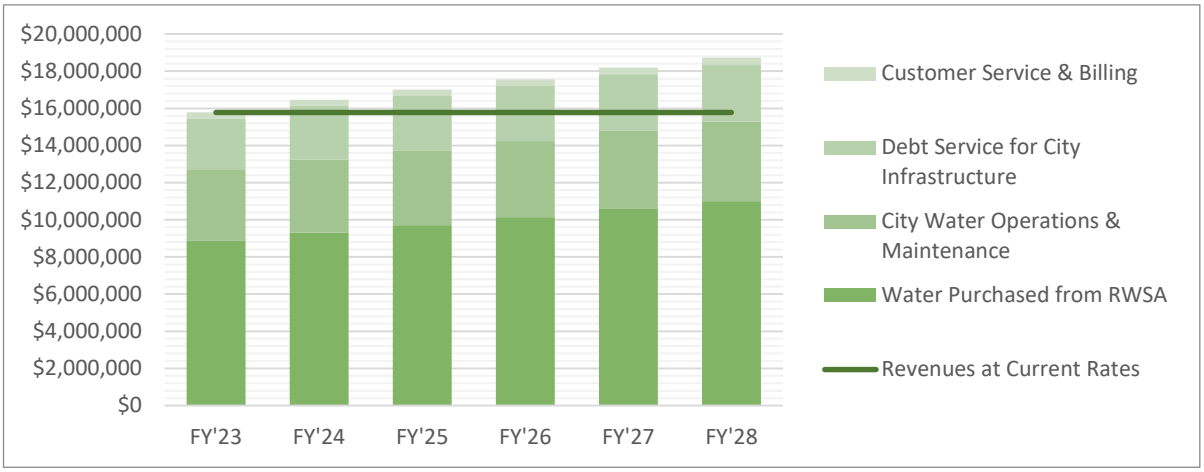
3.10 SEWER RATES

3.10.1 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 following exhibit, current sewer rates are not enough to meet the projected revenue requirements.

Exhibit 34: Sewer Revenue Requirements and Revenue at Current Rates



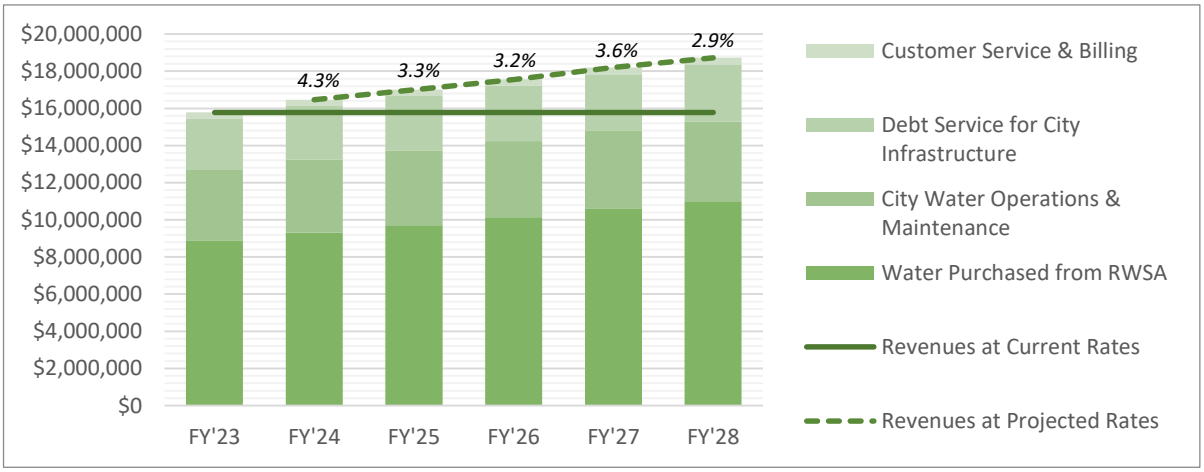
3.10.2 Revenue Projections at Current and Projected Rates

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 enoughto 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 new rates forFY'23 and the years of the planning period for sewer.

Exhibit 35: Sewer Revenue Requirements, Revenue at Current Rates and Revenueat Projected Rates



Sewer Rate Design

3.10.3 Sewer Rate Design

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

3.10.4 Sewer Rates FY'23

Sewer rates for FY'23 are to increase by 3.0%

Exhibit 36: Sewer Rates FY'23

FY'22	FY'23	$ Change	% Change
$81.34	$83.80	$2.46	3.0%

3.10.5 Projected Sewer Rates FY'24-FY'28

Based on the projected revenue requirements for FY'24-FY'28 and customer usage, the projected sewer rates for this planning period are shown below.

Exhibit 37: Projected Sewer Rates FY'24 – FY'28

			PROJECTED				
	FY'22	FY'23	FY'24	FY'25	FY'26	FY'27	FY'28
	$81.34	$83.80	$87.37	$90.29	$93.21	$96.60	$99.39
$ Change		$2.46	$3.57	$2.92	$2.92	$3.39	$2.79
% Change		3.0%	4.3%	3.3%	3.2%	3.6%	2.9%

3.11 CUSTOMER IMPACTS

The table below illustrates the average monthly sewer bill for customers based on water meter size with the FY'23 sewer rate increases and monthly service charge.

Exhibit 38: Customer Impacts at FY'23 Sewer Rates and Charges

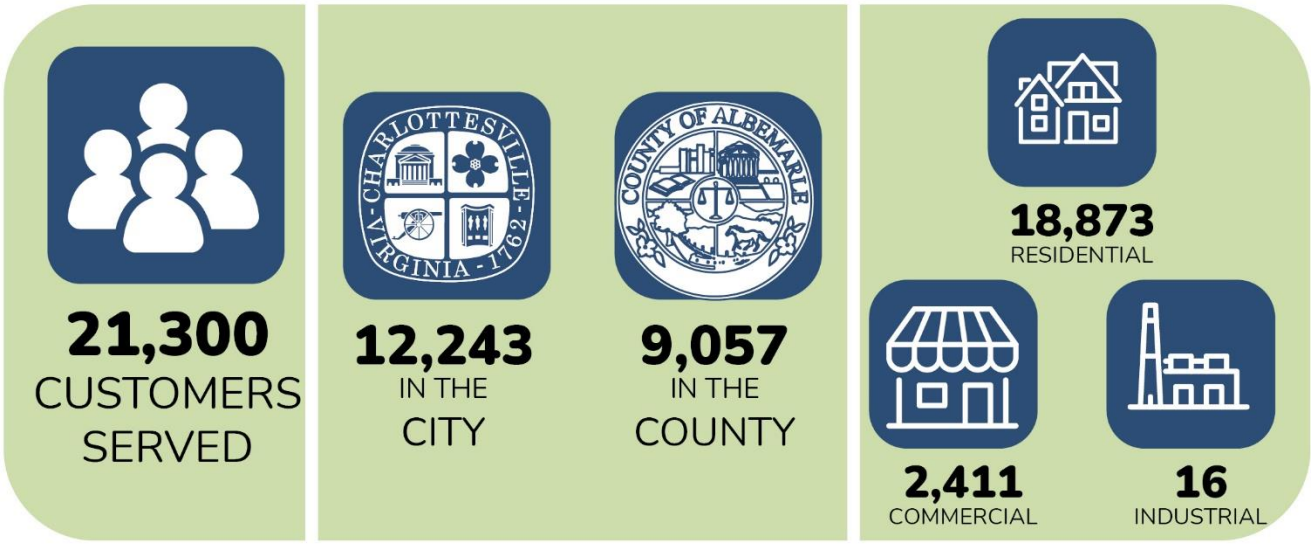
Water Meter Size	Median Sewer/Month (cf)	FY'22 Avg. Monthly Bill	FY'23 Avg. Monthly Bill	$ Increase	% Increase
5/8	400	$38.04	$39.02	$0.99	2.59%
1	1,760	$156.91	$161.25	$4.34	2.76%
1 ½	3,410	$304.87	$313.27	$8.40	2.76%
2	5,680	$506.01	$520.01	$14.00	2.77%
3	11,750	$1,043.75	$1,072.71	$28.96	2.77%
4	43,720	$3,693.68	$3,801.44	$107.76	2.92%

4. NATURAL GAS

4.1 OVERVIEW

The City of Charlottesville's natural gas utility is one of three (3) municipally owned gas utilities in the Commonwealth of Virginia and has been providing service to the residents of Charlottesville and Albemarle County for over 150 years. The gas utility operates on a self-supporting basis and is not designed to generate a profit. However, due to various factors, such as winter weather and an increase in the number of customers, the utility can generate a profit or loss in any given year. Rates are set annually at a breakeven point and only cover the utility's operating budget and the costs associated with the purchase of natural gas from the City's provider. The Charlottesville gas utility currently provides service to Charlottesville, and to various portions of Albemarle County. Within the City of Charlottesville, 87.5% of the utility customers are provided natural gas service. The system consists of approximately 342 miles of main and over 300 miles of service lines. The system currently serves 21,300 customers (12,243 of which are in the City and 9,057 in Albemarle County).

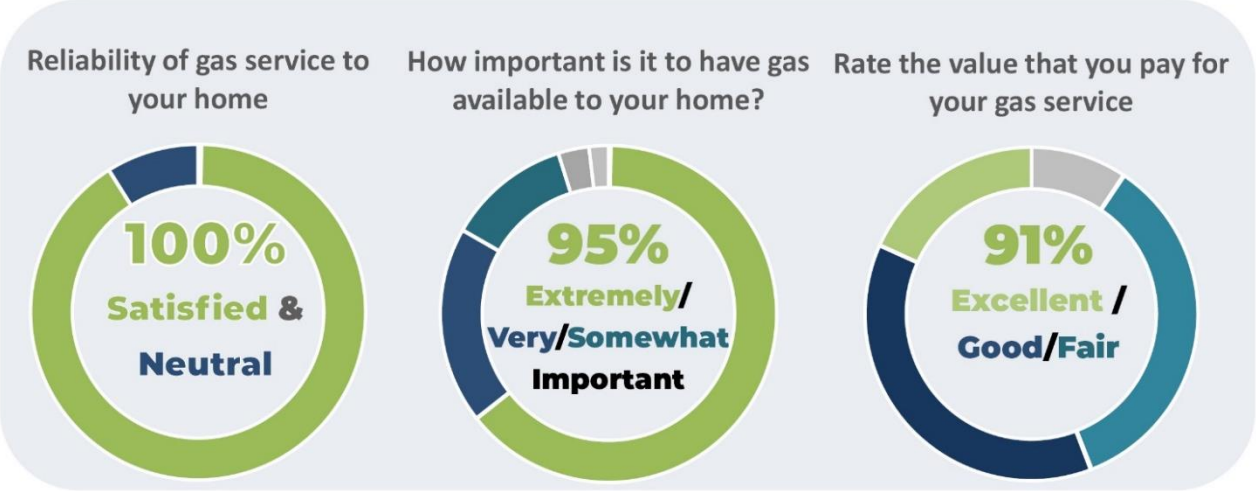
4.1.1 Our Customers



Three (3) levels of service are provided to meet the needs of various customers: Firm, Interruptible, and Small Volume Transportation. Most consumers are firm customers, with a priority for gas use at all times. Currently, there are nine (9) customers who are provided interruptible service. These customers are not assured of continuous service. They must also maintain an alternate fuel system and be prepared to switch to that alternate fuel within one hour of notification. This customer class is vital to the system because it allows the City to stay within the volume requirements set by the City's provider, and still meet the gas needs of firm customers in peak demand periods. Interruptible customers pay a lower rate than firm customers because they have no service assurance in peak demand periods. Therefore, they do not share in the cost of providing peak period supply. Transportation customers are customers 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. The City currently has only one Small Volume Transportation customer

4.1.2 2022 Customer Satisfaction Survey

Our most recent Utilities Customer Satisfaction Survey revealed high levels of satisfaction with the reliability and value of our gas service, as well as a strong desire to maintain access to gas service. One hundred percent of respondents are satisfied or neutral with the reliability of gas service, and 91% of respondents rated the value of their gas service as fair, good or excellent. Additionally, 95% of respondents stated that the availability of natural gas to their home or business is important, with a majority stating its availability is extremely important.



4.2 SAFETY

Natural gas is a common energy source in our community, and we prioritize gas safety awareness among the public. Our Public Gas Safety Awareness Plan complies with, and exceeds, federally mandated regulations that follow the guidance of the American Petroleum Institute (API) Recommended Practice (RP) 1162. Since 2006, there has been a 113% increase in our customers' ability to recognize the smell of natural gas and a 58% reduction in gas line damage caused by third-party excavation. These significant gains in gas safety awareness are directly attributed to our robust safety program, which includes 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 address the situation, we launched the EducationProgram "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 from 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.
- **Outreach and Training of Professional Excavators** – These events include VA811 Day with visits to new construction sites, and excavation safety training with the State Corporation Commission (SCC). Residential construction sites we visited include Belvedere, Spring Hill, and Cascadia. These

outreach events promote and reinforce safe digging practices and are an excellent opportunity to directly interact with local excavators, contractors, plumbers, and buildinginspectors.

- **Outreach through *Nuevas Raices*** – *Nuevas Raices* is a Spanish language newspaper that serves Spanish speakers in Central Virginia. To help ensure our outreach efforts are as inclusive as possible, we run a monthly print advertisement in this newspaper that features the VA811 safety message in Spanish. A high percentage of construction workers in our area are Spanish speakers and communicating to them in the language they are most comfortable ensures we are effectively reaching an important target audience.

Since the "Dig with Care" program was launched, we have experienced a 33% reduction in gas line damage caused by third-party excavators (from 2.83/1000 Miss Utility tickets in 2013 to 1.91/1000 Miss Utility tickets in 2021).

Additional efforts to increase gas safety awareness include a strong presence on various media platforms, consistent participation in community events, outreach at local schools and camps, promotion of national safety campaigns, targeted mailings to professional excavators and plumbers, andenhanced training with emergency officials.

TV Spot – Two sing-along safety commercials, featuring Flicker the Flame, began airing in 2012. The first spot focuses on the smell of gas and what to do if a leak is suspected, and the second spot highlights the importance of contacting 811 before digging. These spots air on local network channels (NBC, CBS, CW, FOX, MeTV and ABC), on the Weather and DYI channels on cable TV, and before film screenings at Stonefield Regal Movie Theater. The latest Public Awareness survey results show thatrespondents aged 26 or younger have a lower recall of our safety campaigns and were less likely to agree that Charlottesville Gas is adequately educating residents. In response to this result, we refreshed both the gas safety awareness and VA811 TV spots in the fall of 2021 with updated and more engaging animation.

Commercials on Streaming Services – Subscription-based streaming providers have recently seen tremendous growth. Results of the TransUnion survey reveal the average consumer spends three (3) tofour (4) hours a day on streaming services, with a total of 55% of all consumers choosing streaming services over cable TV. To maximize our media investment, we have redirected some of our advertisement funds from live TV to streaming ads on Comcast digital platforms.

Community Outreach Programs – In 2021 we saw the resumption of in-person community outreach events, with opportunities continuing into the first quarter of 2022. These events include a safety awareness presence at Blue Ridge Homebuilders Association functions, sponsorship of the UVA Soccer season, Charlottesville's Grand Illumination, UVA Baseball season sponsorship, Kid*Vention, and the Energy-Saving Trees Program. We anticipate the restart of Flicker @ Your Classroom and Camp programs as we continue to reengage in high attendance community events.

Utilities Electronic Newsletter – In December of 2021, we began sending a monthly electronic newsletter using Constant Contact to Utilities customers who receive paperless billing. This newsletter provides customer-focused messages that highlight Utilities services, initiatives, updates, and program opportunities – including our annual gas safety awareness quiz, and information on safe digging practices and VA811 National Safe Digging Month.

National Safe Digging Month – This national safety campaign occurs every April and was promoted in several ways. We sent a bill insert tailored to residential customers explaining the steps of contacting 811 and the importance of safe digging practices at home, not just commercial worksites. This information was also sent to customers who receive paperless billing via the monthly Utilities E-Newsletter, and a month-long social media campaign was launched to highlight safe digging and the 811 process.

Cross-bore Mailing – An informational postcard on cross-bores is periodically mailed to local plumbers to increase awareness of the proper procedure for clearing sewer blockages caused by a utility line that hasaccidently been bored through a sewer line. The postcard includes an infographic of a cross-bore and provides instructions on how to handle a cross-bore situation properly.

Enhanced Training of Emergency Officials – In recent years we have expanded outreach with increased training of all local emergency officials. We provide a combination of presentations and hands-on experiences with the Charlottesville Police Department, Charlottesville Fire Department, Albemarle County Fire and Rescue, Albemarle County Police, UVA Police, and troopers from the Charlottesville office of the Virginia State Police. Recorded trainings are also available to those unable to attend live presentations.

Outsource Utility Location – In 2014, we outsourced the utility locating process, resulting in increased utility marking accuracy and reducing damages.

Targeting Commercial Customers – To ensure commercial information is seen by a more significant number 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.

Local Builders Association Outreach – We continue to maintain a safety awareness presence with the Blue Ridge Home Builders Association (BRHBA). Members of this association include local and national builders and contractors and serves as an excellent opportunity to reinforce VA811 safe digging practices.

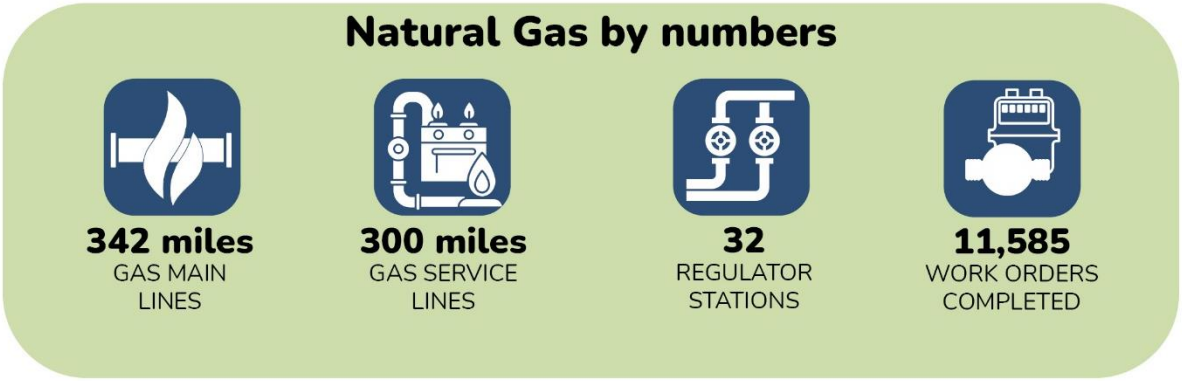
4.3 REGULATORY COMPLIANCE

Operator Qualification Program - 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 regarding a variety of different tasks 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 (5) 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 regarding 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 validating the City's efforts.

Distribution Integrity Management Program (DIMP) - PHMSA requires Charlottesville Gas to monitor and address any potential leak threats to the natural gas system through a Distribution

Integrity Management Program (DIMP). Examples of potential threats include excavator damages, corrosion, and material defects. Included in the City's DIMP Plan are procedures that have been put in place to mitigate potential leak 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 has worked 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 can track and document the location, cause, severity, and response time associated with each leak. In March of 2022, the State Corporation Commission, on behalf of PHMSA, performed a thorough audit of the City's Distribution Integrity Management Program. The Commission found no pipeline safety violations regarding the documentation or implementation of the City's Distribution Integrity Management Program.



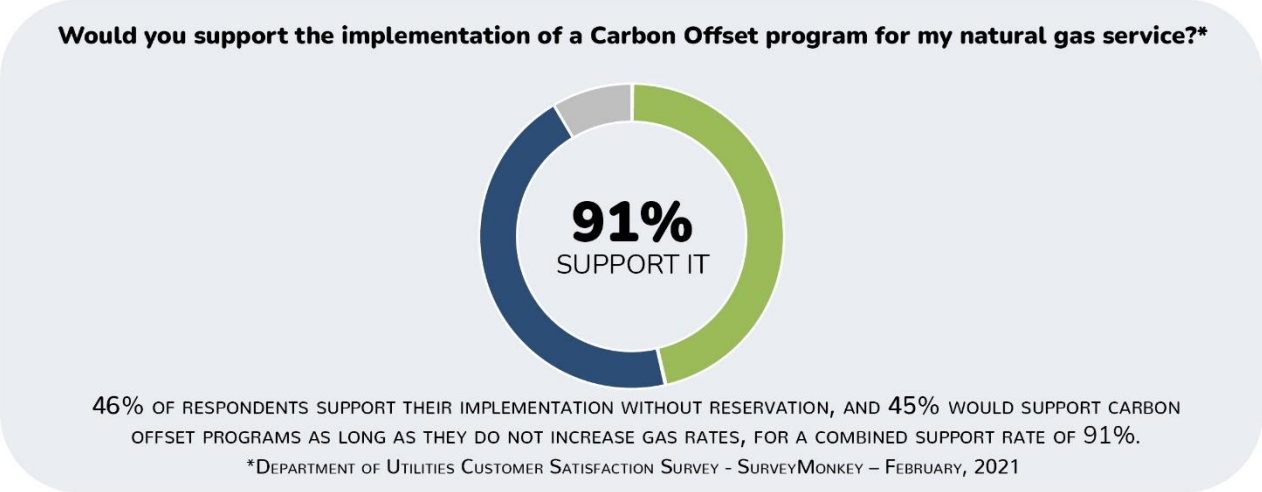
4.4 GREENHOUSE GAS REDUCTION STRATEGY

In July of 2021, as a part of the City Council approved Utility Rate Report, a Carbon Offset Program was added to the Greenhouse Gas (GHG) Reduction Program. Charlottesville Gas was motivated to take advantage of this globally recognized carbon reduction pathway in order to further align itself with the City of Charlottesville climate action goals which include a 45% reduction in citywide greenhouse gas emissions by 2030 and carbon neutrality by 2050.

According to the 2019 City of Charlottesville GHG Inventory by Sector and Fuel Type Report (Released 2022), there has been a reduction of natural gas emissions in our community of 30% compared to the baseline emissions reported in 2011. This reduction is consistent with the City-wide GHG reduction. The majority of this reduction is due to home energy efficiency improvements as well as an increase in efficiency of natural gas appliances. Charlottesville Gas' carbon footprint continues to decrease due to the 25% offset of its GHG emissions through our Carbon Offset Program which further aligns Charlottesville Gas with the citywide climate action goals of a 45% reduction by 2030. Below is more information regarding the programs Charlottesville Gas has implemented as a part of our GHG Reduction Strategy.

4.4.1 Carbon Offset Program

The Department of Utilities has been proactive in finding new ways to better align departmental goals with the City of Charlottesville's Climate Action Plan. Using data captured through the Utilities Customer Satisfaction Survey, Utilities staff was able to recognize and respond to the interest customers had in Carbon Offsets. In doing so, Utilities has voluntarily taken part in a Carbon Offset program that is managed by British Petroleum (BP). This program allows Utilities to invest in various carbon sequestration projects all around the world. From reforestation projects in the Peruvian Amazon, to capturing agricultural methane on large farms in the Midwest, this program allows Utilities to move toward carbon neutrality by 2050. Utilities will initially offset 25% of its greenhouse gas emissions through these various projects. Utilities is able to reduce its carbon footprint with having little to no impact on the natural gas rates.



4.4.2 What are Carbon Offsets?

Whether it's the heating system in your home, the transportation you use, or even the food you eat, almost everything in your daily life contributes to the release of GHG emissions and impacts your carbon footprint. Carbon offsets help manage these emissions by funding projects that counterbalance their release with an equivalent amount of carbon dioxide (CO2) savings elsewhere. Offset projects finance activities that reduce GHGs or absorb CO2, like planting forests, implementing agricultural methane capture projects, and building biogas installations.

We shared the details of our Carbon Offset program with our community on multiple occasions:

- Bill Insert on the November's Utility Bill – *Sustainability Initiatives*
- December E-Newsletter that was sent to 3,600 customers – *Utilities Newsletter*
- Website: www.charlottesville.gov/carbonoffsets

4.4.3 Energy-Efficiency Programs

In recent years, Charlottesville Gas has invested in, and expanded its energy efficiency programs. We highlight to residents the benefits these programs provide, actively promote their availability,

and constantly work to ensure they aid our efforts to reduce energy consumption. Currently, rebates for a programmable thermostat, a tankless water heater, and attic insulation are available, as well as free home weatherization to income-qualified households.

4.4.4 Rebates

Programmable Thermostat

Since 2005, Charlottesville Gas has offered gas customers a rebate towards purchasing and installing a programmable thermostat (up to $100). By setting a thermostat back 10° to 15° at night for 8 hours, it is estimated that a customer can reduce heating bills by 5% to 15%.

Natural Gas Tankless Water Heater

Since 2015, the City has offered a $200 rebate to gas customers who switch from a traditional tank water heater to an energy-saving tankless natural gas water heater. According to the U.S. Department of Energy, water heating is the third-largest energy use in homes. By heating water only when needed, natural gas tankless water heaters reduce water heating expenses by 30% and provide continuous hot water delivery. This technology also produces less CO2 and NOx than conventional gas or electric tank water heaters.

Attic Insulation

In 2020, Charlottesville Gas began offering customers a rebate of up to $300 towards the addition of attic insulation in their home when installed by a licensed contractor. Upgrading attic insulation is one of the most cost-effective ways to increase a home's comfort, lower heating and cooling bills, and improve a home's energy efficiency.

4.4.5 No-Cost Home Weatherization for Income-Qualified Households

In July of 2019, Charlottesville Gas started a partnership with LEAP to offer income-qualified gas customers a program designed to help increase the overall energy efficiency of their homes. The Charlottesville Gas Energy Efficiency Program (CGEEP) provides qualified households with free home weatherization improvements and funds the replacement of inefficient natural gas appliances. Since its launch, 124 gas customers have benefited from the program. Of the total CGEEP recipients, 68% were Charlottesville homeowners, and 73% had at least one family member aged 60 years or older living in the same household. In addition to single-family home customers, we extended our weatherization program to the energy efficiency improvement project performed at Westhaven Apartments.

The energy-savings in these homes can vary a lot depending on the original condition of the dwelling (from 3% to 51% reduction in gas consumption). On average, we noticed a 20% reduction in gas consumption during the winter months.

In 2021, we expanded the income qualification criteria so more customers could take advantage of the program. We now accept applicants with household earnings of 80% or below Area Median Income (AMI) and if the account holder is 60 or older of 120% or below AMI.

To date, the Charlottesville Department of Utilities has invested $173,066 in the CGEEP program.

4.4.6 Energy Efficiency Outreach Actions

- We mailed postcards promoting CGEEP and the Attic Insulation rebate, targeting residents of gas heated homes built before 1970, which is the first year Virginia enacted code requirements for home insulation. By concentrating efforts on older homes, we hope to maximize the benefits these programs provide.

- In March 2022, in partnership with the Arbor Day Foundation, we launched the Energy-Saving Trees Program. This program gave away 250 free trees to Charlottesville Utilities customers to strategically plant on their property, providing energy- and cost-saving benefits to their household and the broader community. Strategically planted trees provide cooling shade from the sun in warm months, and act as a barrier to cold winds during the winter months. The successful planting of these trees will also provide the community with 823,418 lbs. of carbon sequestration over 20 years.

- We periodically promote the rebate programs and free home weatherization with CGEEP on our monthly Utilities Electronic Newsletter.

- Paid web banners and pre-roll spots were aired on NBC29 and CBS19.

- For 2021, we will launch a series of TV spots that feature our energy efficiency programs. These spots will be seen on Comcast's on-demand streaming.

- To help maximize the newly expanded qualification criteria for CGEEP, we presented a webinar of the program in July of 2021 to members of The Center at Charlottesville. The webinar was recorded and is available to watch on their website. Targeting area residents over 60 increases the opportunity for participation, translating into a greater number of energy-efficient homes.

Charlottesville Gas has witnessed 17% reductions in natural gas usage per residential customer using a base year of 2011. This significant reduction in consumption per customer is directly correlated to the increase in energy efficiency of natural gas appliances as well as the ongoing energy conservation programs that Charlottesville Gas continues to promote to its customers. The table below illustrates the significant reduction in consumption.

Exhibit 39: Comparison of Gas Consumption 2021-2011

Year	Number of Customers	Consumption (MCF)	Consumption (MCF) per Customer
2011	16,206	1,064,708	66 MCF
2021	18,730	1,037,729	55 MCF

4.5 DEPARTMENT OF ENERGY REPRESENTATIVE AVERAGE COSTS TO CUSTOMERS

The table below was produced by the Department of Energy (DOE), and highlights the representative average unit costs of energy for five residential energy sources. According to the DOE, natural gas is 3.4 times more affordable than electricity.

Exhibit 40: Comparison of Average Energy Costs by Type

Type of energy	Per million BTU[1]	In commonly used terms	As required by test procedure
Electricity	$41.79	14.26c/kWh	$0.143/kWh
Natural Gas	$12.09	$1.209/therm	$0.00001209/Btu.
No.2 Heating Oil	$25.11	$3.45/gallon	$0.00002511/Btu.
Propane	$24.46	$2.23/gallon	$0.00002446/Btu.
Kerosene	$29.73	$4.01/gallon	$0.00002973/Btu.

Source: U.S Energy Information Administration, Short-Term Energy Outlook (February 8, 2022), Annual Energy Outlook (February 3, 2021), and Monthly Energy Review (January 27, 2022)

4.6 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'21, the City provided 68 households with over $17,374 in assistance. Contributions from area businesses and residents help to supplement the amount of money that is available for assistance. The FY'23 budget includes no new funding since there is sufficient funding ($159,886) from prior years to fund the program in FY'23.

4.7 GAS INFRASTRUCTURE ASSET MANAGEMENT

4.7.1 Gas System Overview

Due to a system wide replacement of the natural gas system and the primary material being high density polyethylene (HDPE) extruded pipe, there are very few replacement projects due to aging infrastructure. Currently, the natural gas system consists of 342 miles of gas mains and 300 miles of gas service lines.

272 miles of the gas main system are constructed of high-density polyethylene (HDPE) pipe, equating to approximately 79.5% of the entire system. Additionally, 99% of the natural gas services lines within the system are HDPE. HDPE is an extruded plastic pipe which possesses satisfactory material strength qualities and is resistant to corrosion. HDPE has become the industry standard for intermediate to low pressure natural gas distribution systems throughout the country.

The next 69 miles of the natural gas system consist of cathodically protected coated steel pipelines, equating to approximately 20.2% of the entire system. Due to the maximum allowable operating pressure of HDPE, operators are required to utilize coated steel for their high-pressure distribution pipelines. These pipelines are induced with cathodic protection either by galvanic anode or impressed current systems. The functionality of the cathodic protection system is continuously monitored by Charlottesville Gas employees to verify that all facilities are meeting appropriate federal regulations and properly combatting below ground corrosion.

Charlottesville Gas currently operates approximately 1 mile of cast iron pipe within the entire system. Compared to other operators like the City of Danville and the City of Richmond, 1 mile of cast or ductile iron is a small amount to maintain. For example, the City of Richmond operates approximately 199 miles of cast or ductile iron main and the City of Danville operates approximately 7 miles of cast or ductile iron main. Charlottesville Gas is decades ahead of other gas distribution operators in terms of system enhancement and leak mitigation due to the tremendous effort of the utility to modernize the system with dependable and gas tight materials.

Exhibit 41: Comparison of Miles of Pipe by Type among Public Gas Systems in Virginia

Company	Miles of Cast Iron	Miles of Ductile Iron	Total Miles
City of Richmond	135	64	199
City of Danville	1	6	7
City of Charlottesville	1	0	1

Table 1 - Cast & Ductile Iron Gas Mains by Company

4.7.2 Gas Leak Summary & Comparison

Charlottesville Gas' primary objective is to provide a clean and reliable fuel source to its customers in the safest and most environmentally conscience way possible. One way Charlottesville Gas is able to demonstrate their commitment to environmental responsibility is its ongoing leak repair and mitigation procedures. Charlottesville Gas has experienced a year after year reduction in the number of gas leaks found. This trend is due to Charlottesville Gas' proactive approach to modernizing the system. Leak causes and trends are tracked through the Charlottesville Distribution Integrity Management Program (DIMP), trends are then analyzed, and accelerated action plans are put into effect to proactively replace leak prone pipelines and components in order to reduce fugitive emissions within the system. The tables below demonstrate the effectiveness of the leak mitigation procedures that Charlottesville Gas currently has in place. For comparison, leak data from the City of Richmond and the City of Danville are included in the tables.

Exhibit 42: Comparison of Number of Leaks among Public Gas Systems in Virginia

Company	Year	Number of Leaks
City of Richmond	2021	956
City of Danville	2021	145
City of Charlottesville	2021	90

Table 2 - Annual Leak Data by Company

Charlottesville Gas' continued effort to mitigate leaks and replace aging infrastructure with new, dependable gas tight materials has significantly reduced the number of natural gas leaks occurring within the system. Charlottesville Gas has experienced a 58% reduction in annual leaks in comparison to before the system-wide replacement. Additionally, in 2021 Charlottesville Gas reported the lowest number of natural gas leaks, 90, it has ever reported to the Department of Transportation.

4.7.3 Natural Gas Capital Improvement Projects

Due to a system wide replacement of the natural gas system, there is not a need for an ongoing replacement program. However, the Department is preparing for two (2) large projects with the current capital budget. The first is a gas meter and regulator abnormal operating conditions (AOC) contract. Abnormal operating conditions (AOC) are conditions identified by Charlottesville Gas that may indicate a malfunction of a component or deviation from normal operations. The conditions primarily consist of corroded above ground gas meter piping or gas meters and regulators not having the required separation from building openings or sources of ignition. Currently, the Department has a large backlog of AOCs and are working towards issuing a construction contract for remediation of the issues. Historically, through a previous annual contract, the Department saw an average cost of $675,000 per year. The contract was bid using quantities equaling over 3,000 AOCs being corrected in the contract period. The contract was bid in March 2021 and the successful low bid was $1,775,875, substantially higher than previous contracts. At this time, AOCs are being corrected by in-house personnel, but in order to eliminate the back log, an outside contractor must assist.

The second project is the replacement of the low-pressure system with a high-pressure system in West Main Street. This project will replace approximately one (1) mile of 10-inch cast iron main with 4-inch high-density polyethylene pipe. The project will also necessitate 17 meters that are currently in the buildings being moved to the outside, which could require substantial interior plumbing. Preliminary estimates for this work range from $1,200,000 to $1,500,000. Fortunately, through the Infrastructure Investment and Jobs Act, which was signed in November of 2021, Charlottesville Gas will have the opportunity to apply for a federal grant which will provide $1,000,000 of funding over the next five (5) years for municipally owned gas utilities. This grant is providing funding for the replacement of aging and leak prone infrastructure.

4.8 FY'23 REVENUE REQUIREMENTS

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

4.8.1 Current Revenue Requirements (FY'23)

The FY'23 revenue requirements for the gas utility totals $31,407,534, the largest component being the purchase of gas from BP (45% of the total).

Exhibit 43: Gas Utility FY'23 Revenue Requirements

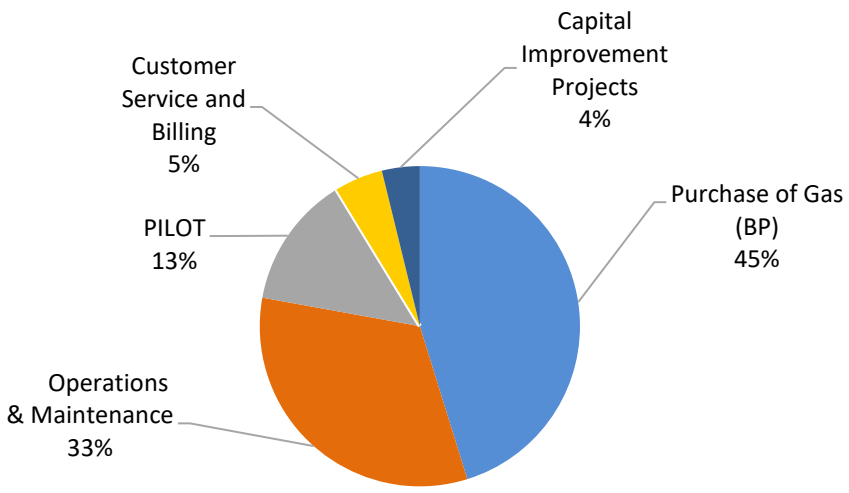


Exhibit 44: Comparison of Gas Revenue Requirements FY'22 to FY'23

Revenue Requirements	FY'22	FY'23	$ Change	% Change
Purchase of Gas (BP)	$11,008,930	$14,200,000	$3,191,070	29.0%
City Operations and Maintenance	$9,560,369	$10,251,186	$690,817	7.2%
Payment in Lieu of Taxes	$4,174,362	$4,216,875	$42,513	1.0%
Capital Improvement Projects	$1,400,000	$1,200,000	($200,000)	-14.3%
Customer Service & Billing	$1,529,190	$1,539,473	$10,283	0.7%
TOTAL	**$27,672,851**	**$31,407,534**	**$3,734,683**	**13.5%**

The cost of gas has increased significantly over the last year. A large part of the increase in the total revenue requirement is the Purchase of Gas from BP.

When setting the base rate each July 1st, the City uses data from the preceding April 1st 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 the utility is generating sufficient revenues to cover its costs and that customers are not being over- or undercharged.

City Operations and Maintenance costs are projected to increase by $690,817 due primarily to a cost-of-living-adjustment (COLA) in salaries and benefits costs. Contractual services is also increasing.

The Payment in Lieu of Taxes (PILOT) is based on a formula of 23% of prior year budgeted expenses lesscost 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 providing utility services.

4.9 MONTHLY SERVICE CHARGE

Like water and sewer, the City assesses a Monthly Service Charge for gas to recoup the fixed costs ofproviding utility services such as customer service, billing, meter services, and infrastructure. There are no changes to the $10.00 Monthly Service Charge.

4.10 GAS RATES

The City is projecting to collect a total of $31,407,534 to operate the gas utility in FY'23. $28,568,478 is projected to be collected from gas rates. Miscellaneous revenues total approximately $342,000. $1,200,000 of fund balance will be used to cash fund capital improvement projects. Additionally, $1,297,056 will be returned to gas customers in the form of a gas rate refund. Due to an ongoing rate case between FERC (Federal Energy Regulatory Commission) and TC Energy (the City's gas transporter) the City's cost of transporting gas was temporarily increased from February 2021 to February 2022. The rate case between the parties was settled and new transportation rates were put into effect in March of 2022. The refund was issued to the City to return the difference between the inflated transportation rates paid by the City.

Exhibit 45: Gas Rate Calculation FY'23

Revenue Requirements	FY'23
Purchase of Gas (BP)	$14,200,000
City Operations and Maintenance	$10,251,186
Payment in Lieu of Taxes	$4,216,875
Capital Improvement Projects	$1,200,000
Customer Service & Billing	$1,539,473
TOTAL	**$31,407,534**
Revenue to be Collected	**FY'23**
Other Funding Sources	
Fund Balance	$1,200,000
Gas Bill Refund	$1,297,056
Miscellaneous Revenues	$342,000
Subtotal	*$2,839,056*
Revenue to Be Collected Through Rates	
Transportation Fees	$62,818
Firm Sales	$21,156,482
Interruptible Sales	$7,349,178
Subtotal	*$28,568,478*
TOTAL REVENUE TO BE COLLECTED	**$31,407,534**

The gas rates for FY'23 are shown below compared to the current rates.

Exhibit 46: FY'22 Gas Rates Compared to FY'23 Gas Rates

Rate (per 1,000 cf)	FY'22 Rates	Adopted FY'23 Rates	$ Change	% Change
Firm Service (1st to 3,000 cf)	$8.9908	$8.8087	($0.18)	-2.03%
Firm Service (next 3,000 cf)	$8.5198	$8.3559	($0.16)	-1.92%
Firm Service (next 144,000 cf)	$8.0489	$7.9031	($0.15)	-1.81%
Firm Service (over 150,000 cf)	$7.5779	$7.4504	($0.13)	-1.68%
Air Conditioning	$7.3471	$7.3471	$0.00	0%
Interruptible Service (up to 600,000 cf)	$7.2178	$7.0120	($0.21)	-2.85%
Interruptible Service (Over 600,000 cf)	$6.6937	$6.5125	($0.18)	-2.71%
Gas Light (charge per month)	$17.5100	$17.5100	$0.00	0%
Small Volume Transportation Customer	$2.6462	$2.6287	($0.02)	-0.66%
Large Volume Transportation Customer	$1.5877	$1.5772	($0.01)	-0.66%
Base Unit Cost (Firm Service)	$4.2810	$5.1715	$0.89	20.80%
Base Unit Cost (Interruptible Service)	$2.8498	$3.4986	$0.65	22.77%

4.11 IMPACTS ON CUSTOMERS

The table below illustrates the impacts of the FY'23 rates on customer's bills at various usage rates. Note: the applicable Monthly Service Charges are included in the calculations.

Exhibit 47: Customer Impacts at FY'23 Gas Rates and Charges

Firm Customers Usage Per CF	**FY'22 Monthly Gas Bill** with April 2022 PGA	**FY'23 Monthly Gas Bill** with April 2022 PGA	**$ Change**	**% Change**
4,000	$55.67	$54.96	(0.71)	-1.28%
4,600	$62.31	$61.50	(0.81)	-1.30%
20,000	$226.10	$223.02	(3.08)	-1.36%
60,000	$649.82	$640.91	(8.91)	-1.37%
Interruptible Customers Usage Per CF	**FY'22 Monthly Gas Bill** with April 2021 PGA	**FY'23 Monthly Gas Bill** with April 2021 PGA	**$ Change**	**% Change**
100,000	$1,015.43	$994.85	(20.58)	-2.03%
400,000	$3,881.72	$3,799.40	(82.32)	-2.12%
1,000,000	$9,404.66	$9,208.71	(195.95)	-2.08%
2,000,000	$18,434.86	$18,057.75	(377.11)	-2.05%

5. STORMWATER

5.1 OVERVIEW

The Stormwater Utility, adopted by City Council in 2013, 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.

5.2 REGULATORY COMPLIANCE

As an operator of a Small Municipal Separate Storm Sewer System, Charlottesville is regulated by the Virginia DEQ-issued General Permit (VAR040051). Through annual reporting, the City summarizes the status of permit compliance and stormwater management program elements pertaining to six required Minimum Control Measures. Activities include public education andoutreach (including participatory events), implementation of Stormwater Pollution Prevention Plans, illicit discharge detection and elimination, administration of stormwater management requirements relating to land disturbing activities, inspection and maintenance of stormwater control facilities, and conveyance infrastructure and water resources protection and improvement projects.

5.3 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 amunicipal 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 annual budget for the Credit Program is $50,000 per year.

The CCAP is provided in partnership with the Thomas Jefferson Soil and Water Conservation District andprovides 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 ofthe program and a full list of eligible practices, please go to: https://www.tjswcd.org/best- management-practices-homeowners/. The annual budget for the CCAP is $32,000 per year.

5.4 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 has an annual budget of $25,000 per year and is paidfrom 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).

5.5 MANAGEMENT FACILITIES

The City of Charlottesville has public ownership responsibility for over 66 public best management practices (BMPs) in 32 separate locations and compliance oversight for over 242 private BMPs at 172 separate addresses. 89 of these BMPs (both public and private) are included in the City's Total Maximum Daily Load (TMDL) Action Plan, a requirement of the Municipal Separate Storm Sewer System (MS4) discharge permit issued by the Virginia Department of Environmental Quality (VDEQ). VDEQ 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 used to manage the inspection of BMPs, maintenance of public BMPs, and enforcement of stormwater management plans for private BMPs.

5.6 STORMWATER INFRASTRUCTURE ASSET MANAGEMENT

5.6.1 Stormwater Infrastructure Systems

Charlottesville's stormwater conveyance system is integrated throughout the City's municipal boundaryand consists of approximately 130 miles of pipe and 8,340 structures including 460 outfalls. 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 to 96-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 ownor 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% ofthe 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 infrastructure system conveys streams that have been piped.

The combination of an integrated and co-mingled privately and publicly owned stormwater conveyancesystem 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 significant 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 dueto 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 City 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 13.5 miles of pipe have been rehabilitated (90% were VC and CMP), and 440 structures have been installed, rehabilitated, or replaced at a cost of $10,852,071.

5.6.2 Water Resources Master Plan

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. In 2019, the City received a commitment for $792,147 in Stormwater Local Assistance Fund (SLAF) matching grant funds from Virginia Department of Environmental Quality (DEQ) for three stream restoration projects that have been identified as priority water quality improvement projects. The SLAF was established by the Virginia General Assembly to support local governments in the planning, design, and implementation of cost-effective stormwater best management practices that address commitments related to reducing pollutant loads and improving water quality.

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.

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 through FY'22. The Stormwater Utility Capital Plan is evaluated on a

yearly basis and occurs in conjunction with the utility rate development process.

Exhibit 48: 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 Projects	$250,000
Stormwater Quality Retrofit Project Construction	$1,000,000
Neighborhood Drainage Improvements	$250,000
Rehabilitation Program	$5,000,000
TOTAL	**$7,500,000**

5.7 REVENUE REQUIREMENTS

The total Stormwater Utility expenditures of approximately $3.5 million is projected to increase from FY'22 to FY'23. The projected FY'23 operating budget for the stormwater utility funds is $43,830 more than the FY'23 budget reflecting an increase in the salary requirements of the utility personnel.

Exhibit 49: Comparison of Stormwater Revenue Requirements FY'22 to FY'23

Revenue Requirements	FY'22 Budget	FY'23 Budget	$ Change	% Change
Salaries & Benefits	$820,441	$903,887	$83,446	10.17%
Operating Expenditures	$1,080,301	$1,040,685	-$39,616	-3.67%
Capital Projects	$1,500,000	$1,500,000	$0	0.00%
Debt Service	$119,039	$119,039	$0	0.00%
TOTAL	**$3,519,781**	**$3,563,611**	**$43,830**	**1.24%**

5.8 STORMWATER UTILITY FEE FOR FY'23

The Stormwater Utility fee rate was adopted in March 2013 at $1.20/500 sq. ft. of impervious surface ona 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.

Exhibit 50: Stormwater Utility Fee Rate FY'23

	FY'22	FY'23	$ Change	% Change
STORMWATER (per 500 sq. ft. impervious area)				
	$1.20	$1.20	$0.00	0.00%

6. GLOSSARY

Base Rate – The gas rate as set each year as of July 1, consisting of budgeted operating costs and currentwholesale 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 yearmay 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 ofCharlottesville.

Debt Service – The amount required to pay the annual principal and interest payments on long termdebt, 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 aconstant 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. Thecharge 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 typicallyreside 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 7,480gallons.

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.