Stantec

City of Annapolis, MD

Utility Rate and Capital Charge Study - Final Report

May 4, 2020

May 4, 2020

Ms. Thora Burkhardt, PE
Water/Sewer Program Manager
Department of Public Works
City of Annapolis
145 Gorman Street
Annapolis, MD 21401

Re: Utility Rate and Capital Charge Study – Final Report

Dear Ms. Burkhardt,

Stantec is pleased to present this Final Report of the Utility Rate and Capital Charge Study that we performed for the City of Annapolis. We appreciate the assistance provided by you and all of the members of the City staff who participated in the Study.

If you or others at the City have any questions, please do not hesitate to contact me. We appreciate the opportunity to be of service to the City of Annapolis and look forward to the possibility of doing so again in the near future.

Sincerely,

David A. Hyder
Senior Principal

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Enclosure

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1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Executive Summary presents an overview of the results of the comprehensive Water and Sewer Utility Rate and Capital Charge Study (Study) that was conducted for the water and sewer systems of the City of Annapolis (hereafter referred to as the City or Utility) by Stantec Consulting Services Inc. (Stantec).

1.2 STUDY OBJECTIVES

The study was conducted to accomplish two primary objectives as follows:

- A revenue sufficiency analysis to determine the ability of the City's current and future revenues to meet the system funding requirements, and to develop a financial management plan to ensure the ongoing financial health of the City's utility system.
- An evaluation of the current capital charges collected by the City from new water and/or sewer customers joining the utility system.

To facilitate the revenue sufficiency analysis, Stantec updated and populated the City's financial forecasting model that simulates the financial operations of the water and sewer systems. The model was used to determine the level of annual revenue required to satisfy projected annual operating and maintenance expenses, debt service payments, debt service coverage, and capital cost requirements, as well as maintain adequate reserves. To evaluate the current capital charges, Stantec populated a capital charge model that was used to calculate new capital charges based on the value of the City's water and sewer infrastructure. The following subsections summarize the revenue sufficiency analysis and the capital charge analysis.

1.3 REVENUE SUFFICIENCY ANALYSIS

The revenue sufficiency analysis (RSA) evaluated the sufficiency of the City's current water and sewer revenues to meet all of its current and projected financial requirements over a ten-year projection period, and determined the level of any rate revenue increases necessary in each year of the projection period to provide sufficient revenues to fund all of the City's cost requirements.

Based on the RSA, it was determined that the City's current water rates will not be sufficient to meet the funding requirements of the water system over the next several years. Sewer rates were determined to be sufficient in the near-term but will likely require adjustments in future years to meet the needs of the sewer system. Based on the needed revenue requirements, including ongoing capital reinvestment in the systems, the current revenues will be insufficient and, without adjustment, the City will exhaust all monies within the Water and Sewer Fund and will not be able to meet debt service coverage requirements in coming years.

To address the needs of the system, Stantec has developed a financial management plan that will gradually increase water and sewer revenues. The recommended financial management plan and corresponding plan of water and sewer rate revenue adjustments are based upon the revenue and expense information, beginning cash balances, and assumptions as described in Section 4 of this report. The RSA examined the historical trends in system expenditures and revenues, including an analysis of the usage by customer class, to examine the impacts of changing usage patterns on system revenues.

The recommended water rate revenue adjustment for Fiscal Year (FY) 2021 is presented in Table 1-1, along with a forecast of future rate adjustments for both water and sewer.

Table 1-1 Recommended Plan of Water and Sewer Rate Revenue Increases

	FY 21	FY 22	FY 23	FY 24	FY 25
Effective Date	***7/1/2021***	*7/1/2022*	*7/1/2023*	*7/1/2024*	*7/1/2025*
Water Rate Increase	**4.00%**	5.00%	5.00%	5.00%	5.00%
Sewer Rate Increase	**0.00%**	2.00%	2.00%	2.00%	2.00%

The rate revenue adjustments identified in Table 1-1 for FY 2022 – 2025 are estimates at this time based on projected needs of the system. The City has adopted a policy of completing annual water and sewer rate reviews. These reviews will allow the City to refine and adjust the level of rate adjustment, given the actual funding requirements of the system each year. The proposed water rates for FY 2021 and the current sewer rates are presented in Tables 1-2 and 1-3.

Table 1-2 Proposed FY 2021 Water and Current Sewer Fixed Charges

Meter Size	Water Fixed Charge	Sewer Fixed Charge*
1” or Less	$12.28	$13.44
1 ½”	$61.38	$67.19
2”	$98.21	$107.50
3”	$196.42	$215.00
4”	$306.90	$335.94
6”	$613.80	$671.88

Table 1-3 Proposed FY 2021 Water and Current Sewer Usage Charges

Type	Usage Charge (per 1,000 gallons)
Residential Water	
Tier 1: 0 - 7,000 gallons	$3.87
Tier 2: 7,001 - 20,000 gallons	$7.76
Tier 3: Over 20,000 gallons	$11.62
Non-Residential Water	$5.77
Sewer Usage Rates	$5.91
Naval Academy Usage Rates	$5.25

1.4 FINANCIAL METRICS

The City has established financial policies that designate the maintenance of specific cash reserves, including operating, repair and replacement, and debt service reserves. The reserve policies help the City maintain a healthy cash balance to address unexpected drops in revenues due to weather or emergency capital improvement needs and ensure adequate liquidity within the Utility. The City's bond covenants define the specific reserves that must be maintained, these reserves are designated as restricted. Specifically, the City has to maintain restricted reserves for repair and replacement of the water plant, a debt service reserve, and an operating reserve of at least at two months of operating expenses. In addition to the restricted reserves, it is recommended that the City maintain an additional four months of operating expenses in an unrestricted reserve, which would bring the operating reserves to a minimum of 6 months (180 days) of operating expenses.

Fund balances resulting from the recommended financial plan are illustrated in Table 1-4.

Table 1-4 Fund Reserve Balances ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25
Restricted Reserves					
Operating	$2.97	$3.11	$3.23	$3.27	$3.39
Repair and Replacement	$0.68	$0.68	$0.68	$0.68	$0.68
Debt Service Reserve	$4.27	$4.60	$5.29	$5.63	$5.97
Total Restricted	$7.91	$8.39	$9.19	$9.58	$10.03
Total Unrestricted	$17.88	$17.03	$15.70	$14.13	$12.32
Unrestricted Days Cash on Hand	607	553	494	432	365
Total Reserves	$25.79	$25.42	$24.89	$23.71	$22.36

In addition to maintaining reserve funds, the annual revenues of the water and sewer system must be sufficient to meet the City's debt service coverage requirements. The City's bond resolution states revenue available for debt service must stay above 125% of total debt service for the combined water and sewer utility. The City has adopted a financial policy that is more conservative than the bond resolution, setting the minimum debt service coverage ratio at 150%. The debt service coverage over the projection period based on the financial plan reflects the 150% debt coverage ratio and is presented in Table 1-5.

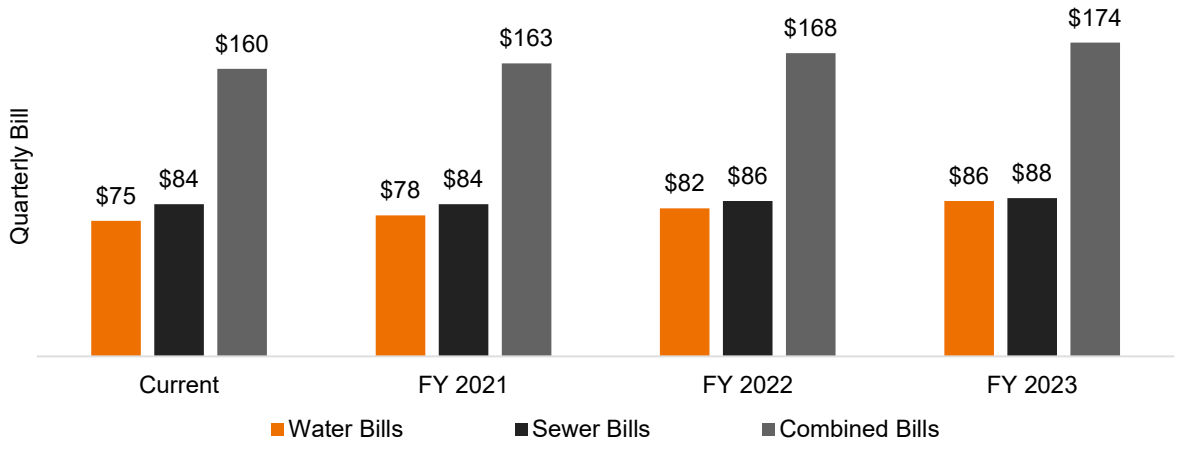
Table 1-5 Senior Lien Debt Service Coverage ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25
Total Revenues Available for Coverage	$16.66	$17.13	$17.62	$18.13	$18.66
Less Operating Expenses	($10.75)	($11.23)	($11.59)	($11.95)	($12.32)
Net Income Available for Debt Service	$5.91	$5.90	$6.03	$6.18	$6.34
Annual Senior Lien Debt Service[(1)]	$1.83	$2.38	$2.74	$3.47	$3.83
Debt Service Coverage Ratio	**3.23**	**2.48**	**2.20**	**1.78**	**1.65**

[(1)] Includes only senior debt which is subject to 1.50 debt service coverage policy.

While reserve fund balances and coverage ratios serve as key metrics for the Utility, customer bill impacts are also a key factor in policy decisions and must be considered within the recommended financial plans for the City. The typical quarterly water and sewer bills for the City's retail residential customers based on the proposed financial plan are represented in Figure 1-1.

Figure 1-1 Quarterly Water and Sewer Bill for Typical Residential Customer (12,000 gallons per quarter)



As demonstrated in the figure above, the quarterly increases in the typical customers bill is fairly minimal, amounting to an increase of $3.00 per quarter or $1.00 per month in FY 2021.

1.5 CAPITAL CHARGE ANALYSIS

The City currently charges a water and a sewer capital charge for new utility customers joining the water and sewer systems. The capital charges were last formally reviewed as part of a rate study in 2011. The City requested that Stantec review the current charges and update the calculations in an effort to ensure the capital charges are appropriately set to recover cost of providing water and sewer system capacity to new connections. Based on the detailed analysis outlined subsequent sections of this Report, Stantec recommends that the City reduce the water capital charge and increase in the sewer capital charge. The proposed capital charges are presented in Table 1-6.

Table 1-6 Proposed Fiscal Year 2021 Water and Sewer Capital Charges per ERU

Per ERU	Water Capital Charge	Sewer Capital Charge
Proposed Capital Charge	$ 3,400	$ 2,100
Current Capital Charge	$ 4,900	$ 1,600

2. INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has conducted a comprehensive Utility Rate and Capital Charge Study Update (Study) for the water and sewer systems of the City of Annapolis (hereafter referred to as the City or Utility). This report presents the background, approach, methodologies, source data, assumptions, as well as the results and recommendations of the Study.

2.1 BACKGROUND

The City of Annapolis provides water and sewer service to residents and businesses located within the City, and a few areas outside the City. Service is currently provided to approximately 12,000 customers located inside the City and just over 800 outside the City. The water and sewer systems are managed by the City's Department of Public Works.

The City owns and operates a water system consisting of the recently constructed water treatment plant, with a maximum capacity of 8.0 MGD, approximately 140 miles of water lines ranging in size from 2 inches to 20 inches, and 5 distribution system storage tanks.

The City's sewer system consists of approximately 125 miles of gravity-fed collection mains, 25 pumping stations, and the Annapolis Water Reclamation Facility (AWRF). The AWRF is jointly owned by the City and Anne Arundel County. The City is allocated 6.7 MGD of permitted average daily capacity within the plant. In addition to providing sewer service to residential and commercial customers, the City provides sewer collection service to the U.S. Naval Academy.

The Annapolis City Council has adopted a policy that requires the City to engage an external consultant to annually review the financial performance of the water and sewer systems including the development of long-term financial plans. This policy augments and assists with validating the detailed financial forecasting completed internally by City staff.

2.2 STUDY OBJECTIVES

The scope of service identified for the Study includes the following tasks:

Review Customer Usage Profile – Conduct a detailed review of the customer counts and annual consumption for the City's water and sewer customer base. The detailed review examines usage trends and patterns within the current water usage rate structure.

Perform a Revenue Sufficiency Analysis Update – Populate and update a multi-year forecasting model for the City's water and sewer system that will determine the level of annual revenue required to satisfy projected annual operating, debt service, and capital cost requirements, as well as maintain adequate reserves.

Demonstrate Customer Impacts – Demonstrate the impact of the recommended financial plan on the customers of the water and sewer systems.

Calculate Updated Capital Charges – Calculate updated water and sewer capital charges for new development connecting to the City's water and sewer systems.

3. DEMAND AND CUSTOMER ANALYSIS

3.1 CUSTOMER ANALYSIS

To complete the water and sewer rate study update, the City provided detailed customer and usage data from the City's utility billing system. The data was provided for FY 2019 by customer for each quarterly billing period. The customer count for each customer type and meter size is presented in Table 3-1.

Table 3-1 Water System Customer Counts

Meter Size	Residential	Multi-Family	Non-Residential	Total
5/8"	9,006	253	700	9,959
3/4"	69	8	16	93
1"	1,625	70	234	1,929
1 ½"	9	151	151	311
2"	1	159	220	380
3"	0	29	58	87
4"	0	16	67	83
6"	0	6	6	12
Total	**10,710**	**692**	**1,452**	**12,854**

The sewer system customer account data is provided for the same time period in Table 3-2.

Table 3-2 Sewer System Customer Counts

Meter Size	Residential	Multi-Family	Non-Residential	Total
5/8"	8,334	251	556	9,141
3/4"	68	8	14	90
1"	1,560	61	182	1,803
1 ½"	6	151	122	279
2"	1	158	180	339
3"	0	27	54	81
4"	0	15	57	72
6"	0	6	4	10
Total	**9,969**	**677**	**1,169**	**11,815**

The City has a very stable customer base with little fluctuation in the number of customers billed on an annual basis. For purposes of the rate study, the current number of customers is assumed to remain the same during the projection period.

3.2 DEMAND ANALYSIS

The usage data provided by the City for FY 2019 was analyzed as part of the study. Particular attention was paid to the ongoing changes in customer usage patterns in light of the inclining block rate structure used for the water system. Similar to most water utilities around the United States, the City of Annapolis has experienced declining water sales on a per customer basis over the past several years. Water customers continue to use less water due to more efficient water fixtures and conservation efforts to minimize their water bills. The total water and billable sewer usage in FY 2018 was very similar to FY 2019 numbers, with a slight increase in both water and sewer usage. Table 3-3 presents the FY 2018 and FY 2019 billed usage for the water and sewer systems.

Table 3-3 Water and Sewer Usage (1,000 gallons)

Customer Class	Water - FY 18	Water - FY 19	Sewer - FY 18	Sewer - FY 19
Single-Family Residential	478,852	487,847	459,725	468,398
Multi-Family	233,391	238,928	227,632	231,749
Non-Residential	391,747	379,042	317,473	327,037
US Naval Academy	-	-	187,759	201,874
Total	**1,103,990**	**1,105,817**	**1,192,589**	**1,229,058**

While there was a slight increase in water and sewer usage in FY19 as compared to FY18, to forecast water and sewer usage, our analysis assumes an ongoing annual reduction in per customer usage of 0.5%. This conservative assumption is consistent with the long-term trends experienced within the City.

The final component of the usage analysis was to examine how the City's residential water customers are using water within the inclining block rate structure. The usage patterns are shown in Table 3-4.

Table 3-4 FY 19 Residential Water Usage Patterns

Water Rate Tiers	Water Volume	Water Rate Tiers
Tier 1: 0 - 7,000 gallons	253,680	52%
Tier 2: 7,001 - 20,000 gallons	180,503	37%
Tier 3: Over 20,000 gallons	53,663	11%
Total	**487,847**	**100%**

While the overall usage has fluctuated year to year in the City, the usage patterns within the current water tiers have stayed fairly consistent. The usage distribution in FY13 was approximately 50%, 40% and 10% among the three tiers. The usage patterns shown in Table 3-4 are fairly consistent with results over the last several years. The usage breakdown shown in Table 3-4 is identical to the usage distribution observed in FY18.

In conclusion, the results of the detailed usage analysis for FY19 reveal relative stability in the usage patterns among the City's customer base over the last several years. However, it is important to note that the City should continue to monitor usage patterns.

4. REVENUE SUFFICIENCY ANALYSIS

4.1 DESCRIPTION

This section presents the methodology and results of the revenue sufficiency analysis (RSA) performed for the City's water and sewer systems. The RSA examines the ability of the water and sewer systems to fund the revenue requirements of the Utility with current water and sewer rates, and identifies any necessary adjustments required to ensure revenue sufficiency. The following subsections present a description of the source data, assumptions, and results of the RSA.

In order to populate the financial model, Stantec reviewed the City's historical and budgeted financial information regarding the operation of its water and sewer systems. Stantec also reviewed the City's multi-year capital improvement programs (CIP), and documented the City's current debt service obligations and covenants, or promises made to lenders, relative to net income coverage requirements, reserves, etc. Stantec also counseled with City staff regarding other assumptions and policies that would affect the financial performance of the Utility, such as changes in system processes or other factors that might impact system expenditures and/or revenues. Finally, Stantec completed a detailed review of historical usage by customer class to assist in the development of demand projections.

All of the City's updated information was entered into the City's existing water and sewer financial model and the model was reviewed for accuracy. The projection period within the model was also extended to provide a full ten-year projection period (FY 2021 to 2030).

Once the financial model was reviewed and updated, Stantec reviewed alternative multi-year financial management plans and corresponding water and sewer rate revenue adjustment plans through an interactive work session with City staff. The work session focused on the capital improvement plan, including discussion surrounding funding sources and spending levels. Each of the potential scenarios were evaluated in light of key financial metrics for the Utility including cash reserves, debt service coverage requirements, and customer bill impacts. After discussions and scenario analysis, Stantec developed the recommended financial management plan and corresponding plan of annual water and sewer rate revenue adjustments presented in this report. The financial plan was developed for the full 10-year projection period with recognition that the City will evaluate the plan annually and make adjustments as necessary given changing conditions within the Utility.

4.2 SOURCE DATA AND ASSUMPTIONS

The following subsections present the key source data and assumptions relied upon in conducting the RSA.

4.2.1 Fund Balances & Reserves

The FY 2019 Comprehensive Annual Financial Report (CAFR) and supporting trial balance files provided by City staff were used to establish the beginning FY 2020 balances for City's water and sewer system. As

of the end of FY 2019, the City had approximately $24.86 million in total fund balance. Included within the total fund balance is $7.63 million which is restricted per the City's bond covenants. The restricted reserves include a debt service reserve of $4.03 million, a repair and replacement reserve of $0.68 million, and operating reserves of $2.92 million. The remaining $17.23 million is considered unrestricted. The total reserves for water system equal $16.72 million and the reserves for sewer system total $8.14 million.

4.2.2 Revenues

The revenues utilized in the RSA reflect an evaluation of multiple years of historical results. Revenues consist of rate revenue, interest income, and other minor revenue from miscellaneous service charges. FY 2020 rate revenue is based upon FY 2019 actual results, adjusted by the 3.0% increase in water and sewer rates adopted for FY 2020. To evaluate the sufficiency of current revenue levels to meet the funding requirements of the water and sewer systems, the revenues are forecasted at current rates with no growth in customers and the annual reductions in demand mentioned in the previous section of this report.

Projected revenues at current rates and miscellaneous revenues are shown below in Table 4-1 for the water system and Table 4-2 for the sewer system. The charges for services reflect the assumed annual decline in metered water and sewer service on a per account basis.

Table 4-1 Projected Water Revenues at Current Rates ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Charges for Services - Water	$7.48	$7.45	$7.42	$7.39	$7.36	$7.32	$7.29	$7.26	$7.23	$7.20
Other Miscellaneous Revenue	$0.56	$0.55	$0.55	$0.55	$0.54	$0.54	$0.54	$0.54	$0.53	$0.53
Total Water Gross Revenues	**$8.04**	**$8.00**	**$7.97**	**$7.94**	**$7.90**	**$7.87**	**$7.83**	**$7.80**	**$7.76**	**$7.73**

Table 4-2 Projected Sewer Revenues at Current Rates ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Charges for Services - Sewer	$7.88	$7.85	$7.81	$7.78	$7.74	$7.71	$7.68	$7.64	$7.61	$7.58
Other Miscellaneous Revenue	$0.45	$0.44	$0.44	$0.44	$0.44	$0.43	$0.43	$0.43	$0.43	$0.43
Total Sewer Gross Revenues	**$8.32**	**$8.29**	**$8.25**	**$8.21**	**$8.18**	**$8.14**	**$8.11**	**$8.07**	**$8.04**	**$8.00**

4.2.3 Operating Expenditures

The Utility's operating expenditures include all operating and maintenance expenses, transfers, debt service requirements, and minor capital outlay. The RSA based operating expenditure projections on the individual expense categories and expense amounts within the FY 2020 Adopted Budget and the FY 2021 Proposed Budget, adjusted annually thereafter based upon assumed cost escalation factors that were

reviewed with City staff (with the exception of annual debt service expenses which reflect the repayment schedules of each outstanding bond/loan). Based on a historical review of the City's budget-to-actual spending, no execution adjustment was made within the forecast as the Utility has historically executed the full budget. It should be noted that the sewer budget for FY21 reflects a reduction in wastewater expenses at the wastewater treatment plant due to nutrient credits. This reduction of $0.6 million is anticipated to continue for four years with the removal of the credits in FY25.

4.2.4 Existing Debt Service

The City currently has several outstanding debt service issuances within the water and sewer fund. Specifically, the water and sewer funds debt issuances include 2019 General Obligation public improvement bonds, 2015 revenue bonds and a 2013 loan from the Maryland Department of Environment (MDE) that was used to fund the construction of the water treatment plant. In addition to the existing debt service, the City provided a debt service schedule associated with the construction of a new Public Works maintenance facility. The debt service for this facility is allocated between water, sewer, stormwater and refuse with payments beginning in FY 2022. The detailed annual debt service amortization schedules for all existing obligations were provided by City staff and included in the RSA.

4.2.5 Capital Improvement Program

City staff provided the multi-year Capital Improvement Program (CIP) in project level detail. Once the capital plan was updated in the model, the annual funding sources for the capital projects were discussed in great detail with City staff during the work session. Recent capital projects have been funded by a combination of debt and current revenues. While the City will continue to utilize bond funding in future years, many of the projects that the City has identified in its capital improvement program are recurring replacement-type projects. It is common to fund at least a portion of these types of projects with current revenues (known as Pay-As-You-Go). This approach reduces the annual interest expenses borne by the City and recognizes that existing users of the system are benefiting from the improvements to the system.

Based on the available cash within the Water and Sewer Fund and the minimum reserve requirements, Stantec recommends that the City continue to use current revenues to fund a portion of the CIP. Specifically, the financial plan assumes that beginning in FY 2021, the City will use cash to fund approximately 30% of the annual capital projects over the projection period. This level will allow the Utility to maintain its minimum reserve balances, while limiting impacts to water and sewer customers. The City's ten-year CIP projection includes approximately $49.15 million of water-related capital projects and $23.38 million of sewer-related capital projects.

4.2.6 Minimum Reserve Policy

Reserve balances for utility systems are funds set aside for a specific cash flow requirement, financial need, project, task, or legal covenant. These balances are maintained in order to meet short-term cash flow requirements, and at the same time, minimize the risk associated with meeting the financial obligations and continued operational and capital needs under adverse conditions. The level of reserves maintained by a

utility is an important component and consideration of developing a utility system multi-year financial management plan.

Many utilities, rating agencies, and the investment community as a whole place a significant emphasis on having sufficient reserves available for potentially adverse conditions. The rationale related to the maintenance of adequate reserves is twofold. First, it helps to assure a utility that it will have adequate funds available to meet its financial obligations during unusual periods (i.e. when revenues are unusually low and/or expenditures are unusually high). Second, it provides funds that can be used for emergency repairs or replacements to the system that can occur because of unanticipated system failures or natural disasters.

By policy, the City has identified fund reserves and restricts the use of specific fund balances each year. Operating reserves are set to equal 180 days of annual operating and maintenance (O&M) expenses, including 120 days of annual O&M expenses in an unrestricted reserve and 60 days of annual O&M expenses in a restricted reserve. Repair and replacement reserves are required for the water treatment plant. The debt service reserve is restricted as required by the City's bond covenants. The total combined cash balances, consisting of the restricted and unrestricted reserves, are shown for the entire planning period in Table 4-5. The table demonstrates that the water and sewer system would exhaust all reserve balances by FY 26, based on the projected system revenue requirements and anticipated revenues at current rates (i.e. assuming the City does not adjust water and sewer rates in future years).

4.3 RESULTS

Based on the RSA, it was determined that the City's current water and sewer rates will not be sufficient to meet the funding requirements of the water and sewer systems over the next several years. A summary of the water system operating and capital expenses (also known as system revenue requirements) are illustrated in Table 4-3, along with the anticipated water revenues at the current water rates.

Table 4-3 Projected Water Operating and Capital Expenses ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Total Operating Expenses	**$4.80**	**$4.94**	**$5.09**	**$5.24**	**$5.39**	**$5.55**	**$5.71**	**$5.88**	**$6.05**	**$6.22**
Capital Expenses										
Cash Funded Capital	$1.20	$1.47	$1.77	$1.49	$1.47	$1.47	$1.47	$1.47	$1.47	$1.47
Existing Debt Service	$3.11	$3.34	$3.33	$3.32	$3.32	$3.31	$3.31	$3.31	$3.30	$3.25
Projected Debt Service	$0.00	$0.20	$0.45	$0.74	$0.99	$1.24	$1.48	$1.73	$1.98	$2.22
Total Capital Expenses	**$4.31**	**$5.01**	**$5.55**	**$5.55**	**$5.78**	**$6.02**	**$6.26**	**$6.51**	**$6.75**	**$6.94**
Total Water Expenses	**$9.11**	**$9.95**	**$10.64**	**$10.79**	**$11.17**	**$11.57**	**$11.97**	**$12.39**	**$12.80**	**$13.16**
Current Water Revenues	**$8.04**	**$8.00**	**$7.97**	**$7.94**	**$7.90**	**$7.87**	**$7.83**	**$7.80**	**$7.76**	**$7.73**

A summary of the sewer system operating and capital expenses (also known as system revenue requirements) are illustrated in Table 4-4 along with the anticipated sewer revenues at the current sewer rates.

Table 4-4 Projected Sewer Operating and Capital Expenses ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Total Operating Expenses	$5.94	$6.29	$6.50	$6.72	$6.93	$7.19	$7.45	$7.73	$8.01	$8.31
Capital Expenses										
Cash Funded Capital	$0.00	$0.68	$0.68	$0.68	$0.68	$0.68	$0.68	$0.68	$0.68	$0.68
Existing Debt Service	$0.82	$0.88	$0.88	$0.88	$0.87	$0.88	$0.87	$0.87	$0.88	$0.91
Projected Debt Service	$0.00	$0.04	$0.16	$0.59	$0.71	$0.82	$0.93	$1.05	$1.16	$1.27
Total Capital Expenses	**$0.82**	**$1.60**	**$1.72**	**$2.15**	**$2.26**	**$2.38**	**$2.48**	**$2.60**	**$2.72**	**$2.86**
Total Sewer Expenses	**$6.76**	**$7.89**	**$8.22**	**$8.87**	**$9.19**	**$9.57**	**$9.93**	**$10.33**	**$10.73**	**$11.17**
Current Sewer Revenues	**$8.32**	**$8.29**	**$8.25**	**$8.21**	**$8.18**	**$8.14**	**$8.11**	**$8.07**	**$8.04**	**$8.00**

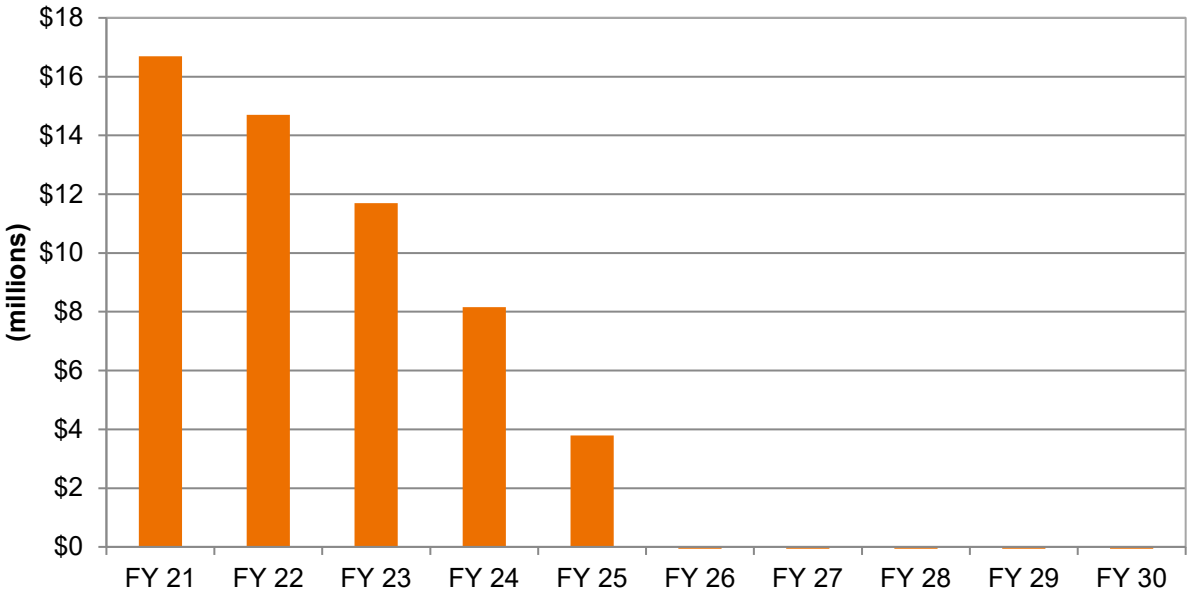
As demonstrated in Tables 4-3 and 4-4, the revenues from current water and sewer rates will not be sufficient to meet the total expenses of the water and sewer systems in each year of the projection beginning in FY 21 for water and FY 24 for sewer. The water and sewer system unrestricted cash balance will be depleted over the next several years if water and sewer rates are not adjusted as shown in Table 4-5.

Table 4-5 Water and Sewer System End of Year Unrestricted Cash Balances ($ millions)

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 21	FY 30
Water System	$11.02	$9.17	$6.59	$3.90	$0.76	-$2.81	-$6.84	-$11.31	-$16.23	-$21.56
Sewer System	$5.68	$5.53	$5.11	$4.25	$3.02	$1.36	-$0.71	-$3.23	-$6.21	-$9.68
Total Combined Cash Balance	$16.70	$14.70	$11.69	$8.16	$3.79	-$1.45	-$7.55	-$14.55	-$22.44	-$31.24

The projected combined cash balance for the Water and Sewer Fund based on current water and sewer rates is presented in Figure 4-1.

Figure 4-1 Total End of Year Unrestricted Water and Sewer Cash Balance



As demonstrated in Table 4-5 and Figure 4-1, if no adjustments are made to current rates, the City will not be able to maintain the necessary cash balances to operate the systems and would exhaust all unrestricted cash reserves by FY 26.

In addition to maintaining sufficient fund balance, the annual revenues of the water and sewer system must be sufficient to meet the City debt service coverage requirements. The City's bond resolution requires that the revenue available for debt service must stay above 125% of senior lien debt service for the water and sewer utility combined. The City has taken an even more fiscally conservative approach above the resolution and strives to achieve a debt service coverage ratio of 150%. The debt service coverage for the City's senior lien debt over the projection period based on current rates is presented in Table 4-6.

Table 4-6 Senior Lien Debt Service Coverage

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Total Revenues Available for Coverage	$16.4	$16.3	$16.2	$16.2	$16.1	$16.0	$15.9	$15.9	$15.8	$15.7
Less Operating Expenses	($10.7)	($11.2)	($11.6)	($12.0)	($12.3)	($12.7)	($13.2)	($13.6)	($14.1)	($14.5)
Net Income Available for Debt Service	$5.6	$5.1	$4.6	$4.2	$3.8	$3.3	$2.8	$2.3	$1.7	$1.2
Annual Senior Lien Debt Service[(1)]	$1.8	$2.4	$2.7	$3.5	$3.8	$4.2	$4.6	$4.9	$5.2	$5.4
Debt Service Coverage Ratio (Min 1.5)	3.07	2.12	1.69	1.21	0.98	0.78	0.61	0.46	0.33	0.22

(1) Includes only senior lien debt which is subject to 1.50 debt service coverage requirement.

As demonstrated in the Table 4-6, the Water and Sewer Fund revenue will not meet the debt service coverage ratio and would violate the bond covenant by FY 24. The annual debt service coverage for the

Water and Sewer Fund total debt service is shown in Table 4-7. The table shows similar results with coverage falling below 1.0 in FY 23.

Table 4-7 Total System Debt Service Coverage

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Total Revenues Available for Coverage	$16.4	$16.3	$16.2	$16.2	$16.1	$16.0	$15.9	$15.9	$15.8	$15.7
Less Operating Expenses	($10.7)	($11.2)	($11.6)	($12.0)	($12.3)	($12.7)	($13.2)	($13.6)	($14.1)	($14.5)
Net Income Available for Debt Service	$5.7	$5.1	$4.6	$4.2	$3.8	$3.3	$2.7	$2.3	$1.7	$1.2
Total Annual Debt Service	$3.9	$4.5	$4.8	$5.5	$5.9	$6.2	$6.6	$7.0	$7.3	$7.7
Debt Service Coverage Ratio	1.43	1.13	0.96	0.76	0.64	0.52	0.42	0.33	0.24	0.16

5. CAPITAL CHARGE ANALYSIS

This section of the report presents the objectives, approach, methodologies, source data, assumptions, as well as the findings and recommendations of the Capital Charge Analysis (Analysis) performed by Stantec for the City.

5.1 BACKGROUND

Capital charges are often referred to by different names such as capital charges, capacity fees, impact fees, system development charges, or connection fees. These charges operate as a "one-time" fee to recover the cost of capacity to serve new development and are widely applied by water and sewer utility providers. Such charges are the mechanism by which new growth can "pay its own way," mitigating the extent to which existing residents bear the cost of new or expanded facilities necessitated by new development. Capital charges are typically based upon the costs of the major backbone infrastructure necessary to provide service to all customers (i.e. water supply facilities, water and sewer treatment facilities, effluent disposal facilities, and water and sewer transmission mains).

5.2 METHODOLOGY

There are three primary approaches for the calculation of capital charges within the utility industry:

Buy-In – This approach uses the value of the utility's existing assets as the basis for the fee calculation. This approach is most appropriate for a system with considerable excess capacity such that most new connections to the system will be served by that existing available capacity.

Incremental – This approach uses the planned multi-year capital improvement program (CIP) that is associated with the provision of additional system capacity as the cost basis for the fee. This approach is most appropriate where 1) the existing system has virtually no excess capacity to accommodate growth, 2) the CIP has a significant number of projects that provide additional system capacity for each functional system component to be representative of the cost of capacity for an entire system, or 3) information on existing infrastructure by functional component is not readily available.

Combined – This approach uses the system's existing assets as well as the growth-related CIP as the cost basis for the fee calculation. This approach is most appropriate to use when 1) there is excess capacity in the current system that will accommodate some growth, but additional capacity is needed in the relative short-term as reflected in the CIP, and 2) the CIP includes a significant amount of projects that will provide additional system capacity, but does not necessarily have a sufficient amount of projects in each functional component to be reflective of a total system.

For the City, the vast majority of the CIP is related to renewal and rehabilitation, and as such, the buy-in methodology was selected as most appropriate for the calculation of capital charges.

5.3 SYSTEM VALUE

The first step in calculating the capital charges was to determine the cost basis for each system function. The net system value for use in determination of the capital charges is calculated using the following approach:

1) The City's accounting records for the Utility's existing and in-service assets were analyzed and used as the basis to determine the replacement cost new less depreciation (RCNLD) of each of the Utility's systems.

2) Any donated assets and/or assets not funded by the City (funded by grants, developer contributions, etc.) are removed from the cost basis of existing plant-in-service.

3) The resulting cost basis is divided by the total available capacity to determine the capital charge.

5.3.1 Fixed Assets

Stantec evaluated the Utility's fixed asset listing and accounting records which included an asset description, purchase date or year in service, original cost, useful life, and accumulated depreciation for each asset, as of June 30, 2019. To determine the current value for each component of the Utility, the net book value of each asset was escalated to estimate the current day replacement cost utilizing the Engineering News Record (ENR) Construction Cost Index, based upon the year the asset was placed in service. In this way, the RCNLD was developed for each asset and then allocated between water and sewer systems, and to each system's respective functional components.

5.3.2 System Credits

Upon determination of the replacement costs and planned capital, certain credits must be factored in recognition that certain assets were contributed to the City at no cost or funded via a grant and therefore should not be considered in the cost basis. It is also appropriate for utility systems to deduct associated debt obligations associated with funding of capital projects from the cost basis recognizing that the annual debt service payments are paid for largely from user rates once connected. The net present value (NPV) of the total outstanding principal for both water and sewer was deducted from the asset base for the capital charge calculation.

5.3.3 Summary of Cost Basis

Tables 5-1 and 5-2 present the resulting net system values for the water and sewer systems, respectively with the application of each of the components discussed in the preceding sections. The resulting net system value was used as the numerator and cost basis in capital charge calculations.

Table 5-1 Water Net System Value by Function

Description	Transmission & Distribution	Treatment & Supply	Total
RCNLD of Existing Assets	$ 68,693,774	$ 48,811,228	$ 117,505,002
Less: NPV Outstanding Principal	$ (6,849,337)	$ (4,866,883)	$ (11,716,219)
Net System Value	**$ 61,844,437**	**$ 43,943,066**	**$ 105,787,504**

Table 5-2 Sewer Net System Value by Function

Description	Collection	Treatment	Total
RCNLD of Existing Assets	$ 34,372,914	$ 24,049,235	$ 58,422,149
Less: NPV Outstanding Principal	$ (1,737,375)	$ (1,212,260)	$ (2,949,635)
Net System Value	**$ 32,635,539**	**$ 22,836,975**	**$ 55,472,514**

5.4 DETERMINATION OF SYSTEM CAPACITY

Once the total cost basis was determined, the next step was to determine the water and sewer system capacities as stated in terms of equivalent residential units (ERUs). Expressing the system capacities in terms of ERUs allows for the development of the unit pricing of capacity which is essential for the determination of capital charges. The total system capacity stated in MGD for each system, divided by the level of service stated in terms of gallons per day (GPD), is equal to the total number of ERUs that the Utility can serve with existing infrastructure outlined herein.

5.4.1 System Capacity

Treatment, supply, and disposal capacities are generally accepted to be either the physical or regulatory permitted capacity of such facilities and are typically readily available. The treatment capacities for the water and sewer systems were obtained from City staff. While capacity estimates for treatment, supply, and disposal functions are often readily available, transmission and other system component capacities are typically more difficult for a Utility to quantify. As such, for purposes of the Analysis, water transmission/distribution and sewer transmission/collection system capacity estimates were assumed as a function of the overall treatment capacities of the system. This approach reflects the expectation that the water and sewer transmission systems are generally aligned with treatment system capacities and will need to be sized accordingly.

Table 5-4 presents the system capacity identified for each functional component of the water and sewer systems.

Table 5-4 System Capacity

Description	Water	Sewer
System Capacity (MGD)	8.00	6.70

5.4.2 Level of Service

In the evaluation of the capital facility needs for providing water and sewer utility services, it is critical that a level of service standard be developed. The "level of service" means an indicator of the extent or degrees of service provided by, or proposed to be provided by a facility, based on and related to the operational characteristics of the facility. For water and sewer service, the level of service that is commonly used in the industry is the amount of capacity allocable to an ERU expressed as the amount of usage in gallons on an average daily basis. This allocation would generally represent the amount of capacity allowable to an ERU, whether such capacity is used on an average daily basis. Table 5-5 presents the level of service standards used in the calculation of the capital charges.

Table 5-5 Level of Service

Description	Water	Sewer
Level of Service (GPD)	250	250

5.5 RESULTS

The identified capital costs for each system's functional components were divided by the capacity for each component stated in terms of ERUs to determine the capacity cost per ERU for water and sewer. Based upon the cost and capacity information provided by the City and the Analysis described herein, the water capacity charge is $3,405 per ERU as compared to the existing fee of $4,900. The resulting sewer capacity charge is $2,132 per ERU as compared to the existing fee of $1,600. A comparison of the existing and proposed capital charges is presented in Table 5-6.

Table 5-6 Proposed Capital Charge per ERU

System	Existing	Calculated*	$ Change	% Change
Water	$ 4,900	$ 3,400	$ (1,500)	-31%
Sewer	$ 1,600	$ 2,100	$ 500	31%
Total	$ 6,500	$ 5,500	$ (1,000)	-15%

**Calculated capital charges rounded to nearest $100*

6. RECOMMENDATIONS

This section of the report presents the recommendations developed as part of the Study.

6.1 REVENUE SUFFICIENCY ANALYSIS

As demonstrated in the revenue sufficiency analysis results section, the City's current water and sewer rates are not sufficient to meet the funding requirements of each system over the projection period. Without adjustments to rates, the City will exhaust all reserves within the Water and Sewer Fund and violate its bond covenant. While it appears that these negative outcomes would not occur for a number of years, should the City hesitate and wait to address them, significant (double digit) rate adjustments will be required, which will most certainly result in rate shock within the community. We recommend that the City gradually increase water and sewer rates over the next several years to ensure revenue sufficiency within the Water and Sewer Fund. This approach will minimize the impacts on customer bills, while allowing the system to meet its financial requirements of the system.

The recommended plan of water and sewer rate revenue increases is presented in Table 6-1. As noted in the table, no rate adjustment is proposed for sewer rates in FY21. Given the reduction in operating costs within the sewer system associated with the nutrient credits allows for no adjustment in FY21 and minimal adjustments in future years.

Table 6-1 Recommended Plan of Water and Sewer Rate Revenue Increases

	FY 21	FY 22	FY 23	FY 24	FY 25
Effective Date	*7/1/2021*	*7/1/2022*	*7/1/2023*	*7/1/2024*	*7/1/2025*
Water Rate Increase	**4.00%**	5.00%	5.00%	5.00%	5.00%
Sewer Rate Increase	**0.00%**	2.00%	2.00%	2.00%	2.00%

It should be noted that the rate revenue adjustments identified in Table 6-1 for FY 2021-2025 are estimates at this time based on projected needs of the system. Stantec recommends that the City continue to evaluate the needs of the system on an annual basis consistent with its current policy. Tables 6-2 and 6-3 present the proposed water rates for FY 2021 along with the current sewer rates.

Table 6-2 Proposed FY 2021 Water and Sewer Fixed Charges

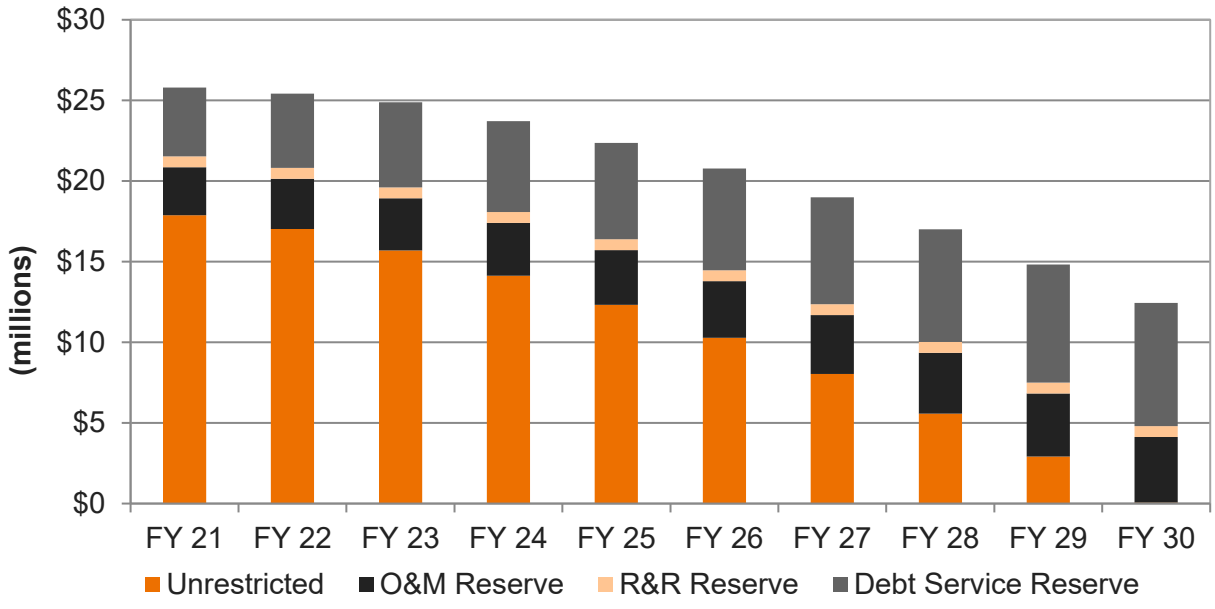
Meter Size	Water Fixed Charge	Sewer Fixed Charge
1" or Less	$12.28	$13.44
1 ½"	$61.38	$67.19
2"	$98.21	$107.50
3"	$196.42	$215.00
4"	$306.90	$335.94
6"	$613.80	$671.88

Table 6-3 Proposed FY 2021 Water and Sewer Usage Charges

Type	Usage Charge (per 1,000 gallons)
Residential Water	
Tier 1: 0 - 7,000 gallons	$3.87
Tier 2: 7,001 - 20,000 gallons	$7.76
Tier 3: Over 20,000 gallons	$11.62
Non-Residential Water	$5.77
Sewer Usage Rates	$5.91
Naval Academy Usage Rates	$5.25

In addition to the recommended rate adjustments, Stantec recommends that the City continue cash funding a portion (approximately 30%) of the annual capital plan. The use of cash funding will utilize some of the existing cash in the Water and Sewer Fund and will significantly reduce interest expenses over the projection period. Figure 6-1 presents the estimated annual cash balances within the Water and Sewer Fund based on the recommended financial management plan. The figure shows that by FY30, all unrestricted cash will be exhausted. Should the forecast of revenues and expenditures match the results of this study, modest additional increases will be required in future years above the increases presented in this Report to ensure that the City maintains adequate cash balances.

Figure 6-1 End of Year Water and Sewer Cash Balances by Reserve Type



The financial management plan will also ensure that the City continues to meet its debt service coverage requirements over the next several years. Table 6-4 presents the annual coverage on senior lien debt over

the projection period. As shown in the table, the debt coverage drops below 1.5 in FY 27. Should the forecast of revenues and expenditures match the results of this study, modest additional increases will be required in future years above the increases presented in this Report to ensure that the City meets its debt service coverage policy of 1.50.

Table 6-4 Senior Lien Debt Service Coverage

	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Total Revenues Available for Coverage	$16.7	$17.1	$17.6	$18.1	$18.7	$19.2	$19.8	$20.4	$21.0	$21.6
Less Operating Expenses	($10.7)	($11.2)	($11.6)	($12.0)	($12.3)	($12.7)	($13.2)	($13.6)	($14.1)	($14.5)
Net Income Available for Debt Service	$5.9	$5.9	$6.0	$6.2	$6.3	$6.5	$6.6	$6.8	$6.9	$7.1
Annual Senior Lien Debt Service[(1)]	$1.8	$2.4	$2.7	$3.5	$3.8	$4.2	$4.6	$4.9	$5.2	$5.4
Debt Service Coverage Ratio (Min 1.5)	3.23	2.48	2.20	1.78	1.65	1.54	1.45	1.38	1.33	1.31

(1) Includes only senior lien debt which is subject to 1.50 debt service coverage requirement.

6.2 CAPITAL CHARGE ANALYSIS

Stantec recommends that the City update the current capital charges for water and sewer to reflect the calculated capital charges of $3,400 for water and $2,100 for sewer. These charges are presented below along with a comparison to the current capital charges.

Table 6-5 Proposed Capital Charge per ERU

System	Existing	Calculated	$ Change	% Change
Water	$ 4,900	$ 3,400	$ (1,500)	-31%
Sewer	$ 1,600	$ 2,100	$ 500	31%
Total	$ 6,500	$ 5,500	$ (1,000)	-15%

Stantec recommends that the City should perform an update to this analysis every three to five years so that as the cost of providing water and sewer system capacity are reflected in the capital charges.

7. CUSTOMER IMPACTS & COMPARISONS

The recommendations developed as part of the revenue sufficiency analysis will have an impact on the water bills for customers served with water service by the City. The following figures demonstrate the impacts to a typical residential and non-residential customer within the City over the next three years.

Figure 7-1 Quarterly Water & Sewer Bill for Typical Residential Customer (12,000 gallons)

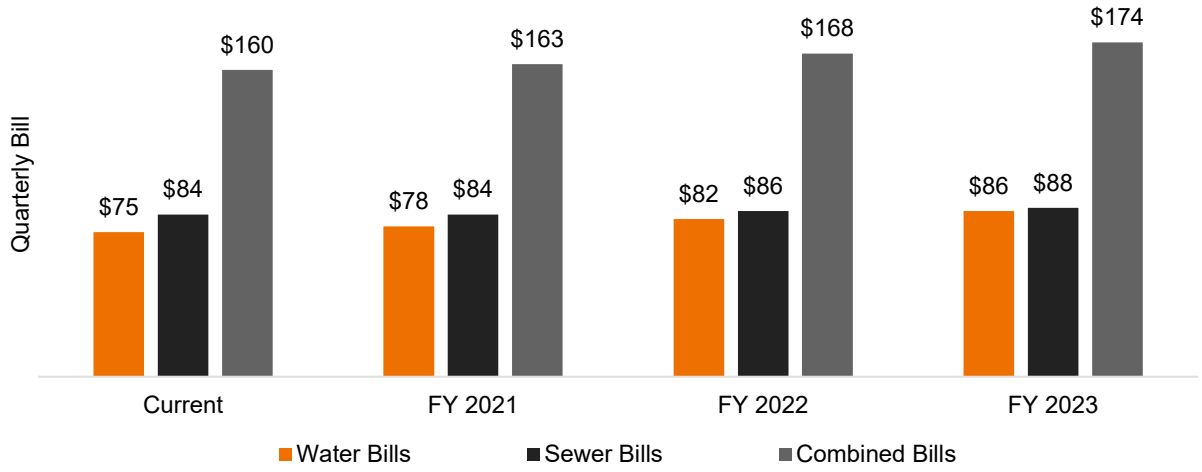
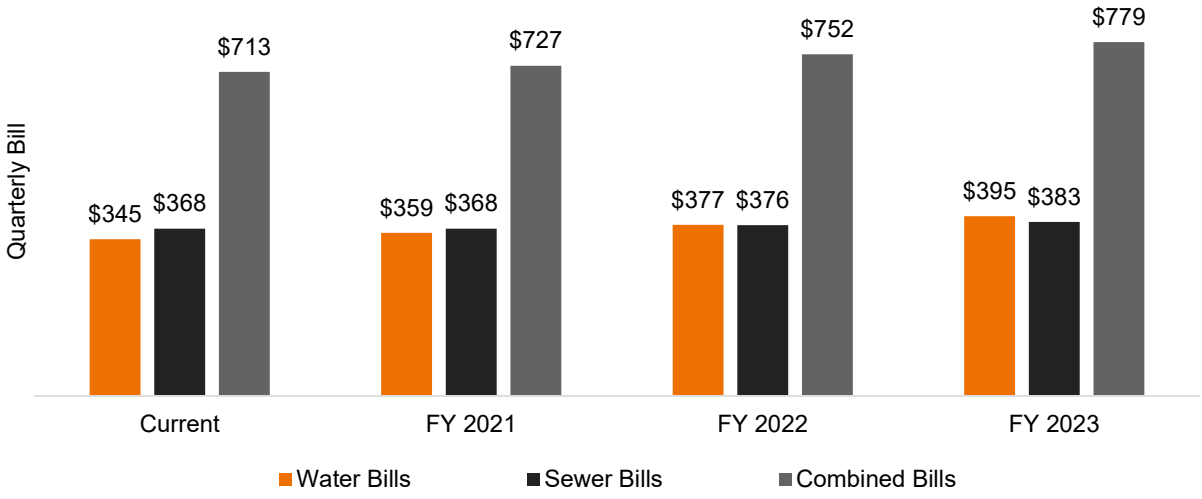


Figure 7-2 Quarterly Water & Sewer Bill for Typical Non-Residential Customer (60,000 gallons)



The comparison of current and proposed water and sewer rates with those assessed by surrounding jurisdictions can provide perspective on the level of bills paid by customers located within the City. The following figures were developed to provide a comparison of what a typical residential customer pays for water and sewer service in surrounding jurisdictions. It is important to note that the comparison community

bills reflect current rates and do not reflect potential rate adjustments in FY 21, for which data is not yet available.

Figure 7-3 Quarterly Water Bill Comparison (1" Meter, 12,000 gallons per quarter)

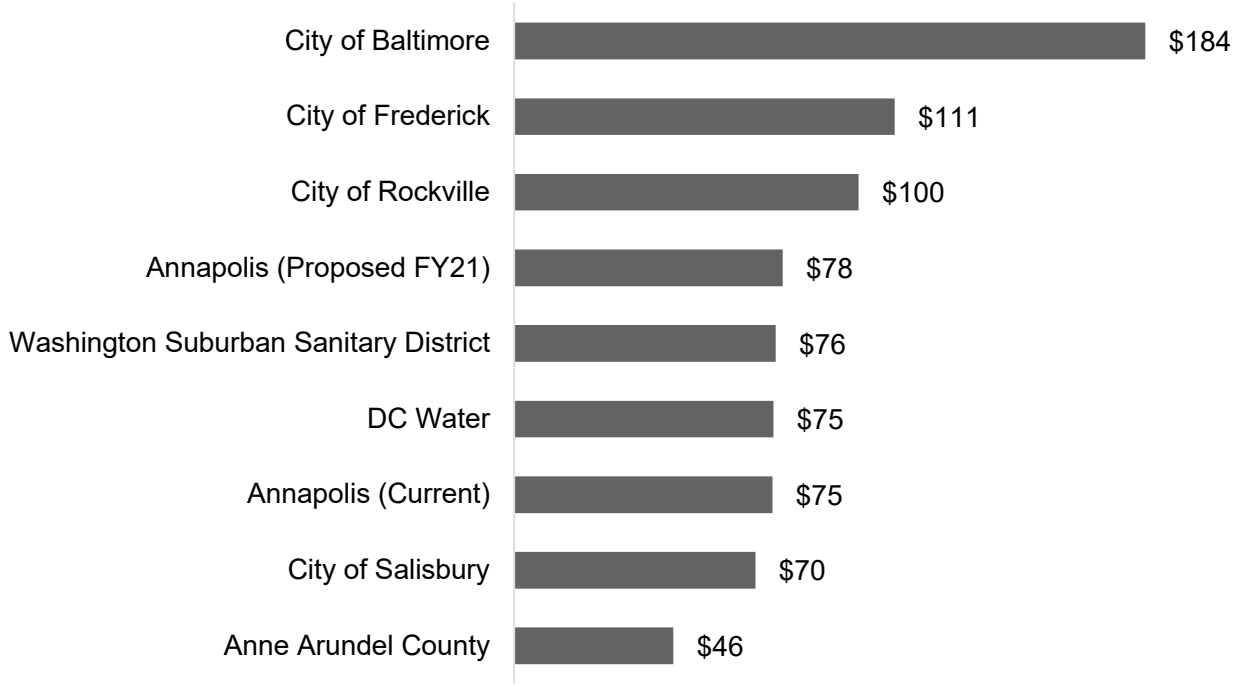


Figure 7-4 Quarterly Sewer Bill Comparison (1" Meter, 12,000 gallons per quarter)

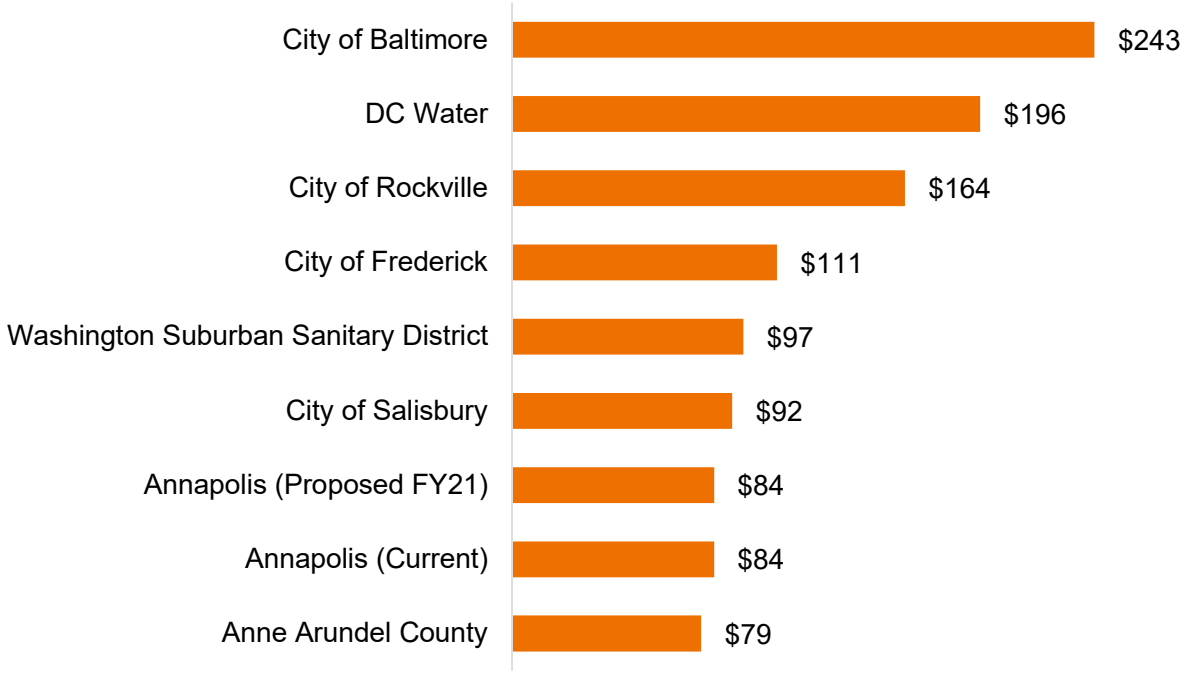
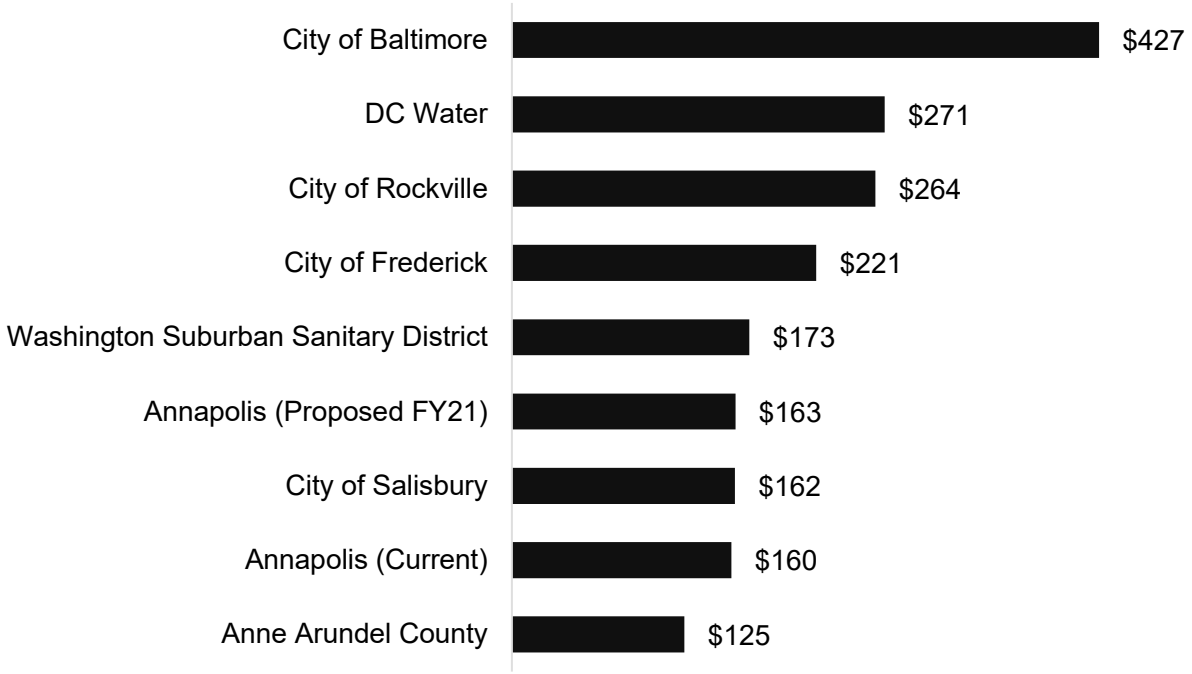


Figure 7-5 Quarterly Combined Water and Sewer Bill Comparison (1” Meter, 12,000 gallons per quarter)



As shown in the figures above, the water and sewer bills for a typical residential customer within the City of Annapolis will remain among the lowest in the region, even with the proposed adjustments to water rates in FY 2021.

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