DRAFT

HARRISBURG WATER RATE STUDY AND REVENUE ADEQUACY EVALUATION

May 2021

CITY OF HARRISBURG℠

AE2S

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For

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Professional Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of South Dakota.

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Date: May 12th, 2021 **Registration Number:** PE-14862

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List of Acronyms

AE2S	Advanced Engineering and Environmental Services, LLC
AWWA	American Water Works Association
CIP	Harrisburg's 2021 – 2025 Capital Improvements Plan
DSCR	Debt service coverage ratio
FCR	full cost recovery
GIS	geographic information system
L&C	Lewis & Clark Regional Water System
LCRWS	Lincoln County Rural Water System
O&M	operation and maintenance (costs)
SRF	State Revolving Fund

Executive Summary

Harrisburg has experienced significant growth in recent years and expects a similar trend to continue for the next 5-10 years. Significant growth coupled with up-keep of capital reinvestment presents challenges for the City to maintain desired reserve targets while generating revenue through affordable and justifiable rates.

Harrisburg values:

- healthy cash reserve to enable capital investment for both expansion and renewal of the water system,
- rate structure that promotes responsible water use through justified price signals,
- and rates that are affordable yet fully fund the revenue requirements of the water system in any one year.

The goal of the study is to provide a 10-year comprehensive financial plan for the water system, covering rates, capital investment, debt financing, and reserve funding. The focus of the study was to develop an approach that would fully fund system expenses, evaluate the timing of capital improvements and impacts of capital and operation and maintenance (O&M)-related costs, and enhance the existing rate structure to signal conservation and responsible water use.

Chapter 1.0 Introduction and Background

Harrisburg has a well-developed 10-year CIP. However, revenue projections incorporating growth and inflationary rate increases will not allow the City to maintain desired cash balances and recover all costs of operating the water system each year for the next 10-years. The goal of this study is to determine the most effective rate strategy that will allow for planned CIP activities to occur when desired and/or necessary.

1.1 Study Objectives and Deliverables

The overall objectives and associated deliverables of this study include:

- **Primary**:
  - Options for rate structure through rate design focused on full cost recovery and revenue stability,
  - Evaluation of revenue sufficiency over the 10-year planning horizon.
- **Secondary**: Planning tool for on-going analysis.

1.2 Study Overview

To meet Harrisburg's objectives, the study consisted of the following components:

- Development of Revenue Requirements,
- Development and Evaluation of Rate Design Alternatives,
- Cost Benchmarking,
- 10-Year Revenue Projections and Evaluation of Revenue Adequacy based on Recommended Rate Design.

1.3 Existing Rate Structure

The City of Harrisburg provides water service to approximately 2,230 accounts, including Single-Family Residential, Multi-Family Residential, and Commercial/Industrial Users which include the School. The City's existing water rate structure consists of:

- Fixed monthly service charge applied by meter size,
- 4-tier inclining block rate applied per thousand gallons (kgal) of water use for Single-Family Residential Users,
- Constant block volumetric rate applied per kgal of water use for Multi-Family Residential and Commercial/Industrial users,

- Fixed base fee surcharge to cover Debt Service for the HWY 115 Water Main Project (WSC-04)
- Two volumetric surcharges applied per kgal to all users for the Lewis & Clark Prepay (WSC-02) and Water Tower (WSC-03) Debt Service.

The existing (2021) fixed charges and volumetric rates are shown in Table 1 and 2, respectively.

Table 1: 2021 Monthly Fixed Service Charge and Debt Surcharge Structure

Meter Size	Monthly Service Charge for all User Classes	Fixed Base Fee Surcharge (WSC-04)
5/8" & 3/4"	$7.66	$4.84
1"	$10.74	
1.5"	$24.10	
2"	$35.25	
3"	$69.83	
4"	$133.94	

Table 2: Volumetric Rate and Surcharge Structure

Volumetric Charge Structure by User Class	$/kgal	Volumetric Surcharge ($/kgal)
Single-Family Residential		WSC-02 = $0.99, WSC-03 = $1.35
Tier 1: 0 – 3,000 gal	$0.90	
Tier 2: 3,001 – 6,000 gal	$3.40	
Tier 3: 6,001 – 9,000 gal	$8.69	
Tier 4: ≥ 9,001 gal	$13.85	
Multi-Family Residential & Commercial/Industrial		
All Flow	$3.64	

1.4 Existing Rate Revenues

Table 3 summarizes the total 2021 user rate revenues (Test Year Revenue) based on expected accounts and water sales using the existing rate structure. In addition, the City generates approximately $150,000 annually through water connection fees, hookup fees, water tower antenna rentals, and other miscellaneous charges.

Table 3: Test Year Revenue by User Class

User Class	Test Year Revenue
Single-Family Residential	$1,131,681
Multi-Family Residential	$31,813
Commercial/Industrial	$168,385
Total	**$1,331,249**

Chapter 2.0 Revenue Requirements

The analyses completed as part of the Water Rate Study were based on total projected revenue requirements. Revenue requirements are the total annual expenses required for a utility to provide water services. Two types of revenue requirements must be considered to achieve full cost pricing – O&M-related and Capital-related (Figure 1). In this study, revenue requirements were developed by establishing O&M expenses, debt service principal and interest expenses, capital funded through rates, and contributions to cash reserves.

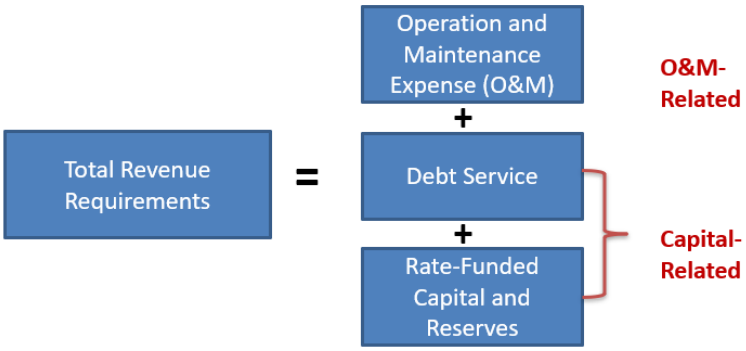

Figure 1: Illustration of Total Revenue Requirements

2.1 Forecasted Water Fund Expenditures

To develop water rates for 2022 and make rate projections through 2032, each line item within the O&M, Capital, and Debt budget functions was forecasted in the following manner:

- **O&M:** indexed O&M related Costs identified in the 2021 – 2025 Capital Improvement Plan (CIP) to appropriate year. If an O&M related budget line item was not addressed in the CIP, then that line item was forecasted using an annual inflationary increase/index of 4.0%.
- **Capital:** Rate Funded Capital related costs identified in the CIP were indexed to the appropriate year. Depreciation was calculated for each year through 2032 with consideration of how Depreciation would change as additional infrastructure identified in the CIP was put into service. If in any year the sum of Rate Funded Capital and Debt Service Principal was less than the Annual Depreciation amount; a Depreciation Based Contribution to Reserves was budgeted to maintain best practice. Best practice being that the minimum annual Contribution to Capital Reserves/Capital Investment should be greater than or equal to Annual Depreciation.
- **Debt:** Summation of Principal and Interest expense on existing debt from amortization schedules, plus calculation of Principal and Interest on expected future debt service with the assumption, per the CIP, that any future debt would be financed using a 20-year SRF Loan at 3% interest.

Table 4, summarizes assumptions specific to each budget line item. Note that any costs indicated in Harrisburg's 2021-2025 Capital Improvement Plan (CIP) were assumed to be in 2020 dollars.

Table 4: Assumptions for Forecasting Water Fund Expenditures through Year 2032

Line	Water Fund Expenditure	Budget Function	Forecasting Assumptions
1	Attorney	O&M	Annual inflation.
2	Engineering	O&M	Engineering Studies quantified in CIP indexed to appropriate year.
3	Salaries and Wages	O&M	Annual inflation.
4	Social Security	O&M	Annual inflation.
5	Medicare	O&M	Annual inflation.
6	Retirement	O&M	Annual inflation.
7	Workman's Compensation	O&M	Annual inflation.
8	Group Insurance	O&M	Annual inflation.
9	Unused Compensation	O&M	Used as a placeholder to satisfy the assumption that all Employee Costs identified in the CIP, plus inflation, are the total employee related water fund expenditures.
10	Insurance	O&M	Annual inflation.
11	Professional Services & Fees	O&M	Annual inflation.
12	Publishing	O&M	Annual inflation.
13	Rentals	O&M	Annual inflation.
14	Repairs & Maintenance	O&M	Emergency Repairs quantified in CIP indexed to appropriate year.
15	Supplies & Materials	O&M	Assumes Equipment and Supplies quantified in CIP and indexed to appropriate year are additional to the 2021 budget amount for Supplies and Materials inflated by 4.0% annually.
16	Energy	O&M	Annual inflation.
17	Resale of Water Water for Resale	O&M	Combined into one budget line item and forecasted by calculating annual costs from various Harrisburg sources of supply, using effective water rates indexed by 4.0% annually, based on flow growth projections.
18	Travel & Conference	O&M	Annual inflation.
19	Utilities	O&M	Operational Costs as quantified in CIP indexed to appropriate year.
20	Land	Capital	Land Acquisition quantified in CIP indexed to appropriate year.
	Improvements other than buildings	O&M	Transferred to Line 30
21	Machinery & Equipment	O&M	Major Equipment Purchases quantified in CIP indexed to appropriate year.
22	Software	O&M	Annual inflation.
23	Books	O&M	Annual inflation.
24	Principal (DW-02, DW-03, DW-04, & Future)	Debt	Sum of principal in existing debt amortization schedules plus calculated principal payments for any future capital assumed to be financed through debt.
25	Interest (DW-02, DW-03, DW-04, & Future)	Debt	Sum of interest in existing debt amortization schedules plus calculated interest for any future capital assumed to be financed through debt.
26	Meter Deposit Refunds (Do not budget)	O&M	Annual inflation.
27	Subsidies	O&M	Annual inflation.
28	Telehandler Loan (DW portion)	O&M	Assumed to be constant cost of $5,000.00 per year through 2027 per narrative in CIP. Considered as O&M Expense due to nature of loan being *Machinery & Equipment* related.
29	Grader Loan (DW portion)	O&M	Assumed to be constant cost of $5,000.00 per year through 2027 per narrative in CIP. Considered as O&M Expense due to nature of loan being *Machinery & Equipment* related.
30	Rate Funded Capital OR Depreciation Based Contribution to Reserves	Capital	50% of the Sum of Annual Rate Funded Capital and/or Depreciation based calculation of contribution to Capital Reserves in CIP years where Annual Rate Funded Capital/Reserves + Sum of Debt Principal is less than Annual Depreciation. Outlier Rate Funded Capital years (2024, 2028, & 2030) not included in calculation of Average Rate Funded Capital. This calculation is based on the High Capital Reserve Target.

2.2 O&M

O&M requirements were indexed as described in Section 2.1. Figure 2 summarizes O&M requirements throughout the planning period and how they are expected to change. The most noteworthy O&M expenses are those associated with purchasing water and employee costs. As

Harrisburg continues to grow, more staff will be required to meet the administrative needs of the City, and more water will be required to meet the needs of its residents and businesses.

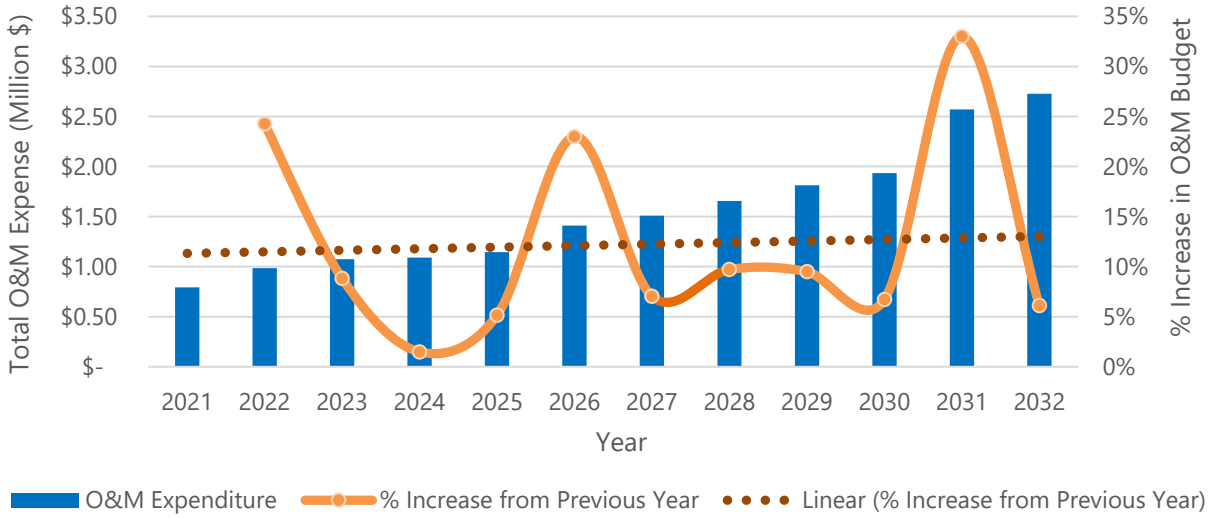

Figure 2: Forecasted O&M Expenditures

Flow or purchased water projections representative of 7% population growth each year through year 2024, and 4% population growth each year through year 2032, are illustrated in Figure 3. This figure further summarizes the actual calculated cost of supply each year. The cost of supply was calculated using the following assumptions:

- Harrisburg must first utilize supply contracted through LCRWS, then Sibley, IA, then L&C.
- Capacity charges (sunk cost) and water rates, which sum as the effective rate per 1,000 gallons, were assumed to increase by inflation (4%) on an annual basis.
- Lincoln County Transfers identified in the CIP are considered a purchased water cost and are expected to occur in years 2022 and 2023.
- All current and pending water purchase agreements were acknowledged.

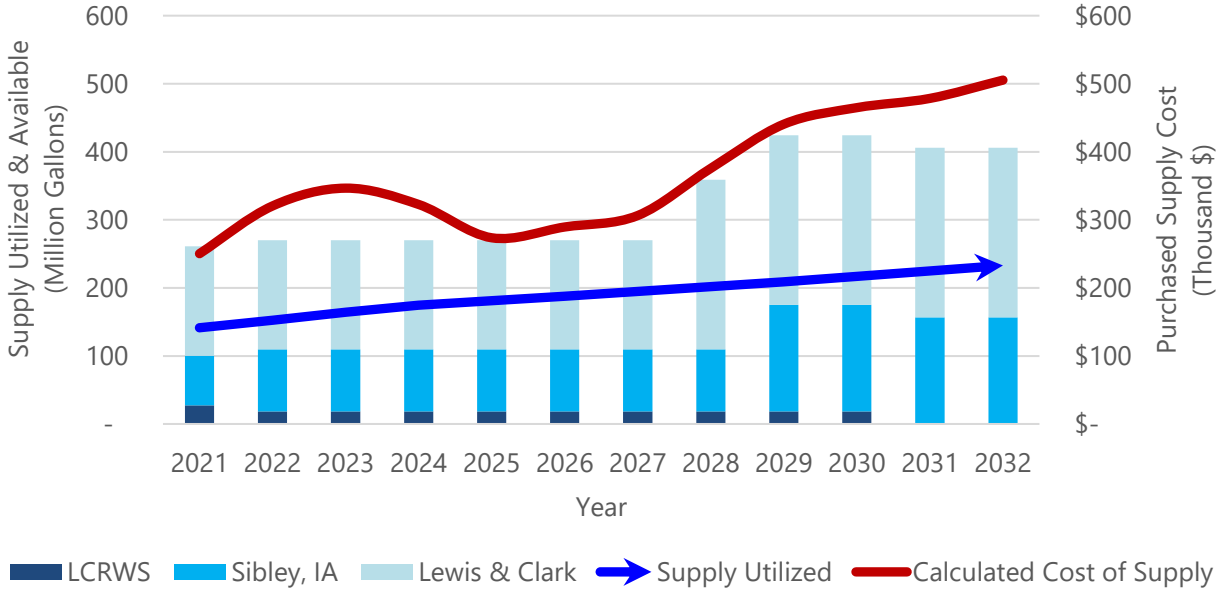

Figure 3: Supply Utilized and Purchase Cost

2.3 Debt Service

Harrisburg strives to make modest rate adjustments. A major component of the strategy required to achieve this is to determine the most efficient balance between debt and rate funded capital. While debt funding options such as SRF are relatively attractive considering fund availability, low interest rates, and reasonable loan terms (3% interest, 20-years); it is important to consider how taking on additional debt requires rate adjustments not just to satisfy debt principal and interest requirements, but also debt service coverage ratio (DSCR). Harrisburg's CIP projected that the following projects would utilize the SRF program for debt funding:

- Southeast Area Improvements - Phase 1: Perry Lane & Willow Street Area Water Main Installation in year 2024.
- 3rd Water Tower in year 2030.

This study analyzed rate adjustment requirements that would allow the City to always meet the SRF DSCR requirement of 110%. If the City were to debt fund the above-named projects, rate adjustments needed to just meet DSCR would have been very significant. Because of this, the results of the study recommend making an adjustment to the CIP assumptions regarding debt funding for the above-named projects to be cash funded and 25% cash funded respectively. Figure 4 below shows the comparison of DSCR through the planning period based on the current strategy suggested in the 2021-2025 CIP, and the recommended strategy which is critical to the effectiveness of modest rate adjustments.

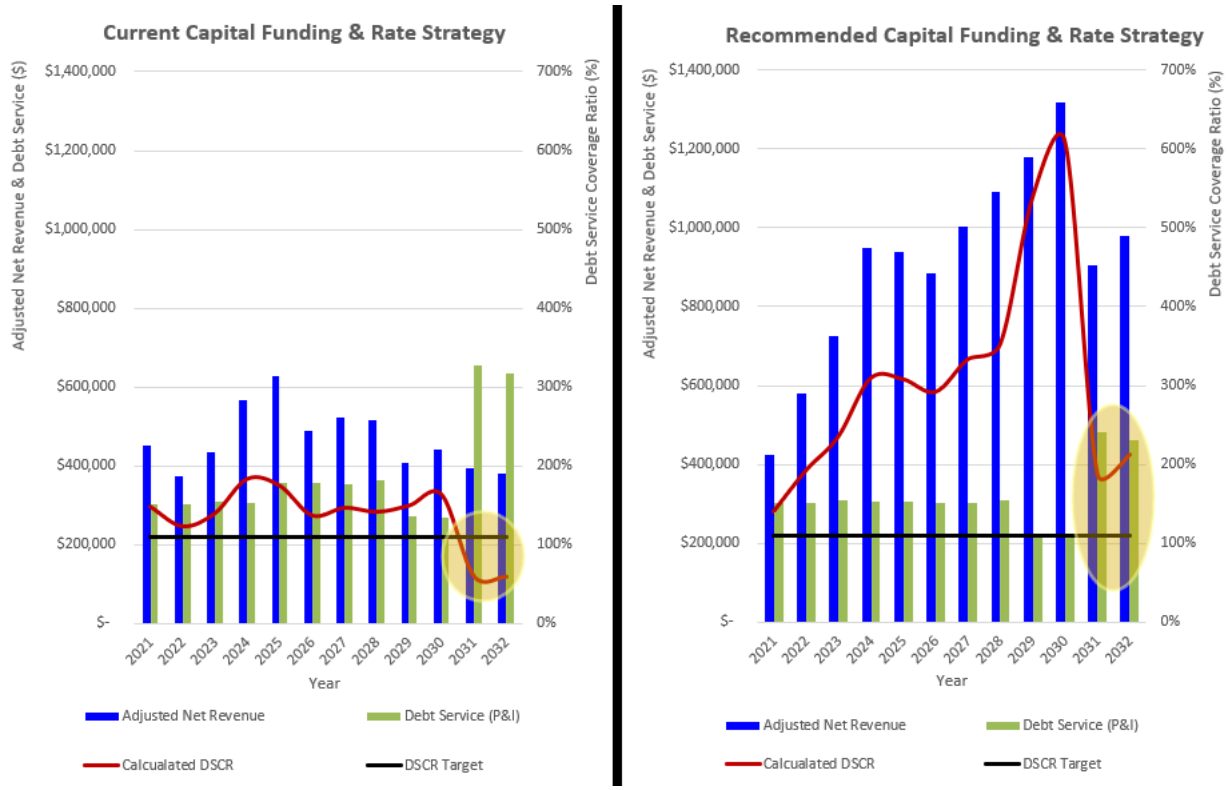

Figure 4: DSCR Comparison

2.4 Rate Funded Capital and Reserves

Best practice for minimum contribution to reserves is to use the rule of thumb that in any one year; the sum of a utilities debt principal plus rate funded capital should be greater than or equal to annual depreciation. As revenue requirements were developed for each year of the planning period, and the debt funding assumptions were modified to reflect what is described in Section 2.3; budget line item #30 as seen in Table 4 was calculated. If the sum of debt principal plus rate funded capital was less than annual depreciation - an equivalent amount to satisfy this best practice rule of thumb was included in the total revenue requirements. In Figure 5 the annual depreciation based contribution to reserves can be understood as the area in which the green line is below the red line.

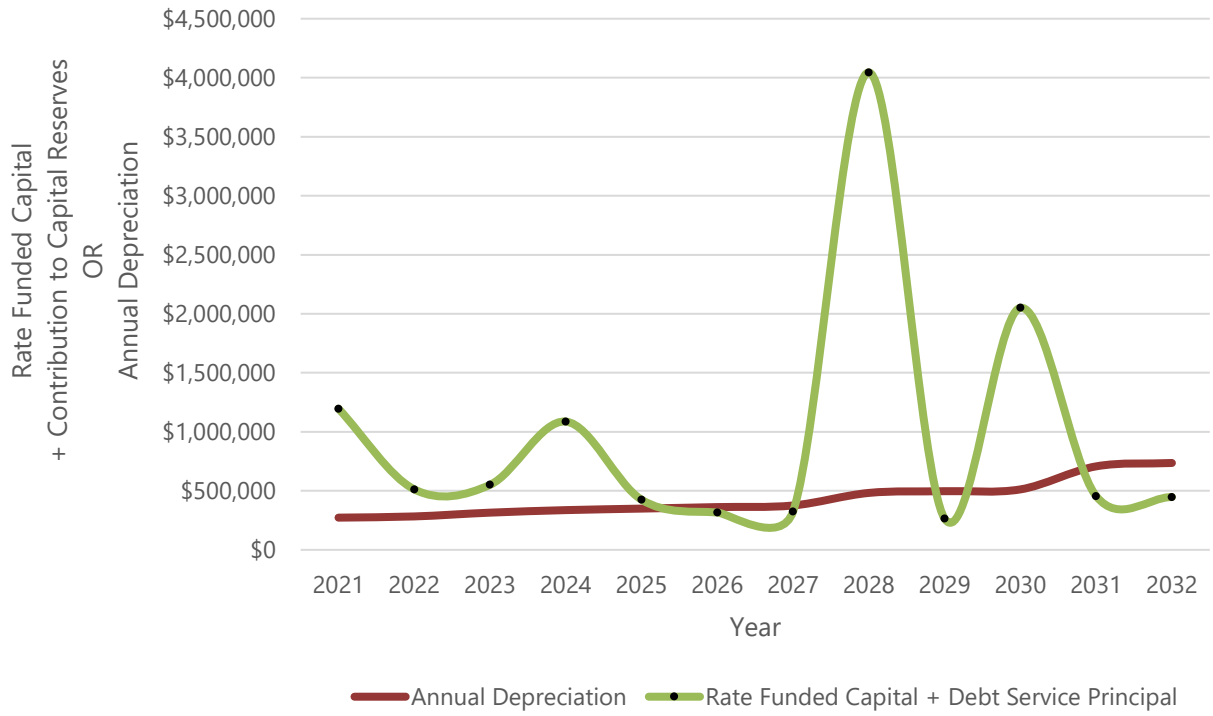

Figure 5: Capital Investments and Depreciation

Chapter 3.0 Rate Setting

The priority rate setting objective of this study focused on full cost recovery through fixed versus variable water rate components. Significant attention was paid to balancing concerns of affordability, political acceptance of rate impacts, revenue stability, and responsible water use.

3.1 Rate Design

Revenue requirements based on full cost recovery were calculated for each year through 2032. The current year (2021) was considered the Test Year. Revenue requirements for the Test Year were analyzed to understand how the current rate structure measured in terms of full cost recovery for each user class based on specific rate components. Rate structure components by revenue requirements per budget function are summarized in Table 5.

Table 5: Rate Structure Components by Revenue Requirements per Budget Function

		REVENUE REQUIREMENTS PER BUDGET FUNCTION		
		O&M	CAPITAL	DEBT
RATE STRUCTURE COMPONENTS	BASE FEE	CUSTOMER *$ per bill*		
		CAPACITY *$ per equivalent meter per bill*		
		STANDARD VOLUMETRIC CHARGES *$/1,000 gallons*		
			BASE FEE SURCHARGE *$ per bill*	
				VOLUMETRIC SURCHARGES *$/1,000 gallons*

Each line item of the water fund budget can be translated to a revenue requirement. Each revenue requirement is then assigned a budget function (O&M, Capital, or Debt). The calculation for each rate structure component based on revenue requirements per budget function, for any one year in the planning period, is shown in the Table 6.

The percent indicated in any cell on the following table was held constant throughout the planning period as rate components based on revenue requirements per budget function were calculated for every year. Upon calculation of the test year revenue requirements these were the percentages that most closely resembled the existing rate structure.

In the future, Harrisburg may desire to refine the philosophy behind calculation of each rate component. If this becomes the case, Table 6 will be especially useful.

Table 6: Calculation of Rate Component by Revenue Requirements per Budget Function

Revenue Requirements - Water Fund Expenditures	Budget Funct.	Customer *$/bill*	Capacity *$/eq. meter*	Standard Vol. *$/kgal*	Base Fee Surcharge *$/bill*	Vol. Surcharge *$/kgal*
Attorney	O&M		100%			
Engineering	O&M		100%			
Salaries and Wages	O&M	15%	25%	60%		
Social Security	O&M	15%	25%	60%		
Medicare	O&M	15%	25%	60%		
Retirement	O&M	15%	25%	60%		
Workman's Compensation	O&M	15%	25%	60%		
Group Insurance	O&M	15%	25%	60%		
Unused Compensation	O&M	15%	25%	60%		
Insurance	O&M			100%		
Professional Services & Fees	O&M	100%		0%		
Publishing	O&M	100%		0%		
Rentals	O&M			100%		
Repairs & Maintenance	O&M			100%		
Supplies & Materials	O&M			100%		
Energy	O&M			100%		
Resale of Water	O&M			100%		
Water for Resale				100%		
Travel & Conference	O&M	100%				
Utilities	O&M			100%		
Land	Capital		100%			
Machinery & Equipment	O&M		100%			
Software	O&M			100%		
Books	O&M			100%		
Principal (DW-02, DW-03, DW-04, & Future)	Debt				100% DW-04 and Future Debt	100% DW-02 and DW-03
Interest (DW-02, DW-03, DW-04, & Future)	Debt					
Meter Deposit Refunds	O&M			100%		
Subsidies	O&M	100%				
Telehandler Loan (DW portion)	O&M			100%		
Grader Loan (DW portion)	O&M			100%		
Rate Funded Capital OR Depreciation Based Contribution to Reserves	Capital			100%		

3.2 Fixed Monthly Service Charge

The total fixed monthly service charge is the sum of the customer charge, capacity charge, and base fee surcharge(s). The capacity charge is dependent on meter size. Equivalent meter ratios were modified to reflect AWWA equivalent meter ratios based on capacity of a ¾" meter. The changes to equivalent meter ratios are in Table 7.

For reference, a capacity charge for a 2" meter is 5.30 times more than for a ¾" meter based on the modified ratio.

Base fees calculated using the information in Table 6 and Table 7 for years 2022 through 2032 are shown in Table 8.

Table 7: Capacity Based Equivalent Meter Ratios

Meter Size	Existing Ratio	Modified Ratio
5/8" & 3/4"	1.00	1.00
1"	1.40	1.70
1.5"	3.10	3.30
2"	4.60	5.30
3"	9.10	10.00
4"	17.50	16.70

Table 8: Full Cost Recovery Base Fees by Meter Size for Years 2022 - 2032

		Base Fee by Meter Size					
		5/8" & 3/4"	1"	1.5"	2"	3"	4"
Year	2022	$ 8.97	$ 13.80	$ 25.86	$ 40.34	$ 74.13	$ 122.40
	2023	$ 9.47	$ 14.46	$ 26.92	$ 41.88	$ 76.77	$ 126.63
	2024	$ 9.97	$ 15.12	$ 27.98	$ 43.41	$ 79.42	$ 130.86
	2025	$ 10.47	$ 15.78	$ 29.03	$ 44.94	$ 82.06	$ 135.09
	2026	$ 10.97	$ 16.44	$ 30.09	$ 46.47	$ 84.70	$ 139.32
	2027	$ 11.48	$ 17.10	$ 31.15	$ 48.01	$ 87.35	$ 143.55
	2028	$ 11.98	$ 17.75	$ 32.20	$ 49.54	$ 89.99	$ 147.77
	2029	$ 12.48	$ 18.41	$ 33.26	$ 51.07	$ 92.63	$ 152.00
	2030	$ 12.98	$ 19.07	$ 34.31	$ 52.60	$ 95.27	$ 156.23
	2031	$ 13.48	$ 19.73	$ 35.37	$ 54.13	$ 97.92	$ 160.46
	2032	$ 13.98	$ 20.39	$ 36.43	$ 55.67	$ 100.56	$ 164.69

Figure 6 illustrates the percentage of O&M, capital, and debt within the sum of the customer and capacity charges, which again make up the base fee. Note that in year 2023 the percent capital in the base fee is approximately 15% higher than in any other year. This is due to the planned site purchase for an additional water storage facility in year 2023.

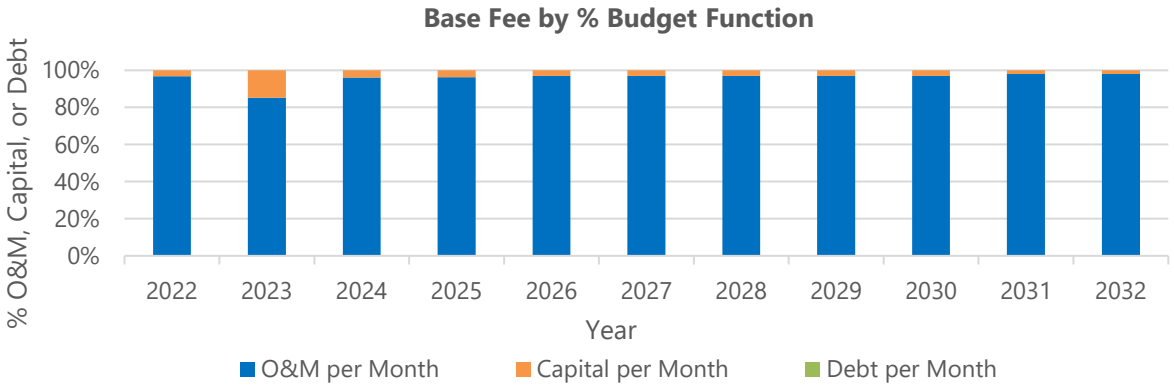

Figure 6: Monthly Base Fee as % O&M, Capital, or Debt for Years 2022 through 2032

3.3 Volumetric Rates

3.3.1 Justifying Tier Structure

The City of Harrisburg modified the constant block volumetric rate structure to a 4-Tier rate structure for the Single-Family Residential user class in October of 2018. The purpose of this modification was to encourage conservation through pricing mechanisms but avoid unduly penalizing single or elderly individuals.

Through this study, City staff assisted in defining the characteristic of each volumetric tier for the single-family residential user class. Furthermore, each tier ratio was re-evaluated using the rule of thumb that - the minimum ratio to send a price signal is 1.25.

Based on discussions with City staff and evaluation of percentile water use for customers classified as single-family residential; the 4-Tier volumetric rate structure was modified to better communicate and encourage responsible water use. The 4-Tier structure below is recommended to be implemented beginning in year 2022 for the single-family residential users.

Table 9: Recommended 4-Tier Rate Structure to Encourage Responsible Water Use Amongst Single-Family Residential Users

Tier	Tier Characteristic	Tier Cap (gallons/month)
1	Essential Use - Small Family/Elderly	3,000
2	Essential Use - Typical Family	6,000
3	Responsible Lawn Watering - Normal Rainfall Year	18,000
4	Excessive Use	> 18,001

Tier 3 of the 5-Tier rate structure is defined as responsible lawn watering in a normal rainfall year. The cap of 18,000 gallons for this tier was calculated by analyzing the median and average single-

family residential lot sizes per the zoning and land use data from the City GIS. The median and average lots sizes are 0.22 acres and 0.25 acres respectively. Additionally, the assumption that 45% of the lot is impervious was incorporated.

Using historical precipitation data, the average rainfall for the primary lawn watering months, June through September, is 3.75" of rain per month or 0.22" per week. Therefore, a normal rainfall year assumes 0.22" of rain per week for the months of June through September.

Based on the SDSU Extension Service Summer Lawn Care guidelines (David Chalmers, 2019); 1" of precipitation (rain + sprinkling) per week will allow a homeowner to maintain good lawn color and growth. Calculation based on the median-average single-family residential lot size, percent impervious, and average weekly rainfall for Harrisburg in the months of June through September - responsible lawn watering requires 12,000 gallons of water to achieve a sum of 1" of precipitation per week.

This calculation allows Harrisburg to better define and communicate purpose of the 3rd tier of the 4-Tier rate structure. Tier 4 is simply excessive water use and is designed to penalize users that use water irresponsibly based on a set of conditions that is representative of 99% of the single-family residential users.

Though this could be considered a significant adjustment, the modifications provide Harrisburg with; a scientific-based, justifiable tiered rate structure the encourages responsible water use but does not penalize single or elderly individuals. Table 10 compares tier caps, tier ratios (price signals), and the percent of accounts within each tier based on summer average water use amongst the single-family residential user class.

Table 10: Tier Cap, Tier Ratio, and Tier Utilization Comparison between Current & Recommended Tier Structures

Tier Characteristic	Current Rate Strategy Year 2021			Recommended Rate Strategy Beginning in Year 2022		
	Cap *gal/mo.*	Ratio	% of Accounts *Summer Average*	Cap *gal/mo.*	Ratio	% of Accounts *Summer Average*
Essential Use (Small Family/Elderly)	3,000	1.00	35%	3,000	1.00	35%
Essential Use (Typical Family)	6,000	3.78	43%	6,000	1.50	43%
Responsible Lawn Watering – Normal Rainfall Year	9,000	2.56	13%	18,000	2.50	21%
Excessive Use	> 9,001	1.59	10%	>18,001	4.00	1%

3.3.2 Standard Tier and All Flow Volumetric Charges

The volumetric charges assigned to; each tier of the 4-tier structure that applies to the single-family residential user class, and all flow for the multi-family residential and commercial/industrial user classes, were calculated for year 2032 using the set of conditions in Table 6 that establish volumetric rates based on full cost recovery. Table 11 summarizes the calculated volumetric charges for each tier and user class. Unlike the fixed charges that make up the base fee – standard volumetric charges do not meet FCR each year for any user class. However, the rate adjustments through year 2032 are intended to be modest yet designed to achieve full cost recovery for each user class by the end of the planning period.

Table 11: Standard Volumetric Charges by Tier and User Class based on Full Cost Recovery by Year 2032

	Standard Volumetric Charges by User Class				
	Single-Family Residential				Multi-Family Residential and Commercial/Industrial
Year	Tier 1 *0 to 3,000 gal*	Tier 2 *3,001 to 6,000 gal*	Tier 3 *6,001 to 18,000 gal*	Tier 4 *over 18,001 gal*	All Flow
2022	$2.31	$3.47	$8.68	$34.72	$4.45
2023	$2.68	$4.02	$10.05	$40.21	$5.00
2024	$3.04	$4.57	$11.42	$45.70	$5.54
2025	$3.41	$5.12	$12.80	$51.18	$6.09
2026	$3.77	$5.67	$14.17	$56.67	$6.64
2027	$4.14	$6.22	$15.54	$62.16	$7.19
2028	$4.51	$6.76	$16.91	$67.65	$7.73
2029	$4.87	$7.31	$18.28	$73.14	$8.28
2030	$5.24	$7.86	$19.66	$78.62	$8.83
2031	$5.60	$8.41	$21.03	$84.11	$9.37
2032	$5.97	$8.96	$22.40	$89.60	$9.92

Figure 7 illustrates the percentage of O&M, capital, and debt within the sum of the full cost recovery based standard volumetric charges.

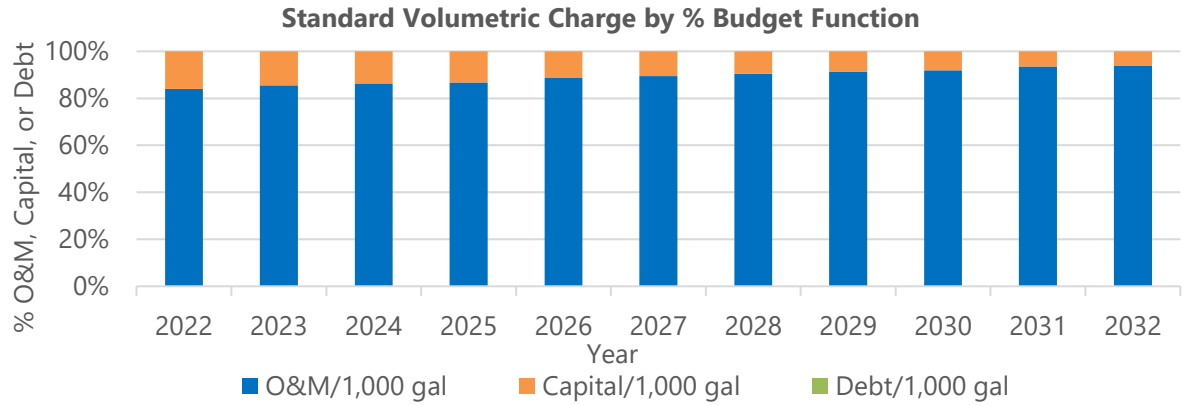

Figure 7: Standard Volumetric Charges as % O&M, Capital, or Debt for Years 2022 through 2032

3.4 Surcharges

South Dakota law specifies that revenues for debt repayment should be set aside in an account separate from funds for operation and maintenance of the system. Harrisburg currently utilizes both fixed and volumetric surcharges to cover debt principal and interest payments on three bonds. The current surcharges and corresponding bonds are listed in the table below.

Table 12: Current Surcharges

Surcharge	Fixed or Volumetric	Water Surcharge Revenue Bond
WSC-02	Volumetric	SRF/DW-02/2007 - Lewis & Clark Prepay
WSC-03	Volumetric	SRF/DW-03/2008 - Water Tower
WSC-04	Fixed	Series 2019 - Hwy 115 Water Main

Analysis completed through rate design exclusively considered how growth to Harrisburg's water utility customer base would impact the surcharge requirements. The fixed surcharge is a function of number of accounts, while the volumetric surcharge is a function of volume of water sold. As Harrisburg grows the denominator (accounts or volume sold) in the calculation of surcharge requirements increases for both the volumetric and fixed surcharges. Therefore, if Harrisburg were to leave the surcharges at their current values, an excess surcharge revenue would be generated and would be required to be set aside in a fund separate from O&M or capital reserves.

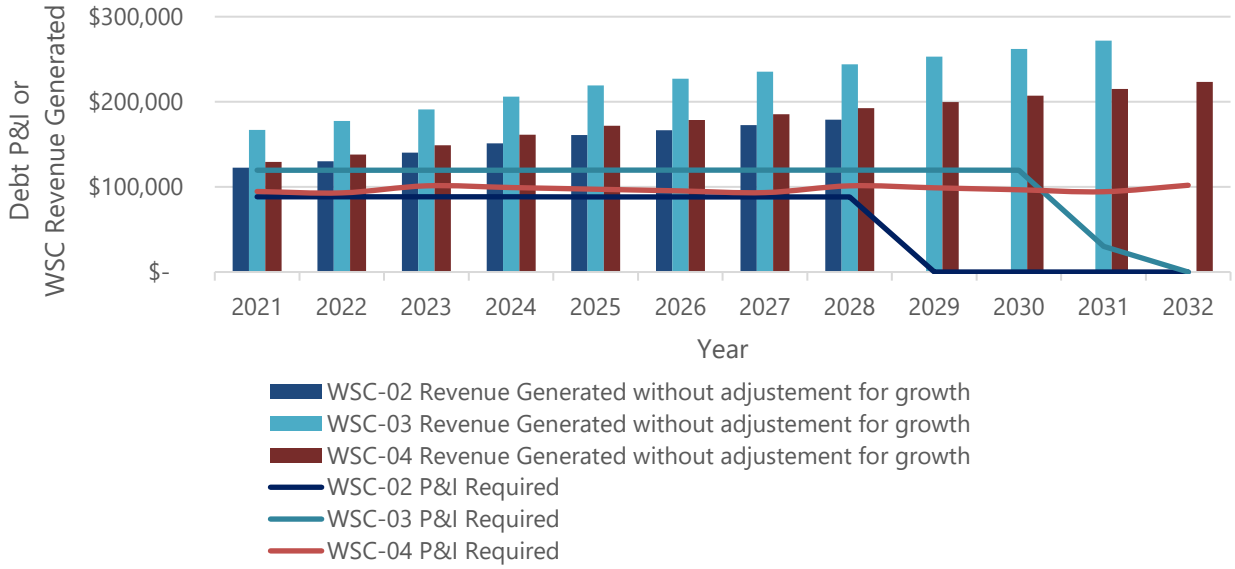

Figure 8: Existing Debt Principal & Interest Required and Surcharge Revenue Generated without Adjustment for Growth

To efficiently utilize the surcharge revenue more than the principal and interest requirements, and the debt service coverage ratio of 110%, a capital reserve surcharge was established. This capital reserve surcharge allows Harrisburg to make an annual adjustment to the WSC-02, WSC-03, and WSC-04 surcharges based on number of accounts and volume sold with consideration of growth to the community, but move the funds that would be generated by the excess surcharge into a capital reserve account to be applied to future capital investments indicated in the CIP.

Additionally, this capital reserve surcharge will help to maintain modest rate increases through year 2032 and reduce the burden of growth on the existing customer base. The burden of growth to the existing customers would especially be realized in year 2031 when new debt and fixed surcharge for the 3rd Water Tower take effect per the CIP. Table 13 summarizes the calculation of each volumetric and fixed surcharge relative to expected water sales and population growth. Figure 9 demonstrates how as Harrisburg continues to see growth the existing customer base (customers as of 2021) carry less of the burden of growth – this is partially due to the implementation of the capital reserve surcharge.

Table 13: Volumetric and Fixed Surcharges as a Function of Population and Flow Growth

	Volumetric Surcharges			Fixed Surcharges			
Year	WSC-02 *All Flow*	WSC-03 *All Flow*	Volume Expected to be Sold *MG*	WSC-04 *per Bill*	Capital Reserve *per Bill*	3rd Water Tower *per bill*	Accounts based on Population Growth
2021	$0.99	$1.35	131.49	$4.84	$0.00	$0.00	2374
2022	$0.69	$0.93	141.60	$4.61	$0.83	$0.00	2566
2023	$0.64	$0.86	152.72	$4.39	$1.62	$0.00	2778
2024	$0.60	$0.81	162.42	$4.16	$2.28	$0.00	2962
2025	$0.58	$0.78	168.29	$3.93	$2.74	$0.00	3074
2026	$0.56	$0.75	174.42	$3.70	$3.19	$0.00	3191
2027	$0.54	$0.73	180.75	$3.48	$3.64	$0.00	3312
2028	$0.52	$0.70	187.34	$3.25	$4.08	$0.00	3438
2029	None	$0.68	194.18	$3.02	$6.77	$0.00	3569
2030		$0.65	201.28	$2.79	$7.11	$0.00	3705
2031		$0.16	208.63	$2.57	TBD	$8.55	3846
2032		None	216.28	$2.34		$8.24	3993

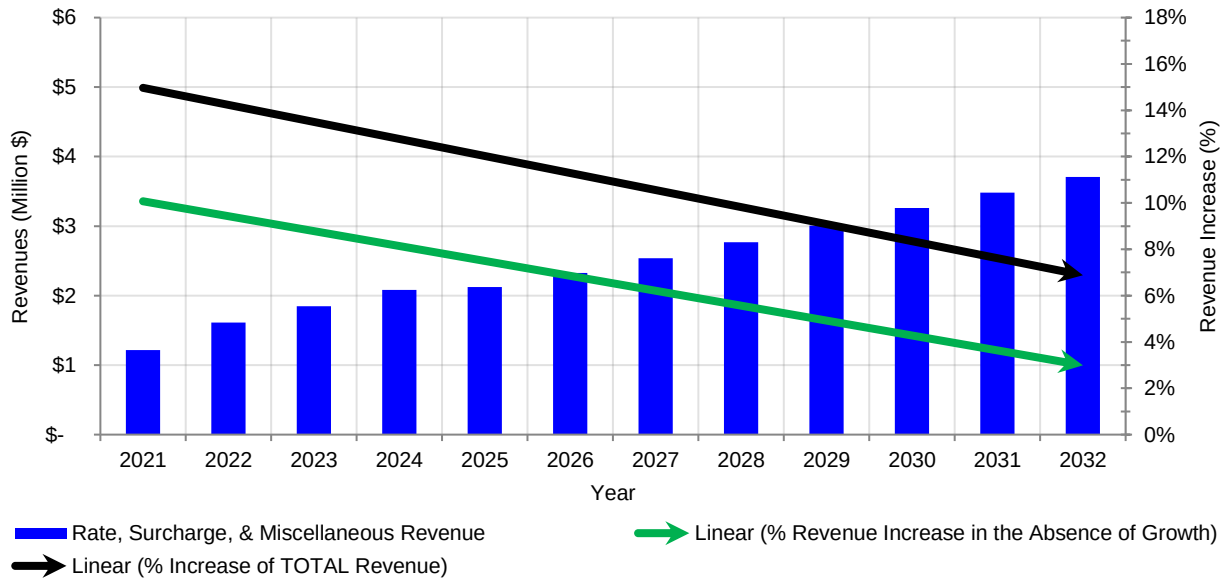

Figure 9: Reduction in Burden of Growth to Existing Customers through 2032

Chapter 4.0 Financial Plan

The backbone of the financial plan is a revenue adequacy evaluation. Revenue adequacy is evaluated to determine the short-term and long-term adequacy of the existing rates, and to propose potential rate adjustments to ensure that the existing rates and any proposed changes do not negatively impact the City's financial position in the future.

4.1 Revenue Adequacy Assumptions

Revenue requirements associated with O&M, debt, and rate funded capital have been modeled through 2032 based on the City's current operations, funding policies, CIP and financial information provided by the staff, and assumptions discussed in Chapter 2.0. The model was used to project total revenue requirements, revenue generated from proposed rates and other miscellaneous revenues, and the corresponding revenue surplus or deficiency. Due to uncertainty associated with projecting into the future, it is recommended that the rate assumptions be re-evaluated and updated on an annual basis in conjunction with the budget and CIP. In addition to the revenue requirements listed above, constant monitoring of the resulting total cash reserve balance with respect to a low, medium, and high reserve target was considered.

4.1.1 Contribution to Reserves

Throughout this study City staff were consulted to assist with defining a low, medium, and high reserve target. The financial model is designed to monitor each cash reserve account and total cash reserve balance so that the City is able to keep a constant understanding of how all decisions related to the water utility impact the total cash reserves, and when the City is at risk for having a negative cash balance.

Table 14: Reserve Target Goals and Philosophy

Reserve Type	Justification	Targets		
		Low	Medium	High
O&M	Days of O&M	**90**	**180**	**270**
Debt Service	% Debt P&I	**0%**	**25%**	**50%**
Capital	% of Average Rate Funded Capital *(outlier years 2024, 2028, & 2030 not included)*	**0%**	**25%**	**50%**

4.1.2 Account and Flow Projections

The determination of future rate adjustments necessary to meet revenue requirements is directly related to how water use and customer base changes over time. As a result, growth and changing water use habits are very important. The meter and flow growth assumptions are summarized below in Table 15 and Table 16, respectively.

Table 15: Projected Water Meters through Year 2032

Year	Single-Family Residential Meters	Multi-Family Residential Meters	Commercial & Industrial Meters	Total Meters
2021	2145	29	200	**2374**
2022	2330	30	206	**2566**
2023	2535	31	212	**2778**
2024	2712	32	218	**2962**
2025	2820	32	222	**3074**
2026	2933	32	226	**3191**
2027	3050	32	230	**3312**
2028	3172	32	234	**3438**
2029	3299	32	238	**3569**
2030	3431	32	242	**3705**
2031	3568	32	246	**3846**
2032	3711	32	250	**3993**

Table 16: Projected Water Volume Used, Sold, and Purchased through Year 2032

	Gallons Used/Sold/Purchased				
Year	Single-Family Residential	Multi-Family Residential	Commercial & Industrial	Total Volume Sold	Total Volume Purchased
2021	109,230,086	3,566,348	18,697,446	131,493,880	141,382,445
2022	118,650,862	3,689,326	19,258,369	141,598,557	152,286,872
2023	129,090,101	3,812,303	19,819,293	152,721,697	164,293,068
2024	138,103,493	3,935,281	20,380,216	162,418,990	174,756,787
2025	143,603,189	3,935,281	20,754,165	168,292,635	181,096,953
2026	149,357,502	3,935,281	21,128,114	174,420,897	187,712,561
2027	155,315,506	3,935,281	21,502,063	180,752,850	194,548,523
2028	161,528,126	3,935,281	21,876,012	187,339,419	201,659,928
2029	167,995,362	3,935,281	22,249,961	194,180,604	209,046,775
2030	174,717,214	3,935,281	22,623,910	201,276,404	216,709,064
2031	181,693,681	3,935,281	22,997,859	208,626,820	224,646,796
2032	188,975,686	3,935,281	23,371,808	216,282,775	232,915,059

4.2 Revenue Requirement Projections

Debt service coverage ratios and reserve targets were incorporated to project the full revenue requirements necessary to meet future O&M expenses and capital improvement needs of the utility. Future O&M, debt, and capital expenditures were forecasted using the assumptions and methodology described in Chapter 2.0. The projected requirements for years 2022 through 2032 are shown in Table 17.

Table 17: Revenue Requirements for Years 2022 through 2032

Year	Rate Funded Capital	Debt Service P&I	O&M Expense	Budgeted Contribution to Capital Reserves (*Depreciation Based*)	Total Revenue Requirements
2022	$301,600	$300,904	$986,505	None	$1,589,009
2023	$324,480	$309,171	$1,073,506		$1,707,157
2024	$854,897	$307,191	$1,089,480		$2,251,568
2025	$187,177	$305,212	$1,145,674		$1,638,063
2026	$72,999	$303,232	$1,408,925	$46,057	$1,831,213
2027	$75,919	$301,252	$1,508,118	$50,604	$1,935,893
2028	$3,779,364	$309,190	$1,654,584	None	$5,743,137
2029	$82,114	$218,665	$1,811,702	$232,189	$2,344,670
2030	$1,864,538	$216,354	$1,933,522	None	$4,014,414
2031	$88,815	$483,023	$2,571,328	$251,882	$3,395,047
2032	$92,367	$460,703	$2,728,129	$288,466	$3,569,665

The total annual revenue requirements can also be analyzed by translating each revenue requirement per budget function to the sum of total fixed charges required and total volumetric charges required per 1,000 gallons. This is how full cost recovery is measured for each user class, or even individual user if desired. Figure 10 and Figure 11 summarize the O&M, capital, and debt related charge requirements per month, and per 1,000 gallons, for the sum of fixed charges and volumetric charges (including surcharges) respectively.

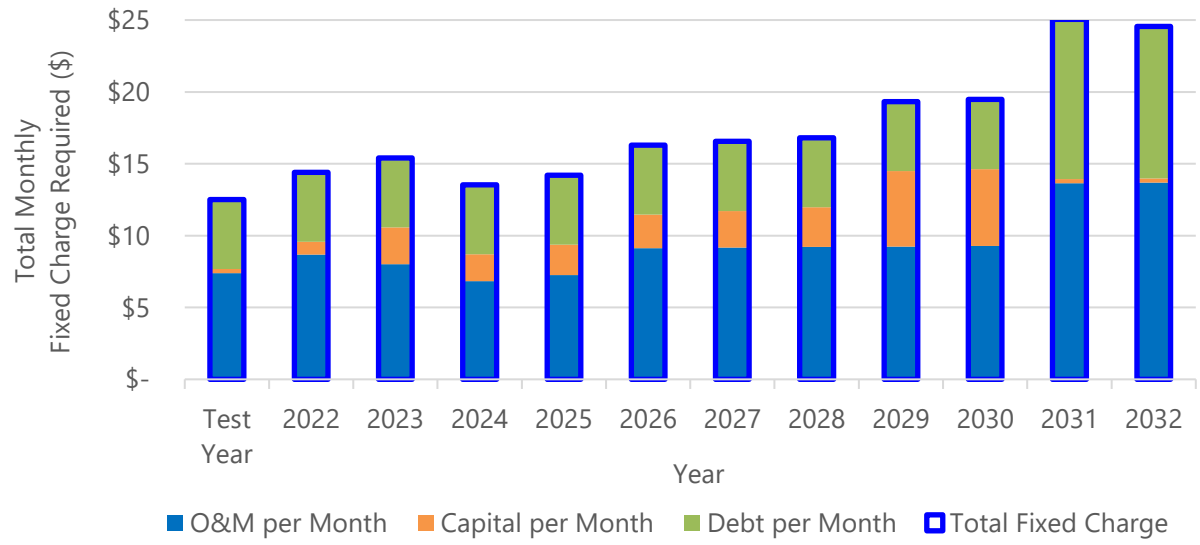

Figure 10: Sum of Fixed Charge Rate Components by Revenue Requirements per Budget Function

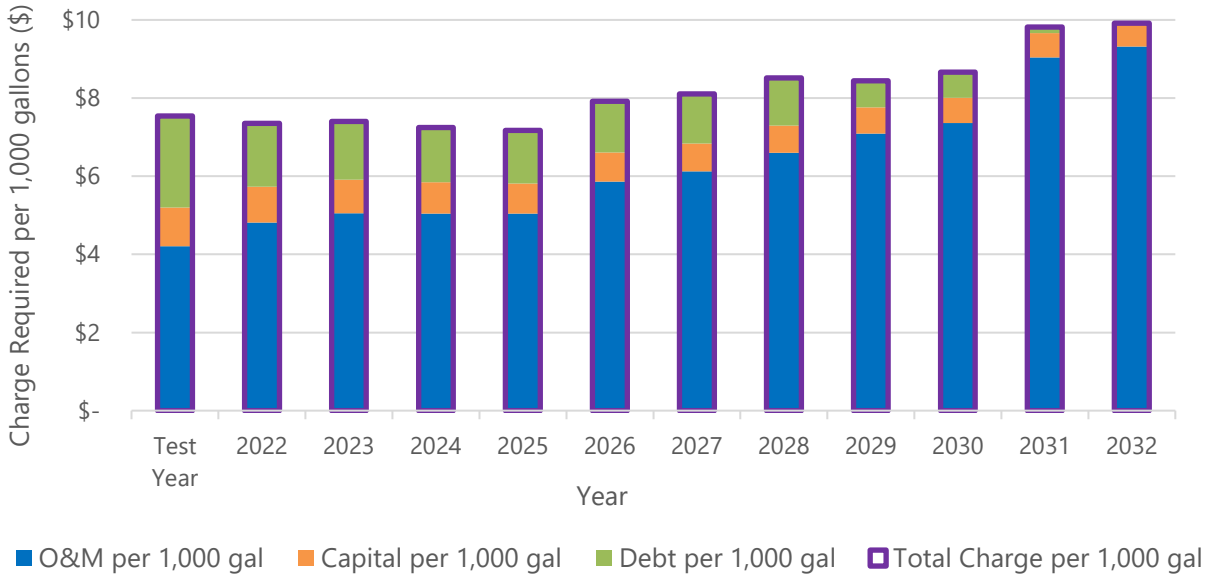

Figure 11: Sum of Volumetric Charge Rate Components by Revenue Requirements per Budget Function

4.3 Revenue Adequacy Projections

Rate design focused on working towards a full cost recovery rate structure by balancing modest, yet strategic, fixed, and volumetric rate increases with maintaining target reserve levels and promoting responsible water use.

The rate recommendations for years 2022 through 2032, as seen in Table 8, Table 11, and Table 13; result in revenue adequacy as it relates to debt service coverage, total cash reserves, operating revenue surplus or deficiency, and full cost recovery for each user class, each year can be seen in Table 18.

Table 18 highlights how managing capital planning and investments, affordability, and the financial health of a water utility is a true balancing act. This table summarizes the overall health of Harrisburg's water utility throughout the planning period through careful consideration of each of the City's goals and values:

- Maintain a healthy cash reserve to enable capital investment for both expansion and renewal of the water system,
- Implement a rate structure that defines and promotes responsible water use through justified price signals,
- Have confidence that rates are fair and affordable yet fully fund the revenue requirements of the water system in any one year,
- Acquire a financial model that can be updated on an annual basis so that City staff can consistently monitor the future health and efficiency of the water utility.

Table 18: Revenue Adequacy Summary through Year 2032

Year	Debt Service Coverage	Total Cash Reserve	Cash Reserve Target Range	Total Revenue Surplus/Deficiency	% Over (+) or Under (-) FCR for User Class		
					Single-Family Residential	Multi-Family Residential	Commercial & Industrial
2021	140%	$2,228,657	High	-$869,192	-51%	-40%	-39%
2022	208%	$2,253,491	High	$24,834	-22%	-11%	-9%
2023	250%	$2,392,061	High	$138,570	-15%	-4%	-2%
2024	323%	$2,220,953	High	-$171,108	-26%	-17%	-16%
2025	320%	$2,704,834	High	$483,881	12%	26%	28%
2026	302%	$3,244,992	High	$494,101	11%	24%	25%
2027	342%	$3,898,287	High	$602,691	16%	28%	29%
2028	359%	$921,233	Medium	-$2,977,054	-57%	-53%	-53%
2029	547%	$1,815,521	High	$662,099	14%	25%	26%
2030	614%	$1,062,308	Medium	-$753,213	-27%	-21%	-20%
2031	189%	$1,401,230	Medium	$87,040	-8%	0%	0%
2032	212%	$1,826,167	High	$136,471	-6%	1%	2%
Planning Period Average	317%	$2,164,144	High	-$178,407	-13%	-3%	-3%

4.4 Water Bill Impacts

To provide further perspective on the magnitude of the rate projections described in Chapter 3.0, monthly bills based on most common meter size and usage (based on analysis of 2020 billing data) amongst each user class are shown in Table 19.

Table 20 and Table 21 put the projected bill impacts into perspective further by summarizing the increase in common monthly bills in terms of dollars as well percent increase or decrease year over year.

The City has undertaken this project to obtain a financial tool to assist in management of financial health of the water utility. Although the projections herein contain proposed rate adjustments through 2032, a change in actual revenues or expenses from those projected could significantly impact the utility. As a result, it is **strongly recommended** that the City closely monitor revenues, expenses, and growth trends as compared to those projected in the rate model, adjusting as necessary, and update the projected rate adjustments based on the desired objective of achieving consistent revenue adequacy, meeting cash reserve target balances, and full cost recovery.

Table 19: Projected Total Monthly Bills for Common Meter Size and Usage through 2032

		Single-Family Residential (5/8" or 3/4" Meter)			Multi-Family Residential (1.5" Meter)	Commercial & Industrial (5/8" or 3/4" Meter)
		3,000 gallons	6,000 gallons	9,000 gallons	10,250 gallons	7,800 gallons
Year	2022	$26.19	$41.44	$72.33	$93.47	$61.72
	2023	$28.00	$44.55	$79.20	$99.50	$66.14
	2024	$29.76	$47.68	$86.18	$105.67	$70.63
	2025	$31.44	$50.87	$93.34	$112.06	$75.25
	2026	$33.13	$54.06	$100.50	$118.46	$79.87
	2027	$34.80	$57.25	$107.66	$124.87	$84.50
	2028	$36.48	$60.44	$114.83	$131.29	$89.13
	2029	$38.92	$62.89	$119.78	$134.86	$92.14
	2030	$40.56	$66.11	$127.04	$141.39	$96.83
	2031	$41.88	$67.59	$131.15	$144.18	$98.94
	2032	$42.47	$69.35	$136.55	$148.68	$101.93

Table 20: Monthly Bill Impacts in Dollars Year over Year through 2032

		Single-Family Residential (5/8" or 3/4" Meter)			Multi-Family Residential (1.5" Meter)	Commercial & Industrial (5/8" or 3/4" Meter)
		3,000 gallons	6,000 gallons	9,000 gallons	10,250 gallons	7,800 gallons
Year	2022	$3.97	$2.00	-$0.20	$3.24	$2.58
	2023	$1.81	$3.11	$6.87	$6.02	$4.42
	2024	$1.76	$3.14	$6.98	$6.17	$4.50
	2025	$1.69	$3.19	$7.15	$6.39	$4.62
	2026	$1.68	$3.19	$7.16	$6.40	$4.62
	2027	$1.68	$3.19	$7.17	$6.41	$4.63
	2028	$1.68	$3.19	$7.17	$6.42	$4.63
	2029	$2.44	$2.46	$4.95	$3.57	$3.00
	2030	$1.64	$3.22	$7.26	$6.53	$4.69
	2031	$1.32	$1.48	$4.11	$2.79	$2.11
	2032	$0.58	$1.76	$5.40	$4.50	$2.99

Table 21: Monthly Bill Impacts as % Increase (+) or Decrease (-) Year over Year through 2032

		Single-Family Residential (5/8" or 3/4" Meter)			Multi-Family Residential (1.5" Meter)	Commercial & Industrial (5/8" or 3/4" Meter)
		3,000 gallons	6,000 gallons	9,000 gallons	10,250 gallons	7,800 gallons
Year	2022	17.85%	5.08%	-0.28%	3.59%	4.35%
	2023	6.92%	7.50%	9.50%	6.44%	7.16%
	2024	6.27%	7.04%	8.82%	6.20%	6.80%
	2025	5.67%	6.68%	8.30%	6.05%	6.54%
	2026	5.35%	6.26%	7.67%	5.71%	6.14%
	2027	5.07%	5.90%	7.13%	5.41%	5.79%
	2028	4.82%	5.57%	6.66%	5.14%	5.48%
	2029	6.69%	4.07%	4.31%	2.72%	3.37%
	2030	4.21%	5.11%	6.06%	4.84%	5.09%
	2031	3.26%	2.24%	3.23%	1.97%	2.18%
	2032	1.39%	2.60%	4.12%	3.12%	3.03%
Average		6.14%	5.28%	5.96%	4.66%	5.08%

Chapter 5.0 Recommendations

The following recommendations were developed in conjunction with completion of the Water Rate Study and Revenue Adequacy Evaluation:

- **Modify the volumes, ratios, and definitions associated with each tier for the 4-Tier rate structure that applies to the single-family residential user class as presented in Section 3.3.1 - Justifying Tier Structure.** Focus on public education of the modified rate structure. Part of any successful conservation effort is the education of your water users. It is recommended that the City continue its water conservation efforts. In addition, expand education efforts on the basis for rate-setting and development of a capital investment and renewal strategy.
- **Adopt the 2022 fixed volumetric charges presented in Table 8 and Table 11, as well as the fixed and volumetric surcharges in Table 13 which includes a capital reserve surcharge**. Evaluate projected revenue requirements annually and adjust rate projections for 2023 and beyond as appropriate to meet the needs of the system.
- **Plan to cash fund both Lewis & Clark – Phase 2 related projects, the Southeast Area Improvements – Phase 1, and 25% of the 3rd Water Tower.** Cash funding these projects at the level described will reduce the need for larger rate increases that would be required to meet DSCR.
- **Update the Water Hookup Fee and hold Water Hookup Fee revenues in a separate account.** To support the concept that "growth pays for growth", maintain a separate account for Water Hookup Fee revenues, which should only be applied to existing or future debt or cash payments associated with growth-related infrastructure.
- **Monitor near-term revenue stability.** The recommended increases to water rates may result in changes to water usage. Conservative water usage growth has been in incorporated into the analysis, but it will be important to adjust the assumptions as actual usage information becomes available. Therefore, the City should monitor revenue stability on an on-going basis.
- **Review water revenue adequacy annually.** The City has undertaken this project to obtain a financial tool to assist in management of financial health of the water utility. Although the projections herein contain proposed rate adjustments through 2032, a change in actual revenues or expenses from those projected could significantly impact the utility. As a result, it is **strongly recommended** that the City closely monitor revenues, expenses, and growth trends as compared to those projected in the rate model, adjusting as necessary, and update the projected rate adjustments based on the desired objective of achieving consistent revenue adequacy, meeting cash reserve target balances, and full cost recovery.

References

David Chalmers, f. P. (2019, February 15). *Summer Lawn Care: Mowing, Weeds & Water*. Retrieved from Douth Dakota State University Extension: https://extension.sdstate.edu/summer-lawn-care-mowing-weeds-water