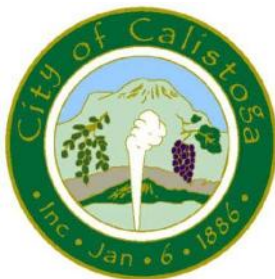


City of Calistoga

Water and Wastewater Cost of Service and Rate Design Study

Study Report // October 11, 2023



October 11, 2023

Mr. Derek Rayner
Public Works Director
City of Calistoga
1232 Washington St
Calistoga, CA 94515

Subject: Water and Wastewater Rate Study

Dear Mr. Rayner,

Raftelis is pleased to provide this Executive Summary of the Water and Wastewater Rate Study to the City of Calistoga. The overall purpose of the study was to develop five years of proposed rates for the City's Water and Wastewater Enterprises for implementation in Fiscal Year (FY) 2023-24 through FY 2027-28. The proposed utility rates were developed following industry standard rate methodologies and in conjunction with the City's legal counsel to ensure that rates are fair, cost-justified, and aligned with the requirements of California's Proposition 218.

The major objectives of the study were to:

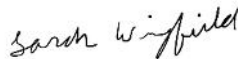
- » Develop a ten-year financial plan for the City's Water and Wastewater Enterprises to ensure financial sufficiency in recovering operating costs, funding long-term capital needs, and maintaining prudent reserves.
- » Conduct water and wastewater cost of service analyses to ensure a nexus between proposed rates and the cost to provide services to customers.
- » Evaluate rate alternatives and proposed rate structure modifications to better align with community values and the City's policy objectives
- » Develop five years of water and wastewater rates in alignment with Proposition 218 requirements.
- » Conduct public outreach to engage, inform, and solicit input from City ratepayers throughout the rate study process

This Executive Summary outlines the study background, results, and recommendations related to the development of utility financial plans, cost of service analyses, and proposed rates. It has been a pleasure working with you and we thank you and other City staff for the support provided to Raftelis during this study.

Sincerely,



Kevin Kostiuk
Senior Manager



Sarah Wingfield
Associate Consultant

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List of Abbreviations

AF: Acre-feet

AFY: Acre-feet per year

AWWA: American Water Works Association

BOD: Biological Oxygen Demand

CIP: Capital Improvement Plan

City: City of Calistoga

COS: Cost of Service

CPI: Consumer Price Index

CY: Calendar Year

FY: Fiscal year

GPCD: Gallons per capita per day

GPM: Gallons per minute

HCF: One hundred cubic feet

K: Thousand

Lbs: Pounds

M: Million

Manual M1: American Water Works Association's *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices - M1 Seventh Edition*

Max Day: Maximum day water demand

Max Hour: Maximum hour water demand

MG: Million gallons

Mg/L: Milligrams per Liter

MGD: Million gallons per day

NPDES Permit: National Pollutant Discharge Elimination System Permit

O&M: Operations and maintenance

PPM: Parts per million

R&R: Repair and replacement

RCLD: Replacement cost less depreciation

SS: Suspended Solids

Study Period: the rate-setting period of this study which extends through fiscal year 2027-28

WEF: Water Environment Federation

WWTP: Wastewater treatment plant

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1. Executive Summary

1.1. Study Overview

Public water and wastewater utilities in California typically perform a cost of service analysis every five to ten years to ensure that customers are appropriately charged for service commensurate with the cost to provide service. The City of Calistoga last conducted a water and wastewater cost of service study in 2018. No rate increases have been implemented since the last year of adopted rates went into effect in January 2022. The City of Calistoga (City) engaged Raftelis to conduct a water and wastewater cost of service study to establish a proposed five-year schedule of water and wastewater rates through fiscal year (FY) 2027-28. Note that proposed rates cannot be implemented until formally adopted by City Council after a public hearing, and absent a majority protest by parcels served by the City. Proposition 218 requires that the City provide mailed notice of the public hearing, detailing proposed rate changes, no fewer than 45 days before the public hearing.

The major objectives of this study are to:

- » Develop a ten-year financial plan that sufficiently funds the City's Water and Wastewater Enterprises' operations and maintenance (O&M) expenses, debt service payments, and capital expenditures while adequately funding reserves and achieving debt coverage requirements.
- » Conduct cost of service analyses that establish a clear nexus between the cost to serve water and wastewater customers and the rates charged to customers, per Proposition 218 and industry standards.
- » Evaluate alternatives to the City's existing water and wastewater rate structures that may better align with community values and the City's policy objectives, while fully recovering the cost of providing service and ensuring rates are cost-justified.
- » Develop a five-year schedule of water and wastewater rates that are fair, cost-justified, and aligned with the requirements of California's Proposition 218.
- » Conduct public outreach to engage, inform, and solicit input from City ratepayers throughout the rate study process.
- » Develop a five-year schedule of drought rates that may be implemented in future declared water shortages or other water emergencies.

1.2. Rate Study Process

This study was conducted using industry-standard principles outlined by the American Water Works Association's (AWWA) *Manual M1* and the Water Environment Federation's (WEF) *Financing and Charges for Wastewater Systems*. The overall process outlined below applies to the development of both water and wastewater rates.

1. **Financial Plan:** Develop cash flow projections for the Water and Wastewater Enterprise to determine the amount of revenue required from water and wastewater rates.
2. **Cost of Service Analysis:** Allocate costs to system components and then to various customer classes based on the costs incurred and user characteristics.
3. **Rate Design:** Develop rates that generate sufficient revenues based on the results of the financial plan and cost of service analyses and communicate the policy preferences of the agency, maintaining that rates are cost-justified.
4. **Administrative Record Preparation:** Develop an administrative record (Study report) to document the results of the rate study.

5. **Rate Adoption:** Proposed rates may be adopted by City Council only after holding a public hearing in accordance with the procedural requirements of Proposition 218.

1.3. Proposed Water Financial Plan

Raftelis conducted a status quo cash flow analysis to evaluate whether existing water rates adequately fund the Water Enterprise's various expenses over the five-year study period. Annual projections of revenues, O&M expenses, debt service payments, and capital expenditures through FY 2032-33 were developed with City staff. Raftelis projects that with no rate increases over the five-year study period, the Water Enterprise's reserves will immediately become negative and fail to meet minimum debt coverage in all years. This demonstrates a clear need for revenue adjustments (i.e. gross water rate revenue increases relative to existing rate revenues). Raftelis worked with City staff to develop the following proposed revenue adjustments over the five-year study period (see **Table 1-1**).

Table 1-1: Proposed Water Enterprise Revenue Adjustments

Fiscal Year	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28
Effective Date	March 1, 2024	January 1, 2025	January 1, 2026	January 1, 2027	January 1, 2028
Revenue Adjustment	50.0%	12.0%	10.0%	6.0%	6.0%

Key factors influencing the need for proposed revenue adjustments include:

- » **Cost inflation:** Operating costs continue to increase year over year due to general inflationary pressures with higher increases projected for power, labor and water supply. Future purchased water (State Water Project (SWP)) treatment and conveyance through the City of Napa is projected to increase at a rate of nearly 10 percent per year for the next 10 years.
- » **Reduction in baseline water demand:** Following two multi-year droughts and associated mandatory conservation and messaging, the City has continued to experience lower overall water consumption relative to historical demands. While conservation is necessary to ensure reliable long-term water supplies, utility costs must be recovered and reduced water demands generally mean increased rate pressure.
- » **Planned capital expenditures:** Adjusted for inflation, the Water Enterprise has over \$16 M in critical CIP in the next five years with another \$26 M estimated in years 6-10 of the plan. These include projects mandated by the Water Resources Control Board (SWRCB or State Board) and the Division of Dams and Safety, as well as other critical aging infrastructure. Rate revenues need to be sufficient to execute these projects with cash, future debt proceeds, or a combination of the two.
- » **Cash Reserves:** The Water Enterprise beginning cash balance is significantly under the reserve policy targets with substantial CIP requirements in the current fiscal year and the coming fiscal years. Without additional reserves the Enterprise will not have sufficient funds to match awarded grants for CIP, maintain operating cash flow, or be extended future credit. The existing cash position presents a great deal of financial risk in both the near and long-term.

Figure 1-1 shows the proposed CIP financing plan over the study period. The City intends to fund future CIP costs through a combination of cash, grants, and future debt proceeds.

Figure 1-1: Water Enterprise Capital Improvement Plan

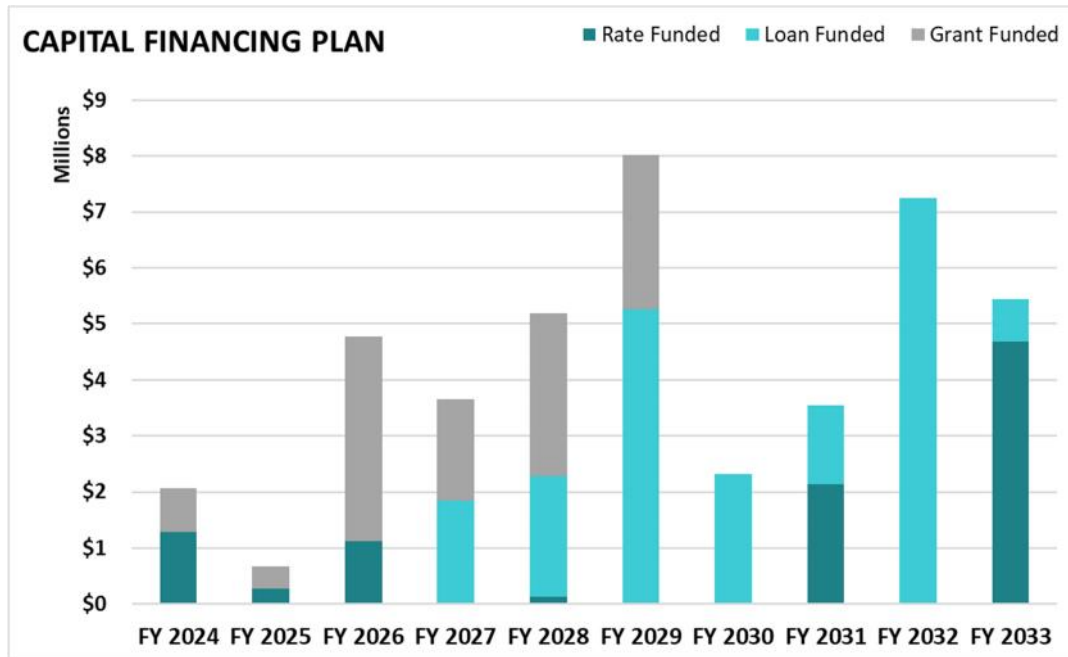


Figure 1-2 shows the proposed versus status quo Water Enterprise operating financial plan. Revenues under the proposed financial plan and status quo financial plan are represented by the dark blue and gray lines, respectively. Revenue requirements including O&M expenses, debt service, and reserve funding for CIP are represented by the various stacked bars. Revenue adjustments (i.e., gross rate revenue increases) are required to generate additional revenue to fully recover O&M expenses, capital repair and replacement (R&R) project costs, debt service payments, and reserve funding over the study period.

Figure 1-2: Proposed vs. Status Quo Water Financial Plan

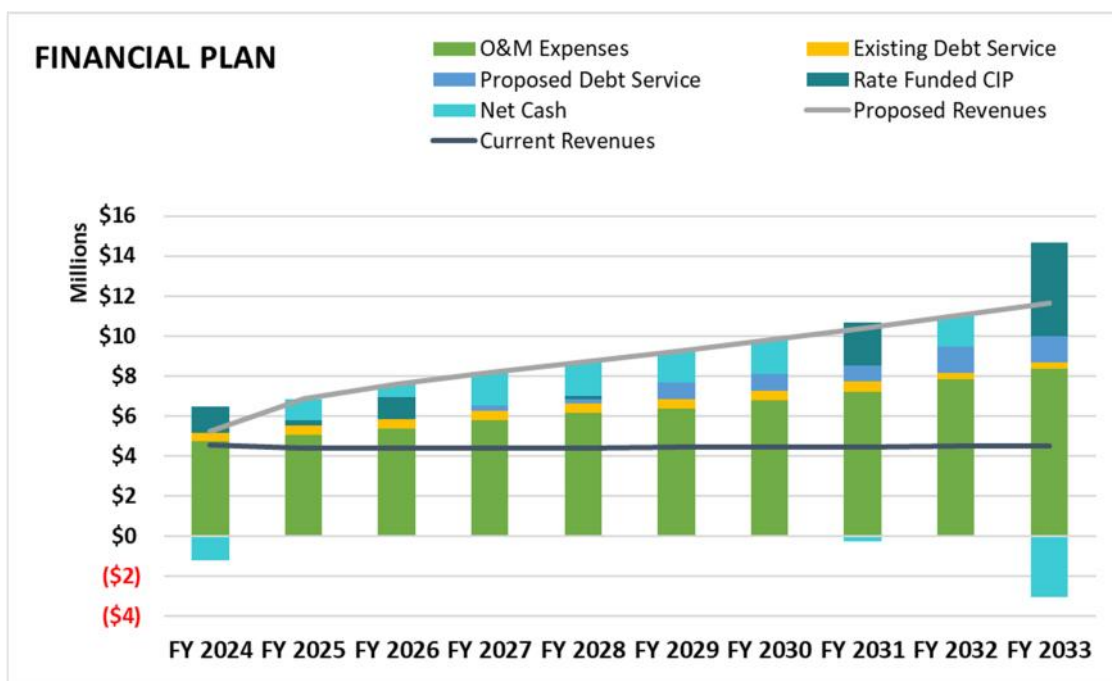


Figure 1-3 shows the Water Enterprise’s projected fiscal year-end balance under the proposed financial plan. The dark blue bars indicate the ending balance on June 30 of each year. The minimum reserve target (120 days of operating expenses plus \$1.5 M emergency reserves) is represented by the gray line. The goal reserve target (120 days of O&M plus \$3.4 M emergency reserves) is shown by the blue line. The Water Enterprise is projected to continue to draw down its reserves through FY 2027-28 to fund substantial repair and replacement (R&R) capital projects. The proposed rate increases shown in Table 1-1 will allow the City to accumulate reserve funding beginning in FY 2024-25, such that the City’s reserve funding will meet its minimum reserve requirement by FY 2027-28 and the goal reserve by the end of the 10-year planning period.

Figure 1-3: Proposed Water Financial Plan – Projected Ending Cash Balances

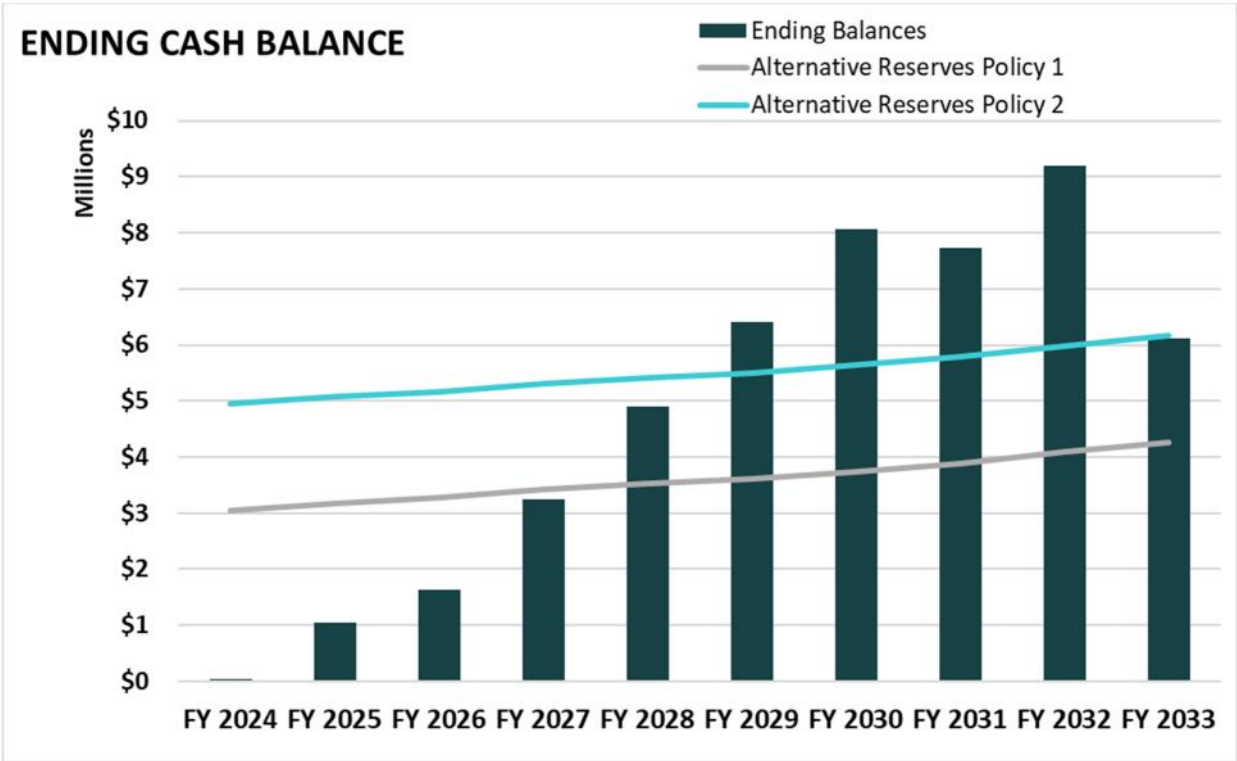
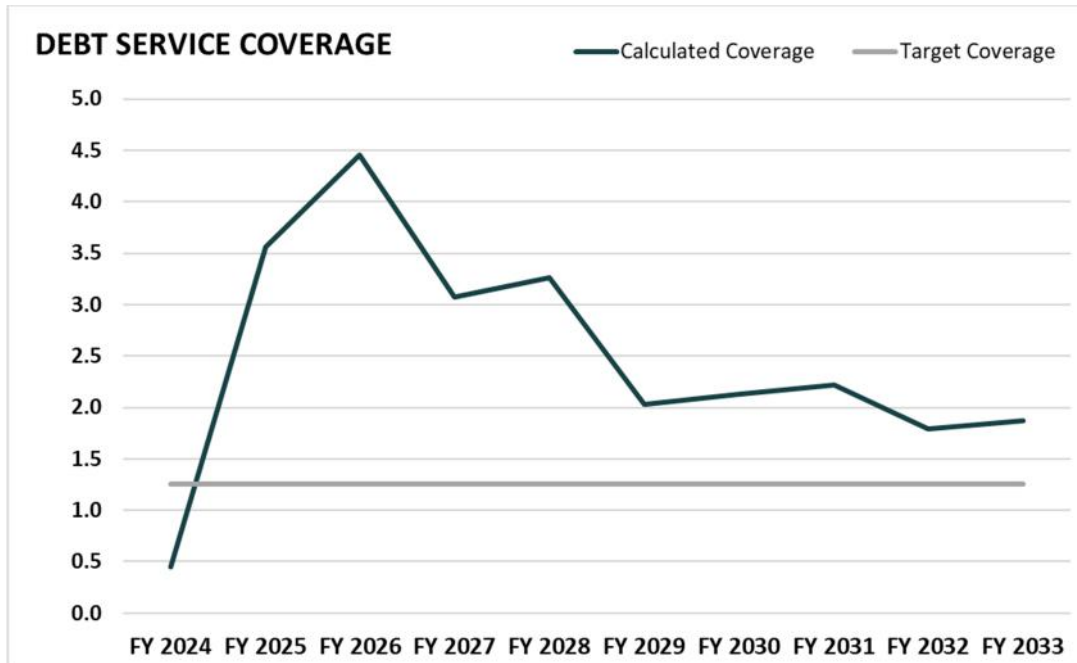


Figure 1-4 shows projected debt coverage (blue line) relative to the debt coverage requirement (gray line) over the study period. Debt coverage is expected to increase substantially in FY 2023-24 with the proposed rate increases shown above in Table 1-1. The proposed rate increases and CIP funding plan will allow the City to meet its minimum debt coverage requirement throughout the study period. Failure to meet minimum debt service coverage in future years without remedial action such as implementing rate increases, could result in a downgrade of credit rating, higher costs in future debt issuance, or even denial of credit.

Figure 1-4: Proposed Water Financial Plan – Projected Debt Coverage



1.4. Proposed Water Rates

The City of Calistoga's existing water rate structure consists of fixed Water Service Charges (based on meter size) and variable Water Volume Rates (per hundred cubic feet [HCF] of water delivered). Raftelis worked closely with City staff and the City's legal counsel to evaluate potential changes to the existing water rate structure. The following changes are proposed:

- » **Single Family Residential (SFR) Tiers:** The Study proposes that the City introduce a two-tiered rate structure for SFR customers. Tier 1 will be defined as the first 12 units of water (HCF) in a two-month period (i.e., bi-monthly). Tier 2 will include all use greater than Tier 1. SFR is a homogenous customer class which has similar indoor needs for health and sanitation, similar outdoor irrigation needs, and similar seasonality in these demand patterns. It is therefore appropriate to tier this class of like customers. The two-tier structure will provide lower cost water in the first tier and a higher cost in the second tier. This will promote affordability of service for lower to average use SFR customers while including a conservation price signal between the two tiers. Note that non-residential customers will maintain a uniform rate structure. Nevertheless, SFR and non-SFR customers will pay roughly the same average rate; the structure of their billing will merely differ, based on the tiered vs uniform volumetric rates paid per HCF of water use. The proposed monthly allotments for residential customers are shown below in **Table 1-2**.
- » **All Other Classes:** The Study recommends that all other customer classes maintain the existing uniform rate structure. These include Multi-Family Residential (MFR), Mobile Home, Commercial, Industrial, and Irrigation classes. The City's MFR and Mobile Home units are predominantly master-metered properties with one large meter serving dozens or even hundreds of dwelling units. Non-residential classes have highly varying demand patterns based on the type of business or seasonal transient effects. For this reason a uniform rate is proposed.

Table 1-2: Proposed Changes to the Water Rate Structure

Description	Current Bi-Monthly Allotment	Proposed Bi-Monthly Allotment
Single Family Residential		
Tier 1	N/A Uniform	0-12 HCF
Tier 2	N/A Uniform	>12 HCF
All Other Classes		
Uniform	N/A	N/A

Table 1-3 shows the five years of proposed Water Service Charges and Water Volume Rates (through FY 2027-28). All fixed charges are shown monthly, but in practice only non-residential customers are billed on a monthly basis. Residential customers, whose meters are not yet automated and must be read manually every other month, are simply billed the same rate multiplied by two on a bi-monthly basis. All volumetric rates are shown in terms of dollars per HCF (\$/HCF). SFR HCF tier allotments are bi-monthly.

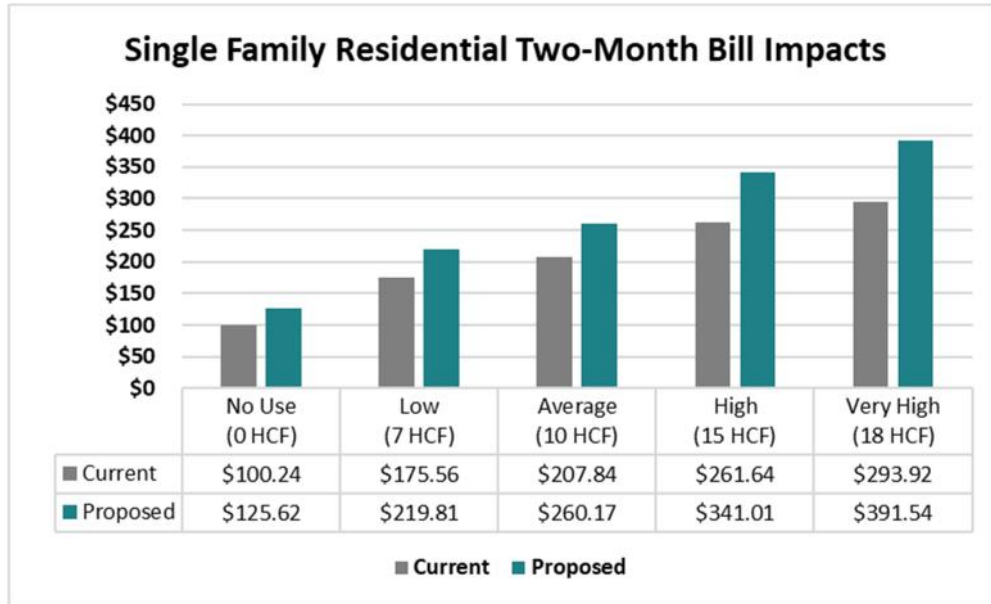
Table 1-3: Proposed Five-Year Water Rates Schedule

	Current	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Effective Date		March 1	January 1	January 1	January 1	January 1
Fixed Rates						
5/8"	\$50.12	\$62.82	\$70.36	\$77.40	\$82.05	\$86.98
1"	\$125.31	\$151.07	\$169.20	\$186.12	\$197.29	\$209.13
1 1/2"	\$250.62	\$298.16	\$333.94	\$367.34	\$389.39	\$412.76
2"	\$400.99	\$474.66	\$531.62	\$584.79	\$619.88	\$657.08
3"	\$751.86	\$886.50	\$992.88	\$1,092.17	\$1,157.71	\$1,227.18
4"	\$1,253.10	\$1,474.84	\$1,651.83	\$1,817.02	\$1,926.05	\$2,041.62
6"	\$2,506.20	\$2,945.69	\$3,299.18	\$3,629.10	\$3,846.85	\$4,077.67
8"	\$4,009.92	\$4,710.71	\$5,276.00	\$5,803.60	\$6,151.82	\$6,520.93
SFR						
Tier 1 (0-12 HCF)	\$10.76	\$13.46	\$15.08	\$16.59	\$17.59	\$18.65
Tier 2 (>12 HCF)	\$10.76	\$16.85	\$18.88	\$20.77	\$22.02	\$23.35
All Other Classes						
Uniform	\$10.76	\$14.52	\$16.27	\$17.90	\$18.98	\$20.12

1.5. Water Bill Impacts

Figure 1-5 shows sample two-month water bills for single family residential customers at varying levels of water use under both current and proposed FY 2023-24 rates. Note that actual bill impacts will vary based on individual water use; however, the values shown below are based on low, high, and typical volumes for SFR customers and reflect actual use patterns for SFR customers at the City of Calistoga.

Figure 1-5: Single Family Residential Bill Impacts (Year One)



1.6. Proposed Water Shortage Surcharges

In addition to the water and wastewater rates developed in this study, Raftelis worked with City staff and legal counsel to develop a schedule of drought surcharge rates to be implemented in times of shortage. The surcharges are an addition to existing fixed water charges when in a declared shortage and when implemented by City Council. These surcharges are a temporary tool to recover revenue shortfalls resulting from reduced water sales during times of conservation or curtailment. Raftelis estimated the net revenue loss at each shortage stage incorporating projected reductions in water sales revenues, avoided costs in water purchases and production, and additional costs in shortage such as conservation programs and messaging. The net loss is then recovered as a fixed surcharge. The resulting five years of drought surcharge rates are shown below in Table 1-4. As a point of reference, most of the City's customers are SFR and almost all SFR customers have a 5/8" metered connection.

Table 1-4: Proposed Five-Year Water Shortage Surcharges

Shortage Stage by FY	Meter Size							
	5/8"	1"	1-1/2"	2"	3"	4"	6"	8"
FY 2024								
Stage 1	\$6.13	\$15.31	\$30.61	\$48.97	\$91.82	\$153.03	\$306.05	\$489.68
Stage 2	\$18.17	\$45.41	\$90.82	\$145.31	\$272.46	\$454.09	\$908.18	\$1,453.08
Stage 3	\$29.48	\$73.70	\$147.40	\$235.84	\$442.20	\$737.00	\$1,473.99	\$2,358.38
FY 2025								
Stage 1	\$6.87	\$17.15	\$34.28	\$54.85	\$102.84	\$171.39	\$342.78	\$548.44
Stage 2	\$20.35	\$50.86	\$101.72	\$162.75	\$305.16	\$508.58	\$1,017.16	\$1,627.45
Stage 3	\$33.02	\$82.54	\$165.09	\$264.14	\$495.26	\$825.44	\$1,650.87	\$2,641.39
FY 2026								
Stage 1	\$7.55	\$18.86	\$37.71	\$60.33	\$113.12	\$188.53	\$377.05	\$603.29
Stage 2	\$22.39	\$55.95	\$111.89	\$179.02	\$335.67	\$559.44	\$1,118.88	\$1,790.19
Stage 3	\$36.32	\$90.80	\$181.60	\$290.55	\$544.79	\$907.88	\$1,815.96	\$2,905.52
FY 2027								
Stage 1	\$8.01	\$19.99	\$39.97	\$63.95	\$119.91	\$199.84	\$399.68	\$639.48
Stage 2	\$23.73	\$59.30	\$118.60	\$189.76	\$355.81	\$593.01	\$1,186.01	\$1,897.61
Stage 3	\$38.50	\$96.25	\$192.49	\$307.99	\$577.48	\$962.46	\$1,924.91	\$3,079.86
FY 2028								
Stage 1	\$8.49	\$21.19	\$42.37	\$67.79	\$127.10	\$211.84	\$423.66	\$677.85
Stage 2	\$25.15	\$62.86	\$125.72	\$201.15	\$377.16	\$628.59	\$1,257.17	\$2,011.46
Stage 3	\$40.81	\$102.02	\$204.04	\$326.47	\$612.13	\$1,020.21	\$2,040.41	\$3,264.65

1.7. Proposed Wastewater Financial Plan

Raftelis conducted a status quo cash flow analysis to evaluate whether existing wastewater rates adequately fund the Wastewater Enterprise's various expenses over the five-year study period. Annual projections of revenues, O&M expenses, debt service payments, and capital expenditures through FY 2032-33 were developed with City staff. Raftelis projects that with no rate increases over the five-year study period, the Wastewater Enterprise's reserves will immediately become negative and fail to meet minimum debt coverage in all years beginning in FY 2023-24. This demonstrates a clear need for revenue adjustments (i.e. gross wastewater rate revenue increases relative to existing rate revenues). Raftelis worked with City staff to develop the following proposed revenue adjustments over the five-year study period (see Table 1-5).

Table 1-5: Proposed Wastewater Enterprise Revenue Adjustments

Fiscal Year	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28
Effective Date	March 1, 2024	January 1, 2025	January 1, 2026	January 1, 2027	January 1, 2028
Revenue Adjustment	35.0%	25.0%	3.0%	3.0%	3.0%

Key factors influencing the need for proposed Wastewater Enterprise revenue adjustments include:

- » **Cost inflation:** Operating costs continue to increase year over year due to general inflationary pressures with higher increases projected for power, labor, and chemicals among others.
- » **Planned capital expenditures:** Adjusted for inflation, the Wastewater Enterprise has over \$16 M in critical CIP in the next five years with another \$15 M estimated in years 6-10 of the plan. These include legally mandated projects related to the wastewater treatment and disposal facilities as well as other critical aging infrastructure. Rate revenues need to be sufficient to execute these projects with cash, future debt proceeds, or a combination of the two.
- » **Cash Reserves:** The Wastewater Enterprise beginning cash balance is significantly under the reserve policy targets with substantial CIP requirements in the current fiscal year and the coming fiscal years. Without additional reserves the Enterprise will not have sufficient funds to match awarded grants for CIP, maintain operating cash flow, or the opportunity to be extended future credit. The existing cash position presents a great deal of financial risk in both the near and long-term.

Figure 1-6 shows the proposed CIP financing plan over the study period. The City plans to finance its wastewater CIP projects through a combination of cash and grant funding.

Figure 1-6: Wastewater Enterprise Capital Improvement Plan

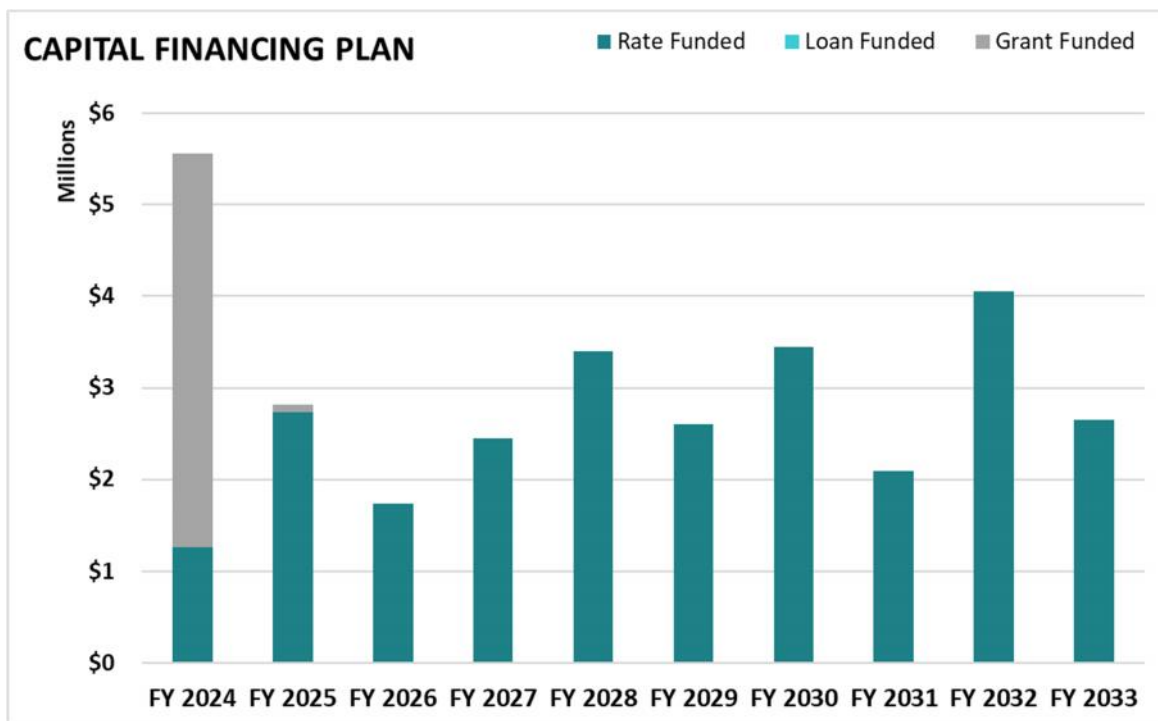


Figure 1-7 shows the proposed versus status quo Wastewater Enterprise operating financial plan. Revenues under the proposed financial plan and status quo financial plan are represented by the gray and dark blue lines, respectively. Revenue adjustments (i.e., gross rate revenue increases) are required to generate additional revenue to fully recover O&M expenses, CIP project costs, debt service payments, and reserve funding over the study period.

Figure 1-7: Proposed vs. Status Quo Wastewater Financial Plan

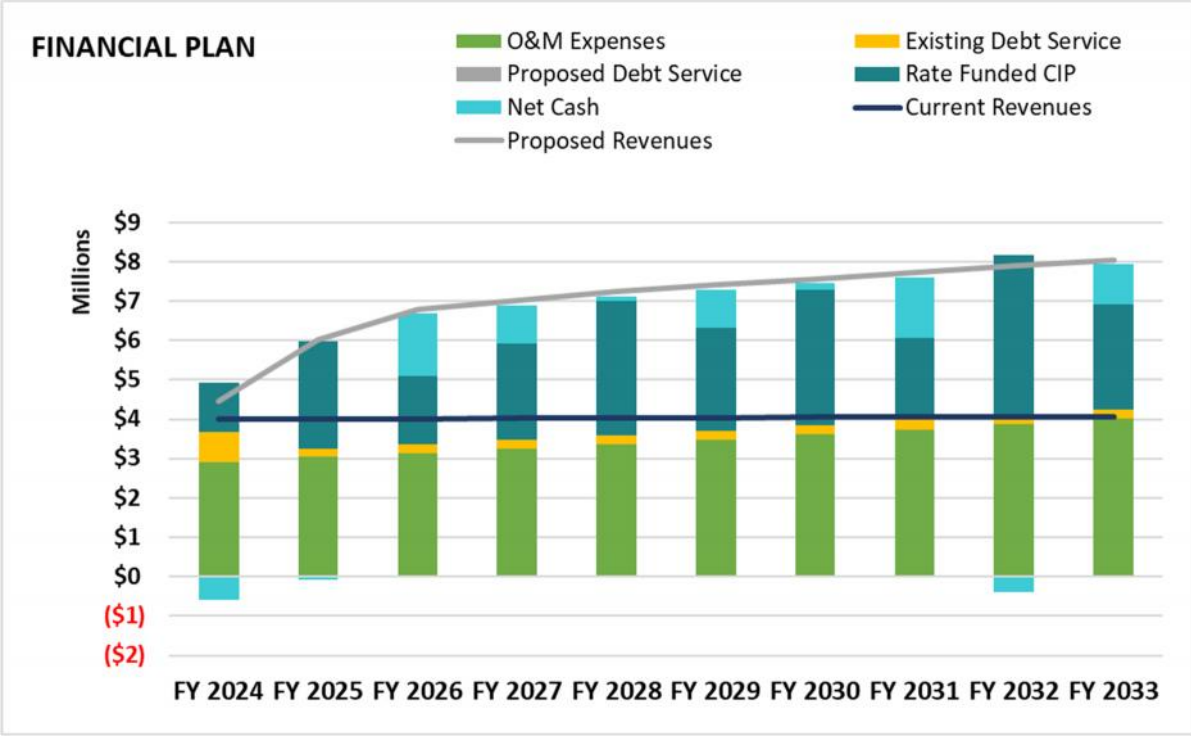


Figure 1-8 shows the Wastewater Enterprise’s projected fiscal year ending balances under the proposed financial plan. The reserve balances are represented by the dark blue bars. The minimum reserve policy is represented by the gray line (120 days of operating expenses plus \$1.5 M emergency); the goal reserve target is represented by the blue line (120 days of operating expenses plus \$4.1 M emergency). As shown in **Figure 1-8** below, the City will gradually build reserves during the first five years of the study, reaching the minimum reserve target in FY 2026-27 and the goal reserve target in FY 2030-31.

Figure 1-8: Proposed Wastewater Financial Plan – Projected Ending Cash Balances

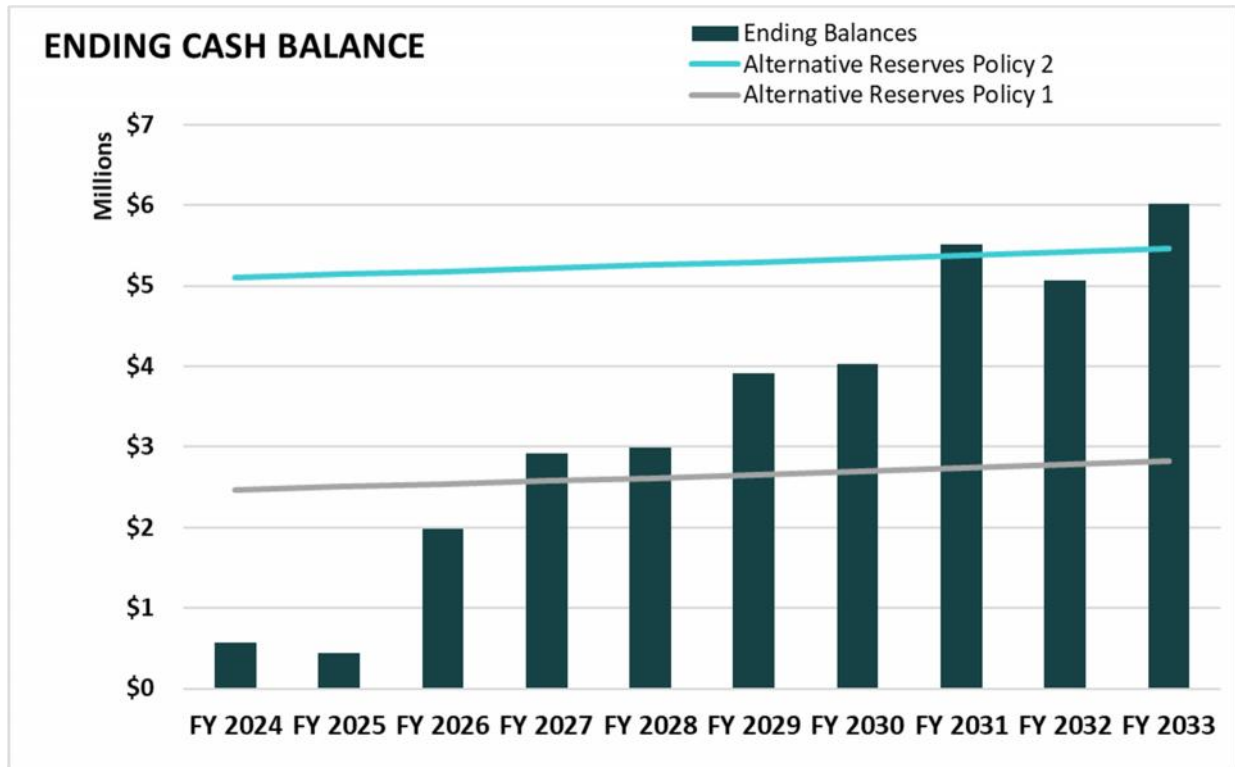
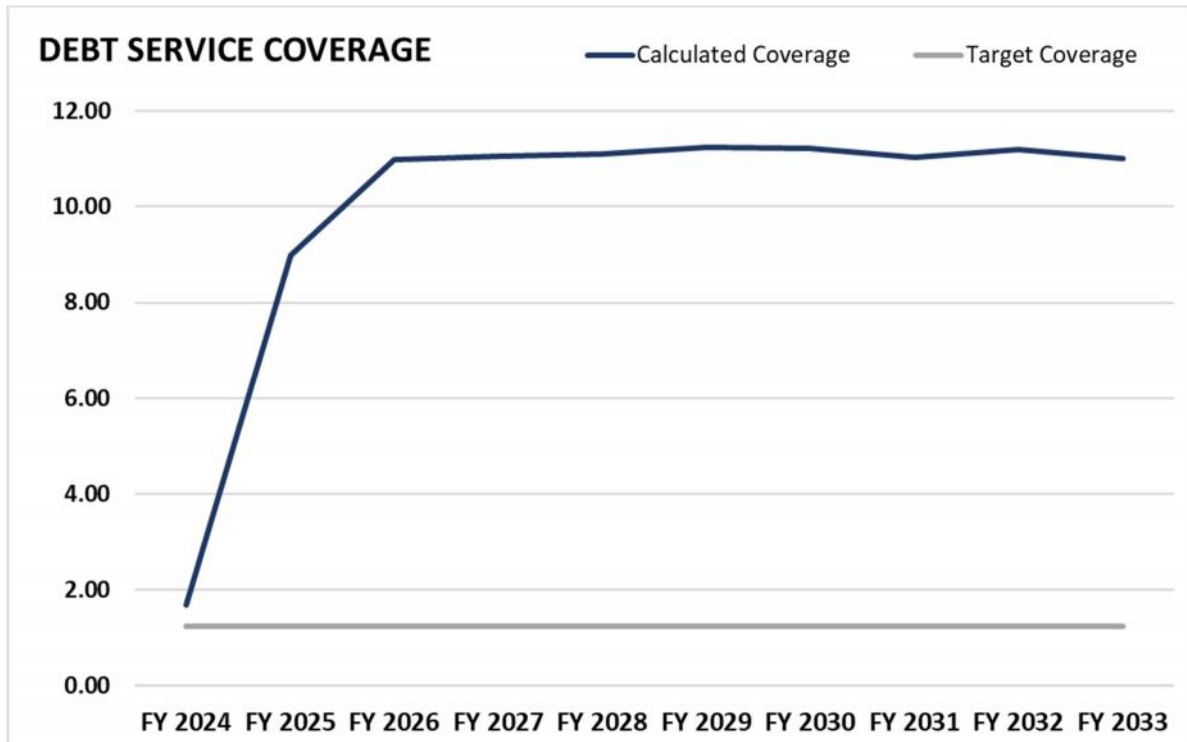


Figure 1-9 shows projected debt coverage (blue line) relative to the debt coverage requirement (gray line) over the study period. No new debt service is planned. Debt coverage remains above the requirement throughout the study period.

Figure 1-9: Proposed Wastewater Financial Plan – Projected Debt Coverage



1.8. Proposed Wastewater Rates

The City of Calistoga’s current wastewater rate structure consists of Fixed Service Charges for Residential users and Flow Charges for Non-Residential customer classes. While Non-Residential charges are 100 percent flow-based, these users are subject to a minimum monthly wastewater charge. Industrial and bottling works customers are charged a rate per million gallons of metered flow as well as per pound of sampled strength. The City will maintain its current structure for wastewater billing. While the structure will remain the same, the proposed rates reflect the updated cost of service analysis and the revenue adjustments. Table 1-6 shows proposed wastewater rates through FY 2027-28. All Fixed Charges shown are monthly.

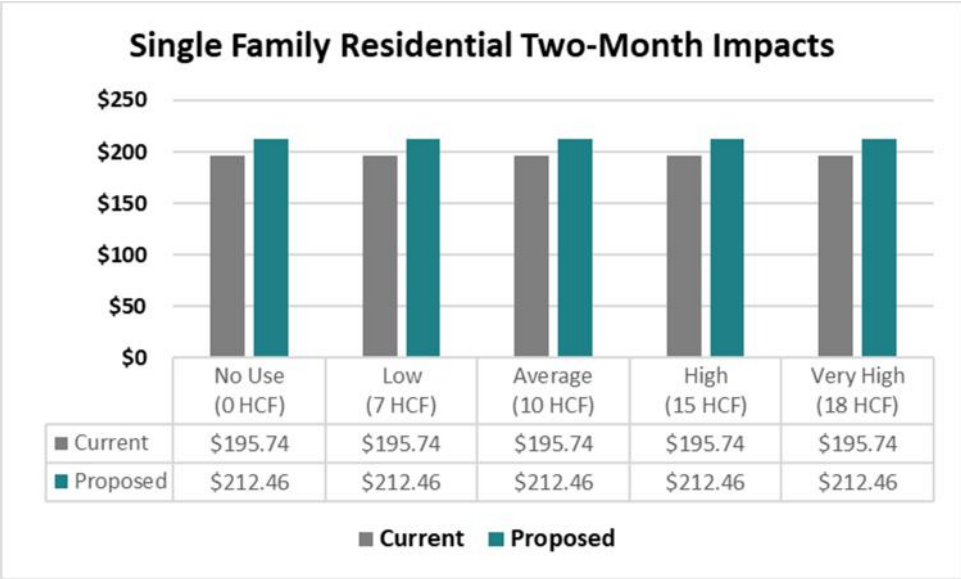
Table 1-6: Proposed Five-Year Wastewater Rates Schedule

Description	Current	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Effective Date		March 1	January 1	January 1	January 1	January 1
Residential (\$/Month/Dwelling Unit)						
Single Family Residential (SFR)	\$97.87	\$106.24	\$132.80	\$136.79	\$140.90	\$145.13
Multi-Family Residential (MFR)	\$82.21	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26
Mobile Home	\$52.85	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26
Transient Rates (\$/HCF)						
Transient General	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Spa (Domestic Wastewater)	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Campground	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Bed & Breakfast	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Other Non-Residential (\$/HCF)						
Commercial General	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Restaurant/Bakery	\$34.85	\$26.21	\$32.77	\$33.76	\$34.78	\$35.83
Laundry	\$13.21	\$16.57	\$20.72	\$21.35	\$22.00	\$22.66
Public Building	\$13.21	\$7.93	\$9.92	\$10.22	\$10.53	\$10.85
Commercial Social (Schools & Churches)	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Medical Care	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Industrial & Bottling Works (per million gallons)						
	\$14,559.98	\$27,270.49	\$34,088.12	\$35,110.77	\$36,164.10	\$37,249.03
BOD (\$/lb)	\$2.64	\$1.47	\$1.84	\$1.90	\$1.96	\$2.02
SS (\$/lb)	\$1.99	\$1.37	\$1.72	\$1.78	\$1.84	\$1.90
Spa - Geothermal Discharge (\$/HCF)						
	\$6.72	\$20.40	\$25.50	\$26.27	\$27.06	\$27.88
Minimum Charge (for All Non-Residential Users)						
	\$57.43	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26

1.9. Wastewater Bill Impacts

Figure 1-10 shows sample two-month wastewater bills for single family residential customers at varying levels of water use under both current rates and proposed FY 2023-24 rates. Since Residential wastewater charges are a fixed service charge, charges do not vary by level of metered water use.

Figure 1-10: Single Family Residential Wastewater Bill Impacts (FY 2023-24)



2. Introduction

2.1. Agency Overview

The City of Calistoga's (City) water and wastewater department provides water and wastewater service to a population of approximately 6,000 people through about 1,800 metered water connections and 1,400 sewer connections. Moreover, approximately 70% of this customer base receives both water and wastewater services from the City. Calistoga's water system consists of the Kimball Water reservoir, the Kimball Surface Water Treatment Plant, over 40 miles of transmission and distribution pipelines, and a set of storage tanks with capacity of 2.5 million gallons. The wastewater system consists of the Dunawear Wastewater Treatment Plant, over 18 miles of collection pipelines, 5.5 miles of recycled water mains, 4 lift stations, and storage ponds with a capacity of 50 million gallons.

The City's potable water supply sources include local surface water from the Kimball Reservoir and imported water from the State Water Project (SWP) that is treated by, and conveyed from, the City of Napa. City customers have reduced water demand through conservation and efficiency measures in response to pervasive drought conditions since 2015. Water demand has been consistently lower than historical levels.

2.2. Study Overview

Public water and wastewater utilities in California typically perform a cost of service analysis every five to ten years to ensure that customers are appropriately charged for service commensurate with the cost to provide service. The City of Calistoga last conducted a water and wastewater cost of service study in 2018, which established proposed rates over a five-year period through Fiscal Year (FY) 2021-22. No rate increases have been implemented since the last year of adopted rates went into effect in January 2022.

The City of Calistoga engaged Raftelis in 2022 to conduct a water and wastewater cost of service study to establish a proposed five-year schedule of water and wastewater rates through FY 2027-28. The results of the study are documented within this report. Note that proposed rates cannot be implemented until formally adopted by City Council after a public hearing. Proposition 218 requires that City customers must be mailed a public hearing notice detailing any proposed rate changes no fewer than 45 days before the public hearing. The notice explains that customers and owners of record have a right to protest the rate proposal and describes the process for doing so.

Study Objectives

The major objectives of this study are to:

- » Develop a ten-year financial plan that sufficiently funds the City's Water and Wastewater Enterprises' operations and maintenance (O&M) expenses, debt service payments, and capital expenditures while adequately funding reserves and achieving debt coverage requirements.
- » Conduct cost of service analyses that establish a clear nexus between the cost to serve water and wastewater customers and the rates charged to customers, per Proposition 218 and industry standards.
- » Evaluate alternatives to the City's existing water and wastewater rate structures that may better align with community values and the City's policy objectives, while fully recovering the cost of providing service and ensuring rates are proportionate and cost-justified.
- » Develop a five-year schedule of water and wastewater rates that are fair, cost-justified, and aligned with the requirements of California's Proposition 218.

- » Conduct public outreach to engage, inform, and solicit input from City ratepayers throughout the rate study process
- » Develop a five-year schedule of drought rates that may be implemented in future declared water shortages or other water emergencies.

Key Changes Since Prior Rate Study

Reduction in baseline water demand: Most notably, drought conditions through 2016 in California resulted in permanent reductions in baseline water demand. Since the last rate study, Calistoga has continued to see reductions in per capita and per connection demands relative to historical baselines. In the early 2000s, annual water demand was approximately 950 AF per year; since 2016, this value has been approximately 700 AF. At the most extreme year in the drought (FY 2015), annual water demand was only 597 AF for the entire utility. Calistoga has since monitored flows but seen only a modest rebound to approximately 700 AF per year, rather than the previous values of over 800 AF per year on average.

Cost inflation: The City's water and wastewater operations are impacted by increasing costs and shocks in system inputs like chemicals and labor. Operating costs continue to increase year over year due to general inflationary pressures with higher increases projected for power, labor, and water supply. Future purchased water (State Water Project (SWP)) treatment and conveyance through the City of Napa is projected to increase at a rate of 10 percent per year for the next 5 years along with SWP increases of 5% per year over the next 5 years. Overall, utility operating costs far outpace general inflation rates.

Capital Expenditures: Ten-year projected water and wastewater capital expenditures (through FY 2032-33) in this study are over \$2.5M and \$1.5M higher per year for water and wastewater respectively than the prior study's ten-year projected capital expenditures (through FY 2025-26). This represents greater than a 400 percent increase in annual average water capital costs and greater than 250 percent increase in wastewater capital expenditures relative to the prior study (which current rates are based on). In total, the ten year capital costs projected for the City (based on capital infrastructure needs and problems with current depreciating capital) are over \$40M greater over the ten year period relative to the costs projected from the previous rate study.

Cash Reserves: Both the Water and Wastewater Enterprises' beginning cash balances are significantly under the reserve policy targets with substantial CIP requirements in the current fiscal year and the coming fiscal years. Without additional reserves the Enterprises' will not have sufficient funds to match awarded grants for CIP, maintain operating cash flow, or be extended future credit. The existing cash position presents a great deal of financial risk in both the near and long-term.

Geothermal Discharge: Since the prior study the City has begun metering sources of geothermal discharges to the wastewater treatment plant (WWTP). Additional estimation of total inflow into the wastewater treatment plant has been calculated with mass balance methodology based on concentration of known geothermal constituents of boron. Taken together, this study allocates the flows and costs of geothermal wastewater to those discharging to the wastewater system. Geothermal sources make up approximately 20% of current wastewater inflows.

3. Legal Requirements and Rate Setting Methodology

3.1. Legal Requirements

California Constitution - Article XIII D, Section 6 (Proposition 218)

Proposition 218, reflected in the California Constitution as Article XIII D, was enacted in 1996 to ensure that rates and fees are reasonable and proportional to the cost of providing service. The principal requirements, as they relate to public water and wastewater service are as follows:

1. A property-related charge (which include water or wastewater rates) imposed by a public agency on a parcel shall not exceed the costs required to provide the property-related service.
2. Revenues derived by the charge shall not be used for any purpose other than that for which the charge was imposed.
3. The amount of the charge imposed upon any parcel shall not exceed the proportional cost of service attributable to the parcel.
4. No charge may be imposed for a service unless that service is actually used or immediately available to the owner of the property.
5. A written notice of the proposed charge shall be mailed to both the customer of record and owner of record of each parcel at least 45 days prior to the public hearing, when the agency considers all written protests against the charge.

As stated in the American Water Works Association's (AWWA) *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices - M1 Seventh Edition* (Manual M1), "water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." Raftelis follows industry standard rate setting methodologies set forth by the AWWA's *Manual M1* to ensure the water cost of service analysis presented in this study meets Proposition 218 requirements and establishes rates that do not exceed the proportionate cost of providing water services on a parcel basis. The methodology in the Manual M1 is a nationally recognized industry ratemaking standard which courts have recognized as consistent with Proposition 218. Similarly, the wastewater cost of service presented in this study was conducted in accordance with principles established by the Water Environment Federation (WEF) and described in *Financing and Charges for Wastewater Systems*.

3.2. Rate-Setting Methodology

This study was conducted using industry-standard principles outlined by the AWWA's *Manual M1* and WEF's *Financing and Charges for Wastewater Systems*. The process and approach Raftelis utilized in the study to determine rates is informed by the City's policy objectives, the current system of rates, and the legal requirements in California (namely, Proposition 218). The resulting financial plans, cost of service analyses, and rate design process follows five key steps, outlined below, to determine proposed rates that fulfill the City's objectives, meet industry standards, and align with state law. The overall process outlined below applies to the cost of service analyses for both water and wastewater.

1. **Financial Plan:** The first study step is to develop a multi-year financial plan that projects the Water and Wastewater Enterprises' revenues, expenses, capital project financing, annual debt service, and reserve

funding. The financial plan is used to determine revenue adjustments needed to recover adequate revenues to fully recover system costs.

2. **Revenue Requirement Determination:** After completing the financial plan, the rate-making process begins with the determination of the revenue requirement for the test year, also known as the cost-of service year. The test year for this study is FY 2022-23. The revenue requirement should sufficiently fund the Water and Wastewater Enterprises' operating costs, annual debt service (including coverage requirements), capital expenditures, and reserve funding needs.
3. **Cost of Service Analysis:** The annual cost of providing water or wastewater service (i.e. the revenue requirement) is then distributed to customer classes commensurate with their use of and burden on the system. A cost of service analysis involves the following steps:
 - » Functionalize costs – the different components of the revenue requirement are categorized into functions such as supply, transmission, storage, customer service, etc. (for water) and collection, treatment, customer, etc. (for wastewater)
 - » Allocate to cost causation components – the functionalized costs are then allocated to cost causation components such as supply, base delivery, peaking, etc. (for water) and flow, strength, etc. (for wastewater)
 - » Develop unit costs – unit costs for each cost causation component are determined using units of service
 - » Distribute cost components – the cost components are allocated to each customer class and tier using the unit costs in proportion to their demand and burden on the system.

A water cost of service analysis considers both the average water demand and peak demand. Peaking, or extra-capacity, costs are incurred during periods of peak consumption, most often coinciding with summer water use. There are additional capacity-related costs associated with designing, constructing, operating, maintaining, and replacing facilities to meet peak demand. Patterns of use impose additional costs on a water utility and are used to determine the cost burden on peaking-related facilities. Similarly, a wastewater cost of service analysis considers the amount of wastewater treatment plant influent contributed by each customer class to account for customer differences in the quantity and strength of wastewater discharges.

4. **Rate Design:** After allocating the revenue requirement to each customer class, the rate design and calculation process can begin. Rates do more than simply recover costs; within the legal framework and industry standards, properly designed rates should support and optimize the City's policy objectives.
5. **Administrative Record Preparation and Rate Adoption:** The final step in a rate study is to develop the administrative record in conjunction with the rate adoption process. This report serves as the administrative record for this study. The administrative record documents the study results and presents the methodologies, rationale, justifications, and calculations used to determine the proposed rates. A thorough and methodological administrative record serves two important functions: maintaining defensibility in a stringent legal environment and communicating the rationale for revenue adjustments and proposed rates to customers and key stakeholders.

4. Water Rate Study

4.1. Key Inputs and Assumptions

Raftelis developed a water rate model in Microsoft Excel to project financial calculations over the next ten fiscal years with projections shown in this report through the five-year rate-setting period of FY 2027-28 (i.e. the “study period.” The City’s fiscal year spans from July 1 through June 30. Projections in future years were generally made based on actual or estimated data for FY 2021-22 or FY 2022-23, or the adopted budget for FY 2022-23 and preliminary budget for FY 2023-24 (current fiscal year) using key assumptions outlined below. Assumptions were discussed with, and reviewed by, City of Calistoga Public Works and Finance staff to ensure that the City water system’s unique characteristics are accurately accounted for. Note that most table values shown throughout this report are rounded to the last digit shown and may therefore not sum precisely to the totals shown.

4.1.1. CURRENT WATER RATES

Table 4-1 shows the rates currently in effect from January 1, 2022, which were developed during the prior rate study in 2018. Customers are currently billed bi-monthly (if Single Family Residential) or monthly (if any other class of customer) for two primary charges: 1) Water Service Charges and 2) Water Volume Rates per hundred cubic feet (HCF)¹ of water delivered. The Water Service Charge is a fixed monthly charge that varies based on meter size. Note that, while rates are determined on a monthly basis, the City charges its SFR customers on a bi-monthly basis (six times per year), due to only having about half the meters being automated and having to manual read the other half. As a result, the actual bill mailed to a customer will be double the amount shown below, plus the charge included for variable water use – again mailed on a bi-monthly basis. Water Volume Rates vary based on customer classes. All customer classes are subject to a uniform Water Volume Rate. Water rates have not changed since January 2022. All proposed fixed rates in this study report are shown in monthly terms.

¹ One HCF equals approximately 748 gallons.

Table 4-1: Current Water Rates Schedule

Description	FY 2022-23
Fixed Rates (All Customers, \$/month)	
5/8"	\$50.12
1"	\$125.31
1 1/2"	\$250.62
2"	\$400.99
3"	\$751.86
4"	\$1,253.10
6"	\$2,506.20
8"	\$4,009.92
Volumetric Rate (\$/HCF)	\$10.76
Private Fire Line Charges (\$/month)	
5/8"	\$5.01
1"	\$12.53
1 1/2"	\$25.06
2"	\$40.10
3"	\$75.19
4"	\$125.31
6"	\$250.62
8"	\$400.99

4.1.2.WATER ENTERPRISE FINANCIAL ASSUMPTIONS

Inflationary assumptions shown in **Table 4-2** are used to escalate projected non-rate revenues and operations and maintenance (O&M) expenses beyond FY 2022-23. For O&M expenses, the general inflation rate is consistent with long-term changes in the Consumer Price Index (CPI). Salary and benefit inflationary increases were provided by City staff, as water utility personnel cost increases are typically agency-specific. Water supply cost escalation is from the City of Napa and is applied to the costs of treatment and conveyance of State water. These projections were provided by the City of Napa in August 2023. Water supply cost escalation is from the City of Napa and is applied to the costs of treatment and conveyance of State water. These projections were provided by the City of Napa in August 2023. All other O&M expense inflationary assumptions were developed by Raftelis based on professional judgement and available industry indices.

Table 4-2: Water Enterprise Inflationary Assumptions

Inflationary Categories	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Non-Rate Revenues					
Property Taxes	2.0%	2.0%	2.0%	2.0%	2.0%
Miscellaneous	3.0%	3.0%	3.0%	3.0%	3.0%
Interest Earnings on Reserves	1.0%	1.0%	1.0%	1.0%	1.0%
Expenses					
General	6.0%	4.5%	3.0%	3.0%	3.0%
Salaries/Benefits	5.5%	5.5%	5.0%	5.0%	5.0%
Utilities	4.0%	4.0%	4.0%	4.0%	4.0%
Chemicals	5.0%	5.0%	5.0%	5.0%	5.0%
Capital	0.0%	3.2%	3.2%	3.2%	3.2%
Water Supply	5.0%	11.9%	9.0%	9.0%	8.0%

4.1.3.PROJECTED WATER SERVICE CONNECTIONS

City staff provided Raftelis with the number of water meters by size for FY 2021-22. The City anticipates negligible growth for the foreseeable future, as the service area is mostly built-out and will not see significant increases in the number of meters for future years. As such, Raftelis used the current actual meter counts – shown below in Table 4-3 - for all future years in the study.

Table 4-3: Current Metered Water Connections

Description	Current Metered Connections
Residential	
5/8"	1,221
1"	86
1 1/2"	14
2"	11
3"	4
4"	2
6"	3
8"	0
Total	1,341
Non-Residential	
5/8"	169
1"	59
1 1/2"	18
2"	35
3"	12
4"	4
6"	1
8"	3
Total	301

4.1.4.PROJECTED WATER SALES

City staff provided Raftelis with total annual water use data by customer class for FY 2021-22. Raftelis worked closely with City staff to develop water use projections over the study period. Water demand projections depend on two key assumptions: new connection growth and water demand per connection (per capita use). Beginning in FY 2022-23, annual water use was projected at the customer class level by increasing prior year water use based on both assumed connection growth and water demand per connection. **Table 4-4** shows projected water use by customer class over the study period based on the current water rate structure. A ten percent increase in demand per connection is assumed in FY 2023-24 from a rebound of demand following an extended drought period. FY 2023-24 projected demand represents the new baseline water demand per connection of approximately 632 AF per year. This level of

water demand still represents a significant reduction from historical baseline demand from the early 2000s, during which average water demand was over 800 AF per year. Total water use is shown in hundred cubic feet (HCF), the billing unit.

Table 4-4: Projected Water Demand

Description	Actual FY 2022	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Demand per Connection	N/A	100.0%	110.0% ²	100.0%	100.0%	100.0%	100.0%
Water Sales (HCF)							
Residential	162,125	162,125	178,338	178,338	178,338	178,338	178,338
Non-Residential	88,267	88,267	97,094	97,094	97,094	97,094	97,094
Total	250,392	250,392	275,431	275,431	275,431	275,431	275,431

4.1.5. PROJECTED WATER SUPPLY

Table 4-5 shows the water supply mix projected to meet water demand over the study period. City staff provided Raftelis with the anticipated amount of water available from each source of supply over the study period. Raftelis then determined the projected supply mix based on the amount of water supply required to satisfy demand, after water loss (due to physical leakage and apparent losses). The potable water supplies are determined based on the following normal year average supply mix: approximately 30% from Kimball Reservoir and approximately 70% State Water purchases. The City's supply mix can vary significantly from year to year and is not based on a rigid prioritization policy. However, simplifying assumptions are necessary to develop reasonable supply mix projections over the study, assuming normal conditions on average.

Table 4-5: Projected Sources of Supply

Description	Actual FY 2022	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Water Supply Required to Meet Demand							
Water Demand (AF)	574	574	632	632	632	632	632
Water Loss	13.64%	13.64%	13.64%	13.64%	13.64%	13.64%	13.64%
Required Water Supply (AF) ³	653	653	718	718	718	718	718
Projected Water Supply Mix (AF)							
Kimball Reservoir	196	196	196	196	196	196	196
SWP	457	457	523	523	523	523	523
Total (AF)	653	653	718	718	718	718	718

² This increase in water demand per connection represents an increase in per capita assumption consistent with the mild rebound seen in water demand since the last study in 2016. This represents an increase in annual baseline water demand from approximately 575 AF in FY 2023 to 632 AF per year for every year after FY 2024.

³ Equal to water demand multiplied by 113.64% (e.g. actual water demand + water used to account for losses, which are 13.64% of total use).

4.2. Water Financial Plan

Section 4.2 details the development of a proposed Water Enterprise financial plan for City of Calistoga over the study period. The following subsections include estimates and projections of annual revenues, O&M expenses, debt service payments, capital expenditures, and reserve funding through FY 2027-28. The overall purpose of the financial plan is to determine annual water rate revenues required to achieve sufficient cash flow, execute the capital program, maintain adequate reserves, and meet debt coverage requirements.

4.2.1. WATER ENTERPRISE REVENUE UNDER CURRENT RATES

The Water Enterprise's revenue sources consist of water rates, capacity fees, miscellaneous fees, interest earnings on cash reserves, and other non-rate revenues. The rate revenue projections shown in this section assume that current water rates are effective throughout the study period, and therefore represent estimated revenues in the absence of any water rate increases. This status quo scenario provides a baseline from which Raftelis evaluates the need for revenue adjustments (i.e. gross rate revenue increases).

Projected Water Rate Revenues

Raftelis projected annual water rate revenues from Water Service Charges and Water Volume Rates over the study period based on current FY 2022-23 water rates. Per City direction, Raftelis projected rate revenues for future years using minimal account growth and constant water demand (as described above in Table 4-3 and Table 4-4). The resulting projected revenues under existing rates are shown below in Table 4-6.

Table 4-6: Projected Revenue from Existing Rates

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Water Rate Revenues						
Fixed	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981
Variable	\$2,437,907	\$2,681,698	\$2,681,698	\$2,681,698	\$2,681,698	\$2,681,698
Total	\$3,968,888	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679

Other Water Enterprise Revenues

Table 4-7 shows all other Water Enterprise revenues. All FY 2022-23 and FY 2023-24 other revenues are based on the City's budgets and are escalated annually by the miscellaneous inflation rate (from Table 4-2), except where noted otherwise. Interest revenue is estimated in the financial plan model beginning in FY 2022-23 based on projected fund balances and the assumed interest rate. Grants for capital projects are accounted for separately in the CIP. SWP income represents a one-time revenue source for FY 2023-24 only.

Table 4-7: Other Water Enterprise Revenues

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Water - Other Revenues						
Capacity Charges	\$32,599	\$50,000	\$51,500	\$53,045	\$54,636	\$56,275
Miscellaneous Revenues	\$1,405,258	\$92,870	\$95,656	\$98,526	\$101,482	\$104,526
Interest Income	\$2,591	\$7,273	\$6,072	\$14,054	\$25,095	\$41,393
Grants	\$0	\$0	\$0	\$0	\$0	\$0
SWP Income	\$0	\$190,000	\$0	\$0	\$0	\$0
Total	\$1,440,448	\$340,143	\$153,228	\$165,625	\$181,212	\$202,194

Summary of Projected Water Enterprise Revenues

Table 4-8 shows a summary of all projected Water Enterprise revenues under current rates over the study period. This includes all projected revenues shown in **Table 4-6** and **Table 4-7**. This revenue summary represents expected revenues in the absence of any rate increase over the study period.

Table 4-8: Summary of Projected Water Enterprise Revenues (Current Rates)

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Water Revenues						
Fixed Revenues	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981	\$1,530,981
Variable Revenues	\$2,437,907	\$2,681,698	\$2,681,698	\$2,681,698	\$2,681,698	\$2,681,698
Capacity Charges	\$32,599	\$50,000	\$51,500	\$53,045	\$54,636	\$56,275
Miscellaneous Revenues	\$1,405,258	\$92,870	\$95,656	\$98,526	\$101,482	\$104,526
Interest Income	\$2,591	\$7,273	\$6,072	\$14,054	\$25,095	\$41,393
Grants	\$0	\$0	\$0	\$0	\$0	\$0
Loans & SWP Income	\$0	\$190,000	\$0	\$0	\$0	\$0
Total	\$5,409,336	\$4,552,822	\$4,365,907	\$4,378,304	\$4,393,891	\$4,414,873

4.2.2. WATER ENTERPRISE OPERATIONS & MAINTENANCE EXPENSES

Table 4-9 shows a summary of all Water Enterprise O&M expenses over the study period. Raftelis worked closely with City staff to determine reasonable inflationary assumptions that were then used to project O&M expenses through FY 2027-28. O&M expenses are projected to increase by approximately 9 percent per year on average over the study period. All O&M expense projections were provided by City in current dollars and adjusted by Raftelis for estimated future inflation.

Table 4-9: Projected Water Enterprise O&M Expenses

O&M Expenses	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Supply - State Water	\$898,400	\$1,063,000	\$1,189,868	\$1,297,514	\$1,414,770	\$1,528,183
Supply - Napa Treatment	\$786,000	\$975,500	\$1,091,925	\$1,190,710	\$1,298,315	\$1,402,392
Supply - Kimball Reservoir	\$668,529	\$946,449	\$988,333	\$1,019,742	\$1,052,167	\$1,085,641
Treatment	\$576,158	\$472,221	\$498,193	\$523,103	\$549,258	\$576,721
Storage	\$68,670	\$84,850	\$88,758	\$92,110	\$95,595	\$99,218
Distribution	\$733,590	\$549,603	\$577,561	\$602,537	\$628,644	\$655,934
Fire	\$23,049	\$18,375	\$19,386	\$20,355	\$21,373	\$22,442
Meters	\$15,149	\$12,145	\$12,767	\$13,309	\$13,875	\$14,467
Customer	\$81,098	\$56,513	\$59,621	\$62,602	\$65,732	\$69,019
Conservation	\$101,270	\$25,200	\$26,334	\$27,124	\$157,938	\$165,276
Transfer to Capital Outlay	\$8,110	\$505,651	\$505,962	\$506,260	\$506,573	\$506,902
Total O&M Expenses	\$3,960,023	\$4,709,508	\$5,058,708	\$5,355,366	\$5,804,240	\$6,126,193

4.2.3.WATER ENTERPRISE DEBT

Table 4-10 shows the Water Enterprise’s projected debt service obligations over the study period. Existing debt service consists of the City’s 2011 COP Water Enterprise USDA Loan, the 2018 Water WWW Revenue Loan, and the General Fund Loan. Proposed Water Enterprise debt service associated with future capital project costs are also shown beginning in FY 2027. Note that proposed debt service terms (inflation, loan duration, issuance cost) represent preliminary projections based on the best information available at the time of this study.

Table 4-10: Water Enterprise Debt Service

Debt Service	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Existing Debt Service						
2011 COPs USDA Loan	\$104,386	\$105,473	\$106,536	\$107,573	\$107,586	\$108,586
2018 WWW Revenue Loan	\$242,941	\$248,316	\$253,441	\$258,316	\$262,941	\$268,441
General Fund Loan	\$0	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
Subtotal	\$347,326	\$453,789	\$459,976	\$465,889	\$470,526	\$477,026
Proposed Debt Service						
2027 Proposed Bonds	\$0	\$0	\$0	\$0	\$250,578	\$250,578
Subtotal	\$0	\$0	\$0	\$0	\$250,578	\$250,578
Total	\$347,326	\$453,789	\$459,976	\$465,889	\$721,104	\$727,604

4.2.4.WATER ENTERPRISE CAPITAL IMPROVEMENT PROGRAM

Table 4-11 shows the City’s planned capital improvement program (CIP) for the Water Enterprise, amounting to approximately \$15M over the study period. The values shown are based on the most recently adopted multi-year CIP, with modifications to the timing of some projects to reduce immediate financial needs and financial impacts. Significant CIP expenditures are anticipated to continue over the next ten years, highlighting the need to maintain adequate reserves for future cash funded, and debt funded, CIP.

Table 4-11: Water Enterprise Five-Year Capital Improvement Plan

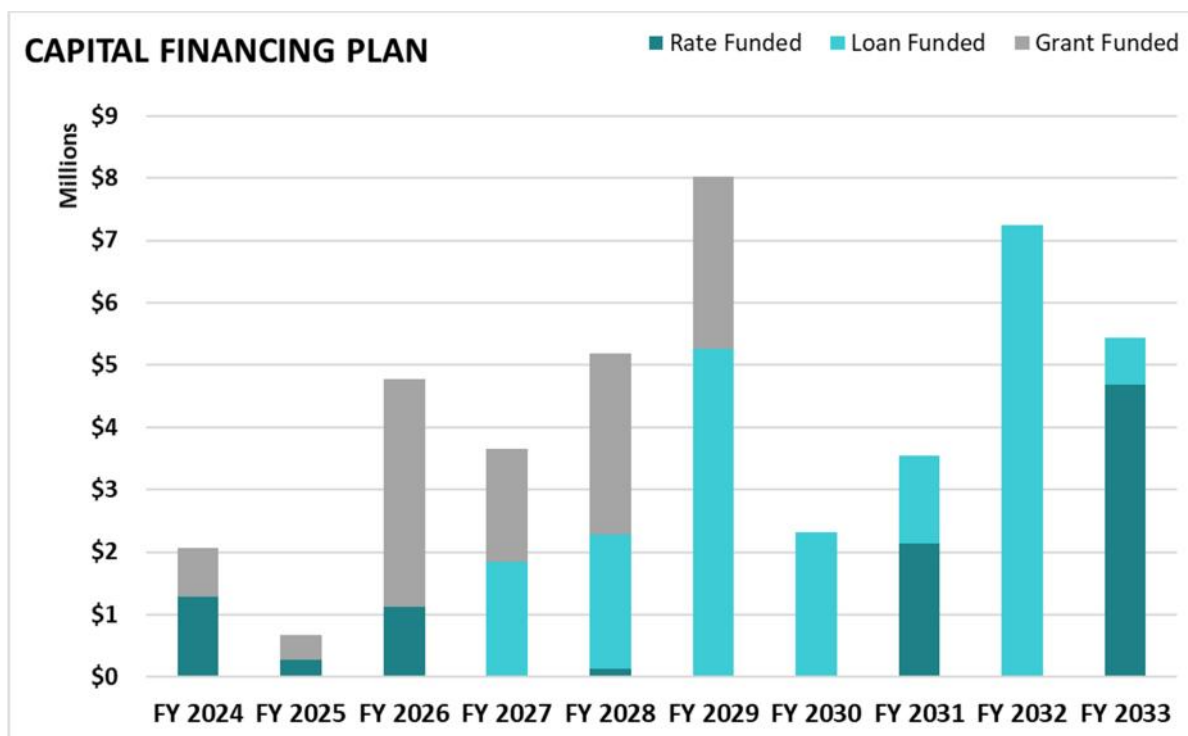
Project Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Relocate Dunaweal Booster Pump Station Down Valley & THM/HAA5s	\$600,000	\$20,000	\$0	\$0	\$1,187,033	\$2,155,125
Kimball Intake Tower and Drain Valve Replacement and	\$50,000	\$0	\$154,800	\$2,582,683	\$0	\$0
New Generators PLC/SCADA Upgrades (Pope & WTP)	\$402,878	\$1,155,039	\$0	\$0	\$0	\$0
Conn Creek Bridge Replacement Waterline	\$0	\$0	\$103,200	\$1,764,479	\$0	\$0
Dwyer road Pump Station Project	\$0	\$0	\$0	\$0	\$0	\$1,134,276
Automatic Meter Read Program	\$80,000	\$80,000	\$82,560	\$85,202	\$329,731	\$850,707
THM Compliance (DBP reduction project)	\$150,000	\$50,000	\$129,000	\$0	\$0	\$0
Rate Study	\$165,000	\$30,000	\$0	\$0	\$0	\$0
Brannon/Lincoln Waterloop	\$0	\$40,000	\$0	\$0	\$0	\$0
Potential additional Well Supply Source - Pursue Future	\$0	\$0	\$0	\$0	\$0	\$0
Kimball Water Treatment Plant Upgrades/Expansion	\$22,000	\$31,000	\$51,600	\$53,251	\$329,731	\$0
Mt Washington Tank Automated chlorination system	\$0	\$0	\$0	\$0	\$0	\$113,428
Water Loop White/Greenwood (Tubbs or upvalley of Tubbs)	\$0	\$0	\$0	\$0	\$0	\$113,428
Cap and Abandon Old Kimball Main and Relocate Bennett Lane Water Services, BFD's	\$0	\$0	\$0	\$0	\$137,388	\$255,212
Replacement Mains & Valves	\$725,000	\$500,000	\$0	\$53,251	\$54,955	\$567,138
10-foot tall Dam Raise at Kimball	\$0	\$5,000	\$154,800	\$159,754	\$1,175,436	\$0
NBA Cathodic Protection Program	\$0	\$0	\$0	\$0	\$0	\$0
Start Planning, Design, Permitting for Replacing NBA Pipeline - St. Helena to Calistoga	\$0	\$0	\$0	\$0	\$0	\$0
Polybutelyne Service replacement	\$0	\$0	\$0	\$0	\$164,866	\$0
Maxfield Pathway Waterline Relocation	\$0	\$0	\$0	\$79,877	\$274,776	\$0
Up-Valley Pressure Zone	\$0	\$0	\$0	\$0	\$0	\$0
Other (Veg, Carport, Raise Iron, MSA, Equip)	\$0	\$160,000	\$0	\$0	\$0	\$0
Total	\$2,194,878	\$2,071,039	\$675,960	\$4,778,496	\$3,653,918	\$5,189,313

Table 4-12 shows the funding plan for Water Enterprise CIP projects over the study period. As shown below, the City plans to fund its CIP projects through a combination of grant, debt, and cash-funding over the study period. Figure 4-1 shows a summary of total Water Enterprise CIP expenditures by funding source through FY 2032-33.

Table 4-12: Water Enterprise Capital Improvement Plan, by Funding Source

Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Capital Improvement Plan						
Rate Funded (PAYGO)	\$1,142,000	\$1,289,765	\$275,960	\$1,124,820	\$0	\$137,395
Debt Funded	\$0	\$0	\$0	\$0	\$1,848,082	\$2,151,918
Grant Funded	\$1,052,878	\$781,274	\$400,000	\$3,653,676	\$1,805,836	\$2,900,000
Total	\$2,194,878	\$2,071,039	\$675,960	\$4,778,496	\$3,653,918	\$5,189,313

Figure 4-1: Water Enterprise Capital Improvement Plan



4.2.5.WATER ENTERPRISE FINANCIAL POLICIES

Required Debt Coverage

The Water Enterprise is required to meet debt service coverage requirements on its outstanding water revenue bonds. The required debt coverage ratio is 1.25, meaning that the Water Enterprise's net operating revenues (i.e. total revenues less operating expenses) must amount to at least 1.25 times the amount of annual debt service. Failure to meet debt service coverage results in a technical default, which without foreseeable remedial action such as implementing rate increases, could result in a downgrade of credit rating, higher costs in future debt issuance, or even denial of credit.

Reserve Targets

Adequate cash reserves are required to meet operating, capital, and debt service requirements. The current operating reserve target is equal to 20% percent of annual O&M expenses, or approximately two months' operating expenses. Raftelis recommends that the City increase this target to 33% of O&M expenses, which constitutes approximately 120 days of operating expenses and more closely reflects industry trends for reserve policies. The City will also introduce an informal emergency reserve to help cover unforeseen capital needs such as line breaks and other sudden expenses due to infrastructure failure. The proposed emergency reserve will have two targets based on a function of capital: a minimum emergency reserve of \$1.5M and a goal emergency reserve of \$3.4M. These reflect 50% and 100% of average annual CIP costs (as shown above in Table 4-11 above). Raftelis and City staff discussed these recommendations with City Council on May 3, 2023 with Council giving direction to target the higher reserve requirement. Council intends to adopt this policy when it considers the proposed rates. Table 4-13 summarizes the Water Enterprise's key financial policies relevant to this rate study. Table 4-14 shows projected operating and capital reserve targets over the study period based on the policies outlined above.

Table 4-13: Water Enterprise Financial Policies

Financial Policy	Target/Requirement
Debt Coverage	
Target Debt Coverage Ratio	1.25
Reserve Targets	
Operating Reserve Target	25% of annual O&M expenses
Emergency Cash Reserve Minimum	50% annual average capital expenditures (\$1.5M)
Emergency Cash Reserve Goal	100% annual average capital expenditures (\$3.4M)

Table 4-14: Projected Water Enterprise Reserve Targets

Reserve Target	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Operating Reserve	\$1,306,808	\$1,554,138	\$1,669,374	\$1,767,271	\$1,915,399	\$2,021,644
Emergency Cash Reserve Minimum	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000
Emergency Cash Reserve Goal	\$3,400,000	\$3,400,000	\$3,400,000	\$3,400,000	\$3,400,000	\$3,400,000
Total Minimum Target⁴	\$2,806,808	\$3,054,138	\$3,169,374	\$3,267,271	\$3,415,399	\$3,521,644
Total Goal Target⁵	\$4,706,808	\$4,954,138	\$5,069,374	\$5,167,271	\$5,315,399	\$5,421,644

⁴ Equal to operating reserve target (first line) plus emergency cash reserve minimum target (second line).

⁵ Equal to operating reserve target (first line) plus emergency cash reserve goal target (third line).

4.2.6.STATUS QUO WATER FINANCIAL PLAN

To evaluate the need for revenue adjustments (i.e. increases to gross rate revenues), Raftelis first developed a status quo financial plan. The status quo financial plan assumes that current rates remain unchanged over the study period. Table 4-15 combines projected water rate revenues (from Table 4-6), O&M expenses (from Table 4-9), and debt service (from Table 4-10) to generate operating cash flow projections under the status quo. In the absence of any revenue adjustments, the Water Enterprise will fail to generate sufficient revenue to recover O&M expenses and debt service, and net cash generation becomes increasingly negative in subsequent years.

Table 4-15: Water Enterprise Cash Flow – Status Quo Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Water Rate Revenue under Current Rates						
2	Water Rates Subject to Revenue Adjustments	\$3,968,888	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679
3	Water Rates not Subject to Revenue Adjustments ⁶	\$1,440,448	\$340,143	\$153,228	\$165,625	\$181,212	\$202,194
4							
5	Revenue Adjustments						
6	Fiscal Year Rev. Adj.						
7	FY 2023 0.00%	\$0	\$0	\$0	\$0	\$0	\$0
8	FY 2024 0.00%		\$0	\$0	\$0	\$0	\$0
9	FY 2025 0.00%			\$0	\$0	\$0	\$0
10	FY 2026 0.00%				\$0	\$0	\$0
11	FY 2027 0.00%					\$0	\$0
12	FY 2028 0.00%						\$0
13	Total Adjustments	\$0	\$0	\$0	\$0	\$0	\$0
14							
18	Total Revenues	\$5,409,336	\$4,552,822	\$4,365,907	\$4,378,304	\$4,393,891	\$4,414,873
19							
20	O&M Expenses	\$3,960,023	\$4,709,508	\$5,058,708	\$5,355,366	\$5,804,240	\$6,126,193
21	Debt Service	\$347,326	\$453,789	\$459,976	\$465,889	\$721,104	\$727,604
22	Rate-Funded CIP	\$1,142,000	\$1,289,765	\$275,960	\$1,124,820	\$0	\$137,395
23	Total Expenses	\$5,449,349	\$6,453,062	\$5,794,644	\$6,946,075	\$6,525,344	\$6,991,192
24							
25	Net Cash Flow⁷	(\$40,013)	(\$1,900,240)	(\$1,428,737)	(\$2,567,771)	(\$2,131,453)	(\$2,576,320)

⁶ Includes capacity fees, miscellaneous revenues, and interest income. Note that grant and loan revenue and the capital projects associated with them are excluded in this cashflow on both the revenue and expense side of the calculation.

⁷ Equal to [Line 18 – Line 23].

Table 4-16 shows projected reserve balances and debt coverage under the status quo financial plan for the entire Water Enterprise. Sources of funds include both rate revenues and non-rate revenues, but do not include revenues from projected rate increases. Use of funds include O&M expenses (from Table 4-9), debt service (from Table 4-10), and CIP expenditures (from Table 4-12). The FY 2022-23 beginning balance reflects actual Water Enterprise reserve balances as of July 1, 2022. All ending balance and debt coverage figures are projected values. Target reserve balances shown are from Table 4-14.

Under the status-quo financial plan, reserves are projected to fall below target by the end of FY 2023-24. Debt coverage is projected to fall well below the required ratio in all years following FY 2023-24. The status quo financial plan is insufficient to meet the Water Enterprise's financial needs over the study period. This demonstrates a clear need for revenue adjustments over the study period to increase rate revenues and ensure financial sustainability.

Table 4-16: Water Enterprise Pro Forma - Status Quo Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Projected Beginning Balance	\$3,176,605	\$3,136,592	\$1,236,352	(\$192,386)	(\$2,760,157)	(\$4,891,610)
2							
3	Source of Funds						
4	Status Quo Rate Revenues	\$3,968,888	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679
5	Other Revenues	\$1,440,448	\$340,143	\$153,228	\$165,625	\$181,212	\$202,194
9	Total Source of Funds	\$5,409,336	\$4,552,822	\$4,365,907	\$4,378,304	\$4,393,891	\$4,414,873
10							
11	Use of Funds						
12	O&M Expenses	\$3,960,023	\$4,709,508	\$5,058,708	\$5,355,366	\$5,804,240	\$6,126,193
13	Debt Service	\$347,326	\$453,789	\$459,976	\$465,889	\$721,104	\$727,604
14	Rate-Funded CIP	\$1,142,000	\$1,289,765	\$275,960	\$1,124,820	\$0	\$137,395
15	Total Use of Funds	\$5,449,349	\$6,453,062	\$5,794,644	\$6,946,075	\$6,525,344	\$6,991,192
16							
17	Net Cashflow	(\$40,013)	(\$1,900,240)	(\$1,428,737)	(\$2,567,771)	(\$2,131,453)	(\$2,576,320)
18							
19	Projected Ending Balance⁸	\$3,136,592	\$1,236,352	(\$192,386)	(\$2,760,157)	(\$4,891,610)	(\$7,467,929)
20	<i>Target Balance</i>	<i>\$2,806,808</i>	<i>\$3,054,138</i>	<i>\$3,169,374</i>	<i>\$3,267,271</i>	<i>\$3,415,399</i>	<i>\$3,521,644</i>
21							
22	Debt Coverage						
23	Projected Debt Coverage ⁹	4.17	-0.35	-1.51	-2.10	-1.96	-2.35
24	<i>Required Debt Coverage</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>

4.2.7. PROPOSED WATER FINANCIAL PLAN

The Water Enterprise must increase its revenues from water rates over the study period to adequately fund its operating and capital expenditures, meet required debt coverage, and maintain sufficient reserve funding. Raftelis worked closely with City staff to identify financial plan options for the City Council's consideration. The selected option of proposed annual revenue adjustments are shown in Table 4-17. Revenue adjustments represent annual percent increases in total rate revenue relative to rate revenue generated by the prior year's water rates. The proposed first rate increase implementation date is March 1, 2024. All subsequent rate adjustments will take effect on January 1, 2025 the beginning of each calendar year.

⁸ Equal to [Line 1 + Line 17]

⁹ Equal to [(Line 9 – Line 12) ÷ Line 13]

Table 4-17: Proposed Water Enterprise Revenue Adjustments

Description	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Effective Date	March 1, 2024	January 1, 2025	January 1, 2026	January 1, 2027	January 1, 2028
Revenue Adjustment	50.0%	12.0%	10.0%	6.0%	6.0%

Table 4-18 combines projected rate and miscellaneous revenues (from Table 4-8), O&M expenses (from Table 4-9), and debt service (from Table 4-10) to generate operating cash flow projections under the proposed financial plan. By implementing the proposed revenue adjustments, we project that Water Enterprise will maintain sufficient operating cash flow through the end of the study period.

Table 4-18: Water Enterprise Cash Flow – Proposed Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Water Rate Revenue under Current Rates						
2	Water Rates Subject to Revenue Adjustments	\$3,968,888	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679	\$4,212,679
3	Water Rates not Subject to Revenue Adjustments ¹⁰	\$1,440,448	\$340,143	\$153,228	\$165,625	\$181,212	\$202,194
4							
5	Revenue Adjustments						
6	Fiscal Year Rev. Adj.						
7	FY 2023 N/A	\$0	\$0	\$0	\$0	\$0	\$0
8	FY 2024 50.00%		\$702,113	\$2,106,339	\$2,106,339	\$2,106,339	\$2,106,339
9	FY 2025 12.00%			\$379,141	\$758,282	\$758,282	\$758,282
10	FY 2026 10.00%				\$353,865	\$707,730	\$707,730
11	FY 2027 6.00%					\$233,551	\$467,102
12	FY 2028 6.00%						\$247,564
13	Total Adjustments	\$0	\$0	\$702,113	\$2,485,480	\$3,218,487	\$3,805,902
14							
18	Total Revenues	\$5,409,336	\$5,254,935	\$6,851,387	\$7,596,790	\$8,199,794	\$8,701,890
19							
20	O&M Expenses	\$3,960,023	\$4,709,508	\$5,058,708	\$5,355,366	\$5,804,240	\$6,126,193
21	Debt Service	\$347,326	\$453,789	\$459,976	\$465,889	\$721,104	\$727,604
22	Rate-Funded CIP	\$1,142,000	\$1,289,765	\$275,960	\$1,124,820	\$0	\$137,395
23	Total Expenses	\$5,449,349	\$6,453,062	\$5,794,644	\$6,946,075	\$6,525,344	\$6,991,192
24							
25	Net Cash Flow¹¹	(\$40,013)	(\$1,198,127)	\$1,056,743	\$650,715	\$1,674,450	\$1,710,698

Table 4-19 shows projected reserve balances and debt coverage under the proposed financial plan for the entire Water Enterprise. Sources of funds include status quo revenues (from Table 4-8), revenue adjustments (from Table 4-18), and miscellaneous revenues. Note that CIP is shown net of grant funding and debt proceeds. Use of funds include O&M expenses (from Table 4-9), debt service (from Table 4-10), and rate-funded CIP expenditures (from Table 4-12). The FY 2023 and 2024 beginning balances reflects actual Water Enterprise reserve balances as of July 1, 2022 and July 1, 2023, respectively. All ending balance and debt coverage figures are projected values. Target

¹⁰ Includes capacity fees, miscellaneous revenues, interest income, and loan/grant revenues.

¹¹ Equal to [Line 18 – Line 23].

reserve balances shown are from Table 4-14. Under the proposed financial plan, reserve balances and debt coverage are projected to achieve target policies over the rate-setting period.

Table 4-19: Water Enterprise Pro Forma - Proposed Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Beginning Balance	\$280,403	\$1,280,000	\$31,873	\$1,037,116	\$1,634,786	\$3,254,599
2							
3	Source of Funds						
4	Rate Revenues (including adjustments)	\$3,968,888	\$4,914,792	\$6,698,159	\$7,431,165	\$8,018,581	\$8,499,696
5	Other Revenues ¹²	\$1,407,849	\$290,143	\$101,728	\$112,580	\$126,576	\$145,918
9	Total Source of Funds	\$5,376,737	\$5,204,935	\$6,799,887	\$7,543,745	\$8,145,157	\$8,645,615
10							
11	Use of Funds						
12	O&M Expenses	\$3,960,023	\$4,709,508	\$5,058,708	\$5,355,366	\$5,804,240	\$6,126,193
13	Debt Service	\$347,326	\$453,789	\$459,976	\$465,889	\$721,104	\$727,604
14	Capital Improvement Plan Expenditures	\$1,142,000	\$1,289,765	\$275,960	\$1,124,820	\$0	\$137,395
15	Total Use of Funds	\$5,449,349	\$6,453,062	\$5,794,644	\$6,946,075	\$6,525,344	\$6,991,192
16							
17	Ending Balance¹³	\$207,791	\$31,873	\$1,037,116	\$1,634,786	\$3,254,599	\$4,909,022
18	<i>Minimum Target Balance</i>	\$2,806,808	\$3,054,138	\$3,169,374	\$3,267,271	\$3,415,399	\$3,521,644
19	<i>Maximum Target Balance</i>	\$4,706,808	\$4,954,138	\$5,069,374	\$5,167,271	\$5,315,399	\$5,421,644
20							
21	Debt Coverage						
22	Projected Debt Coverage ¹⁴	0.03	0.45	3.56	4.46	3.07	3.26
23	<i>Required Debt Coverage</i>	1.25	1.25	1.25	1.25	1.25	1.25

Figure 4-2 shows projected debt coverage (blue line) relative to the debt coverage requirement (red line) all years after the initial rate-setting year (FY 2023-24). Debt coverage is expected to drop sharply in FY 2027, FY 2029, and FY 2032 due to additional debt service from planned borrowings to finance future CIP project costs. Based on projected financial flows and proposed rate increases, the City will begin meeting its debt coverage requirement of 1.25 in FY 2024 and remain above the minimum coverage requirement for the remainder of the study period.

¹² Note that, for the purposes of calculating reserve balances, loan/grant revenues, as well as some miscellaneous revenues designated for particular capital projects (such as capacity fees), have been excluded.

¹³ Equal to [Line 1 + Line 9 – Line 15].

¹⁴ Equal to [(Line 9 – Line 12) / Line 13].

Figure 4-2: Proposed Water Financial Plan – Projected Debt Coverage

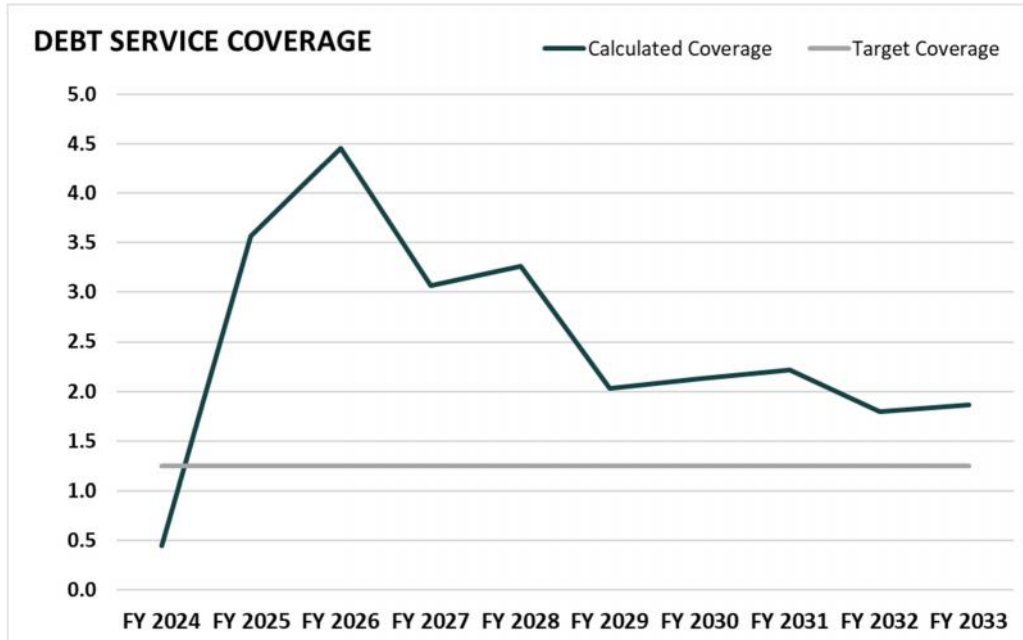


Figure 4-3 shows the Water Enterprise’s projected ending balances under the proposed financial plan. The dark blue bars indicate the ending balance. Minimum and maximum reserve targets (based on the policies described above in Table 4-13) are shown by the gray and light blue lines, respectively. The Water Enterprise is projected to begin building cash reserves beyond FY 2023-24. By the end of the study period, the Water Enterprise’s reserves are projected to achieve the goal target amount with the proposed and planned rate increases.

Figure 4-3: Proposed Water Financial Plan – Projected Ending Cash Balances

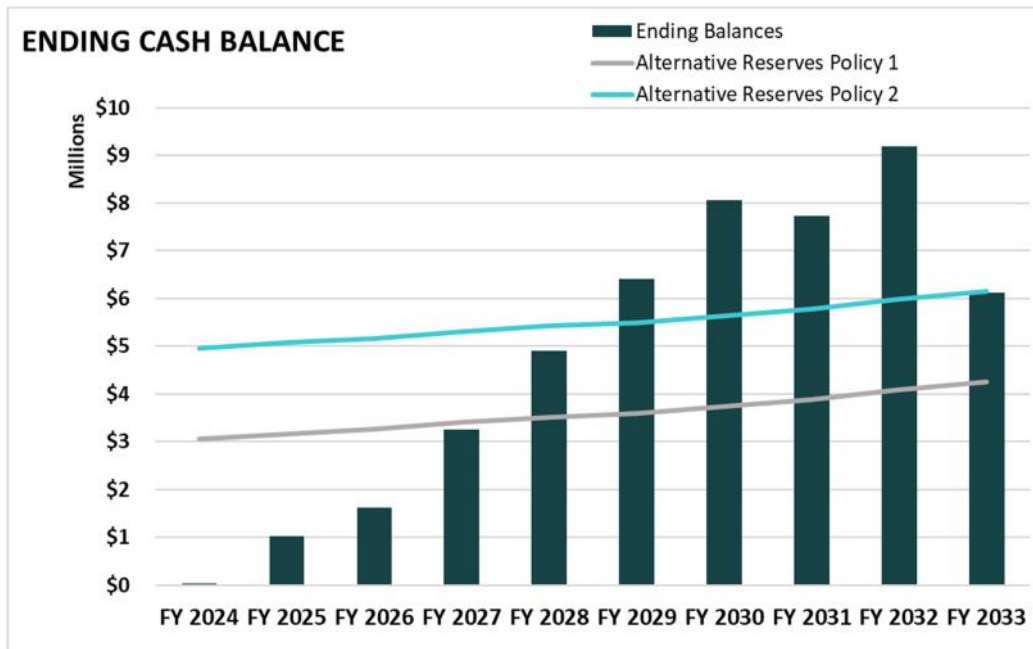
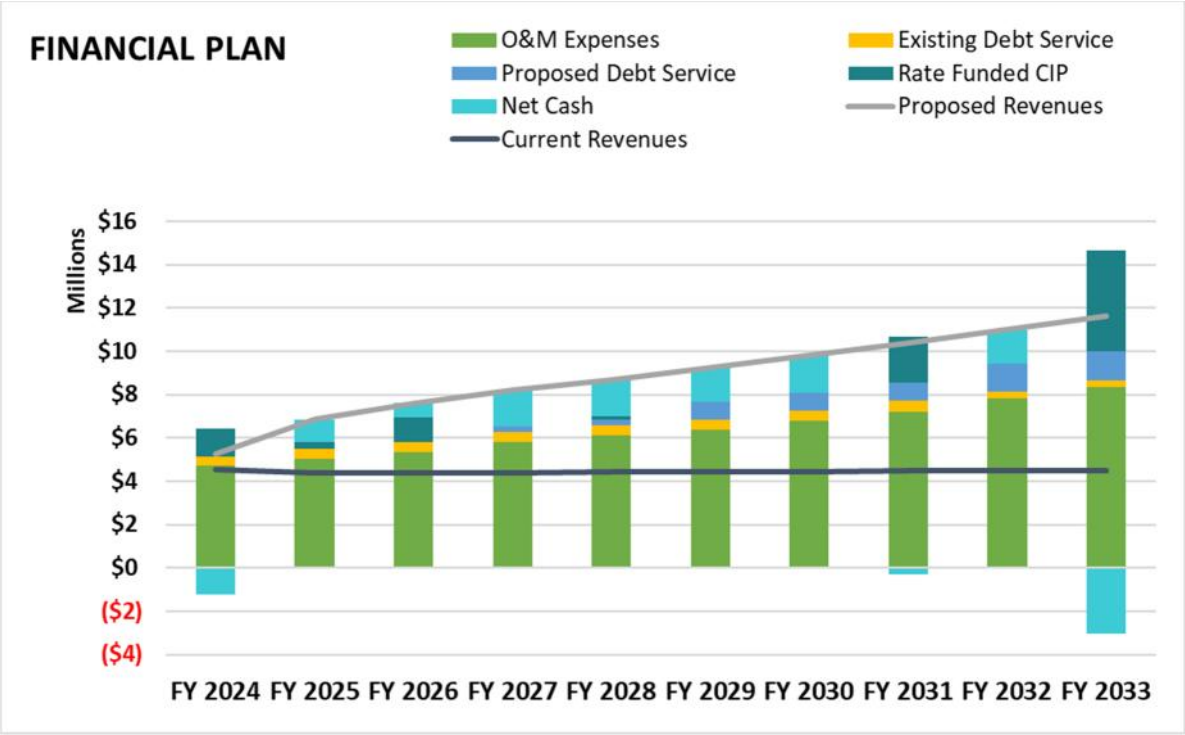


Figure 4-4 shows the proposed versus status quo operating financial plan. Revenues under the status quo and proposed financial plans are represented by the black and gray lines, respectively. Revenue requirements including

O&M expenses, debt service, and reserve funding are represented by the various stacked bars. Revenue adjustments are required to generate sufficient revenue to recover O&M expenses and debt service payments over the study period.

Figure 4-4: Proposed vs. Status Quo Water Financial Plan



4.3. Proposed Water Rate Structure Modifications

Raftelis worked closely with City staff to evaluate potential changes to the existing water rate structure. All proposed water rates presented in subsequent sections incorporate the following recommended revisions to the existing water rate structure.

- » **Single Family Residential (SFR) Tiers:** The Study proposes that the City introduce a two-tiered rate structure for SFR customers. Tier 1 will be defined as the first 12 units of water (HCF) in a two-month period (i.e., bi-monthly). Tier 2 will include all use greater than Tier 1. SFR is a fairly homogenous customer class which has similar indoor needs for health and sanitation, similar outdoor irrigation needs, and similar seasonality in these demand patterns. It is therefore appropriate to tier this class of like customers. The two-tier structure will provide lower cost water in the first tier and a higher cost in the second tier. This will promote affordability of service for lower to average use SFR customers while including a conservation price signal between the two tiers. Note that non-residential customers will maintain a uniform rate structure. Nevertheless, SFR and non-SFR customers will pay roughly the same average amount each month; the structure of their billing will merely differ, based on the tiered vs uniform volumetric rates paid per HCF of water use. The proposed bi-monthly allotments for residential customers are shown below in **Table 1-2**.
- » **All Other Classes:** The Study recommends that all other customer classes maintain the existing uniform rate structure. These include Multi-Family Residential (MFR), Mobile Home, Commercial, Industrial, and Irrigation classes. The City's MFR and Mobile Home units are predominantly master-metered properties with one large meter serving dozens or even hundreds of dwelling units. Non-residential classes have highly varying demand patterns based on the type of business or seasonal transient effects. For this reason a uniform rate is proposed.

Table 4-20: Proposed Water Rate Structure Changes

Description	Current Bi-Monthly Allotment	Proposed Bi-Monthly Allotment
Single Family Residential		
Tier 1	N/A Uniform	0-12 HCF
Tier 2	N/A Uniform	>12 HCF
All Other Classes		
Uniform	N/A	N/A

Table 4-21 shows estimated water use by tier under the proposed two-tier rate structure. All projections are based on detailed account-level analysis of FY 2021-22 actual water use. Raftelis projects that approximately 56% of all residential water use will fall within Tier 1 under the proposed two-tier residential rate structure.

Table 4-21: Projected Water Use by Class and Tier – Test Year

Description	Projected FY 2022-23 Water Use (HCF)
Residential	
Tier 1	57,085
Tier 2	44,727
Subtotal	101,812
Non-Residential	148,580
Total	250,392

4.4. Water Cost of Service Analysis

This section details the cost of service (COS) analysis performed for the Water Enterprise. The COS analysis allocates the overall rate revenue requirement to customer classes based on their proportion of use of and burden on the water system. This provides the basis for the development of proposed water rates through FY 2027-28.

4.4.1. METHODOLOGY

The first step in a COS analysis is to determine the revenue required from water rates. The total revenue requirement results from the financial plan in **Section 4.2**. The framework and methodology utilized to develop the COS analysis and to apportion the revenue requirement to each customer class and tier is informed by the processes outlined in the AWWA's *Manual M1*.

COS analyses are tailored to meet the specific needs of each water system. However, there are four distinct steps in every COS analysis to recover costs from customers in an accurate, equitable, and defensible manner:

- 1. Cost functionalization:** O&M expenses and capital assets are categorized by their function in the system. Sample functions may include water supply, treatment, distribution, transmission, customer service, etc.
- 2. Cost causation component allocation:** Functionalized costs are then allocated to cost causation components based on their burden on the system. The cost causation components include water supply, base delivery, extra-capacity, meters, and customer, among others. The revenue requirement is allocated accordingly to the cost causation components and results in the total share of the revenue requirement attributable to each cost component.
- 3. Unit cost development:** The revenue requirement for each cost causation component is divided by the appropriate units of service to determine the unit cost of each.
- 4. Revenue requirement distribution:** The unit cost is utilized to distribute the revenue requirement for each cost causation component to customer classes based on each customer class's individual service units.

This method of functionalizing costs is consistent with the AWWA's *Manual M1* and is widely used in the water industry to perform COS analyses.

4.4.2. WATER RATE REVENUE REQUIREMENT

Table 4-22 shows the rate revenue requirement for FY 2022-23 (referred to throughout as the "test year"). The revenue requirement is divided into operating and capital categories (Columns C and D), which are later allocated based on either O&M expenses or capital assets. The revenue requirements (Lines 2-8) are equal to FY 2022-23 operating expenses, rate-funded CIP, and debt service costs. The revenue offsets (Lines 11-16) include miscellaneous rate revenue not subject to revenue adjustments, grants, and income from loans. These revenues are applied as offsets to the final

rate revenue requirement. The reserve transfer adjustment (Line 19) is equal to FY 2022-23 negative net operating cash flow and represents the additional rate revenue required to offset reserve spending in the test year. All values are from the proposed financial plan operating cash flow (Table 4-18). Note that, because there is no adjustment in the test year (FY 2022-23), there is also no adjustment for a mid-year increase. Rate adjustments will instead begin after the test year, in FY 2023-24. The final rate revenue requirement (Line 24) is calculated as follows:

$$\text{Total revenue required from rates (Line 24)} = \text{Revenue requirements (Line 8)} - \text{Revenue offsets (Line 16)} - \text{Adjustments (Line 21)}$$

Table 4-22: Water Enterprise Rate Revenue Requirement (Test Year)

[A]	[B]	[C]	[D]	[F]
Line	Description	Operating Revenue Requirement	Capital Revenue Requirement	Total
1	Revenue Requirements			
2	O&M Expenses	\$1,607,094	\$0	\$1,607,094
3	Supply – State Water	\$898,400		\$898,400
4	Supply – Napa Treatment	\$786,000		\$786,000
5	Supply – Kimball Reservoir	\$668,529		\$668,529
6	Debt Service		\$347,326	\$347,326
7	Capital Expenditures - PAYGO		\$1,142,000	\$1,142,000
8	Total Revenue Requirements	\$3,960,023	\$1,489,326	\$5,449,349
9				
10	Less Revenue Offsets			
11	Capacity Charges		\$32,599	\$32,599
12	Miscellaneous Revenues	\$1,405,258		\$1,405,258
13	Interest Income	\$2,591		\$2,591
14	Grants	\$0		\$0
15	Loans & SWP Income	\$0		\$0
16	Total Revenue Offsets	\$1,407,849	\$32,599	\$1,440,448
17				
18	Less Adjustments			
19	Adjustment for Cash Balance		\$40,013	\$40,013
20	Adjustment for Mid-Year Increase		\$0	\$0
21	Total Adjustments	\$0	\$40,013	\$40,013
22				
23	Total Revenue Requirement Without Offsets	\$3,960,023	\$1,449,313	\$5,409,336
24	Total Revenue Requirement	\$2,552,174	\$1,416,714	\$3,968,888

4.4.3. WATER SYSTEM PEAKING FACTORS

A significant portion of the costs of the water system are based on the peaking characteristics of the different customer classes. A water system is designed to meet different requirements, including average water demands, extra-capacity/peak demands, and fire flow requirements. Peaking costs are divided into maximum day (Max Day) and maximum hour (Max Hour) demand. The Max Day demand is the maximum amount of water used in a single day over a full year. The Max Hour demand is the maximum use in an hour on the Max Day. For example, storage and treatment components of the water system are designed to handle Max Day requirements while the distribution system is designed for Max Hour demands.

Table 4-23 shows system-wide peaking factors for the City's water system, which are used to derive the cost component allocation bases for Base Delivery, Max Day, and Max Hour costs. Base Delivery use is considered average daily demand over one year, which has been normalized to a factor of 1.00 (Column C, Line 1). The Max Day peaking factor (Column C, Line 2) indicates that the Max Day demand is 2.13 times greater than the average daily demand. Similarly, the Max Hour peaking factor (Column C, Line 3) shows that the Max Hour demand is 3.00 times greater than average demand. The allocation bases (Columns D-F) are calculated using the equations outlined below. Columns are represented in these equations as letters, and lines are represented as numbers. For example, Column D, Line 2 is shown as D2.

The Max Day allocations are calculated as follows:

- » Base Delivery: $C1 / C2 \times 100\% = D2$
- » Max Day: $(C2 - C1) / C2 \times 100\% = E2$

The Max Hour allocations are calculated as follows:

- » Base Delivery: $C1 / C3 \times 100\% = D3$
- » Max Day: $(C2 - C1) / C3 \times 100\% = E3$
- » Max Hour: $(C3 - C2) / C3 \times 100\% = F3$

Table 4-23: Water System Peaking Factors and Allocations

[A] Line	[B] Description	[C] Factor ¹⁵	[D] Base	[E] Max Day	[F] Max Hour	[G] Total
1	Base	1.00	100%	0%	0%	100%
2	Max Day	2.13	47%	53%	0%	100%
3	Max Hour	3.00	33%	38%	29%	100%

4.4.4.FUNCTIONALIZATION AND ALLOCATION OF EXPENSES

After determining the revenue requirement and systemwide peaking allocation basis, the next step of the water COS analysis is to allocate O&M expenses and capital assets to the following functional categories:

- » **Water Supply:** water supply costs relating to State Water, Napa Treatment, and Kimball Reservoir costs.
- » **Treatment:** costs associated with treating water at Kimball Water Treatment Plant to drinking water standards
- » **Storage:** costs related to water storage tanks and reservoirs
- » **Distribution:** costs related to delivering water to customers through pipelines from storage facilities to the metered connection
- » **Fire Protection:** costs attributable to fireflow sizing for fire protection
- » **Meters:** costs of meter maintenance, servicing, and repair
- » **Customer:** costs of meter reading, billing, and other customer service functions
- » **Conservation:** costs associated with water conservation, outreach, and efficiency programs
- » **General:** operating costs not directly attributable to the above functions are allocated based on the overall cost functionalization

¹⁵ Max Day and Max Hour assumptions were developed in conjunction with City staff using water consumption data for FY 2021-22 and information for individual class peaks from the previous rate study, conducted in 2018.

The functionalization of costs allows for the allocation of costs to cost causation components. Some cost causation components correspond directly to a functional category listed above. The cost causation components include:

- » **Water Supply:** directly associated with the Water Supply functional category
- » **Base Delivery:** costs associated with providing water under average water demand conditions
- » **Peaking** (Max Day and Max Hour): extra-capacity costs associated with providing water during peak demand conditions
- » **Fire Protection:** costs associated with providing fireflow capacity for fire protection
- » **Meters:** directly associated with the Meters functional category
- » **Customer:** directly associated with the Customer functional category
- » **Conservation:** directly associated with the Conservation functional category
- » **General:** directly associated with the General/Admin functional category
- » **Revenue Offsets:** miscellaneous revenues applied as offsets to the rate revenue requirement

Table 4-24 shows the basis for allocating each functional category to the various cost causation components. This provides the basis for allocating O&M and capital expenses in the following subsections. Most functional categories are allocated entirely to the corresponding cost causation component. The allocation basis for functional categories not allocated entirely to a single cost causation component is as follows:

- » **Functional categories allocated based on Max Day demand:** Storage, treatment, and transmission infrastructure is designed to accommodate maximum day water demand. Therefore, all Storage, Treatment, Storage/Treatment, and Transmission costs are allocated to the Base Delivery and Max Day cost causation components based on the Max Day allocation from Table 4-23.
- » **Functional categories allocated based on Max Hour demand:** Distribution infrastructure is designed to accommodate maximum hour water demand, therefore all Distribution costs are allocated to the Base Delivery, Max Day, and Max Hour cost causation components based on the Max Hour allocation from Table 4-23.

Table 4-24: Allocation of Functional Categories to Water Cost Causation Components

[A] Line	[B] Functional Category	[C] Water Supply	[D] Base	[E] Max Day	[F] Max Hour	[G] Fire	[H] Meter	[I] Customer	[J] Conservation	[K] General	[L] Revenue Offset	[K] Total
1	Water Supply	100%										100%
2	Treatment		47%	53%	0%							100%
3	Transmission		47%	53%	0%							100%
4	Storage		47%	53%	0%							100%
5	Distribution		33%	38%	29%							100%
6	Fire					100%						100%
7	Meter Servicing						100%					100%
8	Billing & Customer Service							100%				100%
9	General									100%		100%
10	Conservation								100%			100%
11	Revenue Offset										100%	100%

4.4.5.WATER ENTERPRISE O&M EXPENSE ALLOCATION

The next step of the COS analysis is to develop an allocation basis for the operating revenue requirement based on the functionalization of the Water Enterprise's O&M expenses. Raftelis worked with City staff to assign O&M expenses, by line item, to the most closely associated functional category. **Table 4-25** shows a summary of FY 2022-23 O&M expenses by functional category. This intermediate step is necessary to allocate total O&M expenses to individual cost causation components.

Table 4-25: Water Enterprise O&M Expenses by Functional Category

[A]	[B]	[C]	[D]
Line	Functional Category	FY 2022-23 O&M Expenses	Percent of Total
1	Supply - State Water	\$898,400	22.7%
2	Supply - Napa Treatment	\$786,000	19.8%
3	Supply - Kimball Reservoir	\$668,529	16.9%
4	Treatment	\$576,158	14.5%
5	Storage	\$68,670	1.7%
6	Distribution	\$733,590	18.5%
7	Fire	\$23,049	0.6%
8	Meters	\$15,149	0.4%
9	Customer	\$81,098	2.0%
10	Conservation	\$101,270	2.6%
11	General	\$8,110	0.2%
12	Total O&M Expenses	\$3,960,023	100.0%

Table 4-26 shows the allocation of FY 2022-23 O&M expenses by functional category to each cost causation component. The percentage allocation of each functional category (Columns C-K) to the various cost causation components were determined in Table 4-24. Total O&M expenses associated with each functional category (Column M) were determined in Table 4-25. The total dollar amount allocated to each cost causation component (Line 13) is determined by multiplying the total expense associated with each functional category by the corresponding percentage allocation and summing across all functional categories.

For example, 100 percent (Column C, Line 1) of Water Supply costs for State Water (Column M, Lines 1) are allocated to the Water Supply cost causation factor total (Column C, Line 12). The same calculation is performed for the remaining functional categories (i.e. Column C × Column M in Lines 2-11). The subtotals of Column C × Column M in Lines 1-11 are summed to determine the total dollar amount allocated to the Water Supply cost causation factor (Column C, Line 12). The same calculations are repeated for the remaining cost causation components (Columns D-L) to determine the allocation of O&M expenses to each cost causation component (Line 12). The total operating revenue requirement (Column M, Line 12) equals the operating revenue requirement from Table 4-22. The O&M allocation percentages (Line 14) represent the proportion of total O&M expenses allocated to each cost causation component (Line 12). Raftelis derived a second O&M allocation, exclusive of water supply costs, so as to allocate these distinct direct costs later COS.

Table 4-26: Allocation of Water Enterprise O&M Expenses to Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
Line	Functional Category	Water Supply	Base	Max Day	Max Hour	Fire	Meter	Customer	Conservation	General	Revenue Offset	Total O&M
1	Supply - State Water	\$898,400	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$898,400
2	Supply - Napa Treatment	\$786,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$786,000
3	Supply - Kimball Reservoir	\$668,529	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$668,529
4	Treatment	\$0	\$271,008	\$305,150	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$576,158
5	Storage	\$0	\$32,301	\$36,370	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$68,670
6	Distribution	\$0	\$244,530	\$275,336	\$213,724	\$0	\$0	\$0	\$0	\$0	\$0	\$733,590
7	Fire	\$0	\$0	\$0	\$0	\$23,049	\$0	\$0	\$0	\$0	\$0	\$23,049
8	Meters	\$0	\$0	\$0	\$0	\$0	\$15,149	\$0	\$0	\$0	\$0	\$15,149
9	Customer	\$0	\$0	\$0	\$0	\$0	\$0	\$81,098	\$0	\$0	\$0	\$81,098
10	Conservation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$101,270	\$0	\$0	\$101,270
11	General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,110	\$0	\$8,110
12	Total O&M	\$2,352,929	\$547,839	\$616,856	\$213,724	\$23,049	\$15,149	\$81,098	\$101,270	\$8,110	\$0	\$3,960,023
13												
14	<i>O&M Allocation</i>	<i>59%</i>	<i>14%</i>	<i>16%</i>	<i>5%</i>	<i>1%</i>	<i>0%</i>	<i>2%</i>	<i>3%</i>	<i>0%</i>	<i>0%</i>	<i>100%</i>
15	<i>O&M Allocation Without water supply¹⁶</i>	<i>0%</i>	<i>34%</i>	<i>38%</i>	<i>13%</i>	<i>1%</i>	<i>1%</i>	<i>5%</i>	<i>6%</i>	<i>1%</i>	<i>0%</i>	<i>100%</i>

¹⁶ Raftelis developed an O&M allocation that excludes water supply costs. That is, the values for line 15 are equal to each individual column (C through L) divided by [Column M, Line 12 – Column M, Lines 1-3]. That is, each cost causation component divided by total O&M less water supply costs. This allows the City to allocate water supply costs separately from O&M costs in the final COS.

4.4.6.WATER ENTERPRISE CAPITAL ALLOCATION

Capital assets are utilized in COS analyses to allocate the capital revenue requirement to the various cost causation components. The distribution of short-term CIP project costs can be heavily weighted to specific cost causation components based on the type of projects. Use of short-term plans to allocate capital costs may cause rates to fluctuate and result in customer confusion. The overall water asset base, however, is considerably stable in the long-term, and therefore is more representative of long-term capital investment in the City's water system. Thus, functionalized capital assets are used to allocate capital costs.

City staff provided Raftelis with a detailed capitalized asset database that included the original cost of each individual asset. Raftelis calculated the replacement cost less depreciation (RCLD) of each asset based on net book value using the Engineering News-Record's 20-City Average Cost Construction Index (CCI) to account for capital cost inflation. As part of the capital asset analysis and with assistance from City staff, Raftelis assigned each individual asset to a functional category. Total water asset value (RCLD) by functional category is shown in Table 4-27. Percentages are rounded to the nearest one-tenth of one percent.

Table 4-27: Summary of Water Enterprise Capital Assets by Functional Category

[A]	[B]	[C]	[D]
Line	Functional Category	Asset Value (RCLD)	Percent of Total
1	Supply - State Water	\$4,294	0.0%
2	Supply - Napa Treatment	\$2,879,277	13.0%
3	Supply - Kimball Reservoir	\$159,650	0.7%
4	Treatment	\$3,702,985	16.7%
5	Storage	\$8,756,760	39.4%
6	Distribution	\$6,114,304	27.5%
7	Fire	\$0	0.0%
8	Meters	\$141,195	0.6%
9	Customer	\$0	0.0%
10	Conservation	\$0	0.0%
11	General	\$327,268	1.5%
12	Pump Stations	\$135,549	0.6%
13	Total Asset Value (RCLD)	\$22,221,282	100.0%

Table 4-28 shows the allocation of capital assets by functional category to each cost causation component. The percentage allocation of each functional category (Columns C-L) to the various cost causation components was determined in Table 4-24. Total asset value associated with each functional category (Column M) was determined in Table 4-27. The total dollar amount allocated to each cost causation component (Line 13) is determined by multiplying the total asset value associated with each functional category by the corresponding percentage allocation and summing across all functional categories. This is consistent with the methodology used to determine the allocation of O&M expenses to cost causation components in Table 4-26 (described in detail in Section 4.4.5). The initial capital allocation percentages (Line 15) represent the proportion of total capital assets allocated to each cost causation component (Line 12). Line 16 then reallocates General costs to other cost components based on the allocation determined in Line 15. This provides the final capital allocation used to determine the distribution of capital costs to functional costs in Line 18. The total capital revenue requirement (Column M, Line 18) equals the capital revenue requirement from Table 4-22, Column D, Line 15. This total is allocated to each cost causation component (Columns C-L, Line 18) based on the final capital allocation percentages (Columns C-L, Line 116).

Table 4-28: Allocation of Functionalized Water Capital Assets to Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
Line	Functional Category	Water Supply	Base	Max Day	Max Hour	Fire	Meter	Customer	Conservation	General	Revenue Offset	Asset Value (RCLD)
1	Supply - State Water	\$4,294	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,294
2	Supply - Napa Treatment	\$2,879,277	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,879,277
3	Supply - Kimball Reservoir	\$159,650	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$159,650
4	Treatment	\$0	\$1,741,777	\$1,961,208	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,702,985
5	Storage	\$0	\$4,118,927	\$4,637,833	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,756,760
6	Distribution	\$0	\$2,038,101	\$2,294,863	\$1,781,339	\$0	\$0	\$0	\$0	\$0	\$0	\$6,114,304
7	Fire	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8	Meters	\$0	\$0	\$0	\$0	\$0	\$141,195	\$0	\$0	\$0	\$0	\$141,195
9	Customer	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10	Conservation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	General	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$327,268	\$0	\$327,268
12	Pump Stations	\$0	\$63,758	\$71,791	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$135,549
13	Total Assets	\$3,043,221	\$7,962,564	\$8,965,695	\$1,781,339	\$0	\$141,195	\$0	\$0	\$327,268	\$0	\$22,221,282
14												
15	<i>Capital Allocation</i>	<i>14%</i>	<i>36%</i>	<i>40%</i>	<i>8%</i>	<i>0%</i>	<i>1%</i>	<i>0%</i>	<i>0%</i>	<i>1%</i>	<i>0%</i>	<i>100.0%</i>
16	<i>Capital Allocation w/ General Reallocation</i>	<i>14%</i>	<i>36%</i>	<i>41%</i>	<i>8%</i>	<i>0%</i>	<i>1%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>0%</i>	<i>100.0%</i>
17												
18	Capital Revenue Requirement	\$201,451	\$527,096	\$593,500	\$117,919	\$0	\$9,347	\$0	\$0	\$0	\$0	\$1,449,313

4.4.7.ALLOCATION OF FIRE PROTECTION COSTS

Water systems provide two types of fire protection: fire flows for fire protection from fire hydrants for firefighting; and fire flows from fire lines for private structures with fire suppression sprinkler systems. In 2020, Senate Bill No. 1386 was enacted into California law, and it added Section 53750.5 to the part of the California Government Code known as the Proposition 218 Omnibus Implementation Act, and it reads as follows:

(a) The Legislature finds and declares all of the following:

(1) Fire service is a different and distinct service from water service, which is one of several other property-related services that aids in the provision of fire service provided to properties.

(2) Hydrants are part of the system of public improvements described in subdivision (n) of Section 53750.

(3) Hydrants are generally designed, installed, and used to provide an immediately available water service to aid in extinguishing fires that threaten property served by a water service provider, and are generally not designed or installed to provide water service to aid in extinguishing fires that threaten property not served by a water service provider or wildfires. Hydrants are also used by a water service provider for water system operations and maintenance.

(4) Hydrants are generally located in proximity to properties served by a water service provider to facilitate water service to those properties. Hydrants and the water distributed through them have a direct relationship to property ownership because hydrants are generally sized based upon property use and then are installed when parcels are developed or connected to a water system.

(5) Hydrants and the water distributed through them are not available to the public at large in substantially the same manner as they are to property owners served by a water service provider because hydrants are designed, installed, and used to serve properties receiving water service, and the public at large does not generally have access to water through those hydrants. Incidental or other de minimis use of hydrants and the water distributed through them for other purposes does not change their essential character as a property-related service.

(6) Hydrants and the water distributed through them are part of the property-related water service provided to all property owners served by a water service provider. Through hydrants, water is immediately available to those properties to aid in extinguishing a fire that directly threatens them. The cost associated with this aspect of water service is proportionately allocable among properties that may receive a reasonably similar level of service from the immediate availability of water to aid in extinguishing fires that directly or indirectly threaten those properties.

(7) Property-related water service costs may include, but are not limited to, any costs associated with constructing, maintaining, repairing, upgrading, and replacing hydrants, and costs associated with obtaining, treating, and distributing adequate volumes of water to meet the water demands of properties served by the water service provider, including water supplied for firefighting purposes. The fees or charges related to those costs are imposed upon a parcel or person as an incident of property ownership.

(b) The fees or charges for property-related water service imposed or increased pursuant to Section 6 of Article XIII D of the California Constitution may include the costs to construct, maintain, repair, or replace hydrants as needed or consistent with applicable fire codes and industry standards, and may include the cost of water distributed through hydrants. In addition to any other method consistent with Section 6 of Article XIII D of the California Constitution, fees or charges for the aspects of water service related to hydrants and the water distributed through them may be fixed and collected as a separate fee or charge or included in the other water rates and charges fixed and collected by a public agency, as provided for in Section 53069.9 of the Government Code.

(c) For the purpose of this section, “hydrants” means all hydrants and other infrastructure used to distribute water that aids in the protection of property from fire, and all related or appurtenant infrastructure and facilities owned by a water service provider necessary or convenient for distributing water that aids in the protection of property from fire, including adequately sized and pressurized lines, pumps, and all appurtenances, but does not include privately owned hydrants or other private fire response related infrastructure.

(d) This section is declaratory of existing law.

This provision is declarative of existing law, and clarifies that the costs of water service chargeable to property owners include the cost of infrastructure, such as fire hydrants, that provide fire protection for nearby properties. Raftelis confirmed with City staff that this provision is consistent with the City’s operations and use of fire hydrants.

Raftelis performed a fire demand analysis to determine the share of Fire Protection costs allocated to fire hydrants (hydrant fire flow). The City provided Raftelis with a count of fire hydrants connected to its water system, as shown below in Table 4-29.

Table 4-29 shows the calculation of equivalent fire demand associated with fire hydrants. Each connection size has a fire flow demand factor similar to the hydraulic capacity factor of a water meter. All hydrants are assumed to be a 6-inch hydrant connection, based on the diameter of the conduit serving the hydrant. The diameter is then raised to the power of 2.63 to determine the fire flow demand factor (Column C).¹⁷ The fire flow demand factor (Column C) is multiplied by the number of connections by size (Column D) to calculate equivalent fire demand (Column E). Total equivalent fire demand is shown for fire hydrants in Lines 3 and 14 respectively. Note that, per City direction, Raftelis has excluded private fire from the COS and rate development portion of the study; the City will instead recover all fire protection costs across the total number of connections, acknowledging that private fire service has mutual benefit to neighboring properties and the water system.

Table 4-29: Equivalent Fire Demand

[A] Line	[B] Connection Size	[C] Demand Factor	[D] Unit Count	[E] Equivalent Fire Demand
1	Public Hydrants			
2	6-inch	1.00	184	184
3	Subtotal		184	184
16	Total		184	184

¹⁷ Per the Hazen-Williams equation and AWWA *Manual M1*.

Table 4-30 shows the number of equivalent fire demand units associated with fire hydrants (from Table 4-29). The proportional share of equivalent fire demand (Column D) provides the basis for which Fire Protection costs are allocated in subsequent steps of the COS analysis.

Table 4-30: Fire Protection Allocation Basis

[A]	[B]	[C]	[D]
Line	Connection Size	Equivalent Fire Demand	% of Equivalent Fire Demand
1	Fire Hydrants	184	100.0%
3	Total	184	100.0%

4.4.8. PEAKING UNITS OF SERVICE

Peaking units of service are developed to calculate unit peaking costs (Max Day and Max Hour) for each customer class and tier and provide a basis to reallocate the extra-capacity costs of Fire Protection in subsequent steps of the COS analysis. Fire protection, like hydrants, contribute to system capacity-related costs (i.e. peaking costs), and therefore are reallocated a portion of Max Day and Max Hour costs.

Table 4-31 shows the calculation of peaking units of service for non-fire related water service. These calculations attribute peaking costs to specific customer classes based on actual water use patterns. Raftelis estimates Max Day (Column E) and Max Hour (Column H) factors based on actual FY 2021-22 water use and system-wide peaking factors (from Table 4-31). The Max Day factor is derived using the max month factor calculated from the customer billing data. Utilizing the actual water use data, organized by billing period, and accounting for use by class and tier, Raftelis derives a ratio of maximum period to average period. This ratio becomes the proxy for the max day factor. The Max Hour factor is the max day ratio multiplied proportionally by the ratio of system max hour to max day. Projected FY 2022-23 water use in Column C (from **Table 4-4**) is divided by 365 days to determine average daily water use (Column D). Average daily use in Column D is then multiplied by the Max Day factor (Column E) to determine Max Day demand (Column F). Max Day requirements (Column G) are determined by subtracting average daily water use (Column D) from Max Day demand (Column F). Max Hour requirements (Column J) are similarly calculated. Max Hour demand (Column I) equals average daily water use (Column D) multiplied by the Max Hour factor (Column H). Max Hour requirements (Column J) equal Max Hour demand (Column I) less Max Day demand (Column F).

Table 4-31: Peaking Units of Service by Customer Class

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Line	Customer Class	Annual Water Use (HCF)	Average Daily Water Use (HCF)	Max Day Factor	Max Day Demand (HCF/day)	Max Day Requirements (HCF/day)	Max Hour Factor	Max Hour Demand (HCF/day)	Max Hour Requirements (HCF/day)
1	SFR								
2	Tier 1	57,085	156	1.17	182	26	1.65	257	75
3	Tier 2	44,727	123	1.86	228	106	2.63	322	94
4	Subtotal	101,812	279		411	132	1.95	580	169
5									
6	Non-Residential								
7	Uniform	148,580	407	1.35	550	143	1.91	777	226
8	Total	250,392	686		961	275		1,356	395

Table 4-32 shows the methodology¹⁸ used to calculate peaking units of service associated with fire protection based on a hypothetical fire duration and flow rate in gallons per minute (gpm):

$$\text{Max Day Requirements (HCF/day)} = \text{Duration of Fire (hrs)} \times \text{Water Use Rate (gpm)} \times 60 \text{ mins/hr} \div 748.05 \text{ gallons/HCF}$$

$$\text{Max Hour Requirements (HCF/day)} = [\text{Water Use Rate (gpm)} \times 60 \text{ mins/hr} \times 24 \text{ hrs/day} \div 748.05 \text{ gallons/HCF}] - \text{Max Day Requirements (HCF/day)}$$

Table 4-32: Fireflow Analysis

[A]	[B]	[C]
Line	Description	Value
1	Duration of Fire (Hours)	4.0
2	Water Use Rate (gallons per minute)	1,000
3	Max Day Requirements (HCF/Day)	596
4	Max Hour Requirements (HCF/Day)	1,999

Table 4-33 shows the distribution of Fire Protection Max Day and Max Hour requirements (from Table 4-32) to public hydrants versus private fire lines based on proportional equivalent fire demand (from Table 4-30).

Table 4-33: Allocation of Peaking Units to Fire Protection

[A]	[B]	[C]
Line	Description	Value
1	Max Day Requirements (HCF/Day)	596
2	Allocation to Hydrant Fire Protection (100.0%)	596
4		
5	Max Hour Requirements (HCF/Day)	1,999
6	Allocation to Hydrant Fire Protection (100.0%)	1,999

Peaking units of service (from Table 4-31 and Table 4-33) are summarized below in Table 4-34. The percentage of Max Day and Max Hour Requirements attributed to each customer class is shown in Columns D and E respectively.

¹⁸ Per the AWWA Manual M1.

Table 4-34: Summary of Total Customer Demand Peaking Units

[A]	[B]	[C]	[D]	[E]	[F]
Line	Customer Class	Max Day Requirements (HCF/Day)	% of Max Day Requirements	Max Hour Requirements (HCF/Day)	% of Max Hour Requirements
1	SFR				
2	Tier 1	208	17%	332	19%
3	Tier 2	334	27%	416	24%
4	Subtotal	543	44%	748	43%
5					
6	Non-Residential				
7	Uniform	694	56%	1,003	57%
8	Total	1,236	100%	1,751	100%

4.4.9. DEVELOPMENT OF UNIT COSTS

The next step in the COS is to allocate total revenue requirement costs to cost components using the allocation methods developed above in Table 4-24, Table 4-26, and Table 4-28. These costs include FY 2022-23 operating expenses, water supply costs (for Kimball Reservoir, Napa Treatment, and State Water), capital expenditures, and revenue offsets (including capacity fees, miscellaneous revenues, and loan/grant revenues for FY 2022-23). The total revenue requirement (including operating expenses, capital expenses, supply costs, and revenue offset) is distributed to cost causation components based on the allocation percentages described above.

Table 4-35: Allocation of Revenue Requirement to Cost Components

[A]	[B]	[C]	[D]
Line	Description	Test Year Revenue Requirement	Allocation Basis
1	Operating Expenses	\$1,607,094	O&M w/o water supply (see Table 4-26)
2	Supply - State Water	\$898,400	100% to water supply
3	Supply - Napa Treatment	\$786,000	100% to water supply
4	Supply - Kimball Reservoir	\$668,529	100% to water supply
5	Capital Expenses	\$1,449,313	Capital allocation (see Table 4-28)
6	Revenue Offset	(\$1,440,448)	Capacity component by capital allocation; all other misc. income on O&M
7	Total Revenue Requirement	\$3,968,888	

The allocations above provide the basis for the adjusted COS shown below in line 1 of the table. These costs are then divided by relevant units of service (total water use, max day/hour use, equivalent meters, or annualized bills) to produce the unit cost shown below in line 6. In the next section, these unit costs are applied to customer classes based on each classes' respective units of service.

Table 4-36: Derivation of Cost of Service Unit Rates

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
Line	Description	Water Supply	Base	Max Day	Max Hour	Fire	Meter	Customer	Conservation	General	Rev. Offset	Total
1	Total Adjusted COS	\$1,266,406	\$869,459	\$225,952	\$25,033	\$0 ¹⁹	\$1,464,350	\$52,335	\$65,353	\$0 ²⁰	\$0 ²¹	\$3,968,888
2												
3	Units of Service	250,392	250,392	275	395	0	3,111	19,710	250,392	1,642	250,392	
4	Units	HCF	HCF	HCF/day	HCF/day	private fire lines	equivalent meters	annualized bills	HCF	number of bills	HCF	
5												
6	Unit Cost	\$5.06	\$3.47	\$821.44	\$63.36	\$0.00	\$39.22	\$2.66	\$0.26	\$0.00	\$0.00	
7	Units	\$/HCF	\$/HCF	\$/HCF/day	\$/HCF/day	\$/private fire lines	\$/equivalent meters	\$/annualized bills	\$/HCF	\$/number of bills	\$/HCF	

¹⁹ Public fire costs are reallocated to the meter component and recovered from the meter service charges, by meter size.

²⁰ Per industry standard, general costs are reallocated proportionally to the other cost components.

²¹ As described in earlier sections, revenue offset costs are incorporated into the other cost components based on capital and O&M allocations. These non-rate sources of revenue reduce the overall revenue requirement and each cost component unit rate proportionally.

4.4.10.WATER COST ALLOCATION TO CUSTOMER CLASSES

The final cost of service allocation determines how much revenue must be recovered from the City's water rates and charges. Each cost causation component is recovered by either a fixed charge (in monthly terms) or volumetric rate (per HCF). Table 4-37 details which cost components are recovered by which type of rate.

Table 4-37: Recovery of Cost Causation Components by Charge Type

[A]	[B]	[C]
Line	Cost Causation Component	Associated Charge
1	Water Supply	Volumetric Rates
2	Base Delivery	Volumetric Rates
3	Max Day	Fixed & Volumetric Rates
4	Max Hour	Fixed & Volumetric Rates
5	Fire	Fixed Charges
6	Meter	Fixed Charges
7	Customer	Fixed Charges
8	Conservation	Volumetric Charges
9	General	Reallocated Pro Rata
10	Revenue Offset	Reallocated Pro Rata

Table 4-38 shows projected the projected COS values by customer class and tier. These values are developed by taking the units of service for each customer class (equivalent meters, customer bills, annual average demand, and max day/max hour demands by customer class) and multiplying by the unit rates derived in Table 4-36. These provide the basis for the total cost-to-serve each class, which are then used to develop fixed and variable rates for each customer class/tier in later sections. Note that the total cost to serve in Line 7, Column M is equal to the total revenue requirement derived for FY 2022-23 in Table 4-22.

Table 4-38: Cost to Serve by Water Customer Class

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
Line	Description	Water Supply	Base	Max Day	Max Hour	Fire	Meter	Customer	Conservation	General	Rev. Offset	Total
1	SFR											
2	Tier 1	\$288,719	\$198,221	\$21,351	\$4,751				\$14,899		\$0	\$527,941
3	Tier 2	\$226,216	\$155,310	\$86,933	\$5,948				\$11,674		\$0	\$486,080
4	Subtotal	\$514,934	\$353,531	\$108,283	\$10,699	\$0	\$872,819	\$42,741	\$26,573	\$0	\$0	\$1,929,582
5												
6	Non-Residential	\$751,472	\$515,928	\$117,668	\$14,334	\$0	\$591,530	\$9,594	\$38,780	\$0	\$0	\$2,039,306
7	Total	\$1,266,406	\$869,459	\$225,952	\$25,033	\$0	\$1,464,350	\$52,335	\$65,353	\$0	\$0	\$3,968,888

4.5. Proposed Water Rates

Section 4.5 shows detailed calculations of proposed water rates through FY 2027-28. All proposed rates are first calculated directly from the results of the COS analysis for FY 2022-23 (i.e. the “test year”). Note however that proposed rates will not be implemented until FY 2023-24. Therefore, all FY 2022-23 “COS” rates and charges shown represent intermediate, revenue neutral results of the rate design process. FY 2022-23 “COS” rates and charges must be calculated to provide a basis for proposed rates for FY 2023-24 through FY 2027-28 which rely on the results of the financial plan.

4.5.1. WATER SERVICE CHARGES (TEST YEAR FY 2022-23)

Table 4-39 shows the calculation of equivalent meters, which is necessary to differentiate Water Service Charges by meter size. Meter capacity ratios (Column D) are first calculated by dividing meter capacity (Column C) by 30 gallons per minute (gpm). Meter capacity ratios (Column D) are then multiplied by the number of water meters at each meter size in Column E (from Table 4-3) to determine equivalent meters (Column F). Equivalent meters in this study are based on AWWA-rated hydraulic capacities²² and are calculated to represent the potential demand on the water system relative to a base meter size.

Table 4-39: Equivalent Water Meters (Test Year)

[A] Line	[B] Meter Size	[C] Meter Capacity (gpm)	[D] Meter Capacity Ratio	[E] Number of Meters	[F] Number of Equivalent Meters
1	5/8-inch water meter	20	1.00	1,390	1,390
2	1-inch water meter	50	2.50	145	363
3	1.5-inch water meter	100	5.00	32	160
4	2-inch water meter	160	8.00	46	368
5	3-inch water meter	350	15.00	16	240
6	4-inch water meter	630	25.00	6	150
7	6-inch water meter	1,400	50.00	4	200
8	8-inch water meter	2,400	80.00	3	240
9	Total			1,642	3,111

Water Service Charges are designed to recover costs associated with the Customer and Meters cost causation components. **Table 4-40** shows the calculation of unit charges for the Customer and Meters cost causation components by dividing the total revenue requirement associated with each cost causation component (from Table 4-35) by the number of billing units.

Customer unit charges are calculated per customer bill. Meter unit charges are calculated per equivalent meter. Equivalent meters are used to allocate meter-related costs appropriately and equitably. Larger meters impose larger demand, are more expensive to install, maintain, and replace than smaller meters, and have greater capacity potential within the water system. Finally, because water supply costs associated with State Water Purchases (SWP) are predominantly fixed and not dependent on year-to-year fluctuations in water use, the City will recover a portion of SWP costs in the fixed component. This allows the City to balance revenue stability with concerns over the unit cost of water. The resulting unit costs are shown below.

²² From the AWWA’s *Manual of Water Supply Practices M22: Sizing Water Service Lines and Meters (Third Edition)*.

Table 4-40: Water Service Charge Calculation (Test Year)

Description	Customer	Meters	SWP
COS Allocation	\$52,335	\$1,464,350	\$449,200 ²³
Billing Units	19,710 Bills ²⁴	3,111 Annual Equivalent Meters	3,111 Annual Equivalent Meters
Unit Charge (per Month)	\$2.66 per Bill	\$39.22 per Equivalent Meter	\$12.03 per Equivalent Meter

Table 4-41 shows the detailed calculation of monthly Water Service Charges for the test year based on Customer and Meters unit charges. Customer costs do not vary by meter size. Therefore, the Customer unit rate is applied uniformly to all Water Service Charges (Column F). Because Meters costs vary by meter size based on hydraulic capacity, AWWA capacity ratios in Column C (from Table 4-39) are used to differentiate Meters unit charges by meter size. The Meters charges (Column D) are calculated by multiplying the Meters unit charge (from Table 4-40) by the AWWA capacity ratio (Column C). SWP costs are calculated by multiplying the unit charge from Table 4-40 by the capacity ratios in Column C. COS monthly Water Service Charges (Column G) equal the sum of Columns D-F, and are compared to current FY 2022-23 charges in Columns I and J.

Table 4-41: Water Service Charges Calculation (Test Year)

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Line	Meter Size	Meter Capacity Ratio	Meter	SWP	Customer	COS Monthly Charge	Current Monthly Charge	Difference (\$)	Difference (%)
1	5/8"	1.00	\$27.19	\$12.03	\$2.66	\$41.87	\$50.12	(\$8.25)	-16%
2	1"	1.67	\$67.98	\$30.08	\$2.66	\$100.71	\$125.31	(\$24.60)	-20%
3	1 1/2"	3.33	\$135.95	\$60.16	\$2.66	\$198.77	\$250.62	(\$51.85)	-21%
4	2"	5.33	\$217.53	\$96.25	\$2.66	\$316.44	\$400.99	(\$84.55)	-21%
5	3"	11.67	\$407.86	\$180.48	\$2.66	\$591.00	\$751.86	(\$160.86)	-21%
6	4"	21.00	\$679.77	\$300.80	\$2.66	\$983.22	\$1,253.10	(\$269.88)	-22%
7	6"	43.33	\$1,359.54	\$601.59	\$2.66	\$1,963.79	\$2,506.20	(\$542.41)	-22%
8	8"	80.00	\$2,175.27	\$962.55	\$2.66	\$3,140.47	\$4,009.92	(\$869.45)	-22%

4.5.2. WATER VOLUME RATES (TEST YEAR)

Water Volume Rates are designed to recover the portion of the rate revenue requirement allocated to the following cost causation components: Water Supply, Base Delivery, Peaking (Max Day and Max Hour), and Conservation. However, the costs associated with each cost causation component listed above are not uniformly applied to each customer class. Customer classes are only subject to each unit cost if the service they receive contributes to the Water Enterprise incurring costs associated with that specific cost causation component.

Water Supply Unit Rate

The City of Calistoga supplies water from two sources: surface water from Kimball Reservoir and State Water Project (SWP) imported water. As a result, it is necessary to develop unit rates for each type of water source, based on costs and the water demanded from each category. The first step in this process is to calculate a unit rate for

²³ Equal to half of the SWP costs for water supply (\$898,400). The remaining 50% of SWP costs are later incorporated into the City's variable rates.

²⁴ Equal to 3,111 equivalent meter units multiplied by 12 monthly billing periods per year.

each source and divide each by the total costs for each water source. This is performed by taking the total costs for each supply source (Column G) and dividing them by the total amount of water purchased or produced (Column B). These include the overall operating cost for each source, the capital or CIP-related expenditures pertaining to supply costs, and the portion of revenue offset. The resulting unit rates for each supply source, as well as for the overall supply cost, are shown below in Column H Table 4-42.

Table 4-42: Water Supply Unit Rate

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Description	HCF	Direct Costs	Capital	General	Revenue Offset	Total Annual Cost	Unit Rate (\$/HCF)
SWP	175,274	\$1,235,200	\$190,883	\$2,141	(\$545,689)	\$882,534	\$5.04
Kimball Reservoir	75,118	\$668,529	\$10,568	\$119	(\$295,344)	\$383,872	\$5.11
Total	250,392	\$1,903,729	\$201,451	\$2,259	(\$841,034)	\$1,266,406	\$5.06

Next, we allocate the two types of water supply to the two rate class categories, SFR and Non-Residential. To do so, we first take total water demand and calculate the percentage distribution of each class category. We then apply this percentage to the total amount of water available from SWP and Kimball Reservoir. This provides a baseline estimate for the total amount of water available to each class, from each source. Table 4-43 shows this calculation.

Table 4-43: Allocation of Water Supply Sources between Residential and Non-Residential Customers

[A]	[B]	[C]	[D]	[E]
Customer Class	Demand	Demand (%)	SWP	Kimball Reservoir
SFR	101,812	41%	71,268	30,544
Non-Residential	148,580	59%	104,006	44,574
Total	250,392	100%	175,274	75,118

Finally, we distribute the water supply available to each tier within the SFR class. SWP, the cheaper of the two supply sources, is allocated first in Column D. The remaining water needs are then met by Kimball costs, after all SWP costs allocated to a given class have been used. Note that, in the case of SFR, all Tier 1 water needs are met by SWP; Tier 2 water needs are met by a combination of Kimball and SWP costs. Since the Non-Residential class has a uniform structure, the water supply cost is a blended rate between the two sources.

To calculate the final blended supply rates, the allocated water use is multiplied by the corresponding unit rate developed above in Table 4-42. For example, the calculation of the Residential Tier 1 rate shown in Column F, Line 2, below (\$5.04/HCF) is calculated by multiplying the total amount of SWP water for that tier (Column D, Line 2) by the SWP rate from Table 4-42 (\$5.04). There are no Kimball Reservoir units for this tier (see Column E, Line 2). The total cost is then divided by the total demand in that tier (Column C, Line 2), resulting in the unit rate shown in Column F, Line 2. The Residential Tier 2 rate and Non-Residential rate are determined analogously in Lines 3 and 5 of Table 4-44 below.

Table 4-44: Calculation of Supply Rates by Customer Class and Tier

[A] Line	[B] Description	[C] Total Demand (HCF)	[D] SWP	[E] Kimball Reservoir	[F] Unit Rate (\$/HCF)
1	Residential				
2	Tier 1	57,085	57,085	0	\$5.04
3	Tier 2	44,727	14,183	30,544	\$5.09
4					
5	Non-Residential	148,580	104,006	44,574	\$5.06
6	Total	250,392	175,274	75,118	\$5.06

Base Delivery Unit Rate

Base Delivery unit rates are applied uniformly to all customer classes and tiers as these are costs incurred to provide water service during average daily demand conditions. This rate is calculated by taking the total adjusted COS value for Base (shown in Table 4-36 above) and dividing by the total number of billing units (in HCF). Table 4-45 shows the calculation of Base Delivery unit rates.

Table 4-45: Calculation of Base Delivery Rate

Description	Base Delivery
COS Allocation	\$869,459
Billing Units (HCF)	250,392
Unit Rate (\$ / HCF)	\$3.47

Peaking Unit Rate

Peaking unit rates vary by customer class and tier based on peak water use characteristics. The allocation of these costs is based on the COS allocation of Max Day and Max Hour factors by customer class and tier, developed earlier in Table 4-38. The individual class/tier peaking rates are developed by taking the total allocation for Max Day and Max Hour by customer class and tier (Column C) and dividing by the total water use in each tier/class (Column B). Table 4-46 shows this calculation and the resulting rates (Column D).

Table 4-46: Calculation of Peaking Unit Rates

[A]	[B]	[C]	[D]
Description	Water Use (HCF)	Capacity Costs (Max Day + Max Hour)	Unit Rate (\$/HCF)
SFR			
Tier 1	57,085	\$26,101	\$0.46
Tier 2	44,727	\$92,881	\$2.08
Non-Residential	148,580	\$132,003	\$0.89
Total	250,392	\$250,985	\$1.00

Conservation Unit Rate

Conservation costs are the costs associated with customer outreach, messaging, and direct conservation programs. The total COS costs for conservation, by customer class (from Table 4-38) is divided by the total demands for each tier to determine a per HCF rate. Conservation costs are first allocated to both rate classes and then differentiated by residential tier. Because conservation efforts are aimed at curtailing high volume water use, the costs of SFR conservation are allocated entirely to Tier 2. Non-Residential's share of conservation is recovered uniformly over every unit of water since this class has a uniform rate structure; the conservation calculation is simply the total cost divided by the total water use for that class. Table 4-47 shows the calculation of conservation rates.

Table 4-47: Calculation of Conservation Unit Rates

Description	Water Demand (HCF)	Conservation Costs	Unit Rate (\$/HCF)
SFR			
Tier 1	57,085	\$0 ²⁵	\$0.00
Tier 2	44,727	\$26,573	\$0.59
Subtotal - Residential	101,812	\$26,573	
Non-Residential	148,580	\$38,780	\$0.26
Total	250,392	65,353	\$0.26

Water Volume Rate Calculation (Test Year)

Table 4-48 shows the calculation of Water Volume Rates for the test year. The final rate is summing the individual class/tier rates for each component developed above (water supply, base, peaking, and conservation). No revenue adjustments are incorporated into the COS rates shown, which are designed to collect the same amount of revenue as current water rates. The relevant tables for the calculation of each component are shown below:

- » Water Supply Unit Rates (from Table 4-44)
- » Base Delivery Unit Rates (from Table 4-45)
- » Peaking Unit Rates (from Table 4-46)
- » Conservation Unit Rates (from Table 4-47)

²⁵ Note again that, because Tier 1 customers are low-volume users, they do not drive residential conservation costs. Their share of total residential conservation costs must therefore be zero; their resulting rate is thus also \$0.00/HCF.

Table 4-48: Water Use Rates Calculation (Test Year)

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Customer Class	By Class/Ti er (HCF)	Water Supply Unit Rate	Base Cost Unit Rate	Peaking Unit Rate	Conservati on Unit Rate	Proposed COS Rate (\$/HCF)	Current Rate (\$/HCF)	Differenc e (\$)	Differenc e (%)
1	SFR									
2	Tier 1	57,085	\$5.04	\$3.47	\$0.46	\$0.00	\$8.97	\$10.76	(\$1.79)	-17%
3	Tier 2	44,727	\$5.09	\$3.47	\$2.08	\$0.59	\$11.23	\$10.76	\$0.47	4%
4										
5	Non-Residential	148,580	\$5.06	\$3.47	\$0.89	\$0.26	\$9.68	\$10.76	(\$1.08)	-10%

Proposed Five-Year Rates Schedule

Table 4-49 shows the proposed five-year schedule of water rates for implementation March 2024 through January 2028. March 2024 rates are calculated by taking the final proposed rate in Table 4-48 and multiplying by the proposed revenue adjustment shown in Table 4-17. The rates for the remaining years of the study are calculated by multiplying each year's rate by the proposed adjustment shown for that year in Table 4-17.

Table 4-49: Proposed Five-Year Water Rates Schedule

Description	Test Year COS	Current FY 2023 Rates	Proposed March 2024	Proposed January 2025	Proposed January 2026	Proposed January 2027	Proposed January 2028
Fixed Rates (\$/month), All Customers							
5/8"	\$41.87	\$50.12	\$62.82	\$70.36	\$77.40	\$82.05	\$86.98
1"	\$100.71	\$125.31	\$151.07	\$169.20	\$186.12	\$197.29	\$209.13
1 1/2"	\$198.77	\$250.62	\$298.16	\$333.94	\$367.34	\$389.39	\$412.76
2"	\$316.44	\$400.99	\$474.66	\$531.62	\$584.79	\$619.88	\$657.08
3"	\$591.00	\$751.86	\$886.50	\$992.88	\$1,092.17	\$1,157.71	\$1,227.18
4"	\$983.22	\$1,253.10	\$1,474.84	\$1,651.83	\$1,817.02	\$1,926.05	\$2,041.62
6"	\$1,963.79	\$2,506.20	\$2,945.69	\$3,299.18	\$3,629.10	\$3,846.85	\$4,077.67
8"	\$3,140.47	\$4,009.92	\$4,710.71	\$5,276.00	\$5,803.60	\$6,151.82	\$6,520.93
Volumetric Rates (\$/HCF)							
SFR							
Tier 1 (0-12 HCF)	\$8.97	\$10.76	\$13.46	\$15.08	\$16.59	\$17.59	\$18.65
Tier 2 (12+ HCF)	\$11.23	\$10.76	\$16.85	\$18.88	\$20.77	\$22.02	\$23.35
Non-Residential							
Uniform (0+HCF)	\$9.68	\$10.76	\$14.52	\$16.27	\$17.90	\$18.98	\$20.12

4.6. Proposed Water Shortage Surcharges

4.6.1. WATER SHORTAGE SURCHARGE RATES

In addition to the rates developed for water in normal conditions, the City also engaged Raftelis to develop water shortage rates (also known as drought rates) that can be implemented during periods of mandatory water use reductions. These rates as proposed will act as a surcharge to the City's fixed monthly water meter charges, providing revenue stability during times of reduced water use.

4.6.2. CALCULATION OF PROPOSED WATER SHORTAGE SURCHARGES

This subsection shows detailed calculations of proposed Water Shortage Surcharges through FY 2027-28. All proposed surcharge calculations shown are for FY 2023-24 (year one of the five-year proposed adoption). This first year provides a basis for proposed surcharges for FY 2024-25 through FY 2027-28.

Water shortage rates are designed to recover net revenue shortfalls during periods of reduced water sales. The first step in the development of Water Shortage Surcharges is to estimate reductions in water use at each water shortage stage. Table 4-50 shows projected reductions in water use by customer class and tier. Reductions were estimated in consultation with City staff relying on a mix of prior study assumptions, actual reductions during recent shortage conditions, and professional judgment. All reductions shown are relative to "base" (non-shortage) water use projections (from Table 4-21 for residential customers and Table 4-4 for all other customer classes).

Table 4-50: Projected Water Use Reduction by Water Shortage Stage

Description	Baseline	Stage 1	Stage 2	Stage 3
Water Use Reduction				
Residential	0%	<10%	20%	35%
Non-Residential	0%	<10%	20%	35%
Water Use (HCF)				
Single Family Residential				
Tier 1	57,085	51,377	45,668	37,105
Tier 2	44,727	40,254	35,782	29,073
Non-Residential	148,580	133,722	118,864	96,577
Total Water Use (HCF)	250,392	225,353	200,314	162,755

Table 4-51 shows the detailed calculation of Water Shortage Surcharges as a percent of base Water Volume Rates. The net revenue loss to be recovered by Water Shortage Surcharges is based on three components:

Total rate revenue loss: As water sales decrease with each subsequent stage, revenues from Water Volume Rates also decline. Raftelis projected annualized Water Volume Rate revenues under each stage based on proposed Water Volume Rates (from Table 4-48) and projected water demand by customer class and stage (from Table 4-50).

Changes in water supply costs: The mix of sources of water supply vary in shortage with more or less water purchased, treated, and conveyed through the City of Napa; or produced at Kimball Reservoir. The analysis accounts for these estimated changes as well as avoided costs as less water in aggregate is purchased or produced.

Additional costs: During periods of drought, the City incurs additional costs related to conservation staffing, messaging, and programs. These costs add to the overall costs in shortage.

The total net revenue loss equals the sum of the three components and represents the additional rate revenue required from Water Shortage Surcharges, at each stage.

Table 4-51: Calculation of Water Shortage Surcharges

	Description	Baseline	Stage 1	Stage 2	Stage 3
1	Projected Water Sales				
2	Residential				
3	Tier 1	\$768,079	\$691,271	\$614,463	\$499,251
4	Tier 2	\$753,426	\$678,084	\$602,741	\$489,727
5					
6	Non-Residential	\$2,157,382	\$1,941,643	\$1,725,905	\$1,402,298
7	Total Sales	\$3,678,887	\$3,310,998	\$2,943,109	\$2,391,276
8	Total Losses (\$)		(\$367,889)	(\$735,777)	(\$1,287,610)
9					
10	Water Supply Mix (HCF)				
11	Kimball Reservoir	85,361	85,361	65,344	43,563
12	SWP	199,175	170,722	162,285	141,386
13	Total Production (HCF)	284,536	256,083	227,629	184,949
14					
15	Water Supply Mix (HCF)				
16	Kimball Reservoir	\$242,868	\$242,868	\$185,917	\$123,945
17	SWP	\$975,500	\$836,143	\$794,820	\$692,463
18	Total Supply Cost Changes	\$1,218,368	\$1,079,011	\$980,737	\$816,408
19					
20	Reduced Commodity Revenue ²⁶		\$367,889	\$735,777	\$1,287,610
21	Change in Variable Supply Cost ²⁷		(\$139,357)	(\$237,630)	(\$401,960)
22	Added Conservation Costs ²⁸		\$0	\$180,000	\$215,000
23	Net Revenue Loss		\$228,532	\$678,147	\$1,100,651

Table 4-52 shows the calculation of Water Shortage Surcharges per equivalent connection (the 5/8" meter), at each stage. Surcharges are calculated by dividing the net revenue losses by the total number of equivalent meters (developed in Table 4-39) and then dividing by 12 to derive a monthly surcharge. This unit rate is then multiplied by the capacity ratios to derive rates for each meter size.

²⁶ From Line 8.

²⁷ From Line 18.

²⁸ Per City direction.

Table 4-52: Calculated Water Shortage Surcharges, by Stage (FY 2023-24)

Description	Capacity Ratio	Stage 1 Surcharge	Stage 2 Surcharge	Stage 3 Surcharge
Net Costs		\$228,532	\$678,147	\$1,100,651
Equivalent Meters		3,112	3,112	3,112
Monthly Drought Surcharge per Equivalent Meter		\$6.12	\$18.16	\$29.48
All Customers				
5/8"	1.00	\$6.13	\$18.17	\$29.48
1"	2.50	\$15.31	\$45.41	\$73.70
1 1/2"	5.00	\$30.61	\$90.82	\$147.40
2"	8.00	\$48.97	\$145.31	\$235.84
3"	15.00	\$91.82	\$272.46	\$442.20
4"	25.00	\$153.03	\$454.09	\$737.00
6"	50.00	\$306.05	\$908.18	\$1,473.99
8"	80.01	\$489.68	\$1,453.08	\$2,358.38

Table 4-53 shows the proposed drought rates for the five-year rate-setting period. Each set of rates is calculated by taking the previous year surcharges and multiplying by the corresponding proposed water rate revenue increase from Table 1-1. Surcharges are rounded up to the nearest whole cent.

Table 4-53: Proposed Five-Year Drought Surcharges

Description		5/8"	1"	1 1/2"	2"	3"	4"	6"	8"
Capacity Ratios		1.00	2.50	5.00	8.00	15.00	25.00	50.00	80.01
FY 2024	Stage 1	\$6.13	\$15.31	\$30.61	\$48.97	\$91.82	\$153.03	\$306.05	\$489.68
	Stage 2	\$18.17	\$45.41	\$90.82	\$145.31	\$272.46	\$454.09	\$908.18	\$1,453.08
	Stage 3	\$29.48	\$73.70	\$147.40	\$235.84	\$442.20	\$737.00	\$1,473.99	\$2,358.38
FY 2025	Stage 1	\$6.87	\$17.15	\$34.29	\$54.85	\$102.84	\$171.40	\$342.78	\$548.45
	Stage 2	\$20.36	\$50.86	\$101.72	\$162.75	\$305.16	\$508.59	\$1,017.17	\$1,627.45
	Stage 3	\$33.02	\$82.55	\$165.09	\$264.15	\$495.27	\$825.44	\$1,650.87	\$2,641.39
FY 2026	Stage 1	\$7.56	\$18.87	\$37.72	\$60.34	\$113.13	\$188.54	\$377.06	\$603.29
	Stage 2	\$22.39	\$55.95	\$111.90	\$179.03	\$335.68	\$559.44	\$1,118.88	\$1,790.20
	Stage 3	\$36.32	\$90.80	\$181.60	\$290.56	\$544.80	\$907.99	\$1,815.96	\$2,905.53
FY 2027	Stage 1	\$8.01	\$20.00	\$39.98	\$63.96	\$119.91	\$199.85	\$399.68	\$639.49
	Stage 2	\$23.73	\$59.31	\$118.61	\$189.77	\$355.82	\$593.01	\$1,186.02	\$1,897.61
	Stage 3	\$38.50	\$96.25	\$192.50	\$307.99	\$577.48	\$962.47	\$1,924.92	\$3,079.86
FY 2028	Stage 1	\$8.49	\$21.20	\$42.38	\$67.79	\$127.11	\$211.84	\$423.66	\$677.86
	Stage 2	\$25.16	\$62.86	\$125.72	\$201.15	\$377.16	\$628.59	\$1,257.18	\$2,011.47
	Stage 3	\$40.81	\$102.03	\$204.05	\$326.47	\$612.13	\$1,020.22	\$2,040.41	\$3,264.65

5. Wastewater Rate Study

5.1. Key Inputs and Assumptions

Raftelis developed a wastewater rate model in Microsoft Excel to project financial calculations over the next ten fiscal years with projections shown in this section through the five-year rate-setting period of FY 2032-33 (i.e. the “study period”). Please refer to **Appendix C** for ten-year financial plan projections through FY 2032-33. The City’s fiscal year spans from July 1 through June 30. Projections in future years were generally made based on actual or estimated FY 2021-22 data using key assumptions outlined below. Assumptions were discussed with and reviewed by City staff to ensure that the wastewater system’s unique characteristics are accurately accounted for. Note that most table values shown throughout this report are rounded to the last digit shown and may therefore not sum precisely to the totals shown.

5.1.1. CURRENT WASTEWATER RATES

Table 5-1 shows the wastewater rates currently in effect in FY 2021-22, which were developed during the prior rate study in 2018. Rates and charges vary by customer class. Residential customers are subject to a monthly Fixed Charge per dwelling unit; non-residential customers are subject to a variable Flow Charge based on actual water use for each billing period. Note that non-residential customers pay a minimum amount of \$57.43 per month, even if their wastewater bill calculation (based on flows multiplied per HCF volumetric rate) are lower than this amount. Non-residential customers also pay a minimum capacity charge, again on a monthly basis. Spas (both residential and commercial) also pay special wastewater discharge rates per HCF of wastewater discharged for treatment by the City. Finally, Industrial and Bottling Works customers pay a measured flow rate (per million gallons of measured flow) and BOD and SS rates per pound of wastewater loading. Wastewater rates have not changed since January 1, 2022. All current charges are shown on a monthly basis.

Table 5-1: Current Wastewater Rates Schedule

Description	FY 2022-23
Fixed Rates (Monthly)	
Residential	
Single Family Residential	\$97.87
Multi-Family Residential	\$82.21
Mobile Home	\$52.85
All Other	
Wastewater Capacity Allocation	\$66.71
Minimum for All Non-Residential Users	\$57.43
Volumetric Rates	
Transient Rates (per HCF)	
Transient General	\$19.98
Spa	\$19.98
Campground	\$19.98
Bed & Breakfast	\$19.98
Other Non-Residential Rates (per HCF)	
Commercial General	\$13.21
Restaurant/Bakery	\$34.85
Laundry	\$13.21
Public Building	\$13.21
Commercial Social (Schools & Churches)	\$13.21
Medical Care	\$13.21
Industrial & Bottling Works	
Measured Flow Rate (per mg of measured flow)	\$14,559.98
Calculated BOD Rate (per pound)	\$2.64
Calculated SS Rate (per pound)	\$1.99
Groundwater Discharge Rates (per HCF)	
Spa	\$6.72
Residential Spa/Commercial	\$13.94

5.1.2.WASTEWATER ENTERPRISE FINANCIAL ASSUMPTIONS

Inflationary assumptions shown in Table 5-2 are used to escalate projected non-rate revenues and operations and maintenance (O&M) expenses beyond FY 2022-23. For O&M expenses, the general inflation rate is consistent with long-term changes in the Consumer Price Index (CPI). Salary and benefit inflationary increases were provided by City staff, as wastewater utility personnel cost increases are typically agency specific. All other O&M expense inflationary assumptions were developed by Raftelis based on professional judgement. The capital inflation factor is used to adjust uninflated capital project cost estimates provided to Raftelis by City staff. All inflationary assumptions are consistent with inflationary assumptions used in the water rate study.

Table 5-2: Wastewater Enterprise Inflationary Assumptions

Inflationary Categories	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Revenue Inflation Factors					
Property Tax	2.0%	2.0%	2.0%	2.0%	2.0%
Miscellaneous	3.0%	3.0%	3.0%	3.0%	3.0%
Interest Earnings	1.0%	1.0%	1.0%	1.0%	1.0%
Expenses					
General	6.0%	4.5%	3.0%	3.0%	3.0%
Salaries/Benefits	5.5%	5.5%	5.0%	5.0%	5.0%
Utilities	4.0%	4.0%	4.0%	4.0%	4.0%
Chemicals	5.0%	5.0%	5.0%	5.0%	5.0%
Capital	0.0%	3.2%	3.2%	3.2%	3.2%
No Inflation	0.0%	0.0%	0.0%	0.0%	0.0%
Water Supply	5.0%	5.0%	5.0%	5.0%	5.0%

5.1.3.PROJECTED WASTEWATER BILLING UNITS OF SERVICE

City staff provided Raftelis with the number of accounts by customer class for FY 2021-22. As with its water utility, the City's wastewater connection system is mostly built-out. As such, Raftelis did not assume account growth for the study period but instead used current estimates of actual meter counts for all future years. Table 5-3 shows the actual current values for wastewater meters. No additional demand factor was applied to billed wastewater flows to ensure sufficiently conservative rate revenue projections and to maintain consistency with water demand projections. All billing units shown below are based on the current wastewater rate structure.

Table 5-3: Current Wastewater Enterprise Connections

Description	Current Number of Meters
Residential (Dwelling Units)	
Single Family Residential	1,197
Multiple Family Residential	619
Mobile Home	555
Subtotal - Residential	2,372
Non-Residential Accounts	
Transient General	45
Spa	14
Campground	1
Bed & Breakfast	21
Commercial General	118
Restaurant/Bakery	29
Laundry	1
Public Building	35
Commercial Social (Schools & Churches)	24
Medical Care	10
Industrial & Bottling Works	3
Subtotal – Non-Residential	301
Total Dwelling Units & Accounts	2,673

Table 5-4 shows the projected wastewater flows for the City’s non-residential customers over the study period. Note that, because the City assumed constant water demand, all flows remain constant throughout the study period. As such, only FY 2022-23 projected flows are shown; all other years in the study (through FY 2032-33) are equivalent to those shown in Table 5-4 below. All flows are shown in hundred cubic feet (HCF), except for Industrial and Bottling Works, which show flows and strength loadings in million gallons (MG) and pounds (lb), respectively, in accordance with the City’s current billing structure.

Table 5-4: Estimated Non-Residential Wastewater Flows (HCF), Existing Rate Structure

Description	Estimated FY 2023
Transient	
Transient General	39,407
Spa	9,907
Campground	1,450
	3,299
Subtotal - Transient	54,063
Other Non-Residential	
Commercial General	9,108
Restaurant/Bakery	6,608
Laundry	1,593
Public Building	4,156
Commercial Social (Schools & Churches)	6,842
Medical Care	2,682
Subtotal – Other Non- Residential	30,989
Industrial & Bottling Works	
Flows (MG)	2
BOD (lbs)	5,197
TSS (lbs)	416
Groundwater Discharges	
Spa	9,907
Subtotal – Groundwater Discharges	9,907
Total Flows (HCF)²⁹	94,961

5.2. Wastewater Financial Plan

Section 5.2 details the development of a proposed Wastewater Enterprise financial plan over the study period. The following subsections include estimates and projections of annual revenues, O&M expenses, debt service payments, capital expenditures, and reserve funding through FY 2025-26. The overall purpose of the financial plan is to determine annual wastewater rate revenues required to achieve sufficient cash flow, maintain adequate reserves, and meet debt coverage requirements.

5.2.1. WASTEWATER ENTERPRISE REVENUE UNDER CURRENT RATES

The Wastewater Enterprise’s revenue sources consist of wastewater rates, connection fees, interest earnings on cash reserves, and other non-rate revenues. The rate revenue projections shown in this section assume that current FY

²⁹ Note that this excludes the MG industrial and bottling works flows, as well as their associated strength loadings in pounds. These are billed separately from other flows as described in Table 5-1 above.

2022-23 wastewater rates are effective throughout the study period, and therefore represent estimated revenues in the absence of any wastewater rate increases. This status quo scenario provides a baseline from which Raftelis evaluated the need for revenue adjustments (i.e. gross rate revenue increases).

Table 5-5: Projected Rate Revenues with Current Wastewater Rates

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Wastewater Rate Revenues						
Fixed	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076
Variable	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657
Total	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732

Other Wastewater Enterprise Revenues

Table 5-6 shows all other Wastewater Enterprise revenues. All FY 2021-22 other revenues are based on the City's FY 2021-22 actuals and escalated annually by the miscellaneous inflation rate (from **Table 5-2**), except where noted otherwise. Interest revenue is estimated in the financial plan model beginning in FY 2020-21 based on projected fund balances and the assumed interest rate.

Table 5-6: Other Wastewater Enterprise Revenues

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Wastewater - Other Revenues						
Capacity Charges	\$30,000	\$50,000	\$51,500	\$53,045	\$54,636	\$56,275
Miscellaneous Revenues	\$527,866	\$28,702	\$29,563	\$30,450	\$31,363	\$32,304
Interest Income	\$34,744	\$9,603	\$5,852	\$12,940	\$25,263	\$30,240
Total	\$592,609	\$88,305	\$86,914	\$96,435	\$111,263	\$118,819

Summary of Projected Wastewater Enterprise Revenues

Table 5-7 shows a summary of all projected Wastewater Enterprise revenues under current rates over the study period. This includes all projected revenues shown in Table 5-5 and Table 5-6. This revenue summary represents expected revenues in the absence of any rate increase over the study period.

Table 5-7: Projected Wastewater Enterprise Revenues Under Current Rates

Description	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
Wastewater Revenues						
Fixed Revenues	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076	\$2,241,076
Variable Revenues	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657	\$1,672,657
Capacity Charges	\$30,000	\$50,000	\$51,500	\$53,045	\$54,636	\$56,275
Miscellaneous Revenues	\$527,866	\$28,702	\$29,563	\$30,450	\$31,363	\$32,304
Interest Income	\$34,744	\$9,603	\$5,852	\$12,940	\$25,263	\$30,240
Grants	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$4,506,342	\$4,002,037	\$4,000,647	\$4,010,167	\$4,024,995	\$4,032,551

5.2.2.WASTEWATER ENTERPRISE OPERATIONS & MAINTENANCE EXPENSES

Table 5-8 shows a summary of all Wastewater Enterprise O&M expenses over the study period. O&M expenditures include the cost of operating and maintaining wastewater collection, treatment, and disposal facilities. O&M expenses also include the costs of providing technical services such as laboratory services and other administrative costs of the wastewater system. These costs are a normal obligation of the system and are met from operating revenues as they are incurred. It is projected that O&M expenses will increase by approximately 3.5 percent per year on average over the study period. The City provided Raftelis with projected actuals for FY 2022-23 and budgeted values for FY 2023-24. Raftelis then used the inflation factors shown above in Table 5-2 to escalate O&M costs in the out years.

Table 5-8: Projected Wastewater Enterprise O&M Expenses

O&M Expenses	Projected FY 2023	Projected FY 2024	Projected FY 2025	Projected FY 2026	Projected FY 2027	Projected FY 2028
General	\$0	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000
Collection	\$879,386	\$601,213	\$630,408	\$655,331	\$681,298	\$708,356
Treatment	\$1,967,856	\$1,915,200	\$2,007,354	\$2,087,960	\$2,171,988	\$2,259,588
Total O&M Expenses	\$2,847,242	\$2,916,413	\$3,037,762	\$3,143,291	\$3,253,286	\$3,367,944
% Change		2.4%	4.2%	3.5%	3.5%	3.5%

5.2.3.WASTEWATER ENTERPRISE DEBT

Table 5-9 shows the Wastewater Enterprise's projected debt service obligations over the study period. Existing debt service consists of the City's State Revolving Loan, 2018 WWW Revenue Loan, and the General Fund Loan. The City does not plan to issue new debt for its wastewater enterprise during the study period.

Table 5-9: Wastewater Enterprise Debt Service

Debt Service	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Existing Debt Service						
State CA Revolving Loan	\$363,591	\$364,148	\$0	\$0	\$0	\$0
2018 WWW Revenue Loan	\$378,169	\$385,419	\$207,294	\$208,419	\$214,419	\$221,019
General Loan Repayment	\$0	\$115,938	\$115,938	\$115,938	\$115,938	\$115,938
Subtotal	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957
Proposed Debt Service						
New Debt	\$0	\$0	\$0	\$0	\$0	\$0
Subtotal	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957

5.2.4.WASTEWATER ENTERPRISE CAPITAL IMPROVEMENT PLAN

Table 5-10 shows the City's planned capital improvement plan (CIP) for the Wastewater Enterprise over the study period. The values shown are based on the most recently adopted multi-year CIP, with modifications to the timing of some projects to reduce immediate financial needs and financial impacts. Significant CIP expenditures are anticipated to continue over the next ten years, with approximately \$3.2M in capital spending per year for the duration of the ten-year planning period. This highlights the need to maintain adequate reserves to fund substantial CIP projects beyond FY 2027-28.

Table 5-10: Wastewater Enterprise Capital Improvement Plan

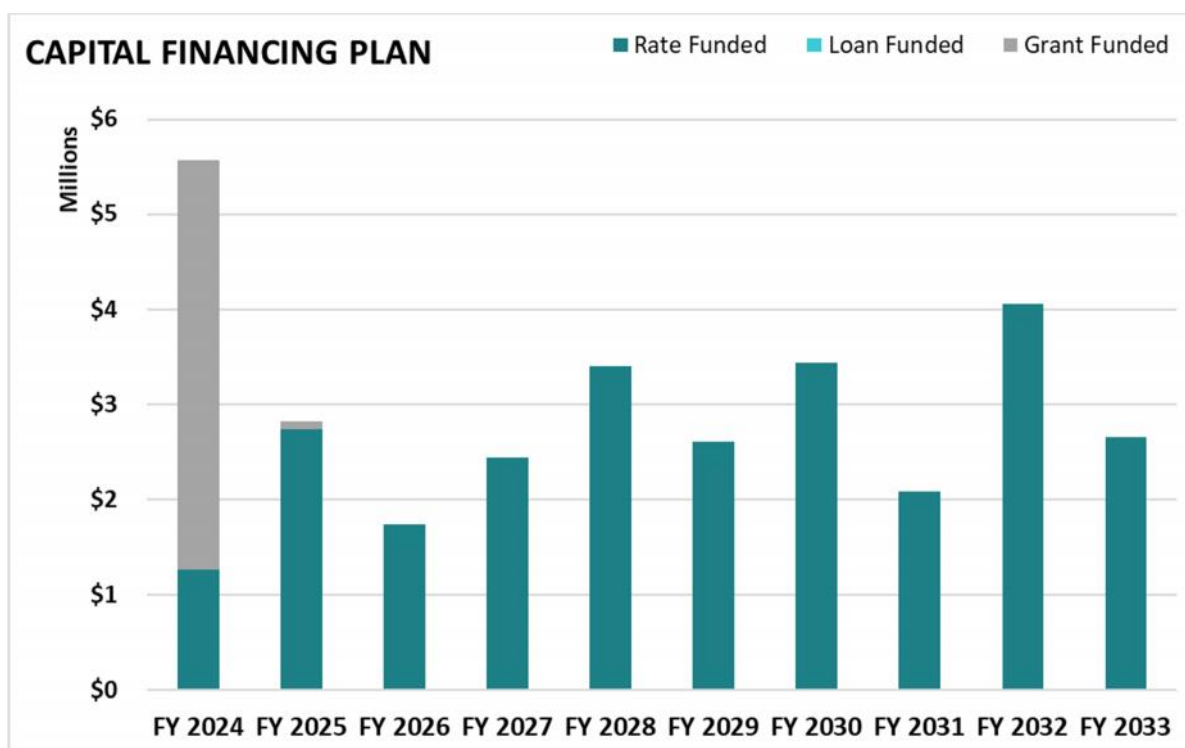
Project Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Riverside Pond & Headworks Project	\$1,100,000	\$3,120,000	\$2,152,711	\$0	\$0	\$0
Geothermal Meters Project	\$5,000	\$5,000	\$0	\$0	\$0	\$0
Replacement Sewer Mains/MH's	\$500,000	\$550,000	\$0	\$0	\$934,239	\$964,135
Liner Replacements (AB, EQ, 20MG - 500,000sf)	\$1,130,000	\$475,000	\$541,800	\$1,597,536	\$0	\$0
EQ Pumps Replacement/Valving	\$0	\$0	\$0	\$0	\$274,776	\$0
New Generator PLCs & Controls	\$981,697	\$977,541	\$0	\$0	\$0	\$0
New Sewer Trunk Line (Brannon/Lincoln/Anna)	\$1,000,000	\$250,000	\$0	\$0	\$0	\$0
Replace Post Filter Vault Piping (corrosion)	\$0	\$0	\$0	\$0	\$164,866	\$0
Rancho De Lift Station Improvements	\$125,000	\$75,000	\$0	\$0	\$0	\$0
Sewer Collect/Treatment Plant Improvements	\$0	\$113,000	\$123,840	\$138,453	\$247,299	\$567,138
Increase Clearwell & CL2 tank capacity	\$0	\$0	\$0	\$0	\$0	\$0
New 20MG outfall to Napa River (E3)	\$0	\$0	\$0	\$0	\$0	\$0
Calibrate Sewer Model/Develop Master Plan	\$0	\$0	\$0	\$0	\$82,433	\$170,141
Clean Grit out of AB's (less \$\$ than Grit Chamber)	\$0	\$0	\$0	\$0	\$0	\$0
Recycle Water Trans/Dist/Pumping Improvements	\$0	\$0	\$0	\$0	\$0	\$1,701,414
Air Lift Pump replacement w/Submersible VFD	\$0	\$0	\$0	\$0	\$549,552	\$0
Sludge DeWatering	\$0	\$0	\$0	\$0	\$0	\$0
Scum line/EQ Pumps run to Headworks	\$0	\$0	\$0	\$0	\$192,343	\$0
Advanced Treatment - Boron Removal	\$0	\$0	\$0	\$0	\$0	\$0
Reinjection or Indirect Reuse	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$4,841,697	\$5,565,541	\$2,818,351	\$1,735,989	\$2,445,508	\$3,402,828

Table 5-11 shows the assumed funding sources for Wastewater Enterprise CIP projects over the study period. The City plans to fund its capital expenditures through rates (e.g., PAYGO) and grant funding. The rate study does not project the need for additional debt issuances for the study period; as such, the capital funding plan for the Wastewater Enterprise assumes either grant or cash-funding for the duration of the study period. Figure 5-1 shows a summary of total Wastewater Enterprise CIP expenditures by funding source through FY 2032-33.

Table 5-11: Wastewater Enterprise Capital Improvement Plan, by Funding Source

Description	FY 2023	FY 2023	FY 2023	FY 2023	FY 2023	FY 2023
Rate Funded	\$777,959	\$1,262,385	\$2,738,351	\$1,735,989	\$2,445,508	\$3,402,828
Bond Funded	\$0	\$0	\$0	\$0	\$0	\$0
Grant Funded	\$4,063,738	\$4,303,156	\$80,000	\$0	\$0	\$0
Total	\$4,841,697	\$5,565,541	\$2,818,351	\$1,735,989	\$2,445,508	\$3,402,828

Figure 5-1: Wastewater Enterprise Capital Improvement Plan



5.2.5.WASTEWATER ENTERPRISE FINANCIAL POLICIES

Required Debt Coverage

The Wastewater Enterprise is required to meet debt service coverage requirements on its outstanding wastewater revenue bonds. The required debt coverage ratio is 1.25, meaning that the Wastewater Enterprise's net operating revenues (i.e. total revenues less operating expenses) must amount to at least 1.25 times the amount of annual debt service. Failure to meet debt service coverage results in a technical default, which, without foreseeable remedial action such as implementing rate increases, could result in a downgrade of credit rating, higher costs in future debt issuance or even denial of credit. This is consistent with the requirements for the City's Water Enterprise.

Reserve Targets

Adequate cash reserves are required to meet operating, capital, and debt service requirements. The current operating reserve target is equal to 20% percent of annual O&M expenses, or approximately two months' operating expenses. Raftelis recommends that the City increase this target to 33% of O&M expenses, which constitutes approximately 90 days of operating expenses and more closely reflects industry trends for reserve policies. The City will also introduce an informal emergency capital reserve to help cover unforeseen capital needs such as line breaks and other sudden expenses. The City will therefore introduce two additional capital reserve targets, one for \$1.5M cash-on-hand for emergency capital expenses, and one for \$4.1M. These reflect approximately 50% and 100% of average annual CIP costs. Raftelis and City staff discussed these recommendations with City Council on May 3, 2023 with Council giving direction to target the higher reserve requirement. Table 5-12 summarizes the Wastewater Enterprise's key financial policies relevant to this rate study. Table 5-13 shows projected operating and capital reserve targets over the study period based on the policies outlined above.

Table 5-12: Wastewater Enterprise Financial Policies

Financial Policy	Target/Requirement
Debt Coverage	
Target Debt Coverage Ratio	1.25
Reserve Targets	
Operating Reserve Target	25% of annual O&M expenses
Emergency Cash Reserve Minimum	50% annual average capital expenditures (\$1.5M)
Emergency Cash Reserve Goal	100% annual average capital expenditures (\$4.1 M)

Table 5-13: Projected Wastewater Enterprise Reserve Targets

Reserve Target	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Operating Reserve	\$939,590	\$962,416	\$1,002,461	\$1,037,286	\$1,073,584	\$1,111,421
Emergency Cash Reserve Minimum	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000	\$1,500,000
Emergency Cash Reserve Goal	\$4,142,892	\$4,142,892	\$4,142,892	\$4,142,892	\$4,142,892	\$4,142,892
Total Minimum Target³⁰	\$2,439,590	\$2,462,416	\$2,502,461	\$2,537,286	\$2,573,584	\$2,611,421
Total Goal Target³¹	\$5,082,482	\$5,105,308	\$5,145,353	\$5,180,178	\$5,216,476	\$5,254,313

5.2.6.STATUS QUO WASTEWATER FINANCIAL PLAN

To evaluate the need for revenue adjustments (i.e. increases to gross rate revenues), Raftelis first developed a status quo financial plan. The status quo financial plan assumes that current FY 2022-23 rates remain unchanged over the study period. Table 5-14 combines projected Fund 51 revenues (from Table 5-7), O&M expenses (from Table 5-8), and debt service (from Table 5-9) to generate operating cash flow projections under the status quo. In the absence of any revenue adjustments, the Wastewater Operating Fund will fail to generate sufficient revenue to recover O&M expenses and debt service over the study period.

³⁰ Equal to operating reserve target (first line) plus emergency cash reserve minimum target (second line).

³¹ Equal to operating reserve target (first line) plus emergency cash reserve minimum target (third line).

Table 5-14: Wastewater Cash Flow – Status Quo Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Wastewater Rate Revenue under Current Rates						
2	Wastewater Rates Subject to Revenue Adjustments	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732
3	Wastewater Rates not Subject to Revenue Adjustments ³²	\$592,609	\$88,305	\$86,914	\$96,435	\$111,263	\$118,819
4							
5	Revenue Adjustments						
6	Fiscal Year Rev. Adj.						
7	FY 2023 0.00%	\$0	\$0	\$0	\$0	\$0	\$0
8	FY 2024 0.00%		\$0	\$0	\$0	\$0	\$0
9	FY 2025 0.00%			\$0	\$0	\$0	\$0
10	FY 2026 0.00%				\$0	\$0	\$0
11	FY 2027 0.00%					\$0	\$0
12	FY 2028 0.00%						\$0
13	Total Adjustments	\$0	\$0	\$0	\$0	\$0	\$0
14							
18	Total Revenues	\$4,506,342	\$4,002,037	\$4,000,647	\$4,010,167	\$4,024,995	\$4,032,551
19							
20	O&M Expenses	\$2,847,242	\$2,916,413	\$3,037,762	\$3,143,291	\$3,253,286	\$3,367,944
21	Debt Service	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957
22	Rate-Funded CIP	\$777,959	\$1,262,385	\$2,738,351	\$1,735,989	\$2,445,508	\$3,402,828
23	Total Expenses	\$4,366,961	\$5,044,303	\$6,099,345	\$5,203,637	\$6,029,151	\$7,107,729
24							
25	Net Cash Flow³³	\$139,381	(\$1,042,265)	(\$2,098,698)	(\$1,193,470)	(\$2,004,156)	(\$3,075,178)

Table 5-15 shows projected reserve balances and debt coverage under the status quo financial plan for the entire Wastewater Enterprise. Sources of funds include both rate and non-rate revenues but exclude revenues from rate increases. Use of funds include O&M expenses (from Table 5-8), debt service (from Table 5-9), and CIP expenditures (from Table 5-11). The FY 2022-23 beginning balance reflects actual Wastewater Enterprise reserve balances as of July 1, 2023. All ending balance and debt coverage figures are projected values. Target reserve balances shown are from Table 5-13.

Under the status-quo financial plan, reserves are projected to fall below target by the end of FY 2023-24 and remain negative for the rest of the study period. Debt coverage will still be met throughout the study period due to the small amount of debt service and absence of additional debt during the ten-year planning period. Still, the status quo financial plan is insufficient to meet the Wastewater Enterprise's financial needs over the study period, allowing reserves to become increasingly negative in out years due to persistent failure to meet operating costs. This demonstrates a clear need for revenue adjustments over the study period to increase rate revenues and ensure financial sustainability.

³² Includes capacity fees, miscellaneous revenues, and interest income. Note that grant and loan revenue and the capital projects associated with them are excluded in this cashflow on both the revenue and expense side of the calculation.

³³ Equal to [Line 18 – Line 23].

Table 5-15: Wastewater Enterprise Pro Forma – Status Quo Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Projected Beginning Balance	\$3,422,069	\$1,200,000	\$157,735	(\$1,940,963)	(\$3,134,433)	(\$5,138,590)
2							
3	Source of Funds						
4	Status Quo Rate Revenues	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732
5	Other Revenues	\$592,609	\$88,305	\$86,914	\$96,435	\$111,263	\$118,819
9	Total Source of Funds	\$4,506,342	\$4,002,037	\$4,000,647	\$4,010,167	\$4,024,995	\$4,032,551
10							
11	Use of Funds						
12	O&M Expenses	\$2,847,242	\$2,916,413	\$3,037,762	\$3,143,291	\$3,253,286	\$3,367,944
13	Debt Service	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957
14	Rate-Funded CIP	\$777,959	\$1,262,385	\$2,738,351	\$1,735,989	\$2,445,508	\$3,402,828
15	Total Use of Funds	\$4,366,961	\$5,044,303	\$6,099,345	\$5,203,637	\$6,029,151	\$7,107,729
16							
17	Net Cashflow	\$139,381	(\$1,042,265)	(\$2,098,698)	(\$1,193,470)	(\$2,004,156)	(\$3,075,178)
18							
19	Projected Ending Balance³⁴	\$3,561,451	\$157,735	(\$1,940,963)	(\$3,134,433)	(\$5,138,590)	(\$8,213,768)
20	<i>Minimum Target Balance</i>	\$2,439,590	\$2,462,416	\$2,502,461	\$2,537,286	\$2,573,584	\$2,611,421
21	<i>Maximum Target Balance</i>	\$5,082,482	\$5,105,308	\$5,145,353	\$5,180,178	\$5,216,476	\$5,254,313
22							
23	Debt Coverage						
24	Projected Debt Coverage ³⁵	2.24	1.25	2.98	2.67	2.34	1.97
25	<i>Required Debt Coverage</i>	1.25	1.25	1.25	1.25	1.25	1.25

5.2.7. PROPOSED WASTEWATER FINANCIAL PLAN

Wastewater Enterprise must increase its revenues from wastewater rates over the study period to adequately fund its operating and capital expenditures, meet required debt coverage, and maintain sufficient reserve funding. Raftelis worked closely with City staff to identify financial plan options for the Council's consideration. The selected option of proposed annual revenue adjustments is shown in Table 5-16. Revenue adjustments represent annual percentage increases in total rate revenue relative to rate revenue generated by the prior year's wastewater rates. Note that, in order to meet Prop. 218 notification requirements, the City will defer rate increase implementation until March 1 (rather than January 1) for the first year in the study. All subsequent rate adjustments will enter into effect on January 1 of the respective fiscal year.

Table 5-16: Proposed Wastewater Enterprise Revenue Adjustments

Description	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Effective Date	March 1, 2024	January 1, 2025	January 1, 2026	January 1, 2027	January 1, 2028
Revenue Adjustment	35.0%	25.0%	3.0%	3.0%	3.0%

Table 5-17 combines projected wastewater rate and non-rate revenues (from Table 5-7), O&M expenses (from Table 5-8), and debt service (from Table 5-9) to generate operating cash flow projections under the proposed

³⁴ Equal to [Line 1 + Line 17]

³⁵ Equal to [(Line 9 – Line 12) ÷ Line 13]

financial plan. By implementing the proposed revenue adjustments, we project that the Wastewater Operating Fund will maintain sufficient operating cash flow through the end of the study period.

Table 5-17: Wastewater Cash Flow – Proposed Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Wastewater Rate Revenue under Current Rates						
2	Wastewater Rates Subject to Revenue Adjustments	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732	\$3,913,732
3	Wastewater Rates not Subject to Revenue Adjustments ³⁶	\$592,609	\$88,305	\$86,914	\$96,435	\$111,263	\$118,819
4							
5	Revenue Adjustments						
6	Fiscal Year Rev. Adj.						
7	FY 2023 N/A	\$0	\$0	\$0	\$0	\$0	\$0
8	FY 2024 35.00%		\$456,602	\$1,369,806	\$1,369,806	\$1,369,806	\$1,369,806
9	FY 2025 25.00%			\$660,442	\$1,320,885	\$1,320,885	\$1,320,885
10	FY 2026 3.00%				\$99,066	\$198,133	\$198,133
11	FY 2027 3.00%					\$102,038	\$204,077
12	FY 2028 3.00%						\$105,099
13	Total Adjustments	\$0	\$0	\$456,602	\$2,030,249	\$2,789,757	\$2,990,862
14							
18	Total Revenues	\$4,506,342	\$4,458,639	\$6,030,895	\$6,799,925	\$7,015,857	\$7,230,551
19							
20	O&M Expenses	\$2,847,242	\$2,916,413	\$3,037,762	\$3,143,291	\$3,253,286	\$3,367,944
21	Debt Service	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957
22	Rate-Funded CIP	\$777,959	\$1,262,385	\$2,738,351	\$1,735,989	\$2,445,508	\$3,402,828
23	Total Expenses	\$4,366,961	\$5,044,303	\$6,099,345	\$5,203,637	\$6,029,151	\$7,107,729
24							
25	Net Operating Cash Flow³⁷	\$139,381	(\$585,663)	(\$68,449)	\$1,596,287	\$986,706	\$122,822

Table 5-18 shows projected reserve balances and debt coverage under the proposed financial plan for the entire Wastewater Enterprise. Sources of funds include revenues (from Table 5-7), revenue adjustments (from Table 5-17), and grants and debt proceeds (from Table 5-11). Use of funds include O&M expenses (from Table 5-8), debt service (from Table 5-9), and CIP expenditures (from Table 5-11). The FY 2022-23 and 2023-24 beginning balance reflects actual Wastewater Enterprise reserve balances as of July 1, 2022 and July 1, 2023, respectively. All ending balance and debt coverage figures are projected values. Target reserve balances shown are from Table 5-13. Under the proposed financial plan, reserve balances and debt coverage are projected to achieve target policies in all years of the rate-setting period.

³⁶ Includes capacity fees, miscellaneous revenues, interest income, and loan/grant revenues.

³⁷ Equal to [Line 18 – Line 23].

Table 5-18: Wastewater Enterprise Pro Forma – Proposed Financial Plan

Line	Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
1	Beginning Balance	\$3,422,069	\$1,200,000	\$174,600	\$106,150	\$1,702,438	\$2,689,144
2							
3	Source of Funds						
4	Rate Revenues (including adjustments)	\$3,913,732	\$4,370,335	\$5,943,981	\$6,703,490	\$6,904,594	\$7,111,732
5	Other Revenues ³⁸	\$592,609	\$88,305	\$86,914	\$96,435	\$111,263	\$118,819
9	Total Source of Funds	\$4,506,342	\$4,458,639	\$6,030,895	\$6,799,925	\$7,015,857	\$7,230,551
10							
11	Use of Funds						
12	O&M Expenses	\$2,847,242	\$2,916,413	\$3,037,762	\$3,143,291	\$3,253,286	\$3,367,944
13	Debt Service	\$741,760	\$865,505	\$323,232	\$324,357	\$330,357	\$336,957
14	Capital Improvement Plan Expenditures	\$777,959	\$1,262,385	\$2,738,351	\$1,735,989	\$2,445,508	\$3,402,828
15	Total Use of Funds	\$4,366,961	\$5,044,303	\$6,099,345	\$5,203,637	\$6,029,151	\$7,107,729
16							
17	Ending Balance³⁹	\$3,561,451	\$614,337	\$106,150	\$1,702,438	\$2,689,144	\$2,811,966
18	<i>Target Balance</i>	<i>\$2,439,590</i>	<i>\$2,462,416</i>	<i>\$2,502,461</i>	<i>\$2,537,286</i>	<i>\$2,573,584</i>	<i>\$2,611,421</i>
19							
20	Debt Coverage						
23	Projected Debt Coverage ⁴⁰	1.44	1.68	8.99	10.98	11.05	11.11
24	<i>Required Debt Coverage</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>	<i>1.25</i>

³⁸ Note that, for the purposes of calculating reserve balances, loan/grant revenues, as well as some miscellaneous revenues designated for particular capital projects (such as capacity fees), have been excluded.

³⁹ Equal to [Line 1 + Line 9 – Line 15].

⁴⁰ Equal to [(Line 9 – Line 12) / Line 13].

Figure 5-2 shows projected debt coverage (blue line) relative to the debt coverage requirement (gray line) over the study period. As shown below, debt coverage remains far above the requirement throughout the study period due to the minimal amount of existing debt and absence of future debt issuances for this study.

Figure 5-2: Proposed Wastewater Financial Plan – Projected Debt Coverage

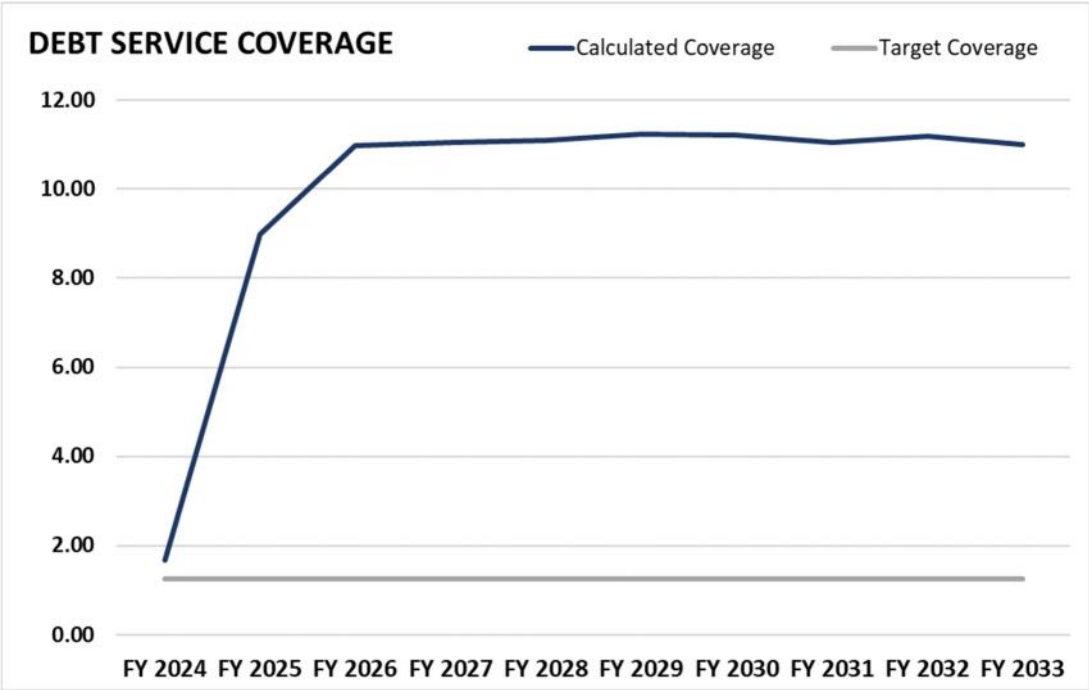


Figure 5-3 shows the Wastewater Enterprise’s projected ending balance under the proposed financial plan. The dark blue bars indicate the ending balance. Minimum and maximum reserve targets (based on the policies described in Table 5-12) are shown by the gray and light blue lines, respectively. The Wastewater Enterprise is projected to begin accruing reserves in FY 2025-26 and reach its maximum target by FY 2030-31. This allows the City to then draw down on reserves in the following year, when several rate-funded capital projects are scheduled to begin. Maintaining reserves above the target amount is necessary as additional drawdown of reserves beyond FY 2032-33 is anticipated to fund substantial R&R CIP related to replacement costs for the City’s aging infrastructure.

Figure 5-3: Proposed Wastewater Financial Plan – Projected Ending Cash Balances

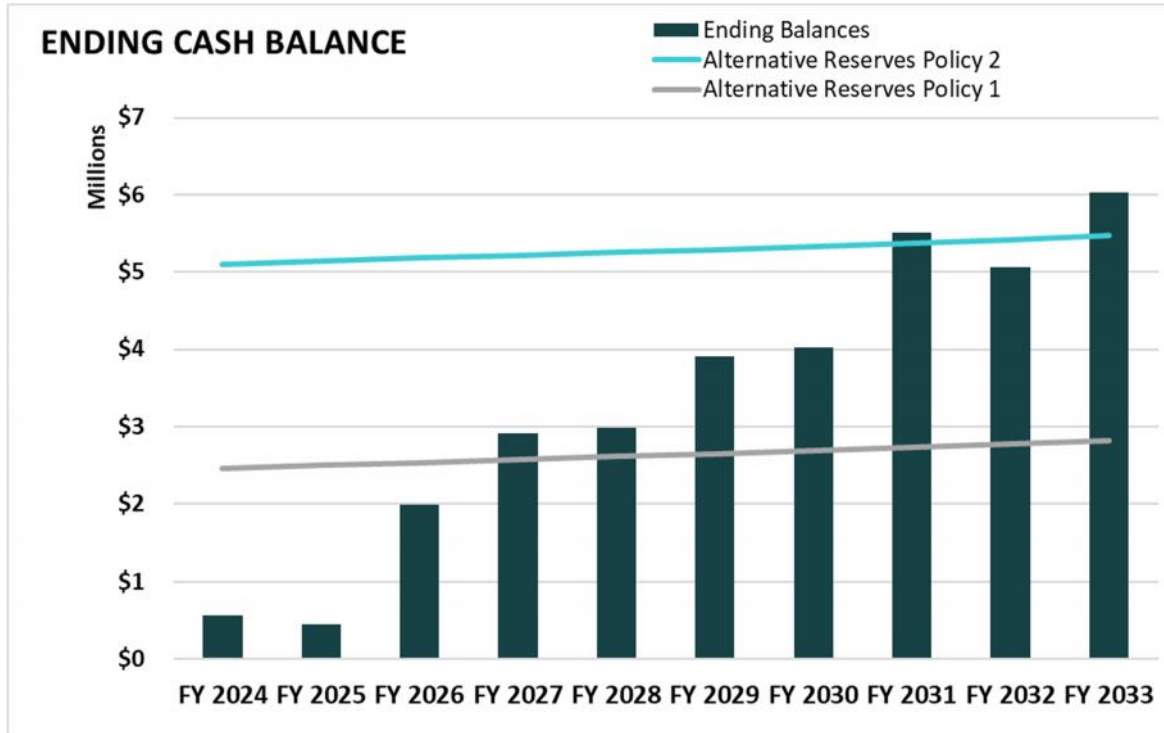
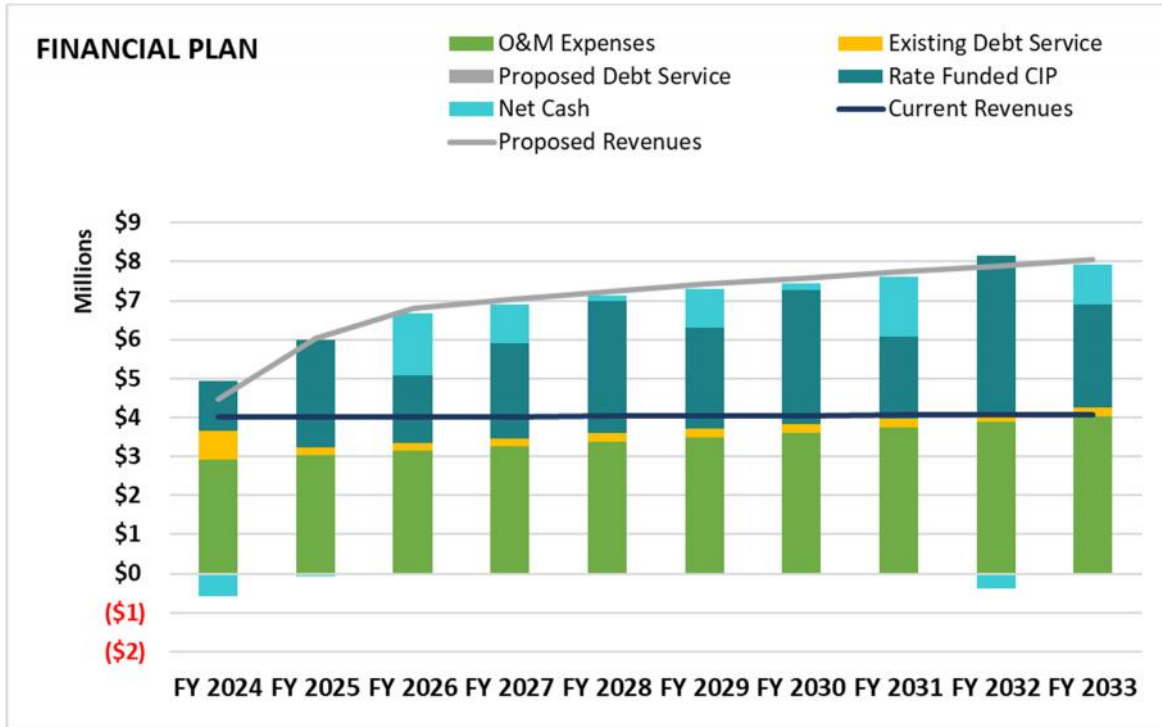


Figure 5-4 shows the proposed versus status quo operating financial plan. Revenues under the status quo and proposed financial plans are represented by the blue and gray lines, respectively. Revenue requirements including O&M expenses, debt service, and reserve funding for CIP/other purposes are represented by the various stacked bars. Revenue adjustments are required to generate sufficient revenue to recover O&M expenses and debt service payments over the study period.

Figure 5-4: Proposed vs. Status Quo Wastewater Enterprise Financial Plan



5.3. Wastewater Cost of Service Analysis

Section 5.3 details the cost of service (COS) analysis performed for the Wastewater Enterprise for FY 2022-23. The COS analysis allocates the overall rate revenue requirement to customer classes based on their proportion of use of and burden on the wastewater system. This provides the basis for the development of proposed wastewater rates through FY 2027-28. Note that costs of reclaimed water are included in this section as part of the wastewater COS analysis as tertiary treatment facilities produce recycled water and the City accounts for recycled costs as part of the Wastewater Enterprise.

5.3.1. METHODOLOGY

The first step in a COS analysis is to determine the revenue required from wastewater rates. The total revenue requirement results from the wastewater financial plan in Section 5.2. The methodology to develop the COS analysis and to apportion the revenue requirement to user classes is informed by the WEF's Manual of Practice (MOP) No. 27 *Financing and Charges for Wastewater Systems*. COS analyses are tailored to meet the specific needs of each wastewater system. However, there are four distinct steps in every COS analysis to recover costs from customers in an accurate, equitable, and defensible manner:

1. **Cost Functionalization:** O&M expenses and capital assets are categorized by their function in the wastewater system. Sample functions may include collection, treatment, and customer service, among others.
2. **Cost Causation Component Allocation:** Functionalized costs are then allocated to cost causation components based on their burden on the wastewater system. The cost causation components include flow, biological oxygen demand (BOD), and suspended solids (SS), among other specific cost components. The

revenue requirement is allocated accordingly to the cost causation components and results in the total share of the revenue requirement attributable to each cost component.

3. **Mass Balance Analysis:** The flow and strength (BOD and SS) of wastewater treatment plant (WWTP) influent is attributed to each customer class based on water use data and estimated wastewater generation and strength assumptions that vary by user classification. This analysis estimates the burden each customer class places on the wastewater system.
4. **Revenue Requirement Distribution:** The mass balance analysis is utilized to distribute the revenue requirement for each cost causation component unit cost to customer classes based on each customer class's individual burden on the wastewater system.

5.3.2.WASTEWATER RATE REVENUE REQUIREMENT

Table 5-19 shows the calculation of the wastewater rate revenue requirement for FY 2022-23 (also referred to as the test year). The revenue requirement is split into operating and capital categories (Columns C-D), which are later allocated based on O&M expenses and capital assets. The revenue requirements (Lines 2-4) include FY 2022-23 O&M expenses, debt service, and capital projects. The revenue offsets (Lines 8-10) include all non-rate revenues. These revenues are applied as offsets to the final rate revenue requirement. The adjustment for cash balance (Line 14) is equal to FY 2022-23 negative net operating cash flow under the proposed financial plan, and accounts for the drawdown of operating reserves in FY 2022-23. All values are from the proposed wastewater financial plan operating cash flow (Table 5-17). The final rate revenue requirement (Line 19) is calculated as follows:

Total revenue required from rates (Line 19) = Revenue requirements (Line 5) - Revenue offsets (Line 11) - Adjustments (Line 16)

Table 5-19: Wastewater Rate Revenue Requirement (Test Year)

[A]	[B]	[C]	[D]	[E]
Line	Description	Operating Revenue Requirement	Capital Revenue Requirement	Total
1	Revenue Requirements			
2	O&M Expenses	\$2,847,242		\$2,847,242
3	Debt Service		\$741,760	\$741,760
4	Capital Expenditures – PAYGO		\$777,959	\$777,959
5	Total Revenue Requirements	\$2,847,242	\$1,519,719	\$4,366,961
6				
7	Less: Revenue Offsets			
8	Capacity Charges		\$30,000	\$30,000
9	Miscellaneous Revenues	\$527,866		\$527,866
10	Interest Income	\$34,744		\$34,744
11	Total Revenue Offsets	\$562,609	\$30,000	\$592,609
12				
13	Less: Adjustments			
14	Adjustment for Cash Balance		(\$139,381)	(\$139,381)
15	Adjustment for Mid-Year Increase		\$0	\$0
16	Total Adjustments	\$0	(\$139,381)	(\$139,381)
17				
18	Total Revenue Requirement w/o Offsets	\$2,847,242	\$1,659,100	\$4,506,342
19	Total - Revenue Requirement	\$2,284,633	\$1,629,100	\$3,913,732

5.3.3.FUNCTIONALIZATION AND ALLOCATION OF EXPENSES

After determining the revenue requirement, the next step of the wastewater COS analysis is to allocate O&M expenses and capital assets to the following functional categories:

- » **Collection:** costs associated with the collection and transport of wastewater discharges from customers to the wastewater treatment plant
- » **Treatment:** costs associated with the treatment and disposal of wastewater from customers
- » **Customer:** costs of billing, revenue collections, and other customer services functions
- » **General:** costs for general administration and operational expenses or any other costs that do not clearly relate to another functional category (i.e. indirect costs)
- » **Lift Stations:** cost of pumping sewage from customer locations to the wastewater plant for treatment
- » **Recycled - Distribution:** costs directly attributable to the reclaimed water system only (such as recycled water distribution)

The functionalization of costs allows for the allocation of costs to cost causation components. Some cost causation components correspond directly to a functional category listed above. The cost causation components include:

- » **Flow:** costs associated with the volume of wastewater generated, collected, and treated
- » **BOD/SS:** costs associated with the strength of wastewater treated and disposed of in terms of the following parameters: suspended solids (SS) and biochemical oxygen demand (BOD)
- » **Customer:** costs of billing, revenue collections, and other customer services functions
- » **General:** costs for general administration and operational expenses or any other costs that do not clearly relate to another functional category (i.e. indirect costs)
- » **Recycled - Treatment:** costs associated with tertiary treatment components of the treatment facilities

5.3.4.WASTEWATER ENTERPRISE O&M EXPENSE ALLOCATION

Table 5-20 shows the basis for allocating each functional category to the various cost causation components. This provides the basis for allocating O&M and capital expenses in the following subsections. The Treatment functional category is allocated to flow and strength based on the prior study allocation of 52% flow, 30% BOD, and 18% SS. This allocation is modified to account for tertiary treatment costs separately. Based on the capitalized asset database, 61% of asset value is related to tertiary facilities. To determine the Recycled- Treatment cost allocation the fraction of tertiary value is multiplied by the fraction of wastewater effluent which becomes recycled water (60%). This yields a functional allocation of 37% to Recycled – Treatment with the remainder to flow, BOD, and SS in proportion to the initial allocation of 52%, 30%, and 18%. The Collection functional category is allocated entirely to the Flow cost causation component as collection-related costs depend on the quantity of wastewater rather than the quality (strength) of wastewater. The Customer and General cost causation component allocations represent a reasonable estimation as determined by City staff, as these cost centers are within the Wastewater Collection budgetary department.

Table 5-20: Allocation of Functional Categories to Wastewater Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line	Functional Category	Flow	Biological Oxygen Demand	Suspended Solids	Customer	General	Recycled - Treatment	Total
1	Collection	89%			9%	2%		100%
3	Treatment ⁴¹	33%	19%	11%			37%	100%

The next step of the COS analysis is to develop an allocation basis for the operating revenue requirement based on the functionalization of the Wastewater Enterprise's O&M expenses. Table 5-21 shows the allocation of FY 2022-23 O&M expenses by functional category to each cost causation component. The percentage allocation of each functional category (Columns C-H) to the various cost causation components was determined in Table 5-20. The total dollar amount allocated to each cost causation component (Line 6) is determined by multiplying the total expense associated with each functional category by the corresponding percentage allocation and summing across all functional categories.

For example, 33 percent of treatment costs are allocated to the flow cost causation component. The same calculation is performed for the remaining functional categories. The subtotals are summed to determine the total dollar amount allocated to the flow cost causation component. The same calculations are repeated for the collection category and cost causation components. The O&M allocation percentages represent the proportion of O&M expenses allocated to each cost causation component. The O&M allocation percentages are used to allocate the total operating revenue requirement (O&M expenses less revenue offsets). The total operating revenue requirement equals the operating revenue requirement from **Table 5-19**.

Table 5-21: Wastewater Enterprise O&M Expenses – Allocation to Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line	Functional Category	Flow	BOD	SS	Customer	General	Recycled - Treatment	FY 2022-23 O&M
1	Collection	\$782,654	\$0	\$0	\$79,145	\$17,588	\$0	\$879,386
2	Treatment	\$648,520	\$374,146	\$224,488	\$0	\$0	\$720,702	\$1,967,856
3	Total O&M	\$1,431,174	\$374,146	\$224,488	\$79,145	\$17,588	\$720,702	\$2,847,242
4	Total O&M – General Reallocated	\$1,440,069	\$376,472	\$225,883	\$79,637	\$0	\$725,182	\$2,847,242
5	<i>Final O&M Allocation</i>	<i>50.6%</i>	<i>13.2%</i>	<i>7.9%</i>	<i>2.8%</i>	<i>0.8%</i>	<i>25.5%</i>	<i>100.0%</i>

5.3.5.WASTEWATER ENTERPRISE CAPITAL ALLOCATION

Capital assets are utilized in COS analyses to allocate the capital revenue requirement to the various cost causation components. The distribution of short-term CIP project costs can be heavily weighted to specific cost causation components based on the type of projects. The use of short-term plans to allocate capital costs may cause rates to fluctuate and result in customer confusion. The overall wastewater asset base, however, is considerably stable in the long-term, and therefore is more representative of long-term capital investment in the City's wastewater system. Thus, functionalized capital assets are used to allocate capital costs.

⁴¹ 60% of wastewater treatment plant influent becomes recycled water. Tertiary components, which produce recycled water account for 61% of the capitalized asset value..

City staff provided Raftelis with a detailed asset listing that included the original cost of each individual wastewater asset. Raftelis calculated the replacement cost less depreciation (RCLD) of each asset based on net book value using the Engineering News-Record's 20-City Average Cost Construction Index (CCI) to account for capital cost inflation. RCLD is the most common valuation method for deriving functional values for a utility system as it is the best point in time estimate of a system for a cost of service analysis. As infrastructure is reinvested in over time, the asset base will change, with changes accounted for in subsequent cost of service analyses. As part of the capital asset analysis, Raftelis assigned each individual asset to a functional category with the assistance of City staff. Total wastewater asset value (RCLD) by functional category is shown in Table 5-22. Percentages are rounded to the nearest one-tenth of one percent.

Table 5-22: Wastewater Enterprise Capital Assets by Functional Category

[A]	[B]	[C]	[D]
Line	Functional Category	Asset Value (RCLD)	Percent of Total
1	Collection	\$2,349,986	14.4%
2	Lift Stations	\$2,189,696	13.4%
3	Treatment	\$10,181,047	62.5%
4	General	\$106,495	0.7%
5	Recycled Water (Distribution)	\$1,466,820	9.0%
6	Total Asset Value (RCLD)	\$16,294,044	100.0%

Table 5-23 shows the allocation of capital assets by functional category to each cost causation component. The percentage allocation of each functional category (Columns C-H) to the various cost causation components was determined in Table 5-20. Total capital assets associated with each functional category (Column I) were determined in Table 5-22. The total dollar amount allocated to each cost causation component (Line 6) is determined by multiplying the total asset value associated with each functional category by the corresponding percentage allocation and summing across all functional categories. This is consistent with the methodology used to determine the allocation of O&M expenses to cost causation components in Table 5-21.

The capital allocation percentages represent the proportion of capital assets allocated to each cost causation component. Note that the general portion of the capital requirement is redistributed evenly among the other cost components based on the percentages in, allowing for the final asset allocation and capital percentage allocations to be calculated. The final capital allocation percentages are used to allocate the total capital revenue requirement (which was calculated in Table 5-19, Column D). This total is allocated to each cost causation component based on capital allocation percentages.

Table 5-23: Functionalized Wastewater Capital Assets Allocation to Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line	Functional Category	Flow	Biological Oxygen Demand	Suspended Solids	Customer	General	Recycled - Treatment	Asset Value (RCLD)
1	Collection	\$2,349,986	\$0	\$0	\$0	\$0	\$0	\$2,349,986
2	Lift Stations	\$2,189,696	\$0	\$0	\$0	\$0	\$0	\$2,189,696
3	Treatment	\$3,355,232	\$1,935,711	\$1,161,426	\$0	\$0	\$3,728,678	\$10,181,047
4	General	\$0	\$0	\$0	\$0	\$106,495	\$0	\$106,495
5	Recycled Water (Distribution)	\$0	\$0	\$0	\$0	\$1,466,820	\$0	\$1,466,820
6	Total Assets	\$7,894,914	\$1,935,711	\$1,161,426	\$0	\$1,573,315	\$3,728,678	\$16,294,044
7	Total Assets – General Reallocated	\$8,738,703	\$2,142,595	\$1,285,557	\$0	\$0	\$4,127,190	\$16,294,044
8	<i>Capital Allocation before General Reallocation</i>	<i>76.8%</i>	<i>9.8%</i>	<i>9.8%</i>	<i>0.0%</i>	<i>1.5%</i>	<i>2.0%</i>	<i>100.0%</i>
9	<i>Final Capital Allocation</i>	<i>76.8%</i>	<i>9.8%</i>	<i>9.8%</i>	<i>0.0%</i>	<i>1.5%</i>	<i>2.0%</i>	<i>100.0%</i>
10								
11	Capital Revenue Requirement	\$889,796	\$218,164	\$130,899	\$0	\$0	\$420,241	\$1,659,100

5.3.6.ALLOCATION OF REVENUE REQUIREMENT TO COST COMPONENTS

Utilizing the cost allocations developed above in Table 5-20, Table 5-21, and Table 5-23, we can now allocate the operating, capital, and revenue offset portions of the revenue requirement to the various cost components. As with Water Enterprise COS, we allocate the revenue offset (non-rate revenues) according to the capital allocation for capacity charges and interest income; and the operating allocation for miscellaneous revenues. The resulting distributions of costs are listed below in Table 5-24. Note that the total revenue requirement in Line 4, Column G, is equal to the total revenue requirement developed in Table 5-19.

Table 5-24: Allocation of Test Year Revenue Requirement to Cost Causation Components

[A]	[B]	[C]	[D]	[E]	[F]	[H]	[G]
Line	Description	Flow	BOD	SS	Customer	Recycled - Treatment	FY 2022-23 Rev. Req.
1	Operating Expenses	\$1,440,069	\$376,472	\$225,883	\$79,637	\$725,182	\$2,847,242
2	Capital Expenses	\$889,796	\$218,164	\$130,899	\$0	\$420,241	\$1,659,100
3	Revenue Offsets	(\$301,705)	(\$78,310)	(\$46,986)	(\$14,764)	(\$150,845)	(\$592,609)
4	Total	\$2,028,160	\$516,326	\$309,796	\$64,872	\$994,578	\$3,913,732

5.3.7.PLANT MASS BALANCE ANALYSIS

The next step of the wastewater COS analysis is to attribute flow and strength loadings entering the City's wastewater treatment plant to various user classifications. This is necessary to allocate the Flow, Biological Oxygen

Demand, and Suspended Solids cost causation components to each customer class for recovery by the proposed wastewater rates.

Table 5-25 shows Raftelis' mass balance analysis of the City's wastewater treatment plant based on plant influent data for FY 2021-22. The result is attribution of flow and strength loadings to each customer class. Key inputs and assumptions include:

- » Estimated total FY 2022-23 wastewater flows entering the wastewater treatment plant
- » Estimated strength concentration for BOD and SS informed by available industry data, guidance from the City's engineering consultants, and from the prior rate study
- » Flow and strength measurements for industrial customers
- » FY 2021-22 water use associated with non-residential wastewater customers (from City billing data)
- » Estimated return-to-sewer factors for non-residential classes based on an analysis of monthly metered water use
- » Residual plant influent is attributable to Residential class wastewater generation. The difference between net plant influent and estimated wastewater generation from all non-residual sources is Residential wastewater flow.
- » Based on three years of concentration samples of boron and antimony in wastewater influent, the volume of geothermal wastewater sources is 20% of total plant influent

Table 5-25: Mass Balance Analysis

[B]	[C]	[D]	[E]	[F]	[G]	[H]
Description	Flow (HCF)	BOD (mg/L)	SS (mg/L)	Flow (MG) ⁴²	BOD (lbs) ⁴³	SS (lbs)
Total Plant Influent	200,390	379	246	149.89	474,539	307,433
Non-Residential Influent						
Transient General	31,526	400	200	23.58	78,719	39,359
Spa (Domestic Wastewater)	7,926	400	200	5.93	19,791	9,895
Campground	1,160	400	200	0.87	2,896	1,448
Bed & Breakfast	2,639	400	200	1.97	6,589	3,295
Commercial General	6,831	300	300	5.11	12,792	12,792
Restaurant/Bakery	4,956	1,000	600	3.71	30,937	18,562
Laundry	1,195	80	80	0.89	597	597
Public Building	1,247	300	300	0.93	2,335	2,335
Commercial Social (Schools & Churches)	5,132	300	300	3.84	9,610	9,610
Medical Care	2,012	300	300	1.50	3,767	3,767
Industrial & Bottling Works	2,842	293	23	2.13	5,197	416
Total Non-Residential Influent	67,465	4,173	2,703	50.46	2,184,878	1,434,036
Spa - Geothermal Discharge	41,864	1	1	31.31	173,230	102,077
Net Residential Flow	91,061	530	361	68.11	261	261
SFR	52,578	530	361	39.33		
MFR	20,290	530	361	15.18	301,047	205,095
Mobile Home	18,192	530	361	13.61	173,822.86	118,420.35

⁴² Conversion factor: one (1) hundred cubic feet = 0.000748 million gallons.

⁴³ Conversion factor: one (1) milligram per liter = 8.35 pounds per million gallons.

5.3.8.WASTEWATER UNIT COSTS

The next step of the wastewater COS analysis is to develop unit costs for each cost causation component. This is necessary to allocate the revenue requirement to each customer class in subsequent steps of the COS analysis. Table 5-26 shows the calculation of unit costs (Line 6). This is developed by taking the total COS allocation for each cost component (Line 1) and dividing by the corresponding total units of service for flow, BOD, SS, customer, and Recycled - Treatment (tertiary treatment assets), shown in Lines 3-4. The resulting unit rates may then be applied to customer classes based on the number of units in each respective class. Flow is recovered across all units of wastewater. BOD and SS unit rates are derived by dividing across the total estimated BOD and SS in pounds per year. Customer costs are divided by the total number of annualized bills. Recycled Water – Treatment / tertiary treatment assets are divided by total estimated wastewater, just like the flow component.

The City treats wastewater to secondary and tertiary and is permitted to discharge both to the Napa River during certain times of the year (Nov 1 thru June 15) with dilution requirements in accordance with its discharge permit with the State's Regional Water Board. Secondary is a very small portion of its treated effluent and only discharged to the Napa River for a brief period, typically one to five weeks per year during heavy rain events. Tertiary effluent is disposed of continuously throughout the year. Tertiary effluent goes onto spray fields and discharged to the Napa River or recycled; some is distributed to recycled water connections; and some is collected by trucks for dust control and other non-potable uses (i.e., "truck-out water").

It is critical for the City to recycle water and dispose of this effluent. Recycled water makes up about 60% of the City's treated effluent. The city does not have enough places to dispose of its tertiary treated effluent year round and has a cease and desist order related to this problem. The high volume and concentrations of boron and antimony in the geothermal influent make the city unable to sell its recycled water. There are limited users that can irrigate with this resource that has these high constituents in it (e.g. vineyards can't irrigate with it and there are limited vegetation that can tolerate this high level of boron in the City's recycled water). If the city was unable to dispose of this water easily it would have to build large, very expensive storage ponds on land that it currently does not own. Although geothermal costs are incurred entirely for flow (very low concentrations of BOD and SS) the class is allocated their proportional share of tertiary treatment costs since they cannot be recovered from meaningful recycled water sales. Recycled Treatment / tertiary costs are therefore recovered over all units of wastewater and all classes of customers.

Table 5-26: Wastewater Unit Costs Calculation (Test Year)

[A]	[B]	[C]	[D]	[E]	[F]	[H]	[G]
Line	Description	Flow	BOD	SS	Customer	Recycled - Treatment	Test Year Revenue Requirement
1	Total COS	\$2,028,160	\$516,326	\$309,796	\$64,872	\$994,578	\$3,913,732
2							
3	Total Units of Service	200,390	474,539	307,433	32,146	200,390	
4	Units	HCF/yr	lb/yr	lb/yr	annualized bills	HCF/yr	
5							
6	Unit Cost	\$10.12	\$1.09	\$1.01	\$2.02	\$4.96	
7	Units	HCF	Lb	lb	per bill	HCF	

5.3.9.WASTEWATER COST ALLOCATION TO CUSTOMER CLASSES

Table 5-27 shows the allocation of the rate revenue requirement, by cost causation component, to each customer class based on the unit rates developed above in Table 5-26. The units of service shown for each customer class for the Flow, Biological Oxygen Demand, Suspended Solids, and Recycled – Treatment cost causation components (Columns C-E) were previously determined as part of the mass balance analysis (see Table 5-25). The unit rate for each of these components is multiplied by the corresponding number of flow/BOD/SS/tertiary units determined in Table 5-25 for each class to calculate the total cost for that component, by customer class. Similarly, the total number of bills (e.g., number of accounts multiplied by the number of bills per year) for each class is multiplied by the unit rate for Customer to determine the total cost component for Customer, for each class. This allows for the development of customer-specific COS allocations, as shown below in Table 5-27. Note again that the total amount of revenue to be recovered (the last line of Column H) is the same as the total revenue requirement originally developed in Table 5-19.

Table 5-27: Wastewater Cost Allocation to Customer Classes (Test Year)

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Line	Customer Class	Flow	BOD	SS	Customer	Recycled Water -Treatment	Total
1	Residential	\$921,633	\$327,557	\$206,671	\$57,436	\$451,954	\$1,965,251
2	SFR	\$532,145	\$189,129	\$119,331	\$28,996	\$260,956	\$1,130,557
3	MFR	\$205,360	\$72,987	\$46,051	\$14,995	\$100,705	\$440,098
4	Mobile Home	\$184,128	\$65,441	\$41,290	\$13,444	\$90,293	\$394,595
5							
6	Non-Residential	\$437,747	\$117,505	\$54,413	\$1,962	\$214,664	\$826,291
7	Transient General	\$319,077	\$85,651	\$39,662	\$1,090	\$156,470	\$601,950
8	Spa (Domestic Wastewater)	\$80,220	\$21,534	\$9,971	\$339	\$39,338	\$151,402
9	Campground	\$11,740	\$3,152	\$1,459	\$24	\$5,757	\$22,133
10	Bed & Breakfast	\$26,710	\$7,170	\$3,320	\$509	\$13,098	\$50,806
11							
12	Other Non-Residential	\$216,303	\$65,325	\$48,029	\$5,257	\$106,072	\$440,986
15	Commercial General	\$69,137	\$13,919	\$12,891	\$2,858	\$33,904	\$132,709
16	Restaurant/Bakery	\$50,160	\$33,661	\$18,705	\$703	\$24,598	\$127,827
17	Laundry	\$12,092	\$649	\$601	\$24	\$5,930	\$19,297
18	Public Building	\$12,619	\$2,541	\$2,353	\$848	\$6,188	\$24,548
19	Commercial Social (Schools & Churches)	\$51,936	\$10,456	\$9,684	\$581	\$25,469	\$98,126
20	Medical Care	\$20,359	\$4,099	\$3,796	\$242	\$9,984	\$38,479
21							
22	Industrial & Bottling Works	\$28,767	\$5,655	\$419	\$73	\$14,107	\$49,020
23							
24	Spa - Geothermal Discharge	\$423,711	\$284	\$263	\$145	\$207,781	\$632,185
25	Total	\$2,028,160	\$516,326	\$309,796	\$64,872	\$994,578	\$3,913,732

5.4. Proposed Wastewater Rates

Section 5.4 shows detailed calculations of proposed wastewater rates through FY 2027-28. All proposed rates are first calculated directly from the results of the COS analysis (in Section 5.3) for FY 2022-23 (i.e. the “test year”). Note however that proposed rates will not be implemented until March 1, 2024. Therefore, all FY 2022-23 “COS” rates and charges shown represent intermediate results of the rate design process and not proposed rates. FY 2022-23 “COS” rates and charges must be calculated to provide a basis for proposed rates for FY 2023-24 through FY 2027-28.

5.4.1. PROPOSED WASTEWATER RATES (TEST YEAR)

Table 5-28 shows the calculation of COS wastewater rates for the test year. The revenue requirement associated with each charge Column C was determined from customer class cost allocations in Table 5-27. All residential customers are billed based on fixed rates; all non-residential customers pay a volumetric rate per HCF of wastewater use (subject to a monthly minimum). The fixed costs in Column C include only Customer costs; all other components (BOD, SS, Flow, and Recycled – Treatment) are included in the variable costs (Column D). The rates for each class are then calculated based on the type of rate required for each class. First, residential rates are determined by taking the entire COS cost by customer class (sum of Columns C and D) and dividing by the number of accounts for each class, then dividing by 12 to get a monthly rate, shown in Column J. The non-residential rates are calculated in two steps. First, the total fixed costs (Column C) are divided by the total flow in HCF for each class (Column F) to get an equal fixed cost component in volumetric terms (Column I). The total volumetric costs (Column D) are then divided by the total flow in HCF (Column F) to get a volumetric component of the rate for each class (Column H). The final rate is then determined by summing the two component rates developed for each customer class (Column H + Column I) to get a final volumetric rate (Column J). The resulting FY 2022-23 COS rates are shown in Column J of Table 5-28.

Table 5-28: Proposed Wastewater Rate Calculation (Test Year)

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Description	Fixed COS Costs ⁴⁴	Variable COS Costs ⁴⁵	No. Accounts	No. HCF	\$/account/bill for Fixed ONLY	\$/HCF for Volumetric	\$/HCF for Fixed	Final Rate	per
1	Residential									
2	SFR	\$28,996	\$1,101,561	1,197	N/A	\$78.68	N/A	N/A	\$78.68	\$/account/month
3	MFR	\$14,995	\$425,104	619	N/A	\$59.23	N/A	N/A	\$59.23	\$/account/month
4	Mobile Home	\$13,444	\$381,151	555	N/A	\$59.23	N/A	N/A	\$59.23	\$/account/month
5										
6	Non-Residential									
7	Transient General	\$1,090	\$600,860	45	39,407	N/A	\$15.25	\$0.036	\$15.29	\$/account/HCF
8	Spa (Domestic Wastewater)	\$339	\$151,063	14	9,907	N/A	\$15.25	\$0.036	\$15.29	\$/account/HCF
9	Campground	\$24	\$22,109	1	1,450	N/A	\$15.25	\$0.036	\$15.29	\$/account/HCF
10	Bed & Breakfast	\$509	\$50,297	21	3,299	N/A	\$15.25	\$0.036	\$15.29	\$/account/HCF
11										
12	Other Non-Residential									
13	Commercial General	\$2,858	\$129,851	118	9,108	N/A	\$14.26	\$0.17	\$14.43	\$/account/HCF
14	Restaurant/Bakery	\$703	\$127,124	29	6,608	N/A	\$19.24	\$0.17	\$19.41	\$/account/HCF
15	Laundry	\$24	\$19,272	1	1,593	N/A	\$12.10	\$0.17	\$12.27	\$/account/HCF
16	Public Building	\$848	\$23,700	35	4,156	N/A	\$5.70	\$0.17	\$5.87	\$/account/HCF
17	Commercial Social (Schools & Churches)	\$581	\$97,545	24	6,842	N/A	\$14.26	\$0.17	\$14.43	\$/account/HCF
	Medical Care	\$242	\$38,237	10	2,682	\$14.26	\$0.17	\$242	\$14.43	\$/account/HCF

⁴⁴ Includes customer component costs only.

⁴⁵ Includes all other cost components (flow, BOD, SS, and Recycled – Treatment).

Industrial & Bottling Works customers are charged three separate components based on actual measurements and sampling of strength. These rates include: a rate per million gallon (MG) of flow and a rate per pound (lb) of strength (BOD and SS). The City will maintain this rate structure for this class. The rate for each of these components is simply the total cost allocated to each in the COS (see Table 5-27) divided by the total flow in MG, total estimated BOD in lbs, and total estimated SS in lbs, respectively. Table 5-29 shows the calculation of each charge component.

Table 5-29: Calculation for Industrial & Bottling Works Rates (Test Year)

Description	Direct Cost Rate	BOD Rate	SS Rate
Total COS Value	\$42,946 ⁴⁶	\$516,326	\$309,796
Billing Units	2.13 MG	474,539 lbs	307,433 lbs
Unit Rate	\$20,200.36⁴⁷	\$1.09	\$1.01
Units	\$/MG	\$/lb	\$/lb

The rate for Spas – Geothermal Discharge customers is calculated by taking the total COS value for this customer class (see above) and dividing by the total billing units (wastewater flows in HCF). This calculation and the resulting rate are shown below in Table 5-30.

Table 5-30: Calculation for Spa – Geothermal Discharge Rates (Test Year)

Description	Value
Total COS for Spa – Geothermal	\$632,567.41
Total Wastewater Flow for Spas - Geothermal	41,864
Unit Rate (\$/HCF)	\$15.11

5.4.2. PROPOSED FIVE-YEAR WASTEWATER RATE SCHEDULE

Table 5-31 shows the proposed five-year schedule of wastewater rates for implementation March 2024 through January 2028. Proposed March 2024 wastewater rates were calculated by increasing COS wastewater rates (from Table 5-28) by the proposed FY 2023-24 revenue adjustment (from Table 5-16). All proposed rates in subsequent years are then increased by the proposed revenue adjustments from Table 5-16. All proposed rates are rounded up to the nearest whole cent.

⁴⁶ Equal to the sum of all COS allocations for Industrial & Bottling Works except BOD and SS (e.g., Flow, Customer, Recycled – Treatment, Recycled – Distribution). See Table 5-27 for further detail.

⁴⁷ Because of the need to round values shown in the table above, the rate shown here will differ slightly from the actual value calculated if using the rounded values shown above. In practice, we do not round until the actual rate is developed. However, for the sake of simplicity, the COS and billing units are rounded here.

Table 5-31: Proposed Five-Year Wastewater Rates Schedule

Description	Test Year COS	Current Rates	Proposed March 2024	Proposed January 2025	Proposed January 2026	Proposed January 2027	Proposed January 2028
Residential (\$/Month/Dwelling Unit)							
Single Family Residential (SFR)	\$78.69	\$97.87	\$106.24	\$132.80	\$136.79	\$140.90	\$145.13
Multi-Family Residential (MFR)	\$59.24	\$82.21	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26
Mobile Home	\$59.24	\$52.85	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26
Transient Rates (\$/HCF)							
Transient General	\$15.29	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Spa (Domestic Wastewater)	\$15.29	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Campground	\$15.29	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Bed & Breakfast	\$15.29	\$19.98	\$20.64	\$25.80	\$26.58	\$27.38	\$28.21
Other Non-Residential (\$/HCF)							
Commercial General	\$14.43	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Restaurant/Bakery	\$19.41	\$34.85	\$26.21	\$32.77	\$33.76	\$34.78	\$35.83
Laundry	\$12.27	\$13.21	\$16.57	\$20.72	\$21.35	\$22.00	\$22.66
Public Building	\$5.87	\$13.21	\$7.93	\$9.92	\$10.22	\$10.53	\$10.85
Commercial Social (Schools & Churches)	\$14.43	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Medical Care	\$14.43	\$13.21	\$19.48	\$24.35	\$25.09	\$25.85	\$26.63
Industrial & Bottling Works (per Million Gallons)							
	\$20,200.36	\$14,559.98	\$27,270.49	\$34,088.12	\$35,110.77	\$36,164.10	\$37,249.03
BOD (\$/lb)	\$1.09	\$2.64	\$1.47	\$1.84	\$1.90	\$1.96	\$2.02
SS (\$/lb)	\$1.01	\$1.99	\$1.37	\$1.72	\$1.78	\$1.84	\$1.90
Spa - Geothermal Discharge (\$/HCF)							
	\$15.11	\$6.72	\$20.40	\$25.50	\$26.27	\$27.06	\$27.88
Minimum Charge (for All Non-Residential Users)							
	\$59.24	\$57.43	\$79.98	\$99.98	\$102.98	\$106.07	\$109.26

6.Customer Bill Impacts

6.1. Combined Water & Wastewater Two-Month Bill Impacts, SFR

Table 6-1 shows the combined two-month bill impacts for a Single Family Residential customer using 12 HCF total over the two-month period (e.g., 6 HCF per month) under current versus proposed rates. This usage level was determined using actual billing data for single family residential customers in FY 2021-22. This impact includes the changes proposed for both water and wastewater, so the total dollar difference is the entire change for a customer receiving both water and wastewater service from the City.

Table 6-1: FY 2023-24 Single Family Residential Two-Month Bill Impacts (12 HCF)

Customer Class	Proposed March 2024 Bill (\$/Two Months)	Current Bill (\$/Two Months)	Difference (\$)	Difference (%)
Single Family Residential	\$ 499.54	\$425.10	\$ 74.44	17.51%