Crescenta Valley Water District

Water and Wastewater Rate Study

Report / July 21 2021

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July 21, 2021

Arturo Montes
Finance & Administration Manager
Crescenta Valley Water District
2700 Foothill Boulevard
La Crescenta, CA 91214

Subject: Water and Wastewater Rate Study Report

Dear Mr. Montes,

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to provide this Water and Wastewater Rate Study Report (Study) for Crescenta Valley Water District (District) to develop water and wastewater rates which meet the requirements of California Constitution Article XIII D, Section 6 (commonly referred to as "Proposition 218"). In particular, this Study contains thorough details on the following:

1. The legal framework surrounding Proposition 218.
2. Recommended policy revisions.
3. Long term financial plans for the water and wastewater utilities.
4. Equitable cost of service-based water and wastewater rates.

The Study summarizes the key findings and results related to the development of rates and charges for water and wastewater service.

It has been a pleasure working with you, and we thank you, Mr. James Lee, other District staff, and the Board of Directors for the support provided during this study.

Sincerely,



Sudhir Pardiwala
Executive Vice President

Kevin Kostiuk
Manager

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Senior Consultant

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Glossary

Term	Definition
ADA	Average Daily Attendance
AF	Acre Feet
AWWA	American Water Works Association
BOD	Biochemical Oxygen Demand
CCI	Construction Cost Index
CPI	Consumer Price Index
DU	Dwelling Unit
FMWD	Foothill Municipal Water District
FYE	Fiscal Year Ending (July 1 – June 30)
GPD	Gallons Per Day
GWP	Glendale Water and Power
KGAL	One Thousand Gallons
LA San	City of Los Angeles Bureau of Sanitation
M1 Manual	"Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1", 7th edition published by AWWA
MFR	Multi-Family Residential
O&M	Operations and Maintenance
R&R	Repair and Replacement
SFR	Single Family Residential
TSS	Total Suspended Solids
WEF	Water Environment Federation

1. Executive Summary

1.1. Background of the Study

The Crescenta Valley Water District (District) was founded in 1950 and serves potable water to approximately 8,000 connections servicing a population of 32,000. The water service area comprises approximately four-square miles in La Crescenta, Montrose, and a portion of the City of Glendale. The District relies on three sources of water supply: local groundwater production from the Verdugo Groundwater Basin, groundwater production from a leased water right from the City of Glendale and imported water from Foothill Municipal Water District (FMWD). On average, the District serves over 4,000 acre-feet (AF) of water annually.

The wastewater utility serves approximately 5,600 accounts in La Crescenta, Montrose, and a portion of the City of La Canada-Flintridge. The wastewater utility operates a collection system with wastewater transported for treatment at City of Los Angeles (Los Angeles Bureau of Sanitation-Glendale Plant) facilities. The collection system consists of 64 miles of mainline sewers and 27 miles of laterals.

In 2020, The District contracted with Raftelis Financial Consultants, Inc. (Raftelis) to conduct a Rate Study (Study) to include a five-year Financial Plan for the water and wastewater utilities. This Study presents the Financial Plans, Cost of Service Analyses, and the resulting five-year water and wastewater rates for implementation beginning October of 2021[1].

This Executive Summary compiles the current and proposed water and wastewater charges and contains a description of the rate study process, methodology, results, and recommendations for the District's rates. The District's last rate adjustment was effective on September 1, 2019. The District wishes to establish fair and equitable rates that:

- Proportionately allocate the costs of providing service in accordance with California Constitution Article XIII D, Section 6 (commonly referred to as Proposition 218).
- Meet the District's fiscal needs in terms of operational expenses, reserve targets, and capital investment to maintain the water and wastewater systems.
- Maintain affordable charges for customers with low water use and a price signal for those whose higher usage creates greater demands and burdens on the District's water system and sources of supply.
- Provide revenue stability and financial sustainability.
- Are easy for customers to understand and easy for District staff to implement and update in the future.

1.2. Objectives of the Study

The major objectives of the Study include the following:

1. Develop Financial Plans for the water and wastewater funds to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding of District financial reserves, and fund capital repairs and replacements (R&R).
2. Conduct a Cost-of-Service analysis for the water and wastewater systems.

[1] Implementation date reflects the billing date and not service date.

3. Develop fair and equitable water and wastewater rates that adequately recover costs, provide revenue stability for recovering fixed costs, and maintain affordable service, while complying with the requirements of Proposition 218.

1.3. Legal Requirements and Rate Setting Methodology

1.3.1. 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 service are as follows:

1. A property-related charge (such as water 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 property.
5. A written notice of the proposed charge shall be mailed to the record owner 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 AWWA's *M1 Manual*, "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 *M1 Manual* to ensure this Study meets Proposition 218 requirements and creates rates that do not exceed the proportionate cost of providing water services on a parcel basis.

1.3.2. CALIFORNIA CONSTITUTION – ARTICLE X, SECTION 2

Article X, Section 2 of the California Constitution states the following:

> *"It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."*

Article X, Section 2 of the State Constitution institutes the need to preserve the State's water supplies and to discourage the wasteful or unreasonable use of water by encouraging conservation. As such, public agencies are constitutionally mandated to maximize the beneficial use of water, prevent waste, and encourage conservation.

In addition, Section 106 of the Water Code declares that the highest priority use of water is for domestic purposes, with irrigation secondary. To meet the objectives of Article X, Section 2, Water Code Section 375 et seq., a water purveyor may utilize its water rate design to incentivize the efficient use of water. The District established inclining tiered (also known as inclining block) water rates to incentivize customers to use water in an efficient manner.

The inclining tier rates (as well as rates for uniform rate classes) need to be based on the proportionate costs incurred to provide water to customer classes and on a parcel basis within each customer class to achieve compliance with Proposition 218.

Tiered Rates – "Inclining" tier rate structures (which are synonymous with "increasing" tier rate structures and "tiered" rates) when properly designed and differentiated by customer class, allow a water utility to send conservation price signals to customers. Due to heightened interest in water conservation and efficiency of water use, inclining tier water rates have gained widespread use, especially in relatively water-scarce regions like Southern California. Tiered rates meet the requirements of Proposition 218 as long as the tiered rates reasonably reflect the proportionate cost of providing service in each tier.

1.3.3. COST-BASED RATE-SETTING METHODOLOGY

To develop water and wastewater rates that comply with Proposition 218 and industry standards while meeting other emerging goals and objectives of the District, there are four major steps discussed below.

1.3.3.1. Calculate the Revenue Requirement

The rate-making process starts by determining the base year (Test Year) revenue requirement, which for this Study is Fiscal Year End (FYE) 2021 which runs from July 1, 2020, through June 30, 2021. The revenue requirement should sufficiently fund the utility's O&M expenses, debt service, capital expenses, and reserve funding.

1.3.3.2. Cost of Service Analysis

The annual cost of providing water and wastewater service is distributed among customer classes commensurate with their service requirements. A COS analysis involves the following:

1. Functionalize costs. Examples of functions are water supply, pumping, storage, treatment, transmission and distribution, meter servicing, hydrants, conservation, and billing and customer service for water and collection and treatment for wastewater.
2. Allocate functionalized costs to cost components. Cost components include variable supply, base delivery, (supply and base delivery costs are called base costs) maximum day, maximum hour[2], fire protection, meter servicing, conservation, and customer service and billing costs for water and collection, Biochemical Oxygen Demand (BOD), and Total Suspended Solids (TSS) service for wastewater.
3. Distribute the cost components. Distribute cost components, using unit costs, to customer classes in proportion to their demands and burdens on the water system. This is described in the M1 Manual published by AWWA and the MOP 27 published by WEF.

A COS analysis for water considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands[3]). Peaking costs are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating and maintaining facilities to meet peak demands. These peak demand costs should be allocated to those customers whose water usage patterns generate additional costs for the utility. In other words, not all customer classes and not all customers share the same responsibility for peaking related costs.

[2] Collectively maximum day and maximum hour costs are known as peaking costs or extra-capacity costs.
[3] System capacity is the system's ability to supply water to all delivery points at the time when demanded. Coincidental peaking factors are calculated for each customer class at the time of greatest system demand. The time of greatest demand is known as peak demand. Both the operating costs and capital asset related costs incurred to accommodate the peak flows are generally allocated to each customer class based upon the class' relative demands during the peak month, day, and hour demand.

1.3.3.3. Rate Design and Calculations

Rates do more than simply recover costs. Within the legal framework and industry standards, properly designed rates should support and optimize a blend of utility objectives, such as conservation, affordability for essential needs, and revenue stability, among other objectives. Rates function as a public information tool in communicating these objectives to customers.

1.3.3.4. Rate Adoption

Rate adoption is the last step of the rate-making process. Raftelis documents the rate study results in this Report which reflect the basis upon which the rates were calculated, the rationale and justifications behind the proposed charges, any changes to rate structures, and anticipated financial impacts to ratepayers.

1.4. Water - Results and Recommendations

Table 1-1 shows the proposed revenue adjustments selected by the District Board and used to calculate the proposed water rates. Although this table shows anticipated revenue adjustments for FYE 2022 through 2026, the District will review and confirm the revenue adjustments on an annual basis[4]. The first revenue adjustment is proposed for implementation in October of 2021. All future revenue adjustments will take effect at the beginning of each fiscal year, beginning July 1, 2022. The assumptions used in calculating the revenue adjustments are described in more detail in Section 4.

Table 1-1: Proposed Water Revenue Adjustments

	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Effective Month	October	July	July	July	July
Revenue Adjustment	8%	8%	8%	7%	7%

1.4.1. FACTORS AFFECTING REVENUE REQUIREMENTS

The following items affect the potable water fund's revenue requirement (i.e., costs) and thus its water rates. The District's expenses include Operation and Maintenance (O&M) expenses and capital expenses (including debt service).

- **Capital Funding**: The District has planned approximately $28.5 million in water capital expenditures over the five-year period to be funded through revenues and reserves. These capital expenditures include both capital projects and capitalized expenses associated with the capital program. A more detailed discussion of the projected capital improvement projects to be funded for the five-years is provided in Table 4-10.
- **Reserve Funding**: The District has established reserve policies for the water utility (further discussed in Section 2.1) to meet operating cash flow needs, protect against rate spikes in times of reduced water demand, and ensure funding in the event of asset failure or other unforeseen circumstances or events. Figure 4-3 shows the reserve balances for the selected Financial Plan. The defined reserve policy is 90 days of cash to meet operating expenses (less water purchase costs from FMWD), or roughly $1.5M in FYE 2022; $1M in unrestricted emergency funds corresponding to the annual depreciation; and 25 percent of the commodity revenue equal to approximately $2.9M for rate stabilization. The total target for FYE 2022 is approximately $5.5M.

[4] The Board maintains the right to implement rates that are *lower* than adopted. If it is determined that a rate *higher* than has been adopted is required, the Board is required to re-notice customers in accordance with Proposition 218 in order to adopt new rates.

1.4.2. PROPOSED BI-MONTHLY FIXED CHARGES

Table 1-2 shows the current and proposed rates for the bi-monthly service charge, by meter size, over the Study period. The rates for the current and proposed bi-monthly fixed charges are based on the size of the meter serving a property. Proposed October 2021 rates reflect the updated cost of service rates and the revenue adjustment percentage shown in Table 1-1. The proposed rates beginning July 2022 are adjusted by the revenue adjustment percentage found in Table 1-1. All rates are rounded up to the nearest whole penny.

Table 1-2: Current and Proposed Water Bi-Monthly Fixed Charges ($/meter size)[5]

Meter Size (Inches)	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
3/4"	$54.10	$58.39	$63.07	$68.12	$72.89	$78.00
1"	$80.69	$86.37	$93.28	$100.75	$107.81	$115.36
1 1/2"	$147.19	$156.32	$168.83	$182.34	$195.11	$208.77
2"	$227.01	$240.27	$259.50	$280.26	$299.88	$320.88
3"	$479.72	$506.09	$546.58	$590.31	$631.64	$675.86
4"	$852.17	$897.83	$969.66	$1,047.24	$1,120.55	$1,198.99

1.4.3. PROPOSED COMMODITY RATES

Table 1-3 shows the proposed rates for the commodity charge by customer class. Proposed October 2021 rates reflect the updated cost of service rates and the revenue adjustment. The proposed rates beginning July 2022 are adjusted by the revenue adjustment percentage found in Table 1-1. The rates for the current and proposed commodity charge are based on the amount of water delivered in units of one thousand gallons (kgal). All rates are rounded up to the nearest whole penny.

Table 1-3: Current and Proposed Water Commodity Rates ($/kgal)[6]

Customer Class	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
SFR						
Tier 1	$5.17	$5.10	$5.51	$5.96	$6.38	$6.83
Tier 2	$8.14	$9.50	$10.26	$11.09	$11.87	$12.71
Tier 3	$12.29	$13.39	$14.47	$15.63	$16.73	$17.91
Multi-Family/Commercial	$7.33	$8.10	$8.75	$9.45	$10.12	$10.83
Irrigation						
Tier 1	$5.66	$5.39	$5.83	$6.30	$6.75	$7.23
Tier 2	$10.89	$10.18	$11.00	$11.88	$12.72	$13.62

1.4.4. PRIVATE FIRE SERVICE CHARGES

Table 1-4 shows the current and proposed private fire service charges by connection size. The rates for the current and proposed bi-monthly private fire service charges are proportional to the potential flow through each fire connection size. Proposed October 2021 rates reflect the updated cost of service rates and the revenue adjustment percentage shown in Table 1-1. The proposed rates beginning July 2022 are adjusted by the revenue adjustment percentage found in Table 1-1. All rates are rounded up to the nearest whole penny.

[5] Outside of District customers pay an additional $0.40 per meter size for administrative services.
[6] SFR stands for Single Family Residential

Table 1-4: Current and Proposed Bi-Monthly Private Fire Service Charges ($/bi-monthly bill)

Private Fire Connection Size (Inches)	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
1"	$15.85	$18.15	$19.61	$21.18	$22.67	$24.26
2"	$24.46	$27.16	$29.34	$31.69	$33.91	$36.29
3"	$44.05	$47.62	$51.43	$55.55	$59.44	$63.61
4"	$77.83	$82.93	$89.57	$96.74	$103.52	$110.77
6"	$199.05	$209.61	$226.38	$244.50	$261.62	$279.94
8"	$408.15	$428.13	$462.39	$499.39	$534.35	$571.76
10"	$722.67	$756.83	$817.38	$882.78	$944.58	$1,010.71

1.5. Wastewater - Results and Recommendations

Table 1-5 shows the proposed revenue adjustments selected by the District Board and used to calculate the proposed wastewater rates. Although this table shows anticipated revenue adjustments for FYE 2022 through 2026, the District will review and confirm the revenue adjustments on an annual basis. The first revenue adjustment is proposed for implementation in October of 2021. All future revenue adjustments will take effect at the beginning of each fiscal year, beginning July 1, 2022. The assumptions used in calculating the revenue adjustments are described in more detail in Section 7.

Table 1-5: Proposed Wastewater Revenue Adjustments

	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Effective Month	October	July	July	July	July
Revenue Adjustment	8%	8%	8%	7%	7%

1.5.1. FACTORS AFFECTING REVENUE REQUIREMENTS

The following items affect the District's revenue requirement (i.e., costs) and thus its wastewater rates. The District's expenses include O&M expenses and capital expenses.

- **Capital Funding**: The District has planned approximately $1.3 million in capital expenditures over the five-year period. These capital expenditures include both capital projects and capitalized expenses associated with the capital program. Capital projects are expected to be funded exclusively through rate revenues. A more detailed discussion of the projected capital improvement projects to be funded through the five-year CIP is provided in Table 7-8.
- **Reserve Funding**: The District has established reserve policies for the wastewater utility (further discussed in Section 2.2) to meet operating cash flow needs, protect against rate spikes, and ensure funding in the event of asset failure or other unforeseen circumstances or events. Figure 7-3 shows the reserve balances for the proposed Financial Plan. The defined reserve policy is 90 days of cash to meet operating expenses (less wastewater treatment and disposal charges), or roughly $593k in FYE 2022; $1M in unrestricted emergency funds; and $889k for rate stabilization representing 25 percent of rate revenue. The total target for FYE 2022 is approximately $2.4M.

1.5.2. PROPOSED WASTEWATER CHARGES

Table 1-6 and Table 1-7 show the current and proposed wastewater rates for the Study period. Table 1-6 shows the wastewater fixed charge by customer class. The fixed charges are per dwelling unit (DU) for residential customers and per account for non-residential customers. Table 1-7 shows the wastewater variable rate by customer class. The variable rates are based on minimum winter water use for residential customers, actual water use for non-residential customers, and average daily attendance (ADA) for schools. Proposed October 2021 rates reflect the updated cost of service rates and the revenue adjustment percentage shown in Table 1-5. The proposed rates beginning July 2022 are adjusted by the revenue adjustment percentage found in Table 1-5. All rates are rounded up to the nearest whole penny.

Table 1-6: Current and Proposed Fixed Wastewater Service Charges ($/DU or account)

Customer Class	Unit	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
Single Family	DU	$47.79	$50.23	$54.25	$58.59	$62.70	$67.09
Multi Family	DU	$31.25	$29.58	$31.95	$34.51	$36.93	$39.52
Commercial/Institutional (minimum charge)	Account	$31.25	$29.58	$31.95	$34.51	$36.93	$39.52

Table 1-7: Current and Proposed Variable Rates for Wastewater ($/kgal water or $/100 ADA)

Customer Class	Unit	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
Single Family, winter water use	kgal	$1.93	$2.13	$2.31	$2.50	$2.68	$2.87
Multi Family, winter water use	kgal	$2.15	$2.37	$2.56	$2.77	$2.97	$3.18
Commercial/Institutional, actual water use	kgal	$5.10	$5.48	$5.92	$6.40	$6.85	$7.33
Primary School/Elementary	100 ADA	$84.86	$91.21	$98.51	$106.40	$113.85	$121.82
Middle School	100 ADA	$169.73	$182.42	$197.02	$212.79	$227.69	$243.63
Secondary School/Middle School	100 ADA	$254.59	$273.62	$295.51	$319.16	$341.51	$365.42

2. Financial Reserve Policies

Reserves are used to provide working capital or cash for ongoing expenses, cope with fiscal emergencies such as revenue shortfalls, asset failure, and natural disasters, among other factors. Sound reserve policy results in prudent financial management, with an overall long-range perspective to maintain financial solvency and mitigate financial risks associated with revenue instability, volatile capital costs, and emergencies.

2.1. Water Utility Financial Reserves Policy

Table 2-1 details the District's adopted policy by reserve type and target level in FYE 2022 for the water utility. The target for the Water Operating Fund equals 90 days of annual operating expenses, or approximately $1.5M. This reserve provides cash flow in case of revenue shortfalls and for working capital. Considerations for billing frequency, seasonal fluctuations in expenditures, and seasonal fluctuations in demand, among others, determine the reserve target. It is important to note that the operating reserve excludes water production and purchase costs, which account for roughly 40 percent of total operating costs.

A Rate Stabilization Reserve is for unplanned challenges (e.g., droughts) related to water sales and/or water costs. An amount equal to a percentage of annual volumetric rate revenue is set aside to be utilized during revenue shortfalls, to smooth out rate impacts, or to forego implementation of water shortage surcharges temporarily. Each utility is unique and rate stabilization reserves are influenced by several variables, including water supply reliability, source cost exposure, and revenues from fixed versus variable sources, among others. The District has adopted a policy that 25 percent of commodity rate revenue be set aside for rate stabilization.

An Emergency Reserve is intended to provide immediate funds in the event of a critical asset failure, loss due to a natural disaster (e.g., earthquake, flood, fire), or other unforeseen catastrophic events. An appropriate Emergency Reserve considers the replacement cost of an essential facility, the time necessary to bring a facility back online, and historical information on the frequency of line breaks or other unanticipated repairs, among other factors. The District targets $1M for the Emergency Reserve.

Table 2-1: Water Financial Reserves Policy

Reserve Type	Policy	FY 2022 Target Level
Operating Reserve	90 days of Operating Expenses	$1,547,759
Rate Stabilization Reserve	25% of Commodity Revenue	$2,983,093
Emergency Reserve	100% of Annual Depreciation	$1,000,000
Total Reserves		**$5,530,852**

2.2. Wastewater Utility Financial Reserves Policy

Table 2-2 details the District adopted policy by reserve type, and target level in FYE 2022 for the wastewater utility. The target for the Wastewater Operating Fund equals 90 days of annual operating expenses, or approximately $593 thousand. This reserve provides cash flow in case of revenue shortfalls and for working capital. Considerations for billing frequency and seasonal fluctuations in revenues and expenditures, among others, determine the reserve target.

A Rate Stabilization Reserve is for unplanned challenges related to wastewater costs. An amount equal to a percentage of annual wastewater rate revenue is set aside to be utilized during revenue shortfalls, to smooth out rate impacts, or to fund unplanned operating costs (e.g., Los Angeles Bureau of Sanitation treatment expenditures). Each

utility is unique and rate stabilization reserves are influenced by several variables. The District has adopted a policy that 25 percent of rate revenue be set aside for rate stabilization.

An Emergency Reserve is intended to provide immediate funds in the event of a critical asset failure, loss due to a natural disaster (e.g., earthquake, flood, fire), or other unforeseen catastrophic events. An appropriate Emergency Reserve considers the replacement cost of an essential facility, the time necessary to bring a facility back online, and historical information on the frequency of line breaks or other unanticipated repairs, among other factors. The District targets $1M for the Emergency Reserve.

Table 2-2: Wastewater Financial Reserves Policy

Reserve Type	Policy	FY 2022 Target Level
Operating Reserve	90 days of Operating Expenses	$593,494
Rate Stabilization Reserve	25% of Commodity Revenue	$889,097
Emergency Reserve	100% of Annual Depreciation	$1,000,000
Total Reserves		**$2,482,592**

3. General Assumptions

3.1. Water Utility

To project revenues and expenses for multiple years, it is necessary to make informed assumptions regarding inflation, water demands, account growth, etc. so that the multi-year financial plan can be developed. This section details the assumptions used in this study.

3.1.1. INFLATION

The Study Period is from Fiscal Year End (FYE) 2022 to 2026 with proposed revenue adjustments and rates presented for the five years FYE 2022 through FYE 2026. Various types of assumptions and inputs are incorporated into the Study based on discussions with and/or direction from District staff. These include the projected number of accounts, annual growth rates in water consumption for different customer classes, and inflation factors, among other assumptions.

The cost escalation factors below show projected increases in various cost categories across the Study period. The factors are applied to all years beginning FYE 2022. Raftelis used the FYE 2021 budget, so no inflationary factors are applied to that year. Raftelis worked with District staff to escalate individual budget line items according to appropriate escalation factors. Inflationary factors are presented in Table 3-1.

A general inflation rate of 3 percent is based on the long-term change in the Consumer Price Index (CPI). Salaries track general inflation with benefits outpacing general inflation and therefore an escalation of 5 percent is used. Power costs reflect the price of electricity related to producing groundwater, pumping water through the distribution system, and treatment of raw water. Capital cost escalation is estimated at 4 percent per year based on historical construction cost index (CCI) inflation.

Table 3-1: Water Inflationary Assumptions

Escalation Factors	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
General	0.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Salary	0.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Benefits	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Power	0.00%	2.50%	2.50%	3.00%	3.00%	3.00%
Capital	0.00%	4.00%	4.00%	4.00%	4.00%	4.00%

3.1.2. PROJECTED WATER DEMAND AND ACCOUNT GROWTH

Water demand is a critical factor in the development of the financial plan. To estimate future water demand two primary factors are used – annual account growth and water demand relative to prior year.

It is estimated that the total number of residential accounts will grow by 1 percent in every year of the Study period and total potable water demand per account is also projected to increase by 1 percent resulting in usage growth of about 2 percent per year. Long term demand is anticipated to reach approximately 3,900 acre feet (AF) in FYE 2026 versus the current level of approximately 3,500 AF.

In order to predict non-operating revenues, the Study assumes that miscellaneous revenues will increase at 1 percent per year through FYE 2026. Interest rates earned on reserves are based on conservative estimates in a low interest financial environment. These revenue growth assumptions are show below in Table 3-2.

Table 3-2: Account, Demand, and Revenue Growth Assumptions for Water[7]

	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Account Growth	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Water Demand Factor	100.0%	101.0%	101.0%	101.0%	101.0%	101.0%
Usage Growth	101.0%	102.0%	102.0%	102.0%	102.0%	102.0%
Water Demand (AFY)	3,570	3,641	3,715	3,789	3,865	3,943
Miscellaneous Revenues	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Reserve Interest	0.00%	2.25%	2.25%	2.25%	2.25%	2.25%

The District purveys water from three sources of supply including the Verdugo Basin, Glendale Water and Power (GWP), and Foothill Municipal Water District (FMWD). The supply mix incorporates availability, maximum allotments or yields, and new sources, and so the mix changes each year. The total water supply needed to meet demand (shown in Table 3-2) is calculated using the following formula to factor in the water loss in the system:

Total Water Production (AF) = Total Water Demand (AF) / (1 – Water Loss)

System water loss is estimated by the District to be 6.4 percent. Table 3-3 summarizes the various sources of supply, the amount provided by each source (in AF) to meet demand (including water loss) in FYE 2021, and the purchase cost (if any) in FYE 2021. The sources are listed in order of use (priority).

Table 3-3: Water Sources of Supply[8]

Source	FYE 2021 (AF)	FYE 2021 Cost ($/AF)
Groundwater (Verdugo Basin)	1,920	$185
Groundwater (GWP)	240	$579
FMWD Tier 1	1,654	$1,105
FMWD Tier 2	0	$1,180
FMWD Fixed Charges		$460
FMWD Power Costs		$179

Based on projections and inputs from District staff, the respective water source future supply costs are shown in Table 3-4. Total water supply costs reflect increases in energy costs for locally produced water, as well as rate increases from wholesalers. Future increases in FMWD water are projected at 2.5 percent per year.

[7] AFY stands for Acre Feet per Year. Once acre foot is equal to 325,851 gallons.
[8] FMWD pricing runs on calendar year. Costs shown for FMWD Tier 1 and Tier 2 are weighted between July-December pricing and January-June pricing to align with fiscal year.

Table 3-4: Water Costs Assumptions ($/AF)

Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Groundwater (Verdugo Basin)	$185	$195	$205	$215	$225	$232
Groundwater (GWP)	$579	$593	$608	$624	$639	$658
FMWD Tier 1 Variable Rate	$1,105	$1,145	$1,174	$1,203	$1,249	$1,286
FMWD Tier 2 Variable Rate	$1,180	$1,196	$1,227	$1,290	$1,354	$1,395
FMWD Fixed Charges	$460	$461	$455	$455	$443	$456
FMWD Power Costs	$179	$189	$199	$209	$219	$226

Similarly, using projected availability from the several sources of supply and factoring in system water loss, Table 3-5 shows the anticipated water supply mix through the Study period. The District has an adjudicated yield of 3,200 AF from the Verdugo Groundwater Basin. The District does not anticipate purchasing Tier 2 water from FMWD in any year.

Table 3-5: Water Supply Mix Assumptions (AF)

Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Groundwater (Verdugo Basin)	1,920	2,060	2,130	2,160	2,160	2,160
Groundwater (GWP)	240	308	308	308	308	308
FMWD Tier 1	1,654	1,522	1,531	1,580	1,662	1,745
FMWD Tier 2	0	0	0	0	0	0
Total	**3,814**	**3,890**	**3,969**	**4,048**	**4,130**	**4,213**

3.2. Wastewater Utility

3.2.1. INFLATION

The Study Period is from Fiscal Year End (FYE) 2022 to 2026 with proposed revenue adjustments and rates presented for the five years FYE 2022 through FYE 2026. Various types of assumptions and inputs are incorporated into the Study based on discussions with and/or direction from District staff. These include the projected number of accounts, annual growth rates in water consumption for different customer classes, and inflation factors, among other assumptions.

The cost escalation factors below show projected increases in various cost categories across the Study period. The factors are applied to all years beginning FYE 2022. Raftelis used the FYE 2021 budget, so no inflationary factors are applied to that year. Raftelis worked with District staff to escalate individual budget line items according to appropriate escalation factors. Inflationary factors are presented in Table 3-6.

A general inflation rate of 3 percent is based on the long-term change in the Consumer Price Index (CPI). Salaries track general inflation with benefits outpacing general inflation and therefore an escalation of 5 percent is used. Power costs reflect the price of electricity related to pumping costs. Capital cost escalation is estimated at 4 percent per year based on historical construction cost index (CCI) inflation.

Table 3-6: Wastewater Inflationary Assumptions

Escalation Factors	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
General	0.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Salary	0.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Benefits	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Power	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Capital	0.00%	0.00%	4.00%	4.00%	4.00%	4.00%
Treatment	0.00%	4.00%	4.00%	4.00%	2.00%	2.00%

3.2.2. PROJECTED WASTEWATER FLOWS AND ACCOUNT GROWTH

To estimate future wastewater flows two primary factors are used – account growth and water demand relative to prior year. It is estimated that the total number of wastewater accounts will grow by 1 percent in each year of the Study period and wastewater flows are expected to remain the same per account.

In order to predict rate revenues, the Study assumes that all other non-operating revenues will increase at 1 percent. Interest rates earned on reserves are based on conservative estimates in a low interest financial environment. These revenue growth assumptions are show below in Table 3-7.

Table 3-7: Account, Demand, and Miscellaneous Revenue Growth Assumptions for Wastewater

	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Account Growth	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Wastewater Flows	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Miscellaneous Revenues	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Reserve Interest	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%

4. Water Utility Financial Plan

This section describes the water utility's customer account and water use data and corresponding financial plan. To develop the financial plan, Raftelis projects annual expenses and revenues; capital expenditures; and models reserve balances and calculates debt service coverage ratios to estimate the amount of additional rate revenue needed in each fiscal year. This section of the Study provides a discussion of O&M expenses, the capital improvement plan, water reserve funding, projected revenue under existing rates and the revenue adjustments required to ensure the fiscal sustainability and solvency of the water utility.

4.1. Water Revenue Requirements

A review of a utility's revenue requirements is a key first step in the rate study process. The review involves an analysis of annual operating revenues under current rates, operation and maintenance (O&M) expenses, transfers between funds, capital expenditures, and reserve requirements.

4.1.1. REVENUES FROM CURRENT WATER RATES

The current rates were last adjusted in September 2019. The District's water service charges have two components – a fixed charge component (bi-monthly service charge) and a variable volumetric charge component (commodity charge). The bi-monthly service charge increases with the size of the water meter serving a property, as larger meter sizes generally consume more water on average and impose greater demands on the system; therefore, the costs to provide service to these customers are higher. A typical single-family home with a 3/4" meter currently has a bi-monthly service Charge of $54.10. The rates for the current service charges are shown in Table 4-1. Customers designated as "outside district" are charged an additional $0.40 administrative charge per bi-monthly billing period.

Table 4-1: Current Water Bi-Monthly Service Charges

Meter Size (Inches)	Current Rates
3/4"	$54.10
1"	$80.69
1 1/2"	$147.19
2"	$227.01
3"	$479.72
4"	$852.17

In addition to the bi-monthly service charge, the District also imposes a fixed bi-monthly fire protection charge on properties that are required as a condition of extending or initiating water service to install a private fire suppression system, or where the customer or property owner has installed a private fire service for the purpose of fire service protection. The rates for the bi-monthly fire protection charge are established on the basis of the size of the fire service serving a property and are calculated to recover the costs associated with fire service capacity in the water distribution system. The current bi-monthly fire protection charges for private fire services are shown in Table 4-2.

Table 4-2: Current Bi-Monthly Private Fire Protection Charges

Private Fire Connection Size (Inches)	Current Rates
1"	$15.85
2"	$24.46
3"	$44.05
4"	$77.83
6"	$199.05
8"	$408.15
10"	$722.67

The volumetric component of a customer's water bill is calculated on the basis of the number of units of water delivered to a property, measured in units of one thousand gallons (kgal), multiplied by the rates that vary by customer class and tier. The current tier widths and rates are shown in Table 4-3. The rates in Table 4-3, multiplied by the amount of use in each respective tier and/or class, determine the water use component of a customer's bill.

Table 4-3: Current Bi-Monthly Commodity Rates by Tier

Customer Class	Current Rates
SFR Bi-Monthly Tier	
Tier 1 0-10	$5.17
Tier 2 11-26	$8.14
Tier 3 27+	$12.29
Multi-Family/Commercial	$7.33
Irrigation	
Tier 1 0-80	$5.66
Tier 2 81+	$10.89

Table 4-4 shows the projected number of water accounts by meter size, by fiscal year. The number of accounts is escalated each year based on the growth assumptions identified in Table 3-2. Similarly, Table 4-5 shows estimated private fire service accounts using the same assumptions as water accounts. Both tables include inside district and outside district accounts.

Table 4-4: Projected Water Accounts by Meter Size

Meter Size	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
3/4"	6,974	7,044	7,114	7,185	7,257	7,330
1"	877	885	894	903	912	921
1 1/2"	150	152	154	155	157	158
2"	66	66	67	68	68	69
3"	28	29	29	29	29	30
4"	2	2	2	2	2	2
Total	**8,097**	**8,178**	**8,260**	**8,343**	**8,426**	**8,510**

Table 4-5: Projected Private Fire Line Accounts by Connections Size

Private Fireline Size	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
1"	1	1	1	1	1	1
2"	8	8	8	8	8	8
3"	2	2	2	2	2	2
4"	70	70	71	72	73	73
6"	18	18	19	19	19	19
8"	6	6	6	6	6	6
10"	2	2	2	2	2	2
Total	**107**	**108**	**109**	**110**	**111**	**113**

Water demand projections through FYE 2026 are shown in Table 4-6. Projected water sales for FYE 2022 through FYE 2026 were calculated by multiplying the FYE 2021 water sales by the usage growth assumptions identified in Table 3-2. Water demand is anticipated to increase through FYE 2026 to approximately 3,943 AF annually.

Table 4-6: Projected Water Usage by Class and Tiers (kgal)

Customer Class	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
SFR						
Tier 1	373,035	380,533	388,182	395,985	403,944	412,063
Tier 2	278,515	284,113	289,823	295,649	301,591	307,653
Tier 3	122,547	125,011	127,523	130,086	132,701	135,369
Multi-Family/Commercial	340,851	347,702	354,691	361,820	369,093	376,511
Irrigation						
Tier 1	16,336	16,664	16,999	17,341	17,689	18,045
Tier 2	31,888	32,529	33,182	33,849	34,530	35,224
Total Water Sales (kgal)	**1,163,172**	**1,186,551**	**1,210,401**	**1,234,730**	**1,259,548**	**1,284,865**
Total Water Sales (AF)	**3,570**	**3,641**	**3,715**	**3,789**	**3,865**	**3,943**

Table 4-7shows the rate revenue generated in each Study year with projected demand and the current rates. Note, revenues for FYE 2021 and beyond use FYE 2021 rates from Table 4-1, Table 4-2, and Table 4-3 to project future rate revenues.

The overall adequacy of water revenues is measured by comparing the projected annual revenue requirement to be met from rates with projected revenues under the existing rates. This is completed in the cost-of-service analysis in Section 5.

Table 4-7: Projected Water Rate Revenue with Current Rates

Revenue Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Service Charges	$3,087,461	$3,118,336	$3,149,519	$3,181,014	$3,212,824	$3,244,952
Commodity Charges	$8,640,367	$8,814,038	$8,991,200	$9,171,923	$9,356,279	$9,544,340
Total Rate Revenue	**$11,727,828**	**$11,932,374**	**$12,140,719**	**$12,352,938**	**$12,569,103**	**$12,789,293**

The District also derives revenues from other non-rate sources. These revenues consist of other operating, miscellaneous, and non-operating revenues and are summarized in Table 4-8.

Table 4-8: Projected Water Non-Rate Revenues

Revenue Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Other Operating Revenues	$160,000	$163,400	$166,888	$170,467	$174,138	$177,905
Non-Operating Revenues	$25,000	$25,750	$26,523	$27,318	$28,138	$28,982
CIP Source Revenues	$277,500	$303,025	$303,555	$154,091	$154,632	$155,178
Interest Income	$213,000	$144,387	$144,901	$133,839	$125,374	$117,929
Total Non-Rate Revenue	**$675,500**	**$636,562**	**$641,867**	**$485,714**	**$482,282**	**$479,995**

4.1.2. OPERATING AND MAINTENANCE (O&M) EXPENSES

Total projected O&M expenses are shown in Table 4-9. These expenses are summarized by department. Operating expenses use the District's FYE 2021 budget values and project future expenses using the inflationary assumptions from Table 3-1.

Table 4-9: Projected Water O&M Expenses

O&M Expenses	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Water Production	$3,361,620	$3,305,569	$3,406,640	$3,590,446	$3,818,865	$4,099,381
Purchased Power	$322,291	$336,988	$352,356	$370,221	$388,993	$408,716
Compensation	$1,893,113	$1,949,906	$2,008,404	$2,068,656	$2,130,715	$2,194,637
Benefits	$1,242,742	$1,304,879	$1,370,123	$1,438,629	$1,510,561	$1,586,089
Plant - Water Operation	$533,010	$540,767	$548,680	$556,752	$564,986	$573,386
Distribution System	$851,178	$882,519	$915,035	$948,999	$984,243	$1,020,815
General and Administrative	$889,548	$916,114	$943,475	$971,779	$1,000,932	$1,030,960
Fire and Debris Recovery	$12,000	$12,360	$12,731	$13,113	$13,506	$13,911
Total O&M Expenditures	**$9,105,502**	**$9,249,103**	**$9,557,443**	**$9,958,595**	**$10,412,801**	**$10,927,894**

4.1.3. PROJECTED CAPITAL IMPROVEMENT PLAN

The District has planned $30.9M in capital expenditures over the Study period for the Water utility, as shown in Table 4-10. The District anticipates funding a portion of the capital improvements in FYE 2021 and FYE 2022 with existing bond proceeds. The District plans on funding the remaining capital projects with rate revenues.

Table 4-10: Projected Water Capital Improvement Plan

Capital Projects	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Pipeline	$2,300,000	$2,600,000	$2,800,000	$0	$0	$0
Other CIP	$2,700,000	$2,608,750	$2,427,163	$5,939,726	$6,760,092	$7,755,608
Existing Bond Proceeds	($2,695,174)	($2,340,592)	$0	$0	$0	$0
Total Rate Funded Capital Projects	**$2,304,826**	**$2,868,158**	**$5,227,163**	**$5,939,726**	**$6,760,092**	**$7,755,608**

4.1.4. DEBT SERVICE

The water utility has two outstanding long-term debt obligations. The total debt service payment obligation for each year of the Study period is summarized in Table 4-11. The total debt service payment in FYE 2021 is $565,274.

Table 4-11: Existing Water Annual Debt Service

Existing Debt	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Pacific Western Infrastructure Loan	$275,274	$0	$0	$0	$0	$0
Certificates of Participation, Series 2020	$290,000	$558,238	$581,381	$579,781	$580,781	$581,381
Total Existing Debt	**$565,274**	**$558,238**	**$581,381**	**$579,781**	**$580,781**	**$581,381**

4.2. Existing Water Financial Plan – No Revenue Adjustments

Table 4-12 displays the proforma of the District's water utility under current rates over the Study period. The proforma incorporates revenues and expenses to show the overall position of the utility. All projections shown in the table are based upon the District's current rate structure and does not include any rate adjustments. The proforma incorporates the water enterprise data shown in the preceding tables of this section.

Under the "status-quo" scenario, revenues generated from rates and other miscellaneous revenues are inadequate to achieve reserve targets and fund capital, over the Study period.

Table 4-12: Existing Water Financial Plan with Current Rates

Existing Financial Plan	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Revenues						
Revenues from Existing Rates	$11,727,828	$11,932,374	$12,140,719	$12,352,938	$12,569,103	$12,789,293
Total Revenue Adjustments	$0	$0	$0	$0	$0	$0
Non-Rate Revenues	$675,500	$628,508	$602,850	$386,999	$356,908	$362,065
Total Revenue	**$12,403,328**	**$12,560,882**	**$12,743,569**	**$12,739,937**	**$12,926,011**	**$13,151,358**
Expenses						
Operating Expenses	$9,105,502	$9,249,103	$9,557,443	$9,958,595	$10,412,801	$10,927,894
Rate Funded CIP	$2,304,826	$2,868,158	$5,227,163	$5,939,726	$6,760,092	$7,755,608
Debt Service	$565,274	$558,238	$581,381	$579,781	$580,781	$581,381
Total Expenses	**$11,975,602**	**$12,675,499**	**$15,365,986**	**$16,478,101**	**$17,753,674**	**$19,264,883**
Net Cash Flow	$427,725	($114,617)	($2,622,417)	($3,738,165)	($4,827,663)	($6,113,525)
Beginning Balance	**$5,757,000**	**$6,184,725**	**$6,070,109**	**$3,447,691**	**($290,474)**	**($5,118,136)**
Ending Balance	**$6,184,725**	**$6,070,109**	**$3,447,691**	**($290,474)**	**($5,118,136)**	**($11,231,662)**
Target Balance	*$5,410,895*	*$5,530,852*	*$5,640,794*	*$5,751,827*	*$5,864,223*	*$5,978,105*
Calculated Debt Coverage	**583%**	**593%**	**548%**	**480%**	**433%**	**382%**
Required Debt Coverage	125%	125%	125%	125%	125%	125%

4.3. Proposed Water Financial Plan

Based on discussions with the District regarding its expected revenue requirements over the Study period, Raftelis proposes that the District adopt the revenue adjustment schedule found in Table 4-13. The FYE 2022 revenue adjustment is proposed to be implemented October 1, 2021, with all subsequent adjustments occurring on July 1 of each fiscal year.

Although Table 4-13 shows anticipated revenue adjustments for FYEs 2022 through 2026, the District will review and confirm the required revenue adjustments on an annual basis. The rates presented in Section 6 are based on the proposed Financial Plan below.

Revenue adjustments represent the average increase in rates for the District's water utility as a whole. Actual percentage increases (or decreases) in rates are dependent upon the cost-of-service analysis in Section 5 and are unique to each customer class and meter size receiving water service. The proposed revenue adjustments help ensure adequate revenue to fund operating expenses, fund the long-term capital program, and comply with existing debt covenants. The reserves under the proposed revenue adjustments fall just below reserve targets in the later years of the five-year plan.

Table 4-13: Proposed Water Revenue Adjustments

	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Effective Month	October	July	July	July	July
Revenue Adjustment	8%	8%	8%	7%	7%

Table 4-14 shows the proforma for the District's water utility with additional revenues from the revenue adjustments in the proposed financial plan. These revenue adjustments allow the enterprise to fund all operating expenses, and capital expenditures during the Study period.

Total rate revenue (revenue from existing rates plus revenue from adjustments) becomes the revenue requirement for the cost-of-service analysis in Section 5.

Table 4-14: Proposed Water Financial Plan

Proposed Financial Plan	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Revenues						
Revenues from Existing Rates	$11,727,828	$11,932,374	$12,140,719	$12,352,938	$12,569,103	$12,789,293
Total Revenue Adjustments	$0	$715,942	$2,020,216	$3,208,206	$4,372,688	$5,655,991
Non-Rate Revenues	$675,500	$636,562	$641,867	$485,714	$482,282	$479,995
Total Revenue	**$12,403,328**	**$13,284,879**	**$14,802,802**	**$16,046,858**	**$17,424,074**	**$18,925,279**
Expenses						
Operating Expenses	$9,105,502	$9,249,103	$9,557,443	$9,958,595	$10,412,801	$10,927,894
Rate Funded CIP	$2,304,826	$2,868,158	$5,227,163	$5,939,726	$6,760,092	$7,755,608
Debt Service	$565,274	$558,238	$581,381	$579,781	$580,781	$581,381
Total Expenses	**$11,975,602**	**$12,675,499**	**$15,365,986**	**$16,478,101**	**$17,753,674**	**$19,264,883**
Net Cash Flow	$427,725	$609,380	($563,184)	($431,244)	($329,600)	($339,604)
Beginning Balance	**$5,757,000**	**$6,184,725**	**$6,794,105**	**$6,230,921**	**$5,799,677**	**$5,470,077**
Ending Balance	**$6,184,725**	**$6,794,105**	**$6,230,921**	**$5,799,677**	**$5,470,077**	**$5,130,473**
Target Balance	*$5,410,895*	*$5,530,852*	*$5,640,794*	*$5,751,827*	*$5,864,223*	*$5,978,105*
Calculated Debt Coverage	**583%**	**723%**	**902%**	**1050%**	**1207%**	**1376%**
Required Debt Coverage	125%	125%	125%	125%	125%	125%

Figure 4-1through Figure 4-4 display the FYE 2021 through FYE 2026 proposed financial plan in a graphic format. Figure 4-1shows the proposed revenue adjustments- in percentage terms- as blue bars, as well as the calculated and minimum debt coverage requirements shown as green and red lines, respectively. Under the proposed revenue adjustments the District meets its debt coverage requirement easily.

Figure 4-1: Proposed Water Revenue Adjustments

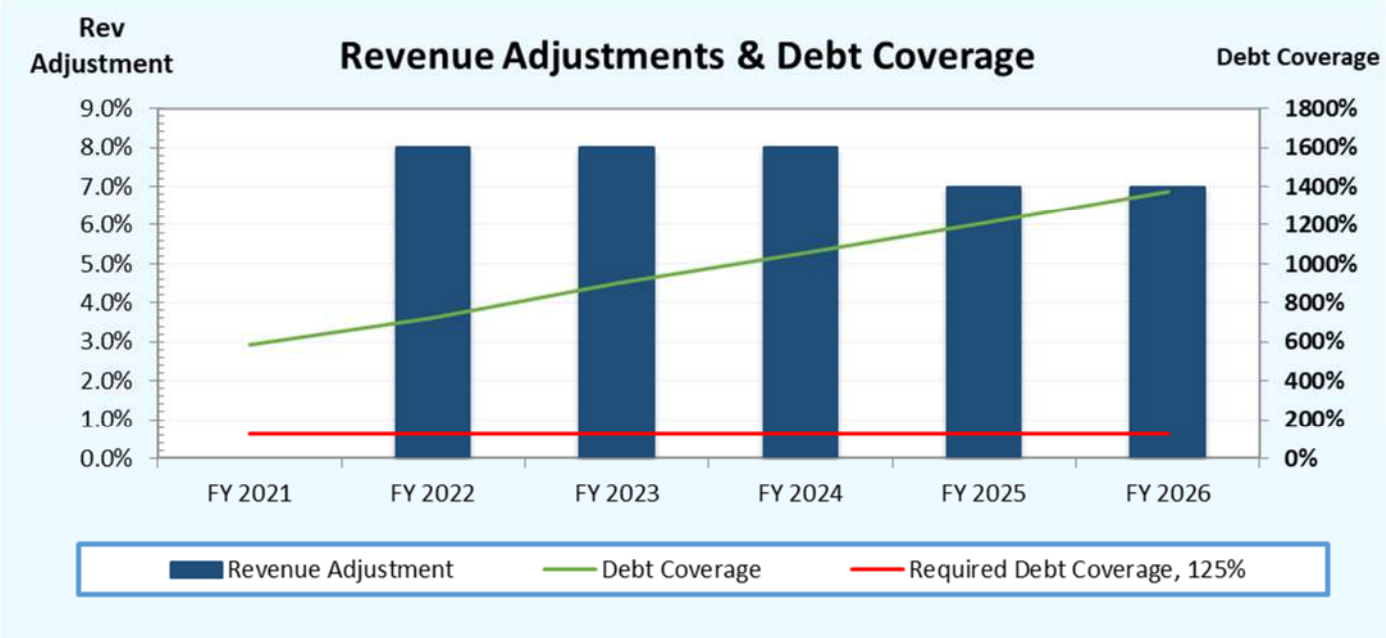


Figure 4-2 illustrates the Operating Financial Plan in a graphic format. It compares existing and proposed revenues with projected expenses. The expenses represent O&M, water supply costs, debt service, and reserve funding. Total revenues at existing and proposed rates are shown by the horizontal black and blue lines, respectively. Revenue from existing rates, in black, does not meet future total expenses (inclusive of reserve funding) and shows the need for revenue adjustments.

Figure 4-2: Proposed Water Operating Financial Plan

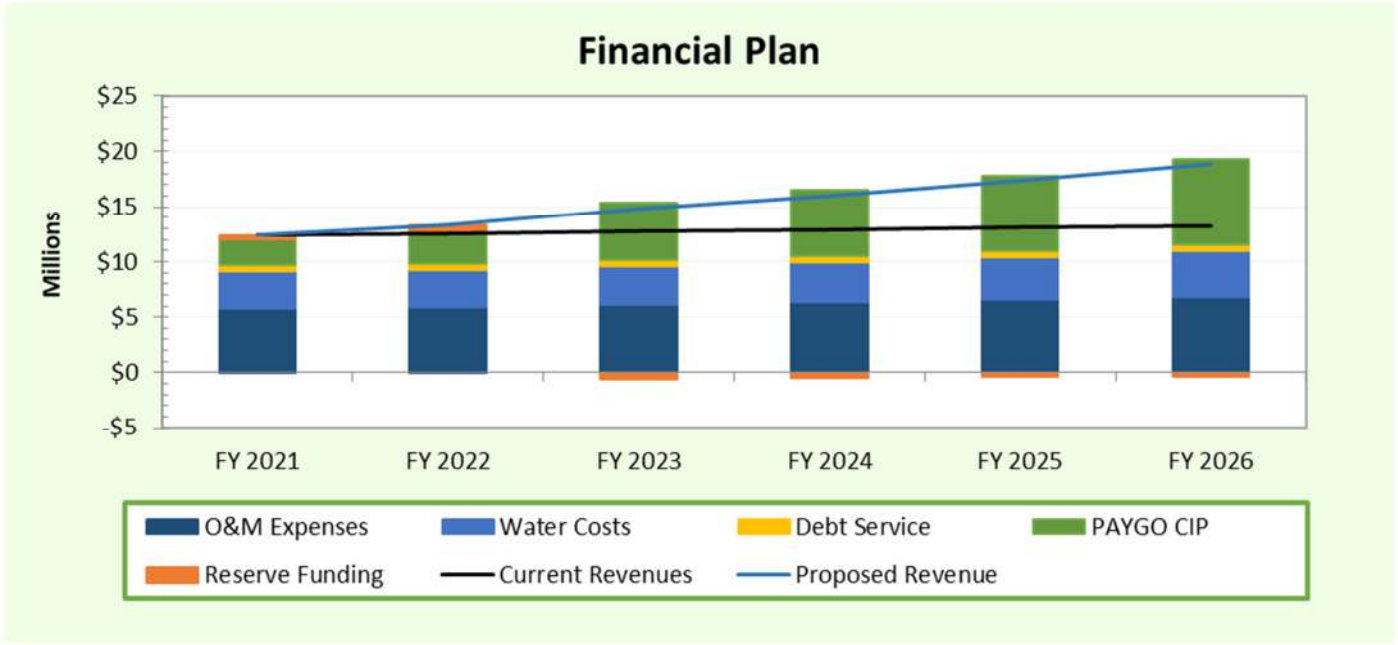


Figure 4-3 shows the water utility's ending balance by fiscal year. The orange bars indicate the ending balance, while the green line indicates the total target balance. The reserves fall just below the target in the last two years of the plan.

Figure 4-3: Proposed Water Ending Fund Balances

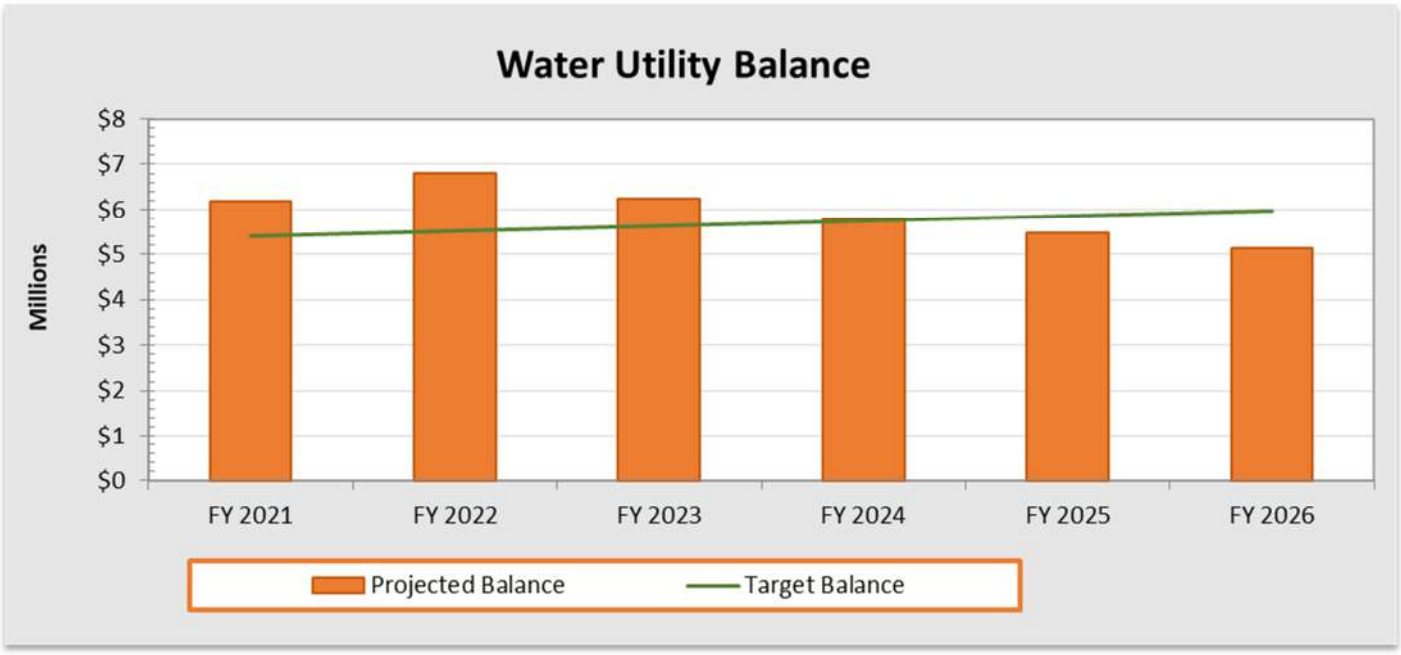
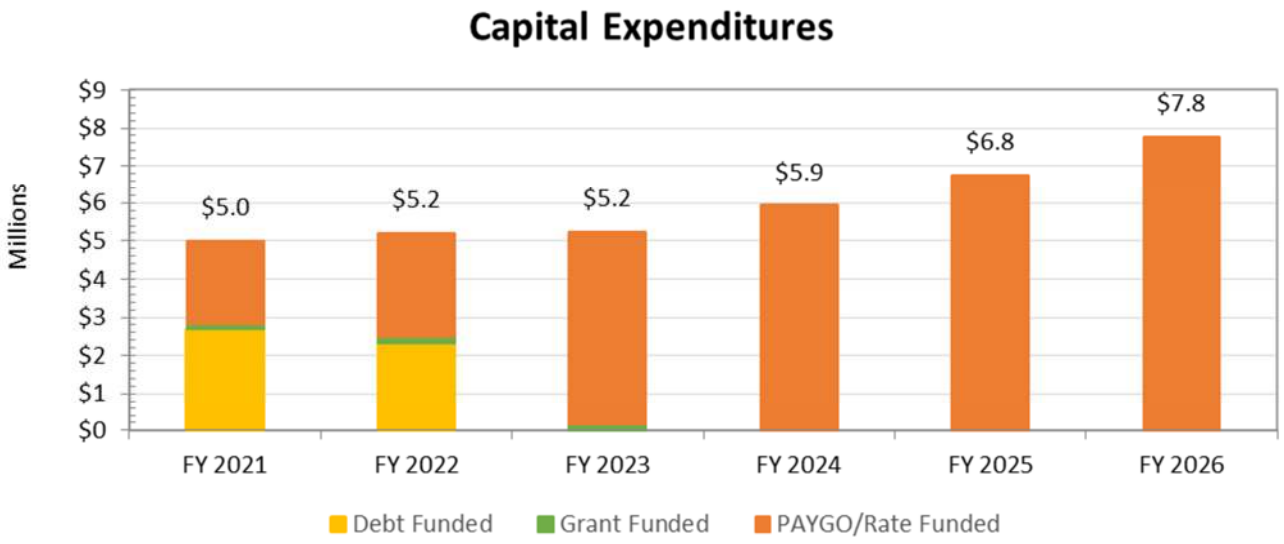


Figure 4-4 shows the total CIP of the water utility and the corresponding funding source. Rate funded capital is shown in orange, grant funded in green, and debt funded in yellow.

Figure 4-4: Proposed Water CIP Funding



5. Water Cost of Service Analysis

5.1. Methodology

The principles and methodology of a cost-of-service analysis were described in Section 0. A cost-of-service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirements, the next step in a cost-of-service analysis is to functionalize its O&M costs. The **functions** include:

1. Supply (FMWD)
2. Pumping (GWP)
3. Pumping (Verdugo)
4. Reservoir
5. Transmission
6. Treatment
7. Distribution
8. Meters
9. Hydrants
10. Customer
11. Conservation
12. General

The functionalization of costs allows us to better allocate to the **cost causation components** (plainly, cost components). Organizing the costs in terms of end function allows direct correlation between the cost component and the rate, coupling the cost incurred by the utility to the demand and burden that the customer places on the utility's system and/or water resources. The principal service requirements that drive costs include the annual volume of water consumed, the peak water demands incurred, and the number of customers or meter equivalents in the system. Accordingly, these service requirements are the basis for the selection of the categories utilized in the functional allocation process.

This method of functionalizing costs is consistent with the AWWA M1 Manual and is widely used in the water industry to perform cost of service analyses.

Table 5-1 shows the functionalization of the District's water O&M expenses for the rate setting year (FYE 2021 found in Table 4-9). Functionalizing O&M expenses allows Raftelis to follow the principles of rate setting theory in which the end goal is to allocate the District's O&M expenses to cost causation components.

Table 5-1: Functionalization of Water O&M Expenses

Cost Category	O&M Expenses by Function ($)	O&M Expenses by Function (%)
Supply (FMWD)	$2,867,460	31%
Pumping (GWP)	$138,960	2%
Pumping (Verdugo)	$355,200	4%
Reservoir	$0	0%
Transmission	$0	0%
Treatment	$545,010	6%
Distribution	$2,269,661	25%
Meters	$0	0%
Hydrants	$0	0%
Customer	$587,683	6%
Conservation	$50,500	1%
General	$2,291,028	25%
Total	**$9,105,502**	**100%**

5.2. Allocation of Functionalized Expenses to Cost Components

After functionalizing expenses, the next step is to allocate the functionalized expenses to cost components. The cost components include:

1. **Supply** are costs related to the purchase and production of water supplies including raw water and treated water to meet annual demands.
1. **Base Delivery** (average) are delivery costs that vary with the average quantity of water demanded within the water system under average conditions. Costs may include operation and maintenance expenses for; treatment, pumping, transmission and distribution facilities, and Capital costs related to plant investment, that are associated with serving customers at a constant, or average, annual rate of use. Base delivery costs are therefore spread over all units of water equally.
2. **Peaking** (maximum day and maximum hour) are costs divided into maximum day demand and maximum hour demand.
    - The maximum day demand is the maximum amount of water used in a single day in a year.
    - The maximum hour demand is the maximum usage in an hour on the maximum usage day.

    Different facilities, such as distribution and storage facilities, and the O&M costs associated with those facilities, are designed to meet the peak demands placed on the system by customers. Therefore, peaking[9] costs include the O&M and capital costs associated with meeting peak customer demand exceeding the average annual rate of use.
3. **Meter** (meter service) costs include maintenance and capital costs related to meters and associated services.
4. **Customer** (billing and customer service) are costs directly associated with serving customers, irrespective of the amount of water used, and generally include meter reading, bill generation, accounting, customer service, and collection expenses.

[9] Peaking costs are also referred to as extra capacity or capacity costs.

5. **Fire Protection** are costs of providing both public and private fire protection service. They capital-related and maintenance costs for fire hydrants and private fire connections, as well as costs for, storage, transmission, and distribution of water as these facilities and infrastructure must be upsized to meet fire protection demands placed on the water system.
6. **Conservation** costs include all costs of funding, administering, and executing water conservation and efficiency related programs and services.
7. **General** (general and administrative) are costs incurred in operating and maintaining the water system not otherwise recovered in the other functionalized cost components. These costs are allocated to the other cost components in proportion to the relative percentages of the other cost components.

In order to allocate functionalized expenses to these cost components, system wide peaking factors must be identified (shown in column (B) of Table 5-2). Peaking factors represent the ratio of water moving through the system during the maximum day and maximum hour, relative to the average day.

The system-wide peaking factors are used to derive the cost causation component allocation bases (i.e., percentages) shown in columns (C) through (E) of Table 5-2. The max day factor of 1.5 was provided by the District and is based on 5-yer average of the ratio of maximum day demand to average day demand. The max hour factor incorporates the max day factor and a system multiplier of 2.25 (2.25 times max day demand of 1.5) to approximate max hour demand (3.38 times average day). To derive the percentages shown in columns (C) through (E) we must first establish the base use equal to the average daily demand during the year, which is assigned a factor of 1.00. The percentages are then calculated as follows:

- Using the maximum day basis, costs are allocated 67 percent (1.00/1.50) to base delivery (average daily demand) use and the remaining 33 percent (0.50/1.50) to maximum day (peaking) use.
- Using the maximum hour basis, costs are allocated 30 percent (1.00/3.38) to base delivery, 15 percent ((1.5-1)/3.38) to maximum day, and the remaining 56% (3.38-1)/3.38) of costs to maximum hour.

These allocation bases are used to assign the functionalized costs to the cost causation components.

Table 5-2: System-Wide Peaking Factors

Allocation Factor	System Wide Factor	Base Delivery	Max Day	Max Hour	Total
(A)	(B)	(C)	(D)	(E)	(F)
Base Delivery	1.00	100%	0%	0%	100%
Max Day	1.50	67%	33%	0%	100%
Max Hour	3.38	30%	15%	56%	100%

Table 5-3 shows the allocation for the District's O&M costs. The top row of Table 5-3 shows the cost causation components and the left most column shows the cost functions. Table 5-3 allocates O&M costs for FYE 2021 as shown in Table 4-9.

For example, treatment related costs are allocated using maximum day allocation in Table 5-2 (67 percent to base delivery, 33 percent to max day, 0 percent to max hour) because treatment facilities are constructed to meet maximum day demand. This means that 67 percent of costs are due to meeting base delivery customer demands, 33 percent of costs are due to meeting max day demands.

The remaining functions shown in Table 5-1 are similarly allocated based on the parameters used to design each function (facility). Additionally, reservoirs and distribution systems are designed to provide fire flow. Based on ISO standards, 15% of the associated system costs are assigned to fire flow.

Capital costs are allocated on the basis of the assets of the system in recognition of the fact that the assets need to be replaced over time and capital expenses over a period of time will match the overall asset base. Table 5-4 shows the allocation for capital costs. This distribution of costs allows the allocations to the cost causation components, and ultimately the rates, to remain relatively stable. Water system assets were provided by the District and are allocated in Table 5-4 .

Table 5-3: Allocation of Functionalized O&M Expenses to Cost Causation Components

Function	O&M Expenses by Function ($)	Supply	Base Delivery	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	General	Total
Supply (FMWD)	$2,867,460	100%									100%
Pumping (GWP)	$138,960	100%									100%
Pumping (Verdugo)	$355,200	100%									100%
Reservoir	$0		57%	28%		15%					100%
Transmission	$0		67%	33%		0%					100%
Treatment	$545,010		67%	33%		0%					100%
Distribution	$2,269,661		25%	13%	47%	15%					100%
Meters	$0						100%				100%
Hydrants	$0					100%					100%
Customer	$587,683							100%			100%
Conservation	$50,500								100%		100%
General	$2,291,028									100%	100%
Total O&M	**$9,105,502**	**$3,361,620**	**$934,958**	**$467,479**	**$1,071,784**	**$340,449**	**$0**	**$587,683**	**$50,500**	**$2,291,028**	**$9,105,502**
% O&M		*37%*	*10%*	*5%*	*12%*	*4%*	*0%*	*6%*	*1%*	*25%*	*100%*
% O&M		*37%*	*10%*	*5%*	*12%*	*4%*	*0%*	*6%*	*1%*	*25%*	*100%*

Table 5-4: Allocation of Functionalized Capital Expenses to Cost Causation Components

Function	Assets by Function ($)	Supply	Base Delivery	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	General	Total
Treatment	$743,846		67%	33%							100%
Reservoir	$5,901,420		57%	28%		15%					100%
Distribution	$18,482,371		25%	13%	47%	15%					100%
Transmission	$0		67%	33%							100%
Meters	$0						100%				100%
General	$5,475,486									100%	100%
Wells	$6,212,807	100%									100%
Fire	$0					100%					100%
Total Assets	**$36,815,929**	**$6,212,807**	**$8,494,855**	**$4,247,427**	**$8,727,786**	**$3,657,569**	**$0**	**$0**	**$0**	**$5,475,486**	**$36,815,929**
% Assets		*17%*	*23%*	*12%*	*24%*	*10%*	*0%*	*0%*	*0%*	*15%*	*100%*

5.3. Revenue Requirement

Table 5-2 shows the revenue requirement derivation with the total revenue required from rates shown in the last line ($). The total (COS to be Recovered from Water Rates) represents the total O&M and capital revenue requirements that are allocated to the cost components.

Raftelis calculated the revenue requirement using Fiscal Year 2021 expenses, rate funded capital and O&M expenses including costs directly related to the supply, treatment, and distribution of water, as well as routine maintenance of system facilities.

To arrive at the rate revenue requirement, the non-rate revenues, adjustments for annual cash balances (which fund capital and reserves) and any mid-year rate increases (to ensure annual revenue requirement) are subtracted. The result is the total revenue required from rates. This total is the amount that the bi-monthly service charge and commodity rates are designed to collect.

Table 5-5: Revenue Required from Water Rates (FYE 2021)

Revenue Requirements	Operating	Capital	Total
Water Supply	$3,361,620		$3,361,620
Compensation	$1,893,113		$1,893,113
Benefits	$1,242,742		$1,242,742
Plant - Water Operation	$533,010		$533,010
Distribution System	$851,178		$851,178
General and Administrative	$889,548		$889,548
Fire and Debris Recovery	$12,000		$12,000
Purchased Power	$322,291		$322,291
Cash Funded CIP		$2,304,826	$2,304,826
Debt Service		$565,274	$565,274
Other Operating Revenues	-$135,000		-$135,000
Sub-total Revenue Requirements	**$8,970,502**	**$2,870,100**	**$11,840,602**
Revenue Offsets			
Rental Property Income	$25,000		$25,000
Non-Operating Revenues	$238,000		$238,000
CIP Source Revenues		$277,500	$277,500
Total Revenue Offsets	**$263,000**	**$277,500**	**$540,500**
Adjustments			
Transfer to (from) Reserves	$0	-$427,725	-$427,725
Annualized Rate Increase	$0	$0	$0
Total Adjustments	**$0**	**-$427,725**	**-$427,725**
COS to be Recovered from Water	**$8,707,502**	**$3,020,325**	**$11,727,828**

Table 5-6 shows the revenue requirement for FYE 2021 by cost causation component. The operating revenue requirement shown in the top row of column (L) is allocated to the cost components using the O&M allocation percentages shown in Table 5-3. Capital expense funding in column (L) is allocated in the same manner as in Table 5-4. General costs in column (K) are redistributed in proportion to the resulting allocation of the other cost components. Public fire protection costs in column (F) are reallocated to the meter service component[10].

[10] Since public fire protection costs are a function of system capacity, they are reallocated to the meter component.

Table 5-6: Revenue Requirement by Cost Component

Cost of Service	Supply	Base Delivery	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	Revenue Offsets	General	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Operating Expenses	$3,311,780	$921,096	$460,548	$1,055,894	$335,402	$0	$578,970	$49,751	$0	$2,257,061	$8,970,502
Capital Expenses	$509,690	$696,906	$348,453	$716,015	$300,062	$0	$0	$0	$0	$449,201	$3,020,325
Revenue Offsets	$0	$0	$0	$0	$0	$0	$0	$0	($263,000)	$0	($263,000)
Total Cost of Service	**$3,821,470**	**$1,618,002**	**$809,001**	**$1,771,909**	**$635,463**	**$0**	**$578,970**	**$49,751**	**($263,000)**	**$2,706,262**	**$11,727,828**
Allocation of General Cost	$1,113,881	$471,615	$235,807	$516,475	$185,225	$0	$168,758	$14,501	$0	($2,706,262)	$0
Allocation of Public Fire Protection					($752,411)	$752,411					$0
Allocated Cost of Service	**$4,935,350**	**$2,089,617**	**$1,044,808**	**$2,288,384**	**$68,276**	**$752,411**	**$747,728**	**$64,253**	**($263,000)**	**$0**	**$11,727,828**
	42%	18%	9%	20%	1%	6%	6%	1%	-2%	0%	100%

5.4. Unit Cost Component Derivation

The end goal is to proportionately distribute the cost components to each user class. To do so we must first calculate the cost component unit costs, which starts by determining the total water demanded by each class for each cost component. Projected usage (base units of service) for FYE 2021 is shown in Table 5-7.

Table 5-7: Projected Water Usage in FYE 2021

Customer Class	Annual Usage (kgal)
SFR	
Tier 1	373,083
Tier 2	278,482
Tier 3	122,533
MFR/Commercial	340,851
Irrigation	
Tier 1	16,336
Tier 2	31,888
Total	**1,163,172**

Second, the customer class peaking factors need to be established for the maximum day and maximum hour requirements for each class and are the basis for the peaking unit rate differentials discussed in Section 6.

Analyzing usage characteristics gives us a better understanding of the actual usage patterns in the District. In the absence of maximum day (max day) data for each customer class, the maximum month (max month) values are used. Since peaking costs are proportional to the peaking experienced by each class, the relative values are more important than the actual values. The max month data derived from the usage patterns are a good proxy for the max day factors.

Max month values are calculated within the FYE 2020 usage analysis. Max day factors are set equal to max month factors. Similarly, since max hour factors for each customer class are not available, we use the District's system wide max hour factor to approximate the max hour factors for each class. The max hour factors are determined by multiplying the max day factors in

Table 5-8 by the system multiplier max hour factor of 2.25, which is the max hour factor.

Table 5-8: Customer Class Peaking Factors

Customer Class	Base Delivery	Max Day	Max Hour	Max Month
SFR				
Tier 1	1.00	1.04	2.34	1.04
Tier 2	1.00	1.38	3.11	1.38
Tier 3	1.00	1.98	4.45	1.98
MFR/Commerc	1.00	1.18	2.66	1.18
Irrigation				
Tier 1	1.00	1.14	2.57	1.14
Tier 2	1.00	1.47	3.30	1.47

Table 5-9 shows the calculation of cost component units for average (daily) demand, max day demand, and max hour demand, as well as the total equivalent meters and annual number of bills issued (discussed in detail in Section 6.2).

Daily use is calculated as annual use divided by 365 days. For example, SFR Tier 1 customers are estimated to use 373,083 kgal annually, or 1,022 kgal daily. The max day demand is then calculated as the daily demand multiplied by the max day factor (1,022 X 1.04). However, we must subtract the anticipated daily usage (1,022) from the max day usage (1,064) to calculate the incremental max day units of service (42). Max hour units of service are calculated similarly, and the calculation is completed for all customer classes.

Table 5-9: Derivation of Cost Component Units (FYE 2021 Usage)

Customer Class	Annual Usage (kgal)	Daily Usage (kgal)	Max Day Factor	Max Day Demand	Max Day Requirements	Max Hour Factor	Max Hour Demand	Max Hour Requirements	Equivalent Meters	Equivalent Fire Lines	No. of Bills
SFR											
Tier 1	373,083	1,022	1.04	1,064	42	2.34	2,394	1,330			
Tier 2	278,482	763	1.38	1,056	293	3.11	2,376	1,320			
Tier 3	122,533	336	1.98	664	328	4.45	1,494	830			
MFR/Commercial	340,851	934	1.18	1,105	171	2.66	2,486	1,381			
Irrigation											
Tier 1	16,336	45	1.14	51	6	2.57	115	64			
Tier 2	31,888	87	1.47	128	41	3.30	289	160			
Meters									9,659	7,081	49,225
Total	**1,163,172**	**3,187**		**4,068**	**882**		**9,154**	**5,086**	**9,659**	**7,081**	**49,225**

5.5. Allocation of Expenses and Revenue recovery by Cost Components

The cost components shown in Table 5-10 are recovered from customers through fixed (bi-monthly service charge) and variable volumetric (commodity) charges. Table 5-10 shows the total revenue requirement to be collected through rates, calculated in Table 5-6, in the second column from the left. While Table 5-10 shows the allocation to rate components in percentage terms, Table 5-11 shows the allocation in dollars.

Supply and Base Delivery (combined and called base) costs are based on average demand and are included in the commodity rate along with a percentage of the peaking costs. A portion (45 percent each) of max day and max hour costs are reallocated to the meter component which allows the District to recover 26 percent of revenues from fixed sources, the remaining 55 percent is allocated to commodity rates. Commodity charge revenue represents 74 percent of the total revenue requirement. The District has proposed this revenue split to maintain affordability and revenue stability. Combining Table 5-6 and Table 5-11 results in the peaking cost allocations to commodity and meter in the adjusted cost of service as shown in Table 5-12.

Revenue offsets in column (J) are maintained as a cost component and utilized as a rate component in Section 6. The total adjusted cost of service is divided by the respective units of service from Table 5-9 to calculate the unit cost of the various cost components. For example, the unit cost for the base delivery component is determined by dividing the total base delivery cost in column (C) by total water use to derive a base delivery unit cost of $1.80 as shown in the bottom row of column (C). Max day and max hour costs are divided by the total max day and max hour use to determine a unit rate in kgal/day in columns (D) and (E). Annual customer costs are divided by the estimated number of annual bi-monthly bills in (column (H) and meter costs are divided by total meter equivalencies to determine a cost per equivalent meter in (column (G). The unit costs are used to distribute the cost components to the customer classes in the next section.

Table 5-10: Cost Recovery, Rate Components (Percentage)

Cost Components	Revenue Requirement	Commodity Rate Components (74%)						Service Charge Components (26%)		
		Supply	Base Delivery	Max Day	Max Hour	Conservation	Revenue Offsets	Fire Protection	Meters	Customer
Supply	$4,935,350	100%								
Base	$2,089,617		100%							
Max Day	$1,044,808			55%					45%	
Max Hour	$2,288,384				55%				45%	
Fire Protection	$68,276							100%		
Meters	$752,411								100%	
Customer	$747,728									100%
Conservation	$64,253					100%				
Revenue Offsets	($263,000)						100%			
Total	**$11,727,828**	**$4,935,350**	**$2,089,617**	**$574,645**	**$1,258,611**	**$64,253**	**($263,000)**	**$68,276**	**$2,252,348**	**$747,728**

Table 5-11: Cost Recovery, Rate Components (Values)

Cost Components	Revenue Requirement	Commodity Rate Components (74%)						Service Charge Components (26%)		
		Supply	Base Delivery	Max Day	Max Hour	Conservation	Revenue Offsets	Fire Protection	Meters	Customer
Supply	$4,935,350	$4,935,350								
Base	$2,089,617		$2,089,617							
Max Day	$1,044,808			$574,645					$470,164	
Max Hour	$2,288,384				$1,258,611				$1,029,773	
Fire Protection	$68,276							$68,276		
Meters	$752,411								$752,411	
Customer	$747,728									$747,728
Conservation	$64,253					$64,253	$0			
Revenue Offsets	($263,000)						($263,000)			
Total	**$11,727,828**	**$4,935,350**	**$2,089,617**	**$574,645**	**$1,258,611**	**$64,253**	**($263,000)**	**$68,276**	**$2,252,348**	**$747,728**

Table 5-12: Unit Cost Calculation

Cost of Service	Supply	Base Delivery	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	Revenue Offsets	General	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Allocated Cost of Service	$4,935,350	$2,089,617	$1,044,808	$2,288,384	$68,276	$752,411	$747,728	$64,253	($263,000)	$0	$11,727,828
Adjustment from COS Component			($470,164)	($1,029,773)		$1,499,937					$0
Adjusted Cost of Service	**$4,935,350**	**$2,089,617**	**$574,645**	**$1,258,611**	**$68,276**	**$2,252,348**	**$747,728**	**$64,253**	**($263,000)**	**$0**	**$11,727,828**
Unit of Measure	kgal	kgal	kgal/day	kgal/day	Equivalent Fire Lines	Equivalent Meters	Number of Bills	kgal	Revenue Offsets		
Unit of Service	1,163,172	1,163,172	882	5,086	7,081	9,659	49,225	1,163,172	1,163,172		
Unit Cost	$4.24	$1.80	$651.75	$247.49	$1.61	$38.86	$15.19	$0.06	($0.23)		

5.6. Distribution of Cost Components to Customer Classes

The final step in a cost-of-service analysis is to distribute the cost components to the user classes using the unit costs derived in Table 5-12. This is the ultimate goal of a cost-of-service analysis and yields the cost to serve each customer class. Table 5-13 shows the derivation of the cost of service for each class. The cost components shown in columns (B) through (G) are collected through the commodity (volumetric) rates ($/kgal). The cost components shown in columns (H) through (J) are collected through the District's bi-monthly service charge.

To derive the cost of service for each class, the unit costs from Table 5-12 are multiplied by the units shown in Table 5-9 for each class. For example, the base delivery cost for the MFR/Commercial class is calculated by multiplying the base delivery unit cost ($1.80) by the annual MFR/Commercial use (340,851 kgal) to arrive at a total of $612,332. Similar calculations for each of the remaining user classes and cost components yield the total cost of service for each user class shown in the column (K) of Table 5-13. Note that the total cost of service is equal to the revenue requirement in Table 5-6 as intended. The cost of service for each user class has now been calculated and rates can now be derived to collect those costs for each class.

Table 5-13: Derivation of Class Cost of Service

Customer Class	Supply	Base Delivery	Max Day	Max Hour	Conservation	Revenue Offsets	Fire Protection	Meters	Customer	Total
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
SFR										
Tier 1	$1,582,993	$670,236	$27,294	$329,163	$20,609	($84,356)				$2,545,939
Tier 2	$1,181,602	$500,288	$190,971	$326,675	$15,383	($62,966)				$2,151,952
Tier 3	$519,909	$220,128	$214,051	$205,454	$6,769	($27,705)				$1,138,606
MFR/Commercial	$1,446,234	$612,332	$111,464	$341,797	$18,828	($77,068)				$2,453,587
Irrigation										$0
Tier 1	$69,313	$29,347	$4,213	$15,845	$902	($3,694)				$115,926
Tier 2	$135,300	$57,286	$26,652	$39,677	$1,761	($7,210)				$253,466
Meters								$2,252,348	$747,728	$3,000,076
Private Fire Lines							$68,276			$68,276
Total	**$4,935,350**	**$2,089,617**	**$574,645**	**$1,258,611**	**$64,253**	**($263,000)**	**$68,276**	**$2,252,348**	**$747,728**	**$11,727,828**

6. Water Rate Design and Derivation

6.1. Existing Rate Structure and Rates

As explained in Section 4 of this Study, the rate structure for the District's water service charges currently has two components – a fixed bi-monthly service charge component and a variable volumetric commodity rate component. The bi-monthly service charge increases with the size of the water meter serving a property. As larger meter sizes impose a greater demand on the system, the costs to provide service to these customers is higher. A typical single-family home with a 3/4" meter currently has a bi-monthly service charge of $54.10. The current rates for the bi-monthly service charge are shown in Table 6-1.

Table 6-1: Current Bi-Monthly Service Charges

Meter Size (Inches)	Current Rates
3/4"	$54.10
1"	$80.69
1 1/2"	$147.19
2"	$227.01
3"	$479.72
4"	$852.17

The current commodity charges are calculated on the basis of the amount of water delivered in kgal. The current commodity rates are shown in Table 6-2.

Table 6-2: Current Commodity Rates ($/kgal)

Customer Class	Current Rates
SFR	
Tier 1	$5.17
Tier 2	$8.14
Tier 3	$12.29
Multi-Family/Commercial	$7.33
Irrigation	
Tier 1	$5.66
Tier 2	$10.89

In addition to the bi-monthly service charge, the District also imposes a fixed bi-monthly fire protection charge on properties that are required as a condition of extending or initiating water service to install a private fire suppression system, or where the customer or property owner has installed a private fire service for the purpose of fire service protection. The rates for the bi-monthly fire protection charge are established on the basis of the size of the fire service serving a property and are calculated to recover the costs associated with fire service capacity in the water distribution system. The current bi-monthly fire protection charges for private fire services are shown in Table 6-3.

Table 6-3: Current Bi-Monthly Private Fire Protection Charges

Private Fire Connection Size (Inches)	Current Rates
1"	$15.85
2"	$24.46
3"	$44.05
4"	$77.83
6"	$199.05
8"	$408.15
10"	$722.67

6.2. Proposed Bi-Monthly Service Charges

Utilities invest in, and continuously maintain facilities to provide capacity to meet all levels of water consumption, including peak demand and fire protection. These costs must be recovered regardless of the amount of water used during a given period. Thus, peaking costs, along with base delivery costs and fixed water system costs to meet average demand, are generally considered as fixed water system costs.

To balance between affordability and revenue stability, it is a common practice that a portion of the peaking costs are recovered in the monthly service charge, along with customer service-related costs and meter-related costs.

The District has chosen to recover 55 percent of peaking costs from the variable rate (commodity rate) along with 100 percent of the supply and base delivery costs.

There are two components that comprise the service charge: 1) Meter capacity costs, 2) Meter servicing costs and 3) Customer service costs. The service charge recognizes the fact that even when a customer does not use any water, the District incurs fixed costs in connection with operating and maintaining the system for each connection at all times.

6.2.1. METER SERVICES COMPONENT

The meter services component collects servicing-related costs as well as a portion of peaking costs. Larger meters are more expensive to maintain and replace and have the potential to demand more capacity, or, said differently, exert greater peaking flows compared to smaller meters.

The potential capacity demanded is proportional to the potential flow through each meter size as established by the American Water Works Association (AWWA) hydraulic capacity ratios. For example, the potential flow through a 4” meter is 21 times that of a 3/4" meter and, therefore, the meter capacity component of the service charge is 21 times that of the 3/4"meter.

Allocating a portion of capacity costs by meter size (with the remainder allocated to the peaking component of the commodity rates) is a common way to provide greater revenue stability, especially in light of decreasing water sales revenues during a drought, from permanent conservation and reduced demand, or water shortage.

In order to create parity across the various meter sizes, each meter size is assigned a factor relative to a 3/4” meter, which has a value of 1.00. This establishes the “base” meter size.

A given meter size's ratio of hydraulic capacity relative to the base (that of a 3/4" meter) determines the *meter equivalency*. Summation of all meter equivalencies for a given size yields the total equivalent meters.

For this study, Raftelis calculated the capacity ratios of each meter size using standard AWWA hydraulic capacity ratios which are estimated to closely match the meters installed in the District. Table 6-4 shows total water meter equivalencies used for this Study. The total equivalent meters calculation is completed by multiplying the count of meters of a specific size by their respective capacity ratio. The total number of equivalent meters within the District is calculated to be 9,659.

Table 6-4: Meter Equivalencies Calculation

Meter Size (Inches)	Meter Count	Capacity Ratio (3/4" Base)	Equivalent Meters
3/4"	6,974	1.00	6,974
1"	877	1.67	1,461
1 1/2"	150	3.33	502
2"	66	5.33	350
3"	28	11.67	330
4"	2	21.00	42
Total	**8,097**		**9,659**

Table 6-5 shows the calculation of the meter service component. The meter capacity component of the bi-monthly service charge is calculated by dividing the total meter costs (inclusive of meter servicing costs, fire protection costs, and a portion of peaking costs) from Table 5-13 by the total number of equivalent meters in Table 6-4, and dividing by six billing periods. The cost is calculated as $38.86 per equivalent meter.

Table 6-5: Bi-Monthly Meter Service Component Calculation

Meter Service Component	FYE 2021
Meter Service Costs	$2,252,348
Equivalent Meters	9,659
Bi-monthly Cost per Equivalent Meter	**$38.86**

6.2.2. BILLING AND CUSTOMER SERVICE COMPONENT

The customer component recovers costs associated with meter reading, customer billing and collection, responding to customer's water quality questions and service calls, and communication with customers through the website and mailers. These costs are uniform for all meter sizes as it costs the same to bill a small meter as it does a large meter.

Table 6-6 shows the customer service component calculation. To calculate the customer component, the total billing and customer costs from Table 5-13 are divided by the total annual bills (total number of accounts multiplied by six billing periods) prepared by the District to determine the bi-monthly customer service charge component of $15.19 (rounded to nearest whole penny).

Table 6-6: Bi-Monthly Customer Component Calculation

Customer Service Component	FYE 2021
Customer Costs	$747,728
Annual Bills	49,225
Bi-montly Customer Component	**$15.19**

Table 6-7 shows the calculation of the rates for the bi-monthly service charges for FYE 2021 based on the updated cost of service. The FYE 2021 rates are the sum of the meter services component and the customer component as calculated above.

The customer component is uniform for all meter sizes. The meter service component for each meter size is the cost per equivalent meter calculated in Table 6-5 multiplied by the respective meter capacity ratio in Table 6-4. The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 COS rates by the revenue adjustment shown in Table 4-13.

The comparison between the proposed FYE 2022 rates and existing rates are shown in Table 6-7. The 3/4" meter experiences an increase of $4.29 relative to the current charge, which includes the 8 percent revenue adjustment.

Table 6-7: Calculation of Bi-Monthly Service Charges ($/Meter Size)

Meter Size (Inches)	Meter Service Component	Customer Service Component	FYE 2021 COS	Proposed FYE 2022	Current Charge	Difference ($)	Difference (%)
3/4"	$38.86	$15.19	$54.06	**$58.39**	$54.10	$4.29	8%
1"	$64.77	$15.19	$79.97	**$86.37**	$80.69	$5.68	7%
1 1/2"	$129.54	$15.19	$144.74	**$156.32**	$147.19	$9.13	6%
2"	$207.27	$15.19	$222.47	**$240.27**	$227.01	$13.26	6%
3"	$453.40	$15.19	$468.60	**$506.09**	$479.72	$26.37	5%
4"	$816.13	$15.19	$831.32	**$897.83**	$852.17	$45.66	5%

Table 6-8 shows the proposed bi-monthly service charges for the five-year Study period. The service charges are increased "across the board" in subsequent years by multiplying the FYE 2021 COS charges by the revenue adjustments shown in Table 4-13. All rates are rounded up to the nearest penny to ensure adequate cost recovery.

Table 6-8: Proposed Bi-Monthly Service Charges ($/Meter Size)

Meter Size (Inches)	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
3/4"	$54.10	$58.39	$63.07	$68.12	$72.89	$78.00
1"	$80.69	$86.37	$93.28	$100.75	$107.81	$115.36
1 1/2"	$147.19	$156.32	$168.83	$182.34	$195.11	$208.77
2"	$227.01	$240.27	$259.50	$280.26	$299.88	$320.88
3"	$479.72	$506.09	$546.58	$590.31	$631.64	$675.86
4"	$852.17	$897.83	$969.66	$1,047.24	$1,120.55	$1,198.99

6.3. Proposed Private Fire Line Charges

Total fire protection costs are allocated to private and public fire protection in proportion to the potential demand of each. The total private fire costs are determined in Table 5-13. This becomes the numerator for the service cost component to determine the cost per equivalent fire connection.

Table 6-9 shows the calculation of equivalent fire connections. Similar to meter capacities used to calculate the water service charges, private fire uses the size of the fire service connection and a fire flow demand ratio[11] to determine total equivalent fire connection units. The total equivalent fire connections are 7,081 using the 1" connection as the base.

Table 6-9: Fire Service Equivalencies Calculation

Private Fire Connection Size (Inches)	Private Fire Service Count	Demand Ratio	Equivalent Fire Connections
1"	1	1.00	1
2"	8	6.19	50
3"	2	17.98	36
4"	70	38.32	2,670
6"	18	111.31	2,024
8"	6	237.21	1,437
10"	2	426.58	862
Total	**107**		**7,081**

Table 6-10 shows the calculation of the fire service component. Dividing the total private fire costs by total equivalent fire service connections gives the bi-monthly cost per equivalent fire connection of $1.61.

Table 6-10: Bi-Monthly Fire Service Component Calculation

Private Fire Service Component	FYE 2021
Private Fire Costs	$68,276
Equivalent Connections	7,081
Bi-monthly Cost per Equivalent Connection	**$1.61**

Table 6-11 shows the derivation of the bi-monthly private fire protection charges. The cost per equivalent line from Table 6-10 is multiplied by the respective fire service demand ratio from Table 6-9 to obtain the private fire service component. Since all fire service accounts receive a bi-monthly bill, each line receives the billing and customer service component, same as the bi-monthly service charge for metered water service.

The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 rates by the revenue adjustment shown in Table 4-13. The comparison between the proposed FYE 2022 rates and existing rates are shown in Table 6-11. The 1" connection increases by $2.30 relative to the current charge, which includes the 8 percent revenue adjustment.

[11] The industry standard uses the capacity of a conduit as diameter raised to the 2.63 power to determine the demand ratio.

Table 6-11: Calculation of Bi-Monthly Private Fire Protection Charges ($/Connection Size)

Private Fire Connection Size (Inches)	Private Fire Service Component	Customer Service Component	FYE 2021 COS	Proposed FYE 2022	Current Charge	Difference ($)	Difference (%)
1"	$1.61	$15.19	$16.80	**$18.15**	$15.85	$2.30	15%
2"	$9.95	$15.19	$25.14	**$27.16**	$24.46	$2.70	11%
3"	$28.90	$15.19	$44.09	**$47.62**	$44.05	$3.57	8%
4"	$61.58	$15.19	$76.78	**$82.93**	$77.83	$5.10	7%
6"	$178.89	$15.19	$194.08	**$209.61**	$199.05	$10.56	5%
8"	$381.22	$15.19	$396.41	**$428.13**	$408.15	$19.98	5%
10"	$685.56	$15.19	$700.76	**$756.83**	$722.67	$34.16	5%

Table 6-12 shows proposed private fire protection charges for the Study period. The charges are increased "across the board" in subsequent years by multiplying the FYE 2021 COS charges by the revenue adjustments shown in Table 4-13. All rates are rounded up to the nearest penny.

Table 6-12: Proposed Rates for the Monthly Private Fire Protection Charges ($/Connection Size)

Private Fire Connection Size (Inches)	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
1"	$15.85	$18.15	$19.61	$21.18	$22.67	$24.26
2"	$24.46	$27.16	$29.34	$31.69	$33.91	$36.29
3"	$44.05	$47.62	$51.43	$55.55	$59.44	$63.61
4"	$77.83	$82.93	$89.57	$96.74	$103.52	$110.77
6"	$199.05	$209.61	$226.38	$244.50	$261.62	$279.94
8"	$408.15	$428.13	$462.39	$499.39	$534.35	$571.76
10"	$722.67	$756.83	$817.38	$882.78	$944.58	$1,010.71

6.4. Proposed Commodity Rates

In the previous rate study completed by Raftelis in July 2016, we set up a three-tier rate structure for single family residences. The first tier of 10 kgal per bi-monthly billing period was based upon indoor use at the State standard of 55 gpd. The second tier of 26 kgal was based on average summer use and usage in excess of 26 kgal per billing period was defined as the third tier. Usage characteristics have remained fairly consistent and we do not recommend any changes to the single family rate structure. This also helps minimize impacts to customers. Approximately one third of the customers use only Tier 1 water and total use in Tier 1 represents about 50 percent of the single family use. About 20 percent of the single family customers fall into the third tier and represents 15 percent of the single family use. These tiers fall within the parameters of good rate design. Irrigation usage is more discretionary and a tiered structure sends a signal for conservation. Irrigation use represents just over four percent of the total water use in the District and therefore we do not recommend any changes to the current irrigation tiers.

Raftelis is proposing to retain the current three tiered rate structure for SFR, two tiered structure for Irrigation customers and uniform commodity rates for the MFR/Commercial class. SFR customers are more homogenous in their usage and have higher peaking factors because of their irrigation demands which are not considered to be essential and are therefore considered for tiered rates. MFR/Commercial customers tend to be much less

homogenous and their individual water needs vary significantly depending on their size. Such customers do not place peak demand on the system to the same extent as single-family residential customers. Generally speaking, Commercial customers have incentive to reduce costs as businesses and therefore not waste water. Because their individual needs can vary significantly from user to user, they are not ideally suited for tiered rates.

6.4.1. *UNIT COST COMPONENT DEFINITIONS*

The Commodity rates for each class and tier are derived by summation of the unit rates ($/kgal) for:

1. Supply
2. Base (Delivery)
3. Peaking
4. Conservation
5. Revenue Offsets

Supply: Costs related to the purchase and production of water to meet customer demand. The District maintains four sources of supply (detailed in upcoming Sections) with disparate costs. These variable supply costs form the foundation of the rate components for each tier within the inclining tier rate structure.

Base Delivery: Costs associated with treating and delivering water to all customers at a constant average rate of use – also known as serving customers under average daily demand conditions. Therefore, base delivery costs are spread over all units of water irrespective of customer class or tiers.

Peaking: Costs incurred to meet customer peak demands in excess of base use (or average daily demand). Total peaking costs are composed of maximum day and maximum hour demands. The peaking costs are distributed to each tier and class using peaking factors derived from customer use data.

Conservation: Costs which cover water conservation and efficiency programs and efforts. Conservation costs are allocated based on water use in each class. Further, these programs are targeted to high volume water users. Therefore, conservation costs in the SFR class are allocated to Tier 3 SFR customers, and in the Irrigation class to Tier 2 Irrigation customers. Since there are no tiers in the MFR/Commercial class, all units of water in that class are assigned conservation costs.

Allocation of conservation costs to upper tiers helps provide a strong price signal for conservation, consistent with Article X Section 2 of the State of California Constitution, and proportionately allocates, on a parcel basis, such costs to those customers whose greater demand create the need for conservation and efficiency programs and efforts.

Revenue Offsets: Discretionary non-rate revenues used by the District to mitigate customer impacts. They are allocated on the basis of usage and applied to the second tier to promote affordability for the SFR class.

Revenue offsets consist of interest earnings, other operating income from rental property, and miscellaneous non-operating revenues. These funds allow flexibility in the rate design process to achieve policy objectives while maintaining cost of service principles and compliance with Proposition 218.

6.4.1.1. Variable Supply Unit Cost Rate Component

The variable supply cost is the cost to supply and deliver water from various sources. Table 6-13 shows the four sources of supply available to the District to meet annual water demand.

The four sources are: Verdugo Basin groundwater, GWP groundwater, Tier 1 imported water from FMWD, and Tier 2 water from FMWD.

The water supply cost components in Table 6-13 are based on FYE 2021 water supply costs from the respective sources and were provided by District staff. The total cost is the sum of the water unit cost and additional supply costs.

The additional supply cost represents the difference in production or purchase costs (the price paid) and the total costs allocated to supply in the COS. The amount (in $/AF) is spread across all units and all sources equally.

Table 6-13: Water Supply Costs

Source of Supply	Production / Purchase (AF)	Production / Purchase (kgal)	Water Unit Cost ($/AF)	Additional Supply Costs ($/AF)	Total Cost ($/AF)
Verdugo Basin	1,920	625,634	$185	$413	$598
GWP	240	78,204	$579	$413	$992
FMWD Tier 1	1,654	538,866	$1,734	$413	$2,147

Table 6-14 shows the supply from each source and the unit cost in $/kgal from each source of supply. The unit cost in $/kgal after loss accounts for system water loss of 6.4 percent to determine the unit cost of water available to meet demand. The unit water supply costs, and available water from each source are used in the unit cost calculation for the commodity rate.

Table 6-14: Water Supply Costs Calculation ($/kgal)

	Verdugo Basin	GWP	FMWD Tier 1
Supply to Meet Demand (kgal)	625,634	78,204	538,866
Cost ($/AF)	$598	$992	$2,147
Unit Cost ($/kgal)	$1.83	$3.04	$6.59
Unit Cost ($/kgal) after loss	$1.96	$3.25	$7.04

Table 6-15 shows estimated total demand in FYE 2021.

Table 6-15: Projected Usage in FYE 2021 (Table 4-6)

Customer Class	FYE 2021
SFR	
Tier 1	373,035
Tier 2	278,515
Tier 3	122,547
Multi-Family/Commercial	340,851
Irrigation	
Tier 1	16,336
Tier 2	31,888
Total Water Sales (kgal)	**1,163,172**

Given the water available from each source (Table 6-14**Error! Reference source not found.**) and the estimated demand from each class, the estimated water available to meet demand from each source is shown in Table 6-16. The supply is allocated in proportion to the overall demand. The lowest cost water is provided to the lowest tiers

first. Note that all customers benefit from this allocation as customers in higher tiers receive the benefit of the lower cost in the lower tiers.

Table 6-16: Water Source Allocation to Meet Class Demand

Customer Class	Annual Usage	Verdugo Basin	GWP	FMWD Tier 1
SFR				
Tier 1	373,083	373,083	0	0
Tier 2	278,482	16,633	48,714	213,134
Tier 3	122,533	0	0	122,533
MFR/Commercial	340,851	171,600	21,450	147,801
Irrigation				
Tier 1	16,336	16,336	0	0
Tier 2	31,888	7,942	3,035	20,911
Total	**1,163,172**	**585,593**	**73,199**	**504,379**

The unit rates for variable supply for the inclining tier rate structure are derived in Table 6-17. Total costs are determined as the sum-products of the unit costs of supply from Table 6-14 and the water required in each source from Table 6-16.

Note that Tier 2 SFR, MFR/Commercial, and Irrigation Tier 2 represent blended rates from two or more sources. Also note that the average unit cost is consistent for all user classes at $4.24/kgal. Unit costs are rounded up to the nearest penny.

Table 6-17: Variable Supply Unit Rate ($/kgal)

Customer Class	Annual Usage	Verdugo Basin	GWP	FMWD Tier 1	Unit Cost ($/kgal)
Unit Cost of Supply		*$1.96*	*$3.25*	*$7.04*	
SFR					
Tier 1	373,083	373,083	0	0	$1.96
Tier 2	278,482	16,633	48,714	213,134	$6.07
Tier 3	122,533	0	0	122,533	$7.04
Total	**774,097**	**389,716**	**48,714**	**335,667**	**$4.24**
MFR/Commercial	**340,851**	**171,600**	**21,450**	**147,801**	**$4.24**
Irrigation					
Tier 1	16,336	16,336	0	0	$1.96
Tier 2	31,888	7,942	3,035	20,911	$5.41
Total	**48,223**	**24,278**	**3,035**	**20,911**	**$4.24**

6.4.1.2. Base Delivery Rate Component

Base Delivery costs are the costs to treat and deliver water under average daily demand conditions. By dividing total base delivery costs from Table 5-13 by estimated annual usage we identify the cost to provide water delivery under average conditions.

The calculated delivery unit cost is presented in Table 6-18. Since delivery recovers costs to meet average daily demands, the delivery cost is the same for all classes and tiers.

Table 6-18: Delivery Unit Cost Calculation ($/kgal)

Base Delivery Component	FYE 2021
Delivery Costs	$2,089,617
Total Annual Usage (kgal)	1,163,172
Base Delivery Unit Cost ($/kgal)	**$1.80**

6.4.1.3. Peaking Rate Component

Peaking costs represent the cost of providing Max Day and Max Hour capacity to each customer class based on the peaking characteristics of each (shown in Table 5-13). Table 6-19 combines the Max Day and Max Hour costs in Table 5-13 into Peaking Costs. These costs are divided by total annual use by class and tier (from Table 4-6) to arrive at the Peaking unit cost for each.

Table 6-19: Peaking Unit Cost Calculation by Class and Tier ($/kgal)

Customer Class	Annual Usage	Peaking Costs	Peaking Unit Cost ($/kgal)
SFR			
Tier 1	373,083	$356,457	$0.96
Tier 2	278,482	$517,646	$1.86
Tier 3	122,533	$419,505	$3.42
MFR/Commercial	340,851	$453,261	$1.33
Irrigation			
Tier 1	16,336	$20,058	$1.23
Tier 2	31,888	$66,329	$2.08

6.4.1.4. Conservation Unit Cost

Conservation costs are only allocated to Tier 3 SFR, Tier 2 Irrigation, and MFR/Commercial customers. Table 6-20 shows the calculation for the unit cost for conservation. Note that the total conservation costs are equal to those in Table 5-13.

Table 6-20: Conservation Unit Cost Calculation ($/kgal)

Customer Class	Annual Usage	Conservation Allocation %	Conservation Factor	Conservation Costs	Unit Rate ($/kgal)
SFR					
Tier 1	373,083	0%	0%	$0	$0.00
Tier 2	278,482	0%	0%	$0	$0.00
Tier 3	122,533	100%	25%	$15,896	$0.13
MFR/Commercial	340,851	100%	69%	$44,219	$0.13
Irrigation					
Tier 1	16,336	0%	0%	$0	$0.00
Tier 2	31,888	100%	6%	$4,137	$0.13
Total	**1,163,172**		**100%**	**$64,253**	

6.4.1.5. Revenue Offset Unit Cost

The revenue offset component is determined in a similar manner as the conservation component. Revenue offsets are applied to Tier 2 SFR use to mitigate impacts. It is Board policy to not apply revenue offsets to Irrigation customers. Table 6-21 shows the revenue offset unit cost calculation. Note that the total revenue offset costs are equal to those in Table 5-13.

Table 6-21: Revenue Offset Unit Cost Calculation ($/kgal)

Customer Class	Annual Usage	Revenue Offset Allocation %	Revenue Offset Factor	Revenue Offset Costs	Unit Rate ($/kgal)
SFR					
Tier 1	373,083	0%	0%	$0	$0.00
Tier 2	278,482	100%	100%	($263,000)	($0.94)
Tier 3	122,533	0%	0%	$0	$0.00
MFR/Commercial	340,851	0%	0%	$0	$0.00
Irrigation					
Tier 1	16,336	0%	0%	$0	$0.00
Tier 2	31,888	0%	0%	$0	$0.00
Total	**1,163,172**		**100%**	**($263,000)**	

6.4.1.6. Final Commodity Rate Derivation

To determine the rates for the commodity charge, the components described above are added together. The resulting summation constitutes the final rates. The cost-of-service base rates are shown in bold in Table 6-22 below. The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 cost of service rates by the revenue adjustment shown in Table 4-13. The comparison between the proposed FYE 2022 rates and existing rates are shown in Table 6-22. All rates are rounded up to the nearest cent.

Table 6-22: Calculation of the Commodity Charge ($/kgal)

Customer Class	Tier Definition	Supply	Base Delivery	Peaking	Conservation	Revenue Offsets	FYE 2021 COS	Proposed FYE 2022	Current Charge	Difference ($)	Difference (%)
SFR											
Tier 1	0-10	$1.96	$1.80	$0.96	$0.00	$0.00	$4.72	**$5.10**	$5.17	($0.07)	-1%
Tier 2	11-26	$6.07	$1.80	$1.86	$0.00	($0.94)	$8.79	**$9.50**	$8.14	$1.36	17%
Tier 3	27+	$7.04	$1.80	$3.42	$0.13	$0.00	$12.39	**$13.39**	$12.29	$1.10	9%
MFR/Commercial	Uniform	$4.24	$1.80	$1.33	$0.13	$0.00	$7.50	**$8.10**	$7.33	$0.77	11%
Irrigation											
Tier 1	0-80	$1.96	$1.80	$1.23	$0.00	$0.00	$4.99	**$5.39**	$5.66	($0.27)	-5%
Tier 2	81+	$5.41	$1.80	$2.08	$0.13	$0.00	$9.42	**$10.18**	$10.89	($0.71)	-7%

Table 6-23 shows proposed water commodity rates for the Study period. The commodity charge is increased "across the board" in subsequent years – that is, relative to existing rates – by the financial plan. All rates are rounded up to the nearest penny.

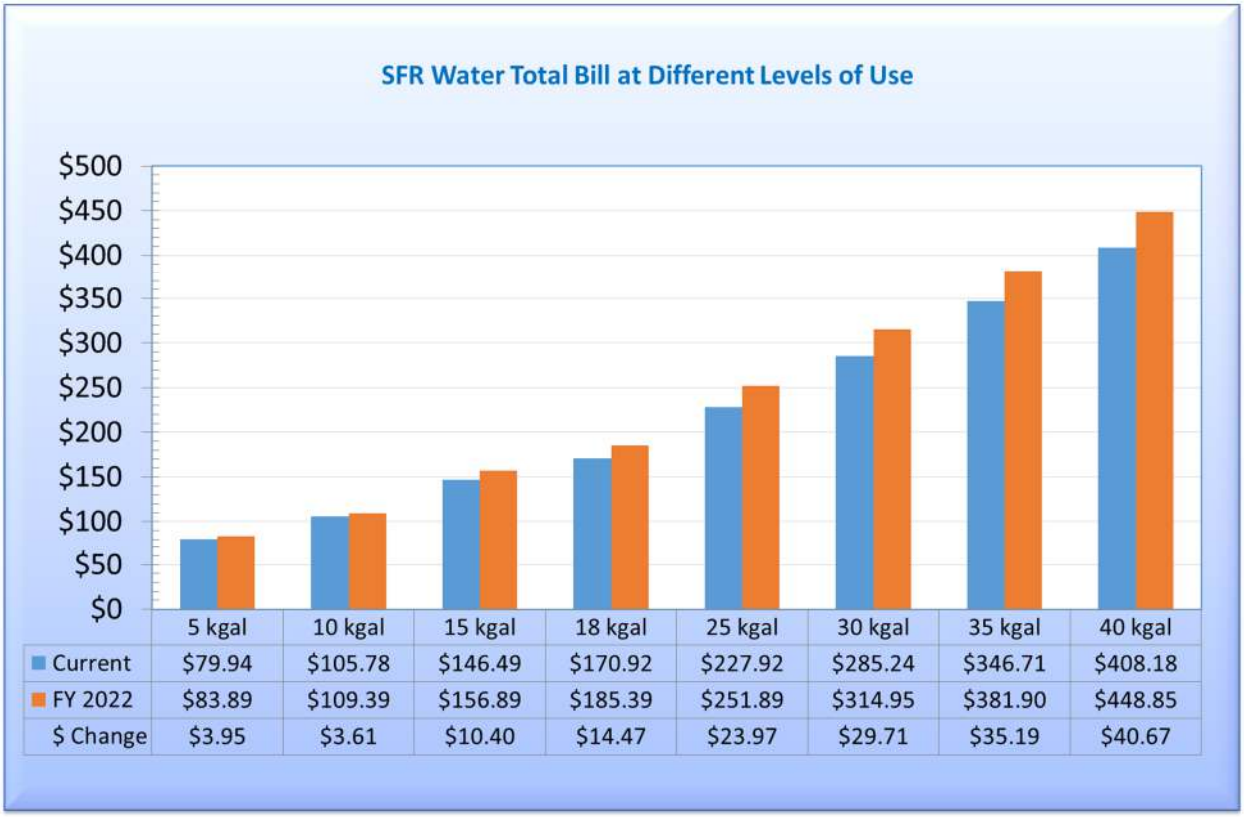
Table 6-23: Proposed Commodity Rates ($/kgal)

Customer Class	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
SFR						
Tier 1	$5.17	$5.10	$5.51	$5.96	$6.38	$6.83
Tier 2	$8.14	$9.50	$10.26	$11.09	$11.87	$12.71
Tier 3	$12.29	$13.39	$14.47	$15.63	$16.73	$17.91
Multi-Family/Commercial	$7.33	$8.10	$8.75	$9.45	$10.12	$10.83
Irrigation						
Tier 1	$5.66	$5.39	$5.83	$6.30	$6.75	$7.23
Tier 2	$10.89	$10.18	$11.00	$11.88	$12.72	$13.62

6.5. Customer Impacts

The rate model calculates water customer impacts for all classes and meter sizes. Customer impacts from the proposed new rates can be seen below in Figure 6-1. A SFR customer with a 3/4" meter using the District-wide annual bi-monthly average of 18 kgal will experience a $14.47 increase in their bi-monthly bill. This is due to both to an increase in the bi-monthly service charge as well as an increase in the Tier 2 and Tier 3 rates which is not fully offset by the decrease in the Tier 1 rate. The usage levels shown include the average winter use (15 kgal), average annual use (18 kgal), and average summer use (25 kgal).

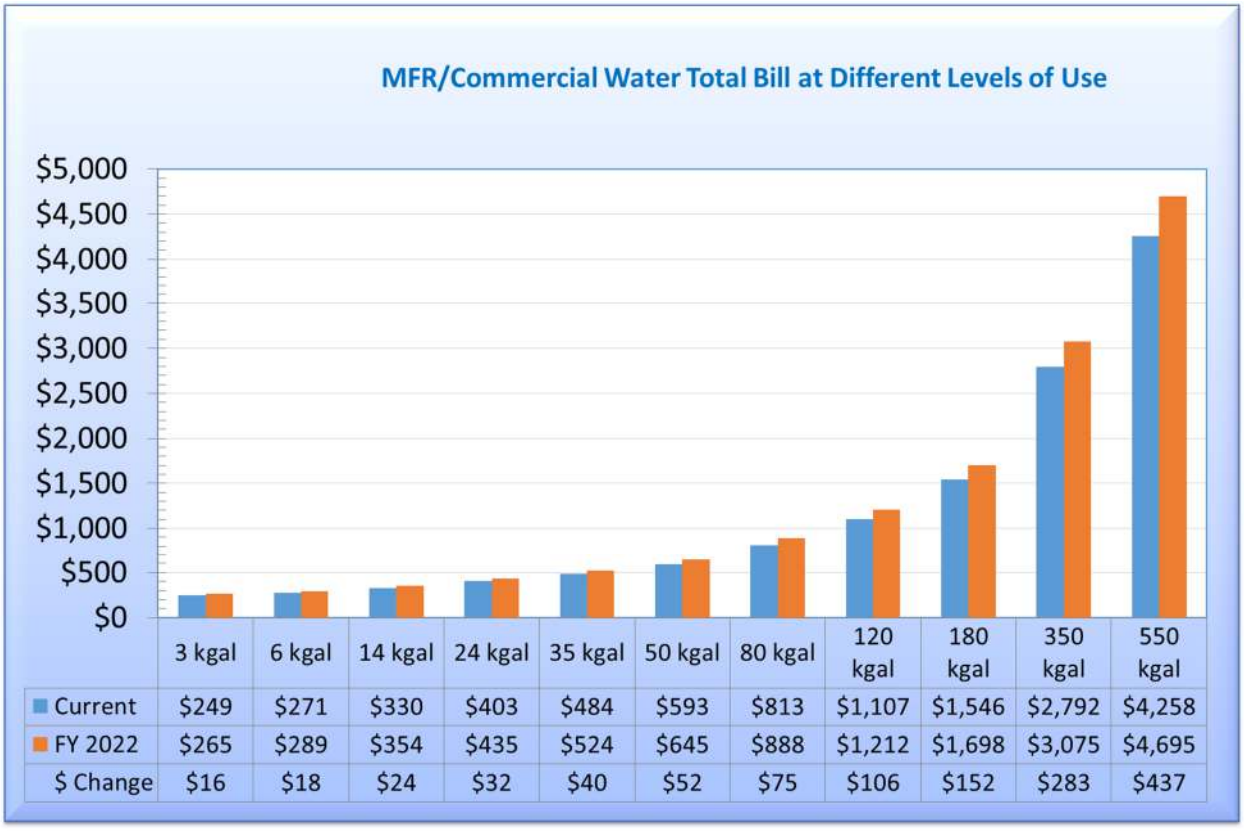
Figure 6-1: Bill Impacts - Single Family Residential with 3/4" Meter



	5 kgal	10 kgal	15 kgal	18 kgal	25 kgal	30 kgal	35 kgal	40 kgal
Current	$79.94	$105.78	$146.49	$170.92	$227.92	$285.24	$346.71	$408.18
FY 2022	$83.89	$109.39	$156.89	$185.39	$251.89	$314.95	$381.90	$448.85
$ Change	$3.95	$3.61	$10.40	$14.47	$23.97	$29.71	$35.19	$40.67

Figure 6-2 shows customer impacts for a MFR customer with a 2" meter. At the 50th percentile of use (50 kgal) a customer experiences a $52 increase in their bi-monthly bill, or 9 percent.

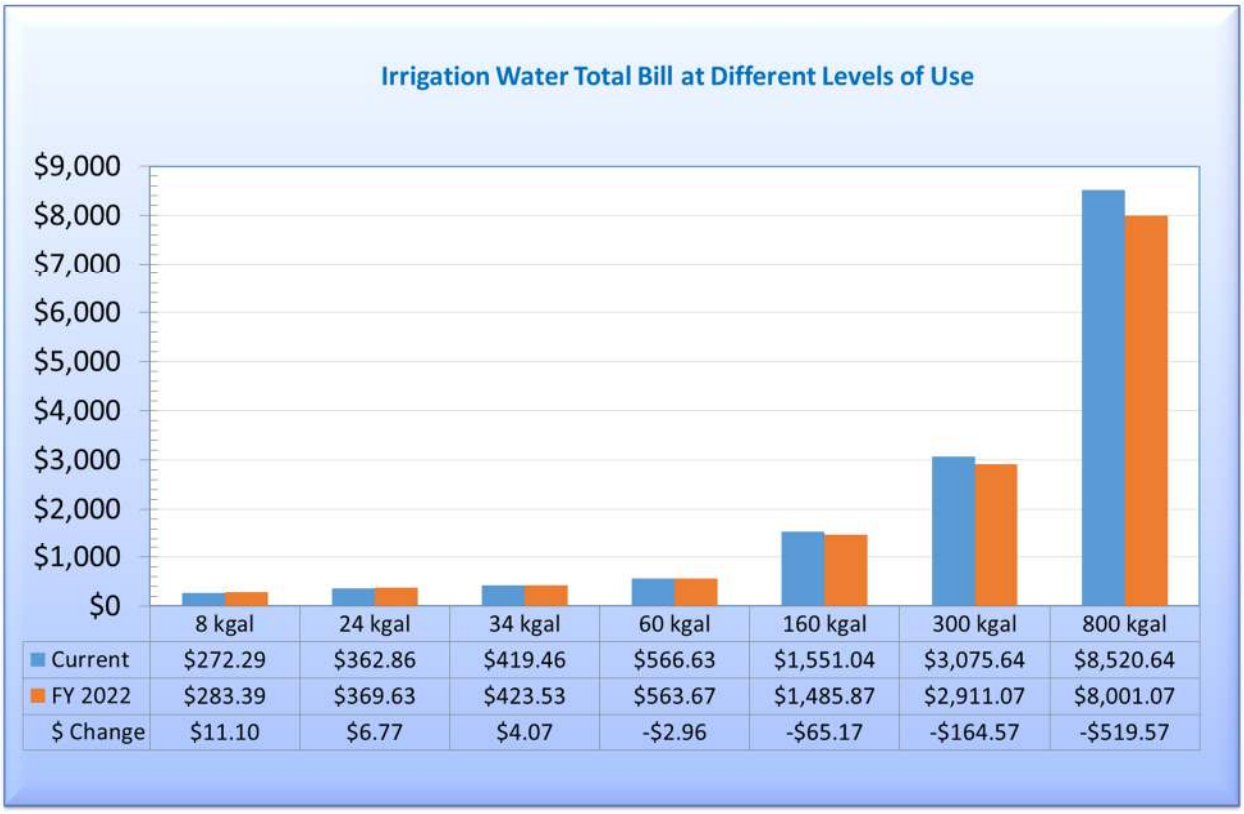
Figure 6-2: Bill Impacts – Multi-Family Residential with 2" Meter



	3 kgal	6 kgal	14 kgal	24 kgal	35 kgal	50 kgal	80 kgal	120 kgal	180 kgal	350 kgal	550 kgal
Current	$249	$271	$330	$403	$484	$593	$813	$1,107	$1,546	$2,792	$4,258
FY 2022	$265	$289	$354	$435	$524	$645	$888	$1,212	$1,698	$3,075	$4,695
$ Change	$16	$18	$24	$32	$40	$52	$75	$106	$152	$283	$437

Figure 6-3 shows customer impacts for an Irrigation customer with a 2" meter. At the 50th percentile of use (60 kgal) a customer experiences a $2.96 decrease in their bi-monthly bill, or 1 percent. The decrease is due to the decrease in both the Tier 1 and Tier 2 commodity rates. The figure includes the 25th, 50th, and 75th percentile of use in the class of 24, 60, and 300 kgal, respectively.

Figure 6-3: Bill Impacts – Irrigation Customer with 2" Meter



	8 kgal	24 kgal	34 kgal	60 kgal	160 kgal	300 kgal	800 kgal
Current	$272.29	$362.86	$419.46	$566.63	$1,551.04	$3,075.64	$8,520.64
FY 2022	$283.39	$369.63	$423.53	$563.67	$1,485.87	$2,911.07	$8,001.07
$ Change	$11.10	$6.77	$4.07	-$2.96	-$65.17	-$164.57	-$519.57

7. Wastewater Utility Financial Plan

This section describes the wastewater utility's customer account and wastewater flow data and corresponding financial plan. To develop the financial plan, Raftelis projects annual expenses and revenues; capital expenditures, models reserve balances; and calculates debt service coverage ratios to estimate the amount of additional rate revenue needed in each fiscal year for prudent fiscal management.

This section of the Study provides a discussion of O&M expenses, the capital improvement plan, reserve funding, projected revenue under existing rates and the revenue adjustments required to ensure the fiscal sustainability and solvency of the wastewater utility.

7.1. Wastewater Revenue Requirements

A review of a utility's revenue requirements is a key first step in the rate study process. The review involves an analysis of annual operating revenues under current rates, operation and maintenance (O&M) expenses, capital expenditures, and reserve requirements.

7.1.1. REVENUES FROM CURRENT WASTEWATER RATES

The current rates were last adjusted in September of 2019. The District's wastewater service charges vary by customer class. Single Family Residential (SFR) and Multi-Family Residential (MFR) customers pay a fixed bi-monthly charge per dwelling unit (DU) and a variable volumetric wastewater flow charge component based on the average winter water use from the previous year. Commercial customers are billed on the actual water use but subject to a minimum charge to cover fixed costs. Schools are charged on the number of students based on the average daily attendance[12]). Existing wastewater rates include the District's policy of a low water use discount of 10 percent on accounts that use less than 12 units of water in any bi-monthly period funded from general fund revenues. Current wastewater rates are shown in Table 7-1 and Table 7-2.

Table 7-1: Current Bi-Monthly Wastewater Service Charges ($/DU)

Customer Class	Unit	Current Rates
Single Family	DU	$47.79
Multi Family	DU	$31.25
Commercial/Institutional	Account	$31.25

[12] The school variable rates are based on average daily attendance (ADA). The charge is based upon 100 ADA as reported by Glendale Unified School District.

Table 7-2: Current Wastewater Use Charges ($/kgal)

Customer Class	Unit	Current Rates
Single Family	kgal	$1.93
Multi Family	kgal	$2.15
Commercial/Institutional	kgal	$5.10
Primary School/Elementary	100 ADA	$84.86
Middle School	100 ADA	$169.73
Secondary School/Middle School	100 ADA	$254.59

Table 7-3 shows the projected number of wastewater accounts subject to the service charge. The number of accounts is escalated each year based on the growth assumptions identified in Table 3-7.

Table 7-3: Projected Accounts by Customer Class

Customer Class	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Single Family (DUs)	5,293	5,346	5,399	5,453	5,508	5,563
Multi Family (DUs)	2,670	2,697	2,724	2,751	2,778	2,806
Commercial/Institutional (Accounts)	176	177	179	181	183	185

Wastewater flow projections through FYE 2026 are shown in Table 7-4. The wastewater flows are escalated each year based on the growth assumptions identified in Table 3-7 using FYE 2021 as the base year.

Table 7-4: Projected Wastewater Flows

Customer Class	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Single Family (kgal)	413,022	417,152	421,324	425,537	429,792	434,090
Multi Family (kgal)	132,660	133,987	135,326	136,680	138,047	139,427
Commercial/Institutional (kgal)	25,325	25,578	25,834	26,092	26,353	26,617
Primary School/Elementary (100 ADA)	18	19	19	19	19	19
Secondary School/Middle School (100 ADA)	12	12	12	12	12	12
Secondary School/High School (100 ADA)	26	26	26	26	27	27

Table 7-5 shows the rate revenue generated in each year of the Study with projected accounts and wastewater flows at current rates. Note, revenues for FYE 2022 and beyond use current rates from Table 7-1 and Table 7-2.

The overall adequacy of wastewater revenues is measured by comparing the projected annual revenue requirement in FYE 2021 to be met from rates with projected revenues under the existing rates. For FYE 2021 the total revenues from rates are $3,321,867.

Table 7-5: Projected Wastewater Rate Revenues (No Revenue Adjustments)

Revenue Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Service Charges	$2,050,965	$2,071,473	$2,092,185	$2,113,105	$2,134,235	$2,155,575
Usage Charges	$1,270,903	$1,283,612	$1,296,448	$1,309,412	$1,322,506	$1,335,731
Total Rate Revenue	**$3,321,867**	**$3,355,084**	**$3,388,633**	**$3,422,518**	**$3,456,741**	**$3,491,306**

The District also derives revenues from other non-rate sources. These revenues consist of other operating and non-operating revenues. These revenues are summarized in
Table 7-6.

Table 7-6: Projected Non-Rate Revenues

Revenue Source	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Other Operating Revenues	$36,500	$31,500	$31,815	$32,133	$32,454	$32,779
Non-Operating Revenues	$500	$63,814	$42,262	$18,831	$0	$0
Total Non-Rate Revenue	**$37,000**	**$95,314**	**$74,077**	**$50,965**	**$32,454**	**$32,779**

7.1.2. OPERATING AND MAINTENANCE (O&M) EXPENSES

Total projected O&M expenses are shown in Table 7-7. These expenses are summarized by department. Operating expenses use the District's budgeted FYE 2021 values and project future expenses using the inflationary assumptions from Table 3-6.

Table 7-7: Projected Wastewater O&M Expenses

O&M Expenses	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Treatment and Disposal Charges	$1,849,900	$1,655,700	$1,873,500	$1,654,200	$1,824,900	$2,040,700
Labor	$960,598	$989,416	$1,019,098	$1,049,671	$1,081,162	$1,113,596
Compensation	$793,534	$833,210	$874,871	$918,614	$964,545	$1,012,772
Plant Operating	$79,011	$80,763	$83,529	$86,393	$89,358	$92,428
Collection System	$116,222	$118,573	$122,901	$127,393	$132,056	$136,894
General and Administrative	$341,607	$352,015	$362,743	$373,801	$385,199	$396,949
Total O&M Expenditures	**$4,140,872**	**$4,029,677**	**$4,336,642**	**$4,210,072**	**$4,477,219**	**$4,793,340**

7.1.3. PROJECTED CAPITAL IMPROVEMENT PLAN

The District has projected $1.5M in capital expenditures during the Study period (FYE 2021 to FYE 2026) for the wastewater utility as shown in Table 7-8. The majority of District expenditures in each year are attributed to collection systems repair and replacement.

In addition to District infrastructure repair and replacement, the District is responsible for a share of the City of Los Angeles Bureau of Sanitation (LA San) capital costs. Wastewater generated in the District's service area is treated at LA San's Glendale facility. LA San provides conveyance, treatment, and disposal of wastewater and the District is responsible for their proportional share of the infrastructure and facilities that are used. The District will fund all capital improvements and LA San capital charges through rate revenues.

Table 7-8: Projected Wastewater Capital Improvement Plan

Capital Projects	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Collections Systems	$75,000	$150,000	$156,000	$162,240	$168,730	$175,479
Interceptor System	$5,000	$5,000	$5,200	$5,408	$5,624	$5,849
Lift Station	$75,000	$0	$0	$0	$0	$0
Technology (Sewer Projects Only)	$5,000	$5,000	$5,200	$5,408	$5,624	$5,849
Facilities & Planning	$10,000	$10,000	$10,400	$10,816	$11,249	$11,699
Misc. Sewer Projects	$5,000	$5,000	$5,200	$5,408	$5,624	$5,849
Capital Outlay	$64,500	$64,500	$62,660	$61,651	$58,493	$60,833
Total Rate Funded Capital Projects	**$239,500**	**$239,500**	**$244,660**	**$250,931**	**$255,344**	**$265,558**

7.1.4. DEBT SERVICE

The wastewater utility has no outstanding long-term debt obligations.

7.2. Existing Wastewater Financial Plan – No Revenue Adjustments

Table 7-9 displays the proforma of the District's wastewater utility under current rates over the Study period. The proforma incorporates revenues and expenses to show the overall position of the District. All projections shown in the table are based upon the District's current rate structure and do not include rate adjustments. The proforma incorporates the wastewater enterprise data shown in the preceding tables of this section.

Under the "status-quo" scenario, revenues generated from rates and other miscellaneous revenues are not adequate to meet expenses as shown by the Net Cash Flow line.

Table 7-9: Existing Wastewater Financial Plan with Current Rates

Existing Financial Plan	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Revenues						
Revenues from Existing Rates	$3,321,867	$3,355,084	$3,388,633	$3,422,518	$3,456,741	$3,491,306
Total Revenue Adjustments	$0	$0	$0	$0	$0	$0
Non-Rate Revenues	$37,000	$95,314	$74,077	$50,965	$32,454	$32,779
Total Revenue	**$3,358,867**	**$3,450,399**	**$3,462,710**	**$3,473,482**	**$3,489,195**	**$3,524,086**
Expenses						
Operating Expenses	$4,140,872	$4,029,677	$4,336,642	$4,210,072	$4,477,219	$4,793,340
Rate Funded CIP	$239,500	$239,500	$244,660	$250,931	$255,344	$265,558
Debt Service	$0	$0	$0	$0	$0	$0
Total Expenses	**$4,380,372**	**$4,269,177**	**$4,581,302**	**$4,461,004**	**$4,732,563**	**$5,058,898**
Net Cash Flow	($1,021,504)	($818,778)	($1,118,592)	($987,521)	($1,243,368)	($1,534,812)
Beginning Balance	**$4,299,000**	**$3,277,496**	**$2,458,718**	**$1,340,125**	**$352,604**	**($890,764)**
Ending Balance	**$3,277,496**	**$2,458,718**	**$1,340,125**	**$352,604**	**($890,764)**	**($2,425,576)**
Target Balance	*$2,403,210*	*$2,432,265*	*$2,462,944*	*$2,494,598*	*$2,527,265*	*$2,560,987*
Calculated Debt Coverage	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Required Debt Coverage	125%	125%	125%	125%	125%	125%

7.3. Proposed Wastewater Financial Plan

Based on discussions with the District regarding its expected revenue requirements over the Study period, Raftelis proposes that the District adopt the revenue adjustment schedule found in Table 7-10. The FYE 2022 revenue adjustment is proposed to be implemented October 1, 2021, with all subsequent adjustments occurring on July 1 of each fiscal year.

Although Table 7-10 shows anticipated revenue adjustments for FYE 2022 through 2026, the District will review and confirm the required revenue adjustments on an annual basis. The rates presented in Section 9 are based on the proposed Financial Plan below.

Revenue adjustments represent the average increase in rates for the utility as a whole. Actual percentage increases (or decreases) in rates are dependent upon the cost-of-service analysis and are unique to each customer class. The proposed revenue adjustments help ensure adequate revenue to fund operating expenses, achieve reserve policy targets, fund the long-term capital program, and generate rate stability over the long term.

Table 7-10: Proposed Wastewater Revenue Adjustments

	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Effective Month	October	July	July	July	July
Revenue Adjustment	8%	8%	8%	7%	7%

Table 7-11 shows the proforma for the wastewater utility with additional revenues from the revenue adjustments in the proposed financial plan. The proposed revenue adjustments will not meet all expense requirements during the Study period, and additional adjustments will be required in later years.

Table 7-11: Proposed Wastewater Financial Plan

Proposed Financial Plan	FYE 2021	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026
Revenues						
Revenues from Existing Rates	$3,321,867	$3,355,084	$3,388,633	$3,422,518	$3,456,741	$3,491,306
Total Revenue Adjustments	$0	$201,305	$563,869	$888,869	$1,202,572	$1,544,010
Non-Rate Revenues	$37,000	$97,579	$85,000	$78,477	$78,061	$79,056
Total Revenue	**$3,358,867**	**$3,653,968**	**$4,037,502**	**$4,389,864**	**$4,737,374**	**$5,114,373**
Expenses						
Operating Expenses	$4,140,872	$4,029,677	$4,336,642	$4,210,072	$4,477,219	$4,793,340
Rate Funded CIP	$239,500	$239,500	$244,660	$250,931	$255,344	$265,558
Debt Service	$0	$0	$0	$0	$0	$0
Total Expenses	**$4,380,372**	**$4,269,177**	**$4,581,302**	**$4,461,004**	**$4,732,563**	**$5,058,898**
Net Cash Flow	($1,021,504)	($615,208)	($543,800)	($71,140)	$4,811	$55,475
Beginning Balance	**$4,299,000**	**$3,277,496**	**$2,662,287**	**$2,118,488**	**$2,047,348**	**$2,052,159**
Ending Balance	**$3,277,496**	**$2,662,287**	**$2,118,488**	**$2,047,348**	**$2,052,159**	**$2,107,634**
Target Balance	*$2,403,210*	*$2,482,592*	*$2,603,911*	*$2,716,815*	*$2,827,908*	*$2,946,989*
Calculated Debt Coverage	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Required Debt Coverage	125%	125%	125%	125%	125%	125%

Figure 7-1 through Figure 7-4 display the FYE 2021 through FYE 2026 proposed financial plan in graphical format. Figure 7-1 shows the proposed revenue adjustments- in percentage terms- as blue bars.

Figure 7-1: Proposed Revenue Adjustments

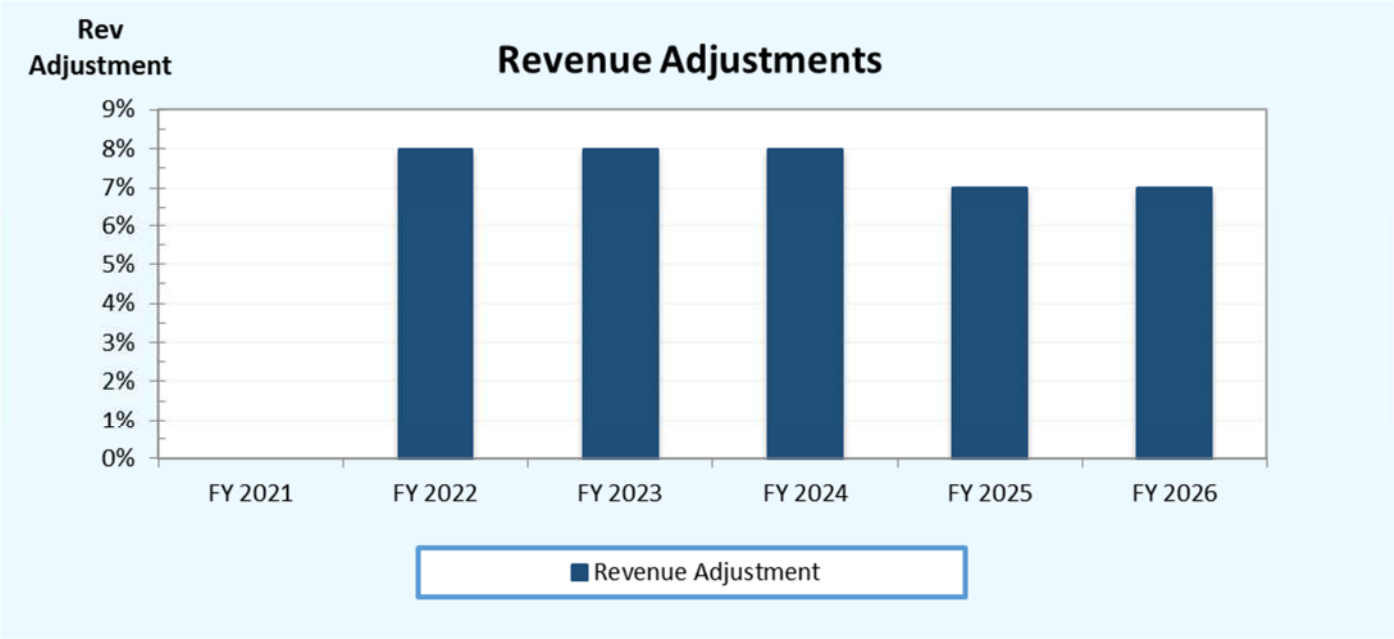


Figure 7-2 illustrates the Operating Financial Plan in a graphical format. It compares existing and proposed revenues with projected expenses. The expenses represent O&M expenses, capitalized expenses, and reserve funding. Total revenues at existing and proposed rates are shown by the horizontal black and blue lines, respectively.

Figure 7-2: Proposed Operating Financial Plan

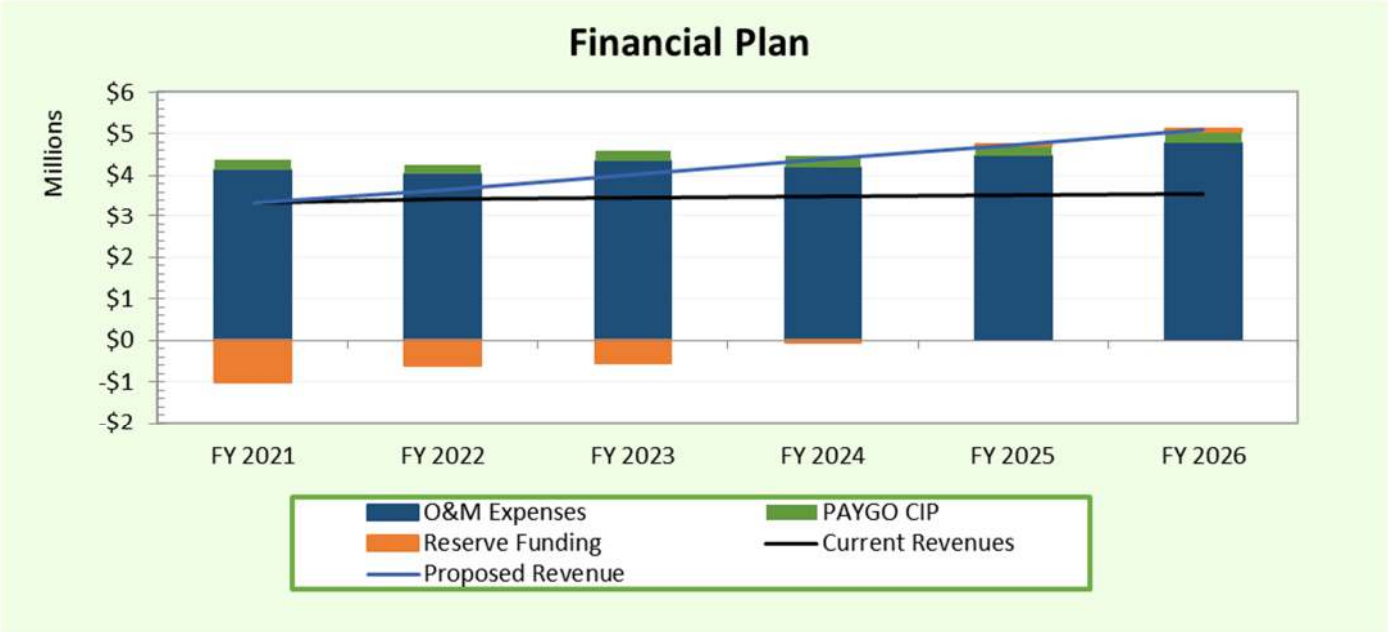


Figure 7-3 shows the wastewater utility's ending balance by fiscal year. The orange bars indicate the ending balance, while the green line indicates the target balance. While the reserves are shown below targets during most of the five-year Study period, in later years they will be supplemented and meet the target.

Figure 7-3: Proposed Ending Fund Balances

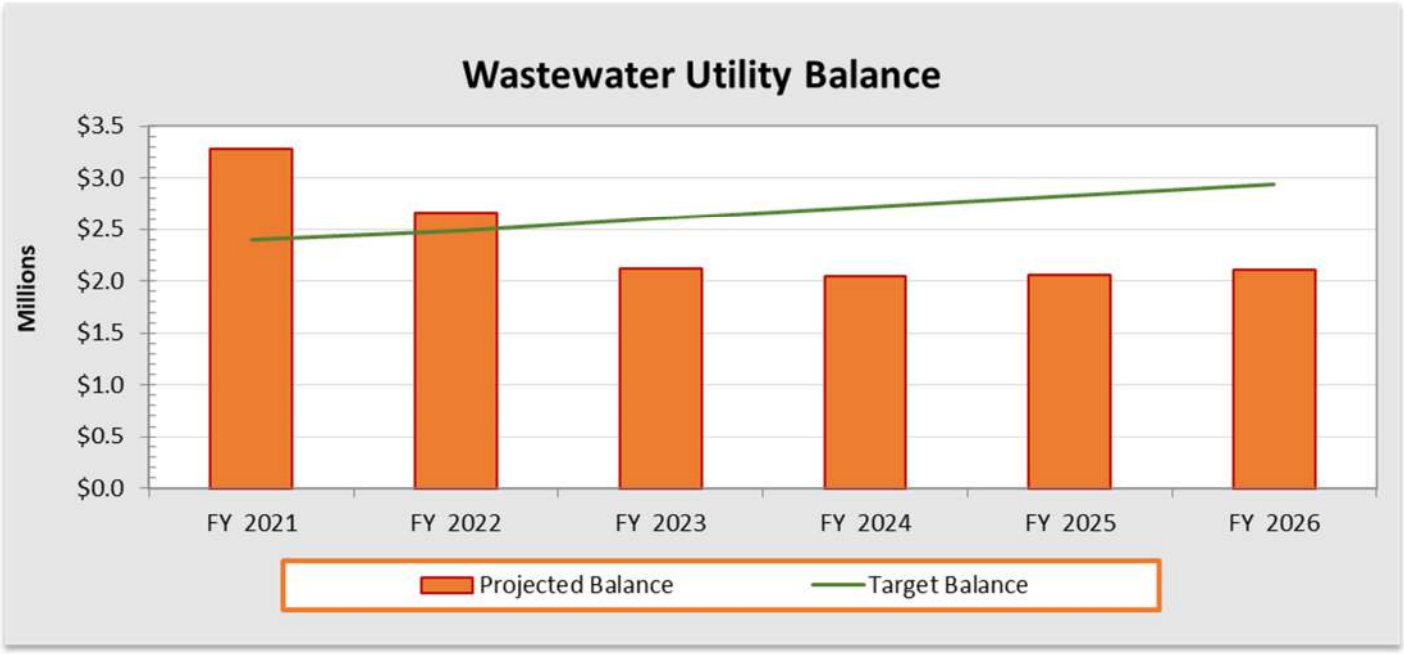
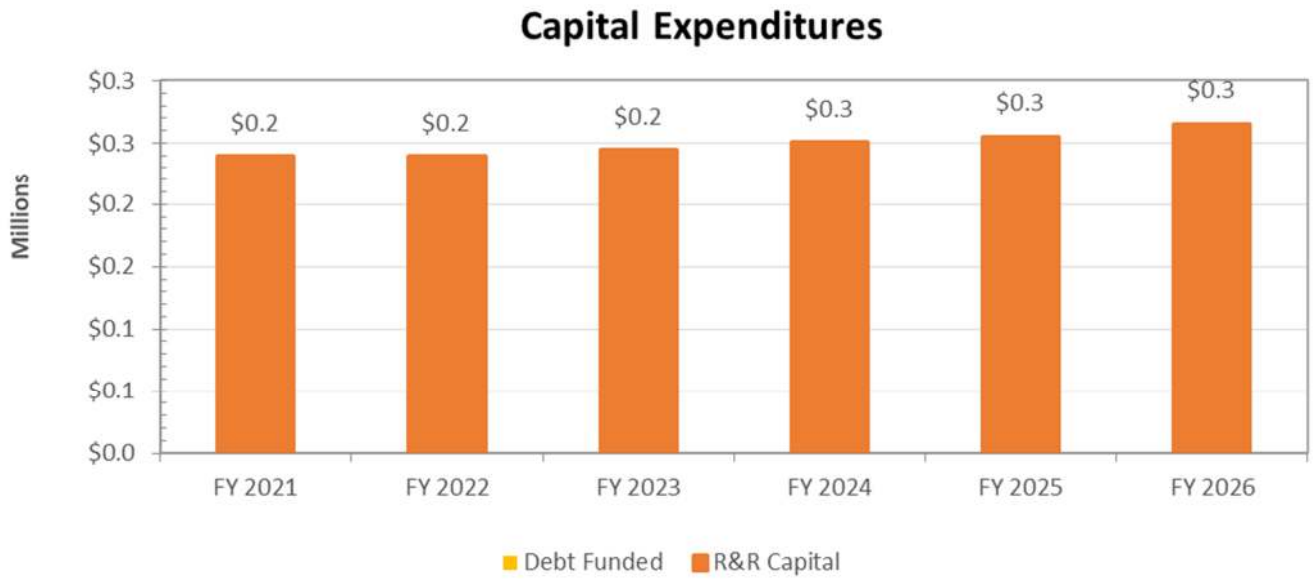


Figure 7-4 shows the total CIP of the wastewater utility and the corresponding expenditure type. All capital is rate funded.

Figure 7-4: Proposed Capital Improvement Program Funding



8. Wastewater Cost of Service Analysis

This section of the Report discusses the allocation of O&M expenses and capital costs to the appropriate parameters consistent with industry standards, the determination of unit costs, and calculation of costs by customer class for the wastewater utility.

8.1. Methodology

To allocate the cost of service among the different customer classes, costs first need to be allocated to the appropriate wastewater parameters. The following sections describe the allocation of the operating and capital costs of service to the appropriate parameters of the wastewater system.

The total cost of wastewater service is analyzed by system function in order to equitably distribute costs of service to the various classes of customers. For this analysis, wastewater utility costs of service are developed consistent with the guidelines for allocating costs detailed in the Water Environment Federation (WEF) Manual of Practice No. 27, Financing and Charges for Wastewater Systems, 2018.

A cost-of-service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirements, the next step is to functionalize its O&M costs based on the District's O&M classification:

1. Treatment – include the costs of treatment and disposal of wastewater flows.
2. Collection – includes the costs of operating and maintaining the collection system.
3. General – costs not attributable to treatment or collection. These can be customer and administrative costs and are reallocated to treatment and collection based on the relative share of the total for each.

The functionalization of costs allows us to better allocate the functionalized costs to the **cost causation components**. Based on the standard industry methodology, which assigns costs based on design of the wastewater system, the cost causation components include:

1. **Flow** refers to the volume of wastewater carried through the wastewater collection system.
2. **BOD** (Biochemical Oxygen Demand) refers to the level of organic material present in wastewater and comes predominantly from food waste as well as other wastes generated by households and businesses.
3. **TSS** (Total Suspended Solids) refers to the particle constituents within wastewater flows which are able to be filtered out through the treatment process.
4. **General** refers to costs incurred in operating and maintaining the wastewater collection system not otherwise recovered in the other functionalized cost components.

The collection system is designed for flow and the treatment system is designed for flow, BOD, and TSS. General costs include administration, billing, and customer service.

8.2. Allocation of Expenses to Cost Causation Components

After functionalizing expenses, the next step is to allocate the functionalized expenses to cost causation components. To do so, costs are identified related to collecting and treating wastewater and administering the wastewater system (as well as providing customer service to account holders).

Treatment costs are allocated to flow, to BOD, and to TSS[13]. Collection system costs are allocated 100 percent to the flow cost causation component, and general costs are allocated 100 percent to the general component. Table 8-1 shows the cost allocations. Allocation of treatment costs is based on data provided by LA San.

Table 8-1: Allocation of Functionalized O&M Expenses to Cost Causation Components

Function	Flow	BOD	TSS	General	Total
Treatment	35%	37%	28%		100%
Collection	100%				100%
General				100%	100%

Table 8-2 shows the total resulting cost causation component allocation for O&M expenses. This resulting allocation is used to allocate the District's operating costs to the cost causation components. Capital costs for the collection system are allocated entirely to flow.

Table 8-2: O&M Allocation

Function	O&M Expenses by Function ($)	Flow	BOD	TSS	General
Treatment	$1,849,900	$648,205	$683,353	$518,157	$0
Collection	$2,290,972	$2,290,972	$0	$0	$0
General	$0	$0	$0	$0	$0
Total O&M	**$4,140,872**	**$2,939,177**	**$683,353**	**$518,157**	**$0**
% O&M	*100%*	*71%*	*17%*	*13%*	*0%*

8.3. Revenue Requirement

Table 8-3 shows the revenue requirement derivation with the total revenue required from rates. The totals shown in the "Operating" and "Capital" columns are the total O&M and capital revenue requirements, respectively, that are allocated to the cost components using the allocation percentages shown in Table 8-1.

Raftelis calculated the revenue requirement using FYE 2021 expenses, which include O&M expenses and rate funded capital expenses. To arrive at the rate revenue requirement, revenue offsets for non-rate revenues from other sources are subtracted; additionally, adjustments are made for annual cash balances which fund reserves. The adjustments are subtracted to arrive at the total revenue requirement from rates. This is the amount that the rates are designed to collect.

[13] Allocations to each component based on LA Bureau of Sanitation's allocation breakdown.

Table 8-3: Revenue Required from Wastewater Rates (FYE 2021)

	Operating	Capital	Total
Revenue Requirements			
Treatment and Disposal Charges	$1,849,900		$1,849,900
Labor	$960,598		$960,598
Compensation	$793,534		$793,534
Plant Operating	$79,011		$79,011
Collection System	$116,222		$116,222
General and Administrative Expenses	$341,607		$341,607
Rate Funded CIP		$239,500	$239,500
Total Revenue Requirements	**$4,140,872**	**$239,500**	**$4,380,372**
Less: Revenue from Other Sources			
Other Operating Revenues	$36,500		$36,500
Non-Operating Revenues (Interest Income)	$500		$500
Sewer Service Discount	$0		$0
Total Revenue from Other Sources	**$37,000**	**$0**	**$37,000**
Less: Adjustments			
Transfer from (to) Reserves		$1,021,504	$1,021,504
Adjustments to Annualize Rate Increase		$0	$0
Total Adjustments	**$0**	**$1,021,504**	**$1,021,504**
Cost to be Recovered from Rates	**$4,103,872**	**($782,004)**	**$3,321,867**

8.4. User Characteristics

The end goal is to proportionately distribute the revenue requirements to each user class. First, a cost allocation basis must be determined. To do so, wastewater generation for each user class is estimated. Single family customers have irrigation usage which needs to be considered to determine the amount of wastewater that they generate. Raftelis and District staff has estimated that on average, 90 percent of the winter water used by single family customers is returned to the sewer. 90 percent is also used for Commercial users. The return rate for MFR is 100 percent of their winter usage because this class generally has dedicated landscape meters, with water used indoors. Schools' water and wastewater flow is estimated based on the average daily attendance and type of school. The estimated water use for elementary, middle, and high school students is 5, 10, 15 gpd per student based on data from the California State Water Resources Control Board. The water use and wastewater flows are shown in Table 8-4.

Table 8-4: Estimated Wastewater Generation

Customer Class	Estimated Water Use (kgal)	Estimated Return Factor	Estimated WW Flows (kgal)	% of WW Flows
Single Family - Winter	477,036	90%	429,332	72.75%
Multi-Family - Winter	127,518	100%	127,518	21.61%
Commercial - Annual	25,074	90%	22,567	3.82%
School	10,724	100%	10,724	1.82%
Total	**640,352**		**590,141**	**100%**

The total revenue requirement from Table 8-3 is allocated according to the percentage attributable to each class to determine the total cost to be recovered from each user class as shown in Table 8-5. It should be noted that customers in the commercial class may have different strengths; however, they contribute a very small amount of the total flow. Therefore, for simplicity, all customers are charged only on the basis of their wastewater flow. Percentage of WW flows are rounded to two decimal places.

Table 8-5: Derivation of Cost to Serve Each Class

Customer Class	Total Revenue Requirement	% of WW Flows	Class Total ($)
Single Family	$3,321,867	72.75%	$2,416,684
Multi-Family	$3,321,867	21.61%	$717,791
Commercial	$3,321,867	3.82%	$127,026
School	$3,321,867	1.82%	$60,367

8.5. Fixed Vs. Variable Cost Recovery

Following cost of service principles, it is appropriate that fixed costs should be collected from fixed charges and variable costs should be collected from variable charges.

Therefore, the District's distribution of fixed and variable costs for FYE 2021 was used as the proxy to determine the revenue split between fixed and variable revenue recovery from residential users.

Raftelis determined that all District costs for operating and maintaining the wastewater collection system are fixed. Charges for LA San are treated as 100 percent variable.

The split of fixed and variable costs is therefore the ratio of the District's costs and LA San costs relative to total operating and capital costs. Using the O&M expenses, capitalized expenses, and capital project expenditures for FYE 2021 the split is 61 percent fixed and 39 percent variable.

9. Wastewater Rate Design and Derivation

9.1. Existing Rate Structure and Rates

The District's existing rate structure varies by customer class, but generally consists of a fixed bi-monthly service charge and a variable volumetric charge. Single Family Residential (SFR) and Multi-Family Residential (MFR) customers pay a fixed bi-monthly charge per dwelling unit (DU) and a volumetric wastewater flow charge component based on the average winter water use from the previous year. Commercial customers pay a variable volumetric wastewater flow charge component based on the amount of water used, with a minimum charge that is allocated to fixed costs. Schools pay a variable volumetric wastewater flow charge component based on the amount of water used.[14] Accounts eligible and enrolled in the District's low water use program (less than 12 kgal per billing period) receive a 10 percent discount. The discount is paid for by District general funds. Current wastewater rates are shown in Table 9-1 and Table 9-2.

Table 9-1: Current Bi-Monthly Wastewater Service Charges ($/DU)

Customer Class	Unit	Current Rates
Single Family	DU	$47.79
Multi Family	DU	$31.25
Commercial/Institutional	Account	$31.25

Table 9-2: Current Wastewater Use Charges based on Water Use ($/kgal)

Customer Class	Unit	Current Rates
Single Family	kgal	$1.93
Multi Family	kgal	$2.15
Commercial/Institutional	kgal	$5.10
Primary School/Elementary	100 ADA	$84.86
Middle School	100 ADA	$169.73
Secondary School/Middle School	100 ADA	$254.59

9.2. Rate Calculation & Proposed Rates

The proposed wastewater rate structure recovers revenue from fixed and variable charges, dependent on customer class and water use.

[14] The school variable rates are based on average daily attendance (ADA). The charge is based upon 100 ADA as reported by Glendale Unified School District.

First, a fixed charge recovers the District's fixed costs from single family and multi-family residential customers generating revenue stability for the utility. Note that commercial customers are subject to the same minimum fixed charge as multi-family customers to ensure recovery of the fixed costs. Schools have no fixed charges.

The variable charge recovers variable costs and is charged based upon a customer's winter water use for single family and multi-family residential users and total water use for commercial users.

The fixed charge component recovers the fixed costs of operating the wastewater collection system and to withstand variability in water use. The variable charge component gives customers a degree of control over their wastewater bill. The fixed and variable charges are explained in additional detail below.

9.2.1. PROPOSED WASTEWATER SERVICE CHARGES (FIXED)

One of the characteristics of wastewater collection utilities is that most of the costs associated with the service are fixed. While the wastewater collection systems are designed to handle flows, they are generally oversized to accommodate ease of cleaning.

For purposes of allocation among customer classes, it is appropriate to allocate costs to the classes proportional to flow. However, since the majority of the costs are fixed, levying a fixed charge and a variable charge reflects the costs of providing service.

Table 9-3 shows the derivation of the proposed fixed charge. The fixed charge recovers all fixed costs as identified as fixed in Section 8.5. Residential costs are divided by the total number of dwelling units (DU) and billing periods (6) and multiplied by the fixed cost recovery percentage to determine the monthly fixed charge. The charge is rounded up to the nearest penny.

Non-residential customers are charged based on their water use. However, to ensure adequate recovery of the fixed costs, they are subject to a minimum fixed charge equal to the MFR fixed charge per billing period. That is, non-residential wastewater users will never pay less than the MFR fixed charge irrespective of water use.

The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 rates by the revenue adjustment shown in Table 7-10. All charges are rounded up to the nearest penny.

Table 9-3: Derivation of Bi-Monthly Fixed Service Charges ($/DU or $/account)

Customer Class	Cost of Service	Dwelling Units	Billing Periods	Fixed Cost Recovery (%)	FYE 2021 COS	Proposed FYE 2022
Single Family	$2,416,684	5,293	6	61%	$46.50	**$50.23**
Multi-Family	$717,791	2,670	6	61%	$27.38	**$29.58**
Commercial *	$127,026	N/A	6		$27.38	**$29.58**

* Commercial is subject to minimum charge

9.2.2. PROPOSED WASTEWATER USAGE CHARGES (VARIABLE)

Table 9-4 and Table 9-5 show the derivation of the wastewater usage charges. The variable charge recovers costs identified as variable in Section 8.5. Both residential and non-residential customers pay the variable charge on their water use. The variable charge is assessed on prior year winter water use for single family and multi-family residential customers and total water use for commercial customers.

SFR use is capped at 20 kgal per billing period and the MFR cap is 15 kgal per dwelling unit to recognize that usage above those caps may be irrigation usage. Costs for each class are divided by estimated FYE 2021 wastewater flows and multiplied by the variable cost recovery percentage to determine a rate per unit of water. Rates for Commercial are calculated as the total cost of service and divided by the estimated wastewater flow.

The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 COS rates by the revenue adjustment shown in Table 7-10. All rates are rounded up to the nearest whole penny.

Table 9-4: Derivation of Variable Usage Charges ($/kgal)

Customer Class	Cost of Service	Variable Cost Recovery (%)	Wastewater Flow (kgal)	FYE 2021 COS, $/kgal of wastewater	Estimated Water Use (kgal)	FYE 2021 COS, $/kgal of water	Proposed FYE 2022
Single Family	$2,416,684	39%	429,332	$2.19	477,036	$1.97	**$2.13**
Multi-Family	$717,791	39%	127,518	$2.19	127,518	$2.19	**$2.37**
Commercial	$127,026	100%	22,567	$5.63	25,074	$5.07	**$5.48**
School	$60,367	100%	10,724	$5.63	10,724	$5.63	**See Table 9-5**

School users are charged based upon increments of 100 students of the average daily attendance (ADA). Glendale Unified School District provides the ADA figures to the District each October. Table 9-5 shows the derivation of school usage charges per 100 ADA. Based on industry standards, primary schools are assumed to use 5 gallons per day (gpd) per student, middle schools are assumed to use 10 gpd, and high schools 15 gpd. For calculating the gallons per student, the school year is assumed to be 180 days. Note that the total annual water use, the cost to serve all schools, and the variable charge ($/kgal) are the same as in Table 9-4.

The proposed FYE 2022 rates are calculated by multiplying the FYE 2021 rates by the revenue adjustment shown in Table 7-10. All rates are rounded up to the nearest whole penny.

Table 9-5: Derivation of School Usage Charges ($/100 ADA)

Schools	GPD / Student	ADA	Annual Water Use (kgal)	% of Use	Cost of Service	Variable Rate ($/kgal)	kgal / year / student	$ / student / bill	FYE 2021 COS	Proposed FYE 2022
Elementary/Pre-K	5	1,849	1,664	16%	$9,367	$5.63	0.90	$0.84	$84.45	**$91.21**
Middle School	10	1,183	2,129	20%	$11,986	$5.63	1.80	$1.69	$168.90	**$182.42**
High School	15	2,567	6,931	65%	$39,014	$5.63	2.70	$2.53	$253.35	**$273.62**
Total		**5,599**	**10,724**	**100%**	**$60,367**					

Table 9-6 and Table 9-7 show the proposed wastewater service charges and wastewater usage charges for the Study period. Both charges are increased "across the board" in subsequent years – that is, relative to the calculated FYE 2021 rates – by the selected financial plan. All rates are rounded up to the nearest penny.

Table 9-6: Proposed Bi-Monthly Wastewater Service Charges ($/DU or $/account)

Customer Class	Unit	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
Single Family	DU	$47.79	$50.23	$54.25	$58.59	$62.70	$67.09
Multi Family	DU	$31.25	$29.58	$31.95	$34.51	$36.93	$39.52
Commercial/Institutional (minimum charge)	Account	$31.25	$29.58	$31.95	$34.51	$36.93	$39.52

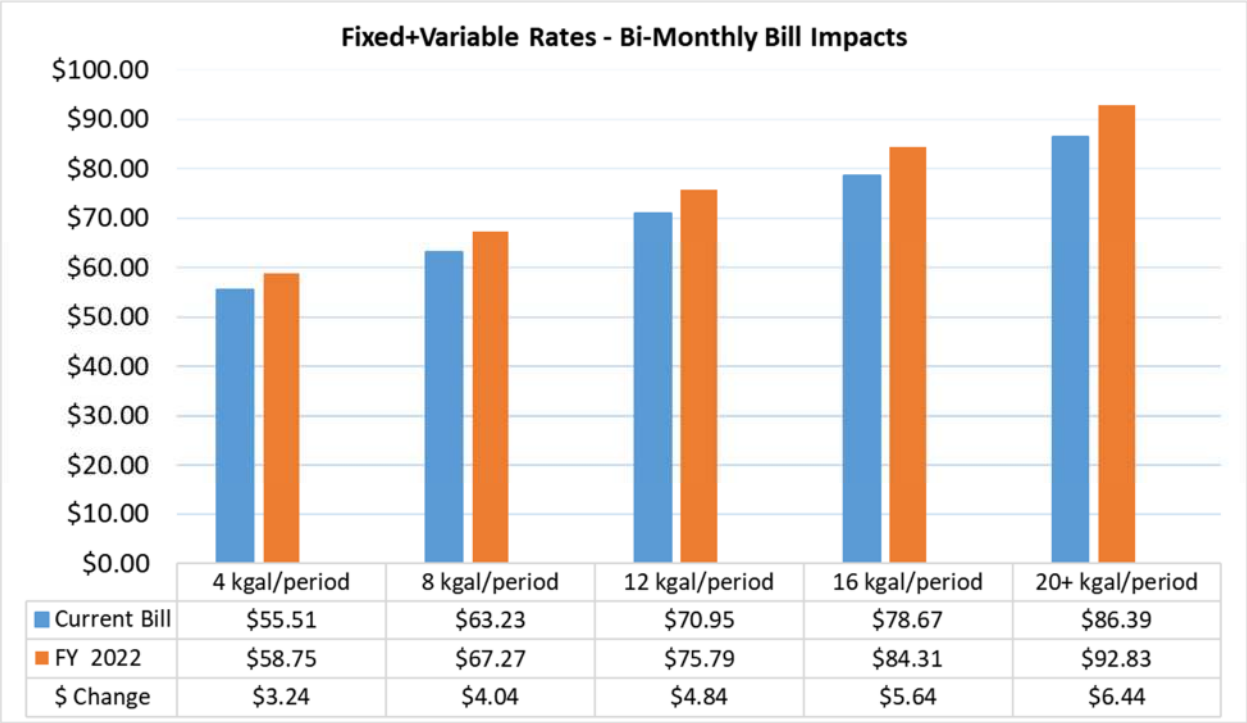
Table 9-7: Proposed Wastewater Use Rates ($/kgal of water)

Customer Class	Unit	Current Rates	Proposed October 2021	Proposed July 2022	Proposed July 2023	Proposed July 2024	Proposed July 2025
Single Family, winter water use	kgal	$1.93	$2.13	$2.31	$2.50	$2.68	$2.87
Multi Family, winter water use	kgal	$2.15	$2.37	$2.56	$2.77	$2.97	$3.18
Commercial/Institutional, actual water use	kgal	$5.10	$5.48	$5.92	$6.40	$6.85	$7.33
Primary School/Elementary	100 ADA	$84.86	$91.21	$98.51	$106.40	$113.85	$121.82
Middle School	100 ADA	$169.73	$182.42	$197.02	$212.79	$227.69	$243.63
Secondary School/Middle School	100 ADA	$254.59	$273.62	$295.51	$319.16	$341.51	$365.42

9.3. Customer Impacts

Figure 9-1 shows the impacts across the SFR customer class. The figure shows the current and proposed bills for low, average, and high-volume users. Under the proposed rates, water usage subject to the variable charge is capped at 20 kgal per billing period. The figure also displays the change in bill in dollar and percentage terms. Due to rounding in the calculations, some values may not add to the penny.

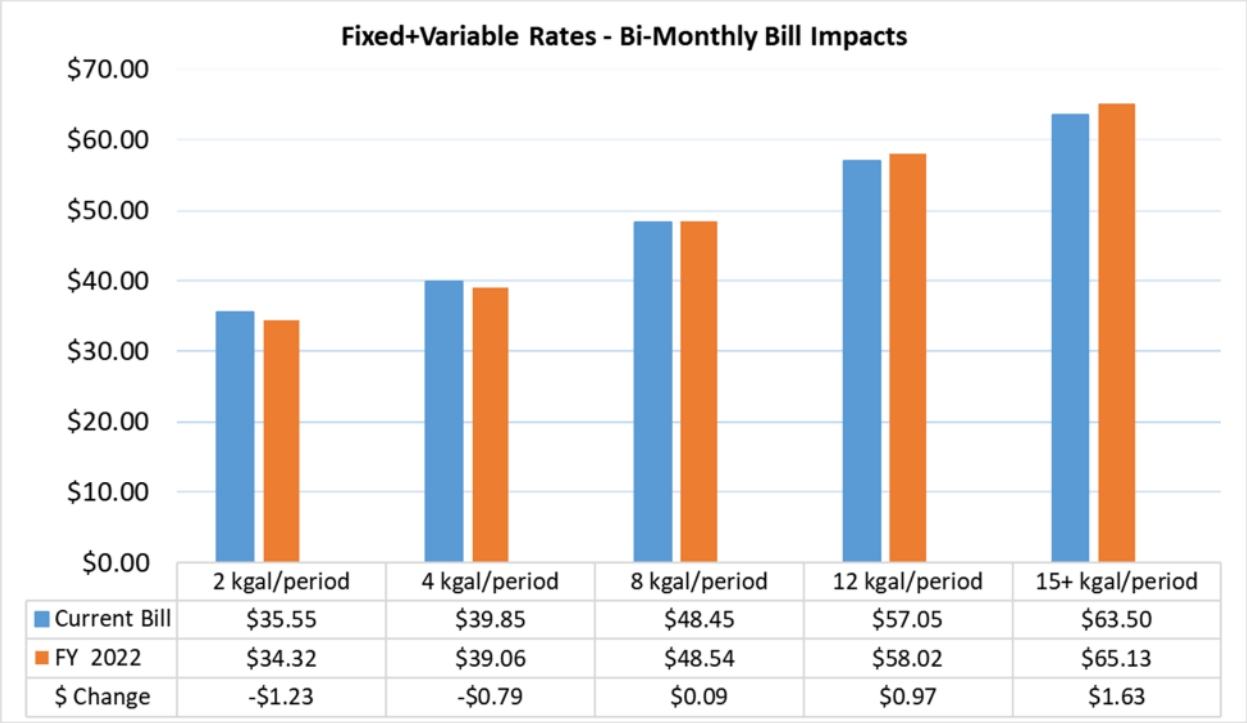
Figure 9-1: Bill Impacts - Single Family Residential



	4 kgal/period	8 kgal/period	12 kgal/period	16 kgal/period	20+ kgal/period
Current Bill	$55.51	$63.23	$70.95	$78.67	$86.39
FY 2022	$58.75	$67.27	$75.79	$84.31	$92.83
$ Change	$3.24	$4.04	$4.84	$5.64	$6.44
% Change	6%	6%	7%	7%	7%

Figure 9-2 conveys the same information for MFR customers. MFR customers use less water on average and so their maximum billable usage is 15 kgal per billing period. An average user at approximately 8 kgal sees a negligible increase in their bill due to a reduction in the fixed charge.

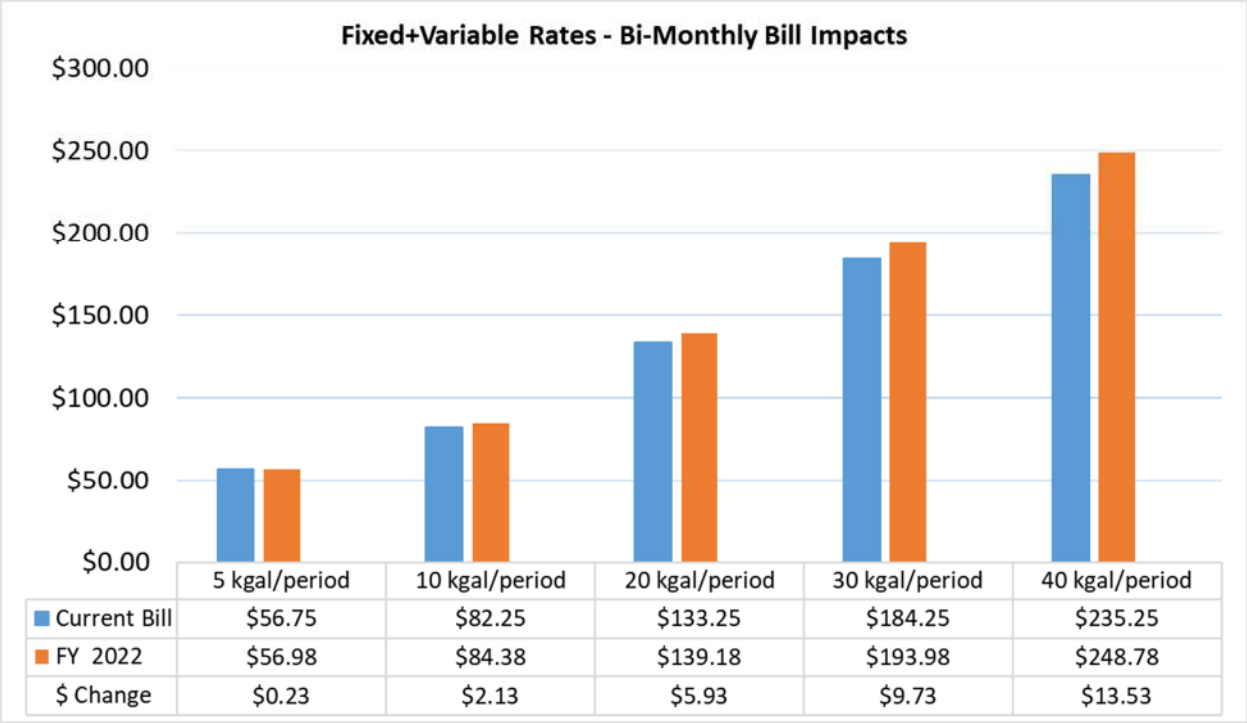
Figure 9-2: Bill Impacts – Multi-Family Residential



	2 kgal/period	4 kgal/period	8 kgal/period	12 kgal/period	15+ kgal/period
Current Bill	$35.55	$39.85	$48.45	$57.05	$63.50
FY 2022	$34.32	$39.06	$48.54	$58.02	$65.13
$ Change	-$1.23	-$0.79	$0.09	$0.97	$1.63

Figure 9-3 shows bill impacts for commercial customers. Commercial customers see small increases in their bills. The proposed rates maintain the current structure for commercial customers with a variable rate and a minimum charge equal to the fixed charge paid by a MFR customer. There is no cap on water use for commercial customers.

Figure 9-3: Bill Impacts – Commercial



	5 kgal/period	10 kgal/period	20 kgal/period	30 kgal/period	40 kgal/period
Current Bill	$56.75	$82.25	$133.25	$184.25	$235.25
FY 2022	$56.98	$84.38	$139.18	$193.98	$248.78
$ Change	$0.23	$2.13	$5.93	$9.73	$13.53