CRESCENTA VALLEY WATER DISTRICT

Water and Sewer Cost of Service Study

Final Report / July 20, 2016

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Kerry Erickson, Board President
Crescenta Valley Water District
2700 Foothill Boulevard
La Crescenta CA 91214

Subject: Water and Sewer Cost of Service Report

Dear Mr. Erickson,

Raftelis Financial Consultants, Inc. (RFC) is pleased to provide this Water and Sewer Cost of Service Study Report (Study) for Crescenta Valley Water District (District) to develop water and sewer 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. Revisions to both rate structures for water and sewer services
3. Recommended policy revisions
4. Long term financial plans for the water and sewer utilities
5. Equitable cost of service based water and sewer rates

The Study summarizes the key findings and results related to the revision of the rate structures and development of rates and charges for water and sewer service. The appendices contain alternative rate structures evaluated including a water budget structure for water service and a fixed residential charge for sewer service.

It has been a pleasure working with you, and we thank you, Mr. David Gould, and District staff for the support provided during the course of this Study.

Sincerely,
Raftelis Financial Consultants, Inc.

Sudhir Pardiwala
Executive Vice President

Kevin Kostiuk
Senior Consultant

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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 over 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 sewer utility serves approximately 5,600 users in La Crescenta, Montrose, and a portion of the City of La Canada-Flintridge. The sewer 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 2015, The District contracted with Raftelis Financial Consultants (RFC) to conduct a Rate Study (Study) to include a ten-year Financial Plan for the water and sewer utilities. This Study presents the Financial Plans, Cost of Service Analyses, and the resulting water and sewer rates for implementation in July of 2016[1].

This Executive Summary compiles the current and proposed water and sewer 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 in July 1, 2015. 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 sewer 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 sufficiency in times of water supply shortage or mandatory conservation; and
- 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 sewer 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). In addition, the analyses

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

contained in this Study make assumptions regarding future water usage and ensures that the District is financially prepared for a period of reduced sales.
2. Conduct a Cost of Service analysis for the water and sewer systems.
3. Develop fair and equitable water rates that adequately recover costs, provide revenue stability for recovering fixed costs, and maintain affordable service, while compliant with the requirements of Proposition 218.

The water cost of service study was prepared using the principles established by the American Water Works Association (AWWA). AWWA *"Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1* (sixth edition) (the "M1 Manual"). The wastewater cost of service study was prepared based on the principles established by the Water Environment Federation and described in *Financing and Charges for Wastewater Systems*. The general principles of rate structure design and the objectives of the Study are described below.

According to the M1 Manual, the first step in the ratemaking process is to determine the adequate and appropriate level of funding for a given utility. This is referred to as determining the "revenue requirement." This analysis considers the short-term and long-term service objectives of the utility over a given planning horizon, including capital facilities, system operations and maintenance, and financial reserve policies, to determine the adequacy of a utility's existing rates to recover its costs. A number of factors may affect these projections, including the number of customers served, water-use trends, extraordinary gains or expenses, weather, conservation, use restrictions, inflation, interest rates, capital finance needs, changes in tax laws, and other changes in operating and economic conditions.

After determining a utility's revenue requirements, the next step is determining the cost of service. Utilizing a public agency's approved budget, financial reports, operating data, and capital improvement plans, a cost of service study generally categorizes the operating system costs by function (e.g., treatment, storage, pumping, distribution/collection, etc.). Asset costs are similarly functionalized to determine the cost of service.

After the assets and the costs of operating those assets are properly categorized by function, these "functionalized costs" are allocated first to cost causation components, and then to the various customer classes (e.g., single-family residential, multi-family residential, and commercial) by determining the characteristics of those classes and the contribution of each to incurred costs such as base costs, peaking costs, delivery costs, service characteristics, and demand patterns for water and flow and strength for wastewater.

Rate design is the final part of the rate-making procedure and uses the revenue requirement and cost of service analysis to determine appropriate rates for each customer class. Rates utilize "rate components" that build-up to rates for commodity charges, and rates for fixed charges, for the various customer classes and meter sizes servicing customers. In the case of inclining tier water rates, the rate components define the cost of service *within* each class of customer, effectively treating each tier as a sub-class and determining the cost to serve each tier.

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." RFC 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 indirect 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 on a parcel basis in each tier.

1.4 RESULTS AND RECOMMENDATIONS

Table 1-1 shows the proposed revenue adjustments selected by the District Board and used to calculate the proposed rates. Although Table 1-1 shows anticipated revenue adjustments for FYs 2017 through 2021, the District will review and confirm the needed revenue adjustments on an annual basis.[2] Both water and sewer revenue adjustments are proposed for implementation July 2016. All future revenue adjustments will take effect on July 1 of each fiscal year.

Table 1-1: Utility Revenue Adjustment Plans

Enterprise	Revenue Adjustments				
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Water	6.5%	7.1%	7.4%	7.5%	7.0%
Sewer	0%	1.5%	1.5%	1.5%	3%

1.4.1 Factors Affecting Revenue Adjustments –Water

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 $14.7 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. Major capital projects include repairs and replacements for water supply, storage, and distribution. A more detailed discussion of the projected capital improvement projects to be funded through the five-year CIP is provided in Section 4.1 and Table 4-10.

[2] The Board maintains the right to implement rates that are *lower* than adopted. If it is determined that a rate *higher* than that adopted is required, the Board will have to adopt new rates and the District will need to re-issue a Proposition 218 notice.

- **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. Section 2.1 describes the reserve targets and Figure 4-3 shows the reserve balances for the selected Financial Plan. The defined reserve policy is 60 days of cash to meet operating expenses (less water production and purchase costs), or roughly $859k in FY 2016; $750k in unrestricted emergency funds; and $1.64M for rate stabilization. The total target for FY 2016 is approximately $3.25M.
- **Reduced Water Sales:** On January 17, 2014, Governor Jerry Brown issued a drought state of emergency declaration in response to record-low water levels in California's rivers and reservoirs as well as an abnormally low snowpack. On April 1, 2015, Governor Brown issued an Executive Order calling for statewide mandatory potable water use reductions of up to 25 percent. On May 5, 2015, the State Water Resources Control Board (State Board) approved regulations, based on Governor Brown's Executive Order, mandating the District reduce its potable water consumption by 24 percent for June 2015 through February 2016 as compared to the same months in 2013. On November 15, 2015, Governor Brown extended these conservation measures until October 31, 2016. On February 11, 2016, the State Board extended the mandatory 24 percent reduction in potable water consumption for the District. The continued drought, State mandated water conservation, and local public outreach efforts to reduce water use, have reduced water use and therefore revenues of the District. The District experienced a 15.9 percent decrease in water use between FY 2014 to FY 2015 and projects a 12.8 percent decrease for FY 2016 versus FY 2015. In addition to reduced water sales, the drought has reduced the availability of groundwater production in the Verdugo basin, increasing the amount and cost of purchased water from FMWD. This results in increased costs per unit of water sold as the District's mostly fixed costs are spread over fewer units of more expensive water sold.

1.4.2 Factors Affecting Revenue Adjustments – Sewer

- **Capital Projects:** The District has approximately $870k in annual capital expenditures over the five-year rate setting period of this Study. Capital projects will be funded exclusively through rate revenue. The majority of capital expenditures relate to the District's portion of Los Angeles Bureau of Sanitation capital projects (approximately $760k annually). The remaining $110k are District repair and replacement projects, with the majority of funds going towards collection system projects. A more detailed discussion of the projected sewer capital improvement projects to be funded through the five-year CIP is provided in Section 8.1 and Table 8-8 .
- **Inflationary Pressures:** Even at the same level of service provided, the District's operating and maintenance costs escalate each year from general inflationary pressures, construction cost inflation, energy prices, reserve funding, and wage pressure. Escalation factors are discussed in Section 3.

1.4.3 Proposed Water Service Charges (Fixed Charges)

Table 1-2 shows the current and proposed charges for the bi-monthly Service Charge. Charges are shown by meter size for the Study period. The proposed Service Charge is inclusive of all water users. The proposed Service Charges are based on the size of the meter serving a property.

Table 1-2: Current and Proposed Rates for Bi-Monthly Service Charges ($/Meter Size)

Meter Size	Current Charge[3]	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
3/4"	$38.24	$41.06	$43.98	$47.24	$50.79	$54.35
1"	$46.96	$61.25	$65.60	$70.46	$75.75	$81.06
1 1/2"	$68.56	$111.73	$119.67	$128.53	$138.17	$147.85
2"	$86.72	$172.32	$184.56	$198.22	$213.09	$228.01
3"	$94.56	$364.16	$390.02	$418.89	$450.31	$481.84
4"	$242.94	$646.87	$692.80	$744.07	$799.88	$855.88

1.4.4 Proposed Water Commodity Rates (Variable Rates)

Table 1-3 shows the current and proposed Commodity rates by customer class. RFC recommends adoption of a 3 Tier inclining rate structure. RFC also recommend adjustments to the tier definitions. Those modifications are found in Table 1-4 and Section 6.1. The proposed rates in years FY 2017 and beyond are adjusted by the revenue adjustment percentage found in Table 1-1. The commodity charges for the current and proposed commodity rates are calculated on the amount of water delivered in units of one thousand gallons (kgal).

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

Class	Current	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR[4]						
Tier 1	$4.61	$4.39	$4.71	$5.06	$5.44	$5.83
Tier 2	$5.96	$6.91	$7.41	$7.96	$8.56	$9.16
Tier 3	$8.50	$10.43	$11.18	$12.01	$12.92	$13.83
Tier 4	$11.39	N/A	N/A	N/A	N/A	N/A
MFR/Commercial[5]	$5.96	$6.22	$6.67	$7.17	$7.71	$8.25
Irrigation						
Tier 1	$5.96	$4.80	$5.15	$5.54	$5.96	$6.38
Tier 2	$11.39	$9.20	$9.86	$10.59	$11.39	$12.19

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

Table 1-4: Current and Proposed Water Tier Definitions

Class	Current (kgal)	Proposed (kgal)
SFR		
Tier 1	0-10	0-10
Tier 2	11-25	11-26
Tier 3	26-37	>26
Tier 4	>37	N/A
MFR/Commercial	Uniform	Uniform
Irrigation		
Tier 1	0-70	0-80
Tier 2	>70	>80

Together, the two components of the District's proposed water service fees are structured to recover the proportionate costs of providing water service to each customer class and each parcel within each customer class, and to deter waste, encourage water conservation, manage the District's water resources, and provide revenue stability.

1.4.5 Proposed Sewer Charges

RFC recommends the District adopt a fixed plus variable sewer rate structure for residential customers. These modifications are found in Section 9.5 and 10.1. Table 1-5 and Table 1-6 show the current and proposed sewer fixed charge and variable sewer rates by customer class. The proposed rates in years FY 2017 and beyond are adjusted by the revenue adjustment percentage found in Table 1-1. The variable rates are based on minimum winter water use for residential customers and actual water use for non-residential customers. The residential usage is capped at 20 kgal per billing period for SFR customers and 15 kgal per period for MFR customers.

Table 1-5: Current and Proposed Fixed Sewer Service Charges ($/month/EDU[6])

Class	Current	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR	$67.50	$45.95	$46.65	$47.35	$48.07	$49.52
MFR	$67.50	$30.05	$30.51	$30.97	$31.44	$32.39
Commercial/Institutional (Minimum Charge)	$67.50	$30.05	$30.51	$30.97	$31.44	$32.39
Commercial Customer Charge	$2.10	N/A	N/A	N/A	N/A	N/A
School Customer Charge	$2.10	N/A	N/A	N/A	N/A	N/A

Table 1-6: Current and Proposed Variable Rates for Sewer Use ($/kgal)

Class	Current	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR	N/A	$1.86	$1.89	$1.92	$1.95	$2.01
MFR	N/A	$2.07	$2.10	$2.14	$2.18	$2.25
Commercial/Institutional	$5.50	$4.90	$4.98	$5.06	$5.14	$5.30
Primary School	$81.00	$81.60	$82.83	$84.08	$85.35	$87.92
Middle School	N/A	$163.20	$165.65	$168.14	$170.67	$175.80
Secondary School	$162.10	$244.80	$248.48	$252.21	$256.00	$263.68

[6] EDU stands for Equivalent Dwelling Unit

2. RESERVE POLICY

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 generates sound 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 DISTRICT POLICIES - WATER

Table 2-1 details the District's adopted policy by reserve type and target level in FY 2016 for the water utility. The target for the Water Operating Fund equals 60 days of annual operating expenses, or approximately $859 thousand. 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 65 percent of total operating costs.

A Rate Stabilization Reserve is for unforeseen challenges (e.g., the ongoing drought) 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 event. 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 $750 thousand for the Emergency Reserve.

Table 2-1: Water Reserve Policies

Reserve Type	Recommended Policy	FY 2016 Target Level
Operating Reserve	60 days of operating budget	$859k
Rate Stabilization Reserve	25% of Commodity Revenue	$1.64M
Emergency Reserve	100% of annual depreciation	$750k
Total Reserves		**$3.25M**

2.2 DISTRICT POLICIES - SEWER

Table 2-2 details the District adopted policy by reserve type, and target level in FY 2016 for the sewer utility. The target for the Sewer Operating Fund equals 60 days of annual operating expenses, or approximately $396 thousand. This reserve provides cash flow in case of revenue shortfalls and for working capital. Considerations for billing frequency and seasonal fluctuations in expenditures, among others, determine the reserve target.

Capital Replacement Reserves consider long term capital improvement projects (CIP) expenditures for both the District and the District's share of Los Angeles Bureau of Sanitation capital costs; projects to be debt financed versus rate funded; and system age, among other factors. The District maintains a Capital R&R reserve equal to one year of average CIP.

A Rate Stabilization Reserve is for unforeseen challenges (e.g., the ongoing drought) related to sewer costs. An amount equal to a percentage of annual sewer rate revenue is set aside to be utilized during revenue shortfalls, to smooth out rate impacts, or to fund unforeseen 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 15 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 event. 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 $750 thousand for the Emergency Reserve.

Table 2-2: Recommended Sewer Reserve Policies

Reserve	Recommended Policy	FY 2016 Target Level
Operating Reserve	60 days of operating budget	$396k
Capital Reserve	One year of average CIP	$900k
Rate Stabilization Reserve	15% of Commodity Revenue	$494k
Emergency Reserve	100% of annual depreciation	$750k
Total Reserves		**$2.54M**

RFC has used these District established reserve targets in the development of the financial plan. Additionally, the District received compensation for pollutants leaked by oil companies and has $6.8M set aside in an MTBE reserve.

3. GENERAL ASSUMPTIONS - WATER

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 INFLATION

The Study Period is from Fiscal Year End (FY) 2016 to 2021 with proposed revenue adjustments and rates presented for the five years FY 2017 through FY 2021. 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.

These cost escalation factors below show projected increases in various cost categories across the Study period. The factors are applied to all years beginning FY 2018. RFC used the FY 2016 and FY 2017 budgets so no inflationary factors are applied to those years. RFC 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 8 percent is used. Energy costs reflect the price of electricity related to producing groundwater, pumping water through the distribution system, and treatment of raw water. Based on District direction, capital costs are not inflated through the Study period.

Table 3-1: Inflationary Assumptions

Escalation Factors	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
General			3.0%	3.0%	3.0%	3.0%
Salary			3.0%	3.0%	3.0%	3.0%
Benefits			8.0%	8.0%	8.0%	8.0%
Energy			3.0%	3.0%	3.0%	3.0%
Capital			0.0%	0.0%	0.0%	0.0%

3.2 PROJECTED WATER DEMAND AND ACCOUNT GROWTH

Water demand is a critical factor in the development of the financial plan. There is significant uncertainty with the current drought and the state mandates for reduction in use. 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 0.10 percent in FY 2016-2020 and 0.06 percent in FY 2021. In consideration of current drought conditions and the District's assigned mandatory water usage cutback of 24 percent from the State Water Resources Control Board (SWRCB), total potable water demand is projected to decrease by 12.8 percent for FY 2016 versus FY 2015. For FY 2017 through FY 2020, potable usage is expected to rebound as the State

comes out of drought conditions and mandatory reductions expire. The District's water demand is at historic lows and water demand is expected to increase approximately 2.5 percent year over year through the Study period. Long term demand is anticipated to be greater than 4,000 acre feet (AF) annually from the current level of approximately 3,300 AF. Even at 4,000 AF the District meets its 20 percent overall reduction by 2020 as part of SB X7-7.

In order to predict non-operating revenues, the Study assumes that miscellaneous revenues will increase at 5 percent per year through FY 2021. 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, Water Demand, and Revenue Growth Assumptions

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Account Growth	0.10%	0.10%	0.10%	0.10%	0.10%	0.06%
Water Demand Factor	88.5%	102.3%	102.6%	102.5%	102.4%	102.5%
Water Demand (AFY)[7]	3,323	3,403	3,495	3,586	3,676	3,770
Misc. Revenues	N/A	N/A	5.0%	5.0%	5.0%	5.0%
Reserve Interest	N/A	N/A	1.25%	1.5%	1.5%	1.5%

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. Table 3-3 summarizes the various sources of supply, the purchase cost (if any) in FY 2016, and the amount provided by each source (in AF) to meet demand in FY 2016. The sources are listed in order of use (priority).

Table 3-3: Water Sources of Supply

Source	FY 2016 Cost ($/AF)	FY 2016 (AF)
Groundwater (Verdugo Basin)	$278	1,820
Groundwater (GWP)	$522	195
FMWD Tier 1	$933[8]	1,574
FMWD Tier 2	$1066	0

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. Metropolitan Water District of Southern California (MWD) has adopted increases in wholesale water rates to its member agencies including FMWD, the wholesale water supplier for the District, effective January 2016. Future increases in FMWD water are projected at 5 percent per year.

[7] AFY stands for Acre Feet per Year. One 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)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Groundwater (Verdugo Basin)	$278	$259	$253	$247	$240	$231
Groundwater (GWP)	$522	$535	$552	$569	$586	$603
FMWD Tier 1	$933	$966	$1,014	$1,065	$1,118	$1,174
FMWD Tier 2	$1,066	$1,103	$1,158	$1,216	$1,277	$1,341

Similarly, using projected availability from the several sources of supply 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, however, pumping has been reduced during the ongoing drought. Groundwater produced from the leased water right from GWP will increase to approximately 600 AF per year per the agreement with the agency. Increased production from local groundwater offsets purchases of Tier 1 imported water from FMWD in future years. The District does not anticipate purchasing Tier 2 water from FMWD in any year.

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

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Groundwater (Verdugo Basin)	1,820	1,950	2,100	2,220	2,400	2,620
Groundwater (GWP)	195	555	555	600	600	600
FMWD Tier 1	1,574	1,170	1,120	1,053	970	851
FMWD Tier 2	0	0	0	0	0	0
Total	**3,589**	**3,675**	**3,775**	**3,853**	**3,970**	**4,071**

4. WATER FINANCIAL PLAN

This section describes the water utility's customer account and water use data and corresponding financial plan. To develop the financial plan, RFC projects annual expenses and revenues; models reserve balances; projects transfers between District funds[9], and capital expenditures; 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 Rates

The current rates were last adjusted in July 2015. 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 is determined on the basis of the size of the water meter serving a property and increases with meter size, as larger meter sizes generally consume more water on average and tend to have higher rates of peaking; 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 $38.24. 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 period.

Table 4-1: Current Bi-Monthly Service Charges

Meter Size	FY 2016
3/4"	$38.24
1"	$46.96
1 1/2"	$68.56
2"	$86.72
3"	$94.56
4"	$242.94

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.

[9] Transfers take place between District funds due to loans from the MTBE Reserve and the Water Fund

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

Fire Service Size	FY 2016
1"	$16.00
2"	$23.56
3"	$35.16
4"	$47.68
6"	$81.98
8"	$124.72
10"	$174.16

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 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. Tiers are discussed in detail in Section 6.1.

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

Class	Tier Definition	Rate ($/kgal)
SFR		
Tier 1	0-10	$4.61
Tier 2	11-25	$5.96
Tier 3	26-37	$8.50
Tier 4	>37	$11.39
MFR/Commercial	Uniform	$5.96
Irrigation		
Tier 1	0-70	$5.96
Tier 2	>70	$11.39

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 fire service accounts using the same assumptions as water accounts. Both tables include inside district and outside district accounts.

Table 4-4: Projected Accounts by Meter Size

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
3/4"	6,949	6,956	6,963	6,970	6,977	6,981
1"	818	819	819	820	821	822
1 1/2"	145	145	145	146	146	146
2"	63	63	63	63	63	63
3"	29	29	29	29	29	29
4"	3	3	3	3	3	3
Total	**8,007**	**8,015**	**8,023**	**8,031**	**8,039**	**8,044**

Table 4-5: Projected Fire Services by Size

Fireline Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
1"	1	1	1	1	1	1
2"	8	8	8	8	8	8
3"	2	2	2	2	2	2
4"	66	66	66	66	66	66
6"	16	16	16	16	16	16
8"	6	6	6	6	6	6
10"	2	2	2	2	2	2
Total	**101**	**101**	**101**	**101**	**102**	**102**

Water demand projections through FY 2021 are shown in Table 4-6. The water demand and revenue growth assumptions are identified in Table 3-2. Water sales revenue is expected to continue to decline in FY 2016 relative to previous years as a result of the ongoing drought. As previously discussed, due to current drought conditions, California Governor Brown issued executive order B-29-15 on April 1, 2015, which mandates a 25 percent reduction in urban water use statewide. The State Water Resources Control Board (SWRCB) determined that the District must reduce water consumption by 24 percent relative to calendar year (CY) 2013 levels.

Water demand is anticipated to rebound slightly in FY 2017 through FY 2021 to recover to a new baseline level of consumption of approximately 3,770 AF annually.

Table 4-6: Commodity Demand Estimates (kgal)

Class	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
SFR						
Tier 1	330,058	337,987	347,121	356,155	365,067	374,419
Tier 2	259,898	266,142	273,335	280,448	287,466	294,829
Tier 3	70,300	71,989	73,935	75,859	77,757	79,749
Tier 4	48,895	50,069	51,422	52,761	54,081	55,466
MFR/Commercial	344,858	353,143	362,687	372,126	381,438	391,208
Irrigation						
Tier 1	11,051	11,316	11,622	11,924	12,223	12,536
Tier 2	17,819	8,247	18,740	19,228	19,709	20,214
Total Water Sales (kgal)	**1,082,878**	**1,108,892**	**1,138,861**	**1,168,500**	**1,197,741**	**1,228,421**
Total Water Sales (AF)	**3,323 AF**	**3,403 AF**	**3,495 AF**	**3,586 AF**	**3,676 AF**	**3,770 AF**

Table 4-7 shows the rate revenue generated in each Study year with projected demand and the current rates. Note, revenues for FY 2016 and beyond use FY 2016 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 Revenues (with No Revenue Adjustments)

Revenue Source	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Commodity Charges	$6,549,193	$6,706,525	$6,887,775	$7,067,029	$7,243,875	$7,429,427
Service Charges	$1,978,819	$1,980,797	$1,982,778	$1,984,761	$1,986,746	$1,987,938
Total Revenues from Rates	**$8,528,012**	**$8,687,322**	**$8,870,553**	**$9,051,790**	**$9,230,621**	**$9,417,364**

CVWD 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 Non-Rate Revenues

Revenue Source	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Other Operating						
Late Fees/Fire Hydrant Flow/Backflow Tests	$77,000	$80,000	$82,400	$84,872	$87,418	$90,041
Rental Property Income	$23,000	$23,000	$24,150	$25,358	$26,625	$27,957
Other Income	$3,000	$5,000	$5,250	$5,513	$5,788	$6,078
Non-Operating						
Interest Income - Water	$50,059	$50,833	$47,803	$49,381	$50,247	$60,390
Gain/Loss on Sale of Investments	$40,000	$56,000	$57,680	$59,410	$61,193	$63,028
Interest Earned - MTBE Reserve Fund	$110,000	$77,000	$77,963	$78,937	$80,121	$81,323
CIP Source Revenues						
Water Systems Connect Fee	$33,000	$45,000	$45,000	$45,000	$45,000	$45,000
Meter Installation/Hydrant Charges	$30,000	$30,000	$31,500	$33,075	$34,729	$36,465
Other Income - Water/Grants[10]	$698,025	$1,150,250	$620,475	$285,300	$250,000	$250,000
Gain/Loss on Sale of Assets	$0	$0	$0	$0	$0	$0
Interest Earned	$200	$200	$203	$205	$208	$211
Total Non-Operating Revenues	**$1,064,284**	**$1,517,283**	**$992,423**	**$667,051**	**$641,329**	**$660,493**

4.1.2 Operations and Maintenance (O&M) Expenses

Total projected O&M expenses are shown in Table 4-9. These expenses are summarized by department. Table 4-9 also includes capitalized expenditures. Operating and capitalized expenses use the District's preliminary budget FY 2017 values and project future expenses using the inflationary assumptions from Table 3-1.

[10] CVWD anticipates receiving revenue for grant reimbursement from California Department of Water Resources (DWR) for Proposition 84 grant projects that were awarded in 2015 and 2016. Reimbursement is expected in FY 2016, 2017 and 2018. The delay is due to timing between invoicing to DWR and receiving reimbursement from DWR.

Table 4-9: Projected Water Fund O&M and Capitalized Expenses

Department	Budgeted FY 2016	Budgeted FY 2017	Projected FY 2018	Projected FY 2019	Projected FY 2020	Projected FY 2021
Water Production	$3,064,386	$2,881,279	$2,937,154	$3,007,126	$3,035,575	$3,016,168
Purchased Power	$255,200	$264,500	$279,798	$295,692	$312,184	$329,786
Compensation	$1,723,900	$1,841,000	$1,896,230	$1,953,117	$2,011,710	$2,072,062
Benefits	$1,029,800	$1,116,000	$1,205,280	$1,301,702	$1,405,839	$1,518,306
Plant/Water Operation	$199,700	$210,925	$218,831	$226,991	$235,407	$244,284
Distribution System	$930,300	$960,300	$964,839	$969,514	$974,330	$979,289
General and Admin.	$660,600	$688,500	$709,155	$730,430	$752,343	$774,913
Fire and Debris Recovery	$1,000	$2,000	$2,060	$2,122	$2,185	$2,251
Total O&M Expenses	**$7,864,886**	**$7,964,504**	**$8,213,347**	**$8,486,694**	**$8,729,573**	**$8,937,059**
Capital Outlay	$22,000	$80,000	$75,000	$81,000	$65,000	$55,000
Capital Equipment	$0	$30,000	$75,000	$75,000	$75,000	$75,000
Total Capitalized Expenses	**$22,000**	**$110,000**	**$150,000**	**$156,000**	**$140,000**	**$130,000**

4.1.3 Projected Capital Improvement Projects

The District has planned $2.8 million in capital expenditures each year over the rate setting period (FY 2017-2021) for the water enterprise, as shown in Table 4-10. A significant portion of the District's projected capital expenditures are attributed to water distribution, water supply, and water storage projects. The District anticipates funding capital improvements exclusively with rate revenues.

Table 4-10: Capital Improvement Plan

Department	Budgeted FY 2016	Budgeted FY 2017	Projected FY 2018	Projected FY 2019	Projected FY 2020	Projected FY 2021
Water Supply	$2,278,754	$810,000	$800,000	$500,000	$500,000	$500,000
Water Storage	$0	$395,000	$400,000	$400,000	$400,000	$400,000
Water Distribution	$812,852	$1,250,000	$1,250,000	$1,350,000	$1,350,000	$1,450,000
Water Treatment	$0	$0	$50,000	$50,000	$75,000	$100,000
Technology	$56,000	$270,000	$300,000	$300,000	$300,000	$100,000
Public Safety/ Emergency Response	$0	$75,000	$0	$0	$0	$0
Facilities & Planning	$0	$0	$0	$200,000	$175,000	$250,000
Total Capital Projects	**$3,147,606**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**

4.1.4 Existing Debt Service

The water utility has one outstanding long-term debt obligation. 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 FY 2016 is $613,838.

Table 4-11: Existing Debt Service

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Principal	$245,000	$255,000	$265,000	$275,000	$285,000	$300,000
Interest	$368,838	$359,038	$348,838	$338,238	$327,238	$315,481
Total Debt Service	**$613,838**	**$614,038**	**$613,838**	**$613,238**	**$612,238**	**$615,481**

In addition to the debt obligation, the water utility has an internal loan from the MTBE Reserve in FY 2016 and FY 2017 with repayment beginning in FY 2021.

Table 4-12: Internal Loan and Repayment Schedule

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Loan	$2,000,000	$1,000,000	$0	$0	$0	$0
Repayment	$0	$0	$0	$0	$0	($500,000)
Loan Balance	**$2,000,000**	**$3,000,000**	**$3,000,000**	**$3,000,000**	**$3,000,000**	**$2,500,000**

4.2 STATUS QUO WATER FINANCIAL PLAN (NO REVENUE ADJUSTMENTS)

Table 4-13 displays the proforma of the District's water fund 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 4-13: Status Quo Water Proforma

Water Utility	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
REVENUES						
Revenue from Existing Rates	$8,528,012	$8,687,322	$8,870,553	$9,051,790	$9,230,621	$9,417,364
Total Revenue Adjustments	$0	$0	$0	$0	$0	$0
Non-Rate Revenues	$1,064,284	$1,513,753	$977,569	$624,594	$561,658	$529,989
TOTAL REVENUE	**$9,592,296**	**$10,201,075**	**$9,848,122**	**$9,676,385**	**$9,792,278**	**$9,947,354**
OPERATING EXPENSES	$7,864,886	$7,964,504	$8,213,347	$8,486,694	$8,729,573	$8,937,059
CAPITAL EXPENSES	$22,000	$110,000	$150,000	$156,000	$140,000	$130,000
TOTAL EXPENSES	**$7,886,886**	**$8,074,504**	**$8,363,347**	**$8,642,694**	**$8,869,573**	**$9,067,059**
REVENUES LESS OPERATING EXPENSES	**$1,705,410**	**$2,126,572**	**$1,484,775**	**$1,033,691**	**$922,705**	**$880,295**
REPLACEMENT CAPITAL PROJECTS	**$3,147,606**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**
PAYGO	$3,147,606	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000
Debt Funded	$0	$0	$0	$0	$0	$0
DEBT ISSUES	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
DEBT SERVICE	**($1,386,162)**	**($385,962)**	**$613,838**	**$613,238**	**$612,238**	**$1,115,481**
NET CASH CHANGE	($106,093)	($334,770)	($1,962,011)	($2,386,472)	($2,460,108)	($2,965,073)
BEGINNING BALANCE	**$4,057,756**	**$3,951,663**	**$3,616,893**	**$1,654,882**	**($731,590)**	**($3,191,698)**
ENDING BALANCE	$3,951,663	$3,616,893	$1,654,882	($731,590)	($3,191,698)	($6,156,771)
TARGET BALANCE	***$3,246,140***	***$3,363,414***	***$3,444,286***	***$3,529,027***	***$3,612,538***	***$3,700,377***
Operating Reserve	$858,842	$936,783	$972,342	$1,012,269	$1,051,569	$1,093,021
Rate Stabilization	$1,637,298	$1,676,631	$1,721,944	$1,766,757	$1,810,969	$1,857,357
Emergency Reserve	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000

4.3 PROPOSED WATER FINANCIAL PLAN

RFC proposes that the District adopt the revenue adjustment schedule found in Table 4-14. The FY 2017 revenue adjustment is proposed to be implemented July 1, 2016 with all subsequent adjustments occurring on July 1 of each fiscal year.

Although Table 4-14 shows anticipated revenue adjustments for FYs 2017 through 2021, 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 CVWD 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. RFC's proposed revenue adjustments help ensure adequate revenue to fund operating expenses, achieve reserve policy targets, fund the long-term capital program, and comply with existing debt covenants.

Table 4-14: Proposed Water Utility Revenue Adjustments

Revenue Adjustments				
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
6.5%	7.1%	7.4%	7.5%	7.0%

Table 4-15 shows the proforma for CVWD with additional revenues from the revenue adjustments in the proposed financial plan. These revenue adjustments allow the enterprise to fund all operating expenses, capital expenditures, and achieve reserve targets 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. Note the total rate revenue of $9,251,998 ($8,687,322+$564,676) from Table 4-15 matches the total revenue required from rates in Table 5-5

Table 4-15: Proposed Water Financial Plan Proforma

Water Utility	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
REVENUES						
Revenue from Existing Rates	$8,528,012	$8,687,322	$8,870,553	$9,051,790	$9,230,621	$9,417,364
Total Revenue Adjustments	$0	$564,676	$1,247,333	$2,036,838	$2,925,156	$3,852,454
Non-Rate Revenues	$1,064,284	$1,517,283	$992,423	$667,051	$641,329	$660,493
TOTAL REVENUE	**$9,592,296**	**$10,769,281**	**$11,110,309**	**$11,755,679**	**$12,797,106**	**$13,930,311**
OPERATING EXPENSES	$7,864,886	$7,964,504	$8,213,347	$8,486,694	$8,729,573	$8,937,059
CAPITAL EXPENSES	$22,000	$110,000	$150,000	$156,000	$140,000	$130,000
TOTAL EXPENSES	**$7,886,886**	**$8,074,504**	**$8,363,347**	**$8,642,694**	**$8,869,573**	**$9,067,059**
REVENUES LESS OPERATING EXPENSES	**$1,705,410**	**$2,694,777**	**$2,746,962**	**$3,112,986**	**$3,927,533**	**$4,863,252**
REPLACEMENT CAPITAL PROJECTS	**$3,147,606**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**	**$2,800,000**
PAYGO	$3,147,606	$2,800,000	$2,800,000	$2,800,000	$2,800,000	$2,800,000
Debt Funded	$0	$0	$0	$0	$0	$0
DEBT ISSUES	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
DEBT SERVICE	**($1,386,162)**	**($385,962)**	**$613,838**	**$613,238**	**$612,238**	**$1,115,481**
NET CASH CHANGE	($106,093)	$229,906	($714,679)	($349,633)	$465,048	$887,381
BEGINNING BALANCE	**$4,057,756**	**$3,951,663**	**$4,181,569**	**$3,466,890**	**$3,117,257**	**$3,582,305**
ENDING BALANCE	$3,951,663	$4,181,569	$3,466,890	$3,117,257	$3,582,305	$4,469,686
TARGET BALANCE	***$3,246,140***	***$3,472,395***	***$3,566,544***	***$3,659,767***	***$3,748,360***	***$3,830,392***
Operating Reserve	$858,842	$936,783	$972,342	$1,012,269	$1,051,569	$1,093,021
Rate Stabilization	$1,637,298	$1,785,612	$1,844,202	$1,897,497	$1,946,791	$1,987,372
Emergency Reserve	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000

Figure 4-1 through Figure 4-4 display the FY 2017 through FY 2021 proposed financial plan in a graphic format. Figure 4-1 shows 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.

Figure 4-1: Proposed Revenue Adjustments

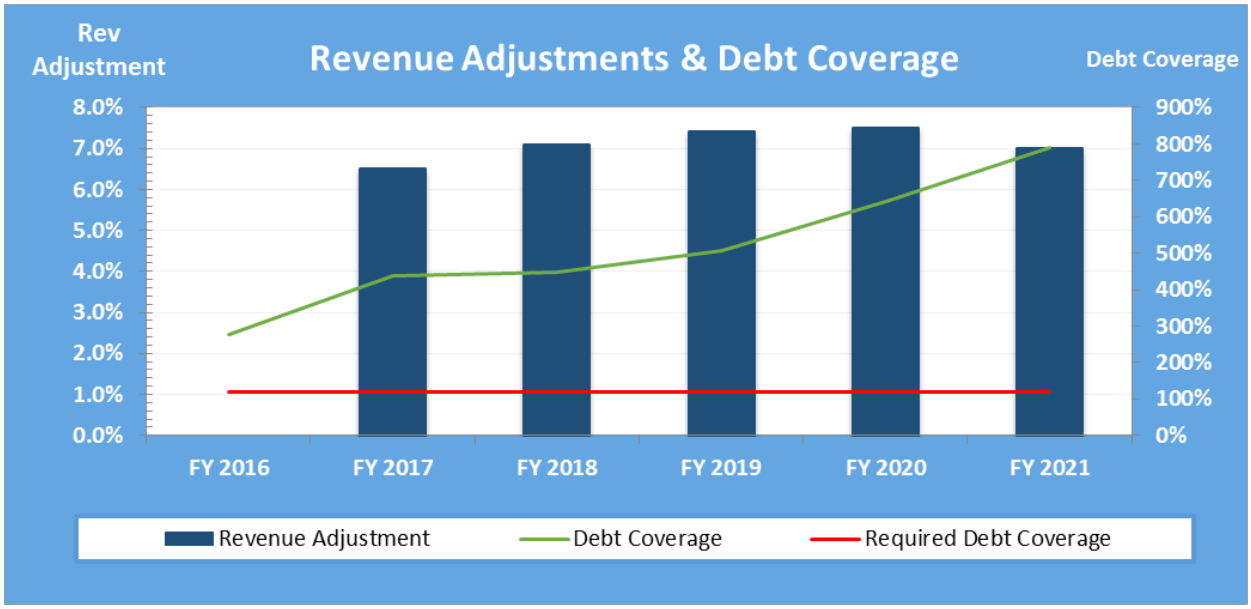


Figure 4-2 illustrates the Operating Financial Plan in a graphic format. It compares existing and proposed revenues with projected expenses. The expenses represent O&M, water supply costs, debt service, and reserve funding. Total revenues at existing and proposed rates are shown by the horizontal black and blue lines respectively. Current 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 Operating Financial Plan

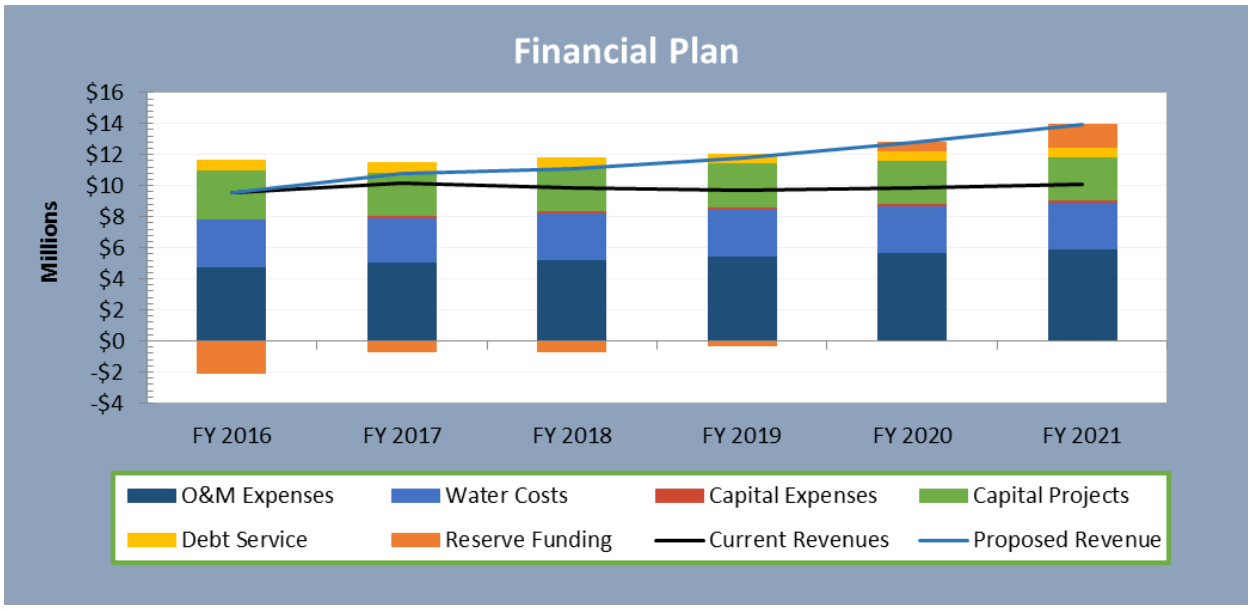


Figure 4-3 shows the water utility's ending balance by fiscal year. The orange bars indicate the ending balance, while the green line indicates the total target balance.

Figure 4-3: Proposed Ending Fund Balances

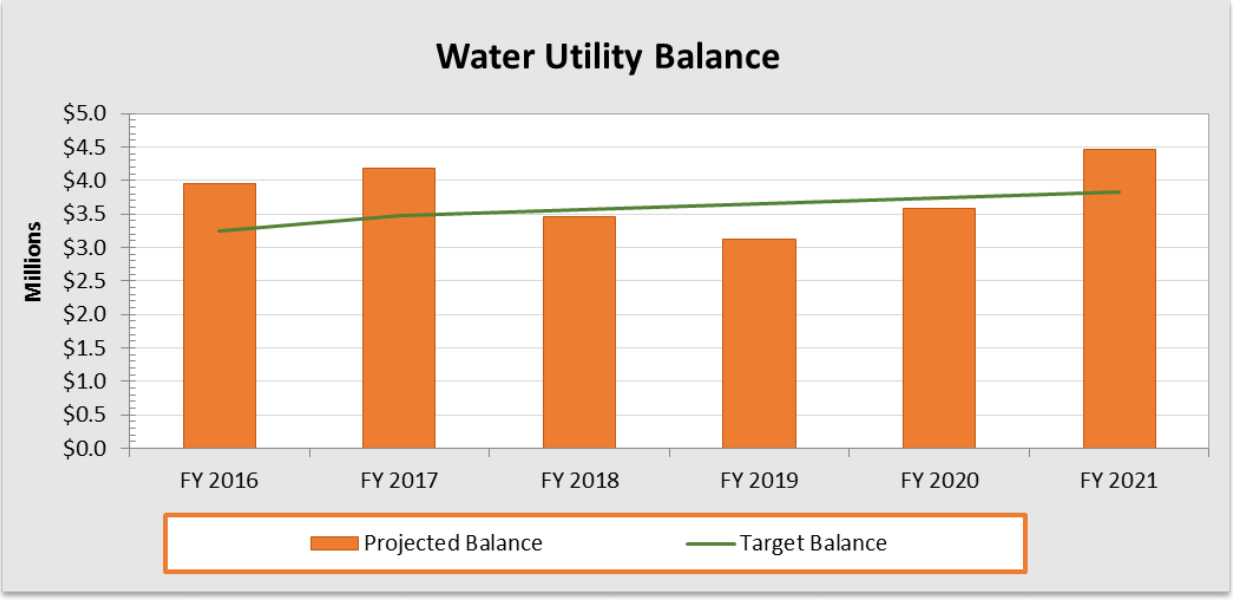
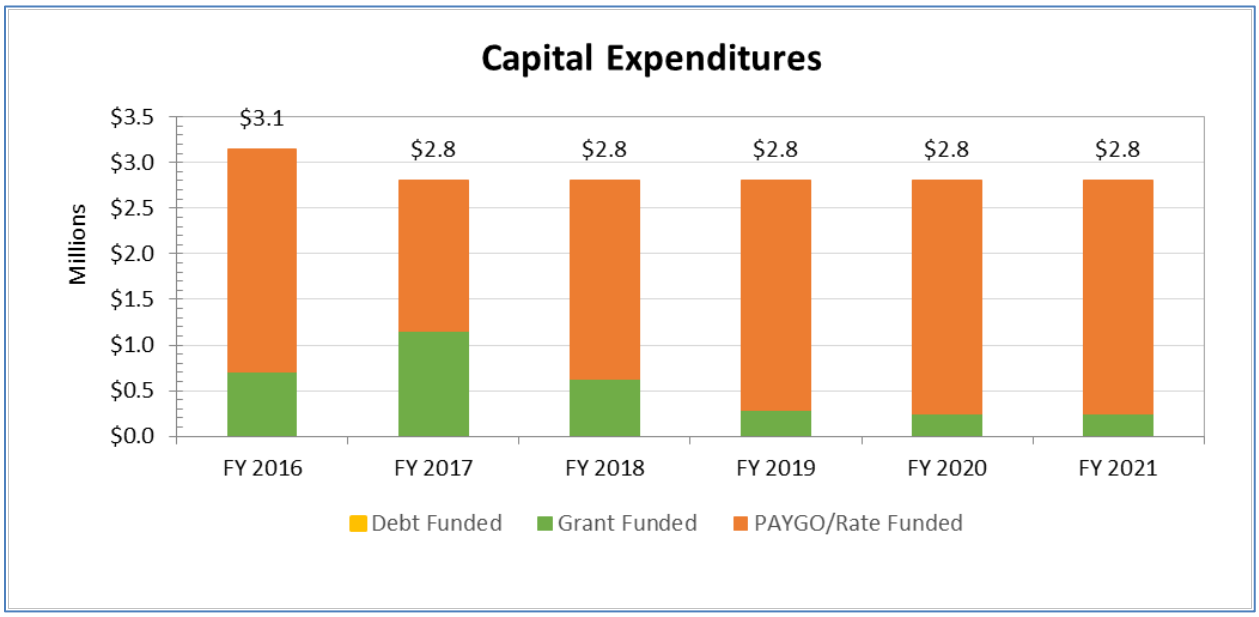


Figure 4-4 shows the total CIP of the water utility and the corresponding funding source. Rate funded capital is shown in orange, grant funded in green, and debt funded (none during the Study period), in yellow.

Figure 4-4: Proposed Capital Improvement Program Funding



5.WATER COST OF SERVICE ANALYSIS

The principles and methodology of a cost of service analysis were described in Section 1.3. 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 costs incurred are generally responsive to the specific service requirements or cost drivers imposed on the system and its water resources by its customers. 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.

The cost components include:

1. **Supply** are costs related to the purchase and production of water supplies including raw water and treated water.
2. **Base** (average) are costs that vary with the total quantity of water demanded within the water system under average conditions. Costs may include operation and maintenance expenses for; 1) supply, 2) treatment, 3) pumping, 4) transmission and distribution facilities, and 5) Capital costs related to plant investment, that are associated with serving customers at a constant, or average, annual rate of use. Base costs are therefore spread over all units of water equally.
3. **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, extra capacity[11] costs include the O&M and capital costs associated with meeting peak customer demand in excess of average annual rate of use or base use requirements.

4. **Meter** (meter service) costs include maintenance and capital costs related to meters and associated services.
5. **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.
6. **Fire Protection** are costs of providing both public and private fire protection service. They include both direct and indirect capital-related and maintenance costs for fire hydrants and private fire connections, as well as indirect costs for source of supply, storage, transmission, and distribution of water as these facilities and infrastructure must be upsized to meet fire protection demands placed on the water system.
7. **Conservation** costs include all costs of funding, administering, and executing water conservation and efficiency related programs and services.
8. **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 causation components in proportion to the relative percentages of the other cost components.

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.

Functionalization of O&M Expenses. Table 5-1 shows the functionalization of the District's O&M expenses for the rate setting year (FY 2017 found in Table 4-9. Functionalizing O&M expenses allows RFC 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. This is further explained in Section 5.1.

Table 5-1: Functionalization of O&M Expenses

Cost Category	O&M Expenses by Function ($)	O&M Expenses by Function (%)
Supply (FMWD)	$2,079,304	26%
Pumping (GWP)	$296,925	4%
Pumping (Verdugo)	$505,050	6%
Reservoir	$0	0%
Transmission	$0	0%
Treatment	$737,925	9%
Distribution	$2,254,800	28%
Meters	$0	0%
Hydrants	$0	0%
Customer	$418,500	5%
Conservation	$37,500	0%
General	$1,634,500	21%
Total	**$7,964,504**	**100%**

[11] *The terms extra capacity, peaking and capacity costs are used interchangeably.*

5.1 ALLOCATION OF FUNCTIONALIZED EXPENSES TO COST COMPONENTS

After functionalizing expenses, the next step is to allocate the functionalized expenses to cost components. To do so, we must identify system wide peaking factors which are shown in column (2) 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 (3) through (5) of Table 5-2. The max day factor of 1.5 was provided by CVWD and is based on 5-year average of the ratio of peak day demand vs. average day demand. The max hour factor incorporates the max day factor and a system multiplier of 1.66, which is based on AWWA, to approximate max hour demand (2.49 times base).

Functionalized expenses are then allocated to the cost components using these allocation bases. To understand the interpretation of the percentages shown in columns (3) through (5) we must first establish the base use equal to the average daily demand during the year, which is assigned a factor of 1.00.

As an example:

- The functionalized expenses that are allocated to the cost components uses the maximum day basis (line 2) attributes 67 percent (1.00/1.50) of the demand (and therefore costs) to the base (average daily demand) use and the remaining 33 percent (0.50/1.50) goes to maximum day (peaking) use.
- Using the maximum hour basis, expenses are allocated 40 percent (1.00/2.49) to base, 20 percent (0.49/2.49) to max day, and the remaining proportion (100%-40%-20%, or, (2.49-1)/2.49) of costs to the maximum hour cost component.

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

Table 5-2: System-Wide Peaking Factors and Allocation to Cost Causation Components

Line	Factor (1)	System Wide Factors (2)	Base (3)	Max Day (4)	Max Hour (5)	Total
1	Base	**1.00**	100.0%			**100%**
2	Max Day	**1.50**	67%	33%		**100%**
3	Max Hour	**2.49**	40%	20%	40%	**100%**

Table 5-3 shows the allocation basis 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 FY 2017as identified in Table 4-9.

- For example, storage related costs (reservoir) are distributed using the max day allocation in Table 5-2 (67 percent to base, 33 percent to max day, 0 percent to max hour). 15 percent of reservoir related costs are allocable to fire protection so the respective allocation to base and max day is reduced proportionally (from 67 percent to 57 percent to base and from 33 percent to 28 percent to max day.

- This means that 57 percent of costs are due to meeting base customer demands, 28 percent of costs are due to meeting max day demands, and 15 percent of costs are allocated to fire protection (such as the need to have additional storage within the system for firefighting).
- A similar distribution of costs is made for all remaining functions and allocation bases. Table 5-4 shows the allocation for capital costs.

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. This distribution of costs allows the allocations to the cost causation components, and ultimately the rates, to remain relatively stable. Similarly, Table 5-4 allocates total water system assets as found in Appendix A.

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

Function	O&M Expenses by Function ($)	Supply	Base	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	General	Total
Supply (FMWD)	$2,079,304	100.0%									100%
Pumping (GWP)	$296,925	100.0%									100%
Pumping (Verdugo)	$505,050	100.0%									100%
Reservoir	$0		57%	28%		15%					100%
Transmission	$0		67%	33%	0%						100%
Treatment	$737,925		67%	33%	0%						100%
Distribution	$2,254,800		34%	17%	34%	15%					100%
Meters	$0						100%				100%
Hydrants	$0					100%					100%
Customer	$418,500							100%			100%
Conservation	$37,500								100%		100%
General	$1,634,500									100%	100%
Total O&M	**$7,964,504**[12]	**$2,881,279**	**$1,261,661**	**$630,830**	**$762,014**	**$338,220**	**$0**	**$418,500**	**$37,500**	**$1,634,500**	**$7,964,504**
% O&M		35%	18%	9%	11%	5%	0%	5%	1%	18%	100%

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

Function	Assets by Function ($)	Supply	Base	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	General	Total
Treatment	$482,497		67%	33%							100%
Reservoir	$5,903,103		57%	28%		15%					100%
Distribution	$17,725,596		34%	17%	34%	15%					100%
Transmission	$0		67%	33%							100%
Meters	$0						100%				100%
General	$5,717,358									100%	100%
Wells	$2,340,093	100%									100%
Fire	$0					100%					100%
Total O&M	**$32,168,647**[13]	**$2,340,093**	**$9,717,663**	**$4,858,831**	**$5,990,397**	**$3,544,305**	**$0**	**$0**	**$0**	**$5,717,358**	100%
% O&M		7%	30%	15%	19%	11%	0%	0%	0%	18%	

[12] From Table 4-9
[13] From Appendix A

5.2 REVENUE REQUIREMENT – TO BE RECOVERED FROM RATES

Table 5-5 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.

RFC calculated the revenue requirement using Fiscal Year 2017 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 we subtract non-rate revenues and adjustments for annual cash balances (which fund capital and reserves), any mid-year rate increases if necessary (to ensure annual revenue requirement), and any fund transfers.

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.

Also note that the FY 2017 revenue requirement includes the 6.5 percent revenue adjustment from the proposed financial plan. Therefore proposed FY 2017 rates presented in Section 6 also reflect the revenue adjustment.

Table 5-5: Revenue Required from Rates

Revenue Requirements	Operating	Capital	Total
REVENUE REQUIREMENTS			
Water Supply	$2,881,279		$2,881,279
Compensation	$1,841,000		$1,841,000
Benefits	$1,116,000		$1,116,000
Plant - Water Operation	$210,925		$210,925
Distribution System	$960,300		$960,300
General and Administrative	$688,500		$688,500
Fire and Debris Recovery	$2,000		$2,000
Purchased Power	$264,500		$264,500
Capital Outlay		$80,000	$80,000
Capital Equipment		$30,000	$30,000
Debt Service		$614,038	$614,038
SUBTOTAL REVENUE REQUIREMENTS	**$7,964,504**	**$724,038**	**$8,688,542**
Less Other Revenues			
Other Operating Revenues	$108,000		$108,000
Non-Operating Revenues	$183,833		$183,833
CIP Source Revenues		$1,225,450	$1,225,450
Total Other Revenue	**$291,833**	**$1,225,450**	**$1,517,283**
Less Adjustments			
Annualized Cash Balance		($2,080,739)	($2,080,739)
Total Adjustments	**$0**	**($2,080,739)**	**($2,080,739)**
COS to be Recovered from Water Rates	**$7,672,671**	**$1,579,327**	**$9,251,998**

Using the revenue requirement from Table 5-5 and the allocations in Table 5-3 and Table 5-4, the total revenue recoverable through water rates is assigned to the cost causation components. Table 5-6 shows the revenue requirement for FY 2017 by cost causation component.

Table 5-6: Revenue Requirement by Cost Component

Cost of Service	Supply	Base	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	Revenue Offsets	General	Total
Operating Expenses	$2,881,279	$1,261,661	$630,830	$762,014	$338,220	$0	$418,500	$37,500		$1,634,500	$7,964,504
Capital Expenses	$114,887	$477,091	$238,545	$294,100	$174,008	$0	$0	$0		$280,695	$1,579,327
Revenue Offsets									($291,833)		($291,833)
Total Cost of Service	**$2,996,166**	**$1,738,752**	**$869,376**	**$1,056,114**	**$512,228**	**$0**	**$418,500**	**$37,500**	**($291,833)**	**$1,915,195**	**$9,251,998**
Allocation of General Cost	$752,198	$436,520	$218,260	$265,141	$128,597	$0	$105,066	$9,415		($1,915,195)	$0
Allocation of Public Fire Protection					($590,247)	$590,247					
Allocated Cost of Service	**$3,748,364**	**$2,175,271**	**$1,087,636**	**$1,321,255**	**$50,578**	**$590,247**	**$523,566**	**$46,915**	**($291,833)**	**$0**	**$9,251,998**
Adjustment for Fixed Charges	$0	$0	($516,627)	($627,596)	$0	$1,144,223	$0	$0			$0
Adjusted Cost of Service	**$3,748,364**	**$2,175,271**	**$571,009**	**$693,659**	**$50,578**	**$1,734,470**	**$523,566**	**$46,915**	**($291,833)**	**$0**	**$9,251,998**
	40.5%	23.5%	6.2%	7.5%	0.5%	18.7%	5.7%	0.5%	-3.2%	0.0%	100.0%

5.3 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 assessing the total water demanded by each class for each cost component. Projected usage (base units of service) for FY 2017 is shown in Table 5-7.

Table 5-7: Projected Water Usage in FY 2017

Class/Tier	FY 2017
SFR	726,187
MFR/Commercial	353,143
Irrigation	29,563
Total	**1,108,892**

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.

Maximum day and maximum hour factors are not available for each customer class from CVWD. We could use industry data or use the actual usage characteristics of the District's customers to derive these factors. Using 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 FY 2015 usage analysis. Max day factors are equal to max month factors. Similarly, since max hour factors for each customer class are not available, we use the District's 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 1.66, which is the max hour factor provided by AWWA.

Table 5-8: Customer Class Peaking Factors

Customer Peaking Factors	Base	Max Day	Max Hour	Max Month
SFR	1.00	1.36	2.26	1.36
MFR/Commercial	1.00	1.19	1.98	1.19
Irrigation	1.00	1.70	2.82	1.70

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 (discussed in detail in Section 6.2) and annual number of bills issued (also discussed in Section 6.2).

Daily use is calculated as annual use divided by 365 days. For example, SFR customers are estimated to use 726,187 kgal annually, or 1,990 kgal daily. The max day demand is then calculated as the daily demand multiplied by the max day factor (1,990 X 1.36). However, we must subtract the anticipated daily usage (1,990) from the max day usage (2,706) to calculate the incremental max day units of service (716). 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 (FY 2017 Usage)

Customer Class	Annual Usage (kgal)	Daily Usage (kgal/day)	Max Day Factor	Max Day Demand (kgal/day)	Incremental Max Day (kgal/day)	Max Hour Factor	Max Hour Demand (kgal/day)	Incremental Max Hour (kgal/day)	Equiv. Meters	Equiv. Fire	No. of Bills (annual)
SFR	726,187	1,990	1.36	2,706	716	2.26	4,492	1,786			
MFR/Commercial	353,143	968	1.19	1,151	184	1.98	1,911	760			
Irrigation	29,563	81	1.70	138	57	2.82	229	91			
Meters									9,543	6,686	48,697
Total	**1,108,892**	**3,038**		**3,995**	**957**		**6,631**	**2,637**	**9,543**	**6,686**	**48,697**

5.4 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, calculated in Table 5-6, to be collected through rates 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. The sum of all rate components under the blue header represents the revenue required from Commodity Charges. The sum of all rate components under the orange header in Table 5-10 and Table 5-11 represents the revenue required from Service Charges. Commodity Charge revenue represents 75 percent of the total revenue requirement, while bi-monthly Service Charges revenue accounts for the remaining 25 percent. This proposed revenue split will increase the revenue recovery from fixed charges approximately 4 percent, from current fixed charge recovery of 21 percent. The updated fixed/variable revenue split was determined through discussion and direction from the CVWD Board of Directors.

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

Cost Components	FY 2017	Commodity Rate Components (75%)						Service Charge Components (25%)		
	Revenue Requirement	Supply	Base	Max Day	Max Hour	Conserv-ation	Rev Offsets	Private Fire Protection	Meters	Customer
Supply	$3,748,364	100%								
Base	$2,175,271		100%							
Max Day	$1,087,636			53%					48%	
Max Hour	$1,321,255				53%				48%	
Fire Protection	$50,578							100%		
Meters	$590,247								100%	
Customer	$523,566									100%
Conservation	$46,915					100%				
Revenue Offsets	($291,833)						100%			
Total	**$9,251,998**	**$3,748,364**	**$2,175,271**	**$571,009**	**$693,659**	**$46,915**	**($291,833)**	**$50,578**	**$1,734,470**	**$523,566**

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

Cost Components	FY 2017	Commodity Rate Components (75%)						Service Charge Components (25%)		
	Revenue Requirement	Supply	Base	Max Day	Max Hour	Conserv-ation	Rev Offsets	Private Fire Protection	Meters	Customer
Supply	$3,748,364	$3,748,364								
Base	$2,175,271		$2,175,271							
Max Day	$1,087,636			$571,009					$516,627	
Max Hour	$1,321,255				$693,659				$627,596	
Fire Protection	$50,578							$50,578		
Meters	$590,247									
Customer	$523,566								$523,566	
Conservation	$46,915					$46,915				
Revenue Offsets	($291,833)						($291,833)			
Total	**$9,251,998**	**$3,748,364**	**$2,175,271**	**$571,009**	**$693,659**	**$46,915**	**($291,833)**	**$50,578**	**$1,734,470**	**$523,566**

Combining Table 5-6 and Table 5-9 in Table 5-12 provides the cost component unit cost derivation. The operating revenue requirement shown in the top row of column (11) of Table 5-12 ($7,964,504) is allocated to the cost components using the resulting O&M allocation percentages in Table 5-3. Capital expenses funding ($1,579,327) in column (11) is allocated in the same manner as in Table 5-4. General costs in column (10) ($1,915,195) are redistributed in proportion to the resulting allocation of the other cost components. Public fire protection costs in column (5) ($590,247) are reallocated to the meter service component. Lastly, we allocate a portion (53 percent each) of max day and max hour costs to the meter component ($1,144,223) which allows us to recover 25 percent of revenues from fixed sources and which yields the adjusted cost of service. Revenue offsets in column (9) 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 component is determined by dividing the total base cost ($2,175,271) by total water use (1,108,892 kgal) to derive a base unit cost of $1.96 as shown in the bottom row of column (2). 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 (3) and (4). Annual customer costs are divided by the estimated number of annual bi-monthly bills (column (7)) and meter costs are divided by total meter equivalencies to determine a cost per equivalent meter (column (6)). The unit costs are used to distribute the cost components to the customer classes in the next section.

Table 5-12: Unit Cost Calculation

Cost of Service	Supply	Base	Max Day	Max Hour	Fire Protection	Meters	Customer	Conservation	Revenue Offsets	General	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Operating Expenses	$2,881,279	$1,261,661	$630,830	$762,014	$338,220	$0	$418,500	$37,500		$1,634,500	$7,964,504
Capital Expenses	$114,887	$477,091	$238,545	$294,100	$174,008	$0	$0	$0		$280,695	$1,579,327
Revenue Offsets									($291,833)		($291,833)
Total Cost of Service	**$2,996,166**	**$1,738,752**	**$869,376**	**$1,056,114**	**$512,228**	**$0**	**$418,500**	**$37,500**	**($291,833)**	**$1,915,195**	**$9,251,998**
Allocation of General Cost	$752,198	$436,520	$218,260	$265,141	$128,597	$0	$105,066	$9,415		($1,915,195)	$0
Allocation of Public Fire Protection					($590,247)	$590,247					
Allocated Cost of Service	**$3,748,364**	**$2,175,271**	**$1,087,636**	**$1,321,255**	**$50,578**	**$590,247**	**$523,566**	**$46,915**	**($291,833)**	**$0**	**$9,251,998**
Adjustment from COS Component	$0	$0	($516,627)	($627,596)	$0	$1,144,223	$0	$0			$0
Adjusted Cost of Service	**$3,748,364**	**$2,175,271**	**$571,009**	**$693,659**	**$50,578**	**$1,734,470**	**$523,566**	**$46,915**	**($291,833)**	**$0**	**$9,251,998**
Unit of Measure	**kgal**	**kgal**	**kgal/day**	**kgal/day**	**Equivalent Fire Meters**	**Equivalent Meters**	**Number of Bills**	**kgal**	**Revenue Offsets**		
Unit of Service	1,108,892	1,108,892	957	2,637	6,686	9,543	48,697	1,108,892	1,108,892		
Unit Cost	$3.38	$1.96	$596.81	$263.09	$1.26	$30.29	$10.75	$0.04	($0.26)		

5.5 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 to serve (i.e., cost of service for) each class. The cost components shown in columns 2 through 7 are collected through the Commodity (volumetric) Charges ($/kgal). The cost components shown in columns 8-10 are collected through the District's bi-monthly Service Charge.

To derive the cost to serve 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 costs for the MFR/Commercial class is calculated by multiplying the base unit cost ($1.96) by the annual MFR/Commercial use (353,143 kgal) to arrive at a total of $692,746. Similar calculations for each of the remaining user classes and cost components yield the total cost to serve each user class shown in the furthest right column of Table 5-13. Note that the total cost of service is equal to the revenue requirement in Table 5-5 as intended. We have now calculated the cost to serve each user class and can proceed to derive rates to collect the cost to serve each class.

Table 5-13: Derivation of the Cost to Serve Each Class

Customer Class 1	Supply 2	Base 3	Max Day 4	Max Hour 5	Conserv-ation 6	Revenue Offsets 7	Fire Protection 8	Meters 9	Customer 10	Total 11
SFR	$2,454,713	$1,424,533	$427,461	$469,832	$30,723	($191,114)				$4,616,148
MFR/Commercial	$1,193,720	$692,746	$109,711	$199,918	$14,941	($92,938)				$2,118,098
Irrigation	$99,930	$57,992	$33,837	$23,908	$1,251	($7,780)				$209,138
Meters								$1,734,470	$523,566	$2,258,036
Fire Service					$30,723	($191,114)	$50,578			$50,578
Total	**$3,748,364**	**$2,175,271**	**$571,009**	**$693,659**	**$46,915**	**($291,833)**	**$50,578**	**$1,734,470**	**$523,566**	**$9,251,998**

6.WATER RATE DERIVATION AND DESIGN

6.1 EXISTING RATE STRUCTURE AND RATES

As explained in Section 1 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 Charge component. The bi-monthly Service Charge is determined on the basis of 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 has a bi-monthly Service Charge of $38.24. The current rates for the bi-monthly Service Charge are shown in Table 6-1.

Table 6-1: Existing Bi-Monthly Service Charges

Meter Size	Current Charge[14]
3/4"	$38.24
1"	$46.96
1 1/2"	$68.56
2"	$86.72
3"	$94.56
4"	$242.94

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

Table 6-2: Existing Rate Structure – Commodity Rates ($/kgal)

Class	Tier Definition (kgal)	Current Charge ($/kgal)
SFR		
Tier 1	0-10	$4.61
Tier 2	11-25	$5.96
Tier 3	26-37	$8.50
Tier 4	>37	$11.39
MFR/Commercial	Uniform	$5.96
Irrigation		
Tier 1	0-70	$5.96
Tier 2	>70	$11.39

6.1 PROPOSED REVISIONS TO RATE STRUCTURES

During the Study RFC, working with District staff and with Board input, chose to revise the rate structures for Single Family Residential and Multi-Family Residential customers. The proposed changes and rationale are detailed in the following subsections, with all revisions shown graphically in Table 6-3.

[14] Outside of District customers pay an additional $0.20 per meter size for administrative services

6.1.1 Single Family Residential (SFR) Tier Definition

RFC recommends changes to the rate structure and tier definitions for the Single Family Residential class. With the requirements of Proposition 218 being examined more closely, and the justification for rates more stringent, it becomes more difficult to rationalize many unique tiers. While some agencies may have many sources of supply allowing a price differential in the marginal cost of water to justify five or more tiers, the District maintains three sources of supply – two sources of local groundwater and one source of imported water. We therefore propose to reduce the SFR rate structure from four tiers to three. Justification of those tiers are based upon meeting efficient and average demands for the class. The proposed tiers and rationale are as follows:

Tier 1: Efficient Indoor Use (10 kgal bi-monthly)

The State of California has targeted 55 gallons per person per day (gpcd) as an efficient indoor use goal. From 2010 US Census data the average SFR household density in CVWD's service area is 2.63 persons (rounded up to 3 persons). Taken together with the average bi-monthly days of service (61 days) produces a value of approximately 9,000 gallons, rounded up to 10 kgal per billing period for efficient indoor water use.

Tier 2: Average Summer Use (total 26 kgal bi-monthly)

The District's SFR customers use on average, 26 kgal per billing period during the peak summer period (July-August). Tier 2 therefore allocates an additional 16 kgal of water, in addition to the 10 kgal in Tier 1, for a total of 26 kgal between Tiers 1 and 2.

Tier 3: All use greater than Tier 3 (>26 kgal bi-monthly)

All usage greater than the sum of Tiers 1 and 2 represents Tier 3 for single family residential customers.

6.1.2 Multi-Family Residential (MFR)/Commercial Rates

RFC recommends the District maintain a uniform rate for the MFR/Commercial/Institutional class. Usage within the class is heterogeneous making tier design for the class difficult to justify. Additionally, many users within this class are served by both a domestic (indoor) meter and a separate landscape irrigation meter billed in the two-tier Irrigation class.

6.1.3 Irrigation Tier Definitions

RFC recommends the District maintain the existing two-tier structure for Irrigation users with a slight modification to the tier definitions. An analysis of Irrigation usage determined that the average water use by the class is 80 kgal per billing period. RFC recommends that Tier 1 include 80 kgal. Tier 2 includes all water use in excess of Tier 1.

Table 6-3: Existing and Proposed Tier Definitions

Class and Tier	Existing Tiers (kgal)	Proposed Tiers (kgal)

SFR		
Tier 1	0-10	0-10
Tier 2	11-25	11-26
Tier 3	26-37	>26
Tier 4	>37	N/A
MFR/Commercial	Uniform	Uniform
Irrigation		
Tier 1	70	80
Tier 2	>70	>80

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 plus 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 base costs and/or peaking costs are recovered in the monthly service charge, along with customer service related costs and meter-related costs.

For the District, 53 percent of peaking costs are recovered from the variable rate (Commodity Charges), and 100 percent of the base costs are also recovered from the Commodity Charge.

There are two components that comprise the Service Charge: 1) Meter servicing costs and 2) 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.

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 (peaking) 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 other 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 total equivalent meters.

For this study, RFC calculated the capacity ratios of each meter size using standard AWWA hydraulic capacity ratios and estimated meter counts for FY 2017. 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 determined to be 9,543.

Table 6-4: Meter Equivalencies Calculation

Meter Size	Meter Count	Capacity Ratio (3/4" Base)	Equiv. Meters (Capacity)
3/4"	6,956	1.00	6,956
1"	819	1.67	1,364
1 1/2"	145	3.33	484
2"	63	5.33	337
3"	29	11.67	339
4"	3	21.00	63
Total Count/ Equivalencies	**8,015**		**9,543**

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. The cost is rounded up to the nearest penny and is calculated as $30.29 per equivalent meter.

Table 6-5: RTS Meter Service Component Calculation

	FY 2016
Meter Services Costs	$1,734,470
Equivalent Meters	9,543
Cost per Equivalent Meter (per month)	**$30.29**

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 RFC divided the total billing and customer costs from Table 5-13 by the total annual bills (accounts multiplied by six billing periods) prepared by the District to determine the bi-monthly customer service charge component of $10.76 (rounded to nearest whole penny).

Table 6-6: Bi-Monthly Customer Component Calculation

	FY 2016
Customer Costs	$523,566
Annual Bills	48,697
Customer Component (per month)[15]	**$10.76**

Table 6-7 shows the calculation of the proposed FY 2017 rates for the bi-monthly Service Charges. The proposed 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 services component is the cost per equivalent meter calculated in Table 6-5 multiplied by the respective meter capacity ratio in Table 6-4.

The comparisons in rates are relative to existing rates implemented July 1, 2015 as shown in Table 6-7. The 3/4" meter experiences an increase of $2.82 relative to the current charge, which is inclusive of the 6.5 percent revenue adjustment. All other meters experience an increase in dollar terms ranging from $14.29 for a 1" meter to $403.93 on a 4" meter.

Existing hydraulic capacity ratios were corrected to agree with AWWA capacity ratios (a relationship of between meter size and potential demand). With the correction, larger meters experience larger increases in their bi-monthly Service Charges relative to smaller meters. This is done to create equity across meter sizes relative to a meter's potential demand.

Table 6-7: Calculation of FY 2017 Bi-Monthly Service Charges ($/Meter Size)

Meter Size	Meter Services Component	Customer Component	Proposed FY 2017	Current Charge	Difference ($)	Difference (%)
3/4"	$30.30	$10.76	$41.06	$38.24	$2.82	7%
1"	$50.49	$10.76	$61.25	$46.96	$14.29	30%
1 1/2"	$100.97	$10.76	$111.73	$68.56	$43.17	63%
2"	$161.56	$10.76	$172.32	$86.72	$85.60	99%
3"	$353.40	$10.76	$364.16	$94.56	$269.60	285%
4"	$636.11	$10.76	$646.87	$242.94	$403.93	166%

Table 6-8 shows the proposed bi-monthly Service Charges for the five-year Study period. The rates for the Service Charge are increased "across the board" in subsequent years– that is, relative to existing rates – by the selected financial plan revenue adjustments.

[15] Billing & CS calculation includes all bills including private fire protection, potable water, and sewer accounts

Beginning July 2016, the rates for the Service Charges will collect an additional 6.5 percent, 7.1 percent more in July 2017, 7.4 percent in July 2018, and so on. All rates are rounded up to the nearest penny.

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

Meter Size	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
Revenue Adjustment	*6.5%*	*7.1%*	*7.4%*	*7.5%*	*7.0%*
3/4"	$41.06	$43.98	$47.24	$50.79	$54.35
1"	$61.25	$65.60	$70.46	$75.75	$81.06
1 1/2"	$111.73	$119.67	$128.53	$138.17	$147.85
2"	$172.32	$184.56	$198.22	$213.09	$228.01
3"	$364.16	$390.02	$418.89	$450.31	$481.84
4"	$646.87	$692.80	$744.07	$799.88	$855.88

6.3 PROPOSED PRIVATE FIRE PROTECTION CHARGES

Table 6-9 shows the derivation of the Private Fire Protection Charge. 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 to be $50,578 (see Table 5-13). This becomes the numerator for the service cost component to determine the cost per fire service equivalency.

Table 6-9 shows the fire service equivalencies calculation. Similar to meter capacities used to calculate Service Charges, private fire service use the size of the fire service and a fire flow demand factor16 to determine total equivalent units. The total equivalent lines is 6,686.

Table 6-9: Fire Service Equivalencies Calculation

Fire Service Size	Fire Service Count	Fire Service Demand Ratio	Equiv. Lines (Fire Capacity)
1"	1	1.0	1
2"	8	6.2	50
3"	2	18.0	36
4"	66	38.3	2,534
6"	16	111.3	1,785
8"	6	237.2	1,426
10"	2	426.6	855
Total Count/ Equivalencies	**101**		**6,686**

Table 6-10 shows the calculation of the fire service component. Dividing the total private fire costs by total equivalent fire service capacity gives the bi-monthly cost per equivalent fire service of $1.27.

[16] The industry standard uses the capacity of water through a conduit of a specific size raised to the 2.63 power to determine fire service equivalencies.

Table 6-10: Fire Service Component Calculation

	FY 2016
Private Fire Costs	$50,578
Equivalent Lines	6,686
Cost per Equivalent Fireline (per month)	**$1.27**

Table 6-11 shows the derivation of the bi-monthly Private Fire Protection Charges. The cost per equivalent line ($1.27 rounded up to the nearest penny) is multiplied by the respective fire service ratio to obtain the fire service component. Since all fire service accounts receive a monthly bill, each line receives the billing and customer service component, same as the bi-monthly Service Charge for metered water service.

The Private Fire Protection Charges are lower than the current charge for smaller lines as a result of the updated cost of service and respective allocations to private fire costs and billing and customer service costs. Larger lines experience an increase for similar reasons as potable water meters – an update to fire flow demand factors creating equity across fire service sizes.

Table 6-11: Calculation of Rates for the FY 2016 Private Fire Protection Charges

Fireline Size	Fireline Service Component	Billing & CS Component	Proposed FY 2017	Current Charge	Difference ($)	Difference (%)
1"	$1.27	$10.76	$12.03	$16.00	($3.97)	-25%
2"	$7.81	$10.76	$18.57	$23.56	($4.99)	-21%
3"	$22.68	$10.76	$33.44	$35.16	($1.72)	-5%
4"	$48.32	$10.76	$59.08	$47.68	$11.40	24%
6"	$140.34	$10.76	$151.10	$81.98	$69.12	84%
8"	$299.06	$10.76	$309.82	$124.72	$185.10	148%
10"	$537.81	$10.76	$548.57	$174.16	$374.41	215%

Table 6-12 shows proposed Private Fire Protection Charges for the Study period. The Private Fire Protection Charges are increased "across the board" in subsequent years – that is, relative to existing rates – by the selected financial plan.

Beginning July 2016, the rates for the Private Fire Protection Charge will collect an additional 6.5 percent, 7.1 percent more in July 2017, 7.4 percent in July 2018, and so on. All rates are rounded up to the nearest penny.

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

Fireline Size	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
Revenue Adjustment	*6.5%*	*7.1%*	*7.4%*	*7.5%*	*7.0%*
1"	$12.03	$12.89	$13.85	$14.89	$15.94
2"	$18.57	$19.89	$21.37	$22.98	$24.59
3"	$33.44	$35.82	$38.48	$41.37	$44.27
4"	$59.08	$63.28	$67.97	$73.07	$78.19
6"	$151.10	$161.83	$173.81	$186.85	$199.93
8"	$309.82	$331.82	$356.38	$383.11	$409.93
10"	$548.57	$587.52	$631.00	$678.33	$725.82

6.4 PROPOSED COMMODITY RATES

6.4.1 Unit Cost Components 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 numerous sources of supply (detailed in Section 6.4.1.1) 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 costs are spread over all units of water irrespective of customer class or tiers.

Peaking: or extra-capacity costs, represent costs incurred to meet customer peak demands in excess of base use (or average daily demand). Total extra capacity costs are comprised 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. These programs are targeted to high volume water users. Therefore, conservation costs are allocated to Tiers 3 SFR customers (Tier 2 for Irrigation customers, and all units of water in the MFR/Commercial class) for which conservation programs are designed to promote efficient water use.

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 available to the District to reduce the commodity rates. They are allocated on the basis of usage and applied to the lower tiers to promote affordability for the SFR class and to all usage in the MFR/Commercial 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

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 FY 2017 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	Average Production/ Purchase (AF)	Average Production/ Purchase (kgal)	Water Unit Cost ($/AF)	Additional Supply Costs ($/AF)	Total Cost ($/AF)
Verdugo Groundwater	2,000	651,700	$259	$286	$545
GWP Groundwater	565	184,105	$535	$286	$821
FMWD Tier 1	1,135	369,840	$1,648	$286	$1,934
FMWD Tier 2	0	-	$1,785	$286	$2,071

Table 6-14 shows the unit cost in $/kgal from each source of supply. The unit cost converts the unit cost in $/AF to $/kgal and accounts for system loss to determine the unit cost of water available to meet demand. The water supply costs and availability are used in the water supply unit cost calculation for the Commodity Charge and reflect a reasonable estimate of total water supply mix.

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

	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2
Supply to Meet Demand (kgal)	651,700	184,105	369,840	-
Cost ($/AF)	$545	$821	$1,934	$2,071
Unit Cost ($/kgal)	$1.67	$2.52	$5.93	$6.36
Unit Cost ($/kgal) after loss[17]	$1.82	$2.74	$6.45	$6.91

Table 6-15 shows estimated total demand in FY 2017.

Table 6-15: Projected Usage in FY 2017 (Table 4-6)

Usage	Estimated Demand (kgal)
SFR	
Tier 1	338,115
Tier 2	275,277
Tier 3	112,795
Tier 4	
MFR/Commercial	353,143
Irrigation	
Tier 1	16,334
Tier 2	13,228
Total	**1,108,892**

Given the water available from each source (Table 6-14) 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.

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

	Annual Usage	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2
SFR	726,187	392,640	110,921	222,823	0
MFR/Commercial	353,143	190,940	53,940	108,358	0
Irrigation	29,563	15,984	4,516	9,071	0
Total	**1,108,892**	**599,564**	**169,377**	**340,253**	**0**

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 from Table 6-14 and the water required in each tier from Table 6-16.

[17] Unit cost accounts for an estimated 8 percent system-wide water loss. The loss is allocated to all sources.

Note that Tier 2 SFR, MFR/Commercial, and both Irrigation tiers represent blended rates from two or more sources. Also note that the average unit cost is consistent for all user classes at $3.38/kgal. Unit costs are rounded up to the nearest penny.

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

Class	Annual Usage	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2	Unit Cost ($/kgal)
Unit Cost of Supply		$1.82	$2.74	$6.45	$6.91	
SFR						
Tier 1	338,115	338,115	-	-	-	$1.82
Tier 2	275,277	54,525	110,921	109,831	-	$4.04
Tier 3	112,795	-	-	112,795	-	$6.45
Total	**726,187**	**392,640**	**110,921**	**222,626**	**-**	**$3.38**
MFR/Commercial	**353,143**	**190,940**	**53,940**	**108,262**	**-**	**$3.38**
Irrigation						
Tier 1	16,334	15,984	350	-	-	$1.84
Tier 2	13,228	-	4,165	9,063	-	$5.29
Total	**29,563**	**15,984**	**4,516**	**9,063**	**-**	**$3.38**

6.4.1.2 Delivery Unit Cost

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

Class and Tier	Projected Demand
SFR	
Tier 1	338,115
Tier 2	275,277
Tier 3	112,795
MFR/Commercial	353,143
Irrigation	
Tier 1	16,334
Tier 2	13,228
Total (kgal)	**1,108,892**
Delivery Costs ($)	**$2,175,271**
Delivery Unit Cost ($/kgal)	**$1.96**

6.4.1.3 *Peaking Unit Cost*

Table 6-19 provides customer class peaking factors. For the derivation of intra-class peaking cost components we must derive peaking factors *within* the tiers.

The peaking costs shown are derived by analyzing the District's usage while utilizing the revised tier definitions (Table 6-3).

The factors are calculated by dividing the maximum billing period of use by the average billing period of use.

For each tier RFC determines the average use within the tier throughout the year (6 billing periods per year). Next, RFC identifies the maximum use billing period for the tier during the year. Dividing the maximum by the average gives a factor of max to average.

Table 6-19: Customer Class Peaking Factors

Usage	Max Period Demand (kgal/bill)	Avg. Period Demand (kgal/bill)	Max / Average
SFR			
Tier 1	9.55	9.15	1.04
Tier 2	12.07	8.63	1.40
Tier 3	16.32	7.45	2.19
MFR/Commercial	71.5	60.3	1.19
Irrigation			
Tier 1	45.8	40.7	1.13
Tier 2	354.4	168.2	2.11

Table 6-20 shows the unit cost calculation of class peaking costs. Projected demand in each tier is multiplied by the respective peaking factor to derive total weighted units (peaking units). Total peaking units is 1,449,908 as compared to 1,108,892 annually.

The allocation to each class- that is the amount that each class is responsible for- is determined by multiplying the class demand by the class peaking factor and then dividing by the weighted demand.

Next the total revenue requirement is distributed to the customer classes based on the allocation percentages. Lastly the class revenue requirement is divided by the projected demand to determine the unit rate of peaking.

Table 6-20: Peaking Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Class Peaking Factor	Allocation %	Rev. Requirement	Unit Rate
SFR	726,187	1.36	67.9%	$858,746	$1.19
MFR/Commercial	353,143	1.19	28.9%	$365,561	$1.04
Irrigation	29,563	1.57	3.2%	$40,360	$1.37
Total (kgal)	**1,108,892**	**1,449,908**		**$1,264,667**	

Once class requirements are calculated (Table 6-20) the same process is followed to determine the intra-class (tier) unit rates. Again, weighted demand is calculated to determine the relative share required from each tier. Next the revenue requirement is distributed based on the allocation percentage and then a unit rate determined. The unit rates for each class and tier is calculated and shown in Table 6-21.

Table 6-21: Peaking Unit Cost Calculation (Tiers)

Class and Tiers	Projected Demand	Peaking Factor	Allocation %	Rev. Requirement	Unit Rate
SFR					
Tier 1	338,115	1.04	36%	$307,837	$0.92
Tier 2	275,277	1.40	39%	$335,508	$1.22
Tier 3	112,795	2.19	25%	$215,401	$1.91
Total	**726,187**	**984,529**		**$858,746**	
MFR/Commercial	**353,143**	**1.19**	**100%**	**$365,561**	**$1.04**
Irrigation					
Tier 1	16,334	1.13	40%	$16,048	$0.99
Tier 2	13,228	2.11	60%	$24,312	$1.84
Total	**29,563**	**46,272**	**100%**	**$40,360**	

6.4.1.4 Conservation Unit Cost

Conservation costs are only allocated to Tier 3 of the SFR structure, Tier 2 of the Irrigation structure, and MFR/Commercial users. Table 6-22 shows the calculation for the unit cost for conservation.

Table 6-22: Conservation Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Allocation %	Rev. Requirement	Unit Rate
SFR Tier 3	112,795	23.5%	$11,044	$0.10
MFR/Commercial	353,143	73.7%	$34,576	$0.10
Irrigation Tier 2	13,228	2.8%	$1,295	$0.10
Total (kgal)	**479,166**		**$46,915**	

6.4.1.5 *Revenue Offset Unit Cost*

Revenue offset components are determined same as the peaking and conservation components: revenue offsets are applied equally to Tier 1 and Tier 2 of the SFR structure, and to MFR/Commercial customers.

However, it is Board policy to not apply revenue offsets to Irrigation customers. Therefore, while the offset is calculated for irrigation below, it is not incorporated into the Irrigation Commodity Charge rate. Table 6-23 and Table 6-24 show the revenue offset unit cost and revenue offset component rate calculation.

Table 6-23: Revenue Offset Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Revenue Offset Factor	Allocation %	Rev. Requirement	Unit Rate
SFR	726,187	0.84	65.5%	($191,114)	($0.27)
MFR/Commercial	353,143	1.00	31.8%	($92,938)	($0.27)
Irrigation	29,563	0.55	2.7%	($7,780)	($0.27)
Total (kgal)	**1,108,892**	**982,869**	**100.0%**	**($291,833)**	

Table 6-24: Revenue Offset Rate Component Calculation (Tiers)

Class and Tiers	Projected Demand	Revenue Offset Factor	Allocation %	Rev. Requirement	Unit Rate
SFR					
Tier 1	338,115	100%	55%	($105,346)	($0.32)
Tier 2	275,277	100%	45%	($85,768)	($0.32)
Tier 3	112,795	0%	0%	$0	$0.00
Total	**726,187**	**613,392**	**100%**	**($191,114)**	
MFR/Commercial	**353,143**	**100%**	**100%**	**($92,938)**	**($0.27)**
Irrigation					
Tier 1	16,334	100%	100%	($7,780)	($0.48)
Tier 2	13,228	0%	0%	$0.00	$0.00
Total	**29,563**	**16,334**		**($7,780)**	

6.4.1.6 *Final Commodity Charge Rates 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 6-25 below.

Table 6-25: Proposed Rates for the Commodity Charge ($/kgal)

Class and Tier	Tier Definition	Variable Supply	Delivery	Peaking	Conserv-ation	Revenue Offsets	COS Rates ($/kgal)
	Table 6-3	Table 6-17	Table 6-18	Table 6-21	Table 6-22	Table 6-24	
SFR							
Tier 1	0-10	$1.82	$1.96	$0.92	$0.00	($0.32)	**$4.39**
Tier 2	11-26	$4.04	$1.96	$1.22	$0.00	($0.32)	**$6.91**
Tier 3	>26	$6.45	$1.96	$1.91	$0.10	$0.00	**$10.43**
Total							
MFR/Commercial	Uniform	$3.38	$1.96	$1.04	$0.10	($0.27)	**$6.22**
Irrigation							
Tier 1	80	$1.84	$1.96	$0.99	$0.00	$0.00	**$4.80**
Tier 2	>80	$5.29	$1.96	$1.84	$0.10	$0.00	**$9.20**

Table 6-26 shows proposed water Commodity Rates for the Study period. The Commodity Rate is increased "across the board" in subsequent years – that is, relative to existing rates – by the selected financial plan.

Beginning July 2016 commodity rates will increase to collect an additional 6.5 percent in revenue in FY 2017. Future increases follow the proposed revenue adjustment schedule listed in Table 4-14. All rates are rounded up to the nearest penny.

Table 6-26: Proposed Rates for the Commodity Charge for the Study Period ($/kgal)

Class and Tier	Current Rates	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR						
Tier 1	$4.61	$4.39	$4.71	$5.06	$5.44	$5.83
Tier 2	$5.96	$6.91	$7.41	$7.96	$8.56	$9.16
Tier 3	$8.50	$10.43	$11.18	$12.01	$12.92	$13.83
Total	$11.39	N/A	N/A	N/A	N/A	N/A
MFR/Commercial	$5.96	$6.22	$6.67	$7.17	$7.71	$8.25
Irrigation						
Tier 1	$5.96	$4.80	$5.15	$5.54	$5.96	$6.38
Tier 2	$11.39	$9.20	$9.86	$10.59	$11.39	$12.19

6.5 WATER 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 20 kgal will experience a $10.12 increase in their bill. This is due to both to an increase in the bi-monthly Service Charge as well as an increase in the Tier 2 rate 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 (20 kgal), and average summer use (25 kgal).

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

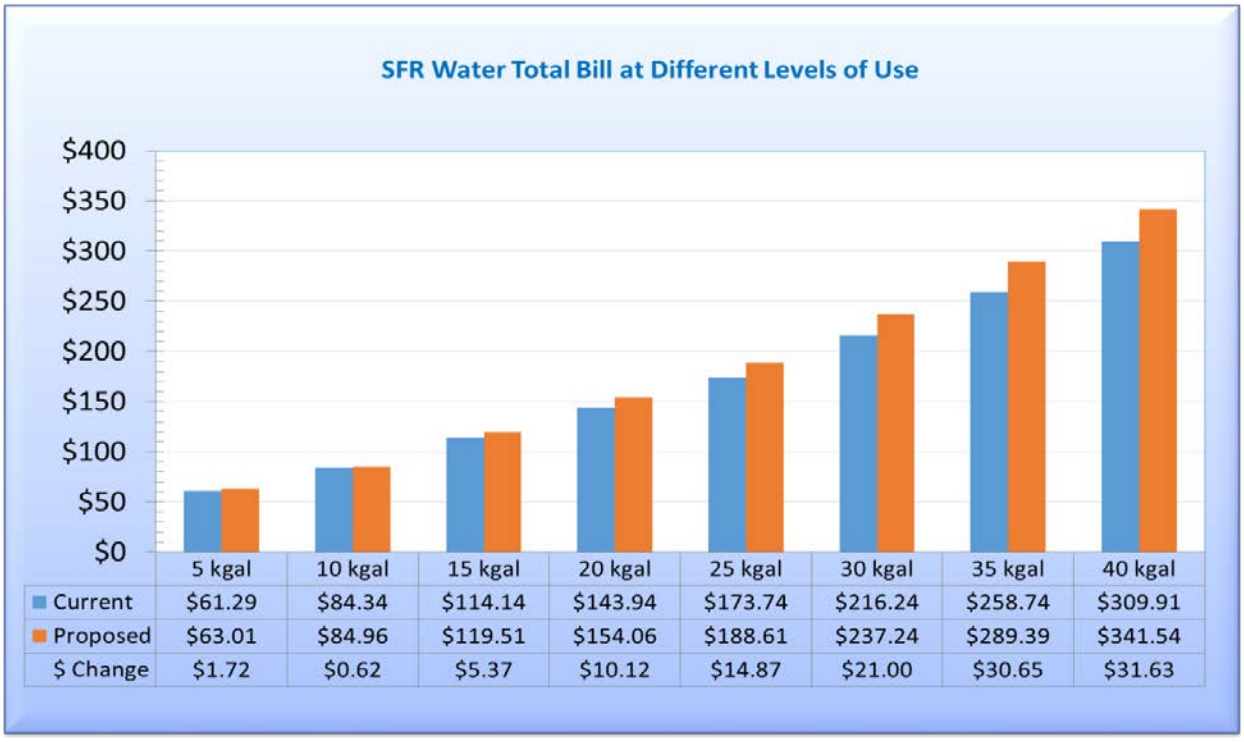
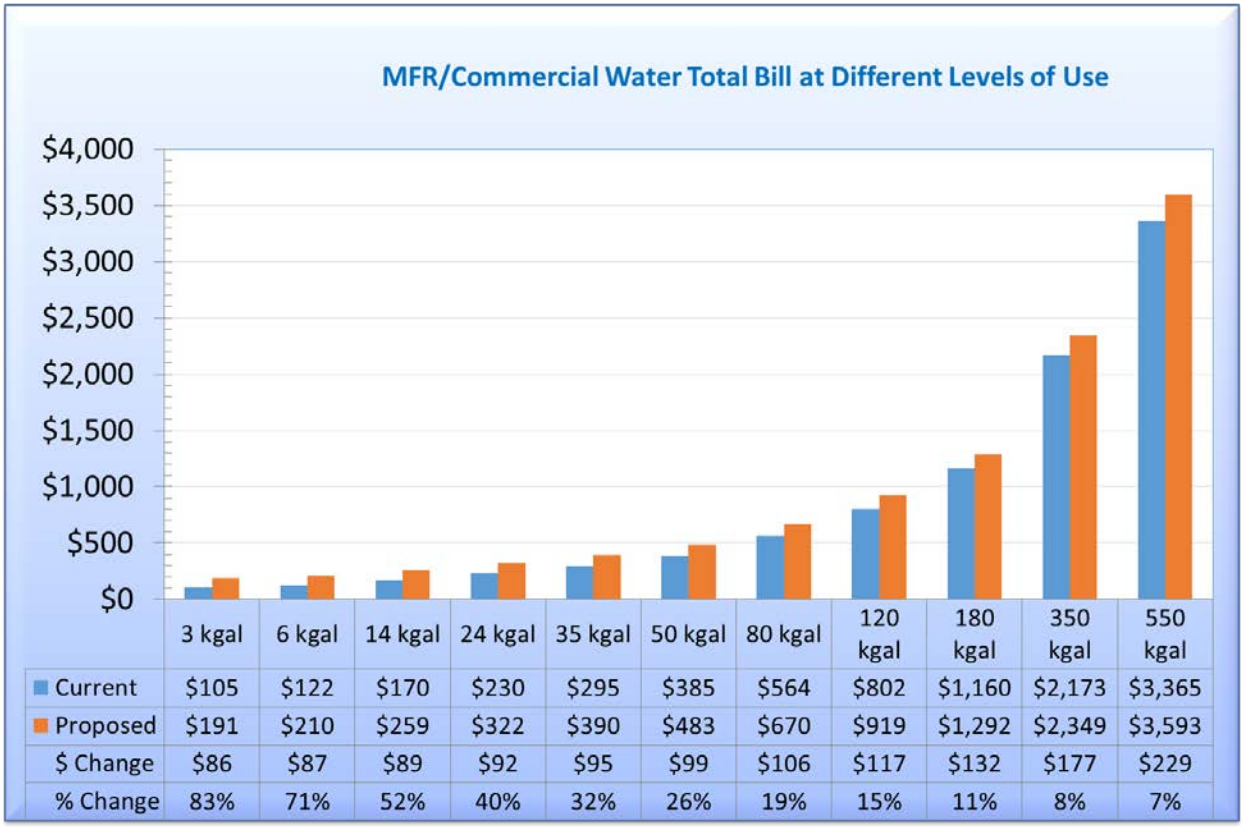


Figure 6-2 shows customer impacts for a MFR customer with a 2" meter. At the 50th percentile of use (50 kgal) a customer experiences a $98.60 increase in their bi-monthly bill, or 26 percent. The increase is due almost exclusively to the increase in the bi-monthly Service Charge by $85.80.

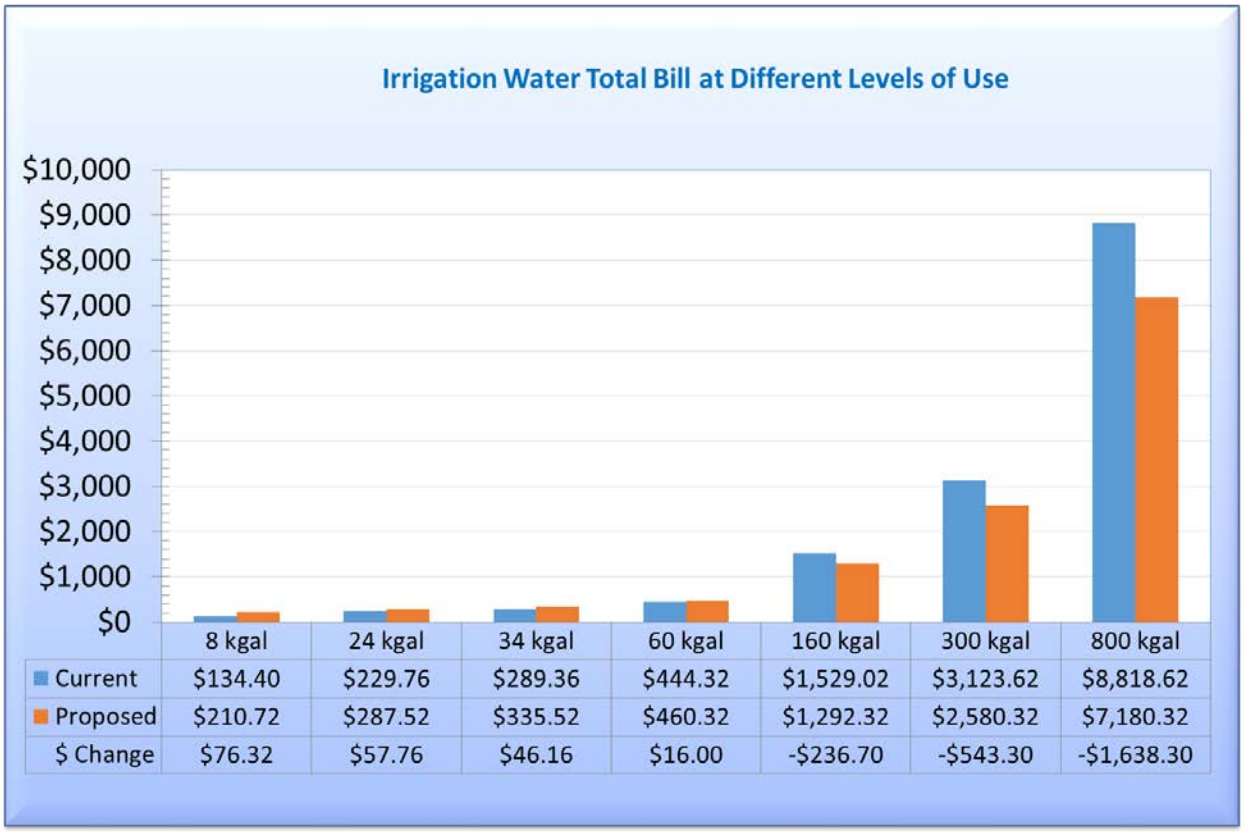
Figure 6-2: Bill Impacts – Multi-Family Residential with 2" Meter



	3 kgal	6 kgal	14 kgal	24 kgal	35 kgal	50 kgal	80 kgal	120 kgal	180 kgal	350 kgal	550 kgal
Current	$105	$122	$170	$230	$295	$385	$564	$802	$1,160	$2,173	$3,365
Proposed	$191	$210	$259	$322	$390	$483	$670	$919	$1,292	$2,349	$3,593
$ Change	$86	$87	$89	$92	$95	$99	$106	$117	$132	$177	$229
% Change	83%	71%	52%	40%	32%	26%	19%	15%	11%	8%	7%

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 $16.00 increase in their bi-monthly bill, or 4 percent. The increase is due to the increase in the bi-monthly service charge being greater than the reduction in the Tier 1 Commodity rate. 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	$134.40	$229.76	$289.36	$444.32	$1,529.02	$3,123.62	$8,818.62
Proposed	$210.72	$287.52	$335.52	$460.32	$1,292.32	$2,580.32	$7,180.32
$ Change	$76.32	$57.76	$46.16	$16.00	-$236.70	-$543.30	-$1,638.30

7. GENERAL ASSUMPTIONS - SEWER

7.1 INFLATION

The Study Period is from Fiscal Year (FY) 2016 to 2021 with proposed revenue adjustments and rates presented for the five years FY 2017 through FY 2021. Various types of assumptions and inputs are incorporated into the Study based on discussions with and/or direction from the District's Board of Directors, staff, and public comments. These include the projected number of accounts, water consumption, and inflation factors, among other assumptions.

These cost escalation factors below show projected increases in various cost categories across the Study period. The factors are applied to all years beginning FY 2018. FY 2016 and FY 2017 use budgeted values so no inflationary factors are applied. RFC worked with District staff to escalate individual budget line items according to the 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 8 percent is used. Energy escalation of 3 percent and capital escalation of 0.5 percent were provided by District staff.

Table 7-1: Inflationary Assumptions

Escalation Factors	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
General			3.0%	3.0%	3.0%	3.0%
Salary			3.0%	3.0%	3.0%	3.0%
Benefits			8.0%	8.0%	8.0%	8.0%
Energy			3.0%	3.0%	3.0%	3.0%
Capital			0.5%	0.5%	0.5%	0.5%

7.2 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 sewer accounts will grow by 0.10 percent in FY 2016 through FY 2020 and 0.06 percent in FY 2021. For FY 2017 through FY 2020, wastewater flows are expected to rebound as drought conditions, and conservation mandates are reduced. Wastewater flows will rebound after a drought, but not at the same rate as water use since the majority of the increase in water use will be outdoors.

In order to predict rate revenues, the Study assumes that all other non-operating revenues will increase at 5 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 7-2.

Table 7-2: Account, Water Demand, and Revenue Growth Assumptions

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Sewer Account Growth	0.10%	0.10%	0.10%	0.10%	0.10%	0.06%
Water Demand (% Prior Year) in kgal	88.50%	102.30%	102.60%	102.50%	102.40%	102.50%
Misc. Revenues	N/A	5.0%	5.0%	5.0%	5.0%	5.0%
Reserve Interest	N/A	1.25%	1.25%	1.5%	1.5%	1.5%

8. SEWER FINANCIAL PLAN

This section describes the sewer utility's customer account and wastewater flow data and corresponding financial plan. To develop the financial plan, RFC projects annual expenses and revenues; models reserve balances; projects transfers between District funds, and capital expenditures; 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, reserve funding, projected revenue under existing rates and the revenue adjustments required to ensure the fiscal sustainability and solvency of the sewer utility.

8.1 SEWER 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.

8.1.1 Revenues from Current Rates

The current rates were last adjusted in July 2015. 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. Commercial and School customers have two components to their charge – a fixed Customer Charge component and a variable volumetric Wastewater Flow Charge component based on the amount of water used (for schools the use rate is charged per 100 students[18]). Current wastewater rates[19] are shown in Table 8-1 and Table 8-2.

Table 8-1: Current Bi-Monthly Sewer Service Charges ($/DU[20])

Class	Current
SFR	$67.50
MFR	$67.50
Commercial/Institutional (Minimum Charge)	$67.50
Commercial Customer Charge	$2.10
School Customer Charge	$2.10

[18] 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.
[19] 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.
[20] DU stands for Dwelling Unit

Table 8-2: Current Sewer Use Charges ($/kgal Water)

Class	Current
SFR	N/A
MFR	N/A
Commercial/Institutional	$5.50
Primary School (per 100 ADA)	$81.60
Middle School (per 100 ADA)	N/A
Secondary School (per 100 ADA)	$162.10

Table 8-3 shows the projected number of sewer accounts subject to the Service Charge, Customer Charge, and water use subject to the Wastewater Use Charge. The number of accounts and water use is escalated each year based on the growth assumptions identified in Table 7-2.

Table 8-3: Projected Accounts by Customer Class and Use Type

Class	FY 2016
Wastewater Service Charge	
SFR	5,278
MFR	2,551
Commercial/Institutional (Minimum Charge)	166
Customer Charge	
School	6
Commercial	166
Wastewater Usage	
Primary School	18
Secondary School	39
Commercial/Institutional	28,875

Water demand projections through FY 2021 are shown in Table 4-6. The water demand and revenue growth assumptions are identified in Table 3-2. Water sales revenue is expected to continue to decline in FY 2016 relative to previous years as a result of the ongoing drought.

As previously discussed, due to current drought conditions, California Governor Brown issued executive order B-29-15 on April 1, 2015, which mandates a 25 percent reduction in urban water use statewide. The State Water Resources Control Board (SWRCB) determined that the District must reduce water consumption by 24 percent relative to calendar year (CY) 2013 levels.

Water demand is anticipated to rebound slightly in FY 2017 through FY 2021 to recover to a new baseline level of consumption of approximately 4,000 AF annually. As noted in the previous section, wastewater flows will rebound after a drought, but not at the same rate as water use since the majority of the increase in water use will be outdoors.

Table 8-4: Sewer Accounts and Water Use Estimates

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential Accounts (Wastewater Service Charge)						
SFR	5,278	5,284	5,289	5,294	5,299	5,303
MFR	2,551	2,553	2,556	2,558	2,561	2,562
Commercial/Institutional (Minimum Charge)	166	166	166	167	167	167
Customer Charge (Non-Residential Customers)						
School	6	6	6	6	6	6
Commercial	166	166	166	167	167	167
Water Usage (Wastewater Usage Charge)						
Primary School	18	18	18	18	18	18
Secondary School	39	40	40	40	40	40
Commercial/Institutional	28,875	29,569	30,368	31,159	31,938	32,756

Table 8-5 shows the rate revenue generated in each year of the Study with projected residential accounts and non-residential water demand at current rates. Note, revenues for FY 2016 and beyond use FY 2016 rates from Table 8-1 and Table 8-2.

The overall adequacy of sewer revenues is measured by comparing the projected annual revenue requirement in FY 2017 to be met from rates with projected revenues under the existing rates. For FY 2017 the total revenues from rates are $3,303,357 which becomes the revenue requirement for the cost of service analysis (because there are no revenue adjustments in FY 2017) in Section 9.

Table 8-5: Projected Sewer Rate Revenues (No Revenue Adjustments)

Revenue Source	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Service Charges	$3,237,970	$3,241,208	$3,244,449	$3,247,693	$3,250,941	$3,252,892
Customer Charge	$2,169	$2,172	$2,174	$2,176	$2,178	$2,179
Usage Charge	$206,115	$209,978	$214,420	$218,815	$223,150	$227,678
Sewer Service Discount[21]	($150,000)	($150,000)	($150,000)	($150,000)	($150,000)	($150,000)
Total Revenues from Rates	**$3,296,254**	**$3,303,357**	**$3,311,043**	**$3,318,684**	**$3,326,270**	**$3,332,749**

CVWD also derives revenues from other non-rate sources. These revenues consist of other operating and non-operating revenues. These revenues are summarized in Table 8-6.

[21] The District currently provides a 10 percent discount to all user classes that use less than 12 kgal per billing period. RFC assumes the discount in projecting future revenues under current rates, however, proposed sewer rates presented in Section 10 and reflect no discount in future years and cessation of the discount program.

Table 8-6: Projected Non-Rate Revenues

Revenue Source	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Other Operating						
Sewer Permits	$1,500	$1,500	$4,000	$4,200	$4,410	$4,631
Late Fees	$0	$0	$0	$0	$0	$0
Sewer Connection Fee (CVWD)	$15,000	$15,000	$30,000	$30,900	$31,827	$32,782
Sewer Connection Fee (Admin Fee)	$0	$0	$0	$0	$0	$0
Misc. Revenue	$5,000	$5,000	$5,000	$5,250	$5,513	$5,788
Rental Properties Income	$7,500	$7,500	$7,500	$7,875	$8,269	$8,682
Non-Operating Revenues						
Interest Income	$65,880	$63,732	$60,095	$67,188	$62,355	$57,942
Total Non-Operating Revenues	**$94,880**	**$92,732**	**$106,595**	**$115,413**	**$112,373**	**$109,824**

8.1.2 Operations and Maintenance (O&M) Expenses

Total projected O&M expenses are shown in Table 8-7. These expenses are summarized by department. Operating expenses use the District's budgeted FY 2017 values and project future expenses using the inflationary assumptions from Table 7-1.

Table 8-7: Projected Sewer Fund O&M Expenses

Department	Budgeted FY 2016	Budgeted FY 2017	Projected FY 2018	Projected FY 2019	Projected FY 2020	Projected FY 2021
Treatment and Disposal Charges	$450,888	$696,140	$699,621	$703,119	$706,634	$710,168
Compensation	$858,800	$839,625	$864,814	$890,758	$917,481	$945,005
Benefits	$638,200	$676,950	$731,106	$789,594	$852,762	$920,983
Plant Operating	$58,600	$65,525	$67,040	$68,597	$70,199	$71,847
Collection System	$64,350	$68,150	$69,838	$71,575	$73,363	$75,202
General and Administrative Expenses	$304,050	$284,400	$292,932	$301,720	$310,772	$320,095
Total O&M Expenses	**$2,374,888**	**$2,630,790**	**$2,725,350**	**$2,825,364**	**$2,931,211**	**$3,043,300**
Capital Outlay	$12,000	$18,844	$22,221	$24,362	$17,343	$17,429
Capital Equipment	$75,000	$100,500	$101,003	$101,508	$0	$0
Total Capitalized Expenses	**$87,000**	**$119,344**	**$123,223**	**$125,869**	**$17,343**	**$17,429**

8.1.3 Projected Capital Improvement Projects

The District has projected $110 thousand in capital expenditures each year over the rate setting period (FY 2017-2021) for the sewer utility as shown in Table 8-8. The majority of District expenditures in each year are attributed to collection systems repair and replacement.

In addition to CVWD 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 CVWD's service area is treated at LA San's Glendale facility. LA San provides conveyance, treatment, and disposal of wastewater and CVWD is responsible for their proportional share of the infrastructure and facilities that are used. The estimated annual capital charges are approximately $750 thousand through the Study period. The District will fund all capital improvements and LA San capital charges through rate revenues.

Table 8-8: Capital Improvement Plan

Department	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Collections Systems	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000
Interceptor System	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
Lift Station	$75,000	$3,000	$3,000	$3,000	$3,000	$3,000
Technology (Sewer Projects Only)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Facilities & Planning	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Misc. Sewer Projects	$8,000	$5,000	$5,000	$5,000	$5,000	$5,000
Total CVWD Capital	**$185,000**	**$110,000**	**$110,000**	**$110,000**	**$110,000**	**$110,000**
LA San Capital Charges	$744,984	$748,709	$752,452	$756,215	$759,996	$763,796
Total LA San Capital	**$744,984**	**$748,709**	**$752,452**	**$756,215**	**$759,996**	**$763,796**
Total Capital Projects	**$929,984**	**$859,259**	**$863,555**	**$867,873**	**$872,212**	**$876,573**

8.1.4 Existing Debt Service

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

8.2 STATUS QUO SEWER FINANCIAL PLAN (NO REVENUE ADJUSTMENTS)

Table 8-9 displays the proforma of the District's sewer 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 sewer enterprise data shown in the preceding tables of this section.

Under the "status-quo" scenario, revenues generated from rates and other miscellaneous revenues are adequate to achieve reserve targets and fund capital over the Study period. However, foregoing revenues adjustments during the Study period would lead to rate instability and the need for large rate increases in the future.

Table 8-9: Status Quo Sewer Proforma

Wastewater Utility	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
REVENUES						
Revenue from Existing Rates	$3,296,254	$3,303,357	$3,311,043	$3,318,684	$3,326,270	$3,332,749
Revenue Adjustments	$0	$0	$0	$0	$0	$0
Non-Rate Revenues	**$94,880**	**$92,732**	**$106,285**	**$113,916**	**$108,984**	**$103,370**
TOTAL REVENUE	**$3,391,135**	**$3,396,089**	**$3,417,328**	**$3,432,600**	**$3,435,254**	**$3,436,119**
OPERATING EXPENSES	$2,374,888	$2,630,790	$2,725,350	$2,825,364	$2,931,211	$3,043,300
CAPITALIZED EXPENSES	$87,000	$119,344	$123,223	$125,869	$17,343	$17,429
TOTAL EXPENSES	**$2,461,888**	**$2,750,134**	**$2,848,573**	**$2,951,233**	**$2,948,554**	**$3,060,729**
REVENUES LESS OPERATING EXPENSES	**$929,247**	**$645,956**	**$568,754**	**$481,366**	**$486,700**	**$375,390**
REPLACEMENT CAPITAL PROJECTS	**$929,984**	**$859,259**	**$863,555**	**$867,873**	**$872,212**	**$876,573**
DEBT ISSUES	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Issuance Costs	$0	$0	$0	$0	$0	$0
Debt Proceeds	$0	$0	$0	$0	$0	$0
DEBT SERVICE	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH CHANGE	($66,618)	($277,036)	($354,586)	($452,197)	($444,478)	($552,671)
BEGINNING BALANCE	**$5,303,730**	**$5,237,112**	**$4,960,077**	**$4,605,491**	**$4,153,294**	**$3,708,815**
ENDING BALANCE	$5,237,112	$4,960,077	$4,605,491	$4,153,294	$3,708,815	$3,156,145
TARGET BALANCE	**$2,540,253**	**$2,583,969**	**$2,600,881**	**$2,618,697**	**$2,637,476**	**$2,657,129**
Operating Reserve	$395,815	$438,465	$454,225	$470,894	$488,535	$507,217
Rate Stabilization	$494,438	$495,504	$496,656	$497,803	$498,940	$499,912
Emergency Reserve	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Capital R&R/Depreciation Target	$900,000	$900,000	$900,000	$900,000	$900,000	$900,000

8.3 PROPOSED SEWER FINANCIAL PLAN

RFC proposes that the District adopt the revenue adjustment schedule found in Table 8-10. No revenue adjustment is proposed for FY 2017. FY 2018 and all subsequent year revenue adjustments are proposed to be implemented July 1 of each fiscal year.

Although Table 8-10 shows anticipated revenue adjustments for FYs 2017 through 2021, the District will review and confirm the required revenue adjustments on an annual basis. The rates presented in Section 10 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 and receiving sewer service. RFC's 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 8-10: Proposed Sewer Utility Revenue Adjustments

Revenue Adjustments				
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
0.0%	1.5%	1.5%	1.5%	3.0%

Table 8-11 shows the proforma for the sewer utility with additional revenues from the revenue adjustments in the proposed financial plan. These revenue adjustments allow the enterprise to fund all operating expenses, capital expenditures, and achieve reserve targets during the Study period.

Table 8-11: Proposed Sewer Financial Plan Proforma

Wastewater Utility	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
REVENUES						
Revenue from Existing Rates	$3,296,254	$3,303,357	$3,311,043	$3,318,684	$3,326,270	$3,332,749
Revenue Adjustments	$0	$0	$49,666	$100,307	$151,939	$256,784
Non-Rate Revenues	**$94,880**	**$92,732**	**$106,595**	**$115,413**	**$112,373**	**$109,824**
TOTAL REVENUE	**$3,391,135**	**$3,396,089**	**$3,467,304**	**$3,534,404**	**$3,590,581**	**$3,699,358**
OPERATING EXPENSES	$2,374,888	$2,630,790	$2,725,350	$2,825,364	$2,931,211	$3,043,300
CAPITALIZED EXPENSES	$87,000	$119,344	$123,223	$125,869	$17,343	$17,429
TOTAL EXPENSES	**$2,461,888**	**$2,750,134**	**$2,848,573**	**$2,951,233**	**$2,948,554**	**$3,060,729**
REVENUES LESS OPERATING EXPENSES	**$929,247**	**$645,956**	**$618,731**	**$583,171**	**$642,028**	**$638,629**
REPLACEMENT CAPITAL PROJECTS	**$929,984**	**$859,259**	**$863,555**	**$867,873**	**$872,212**	**$876,573**
DEBT ISSUES	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Issuance Costs	$0	$0	$0	$0	$0	$0
Debt Proceeds	$0	$0	$0	$0	$0	$0
DEBT SERVICE	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
NET CASH CHANGE	($66,618)	($277,036)	($304,920)	($351,890)	($292,540)	($295,886)
BEGINNING BALANCE	**$5,303,730**	**$5,237,112**	**$4,960,077**	**$4,655,157**	**$4,303,266**	**$4,010,727**
ENDING BALANCE	$5,237,112	$4,960,077	$4,655,157	$4,303,266	$4,010,727	$3,714,840
TARGET BALANCE	**$2,540,253**	**$2,583,969**	**$2,608,331**	**$2,626,164**	**$2,644,960**	**$2,672,126**
Operating Reserve	$395,815	$438,465	$454,225	$470,894	$488,535	$507,217
Rate Stabilization	$494,438	$495,504	$504,106	$505,270	$506,425	$514,910
Emergency Reserve	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Capital R&R/Depreciation Target	$900,000	$900,000	$900,000	$900,000	$900,000	$900,000

Figure 8-1 through Figure 8-4 display the FY 2017 through FY 2021 proposed financial plan in a graphical format. Figure 8-1 shows the proposed revenue adjustments- in percentage terms- as blue bars.

Figure 8-1: Proposed Revenue Adjustments

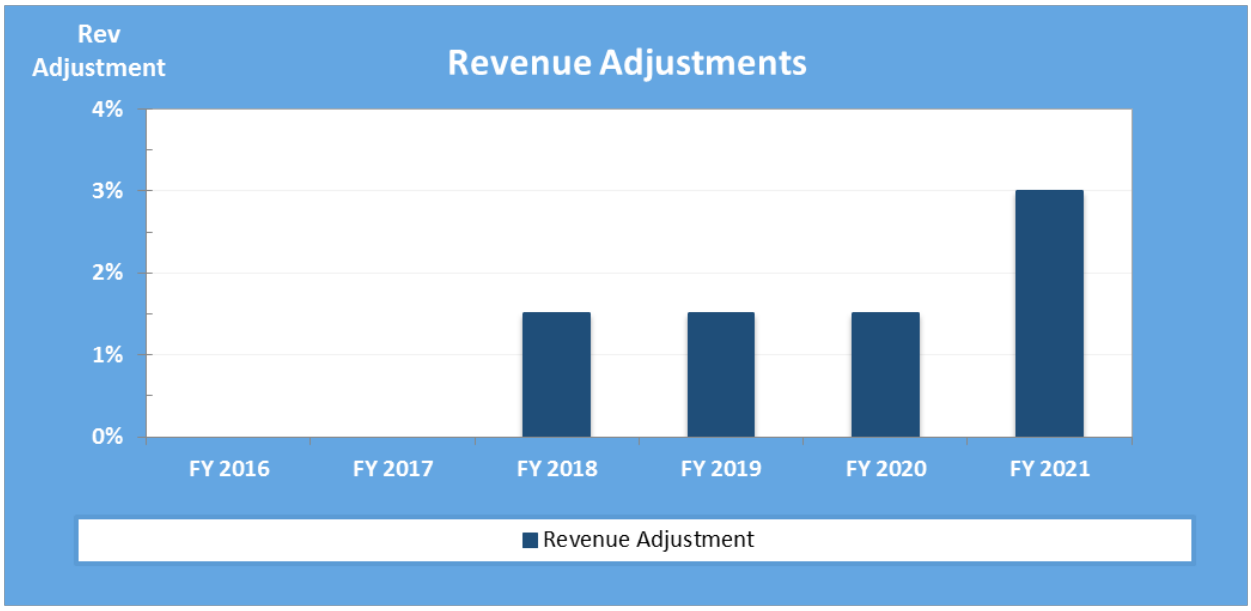


Figure 8-2 illustrates the Operating Financial Plan in a graphical format. It compares existing and proposed revenues with projected expenses. The expenses represent O&M expenses, capitalized expenses, and reserve funding. Total revenues at existing and proposed rates are shown by the horizontal black and blue lines respectively

Figure 8-2: Proposed Operating Financial Plan

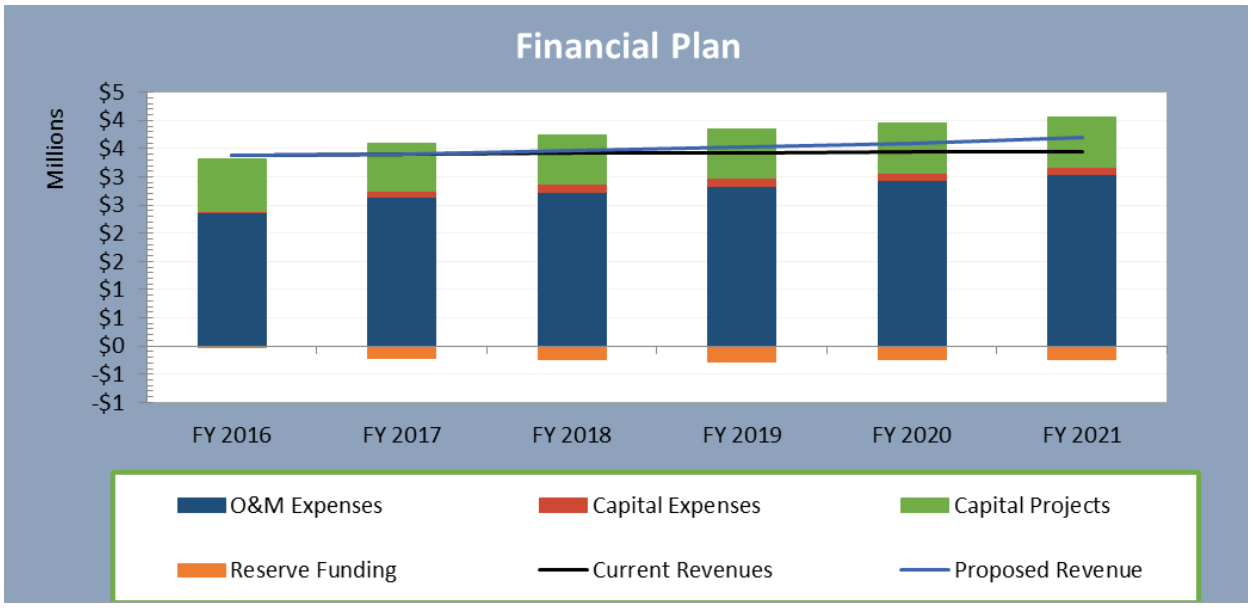


Figure 8-3 shows the sewer utility's ending balance by fiscal year. The orange bars indicate the ending balance, while the green line indicates the target balance.

Figure 8-3: Proposed Ending Fund Balances

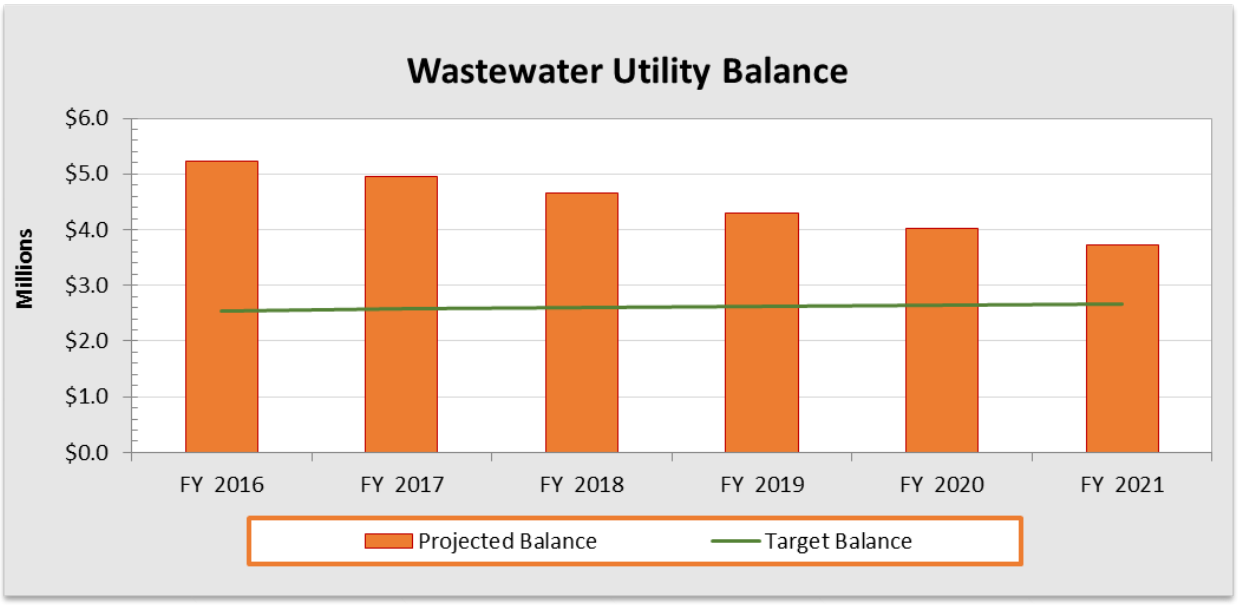
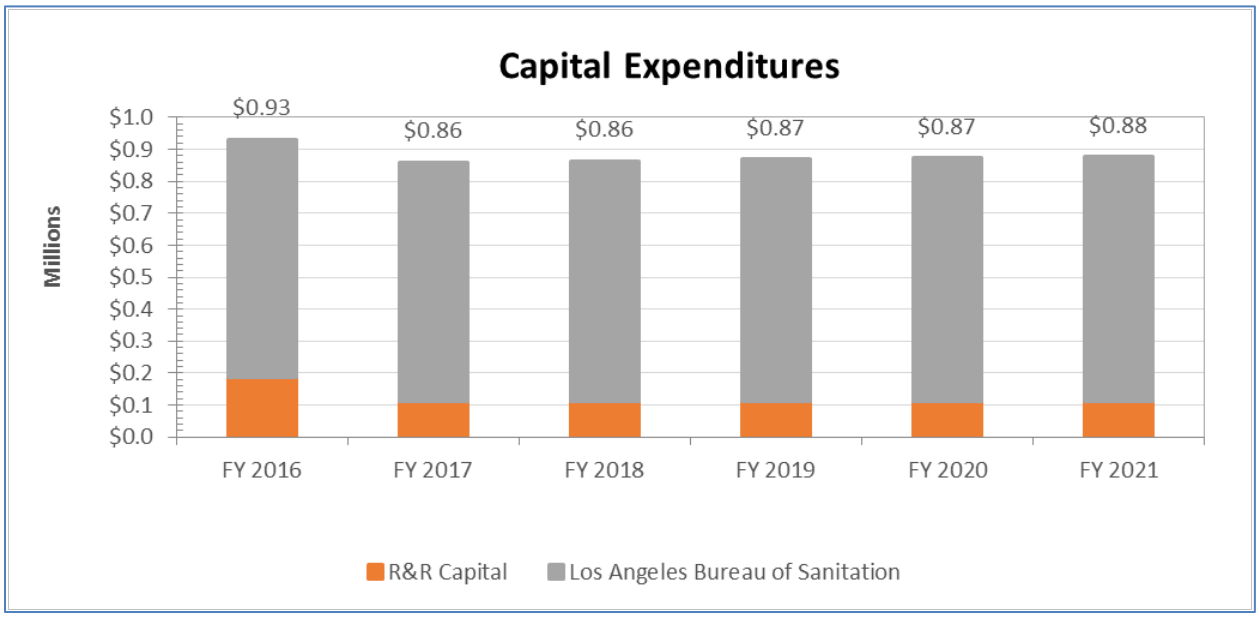


Figure 8-4 shows the total CIP of the sewer utility and the corresponding expenditure type. CVWD repair and replacement capital is shown in orange and LA San capital in grey. All capital is rate funded.

Figure 8-4: Proposed Capital Improvement Program Funding



9. SEWER ENTERPRISE COST OF SERVICE

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 sewer utility.

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 sewer system.

The total cost of sewer service is analyzed by system function in order to equitably distribute costs of service to the various classes of customers. For this analysis, sewer 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, 2004.

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 sewer 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 sewer 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.

9.1 CURRENT SEWER SERVICE CUSTOMER CLASSES

The District has three classes of sewer service – residential (SFR and MFR), non-residential (Commercial/Institutional), and schools. Residential customers are charged a flat bi-monthly Service Charge rate of $67.50 for sewer service. Non-residential customers are billed a Use Charge per kgal of water (subject to a minimum of $67.50), as well as a small fixed Customer Charge of $2.10 per account. School customers are billed the same fixed Customer Charge as non-residential plus a charge per 100 average daily attendance (ADA).

The District requested RFC to develop a fixed plus variable rate structure for all sewer service customers, similar to how water customers are billed. Under the proposed structure residential customers will pay a portion of their total sewer charges as a fixed Wastewater Service Charge and a portion dictated by a customer's winter water use, which is a reasonable assumption of indoor water use. Non-residential customers would continue to be billed on actual water use in each billing period.

9.2 ALLOCATION OF FUNCTIONALIZED EXPENSES TO COST 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 sewage and administering the sewer system (as well as providing customer service to account holders).

Treatment costs are allocated 35 percent to flow, 37 percent to BOD and 28 percent to TSS[22]. 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 9-1 shows the cost allocations.

Table 9-1: Allocation of Functionalized O&M Expenses to Cost Causation Components

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

Table 9-2 shows the total resulting cost causation component allocation for O&M expenses. This resulting allocation is used to allocate the District's operating and capital revenue requirement to the cost causation components.

Table 9-2: O&M Allocation

Description	Flow	BOD	TSS	General	Total
Treatment and Disposal Charges	$243,927	$257,154	$194,989	$0	$696,140
Labor	$839,625	$0	$0	$0	$839,625
Compensation	$676,950	$0	$0	$0	$676,950
Plant Operating Expenses	$65,525	$0	$0	$0	$65,525
Collection System Expenses	$68,150	$0	$0	$0	$68,150
General and Administrative Expenses	$284,400	$0	$0	$0	$284,400
Total O&M Allocated	**$2,178,577**	**$257,154**	**$194,989**	**$0**	**$2,630,790**

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

9.3 REVENUE REQUIREMENT

Table 9-3 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 9-1.

RFC calculated the revenue requirement using FY 2017 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.

Table 9-3: Revenue Required from Rates (FY 2017)

Revenue Requirements	Operating	Capital	Total
REVENUE REQUIREMENTS			
Treatment and Disposal Charges	$696,140		$696,140
Labor	$839,625		$839,625
Compensation	$676,950		$676,950
Plant Operating	$65,525		$65,525
Collection System	$68,150		$68,150
General and Administrative Expenses	$284,400		$284,400
Capital Outlay		$18,844	$18,844
Capital Equipment		$100,500	$100,500
SUBTOTAL REVENUE REQUIREMENTS	**$2,630,790**	**$119,344**	**$2,750,134**
Less Other Revenues			
Other Operating Revenues	$29,000		$29,000
Non-Operating Revenues	$63,732		$63,732
Total Other Revenue	**$92,732**	**$0**	**$92,732**
Adjustments			
Annualized Cash Balance		($645,956)	($645,956)
Total Adjustments	**$0**	**($645,956)**	**($645,956)**
COS to be Recovered from Water Rates	**$2,538,058**	**$765,299**	**$3,303,357**

9.4 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. RFC 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 and Schools is 100 percent because these classes generally have dedicated landscape meters, with almost all water used indoors. This is shown in Table 9-4.

Table 9-4: Estimated Wastewater Generation

User Class	Estimated Water Use	Estimated Return Factor	Estimated Wastewater Generation	% Wastewater Attributable
Single Family	478,758	90%	430,882	71%
Multi-Family	136,182	100%	136,182	22%
Commercial	32,595	90%	29,336	5%
School	10,956	100%	10,956	2%
Total	**658,491**		**607,355**	

The total revenue requirement from Table 9-3 is allocated according to the percentage attributable to each class to determine the total cost to be recovered from each user class. Table 9-5. It should be noted that the commercial class may have different strengths, however, since 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.

Table 9-5: Estimated Wastewater Generation

User Class	Total Revenue Requirement	% Wastewater Attributable	Class Total
Single Family	$3,303,357	71%	$2,343,533
Multi-Family	$3,303,357	22%	$740,683
Commercial	$3,303,357	5%	$159,553
School	$3,303,357	2%	$59,587
Total Revenue to be Recovered			**$3,303,357**

9.5 FIXED VS. VARIABLE COST RECOVERY

One of the District's goals in performing the wastewater cost of service study is to develop a fixed and variable rate structure for all sewer service customers, similar to how water customers are billed. The first step in developing a new rate structure is determining how much revenue should be collected via fixed charges and how much should be collected via variable charges.

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 FY 2017 was used as the proxy to determine the revenue split between fixed and variable revenue recovery from residential users.

RFC determined that all District costs for operating and maintaining the sewer 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 CVWD and LA San costs relative to total operating and capital costs. Using the O&M expenses, capitalized expenses, and capital project expenditures for FY 2017 the split is 62 percent fixed and 38 percent variable.

10. SEWER RATE DERIVATION

10.1 EXISTING RATE STRUCTURE AND RATES

The District's existing rate structure consists of a fixed bi-monthly Service Charge for residential users (SFR and MFR) and a 100 percent variable[23] Use Charge based upon a customer's water use for non-residential users (Commercial/Institutional). 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 10-1 and Table 10-2.

Table 10-1: Current Sewer Service Charges ($/billing period/DU)

Class	Current
SFR	$67.50
MFR	$67.50
Commercial/Institutional (Minimum Charge)	$67.50
Commercial Customer Charge	$2.10
School Customer Charge	$2.10

Table 10-2: Current Sewer Use Rates ($/kgal)

Class	Current
SFR	N/A
MFR	N/A
Commercial/Institutional	$5.50
Primary School	$81.60
Middle School	N/A
Secondary School	$162.10

10.1 PROPOSED RATE STRUCTURE AND RATES

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

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 to ensure recovery of the fixed costs.

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

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

[23] Non-residential users do pay a $2.10 customer charge per bill.

10.1.1 Proposed Sewer Service Charges (Fixed)

One of the characteristics of sewer collection utilities is that most of the costs associated with the service are fixed. While the collection sewers 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 10-3 show the derivation of the proposed fixed charge. The fixed charge recovers revenue from residential customers who have reasonably consistent water use and homogenous water use as a customer class. The fixed charge recovers all costs identified as fixed in Section 9.5. Costs are divided by the total number of dwelling units and billing periods (6), and multiplied by the fixed cost recovery percentage to determine the monthly fixed charge of $45.95 for SFR and $30.05 for MFR. The charge is rounded up to the nearest penny.

Non-residential customers are charged on their water use. However, to ensure adequate recovery of the fixed costs, they are subject to a minimum bill charge equal to the MFR fixed charge of $30.05 per billing period. That is, non-residential sewer users will never pay less than the MFR fixed charge irrespective of water use.

Table 10-3: Derivation of Fixed Service Charges for Residential Users ($/DU)

User Class	Cost of Service	Dwelling Units	Fixed Cost Recovery %	Billing Periods	Bi-Monthly Fixed Charge ($/DU)
Single Family Residential (SFR)	$2,343,533	5,273	62%	6	**$45.95**
Multi-family Residential (MFR)	$740,683	2,548	62%	6	**$30.05**
Commercial/Institutional	$159,553	N/A	0%	N/A	
School	$59,587	N/A	0%	N/A	
Total	**$3,303,357**	**7,821**		**2,087**	

RFC proposes to discontinue the Customer Charge currently charged to non-residential customers.

10.1.2 Proposed Sewer Usage Charges (Variable)

Table 10-4 and Table 10-5 shows the derivation of the sewer usage charges. The variable charge recovers costs identified as variable in Section 9.5. Both residential and non-residential customers pay the variable charge on their total bill. The variable charge is assessed on prior year winter water use for residential customers and total water use for non-residential customers.

SFR use is capped at 20 kgal per billing period and the MFR cap is 15 kgal to recognize that usage above those caps may be irrigation usage. Costs for each class are divided by estimated FY 2017 water use and multiplied by the variable cost recovery percentage to determine a rate per unit of water. Rates are rounded up to the nearest whole penny.

Table 10-4: Derivation of Variable Usage Charges ($/kgal)

User Class	Cost of Service	Water Use	Variable Cost Recovery %	Variable Rate ($/kgal Water)
Single Family Residential (SFR)	$2,343,533	478,758	38%	$1.86
Multi-family Residential (MFR)	$740,683	136,182	38%	$2.07
Commercial/Institutional	$159,553	32,595	100%	$4.90
School	$59,587	10,956	100%	$5.44
Total	**$3,303,357**	**658,491**		

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 10-5 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.

Table 10-5: Derivation of School Usage Charges ($/kgal)

School	Water Use	Cost	Variable Rate ($/kgal)	Gpd /student	Kgal/yr /student	$/student /period	$/100 ADA
Elementary	1,682	$9,149	$5.44	5	0.90	$0.82	**$81.60**
Middle	2,254	$12,257	$5.44	10	1.80	$1.63	**$163.20**
High	7,020	$38,181	$5.44	15	2.70	$2.45	**$244.80**
Total	**10,956**	**$59,587**					

Table 10-6 and Table 10-7 show the proposed sewer Service Charges and sewer Usage Charges for the Study period. Both charges are increased "across the board" in subsequent years – that is, relative to existing rates – by the selected financial plan. FY 2017 charges will collect the same revenue as FY 2016. All rates are rounded up to the nearest penny.

Table 10-6: Proposed Bi-Monthly Sewer Service Charges ($/EDU[24])

Class	Current	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR	$67.50	$45.95	$46.65	$47.35	$48.07	$49.52
MFR	$67.50	$30.05	$30.51	$30.97	$31.44	$32.39
Commercial/Institutional (Minimum Charge)	$67.50	$30.05	$30.51	$30.97	$31.44	$32.39
Commercial Customer Charge	$2.10	N/A	N/A	N/A	N/A	N/A
School Customer Charge	$2.10	N/A	N/A	N/A	N/A	N/A

[24] EDU stands for Equivalent Dwelling Unit

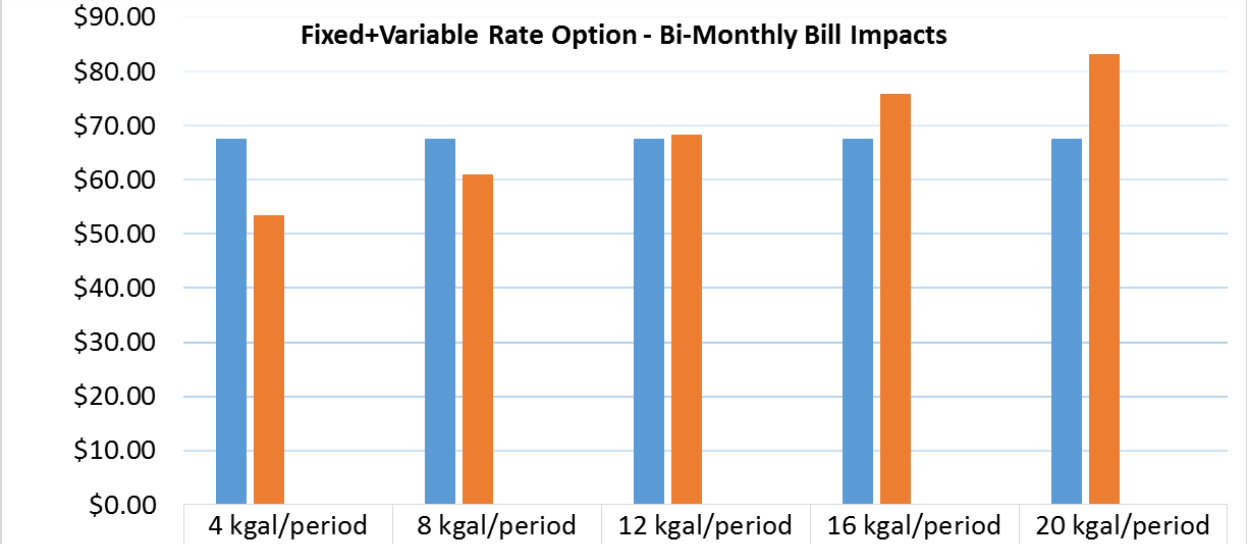
Table 10-7: Proposed Sewer Use Rates ($/kgal Water)

Class	Current	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR	N/A	$1.86	$1.89	$1.92	$1.95	$2.01
MFR	N/A	$2.07	$2.10	$2.14	$2.18	$2.25
Commercial/Institutional	$5.50	$4.90	$4.98	$5.06	$5.14	$5.30
Primary School (100 ADA)	$81.00	$81.60	$82.83	$84.08	$85.35	$87.92
Middle School (100 ADA)	N/A	$163.20	$165.65	$168.14	$170.67	$175.80
Secondary School (100 ADA)	$162.10	$244.80	$248.48	$252.21	$256.00	$263.68

10.2 SEWER CUSTOMER IMPACTS

Figure 10-1 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 rate structure, 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.

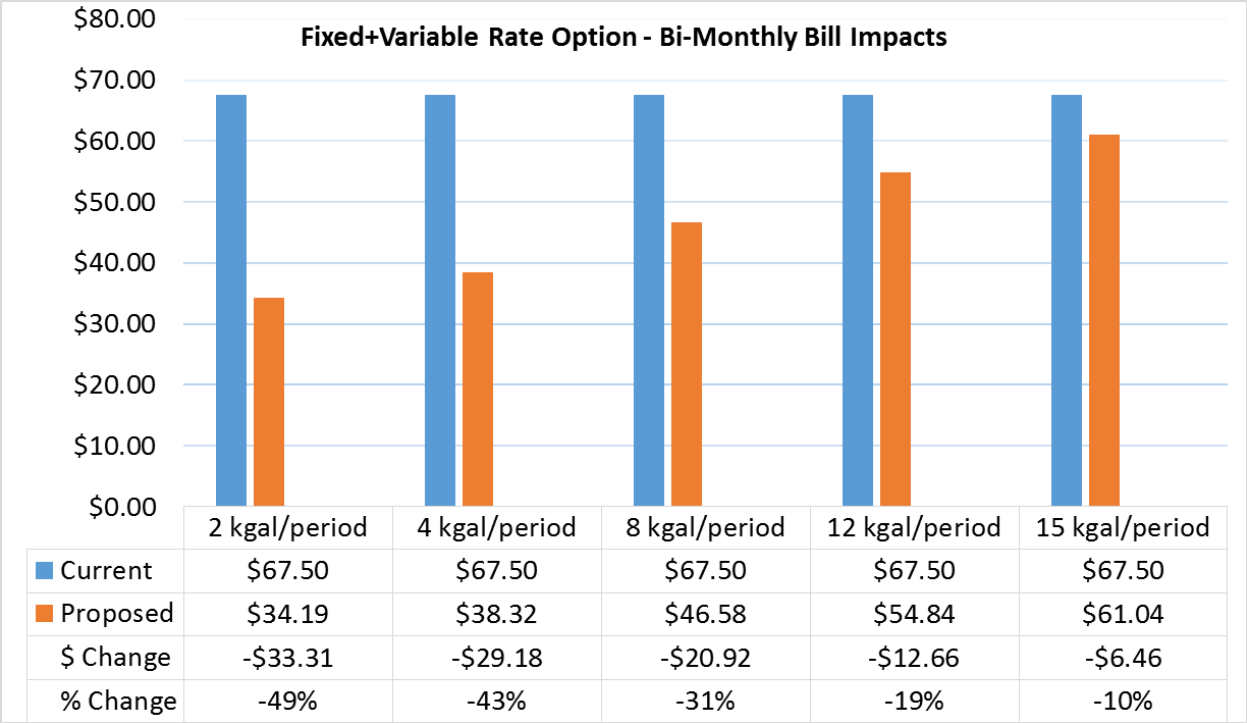
Figure 10-1: Bill Impacts - Single Family Residential



	4 kgal/period	8 kgal/period	12 kgal/period	16 kgal/period	20 kgal/period
Current	$67.50	$67.50	$67.50	$67.50	$67.50
Proposed	$53.40	$60.84	$68.28	$75.72	$83.16
$ Change	-$14.10	-$6.66	$0.78	$8.22	$15.66
% Change	-21%	-10%	1%	12%	23%

Figure 10-2 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 31 percent decrease in their bill due to a reduction in the fixed portion.

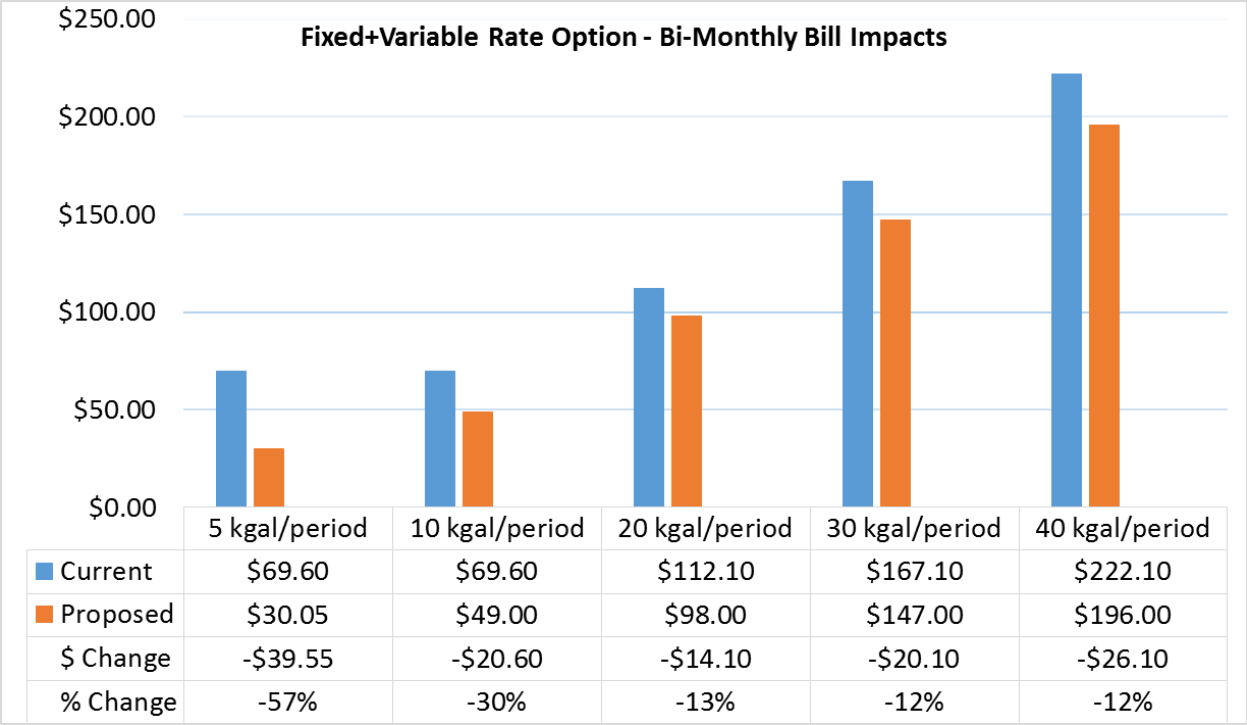
Figure 10-2: Bill Impacts – Multi-Family Residential



	2 kgal/period	4 kgal/period	8 kgal/period	12 kgal/period	15 kgal/period
Current	$67.50	$67.50	$67.50	$67.50	$67.50
Proposed	$34.19	$38.32	$46.58	$54.84	$61.04
$ Change	-$33.31	-$29.18	-$20.92	-$12.66	-$6.46
% Change	-49%	-43%	-31%	-19%	-10%

Figure 10-3 shows bill impacts for commercial customers. Since commercial customers are 100 percent variable, and due to a decrease in the Sewer Use Charge per kgal, commercial customers at all levels of water use experience a savings. The current rate structure does not include a flat rate for commercial customers, however, they are subject to a minimum charge. The proposed rate structure maintains the 100 percent variable structure, subject to a minimum charge equal to the fixed charge paid by a MFR customer.

Figure 10-3: Bill Impacts – Commercial



	5 kgal/period	10 kgal/period	20 kgal/period	30 kgal/period	40 kgal/period
Current	$69.60	$69.60	$112.10	$167.10	$222.10
Proposed	$30.05	$49.00	$98.00	$147.00	$196.00
$ Change	-$39.55	-$20.60	-$14.10	-$20.10	-$26.10
% Change	-57%	-30%	-13%	-12%	-12%

APPENDIX A – WATER & SEWER ASSET SUMMARIES

	Original Cost (OC)	Accumulated Depreciation (AD)	Book Value (OC -AD)	Replacement Cost (RC)	Accumulated Depreciation (RC)	RCLD (RC-AD)	Average Useful Life in Years	Average Asset Age	Average Annual Depreciation (OC)	Average Annual Depreciation (RC)
Water Enterprise										
CIP	$344,155	$0	$344,155	$344,155	$0	$344,155	0	0	$0	$0
Land	$1,158,526	$0	$1,158,526	$4,003,881	$0	$4,003,881	0	0	$0	$0
Water Treatment	$369,694	$312,679	$57,015	$430,278	$389,197	$41,080	5	4	$12,799	$9,222
Pump Machinery	$1,140,860	$610,491	$530,369	$1,479,593	$879,015	$600,578	15	8	$67,923	$76,915
Wells & Tunnels	$1,834,705	$411,244	$1,423,461	$3,707,967	$1,968,452	$1,739,515	40	9	$152,120	$185,896
Pump House Building	$414,514	$334,562	$79,952	$691,689	$585,683	$106,006	20	12	$6,461	$8,566
Tools & Lab Equipment	$167,708	$148,659	$19,049	$261,444	$247,883	$13,561	5	5	$4,099	$2,918
Dwellings/Rental House	$236,493	$216,073	$20,420	$320,425	$311,050	$9,375	10	9	$2,334	$1,071
SCADA	$919,845	$692,485	$227,360	$1,314,687	$1,078,082	$236,605	10	8	$28,420	$29,576
Glenwood Building	$585,216	$400,659	$184,557	$2,117,848	$1,877,252	$240,597	40	23	$7,978	$10,400
Safety Equipment	$297,295	$190,013	$107,283	$391,195	$279,106	$112,089	10	8	$13,220	$13,812
Pipelines	$20,430,171	$8,253,684	$12,176,487	$46,211,170	$28,591,580	$17,619,590	40	25	$494,994	$716,265
Reservoirs	$8,298,589	$4,623,309	$3,675,279	$27,365,811	$21,462,708	$5,903,103	40	25	$144,983	$232,866
Generators	$298,409	$235,558	$62,851	$383,039	$318,869	$64,169	10	8	$7,999	$8,167
Autos & Trucks	$929,352	$697,236	$232,116	$1,170,926	$992,433	$178,494	4	3	$68,269	$52,498
Radio Equipment	$3,894	$3,894	$0	$6,415	$6,415	$0	4	4	$0	$0
Office Equipment	$19,538	$15,579	$3,958	$29,982	$25,703	$4,279	10	9	$456	$493
Computers	$511,259	$431,652	$79,607	$597,823	$528,859	$68,964	5	4	$20,428	$17,696
Furniture	$68,421	$58,197	$10,224	$84,135	$73,639	$10,495	10	9	$1,191	$1,223
Office Building	$548,360	$225,015	$323,345	$1,684,745	$1,254,051	$430,694	40	21	$15,305	$20,386
Nitrate Plant	$2,642,127	$2,251,472	$390,655	$5,249,571	$4,808,154	$441,417	25	13	$30,389	$34,338
Total Water Enterprise	**$41,219,131**	**$20,112,462**	**$21,106,669**	**$97,846,778**	**$65,678,131**	**$32,168,647**	**16.4**	**9.9**	**$1,079,367**	**$1,422,308**

	Original Cost (OC)	Accumulated Depreciation (AD)	Book Value (OC -AD)	Replacement Cost (RC)	Accumulated Depreciation (RC)	RCLD (RC-AD)	Average Useful Life in Years	Average Asset Age	Average Annual Depreciation (OC)	Average Annual Depreciation (RC)
Sewer Enterprise										
CIP	$21,623	$0	$21,623	$21,623	$0	$21,623	40	0	$0	$0
Safety Equipment	$6,569	$5,109	$1,460	$8,382	$7,295	$1,087	10	8	$193	$143
Autos & Trucks	$474,075	$450,170	$23,905	$650,484	$631,862	$18,622	4	4	$6,187	$4,820
Office Equipment	$4,691	$4,691	$0	$7,832	$7,832	$0	10	10	$0	$0
Computers	$10,720	$3,752	$6,968	$11,254	$4,502	$6,752	5	2	$3,982	$3,858
Interceptor	$4,976,618	$2,375,507	$2,601,111	$12,549,983	$8,282,321	$4,267,662	17	8	$328,968	$539,740
Collection Unit 1	$11,373,628	$5,472,889	$5,900,739	$27,973,689	$18,337,576	$9,636,113	13	7	$878,842	$1,435,179
Collection Unit 2	$19,891,101	$9,459,403	$10,431,698	$50,195,916	$33,177,091	$17,018,825	18	11	$945,242	$1,542,118
Tools	$30,381	$30,131	$250	$41,528	$41,528	$0	5	5	$50	$0
Boosters	$66,465	$14,594	$51,871	$80,698	$19,329	$61,370	30	8	$6,693	$7,919
Total Sewer Enterprise	**$36,855,871**	**$17,816,246**	**$19,039,625**	**$91,541,389**	**$60,509,335**	**$31,032,055**	**15.2**	**6.2**	**$2,170,156**	**$3,533,777**

APPENDIX B – WATER BUDGET METHODOLOGY AND TIER DEFINITIONS

The District wished to evaluate a water budget allocation rate structure for residential and irrigation water customers, both of which are ideally suited for allocation based rate structures. Non-residential accounts are heterogeneous and not ideally suited for water budget rate structures. Similarly, without accurate dwelling count information, it is not possible to define allocations for Multi-family residential accounts. These two classes would retain a single uniform rate (MFR/Commercial). The description of the allocations to individual customers and the development of water budgets is described in this section for completeness of the Study.

When properly designed, water budget rate structures can create fair and equitable rates, provide revenue stability to the utility, and act as a water resource management tool for long term and strategic planning purposes. Just as with any other rate structure water budgets must strictly meet the requirements of Proposition 218.

A water budget attempts to determine an efficient level of water usage based on parcel specific, and household specific in the case of residential accounts, characteristics. Therefore the "allocation" of water to customers varies based on household size, landscape area and type, and weather. Residential accounts have an indoor allocation, or "budget", to meet essential household needs (e.g. cooking, cleaning, and sanitation) and an outdoor allocation to meet the efficient irrigation demands of their individual parcel. The outdoor budget considers a parcel's landscape, or irrigated area, and evapotranspiration from the landscape for each billing period, among other factors. The sum of the **indoor** and **outdoor** budgets equals an account's **total water budget**. A water budget rate structure is in essence a special case of a traditional inclining block rate structure where the tier sizes are account specific, i.e., the tier widths or the amount of water in each tier, is different among customers in the same class and varies with the weather for a single account throughout the year.

Tiers based on water budget allocation are defined by the indoor and outdoor allocations. Tier 1, indoor allocations, are set by default as the efficient water use of a three person household for single family accounts[25]. Tier 2, outdoor allocations, are based on landscape area and historical weather patterns for efficient water usage based on the *Model Water Efficient Landscape Ordinance*. While the Tier 1 indoor allocation will be the same for most residential customers unless they request changes to their household density (number of persons in household), the outdoor allocation will vary with the landscape area of each property.

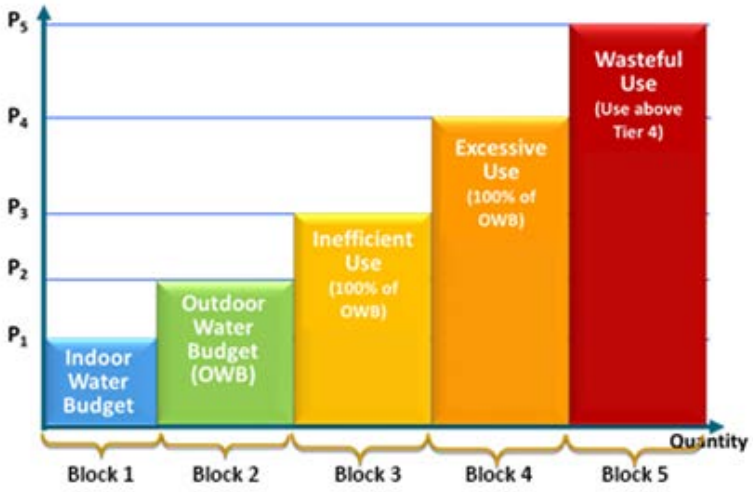
WATER BUDGET DEFINITIONS

The American Water Works Association Journal defines a water budget as "the quantity of water required for an *efficient* level of water use by that customer" (*Source: American Water Works*

[25] The rate structure allows for variances for households that have more than, or less than, the default value of three.

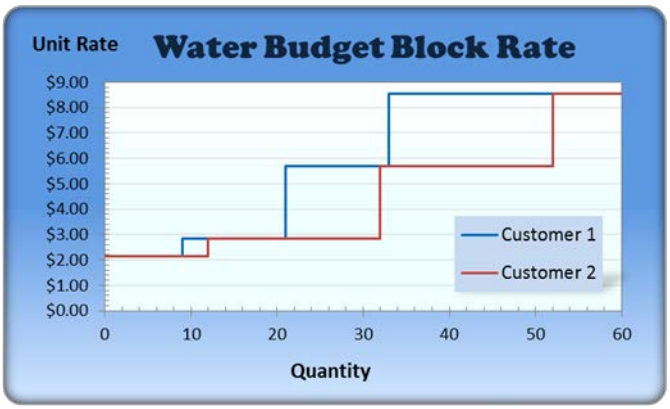
Association Journal, May 2008, Volume 100, Number 5). Therefore, each customer has his or her own allocation or water budget as shown in the following figures. Figure B-1 shows a hypothetical construction of water budget tiers. In the example, Tier 1 is defined by the allotment for efficient indoor use and Tier 2 is defined by the allotment for efficient outdoor use. In the example, Tiers 3 and 4 are each set to 100 percent of the Outdoor Water Budget (OWB). For example, if the Tier 2 OWB was 12 units, Tier 3 would be 12 units, and Tier 4 would be an additional 12 units. Any use beyond Tier 4 is considered wasteful and falls into Tier 5. It is important to note that water budget rate structures can have three, four, or five tiers. Our example shows five tiers for illustrative purposes only.

Figure B-1: Water Budget Tiers



Recall that water budget rate structures are customized for each customer, which results in different tier breaks for different customers. For example, as illustrated by Figure B-2, the first 9 units consumed by Customer 1 are charged at the Tier 1 rate, whereas Customer 2 has 12 units at the Tier 1 rate for indoor use. The next 12 units (10 – 21 units) consumed by Customer 1 are reserved for outdoor use, which are charged at the Tier 2 rate, and usage from 22 – 32 units falls into Tier 3. Any usage exceeding 33 units will be deemed excessive and charged at the Tier 4 rate. Similarly, for Customer 2, Tier 2 spans from 13 – 32 units, Tier 3 spans from 33 – 51 units, and usage exceeding 52 units will be charged at the Tier 4 rate. Customer 2, with a larger indoor and outdoor water budget (or allotment), represents a residential customer with a larger family and larger irrigated landscape area than Customer 1.

Figure B-2: Account Specific Water Budget Tiers



PARCEL ALLOCATION (WATER BUDGET) DEVELOPMENT METHODOLOGY

Residential Indoor Budget (Essential Use) Definition

The indoor water budget (IWB) is determined by a customer's household size and a standard consumption per person. The proposed IWB formula is as follows:

$$IWB = \frac{GPCD * Household\ \ Size * Days\ of\ Service * DF_{indoor}}{1000} + V_{indoor}$$

where

- GPCD – Gallons per capita per day.
- Household Size – Number of residents per dwelling unit.
- Days of Service – The number of days of service varies with each billing cycle for each customer. The actual number of days of service will be applied to calculate the indoor water budget for each billing cycle.
- DF_{indoor} – Indoor drought factor. The percentage of indoor water budget allotted during drought conditions. The drought factor is determined based on the degree of water shortage and is subject to the approval of the District Board. The indoor drought factor is set at 100 percent in non-drought periods.
- V_{indoor} – Indoor variance. The additional water allotment to be granted for extenuating circumstances is subject to the District's approval or verification as outlined in the District's variance program. Variances may be requested by submitting a "Variance/Adjustment Request Form."
- 1000 is the conversion unit from gallons to a billing unit of one thousand gallons (kgal).

Outdoor Budget (Efficient Use) Definition

The outdoor water budget (OWB) is determined by three main variables: irrigable landscape area, weather data, and an evapotranspiration (ET) Adjustment Factor. The irrigable landscape area is measured as the square footage of landscape surface on a customer's property. The weather data is based on the reference evapotranspiration (ET_0), which is the amount of water loss to the atmosphere over a given time period at given specific atmospheric conditions. ET_0 represents the amount of water

(in inches per billing period) needed for a hypothetical reference crop to maintain its health and appearance. The ET Adjustment Factor (ETAF) is a coefficient that adjusts ET_0 values based on plant factor and irrigation system efficiency.

The formula to calculate an outdoor water budget is as follows:

$$OWB = \left(\frac{\text{Landscape Area} * ET_0 * ETAF}{1604} + V_{outdoor} \right) * DF_{outdoor}$$

where

- ET_0 is measured in inches of water during the billing period based on a 15 year average ET_O from the California Irrigation Management Information System (CIMIS) stations at Arleta (Station 216)[26] and Monrovia (Station 159), the two nearest stations to the District.
- ETAF (% of ET_0) is set to 80%. 80% ETAF is equivalent to the standard set by the California Model Water Efficient Landscape Ordinance. The ordinance has recently been updated to 70% for existing landscapes and 55% for new development and the District will review and revise the ETAF if and when it decides to implement the water budget rate structure.
- Landscape Area (or Irrigable Landscape Area) in square feet is the estimated irrigable landscape served by a customer's meter. Without access to measured irrigable area, RFC grouped lot sizes in to three size bins with estimated percentage irrigable area for each. These groupings are shown in Table B-1 below. Percent lot size estimates come from empirical studies from Irvine Ranch Water District and the City of San Diego. The District may consider obtaining better landscape area from aerial photogrammetry.
- $DF_{outdoor}$ – Outdoor drought factor. The percentage of outdoor water budget allotted during drought conditions. The drought factor is determined based on the degree of water shortage and is subject to the approval of the District's Board. The outdoor drought factor is currently set at 100 percent.
- $V_{outdoor}$ – Outdoor variance. The additional water allotment to be granted for extenuating circumstances is subject to the District's approval or verification as outlined in the variance program. An outdoor variance is subject to outdoor drought factor.
- 1,604 is the conversion unit from inches per ft^2 to the billing unit of one thousand gallons (kgal).

Table B-1: Water Budget Factors and Block Definitions

Lot Size	Minimum Square Footage	Maximum Square Footage	Landscape Area as % of Lot Size
Small Lot	0	5,000	32%
Average Lot	5,001	10,000	47%
Large Lot	10,001	N/A/	55%

PROPOSED BUDGET DEFINITIONS AND ALLOCATION FACTORS

Residential Indoor Budget (Essential Use) Definition (Tier 1)

[26] Station 133 in Glendale is not active anymore

The State of California has revised the standard to 55 gallons per person per day (gpcd) for efficient indoor use goal[27]. RFC recommends the indoor water budget reflect the State's goal. Therefore, the definition for single family residential Tier 1 will be 55 gpcd multiplied by 3 persons per household multiplied by the days of service (on average 61). That equals approximately 11 kgal bi-monthly, or 5.5 kgal per month. Irrigation accounts do not receive an indoor budget as all use is outdoors.

Outdoor Budget (Efficient Use) Definition (Tier 2)

Outdoor budgets reflect the unique parcel characteristics of an account, as well as the specific billing period during the year. The outdoor budget consists of a parcel's estimated irrigable area, historical weather in the service area for the service (billing) period, and ETAF.

Inefficient/Excessive Use Definition (Tier 3)

All use in excess of the total water budget (TWB, or, indoor water budget plus outdoor water budget) is considered inefficient and falls in to Tier 3.

Table B-2: Water Budget Factors and Block Definitions

Variable	Revised
SFR Household Size	3
GPCD	55
ETAF	80%
Inefficient Use	>TWB

PROPOSED WATER BUDGET COMMODITY RATES

The water budget structure rates that follow are based on the same cost of service as presented in Section 5. The water budget rates presented use separate tier definitions and so the rate component unit costs are different than inclining tier components. Water supply components are based upon source availability to meet demand. Peaking and conservation components are based upon water budget allocations presented earlier in this Appendix. Since the revenue required from fixed and variable charges has been determined in the cost of service section, only commodity rates are discussed here. Bi-monthly fixed charges remain the same.

The rate structures proposed are a three tier water budget rate structure for Single Family Residential (SFR) and a two tier water budget rate structure for Irrigation. Multi-family residential (MFR)/Commercial will have their own uniform rate structure because these accounts use water heterogeneously and therefore are not good candidates for allocation based structures. For clarity and consistency, calculations are shown for all classes. The rates presented are for illustration only and were designed for discussion with the District Board. They were not agreed to by the Board and should not be interpreted as final rates.

[27] As identified in SBx7-7

10.2.1 Unit Cost Components 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

Please see Section 6.4 for detailed definitions and explanations of the commodity rate components.

Variable Supply Unit Cost

The variable supply cost is the cost to supply and deliver water from various sources. Table B-3 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 B-3 are based on FY 2017 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 ($/AF) is spread across all units and all sources equally.

Table B-3: Water Supply Costs

Source of Supply	Average Production/ Purchase (AF)	Average Production/ Purchase (kgal)	Water Unit Cost ($/AF)	Additional Supply Costs ($/AF)	Total Cost ($/AF)
Verdugo Groundwater	2,000	651,700	$259	$286	$545
GWP Groundwater	565	184,105	$535	$286	$821
FMWD Tier 1	1,135	369,840	$1,648	$286	$1,934
FMWD Tier 2	0	-	$1,785	$286	$2,071

Table B-4 shows the unit cost in $/kgal from each source of supply. The unit cost converts the unit cost in $/AF to $/kgal and accounts for system loss to determine the unit cost of water available to meet demand. The water supply costs and availability are used in the water supply unit cost calculation for the Commodity Charge and reflect a reasonable estimate of total water supply mix.

Table B-4: Water Supply Costs Calculation ($/kgal)

	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2
Supply to Meet Demand (kgal)	651,700	184,105	369,840	-

Cost ($/AF)	$545	$821	$1,934	$2,071
Unit Cost ($/kgal)	$1.67	$2.52	$5.93	$6.36
Unit Cost ($/kgal) after loss[28]	$1.82	$2.74	$6.45	$6.91

Table B-5 shows estimated total demand in FY 2017. Due to slight differences in data in the calculation of the water budgets, the total water usage in each class and in total does not tie exactly to the estimated demand in Section 6, however, the variance is less than one tenth of one percent (0.1%).

Table B-5: Projected Usage in FY 2017 (Table 4-6)

Usage	Estimated Demand (kgal)
SFR	
Tier 1	360,816
Tier 2	286,616
Tier 3	77,305
Tier 4	
MFR/Commercial	353,143
Irrigation	
Tier 1	20,233
Tier 2	9,271
Total	**1,107,383**

Given the water available from each source (Table B-4) and the estimated demand from each class (Table B-5), the estimated water available to meet demand from each source is shown in Table B-6. The supply is allocated in proportion to the overall demand.

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

	Annual Usage	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2
SFR	724,737	392,390	110,850	221,497	-
MFR/Commercial	353,143	191,200	54,014	108,506	-
Irrigation	29,504	15,974	4,513	9,017	-
Total	**1,107,383**	**599,564**	**169,377**	**339,020**	**0**

The unit rates for variable supply for the water budget structure are derived in Table B-7. Total costs are determined as the sum-products of the unit costs from Table B-4 and the water required in each tier from Table B-6.

[28] Unit cost accounts for an estimated 8 percent system-wide water loss. The loss is allocated to all sources.

Note that Tier 2 SFR, MFR/Commercial, and both Irrigation tiers represent blended rates from two or more sources. Also note that the average unit cost is consistent for all user classes at $3.38/kgal. Unit costs are rounded up to the nearest penny.

Table B-7: Variable Supply Unit Rate ($/kgal)

Class	Annual Usage	Verdugo	GWP	FMWD Tier 1	FMWD Tier 2	Unit Cost ($/kgal)
Unit Cost of Supply		$1.82	$2.74	$6.45	$6.91	
SFR						
Tier 1	360,816	360,816	-	-	-	$1.82
Tier 2	286,616	31,574	110,850	144,192	-	$4.69
Tier 3	77,305	-	-	77,305	-	$6.45
Total	**724,737**	**392,390**	**110,850**	**221,497**	**-**	**$3.38**
MFR/Commercial	**353,143**	**191,200**	**54,014**	**108,506**	**-**	**$3.38**
Irrigation						
Tier 1	20,233	15,974	4,259	-	-	$2.02
Tier 2	9,271	-	254	9,017	-	$6.35
Total	**29,504**	**15,974**	**4,513**	**9,017**	**-**	**$3.38**

Delivery Unit Cost

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

The calculated delivery unit cost is presented in Table B-8. Since delivery recovers costs to meet average daily demands, the delivery cost is the same for all classes and tiers.

Table B-8: Delivery Unit Cost Calculation

Class and Tier	Projected Demand
SFR	
Tier 1	360,816
Tier 2	286,616
Tier 3	77,305
MFR/Commercial	353,143
Irrigation	
Tier 1	20,233
Tier 2	9,271
Total (kgal)	**1,107,383**
Delivery Costs ($)	**$2,175,271**
Delivery Unit Cost ($/kgal)	**$1.96**

Peaking Unit Cost

Table B-9 provides customer class peaking factors. For the derivation of intra-class peaking cost components we must derive peaking factors *within* the tiers.

The peaking costs shown are derived by analyzing the District's usage while utilizing the constructed water budget for each parcel.

For each tier RFC determines the average use within the tier throughout the year (6 billing periods per year) by dividing the use by the number of bills. Next, RFC identifies the average cumulative use for each tier during the year. For example, if the average use is 5 kgal for Tier 1 and 10 kgal for Tier 2, the cumulative total for Tier 2 is 15 kgal. Dividing the maximum by the average gives a factor of max to average. The cumulative total of all bills in the tier is then expressed as a ratio of the class average (10.0 kgal in the case of SFR). Since the MFR/Commercial class is a uniform rate and has no tiers, the peaking factor is simply calculated as the average use in the max period divided by the average use in the average period.

Note that the peaking factor is less than 1 for the SFR class because the usage in Tier 1 in the peak month for all SFR usage was less than the average Tier 1 usage. Accounting for peaks in this manner allows the calculations to remain proportional among classes.

Table B-9: Customer Class Peaking Factors

Usage	Avg. Annual Use	Avg. Annual Bills	Max Period Demand (kgal/bill)	Avg. Period Demand (kgal/bill)	Tier / Class Average
SFR					
Tier 1	66,423	6,772	9.8	9.8	0.98
Tier 2	52,763	4,807	11.0	20.8	2.08
Tier 3	14,231	1,765	8.1	28.8	2.89
Total	133,417	12,662	10.0		
MFR/Commercial	76,956	1,076	71.5	60.3	1.19
Irrigation					
Tier 1	3,725	56	66.7	66.7	0.84
Tier 2	1,707	13	136.5	203.2	2.56
Total	5,431	68	79.5		

Table B-10 shows the unit cost calculation of class peaking costs. Projected demand in each tier is multiplied by the respective peaking factor to derive total weighted units (peaking units). Total peaking units is 1,632,627 kgal as compared to the annual average of 1,107,383 kgal.

The allocation to each class- that is the amount that each class is responsible for- is determined by multiplying the class demand by the class peaking factor and then dividing by the total peaking demand (in this case 1,632,627 kgal).

Next the total revenue requirement is distributed to the customer classes based on the allocation percentages. Lastly the class revenue requirement is divided by the projected demand to determine the unit rate of peaking.

Table B-10: Peaking Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Class Peaking Factor	Peaking Demand	Allocation %	Rev. Requirement	Unit Rate
SFR	724,737	1.62	1,167,522	71.8%	$908,501	$1.25
MFR/Commercial	353,143	1.19	419,106	25.7%	$324,648	$0.92
Irrigation	29,504	1.38	40,688	2.5%	$31,518	$1.07
Total (kgal)	**1,107,383**		**1,632,627**		**$1,264,667**	

Once class requirements are calculated (Table B-10) the same process as described in Section 6.4.1.3 is followed to determine the intra-class (tier) unit rates. Again, weighted demand (total peaking units) is calculated to determine the relative share required from each tier. Next the revenue requirement is distributed based on the allocation percentage and then a unit rate determined. The unit rates for each class and tier is calculated and shown in Table B-11.

Table B-11: Peaking Unit Cost Calculation (Tiers)

Class and Tiers	Projected Demand	Peaking Factor	Peaking Demand	Allocation %	Rev. Requirement	Unit Rate
SFR						
Tier 1	360,816	0.98	353,964	30%	$274,188	$0.76
Tier 2	286,616	2.08	595,823	51%	$461,537	$1.61
Tier 3	77,305	2.89	223,046	19%	$172,776	$2.24
Total	**724,737**		**1,172,833**		**$908,501**	
MFR/Commercial	353,143	1.19	419,106	100%	$324,648	$0.92
	353,143		**419,106**		**$324,648**	
Irrigation						
Tier 1	20,233	0.84	16,982	42%	$13,154	$0.65
Tier 2	9,271	2.56	23,706	58%	$18,363	$1.98
Total	**29,504**		**40,688**	**100%**	**$31,518**	

Conservation Unit Cost

Conservation costs are allocated in the same manner and using the same factors calculated for the peaking components. Table B-12 shows the calculation for the unit cost for conservation for each class. Table B-13 shows the conservation cost allocation to the tiers.

Table B-12: Conservation Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Peaking Factor	Conservation Demand	Allocation %	Rev. Requirement	Unit Rate
SFR	724,737	1.62	1,167,522	71.8%	$33,702	$0.05
MFR/Commercial	353,143	1.19	419,106	25.7%	$12,043	$0.03
Irrigation	29,504	1.38	40,688	2.5%	$1,169	$0.04
Total (kgal)	**1,107,383**		**1,632,627**		**$46,915**	

Table B-13: Conservation Unit Cost Calculation (Tiers)

Class and Tiers	Projected Demand	Peaking Factor	Conservation Demand	Allocation %	Rev. Requirement	Unit Rate
SFR						
Tier 1	360,816	0.98	353,964	30%	$10,171	$0.03
Tier 2	286,616	2.08	595,823	51%	$17,121	$0.06
Tier 3	77,305	2.89	223,046	19%	$6,409	$0.08
Total	**724,737**		**1,172,833**		**$33,702**	
MFR/Commercial	353,143	1.19	419,106	100%	$12,043	$0.03
	353,143		**419,106**		**$12,043**	
Irrigation						
Tier 1	20,233	0.84	16,982	42%	$488	$0.02
Tier 2	9,271	2.56	23,706	58%	$681	$0.07
Total	**29,504**		**40,688**	**100%**	**$1,169**	

Revenue Offset Unit Cost

Revenue offset components are applied equally to Tier 1 and Tier 2 of the SFR structure, Tier 1 of the Irrigation structure, and to MFR/Commercial customers.

However, it is Board policy to not apply revenue offsets to Irrigation customers. Therefore, while the offset is calculated for irrigation below, it is not incorporated into the Irrigation Commodity Charge rate. Table B-14 and Table B-15 show the revenue offset unit cost and revenue offset component rate calculation.

Table B-14: Revenue Offset Unit Cost Calculation (Class)

Class and Tiers	Projected Demand	Revenue Offset Factor	Rev Off. Demand	Allocation %	Rev. Requirement	Unit Rate
SFR	647,432	1.00	647,432	63%	($185,091)	($0.29)
MFR/Commercial	353,143	1.00	353,143	35%	($100,958)	($0.29)
Irrigation	20,233	1.00	20,233	2%	($5,784)	($0.29)
Total (kgal)	**1,020,808**		**1,020,808**	**100.0%**	($291,833)	

Table B-15: Revenue Offset Rate Component Calculation (Tiers)

Class and Tiers	Projected Demand	Revenue Offset Factor	Rev Off. Demand	Allocation %	Rev. Requirement	Unit Rate
SFR						
Tier 1	360,816	1.00		56%	($103,151)	($0.29)
Tier 2	286,616	1.00		44%	($81,939)	($0.29)
Tier 3	0	0.00		0%	$0	$0.00
Total	**647,432**		**647,432**	**100%**	**($185,091)**	
MFR/Commercial	353,143	1.00	353,143	100%	($100,958)	($0.29)
	353,143		**353,143**		**($100,958)**	
Irrigation						
Tier 1	20,233	1.00		100%	($5,784)	($0.29)
Tier 2	0	0.00		0%	$0	$0.00
Total	**20,233**	**20,233**			**($5,784)**	

Final Commodity Rates Derivation

To determine the Commodity rates, 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 B-16 below.

Table B-16: Proposed Commodity Rates ($/kgal)

Class and Tier	Tier Definition	Variable Supply	Delivery	Peaking	Conserv-ation	Revenue Offsets	COS Rates ($/kgal)
		Table B-7	Table B-8	Table B-11	Table B-13	Table B-15	
SFR							
Tier 1	IWB	$1.82	$1.96	$0.76	$0.03	($0.29)	**$4.29**
Tier 2	OWB	$4.51	$1.96	$1.61	$0.06	($0.29)	**$7.86**
Tier 3	>TWB	$6.45	$1.96	$2.24	$0.08	$0.00	**$10.74**
MFR/Commercial	Uniform	$3.38	$1.96	$0.92	$0.03	($0.29)	**$6.02**
Irrigation							
Tier 1	OWB	$2.02	$1.96	$0.65	$0.02	$0.00	**$4.66**
Tier 2	>OWB	$6.35	$1.96	$1.98	$0.07	$0.00	**$10.37**

Table B-17 shows proposed water Commodity Rates for the Study period. The Commodity Rate is increased "across the board" in subsequent years – that is, relative to existing rates – by the selected financial plan.

Beginning July 2016 commodity rates will increase to collect an additional 6.5 percent in revenue in FY 2017. Future increases follow the proposed revenue adjustment schedule listed in Table 4-14. All rates are rounded up to the nearest penny.

Table B-17: Proposed Commodity Rates for the Study Period ($/kgal)

Class and Tier	Current Rates	Proposed July 2016	Proposed July 2017	Proposed July 2018	Proposed July 2019	Proposed July 2020
SFR						
Tier 1	$4.61	$4.29	$4.60	$4.95	$5.33	$5.71
Tier 2	$5.96	$7.86	$8.42	$9.05	$9.73	$10.42
Tier 3	$8.50	$10.74	$11.51	$12.37	$13.30	$14.24
Tier 4	$11.39	-	-	-	-	-
MFR/Commercial	$5.96	$6.02	$6.45	$6.93	$7.45	$7.98
Irrigation						
Tier 1	$5.96	$4.66	$5.00	$5.37	$5.78	$6.19
Tier 2	$11.39	$10.37	$11.11	$11.94	$12.84	$13.74

The rate model calculates water customer impacts for the hypothetical water budget model. Table B-18 compares a single customer who uses their total water budget, versus the same customer who goes 20 percent over their budget. The District's bi-monthly winter average of 30 kgal is used in the example. In going 20 percent, or 6 kgal, over budget the customer's bi-monthly bill would increase by $64.44 as all water in excess of budget is billed at the Tier 3 rate.

Table B-18: Bill Impacts – Water Use at Water Budget versus 20 Percent Over Budget

	At Budget				Over Budget		
Water Use	30			Water Use	36		
Water Budget	30			Water Budget	30		
Meter Size	3/4"			Meter Size	3/4"		
At Budget				**Over Budget**			
	Water Use	Rate	Total		Water Use	Rate	Total
Indoor Budget	11	$4.29	$47.19	Indoor Budget	11	$4.29	$47.19
Outdoor Budget	19	$7.86	$149.34	Outdoor Budget	19	$7.86	$149.34
> Budget	0	$10.74	$0.00	> Budget	6	$10.74	$64.44
Total Commodity Charges	*30*		**$196.53**	**Total Commodity Charges**	*36*		**$260.97**
Service Charge			**$41.06**	**Service Charge**			**$41.06**
Total Bi-Monthly Bill			**$237.59**	**Total Bi-Monthly Bill**			**$302.03**

Customer impacts from the proposed new rates are shown in Table B-19. An SFR customer with a 3/4" meter using the District-wide bi-monthly winter average of 15 kgal will experience a $20.95 increase in their bill. This is due to both to an increase in the bi-monthly Service Charge as well as an increase in the Tier 2/Block 2 commodity charge from $5.96/kgal to $7.86/kgal.

Table B-19: Water Use at Water Budget versus Current Rate Structure

	At Budget		Current Structure	
Water Use	30		Water Use	30
Water Budget	30		Water Budget	N/A
Meter Size	3/4"		Meter Size	3/4"

At Budget				**Current Structure**			
	Water Use	Rate	Total		Water Use	Rate	Total
Indoor Budget	11	$4.29	$47.19	Tier 1	10	$4.61	$46.10
Outdoor Budget	19	$7.86	$149.34	Tier 2	15	$5.96	$89.40
> Budget	0	$10.74	$0.00	Tier 3	5	$8.50	$42.50
Total Commodity Charges	*30*		**$196.53**	**Total Commodity Charges**	*30*		**$178.00**
Service Charge			**$41.06**	**Service Charge**			**$38.64**
Total Bi-Monthly Bill			**$237.59**	**Total Bi-Monthly Bill**			**$216.64**