CITY OF SHASTA LAKE

Water Rate Study

Final Report / July 15, 2016

RAFTELIS
FINANCIAL CONSULTANTS, INC.

July 21, 2016

Subject: Water Rate Study Report

City of Shasta Lake, CA
1650 Stanton Dr.
Shasta Lake, CA 96019

Dear Tony Thomasy,

Raftelis Financial Consultants, Inc. (RFC) is pleased to present this water rate study (Study) to the City of Shasta Lake. The Study involved a comprehensive review of the City's Financial Plan, user classifications and rate structures. We are confident that the results, based on cost of service principles, result in fair and equitable water rates for the City's customers and meet the requirements of Proposition 218.

The report includes a brief Executive Summary followed by study assumptions and a detailed rate derivation in subsequent sections. Drought rates are presented in the final Section 8.

It was a pleasure working with you and we wish to express our thanks for your and other staff member support during the study. If you have any questions, please call me at (213) 327-4405.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.

Sanjay Gaur	**Steve Gagnon, PE**	**Victor Smith**
Executive Vice President	*Senior Consultant*	*Consultant*

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1 EXECUTIVE SUMMARY

1.1 BACKGROUND

In late 2015, the City of Shasta Lake (City) contracted with Raftelis Financial Consultants (RFC) to conduct a Water Rate Study (Study) to include a five-year Financial Plan. This report presents the Financial Plan and the resulting rates for implementation on October 1, 2016.

This Executive Summary displays the water rates and contains a description of the rate study process, methodology, results and recommendations for the City's water rates. The City's last rate adjustment was effective on October 1, 2014. The City wishes to establish fair and equitable rates that:

- Meet the City's fiscal needs in terms of operational expenses, reserve goals and capital investment to maintain the system;
- Revise rates to reflect a new normal level of water use;
- Proportionately allocate the costs of providing service in accordance with California Constitution article XIII D, section 6 (commonly referred to as Proposition 218).

1.2 PROCESS

RFC first developed a Financial Plan for the City, which set forth the total revenue adjustments, capital investment, and debt proposed during the five-year Study period. After developing the Financial Plan, RFC performed a cost of service analysis to determine the rates based on the selected Financial Plan.

RFC met with City staff to discuss study goals. Upon completion of the Financial Plan, RFC met with City staff to review the resulting rates. RFC also presented the resulting rates to the four largest City water users before presenting the Financial Plan and rates to the City Council.

The proposed rate alternative consists of a 3-tier rate structure for the residential commodity rate and a uniform rate for all other customers, as well as a monthly service charge that collects a portion of capacity related costs through the fixed monthly service charge.

1.3 METHODOLOGY

The water rates were developed using cost of service principles set forth by the American Water Works Association M1 Manual titled *Principles of Water Rates, Fees and Charges* (AWWA M1 Manual). Cost of service principles endeavor to distribute costs to customer classes in accordance with the way each class uses the water system. This methodology is described in detail in Sections 4 and 5 of this report. For this Study, the Base-Extra Capacity Method of the AWWA M1 Manual was used for distributing costs. This method separates costs into four components: "(1) base costs, (2) extra capacity costs, (3) customer costs, and (4) direct fire protection costs." Base costs are costs that are associated with meeting average daily demand needs and include operations and maintenance costs and capital costs designed to meet average load conditions. Extra capacity costs are costs associated with meeting peak demand. Customer costs are costs associated with serving customers, such as meter reading, billing, customer service, etc.

Direct fire protection costs are related solely to the fire protection function of a water system, such as fire hydrants and related branch mains and valves.

1.4 RESULTS AND RECOMMENDATIONS

Table 1-1 shows the yearly revenue adjustments selected by the City Council. The percentages shown in Table 1-1 are the yearly increases in rate revenue required to maintain a financially viable water utility.

Table 1-1: Proposed Water Revenue Adjustments

Effective Date	Proposed Water Revenue Adjustments
FY 2017	30 percent
FY 2018	15 percent
FY 2019	10 percent

Factors Affecting Revenue Adjustments

The following items affect the City's revenue requirement (i.e. costs) and thus its water rates. The City's expenses include Operation and Maintenance (O&M) expenses and capital expenses.

- **O&M expenses:** Overall, the City's O&M expenses are expected to increase just under 7% from FY 2016 to FY 2017 and continue to grow between 4% and 5% throughout the Study period. However, between FY 2015 and FY 2016 the City's O&M expenses increased 21%. This high level of O&M growth is being largely driven by increases in water treatment costs, which are expected to increase by an average of 7% throughout the Study period.

- **Water System Capital Investment:** The City anticipates spending an average of $700,000 on capital improvement annually throughout the Study period.

- **Reserve Funding:** The City plans to use reserves through FY 2018 in addition to rate increases in order to meet capital improvement needs. However, depleted reserves should be returned to target levels in the long term. Section 3 shows the reserve balances with the proposed Financial Plan.

- **Reduced Water Sales:** State and local public outreach efforts to conserve water are affecting City water use and revenues. The City has seen a 39% decrease in water use in FY 2016 relative to FY 2014 and projects that usage will remain between 21% and 13% lower than FY 2014's use through FY 2021. This results in increased water rates as the City's (mostly fixed) costs are spread over fewer units of water sold.

Proposed Water Rates

The City's water service fees are comprised of two components: (1) a monthly service charge, and (2) a consumption charge. The monthly service charge is a fixed charge based on the size of the meter serving a property, and is calculated to recover a portion of the City's fixed costs, such as the costs of billing and collections, customer service, meter reading, meter maintenance all of which do not vary with water use. The monthly service charge also collects a portion of capacity related costs. The consumption rate recovers all remaining costs associated with meeting base and extra capacity costs.

Table 1-2 shows the current and proposed charges for the monthly service charge by meter size.

Table 1-2: Current and Proposed Monthly Readiness-to-Serve Charges

Meter Size	FY 2017 Monthly Charge	Proposed Monthly Charge
5/8"	$20.69	$24.56
1"	$51.72	$55.68
1.5"	$103.44	$107.55
2"	$165.50	$169.79
3"	$310.31	$315.03
4"	$517.18	$522.50
6"	$1,034.36	$1,041.20
8"	$1,654.97	$1,663.64
10"	$2,999.62	$3,012.24
12"	$4,447.72	$4,464.59

Table 1-3 shows the current and proposed tier widths for the single family residential (SFR) and lifeline classes.

Table 1-3: Current and Proposed SFR and Lifeline Tier Widths and Rationale

Tier	Current Range (cubic feet)	Proposed Range (cubic feet)	Rationale
Tier 1	0-1,000	0-800	minimum average winter use
Tier 2	1001-5,000	801-2,000	average summer use
Tier 3 (Excess Consumption Rate)	5,001+	2,001+	

Table 1-4 shows the proposed consumption rates. RFC recommends implementing a uniform consumption rate for all non-single family-residential customers. Cost of service principles justify higher rates for classes with higher peaking characteristics as shown in Table 1-4. The rates are fully derived in Sections 5 and 6 of this report.

Table 1-4: Current and Proposed Commodity Rates ($/HCF

Customer Classes	Total Rate ($/ HCF*)	FY 2017 Current Rate ($ / HCF)
Lifeline Tier 1	$1.53	$1.07
Lifeline Tier 2	$2.20	$1.54
Lifeline Tier 3	$2.76	$1.87
Single Family Residential Tier 1	$1.92	$1.34
Single Family Residential Tier 2	$2.20	$1.54
Single Family Residential Tier 3	$2.76	$1.87
MFR & Mobile	$2.03	Same as SFR Tiers 1 & 2
Commercial and Industrial	$2.07	Same as SFR Tiers 1 & 2
Commercial Irrigation and Govt.	$2.26	Same as SFR Tiers 1 & 2
School	$2.42	Same as SFR Tiers 1 & 2

*HCF = hundred cubic feet

Together, the two components of the City's proposed water service fees are structured to recover the proportionate costs of providing water service to each customer class and to deter waste, encourage water use efficiency, and manage the City's water resources.

2 WATER SYSTEM

This section briefly describes the water system and the City provided customer account and water use data for FY 2014.

2.1 WATER SOURCES AND SYSTEM FACILITIES

The City provides water service to 3,800 accounts and has roughly 60 miles of pipeline, and 9 treated water storage tanks. The City's water treatment plant is capable of distributing roughly 9.72 million gallons of treated water per day (MGD).

Water is procured from six potential sources: (1) the Central Valley Project (CVP); (2) The McConnell Foundation; (3) Shasta County Water District; (4) Anderson Cottonwood Irrigation District; (5) MCM Properties, and; (6) Centerville Community Services District. However, in line with historical purchases, we assumed water is procured from sources 1 and 3 during normal times and source 2 during times of drought.

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 water reductions of up to 25%. Additionally, on May 5, 2015, the State Water Resources Control Board approved regulations, based on Governor Brown's Executive Order, mandating the City to reduce its water consumption by 28% percent for June 2015 through February 2016, as compared to the same months in 2013. The drought impacted the availability of water from the CVP. In fiscal years 2015 and 2016, the City's available CVP water decreased by 70% and 50% respectively. Compared to FY 2014 usage, the City is estimated to use 39% less water in FY 2016.

2.2 NUMBER OF ACCOUNTS

Table 2-1 shows the estimated number of potable water accounts by meter size and customer class for FY 2016. RFC estimated the number of accounts by tabulating FY 2015 (actual) account data provided by the City and escalating the number of accounts using the growth factors described in Section 2.3. The number of accounts are used to forecast the amount of fixed revenue the City will receive from the monthly service charge.

Table 2-1: Potable Water Accounts by Meter Size (Actual - FY 2015)

Meter Size	Lifeline	SFR[1]	MFR[2]	Mobile Homes	CSF[3]	Comm.[4]	Ind[5]	Comm Irr[6]	School	Gov[7]	Total
5/8"	392	3,001	47	26	12	88	0	14	2	3	3,585
3/4"	0	0	0	0	0	0	0	0	0	0	0
1"	0	15	39	4	3	13	3	9	1	5	92
1.5"	0	0	2	0	0	8	0	4	0	0	14
2"	0	0	13	1	2	8	5	7	6	1	43
3"	0	0	0	0	0	0	0	1	0	0	1
4"	0	0	0	0	0	0	0	0	2	1	3
6"	0	0	0	0	0	0	1	0	0	0	1
8"	0	0	0	0	0	0	0	0	0	0	0
10"	0	0	0	1	0	0	1	0	0	0	2
12"	0	0	0	0	0	0	0	0	0	0	0
Total	**392**	**3,016**	**101**	**32**	**17**	**117**	**10**	**35**	**11**	**10**	**3,741**

2.3 ACCOUNT AND WATER USE GROWTH ASSUMPTIONS

The revenue calculated for each fiscal year in the Financial Plan is a function of the number of accounts, account growth, water use, and existing rates. The City has realized very low account growth for the past few years, therefore RFC assumed no account growth throughout the Study period as shown in Table 2-2. Like most water purveyors, the City has realized reduced water use due to conservation. RFC and City Staff expect conservation to continue and that the drought will have a long-term effect on water sales which many call a "new normal" water use. Table 2-2 shows the recent and assumed water sales in acre-feet. The "Year to Year Change" line shows that fiscal year's consumption in relation to the previous fiscal year. For example, FY 2015 shows -28% which was a 28% reduction compared to FY 2014 usage.

Table 2-2: Account Growth and Water Use Assumptions

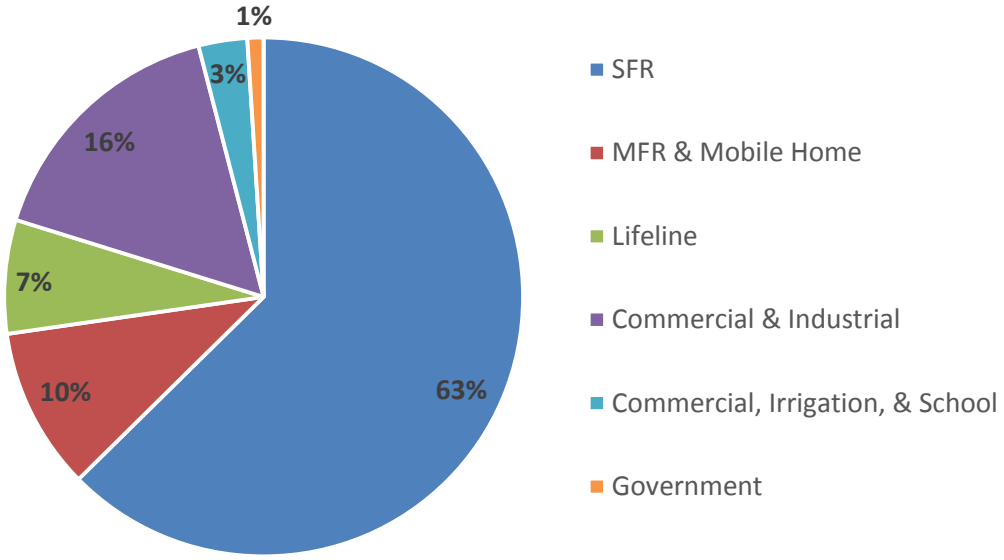
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Account Growth (All Classes)			0%	0%	0%	0%	0%
Water Sold (Acre Feet)	2,297	1,645	1,402	1,810	1,859	1,908	1,958
Percentage Change from FY 2015			-15%	10%	13%	16%	19%
Year to Year Change		-28%	-15%	29%	3%	3%	3%

[1] Single Family Residential
[2] Multi-family Residential
[3] Communal, Social and Fraternal organizations
[4] Commercial
[5] Industrial
[6] Commercial Irrigation
[7] Government

2.4 WATER USE

Figure 2-1 shows the FY 2016 water use by customer class. This pie chart shows the percentage of total projected water use by customer class for FY 2016. Total projected water sales were 61,090,084 cubic feet (CF) or 1,402 acre feet (AF).

Figure 2-1: Water Use by Customer Class - FY 2016



3 FINANCIAL PLAN

This section describes the assumptions used in projecting operating and capital expenses as well as reserve coverage requirements. These assumptions determine the overall revenue adjustments and therefore the total amount of revenue required from rates. The revenue covers O&M and capital expenses as well as reserve funding. Revenue adjustments represent the average rate increase for the City as a whole; rate changes for individual classes will depend on the cost of service analysis.

3.1 INFLATIONARY AND OTHER ASSUMPTIONS

To ensure that future costs are reasonably projected, RFC makes informed assumptions regarding inflationary factors including general and salary inflation and water cost inflation as shown in Table 3-1. Note that the City has decided to pass-through water wholesaler cost increases. Therefore, the water wholesaler inflation shown in Table 3-1 is for modeling purposes; *actua*l wholesaler water purchase costs will be passed-through to customers after the wholesalers (Bureau of Reclamation, McConnell Foundation, Shasta County Water Agency etc.) publish their rates. Salaries and Benefits cost inflation were provided by City Staff and take into account upcoming salary increases.

Table 3-1: Inflationary Assumptions

INFLATION FACTORS	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
General	3.0%	3.0%	3.0%	3.0%	3.0%
Salaries/Benefits	3.0%	11.0%	6.0%	4.0%	4.0%
All Water Wholesalers	5.0%	5.0%	5.0%	5.0%	5.0%
Power	4.0%	3.2%	3.2%	3.2%	3.2%
Chemical	3.0%	3.0%	3.0%	3.0%	3.0%
Capital	3.1%	3.1%	3.1%	3.1%	3.1%
Miscellaneous Revenue	1.0%	1.0%	1.0%	1.0%	1.0%

3.2 FINANCIAL PLAN

The assumptions shown in Table 3-1 were incorporated into the five-year Financial Plan. To develop the Financial Plan, RFC projected annual expenses and revenues, modeled reserve balances and transfers between funds, capital expenditures and calculated debt service coverage ratios to estimate the amount of additional rate revenue needed per year. This section of the report provides a discussion of O&M expenses, the Capital Improvement Plan (CIP), reserve funding, projected revenue under existing rates and the revenue adjustments needed to ensure fiscal sustainability.

3.3 CURRENT RATE REVENUE

The City's rate structure consists of two different types of charges: fixed charges, known as a monthly service charge and variable charges, which are dependent on water use, known as the consumption rate.

3.3.1 FIXED CHARGE REVENUE

The City collects a fixed monthly service charge from its customers based on meter size. For this Study, the FY 2017 rates were used to project future revenues since the City had previously adopted these rates and these rates would be implemented in the absence of this Study. The proposed monthly service charges are shown in Table 3-2 below.

Table 3-2: FY 2016 through FY 2020 Monthly Service Charges by Meter Size

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
5/8"	$20.18	$20.69	$20.69	$20.69	$20.69
1"	$30.27	$31.03	$31.03	$31.03	$31.03
1.5"	$50.46	$51.72	$51.72	$51.72	$51.72
2"	$100.91	$103.44	$103.44	$103.44	$103.44
3"	$161.46	$165.50	$165.50	$165.50	$165.50
4"	$302.74	$310.31	$310.31	$310.31	$310.31
6"	$504.56	$517.18	$517.18	$517.18	$517.18
8"	$1,009.13	$1,034.36	$1,034.36	$1,034.36	$1,034.36
10"	$1,614.60	$1,654.97	$1,654.97	$1,654.97	$1,654.97
12"	$2,926.46	$2,999.62	$2,999.62	$2,999.62	$2,999.62

In order to determine annual revenues from the monthly service charges, RFC multiplied the monthly service charges by the number of accounts in each meter size in each year and multiplied by twelve. As mentioned in Section 2.2, the number of accounts is not projected to grow through the course of the Study period. The number of accounts for the Study period is shown in Table 3-3.

Table 3-3: Meters through FY 2020 by Meter Size

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
5/8"	3,585	3,585	3,585	3,585	3,585
1"	92	92	92	92	92
1.5"	14	14	14	14	14
2"	43	43	43	43	43
3"	1	1	1	1	1
4"	3	3	3	3	3
6"	1	1	1	1	1
8"	0	0	0	0	0
10"	2	2	2	2	2
Total	**3,741**	**3,741**	**3,741**	**3,741**	**3,741**

In addition to the monthly service charge assessed on water meters shown in Table 3-2, the City also assesses a Fixed Debt Charge on every account of $.80 per account per month, regardless of meter size.

The last source of fixed revenue that the City collects is Private Fire Meter Charge revenue. This is a monthly fixed charge assessed on fire meters by meter size. A summary of monthly Fire Meter Charges is shown in Table 3-4 below.

Table 3-4: Monthly Fire Meter Charges through FY 2020

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
4"	$15.00	$15.00	$15.00	$15.00	$15.00
6"	$20.00	$20.00	$20.00	$20.00	$20.00
8"	$25.00	$25.00	$25.00	$25.00	$25.00
10"	$30.00	$30.00	$30.00	$30.00	$30.00

The number of fire meters by meter size through the Study period is shown in Table 3-5 below.

Table 3-5: Fire Meters through FY 2020

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
4"	5	5	5	5	5
6"	8	8	8	8	8
8"	4	4	4	4	4
10"	2	2	2	2	2
Total	19	19	19	19	19

Referring to the monthly fixed rates and account totals in Table 3-2 and Table 3-3 respectively, the monthly fixed charge revenue from all single family homes with a 5/8" meter for FY 2017 is calculated as follows:

$$fixed\ charge\ rate\ for\ 5/8"\ meter\ \times number\ of\ accounts\ with\ 5/8"\ meter\ \times 12\ months$$
$$\$20.69\ \times 3{,}585 \times 12 = \$890K$$

The same calculation is repeated for all meter sizes and then added together to determine the total monthly fixed charge revenue for all customers (including Fire Line meters). The result of this calculation and the sum of all fixed revenue through FY 2020 is shown in Table 3-6.

Table 3-6: Fixed Revenue through FY 2020

Meter Size	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Fixed Revenue					
Monthly Service Charge Revenue	$1,128,259	$1,156,704	$1,156,704	$1,156,704	$1,156,704
Private Fire Meter Charge Revenue	$4,740	$4,740	$4,740	$4,740	$4,740
Fixed Debt Charge	$35,914	$35,914	$35,914	$35,914	$35,914
Total Fixed Revenue	**$1,168,913**	**$1,197,357**	**$1,197,357**	**$1,197,357**	**$1,197,357**

3.3.2 COMMODITY CHARGE REVENUE

In addition to fixed charge revenue from the monthly service charge, the City also collects revenue based on water use. The City has a tiered consumption rate structure for all customers. Lifeline and SFR have a three tiered rate while all other classes have a two tiered rate except for 5/8 inch meters which all have a three tiered rate. The third tier rate is called the “Excess Consumption” rate. The tier width for Lifeline, SFR, CSF and other customers with 5/8” meters is shown below in Table 3-8. All other customers have a first tier of up to 10 hundred cubic feet (HCF) and then pay the tier 2 rate for consumption beyond Tier 1.

Table 3-7: Consumption Rate Structure

Tier	Current SFR, CSF, Lifeline and 5/8" Meter Tier width (CF)	Tier Width for All Other Customers (CF)
Tier 1	0-1,000	0-1,000
Tier 2	1,001-5,000	1,001+
Tier 3/ Excess Consumption	5,001+	N/A

Lifeline customers pay a separate Tier 1 rate, while all other customers pay the same rate for Tier 1 and Tier 2. The "Excess Consumption" rate applies only to 5/8 inch meters and Residential 1" meters. The current consumption rates are shown below in Table 3-8.

Table 3-8: Commodity Rates Across Study period, in $/HCF

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Lifeline	$1.04	$1.07	$1.07	$1.07	$1.07
Tier 1	$1.30	$1.34	$1.34	$1.34	$1.34
Tier 2	$1.50	$1.54	$1.54	$1.54	$1.54
Tier 3/Excess Consumption Rate	$1.82	$1.87	$1.87	$1.87	$1.87

RFC calculated tiered usage based on FY 2015 consumption data and projected it across the Study period. This process resulted in the following consumption data, presented in cubic feet in Table 3-9. A breakdown of usage by customer class is available in the appendix.

Table 3-9: Consumption by Tier across Study period

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Expressed in CF					
Lifeline	2,633,993	3,208,022	3,295,514	3,383,005	3,470,497
Tier 1	24,268,662	29,712,446	30,522,786	31,333,125	32,143,465
Tier 2	32,753,573	43,537,254	44,724,634	45,912,014	47,099,393
Tier 3/Excess Consumption	1,433,856	2,368,192	2,432,779	2,497,366	2,561,953
Total	**61,090,084**	**78,825,915**	**80,975,713**	**83,125,510**	**85,275,308**
Expressed in HCF					
Lifeline	26,340	32,080	32,955	33,830	34,705
Tier 1	242,687	297,124	305,228	313,331	321,435
Tier 2	327,536	435,373	447,246	459,120	470,994
Tier 3/Excess Consumption	14,339	23,682	24,328	24,974	25,620
Total	**610,901**	**788,259**	**809,757**	**831,255**	**852,753**

The consumption revenues shown for FY 2016 through FY 2020, shown in Table 3-10, are calculated by multiplying the projected consumption found Table 3-9 by the rates found in Table 3-8. For example, the commodity charge revenue from Tier 1 usage for FY 2016 can be calculated as follows:

$$Projected\ Tier\ 1\ Usage\ for\ FY\ 2016\ \times Tier\ 1\ Rate$$
$$242{,}687\ \times \$1.30\ = \$315K$$

The same calculation is repeated for all tiers and the other customer classes (including Fire Line) to determine the total consumption revenue for each year.

Table 3-10: Consumption Revenues by Tier across Study period

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Lifeline	$27,394	$34,198	$35,130	$36,063	$36,995
Tier 1	$315,493	$398,147	$409,005	$419,864	$430,722
Tier 2	$491,304	$669,385	$687,641	$705,897	$724,153
Tier 3/Excess Consumption Rate	$26,096	$44,179	$45,383	$46,588	$47,793
Total	**$860,286**	**$1,145,908**	**$1,177,160**	**$1,208,412**	**$1,239,664**

3.4 UTILITY EXPENSES

The City's expenses include O&M expenses, capital expenses, and debt service payments. Section 3.4 through 3.6 discuss the details of each of these expenses.

O&M Expenses

In order to project the City's O&M expenses, RFC first calculated the costs of purchasing water. The City has six potential sources of water, but is projected to only purchase from two (during normal times) throughout the Study period (although the City did purchase from a third source, McConnell Foundation, in FY 2016 due to the drought). Note that the information below is presented in Water Years (WY), which begins on March 1, and ends on February 28. These purchase amounts are in AF, one AF is approximately 435,600 hundred cubic feet, or 325,851 gallons.

Table 3-11: Projected Water Purchases across Study period in Acre Feet

Water Wholesaler	WY[8] 2017	WY 2018	WY 2019	WY 2020
Central Valley Project	1,896	1,949	2,002	2,055
McConnell Foundation	-	-	-	-
Anderson Cottonwood Irrigation District	-	-	-	-
MCM Properties	-	-	-	-
Shasta County Water Agency	50	50	50	50
Centerville Community Services District	-	-	-	-
Total Potable Supply (AF)	**1,946**	**1,999**	**2,052**	**2,105**

The City provided RFC with the WY 2016 rates for each water wholesaler, and RFC escalated these prices according to the percentages shown in Table 3-1. Table 3-12 shows projected costs by wholesaler throughout the Study period.

[8] WY = Water Year

Table 3-12: Projected Water Purchase Rates in $/Acre Feet

Water Wholesaler	WY 2017	WY 2018	WY 2019	WY 2020
Central Valley Project	$120.88	$126.92	$133.27	$139.93
McConnell Foundation	$262.50	$275.63	$289.41	$303.88
Anderson Cottonwood Irrigation District	$238.61	$250.54	$263.07	$276.22
MCM Properties	$224.78	$236.02	$247.82	$260.22
Shasta County Water Agency	$131.44	$138.01	$144.91	$152.16
Centerville Community Services District	$236.25	$248.06	$260.47	$273.49

RFC then calculated the total water purchase cost for each FY by multiplying the purchased water projections by the purchased water costs. Note that Table 3-13 shows the costs for the FY and not for the WY. The water purchase cost takes into account the fact that the fiscal year occurs over two WYs - nine months of the first WY and three months in the next WY. Therefore, for each fiscal year ¾ of water purchase costs are in the first WY, and that the remaining ¼ of water purchase costs are in the second WY. Water purchase costs were estimated at for this Study, however the City is implementing a pass-through of its water purchase costs (costs the City incurs to buy water from its wholesalers). When the City knows its wholesale water purchase costs it will pass-through these costs to City customers as discussed in the Pass-through section below.

Table 3-13: Projected Water Purchases Costs

Water Wholesaler	FY 2017	FY 2018	FY 2019	FY 2020
Central Valley Project	$233,710	$252,215	$271,987	$293,105
McConnell Foundation	$0	$0	$0	$0
Anderson Cottonwood Irrigation District	$0	$0	$0	$0
MCM Properties	$0	$0	$0	$0
Shasta County Water Agency	$6,654	$6,987	$7,336	$7,703
Centerville Community Services District	$0	$0	$0	$0
Water Supply Cost	**$240,364**	**$259,202**	**$279,323**	**$300,807**

Pass-through Costs

The City has elected to pass-through its wholesale water purchase costs. RFC has ***estimated*** the pass-through costs of water supply cost increases based on the inflationary factors discussed in Table 3-1. **The City will calculate actual pass-through rates once wholesaler water rates are known.** RFC estimated the pass-through cost using the following steps:

1. Freeze the wholesaler rates from WY 2017 (Table 3-14) and applied them to all water purchases throughout the Study period.
2. The total water purchases costs calculated from the increasing wholesale rates (Table 3-12) are subtracted from the water purchase costs from the frozen rates (Table 3-14)
3. Divide the difference (shown in Line 9 in Table 3-15) by the total HCF sold in that FY.

Table 3-14 shows the WY 2017 Water Purchase Rates.

Table 3-14: WY 2017 Water Purchase Rates in $/Acre Feet, used for Pass-Through Analysis

Water Wholesaler	WY 2017	WY 2018	WY 2019	WY 2020
	Table 3-12			
Central Valley Project	$120.88	$120.88	$120.88	$120.88
McConnell Foundation	$262.50	$262.50	$262.50	$262.50
Anderson Cottonwood Irrigation District	$238.61	$238.61	$238.61	$238.61
MCM Properties	$224.78	$224.78	$224.78	$224.78
Shasta County Water Agency	$131.44	$131.44	$131.44	$131.44
Centerville Community Services District	$236.25	$236.25	$236.25	$236.25

Using the same calculation methodology as described for the water purchase cost in Table 3-13, RFC calculated the water purchase costs using WY 2017 rates for all years. This cost was then subtracted from the water supply cost from Table 3-13 to get the projected pass-through. By dividing the projected passed-through cost by the total HCF sold (from Table 3-9), RFC arrived at the pass-through cost per HCF shown in line 11.

Table 3-15: Water Supply Costs using WY 2017 Rates

Line		Source	FY 2017	FY 2018	FY 2019	FY 2020
1	Central Valley Project		$229,162	$235,576	$241,991	$248,406
2	McConnell Foundation		$0	$0	$0	$0
3	Anderson Cottonwood Irrigation District		$0	$0	$0	$0
4	MCM Properties		$0	$0	$0	$0
5	Shasta County Water Agency		$6,572	$6,572	$6,572	$6,572
6	Centerville Community Services District		$0	$0	$0	$0
7	Water Supply Cost using WY 2017 Rates		$235,734	$242,148	$248,563	$254,978
8	Water Supply Cost from Table 3-13	*Table 3-13*	$240,364	$259,202	$279,323	$300,807
9	Projected Passed-Through Cost	*Line 8 – Line 7*	$4,631	$17,054	$30,760	$45,830
10	Total HCF Sold	*Table 3-9*	788,259	809,757	831,255	852,753
11	Cumulative Pass-Through Cost per HCF	*Line 9 ÷ Line 10*	**$0.01**	**$0.02**	**$0.04**	**$0.05**
12	Incremental Pass-Through Cost per HCF	*Line 11- Previous Year*	**$0.01**	**$0.01**	**$0.02**	**$0.01**

3.4.1 TOTAL O&M BUDGET

The City's projected O&M budget is shown by fiscal year in Table 3-16. FY 2017 is the year with which rates were calculated (this is known as the test year) and FY 2016 is shown for comparison. The Financial Plan Study period is from FY 2016 to 2020. The O&M budget incorporates the inflationary factors discussed in Section 3.1, and purchased water costs from Table 3-13.

Table 3-16: Projected Water O&M Expenses

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
General and Administrative	$542,905	$563,080	$580,457	$598,371	$616,837
Distribution	$709,954	$736,635	$759,406	$782,881	$807,080
Water Treatment Plant	$677,872	$795,928	$849,272	$889,054	$930,660
Water Purchases	$247,570	$240,364	$259,202	$279,323	$300,807
TOTAL O&M EXPENSES	**$2,178,301**	**$2,336,007**	**$2,448,337**	**$2,549,628**	**$2,655,384**

3.5 CAPITAL IMPROVEMENT PLAN

Table 3-17 shows the City's detailed five-year Note that the values shown in Table 3-17 are inflated according to the assumed Capital inflation figure found in Table 3-1.

Table 3-17: Detailed Inflated Capital Improvement Plan

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Chlorine Analyzer	$0	$0	$0	$0	$0	$0
City Hall Transfer	$450,000	$0	$0	$0	$0	$0
Raw Water Pump - Filter Plant (BOR)	$0	$309,300	$0	$0	$0	$0
Refurbish Tank II	$0	$0	$0	$0	$0	$0
2013\2014\2015 Water Improvements	$14,982	$0	$0	$0	$0	$0
Water Master Plan Update	$150,000	$0	$0	$0	$0	$0
Sludge Dewatering (Net of Grant expense)	$50,000	$51,550	$0	$0	$0	$0
Pensacola Transmission Main Replacement	$0	$0	$0	$0	$0	$0
Water Maintenance	$0	$0	$0	$0	$0	$0
Software and server	$0	$0	$0	$0	$0	$0
Water Feasibility Study	$0	$0	$0	$0	$0	$0
Filter No 2 Media Replacement	$100,000	$0	$0	$0	$0	$0
Storage Tank Replacement	$0	$257,750	$265,740	$273,978	$282,472	$291,228
Westside Water Project (3 phase)	$0	$0	$318,888	$328,774	$338,966	$349,474
Chlorine Gas Detector Monitor	$0	$0	$0	$0	$0	$0
Toyon Water Plan Demolition	$0	$51,550	$0	$0	$0	$0
Retaining Wall	$0	$128,875	$0	$0	$0	$0
Reserve Allocation	$0	$0	$0	$0	$0	$0
Filter No 1 Rehab	$0	$0	$106,296	$109,591	$0	$0
TOTAL CIP - INFLATED	**$764,982**	**$799,025**	**$690,925**	**$712,343**	**$621,437**	**$640,702**

3.6 EXISTING AND PROPOSED DEBT SERVICE

Table 3-18 shows the City's existing debt service payments. The City does not anticipate issuing more debt in the Study period.

Table 3-18: Existing and Proposed Debt Service

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Safe Drinking Water Loan					
Principal	$49,597	$51,673	$53,837	$56,098	$0
Interest	$8,244	$6,167	$4,004	$1,750	$0
Total Debt Service	$57,841	$57,840	$57,841	$57,848	$0
iBank Water Loan					
Principal	$147,217	$151,678	$156,274	$161,009	$165,888
Interest	$117,996	$113,468	$108,803	$103,996	$99,043
Total Debt Service	$265,213	$265,146	$265,077	$265,005	$264,931
Cal PERS Loan from the Electric Fund					
Principal	$11,034	$11,255	$11,480	$11,709	$11,944
Interest	$1,894	$1,673	$1,448	$1,218	$984
Total Debt Service	$12,928	$12,928	$12,928	$12,927	$12,928
TOTAL EXISTING DEBT SERVICE	**$335,982**	**$335,914**	**$335,846**	**$335,780**	**$277,859**

3.7 RESERVE TARGETS

Currently, the City maintains three reserves: an operating reserve, a capital reserve, and a debt service reserve.

Operating Reserve – The Operating Reserve is used primarily to meet ongoing cash flow requirements. The City's Operating Reserve target is currently at 25% (three months) of budgeted Operating Expenses and will remain the same.

Capital Reserve – The Capital Reserve is used to cover any unexpected and unplanned infrastructure repairs and replacements not included in the budget. It is recommended that the City maintain a Capital Reserve equivalent to one year's CIP spending based on the study period's average CIP expenditure, roughly $700,000. RFC used this recommended reserve target to develop the rate adjustments shown in this financial plan.

Debt Service Reserve – The City holds the final principal payment of its retiring debt service in reserve.

3.8 PROPOSED FINANCIAL PLAN AND REVENUE ADJUSTMENTS

The proposed revenue adjustments help ensure adequate revenue to fund operating expenses, capital expenditures and compliance with bond covenants. Financial Plan modelling assumes the first revenue adjustment occurs on October 1, 2016 with the subsequent ones in March of 2018 and 2019. The proposed revenue adjustments would enable the City to execute the CIP shown in Table 3-17, while exceeding its debt service coverage requirement of 110% over the five-year Study period.

Table 3-19 shows the proposed revenue adjustments for the course of the Study period.

Table 3-19: Proposed Rate Adjustments

Effective Date	Proposed Water Revenue Adjustments
October 2016	30 percent
March 2018	15 percent
March 2019	10 percent

Table 3-20 shows the cash flow detail over the next five years assuming the selected Financial Plan. Line 7 shows the additional revenue from the revenue adjustments. Line 26 shows the City meets debt service coverage requirements during the Study period.

Table 3-20: Five-Year Water Operating Cash Flow

Line				FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
1	Revenue from Current Rates			$2,029,199	$2,343,266	$2,374,518	$2,405,770	$2,437,022
	Fiscal Year	**Revenue Adjustments**	**Month Effective**					
2	2016	0.0%	July	$0	$0	$0	$0	$0
3	2017	30.0%	October		$527,235	$712,355	$721,731	$731,107
4	2018	15.0%	March			$154,344	$469,125	$475,219
5	2019	10.0%	March				$119,888	$364,335
6	2020	0.0%	March					$0
	Additional Rate Revenue			$0	$527,235	$866,699	$1,310,744	$1,570,661
7	**Total Rate Revenue**			**$2,029,199**	**$2,870,500**	**$3,241,217**	**$3,716,513**	**$4,007,682**
8	**Other Revenue**							
9	Interest Revenue			$17,709	$13,537	$9,609	$18,738	$25,596
10	Transfer from General Fund			$0	$11,000	$11,000	$11,000	$11,000
11	Pass-through Revenue			$0	$4,631	$17,054	$30,760	$45,830
12	Drought Rate Revenue (Penalty Rates)			$495,000	$0	$0	$0	$0
13	**TOTAL REVENUE**			**$2,541,908**	**$2,899,668**	**$3,278,880**	**$3,777,011**	**$4,090,108**
	O&M Expenses							
14	General and Administrative			$542,905	$563,080	$580,457	$598,371	$616,837
15	Distribution			$709,954	$736,635	$759,406	$782,881	$807,080
16	Water Treatment Plant			$677,872	$795,928	$849,272	$889,054	$930,660
17	Water Purchases			$247,570	$240,364	$259,202	$279,323	$300,807
18	**Total O&M Expenses**			**$2,178,301**	**$2,336,007**	**$2,448,337**	**$2,549,628**	**$2,655,384**
19	Existing Debt Service			$335,982	$335,914	$335,846	$335,780	$277,859
20	Proposed Debt Service			$0	$0	$0	$0	$0
21	Rate Funded Capital Projects			$764,982	$799,025	$690,925	$712,343	$621,437
22	General Admin Transfer			$0	$11,000	$11,000	$11,000	$11,000
23	**TOTAL EXPENSES**			**$3,279,265**	**$3,481,946**	**$3,486,108**	**$3,608,752**	**$3,565,681**
24	**Net Cash Flow**			**($737,357)**	**($582,278)**	**($207,228)**	**$168,259**	**$524,428**
26	Calculated Debt Coverage			108%	168%	247%	366%	516%
26	Required Debt Coverage			125%	125%	125%	125%	125%

Figures 3-1 through 3-5 display the FY 2016 through FY 2020 Financial Plan in graphical format. Figure 3-1 shows the modeled revenue adjustments (blue bars) for the next four years. RFC notes that the City is setting rates and adjusting revenues through FY 2019. Revenue adjustments beyond FY 2019 will be evaluated on an as-needed basis in the future. Figure 3-1 also graphs the calculated and minimum debt coverage requirements as shown by the green and red Lines respectively.

Figure 3-1: Proposed Revenue Adjustments

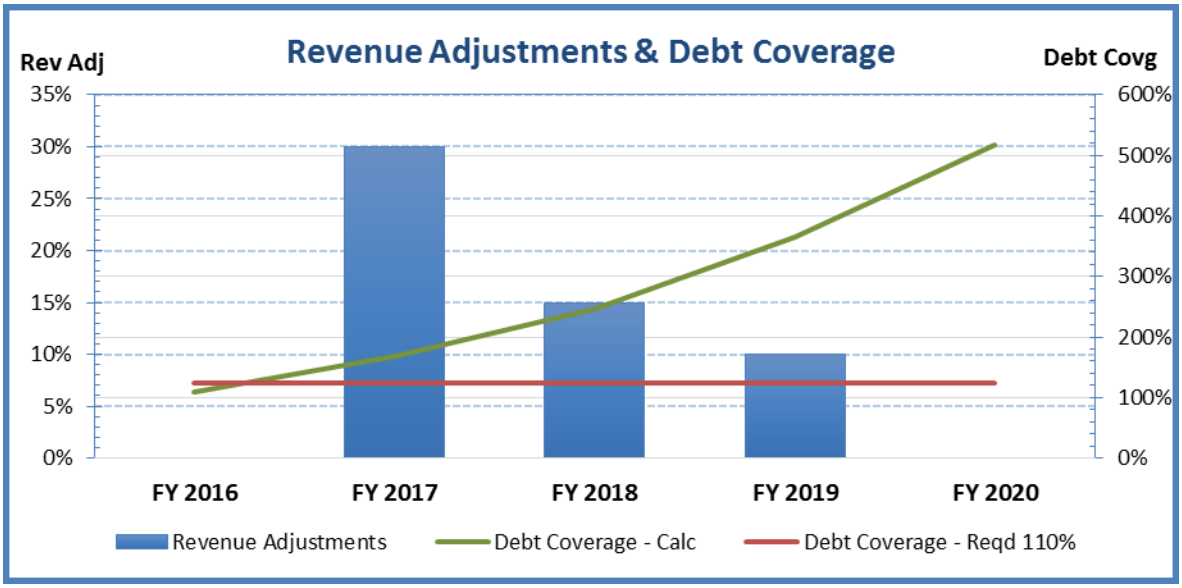


Figure 3-2 graphically illustrates the operating Financial Plan – it compares existing and proposed revenues with projected expenses. The expenses include O&M, purchased water, debt service, and reserve funding and are shown by the stacked bars; and total revenues at existing and proposed rates are shown by the horizontal orange and blue Lines, respectively. Current revenue from existing rates, in orange, does not meet future total expenses and shows the need for revenue adjustments.

Figure 3-2: Proposed Operating Financial Plan

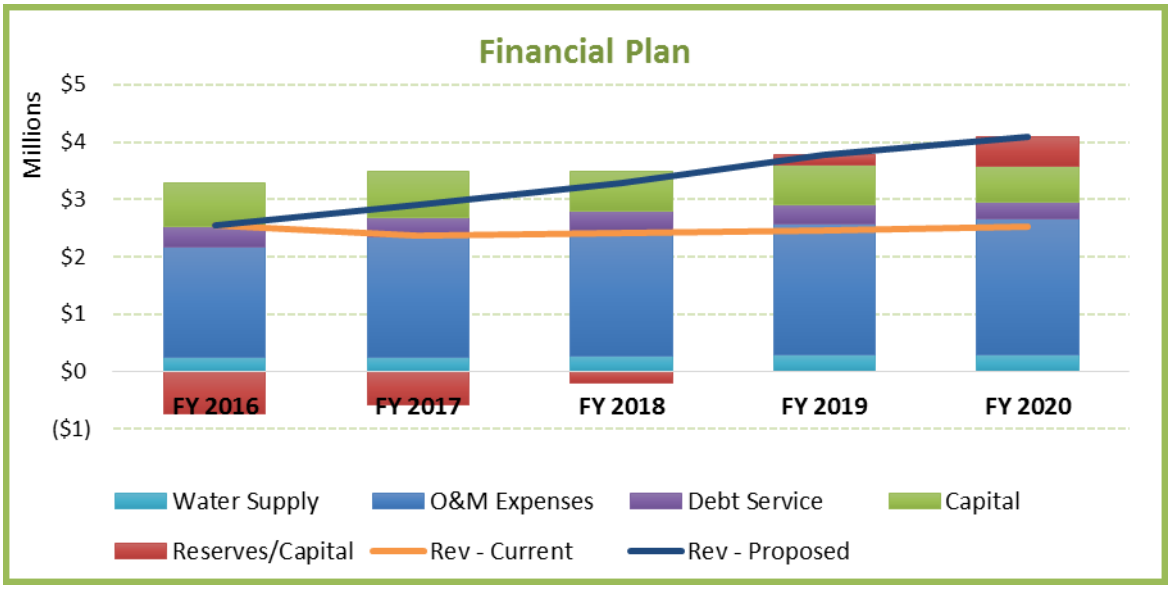


Figure 3-3 summarizes the projected CIP and its funding sources – debt or rate/reserve funded. As shown, the City plans to pay for all its CIP via rate revenue-; the City will not issue debt to pay for future CIP.

Figure 3-3: Projected CIP and Funding Sources

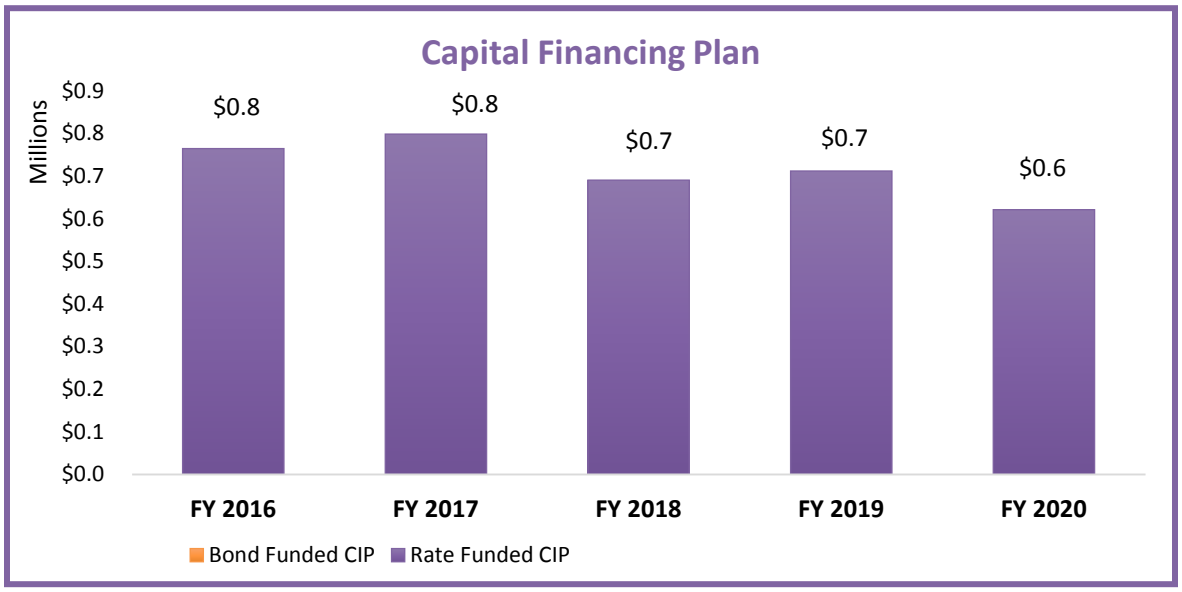
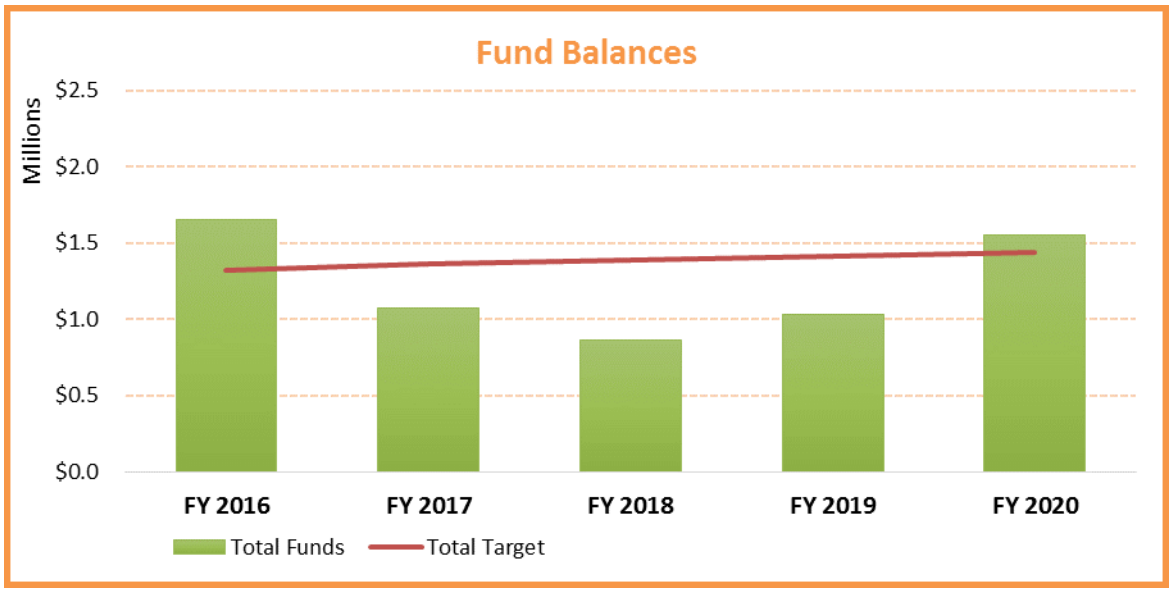


Figure 3-4 displays the total of all funds (operating and capital) yearly ending balance (green bars). The red line is the total fund target balance, which is the combination of 3 months of O&M expenses based on currently adopted City policy and the average of a year's worth of CIP spending over the course of the Study period. As shown, the operating fund is anticipated to dip below the target in FY 2017 through FY 2019 – this is due to anticipated water sales and capital project expenditures. As shown in Figure 3-4, the operating fund recovers by the end of the Study period.

Figure 3-4: Projected Operating Fund Ending Balances



4 LEGAL FRAMEWORK AND RATE SETTING METHODOLOGY

4.1 LEGAL FRAMEWORK

This section of the report describes the legal framework that was considered to ensure that the calculated cost of service rates provide a fair and equitable allocation of costs to customer classes.

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 for fairness of the fees, 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 other 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. No fee or charge may be imposed for general governmental services including, but not limited to, police, fire, ambulance or library services, where the service is available to the public at large in substantially the same manner as it is to property owners.
6. 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." Prop 218 requires that water rates cannot be "arbitrary and capricious," meaning that the rate-setting methodology must be sound and that there must be a nexus between costs and the rates charged. RFC followed 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.

California Constitution - Article X, Section 2

Article X, Section 2 of the California Constitution (established in 1976) 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."

As stated above 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 City established single family tiered rates to incentivize customers to conserve water. The tiered rates (as well as rates for the remaining classes) need to be based on the proportionate costs incurred to provide water to customer classes to achieve compliance with Proposition 218.

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

4.2 COST-BASED RATE-SETTING METHODOLOGY

As stated in the AWWA M1 Manual, "the costs of water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." To develop utility rates that comply with Proposition 218 and industry standards while meeting other emerging goals and objectives of the utility, there are four major steps discussed below.

1) Calculate Revenue Requirement

The rate-making process starts by determining the test year revenue requirement - which for this study is FY 2016. The revenue requirement should sufficiently fund the utility's O&M, debt service, and capital expenses, and reserve funding.

2) Cost Of Service Analysis (COS)

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

1. Functionalizing costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing and customer billing and collection.
2. Allocating functionalized costs to cost components. Cost components include base, maximum day, maximum hour[9], meter service, customer servicing and conservation costs.
3. Distributing the cost components. Distribute cost components, using unit costs, to customer classes in proportion to their demands on the water system. This is described in the M1 Manual published by AWWA.

[9] *Collectively maximum day and maximum hour costs are known as peaking costs or capacity costs.*

A COS analysis considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).[10] Peaking costs are costs that are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating and maintaining facilities to meet peak demands. These peak demand costs need to be allocated to those imposing such costs on the utility. In other words, not all customer classes share the same responsibility for peaking related costs.

3) Rate Design and Calculations

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

4) Rate Adoption

Rate adoption is the last step of the rate-making process to comply with Proposition 218. RFC documented the rate study results in this Study Report to help educate the public about the proposed changes, the rationale and justifications behind the changes and their anticipated financial impacts in lay terms.

[10] System capacity is the system's ability to supply water to all delivery points at the time when demanded. Coincident peaking factors are calculated for each customer class at the time of greatest system demand. The time of greatest demand is known as peak demand. Both the operating costs and capital asset related costs incurred to accommodate the peak flows are generally allocated to each customer class based upon the class's contribution to the peak month, day and hour event.

5 COST OF SERVICE ANALYSIS

The principles and methodology of a cost of service analysis were described in Section 4.2. A cost of service analysis distributes a utility's revenue requirements (costs) to each customer class. After determining a utility's revenue requirement, the next step in a cost of service analysis is to functionalize its O&M costs to the following **functions**:

1. General and Administrative Costs
2. Distribution Costs
3. Water Treatment Plant (Treatment) Costs
4. Water Supply
5. Customer Service
6. Meter Service

The functionalization of costs allows us to better allocate the functionalized costs to the **cost causation components**. The cost causation components include:

1. Supply costs
2. Base Delivery (Base) costs[11]
3. Peaking costs (maximum day and maximum hour)
4. Fire Protection (Fire) costs[12]
5. Meter Service (Meter) costs
6. Customer Service (Customer) costs
7. General and Administrative (General) costs
8. Conservation costs
9. Lifeline costs

Peaking costs are further divided into maximum day 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 peaking demands of customers. Therefore, extra capacity[13] costs include the O&M and capital costs associated with meeting peak customer demand. This method is consistent with the AWWA M1 Manual, and is widely used in the water industry to perform cost of service analyses.

5.1 FUNCTIONALIZATION OF O&M EXPENSES

Table 5-1 shows the functionalization of the City's O&M expenses. Functionalizing O&M expenses allows RFC to follow the principles of rate setting theory in which the end goal is to allocate the City's O&M expenses to cost causation components. This is further explained in Section 5.2. We note that the

[11] Base Delivery costs are the average costs of supply
[12] Fire Protection Costs will be used interchangeably with Fire Costs
[13] The terms extra capacity, peaking, and capacity costs are used interchangeably.

functionalized expenses shown in Table 5-1 match with the O&M FY 2017 O&M expenses shown in Table 3-16.

Table 5-1: Functionalization of O&M Expenses

Function	Budgeted FY 2017
General and Administrative	$563,080
Distribution	$736,635
Water Treatment Plant	$795,928
Water Purchases	$240,364
TOTAL O&M EXPENSES	**$2,336,007**

5.2 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 we must identify system wide peaking factors which are shown in Column A, Table 5-2. The system-wide peaking factors are used to derive the cost component allocation basis (i.e., percentages) shown in Columns B through D of Table 5-2. Functionalized expenses are then allocated to the cost components using these allocation bases. To understand the interpretation of the percentages shown in Columns B through Column D we must first establish the base use as the average daily demand during the year.

Examples of how the percentages shown in Table 5-2 were derived are shown below the table. As shown in the example calculations, we first remove fire protection from the total percentage before the remaining calculations are performed.

As an example, the functionalized expenses that are allocated to the cost components using the maximum day basis (Line 2) attribute 41% of the demand (and therefore costs) to base (average daily demand) use and the remaining 49% to maximum day (peaking) use. Expenses allocated using the maximum hour basis assume 23% of costs are due to base demands with the remaining proportion (100%-23%) of costs allocated to the maximum day cost component. Collectively the maximum day and hour cost components are known as peaking costs. These allocation bases are used to assign the functionalized costs in Table 5-3 to the cost components. A summary of the calculations made to generate Table 5-2 are shown on the following page.

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

Line		Peaking Factors	Base	Max Day	Max Hour
		A	B	C	D
1	Base	1.00	100%	0%	0%
2	Max Day	2.18	41%	49%	0%
3	Max Hour	3.63	23%	28%	35%
4	Average		32%	39%	17%

$$Base = (1 - Fire\ Protection) \times \frac{Base}{Max\ Day}$$

$$Max\ Day = (1 - Fire\ Protection)\ \times \frac{Max\ Day - Base}{Max\ Day}$$

$$Max\ Hour = (1 - Fire\ Protection)\ \times \frac{Max\ Hour - Max\ Day}{Max\ Hour}$$

These peaking characteristics result in the following Cost Components allocations for Max Day:

$$Base = \ (1 - Fire\ Protection) \times \frac{Base}{Max\ Day} \ = (1 - .10) \times \frac{1}{2.18} \ \approx 41\%$$

$$Max\ Day = \ (1 - .10) \times \frac{2.18 - 1}{2.18} \ \approx 49\%$$

For the Max Hour Component, the calculations are shown below.

$$Base = (1 - Fire\ Protection) \times \frac{Base}{Max\ Hour} \ = (1 - .14) \times \frac{1}{3.63} \ \approx 23\%$$

$$Max\ Day = (1 - Fire\ Protection) \times \frac{Max\ Day - Base}{Max\ Hour} \ = (1 - .14) \times \frac{1.18}{3.63} \ \approx 28\%$$

$$Max\ Hour = (1 - Fire\ Protection) \times \frac{Max\ Hour - \ Max\ Day}{Max\ Hour} = (1 - .14) \times \frac{1.45}{3.63} \ \approx 35\%$$

Table 5-3 allocates the functionalized O&M expenses shown in Column K, Lines 5 through 8, (and also shown earlier in Table 5-1) to each cost component using the basis shown in the upper portion of Table 5-3 (Lines 1-4) – some of which are the same as those shown in Table 5-2. There are several exceptions however: the General and Administrative expenses are mostly allocated to General costs, with the exception of costs that were 1. Related to Meters; 2. Related to Customer Service, or; 3. Related to conservation programs.[14] Water purchase costs were allocated solely to the Supply cost causation component.

The functions (Lines 5 through 8) are allocated according to industry standards that are defined based on the nature of the water treatment function. For example: water purchases are associated with getting and treating water – therefore those costs are allocated (100%) to the supply cost component using line 4 of Table 5-3. Treatment costs are mostly associated with meeting base demands, however

[14] These breakdowns were provided by Staff.

treatment costs are likely higher during the summertime (the months of June through September when demand is at its highest) and therefore a portion of treatment costs are allocated to maximum day demands as shown in Line 7. A similar basis is used for the distribution system, which is operated to meet maximum hour and day (peaking) demand and is allocated as such in Line 6 of Table 5-3.

Line 10 of Table 5-3 shows the total resulting cost component allocation for O&M expenses. This resulting allocation is used to allocate the City's operating revenue requirement (discussed in Section 5.3) to the cost components.

Table 5-3 also shows the total resulting allocation for the City's assets. The resulting total asset allocation is derived in a similar manner as the O&M allocation - first, RFC functionalized the City's assets and then allocated them to the cost causation components using the same percentages shown in Lines 1 through 4 of Table 5-3, resulting in the asset total allocation shown in Line 11. Part of the City's revenue requirement includes rate/reserve funded capital. This capital portion of the revenue requirement is allocated to the cost components using the resulting asset allocation in Line 13.

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

	O&M Functions	Allocation Basis	Supply	Base	Max Day	Max Hour	Fire	Meter	Customer	General	Conservation	TOTAL
Line		A	B	C	D	E	F	G	H	I	J	K
1	General and Administrative							5%	24%	68%	3%	100%
2	Distribution	Max Hour		23%	28%	35%	14%	0%				100%
3	Water Treatment Plant	Max Day		41%	49%	0%	10%	0%				100%
4	Water Purchases	Supply	100%									100%
	O&M Allocation											
5	General and Administrative		$0	$0	$0	$0	$0	$25,929	$134,932	$383,637	$18,582	$563,080
6	Distribution		$0	$168,010	$205,351	$257,682	$105,592	$0	$0	$0	$0	$736,635
7	Water Treatment Plant		$0	$324,680	$391,656	$0	$79,593	$0	$0	$0	$0	$795,928
8	Water Purchases		$240,364	$0	$0	$0	$0	$0	$0	$0	$0	$240,364
9	**TOTAL O&M EXPENSES**		**$240,364**	**$492,689**	**$597,007**	**$257,682**	**$185,185**	**$25,929**	**$134,932**	**$383,637**	**$18,582**	**$2,336,007**
10	% Allocation		10%	21%	26%	11%	8%	1%	6%	16%	1%	100%
	Capital Allocation		**Supply**	**Base**	**Max Day**	**Max Hour**	**Fire**	**Meter**	**Customer**	**General**	**Conservation**	**TOTAL**
11	Functionalized Asset Percentages		4%	37%	24%	18%	9%	0%	0%	7%	0%	100
12	Rate Funded Capital Projects		$33,458	$297,759	$194,717	$143,924	$75,239	$603	$0	$53,325	$0	$799,025
13	**Allocated by Funct. Assets**		**$33,458**	**$297,759**	**$194,717**	**$143,924**	**$75,239**	**$603**	**$0**	**$53,325**	**$0**	**$799,025**
	Total Allocation		**Supply**	**Base**	**Max Day**	**Max Hour**	**Fire**	**Meter**	**Customer**	**General**	**Conservation**	**TOTAL**
14	O&M Allocated Expenses		$240,364	$492,689	$597,007	$257,682	$185,185	$25,929	$134,932	$383,637	$18,582	$2,336,007
15	Capital Allocated Expenses		$33,458	$297,759	$194,717	$143,924	$75,239	$603	$0	$53,325	$0	$799,025

5.3 REVENUE REQUIREMENT DETERMINATION

Table 5-4 shows the revenue requirement derivation with the total revenue required from rates shown in C15. The totals shown in Columns C are the total O&M and capital revenue requirements that are allocated to the cost components using the allocation percentages shown in Lines 10 and 13 of Table 5-3.

RFC calculated the revenue requirement using Fiscal Year 2017 expenses, which include water purchases, O&M expenses, capital expenses and existing and proposed debt service[15]. O&M expenses include 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 revenue offsets (line 8) from other revenues and make adjustments for annual cash balances (line 12) and for the fact that the impending rate adjustment will take place four months into the fiscal year and we must therefore annualize the rate increase (Line 13). The adjustments, shown as negative values are subtracted (therefore added as a result of subtracting a negative number) to arrive at the total revenue required from rates in C15. This is the amount that fixed and consumption rates are designed to collect.

The pass-through revenue in Line 11 is subtracted from the revenue requirement as an adjustment because the revenues from the pass-through are calculated separately and in this way they are not incorporated into the COS.

The transfer from General Fund in Line 7 is the same value as the Lifeline Adjustment in Line 10. The transfer to the General Fund covers services rendered by the General Fund to the water Utility. The General Fund transfers a similar amount to the water enterprise to offset (lower) the Tier 1 rate for Lifeline (lower income and fixed income) customers.

[15] There is no proposed debt service for FY 2017 or at any time throughout the Study period.

Table 5-4: Revenue Requirement Determination

Line			FY 2017		
			A	B	C
			Operating	Capital	Total
	Revenue Requirements				
1	O&M Expenses		$2,336,007		$2,336,007
2	Existing Debt Service			$335,914	$335,914
3	Proposed Debt Service			$0	$0
4	Rate Funded Capital Projects			$799,025	$799,025
5	Total Revenue Requirements	*Line 1+2+3+4*	$2,336,007	$1,134,939	$3,470,946
	Less: Revenue Offsets				
6	Interest Revenue		$13,537		$13,537
7	Transfer from General Fund		$11,000		$11,000
8	Total Revenue Offsets	*Line 6+7*	$24,537	$0	$24,537
	Less: Adjustments				
10	Lifeline Adjustment		($11,000)		($11,000)
11	Pass Through Revenue		$4,631		$4,631
12	Adjustment for Cash Balance			$582,278	$582,278
13	Adjustment for Midyear Increase		($175,745)		($175,745)
14	Total Adjustments	*Line 10+11+12+13*	($182,114)	$582,278	$400,163
15	**Revenue Requirement from Rates**	***Line 5 – Line 8 – Line 14***	**$2,493,584**	**$552,661**	**$3,046,245**

5.4 REVENUE OFFSET, GENERAL EXPENES, AND PEAK ALLOCATION

Table 5-4 shows several revenue offsets that reduce the total revenues to be recovered from rates. In order to calculate the final rates these offsets have to be allocated as they were in Table 5-3. Table 5-5, shows this allocation to each cost component. Note that Column K in Table 5-5 is a new Column, not found in previous tables. Interest revenue was allocated using the same percentages as the functionalized asset percentages found in Line 11 of Table 5-3. The Transfer from the General Fund is allocated to the new Lifeline cost component so that it can be applied to Lifeline Tier 1 usage.

Table 5-5: Allocation of Offsets

Revenue Offset	Allocation Basis	Supply	Delivery	Max Day	Max Hour	Fire	Meter	Customer	General	Conservation	Lifeline	TOTAL
	A	B	C	D	E	F	G	H	I	J	K	L
Interest Revenue	Capital	4%	37%	24%	18%	9%	0%	0%	7%			$13,537
Transfer from General Fund											100%	$11,000
Total Revenue Offsets		**$567**	**$5,045**	**$3,299**	**$2,438**	**$1,275**	**$10**	**$0**	**$903**	**$0**	**$11,000**	**$24,537**

We then apply the offsets (line 2 in Table 5-6) calculated in Table 5-5 to the Operating Expenses (Table 5-6, Line 1) and then add the capital expenses (line 3, Table 5-6) to yield the total Cost of Service shown in line 4. Note that the total cost of service (line 4) is the same as the revenue requirement shown in C15 of Table 5-4. These Operating Expenses are allocated according to the allocation found in Table 5-3, Line 10. The Capital Expenses are the total Capital Revenue Requirement from Rates (Table 5-4, B15) allocated according to the percentages found in Table 5-3, Line 11.

Lines 1 through 3 are totaled to equal Line 4 -the Total Cost of Service. We then allocate General Costs and peaking costs (max day and max hour) to the meter cost component in lines 5 and 6. We allocated General Costs in H4 in proportion to the amounts of the other cost components in Line 4 Column A through F. Lifeline and Conservation were left out of this allocation in order to keep Lifeline costs separate, and to maintain the direct correlation between Conservation program costs and the Conservation component. Finally, 64% of peak costs (max day and max hour) were allocated to the Meter cost component in order to achieve the City's desired level of fixed revenue since Meter and Customer costs are collected through the fixed monthly service charge. The remaining cost components are collected through the consumption rate.

Table 5-6: Total Adjusted Cost of Service Calculation

Line		Supply	Delivery	Max Day	Max Hour	Fire	Meter	Customer	General	Lifeline	Conservation	TOTAL
		A	B	C	D	E	F	G	H	I	J	K
1	Operating Expenses	$259,103	$531,099	$643,550	$277,770	$199,622	$27,950	$145,451	$413,546	$0	$20,030	$2,518,122
2	Revenue Offset	($567)	($5,045)	($3,299)	($2,438)	($1,275)	($10)	$0	($903)	($11,000)	$0	($24,537)
3	Capital Expenses	$23,142	$205,951	$134,679	$99,548	$52,040	$417	$0	$36,884	$0	$0	$552,661
4	**Total Cost of Service**	**$281,678**	**$732,006**	**$774,930**	**$374,880**	**$250,388**	**$28,357**	**$145,451**	**$449,526**	**($11,000)**	**$20,030**	**$3,046,245**
5	Allocation of General Cost ($)	$48,932	$127,162	$134,619	$65,123	$43,497	$4,926	$25,267	($449,526)			$0
6	Allocation of Peaking Cost to Meter			($582,111)	($281,602)		$863,713					
7	**Total Adjusted Cost of Service**	**$330,610**	**$859,167**	**$327,438**	**$158,401**	**$293,884**	**$896,997**	**$170,718**	**$0**	**($11,000)**	**$20,030**	**$3,046,245**

The final Total Adjusted Cost of Service (on Line 7 of Table 5-6) is total to be recovered from the fixed monthly service charge and the consumption rate..

6 RATE DERIVATION

6.1 PROPOSED RATE STRUCTURE AND RATES

The City's water service fees are comprised of two components: (1) a Monthly Service Charge, and (2) a Consumption Charge. The Monthly Service Charge is a fixed charge based on the size of meter serving a property, and is calculated to recover a portion of the City's fixed costs, such as the costs of billing and collection, customer service, meter reading, and meter maintenance. The commodity rate recovers the balance of remaining costs associated with meeting base and extra capacity costs.

Table 6-1 shows the current and proposed commodity rates by user class. RFC recommends a simplification of the current tiered rate structure, and implementing a uniform commodity rate for all non-single family-residential (SFR) customers. Moreover, RFC recommends adjusting SFR tier widths, as shown in Table 6-1.

Table 6-1: Current and Proposed SFR and Lifeline Tier Widths and Rationale

Tier	Current Range (cubic feet)	Proposed Range (cubic feet)	Rationale
Tier 1	0-1,000	0-800	minimum average winter use
Tier 2	1001-5,000	801-2,000	average summer use
Tier 3	5,001+	2,001+	

For all other customer classes, the commodity rate is a distinct uniform rate per HCF of water usage. Cost of service principles justify higher rates for classes with higher peaking ratios.

This section will explain the rate derivation process for Fire Service Charges, Monthly Service Charges, and Commodity Charges, in that order.

The Rate Derivation will recover the costs shown in row 7 of Table 5-6, which is repeated below in Table 6-2, less the Lifeline costs.

Table 6-2: Total Adjusted Cost of Service

Total Adjusted COS	Supply	Delivery	Max Day	Max Hour	Fire	Meter	Customer	Lifeline	Conservat ion.
	A	B	C	D	E	F	G	H	I
$3,046,245	$330,610	$859,167	$327,438	$158,401	$293,884	$896,997	$170,718	($11,000)	$20,030

6.2 PROPOSED PRIVATE FIRE CHARGES

Total Fire Protection costs include public and private fire costs. The monthly service charge includes public fire protection costs, therefore we first determine public fire protection costs which are incorporated into the monthly service charge. The remaining Private Fire Protection costs are incorporated into the Private Fire Charges. Table 6-3 shows this process in two steps.

RFC first calculated Public and Private Fire costs as shown in column D of Table 6-3 . Column A shows the Fire Demand Factor for each Fire Meter. The fire demand factor is calculated using the Hazen Williams equation for flow – which assumes that the flow is equal to the diameter of the pipe raised to the 2.63 power. The Public 4" hydrants each have two 2.5" connections as well, so the potential demand for the public hydrants is higher than the 4" private line. The City provided RFC with the number of hydrants, and the number of private fire connections shown in column B of Table 3-5. The Total Fire Demand Units in Column C are found by multiplying the numbers in Column A by Column B. Column D shows the total percent allocation. Public fire accounts for 89.5% of the City's fire demand and therefore is allocated 89.5% of the City's fire cost. The total found in E1 is taken by multiplying D1 by the total in F7 of Table 5-6.

Private Fire Charges collect the remaining 10.5% of the fire revenue requirement. RFC calculated the private fire charges by taking the Private Fire subtotal (E9) and dividing by the annualized Private Fire Demand Units. The annualized Private Fire Demand Units number is equal to the Private Fire Demand Unit Subtotal (C9) divided by 12, since this charge is collected on a monthly basis. This process gives the Monthly Cost per Demand Unit (D10). RFC found the final Rate for each Meter by multiplying the Monthly Cost per Demand Unit by the Meter's Fire Demand Factor (Column A). The revenue check in Column E confirms that the revenues from the proposed charges are sufficient to cover private fire costs.

Table 6-3: Fire Charge Calculation

	Connection Size	Fire Demand Factor	No. of Hydrants	Total Fire Demand Units	Percent Allocation	Fire Protection Costs	Monthly Charge
Line		A	B	C = A × B	D = C ÷ C9	E = D × E10	F
	Public Hydrants						
1	4"	61	405	24,536	**89.5%**	**$262,974**	
	Private Fire Lines						
2	2"	6	0	0	0.0%	$0	**$5.53**
3	3"	18	0	0	0.0%	$0	**$16.06**
4	4"	38	5	192	0.7%	$2,053	**$34.22**
5	6"	111	8	890	3.2%	$9,544	**$99.42**
6	8"	237	4	949	3.5%	$10,169	**$211.86**
7	10"	427	2	853	3.1%	$9,144	**$381.00**
8	12"	689	0	0	0.0%	$0	**$615.41**
9	**Subtotal**		**19**	**2,884**	**10.5%**	**$30,911**	
10	**Monthly Cost per Demand Unit**				**$0.89**		
11	**Total**			**27,421**	**100%**	**$293,884**	

6.3 PROPOSED MONTHLY SERVICE CHARGE

The Proposed Monthly Service Charges are designed to recover three different cost components: The Meter Costs, Customer Costs, and Public Fire Costs. In order to calculate the Monthly Service charges RFC first had to determine the proper denominator to allocate these costs, which was done in an Equivalent Meter Units (EMU) Analysis. The Metering Costs have the public fire costs included in them, and is allocated based on meter Operating Capacity, and the Customer Service Component is allocated equally to all accounts.

Table 6-4 shows the EMU calculation process. Column A shows the number of meters for each meter size, this information is taken from Table 3-3. Column B shows each meter's Operating Capacity as provided by the AWWA M1 Manual in Table B-1.[16] Column C shows the ratio of each meter's operating capacity relative to the base meter, in this case the 5/8" meter. Column D calculates the total number of EMUs by multiplying the values in Column C by the values in Column A. The total EMUs is shown in D11.

Table 6-4: Equivalent Meter Unit Calculation

	Meter Size	Meter Count	AWWA Operating Capacity	AWWA Capacity Ratio	Equivalent Meter Units
		A	B	C	D
Line	Source	Table 3-3	AWWA M1 Manual	Column B ÷ B1	A × C
1	**5/8"**	3,585	20	1.0	3,585
2	**1"**	92	50	2.5	230
3	**1.5"**	14	100	5.0	70
4	**2"**	43	160	8.0	344
5	**3"**	1	300	15.0	15
6	**4"**	3	500	25.0	75
7	**6"**	1	1,000	50.0	50
8	**8"**	0	1,600	80.0	0
9	**10"**	2	2,900	145.0	290
10	**12"**	0	4,300	215.0	0
11	**Total**	**3,741**			**4,659**

Table 6-5 shows the Monthly Service Charge calculation. This charge was calculated by dividing the sum of the Meter Cost and *Public* Fire Cost by the number of EMUs per year. Note that EMUs per year is the total number of EMUs multiplied by 12.

Table 6-5: Monthly Meter Charge Calculation

Line		Source	Total
1	Meter Cost	*Table 6-2*	$896,997
2	Public Fire Cost	*Table 6-3*	$262,974
3	Total of Fire and Meter Cost	*Line 1 + Line 2*	$1,159,970
4	Total EMUs	*Table 6-4*	4,659
5	EMUs per Year	*Line 4 × 12*	55,908
6	Monthly Meter Charge	*Line 3 ÷ Line 5*	$20.75

The Customer Service Costs are allocated evenly to all customers based on the assumption that it costs the City the same amount to bill customers regardless of their meter size. The total Customer Service Costs are spread evenly across all customers, therefore the Monthly Service Charge is calculated by dividing the total Customer Service Costs by the number of Bills per Year (which is the number of meters multiplied by 12). The calculation is shown in Table 6-6.

[16] American Water Works Association, Principles of Water Rates, Fees, and Charges 2012 Edition, Table B-1, p. 326

Table 6-6: Monthly Customer Service Charge Calculation

Line		Source	Total
1	Customer Service Cost	*Table 6-2*	$170,718
2	Total Meters	*Table 6-4*	3,741
3	Bills per year	*Line 2 × 12*	44,892
4	Monthly Customer Service Charge	*Line 1 ÷ Line 3*	$3.80

The Monthly Service Charge is calculated by adding the Monthly Meter Charge to the Monthly Customer Service Charge. However, since the Meter Charge is calculated based on the number of EMUs, the Meter Charge for each meter must be multiplied by the number of EMUs for each meter size (column B in Table 6-7). This calculation is shown in Table 6-7 below.

Column A shows the Monthly Meter Service Charge as derived in Table 6-5 for one equivalent meter. Column C shows the total Meter Component for each meter size, which is obtained by multiplying the Base Monthly Meter Charge in Column A by the AWWA Capacity Ratios shown in Column B. Column D, shows the Monthly Customer Service Charges from Table 6-6. The Proposed Charges in Column E are calculated by adding Column C to Column D. Note that the charges in Column E, the total proposed Monthly Meter Service Charge, are rounded so some may be one cent higher than one might expect.

Table 6-7: Derivation of the Monthly Meter Service Charge

	Meter Size	Base Charge	AWWA Capacity Ratio	Meter Component	Customer Service	Proposed Charge
		A	B	C	D	E
Line	Source	Table 3-3	Table 6-4	Table 6-5	Table 6-6	C+D
1	**5/8"**	$20.75	1.00	$20.75	$3.80	**$24.56**
2	**1"**	$20.75	2.50	$51.87	$3.80	**$55.68**
3	**1.5"**	$20.75	5.00	$103.74	$3.80	**$107.55**
4	**2"**	$20.75	8.00	$165.98	$3.80	**$169.79**
5	**3"**	$20.75	15.00	$311.22	$3.80	**$315.03**
6	**4"**	$20.75	25.00	$518.70	$3.80	**$522.50**
7	**6"**	$20.75	50.00	$1,037.39	$3.80	**$1,041.20**
8	**8"**	$20.75	80.00	$1,659.83	$3.80	**$1,663.64**
9	**10"**	$20.75	145.00	$3,008.44	$3.80	**$3,012.24**
10	**12"**	$20.75	215.00	$4,460.79	$3.80	**$4,464.59**

6.4 COMMODITY RATES

SFR Tier Definitions

With direction from the City, RFC redefined the City's current tier structure.

The proposed breakpoint for the first tier is set at 800 cubic feet (CF) or 8 hundred cubic feet (HCF), which is the minimum average monthly usage in the winter of FY 2015. This amount was chosen as it reflects indoor usage, as it is assumed that outdoor usage is minimized in winter months. The second tier is set at the average summer monthly use – this tier includes outdoor use as it is the summer average use when outdoor water consumption is highest. This tier break point is at 2,000 CF or 20 HCF. The third tier includes any use beyond the second tier.

Non-SFR Commodity Rates

RFC recommends changing the City's current tiered system for all customers, and implementing a uniform rate structure for all customers other than Lifeline and SFR customers. However, RFC also recommends separating the other customers by peaking characteristics into the following usage classes:

1. Multi-Family Residential and Mobile
2. Commercial and Industrial
3. Commercial Irrigation and Government
4. School

Unit Cost Definitions

The commodity rates for each class and tier are derived by summing of the unit rates ($ / HCF) for each cost component:

5. Supply
6. Delivery
7. Peaking
8. Conservation

Water Supply costs are the costs associated with obtaining and treating water to make it ready for transmission and distribution. The City has six possible sources of water, shown in Table 3-11 with only three expected to be used in FY 2016 due to drought conditions.

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

Peaking costs, or extra-capacity costs, represent costs incurred to meet customer peak demands in excess of a 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 are costs, which cover water conservation and efficiency programs and efforts. These programs are targeted to high volume water users. Therefore, conservation costs were allocated to Tier 3 where water consumption is considered discretionary and for which conservation programs are designed to promote water efficiency. 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 such costs to those customers whose greater demand create the need for conservation and efficiency programs and efforts.

Unit Cost Derivation for each Cost Component

RFC estimated FY 2017 consumption by escalating FY 2015 consumption by the factors shown in Table 2-2. Actual sales in FY 2015 were 1645 AF, whereas projected sales in FY 2017 are 1810 AF, a difference of 10%. In order to project FY 2017 sales, RFC increased FY 2015 consumption by 10% for all accounts in all months across the board. A summary of the projected water use is shown in Appendix C. Table 6-8 shows the estimated consumption in each tier in CF and HCF for FY 2017.

Table 6-8: Projected Usage in Revised Tiers (FY 2017)

Line	SFR Use by Tier	Cubic Feet (CF)	HCF
1	Tier 1	23,204,573	232,046
2	Tier 2	14,313,908	143,139
3	Tier 3	10,361,855	103,619
4	**Total**	**47,880,336**	**478,803**
5			
	Lifeline Use by Tier	**Cubic Feet (CF)**	**HCF**
6	Tier 1	2,817,766	28,178
7	Tier 2	1,458,180	14,582
8	Tier 3	941,279	9,413
9	**Total**	**5,217,225**	**52,172**
10	**Total SFR and Lifeline**	**53,097,561**	**530,976**

Table 6-9 shows the sum from each tier of SFR and Lifeline usage from Table 6-8. RFC combined these two customer classes for the purposes of analyzing SFR usage. In essence, Lifeline usage is treated as part of SFR usage for all purposes except that it has a discounted first tier rate.

Table 6-9: Projected SFR and Lifeline Combined Usage in Revised Tiers (FY 2017)

Line	Residential Tier (Lifeline and SFR)	FY 2017 Annual Usage (cf)	HCF
1	Tier 1	26,022,339	260,223
2	Tier 2	15,772,088	157,721
3	Tier 3	11,303,134	113,031
4	**Total**	**53,097,561**	**530,976**

Total projected usage for all classes in FY 2017 is shown in Table 6-10.

Table 6-10: Projected Usage in CF (FY 2017)

Line	Residential Tier (Lifeline and SFR)	FY 2017 Annual Usage (cf)	HCF
1	*Lifeline Customers*	*5,217,225*	*52,172*
2	*SFR & CSF*	*47,880,336*	*478,803*
3			
4	Lifeline and SFR	53,097,561	530,976
5	MFR & Mobile	7,545,483	75,455
6	Commercial and Industrial	12,601,080	126,011
7	Commercial Irrigation and Government	3,372,674	33,727
8	School	2,209,118	22,091
9	**Total**	**78,825,915**	**788,259**

The first step in calculating commodity rates is to allocate supply costs. Supply costs were allocated in proportion to use as shown in Table 6-11, columns B and C. Column A shows usage by customer class, Column B shows the percentage of usage of each customer class, Column C shows the allocated supply costs that are equal to Column B multiplied by the total Supply Cost from Table 6-2. Column D shows the unit rate per HCF calculated by dividing Column C by Column A.

Table 6-11: Supply Rate Calculation

Line	Customer Class	FY 2017 Annual Usage (HCF)	Percent of Usage	Allocated Supply Costs	Unit Rate ($ /HCF)
		Table 6-10		Table 6-2, Col A	
		A	B = A ÷ A9	C	D = C ÷ A
1	*Lifeline Customers*	*52,172*			
2	*SFR & CSF*	*478,803*			
3					
4	Lifeline and SFR	530,976	67%	$222,701	Differentiated
5	MFR & Mobile	75,455	10%	$31,647	$0.42
6	Commercial and Industrial	126,011	16%	$52,851	$0.42
7	Commercial Irr. and Govt.	33,727	4%	$14,146	$0.42
8	School	22,091	3%	$9,265	$0.42
9	**Total**	**788,259**	100%	$330,610	

The Supply allocation for Lifeline and SFR customers was then allocated to tiers by price, with the cheapest source going to low tiers.

Table 6-12 shows the supply cost by source. Column A shows the total AF purchased from each source in FY 2017 from Table 3-11, while Column B shows the percentage of total water supply from each source Column C shows the total amount of SFR and Lifeline water supplied by each source, which was calculated by multiplying Column B by the total SFR and CF consumption. Column D shows the cost per AF from each source of supply from Table 3-12, while Column E shows the purchase cost, obtained by multiplying Column A by Column D. Column F shows the percentage of total purchase cost for each source of supply, obtained by dividing the cost for each source in Column E by the total. Column G shows allocated supply cost, obtained by multiplying the SFR and Lifeline allocation from Table 6-11 by the percentages in Column F. The cost per HCF in Column H is obtained by dividing the costs in Column G by the HCF usage in Column C.

Table 6-12: Supply Rate Derivation by Source

Line	Source of Supply	Total Supply (AF)	% of Total Supply	SFR HCF Supplied by Source	Cost Per AF	Purchase Cost	% of Purchase Cost	Allocated Supply Cost	Cost per HCF
		Table 3-11		Table 6-10	Table 3-12			Table 6-11	
		A	B = A ÷ A7	C	D	E = A × D	F = E ÷ E7	G	H = G ÷ C
1	Central Valley Project	1,896	97.4%	517,331	$120.88	$229,162	97.21%	$216,492	$0.42
2	McConnell Foundation	0	0.0%	0	$262.50	$0	0.00%	$0	$0.00
3	Anderson Cottonwood ID	0	0.0%	0	$238.61	$0	0.00%	$0	$0.00
4	MCM Properties	0	0.0%	0	$224.78	$0	0.00%	$0	$0.00
5	Shasta County Water Agency	50	2.6%	13,644	$131.44	$6,572	2.79%	$6,209	$0.46
6	Centerville CSD	0	0.0%	0	$236.25	$0	0.00%	$0	$0.00

7	**Total Potable Supply (AF)**	**1,946**	**100.0%**	**530,976**		**$235,734**	**100.00%**	**$222,701**	

The next step for determining the rate for each tier is to allocate water to each tier. To do this, RFC allocated the most economical water first. Table 6-13 shows the allocation of water from each source to the tiers. Since Central Valley Project water is most economical, RFC allocated it first to the lower tiers until it is exhausted, at which point water from Shasta County Water Agency is used in Tier 3. Column E shows the rates derived from Table 6-12.

Table 6-13: Differentiated Supply Water Allocation

Line	Source of supply	Total Supply	Tier 1	Tier 2	Tier 3	Rate ($ /HCF)
	Source	Table 6-12	Table 6-8	Table 6-8	Table 6-8	Table 6-1
		A	B	C	D	E
1	Central Valley Project	517,331	260,223	157,721	99,387	$0.42
2	Shasta County Water Agency	13,644	0	0	13,644	$0.46
3	**Total**	**530,976**	**260,223**	**157,721**	**113,031**	

We then determine the rate for each tier based on the above allocation and the cost by source derived in column H of Table 6-12. Columns 1 and 2 show the relative proportion of each source of water used in each tier, calculated from Table 6-13. The rate for each tier is percentage of from each source multiplied by the cost of each source. Since Tiers 1 and 2 receive all their water from the CVP, their rate is equal to the CVP rate derived in column H. The Tier 3 rate is slightly higher since Tier 3 receives a small amount of water from the Shasta County Water Agency. The resulting rates for each tier as shown in line 4 of Table 6-14 (they are very similar since majority of water comes from the CVP, and as such we have shown fractional cents).

Table 6-14: Differentiated Supply Tier Rate Calculation

Line	Source of supply	Total Supply	Tier 1	Tier 2	Tier 3
	Source	Table 6-12	Table 6-13	Table 6-13	Table 6-13
		A	B	C	D
1	Central Valley Project	517,331	100%	100%	88%
2	Shasta County Water Agency	13,644	0%	0%	12%
3	**Total**	**530,976**	**260,223**	**157,721**	**113,031**
4	**Rate ($ / HCF)**		**$0.418**	**$0.418**	**$0.423**

Delivery Unit Cost

RFC derived the Delivery unit cost in much the same way as the Supply cost for all non-residential classes, delivery costs are spread in proportion to water use in each class. Table 6-15 shows the delivery Unit Cost Calculation. Column A shows usage by customer class, Column B shows the percentage of usage of each customer class, Column C shows the allocated delivery costs which is equal to Column B multiplied by the total delivery Cost from Table 6-2. Column D shows the unit rate per HCF which is calculated by dividing Column C by Column A.

Table 6-15: Delivery Unit Cost Calculation

Line	Customer Class	FY 2017 Annual Usage (HCF)	Percent of Usage	Allocated Delivery Costs	Unit Rate ($ /HCF)
		Table 6-8		Table 6-2	
		A	B = A ÷ A9	C	D = C ÷ A
1	Lifeline and SFR	530,976	67%	$578,740	$1.09
2	MFR & Mobile	75,455	10%	$82,242	$1.09
3	Commercial and Industrial	126,011	16%	$137,346	$1.09
4	Commercial Irr. and Govt.	33,727	4%	$36,761	$1.09
5	School	22,091	3%	$24,078	$1.09
6	**Total**	**788,259**	**100%**	**$859,167**	

Peaking Unit Cost

The next step in calculating Commodity rates is the allocation of Peaking costs. The costs in Table 6-2 that are associated with Peaking are the Max Day and Max Hour costs. RFC determined the total Peaking cost component by adding these two costs together. Table 6-16, column C, shows this cost by adding the Max Day cost in Column A to the Max Hour cost in Column B.

Table 6-16: Total Peaking Component Calculation

Max Day	Max Hour	Peaking
Table 6-2	Table 6-2	
A	B	C
$327,438	$158,401	$485,839

Table 6-17 shows the derivation of the Peaking Rate in column H by each customer class. Column A shows the projected FY 2017 usage from Table 6-10. Columns B and C show average monthly usage and peak monthly usage from RFC's analysis of the City's usage patterns, found in the appendix. Column D shows the peaking factor for each customer class, which is obtained by dividing the peak monthly usage in Column C by the average monthly usage in Column B. RFC used the coincidental peak month, which is defined as the month with the most usage across all classes. Column E shows the weighted peaking factor, which is a unitless column, but provides an estimate of how much each class contributes to peaking demands on the system by calculating the percentage of peak value in column F - found by determining each class's percentage of the weighted peaking factor. The peaking rates in Column G were allocated by multiplying the total peaking cost in Table 6-16 by the percentages in Column F. SFR and Lifeline peaking rates are further derived in Table 6-18.

Table 6-17: Peaking Rate Derivation

Line	Customer Classes	FY 2017 Usage	Average Month Use	Peak Month Use	Peaking Factor	Weighted Peak Usage	% of Peak	Allocated Peak Costs	Peaking Unit Rate ($ / HCF)
	Source	Table 6-10						Table 6-16	
		A	B = A ÷ 12	C	D	E = C × D	F = E ÷ E6	G	H = G ÷ C
1	Lifeline and SFR	530,976	44,248	80,197	1.81	962,366	70%	$339,119	Tiered
2	MFR & Mobile	75,455	6,288	8,720	1.39	104,642	8%	$36,874	$0.49
3	Commercial and Industrial	126,011	10,501	15,768	1.50	189,216	14%	$66,676	$0.53
4	Commercial Irr. and Govt.	33,727	2,811	5,659	2.01	67,911	5%	$23,931	$0.71
5	School	22,091	1,841	4,550	2.47	54,598	4%	$19,239	$0.87
6	**Total)**	**788,259**				**1,378,734**	**100%**	**$485,839**	

Table 6-18 shows the derivation of the unit peaking costs for single family and lifeline tiers. Column A shows the annual usage that occurs in each tier, while Column B shows the peaking factor for each tier. The peaking factors for each tier were calculated in a separate analysis and are available in the Appendix. The weighted peaking factor in Column C is determined by multiplying the usage in Column A by the peaking factor in Column B. Column C shows the weighted peaking factor, which is a unitless number. The percentage of peak value in Column D is found by determining each tier's percentage of the weighted peaking factor. The costs that were allocated to tiers in Table 6-17 (in G1) are then allocated to each tier using the percentages in Column D. The unit rate in Column F is derived by dividing the allocated peak costs in Column E by the usage in Column A.

Table 6-18: Peaking Rate Derivation

Line	Residential Tier (Lifeline & SFR)	FY 2017 Usage	Peaking Factor	Weighted Peak Usage	% of Peak	Allocated Peak Costs	Unit Rate ($ / HCF)
	Source	Table 6-10				Table 6-16	
		(A)	(B)	C = A × B	D = C ÷ C5	(E)	F = E ÷ C
1	*Total SFR and Lifeline*	*530,976*	*1.81*	*962,366*	*100%*	*$339,119*	
2	Tier 1	260,223	1.15	298,297	31%	$105,114	$0.40
3	Tier 2	157,721	1.93	304,642	32%	$107,350	$0.68
4	Tier 3	113,031	3.18	359,428	37%	$126,655	$1.12
5	**Total**	**530,976**		**962,366**	100%	$339,119	

Conservation Unit Cost

Table 6-19 shows the derivation of the conservation unit costs. The conservation costs for the single family class is calculated by taking the conservation costs derived in the cost of service analysis, shown in Column I of Table 6-2, and allocating these costs to each tier and class in proportion to use in column B. This results in that amount shown in C5 for SFR and Lifeline. The amount in C5 is then allocated to the tiers using the allocation factors, shown in Column D, to allocate the total conservation costs to Tier 3. Tier 3 containing the highest volume users, has a 100% allocation factor, signifying that all conservation costs go to Tier 3, to recognize the fact that conservation and efficiency programs are targeted at these users who create the need, and therefore generate the costs, for these programs. The conservation rate is derived by dividing the conservation costs in Column E by the use in Column A and is shown in Column F.

The conservation rate for the remaining user classes is calculated by dividing their allocated conservation costs (column C) by the use (column A) to yield the conservation rate in Column F. We

note that the total conservation costs shown in Column C matches with that derived in Column I of Table 6-2.

Table 6-19: Derivation of Conservation Unit Costs

Line	Customer Class	FY 2017 Annual Usage (HCF)	Percent of Usage	Allocated Cons. Costs	% Responsibility	Reallocated Cons. Cost	Unit Rate ($ /HCF)
		Table 6-9 & Table 6-10		Table 6-2			
		(A)	B = A ÷ A11	(C)	(D)	E = C × D	F = D ÷ A
1	***SFR and Lifeline***						
2	Tier 1	260,223	33%	$6,612	0%	$0	$0.00
3	Tier 2	157,721	20%	$4,008	0%	$0	$0.00
4	Tier 3	113,031	14%	$2,872	100%	$13,492	$0.12
5		**530,976**		$13,492	100%	$13,492	
6							
7	MFR & Mobile	75,455	10%	$1,917		$1,917	$0.03
8	Commercial and Industrial	126,011	16%	$3,202		$3,202	$0.03
9	Commercial Irr. & Govt.	33,727	4%	$857		$857	$0.03
10	School	22,091	3%	$561		$561	$0.03
11	**Total**	**788,259**	**100%**	**$20,030**		**$20,030**	

Lifeline Discount

The City has historically offered a discounted first tier rate for low income customers called a Lifeline rate. This discount is available due to a transfer from the General Fund, which is shown in Column H of Table 6-2. The City has decided to allocate all of this transfer to the first tier of Lifeline usage only. As a result, the discount in Column F is calculated by dividing the general fund transfer in its entirety by the Tier 1 Lifeline usage.

Table 6-20: Derivation of Lifeline Discount

Line	Lifeline Reduction	FY 2017 Annual Usage (HCF)	Allocate General Fund Transfer	Discounted Usage	Percentage of Lifeline	Total Allocation	Discount ($ / HCF)
	Source	Table 6-8				Table 6-2	
		A	B	C	D	E	F = E ÷ C
1	Lifeline Tier 1	28,178	Yes	28,178	100%	($11,000)	($0.39)
2	Lifeline Tier 2	14,582	No	0	0%	$0	$0.00
3	Lifeline Tier 3	9,413	No	0	0%	$0	$0.00
4	**Total**	**52,172**		**28,178**		**($11,000)**	

Pass-Through Component

The final rate component is the pass-through component. Its calculation is discussed in Section 3.4 and therefore will not be discussed here, but Table 6-21 shows a quick recap of the calculation.

Table 6-21: Derivation of Pass-Through Component

Line		Pass-Through Total	Total Water Usage (HCF)	Passed-through $ / HCF	Pass-Through Total
1	Total Pass-through	$4,631	788,259	$0.01	$4,631

Final Rate Derivation

RFC calculated the unit rates for supply, delivery, peaking, conservation, Lifeline discounts, and the pass-through component for single family tiers and for each class in Table 6-11 through Table 6-21. Table 6-22 shows the final Commodity rate derivation by summing each unit cost to derive the total rate for each tier and class, as shown in Column G.

Table 6-22: Derivation of Rates by Tier and Class

Line	Customer Classes	Supply ($ / hcf)	Delivery Component	Peaking Component	Lifeline Component	Pass-through Component	Conservation Component	Total Rate ($/ HCF)
		Table 6-12 & Table 6-14	Table 6-15	Table 6-16 Table 6-18	Table 6-20	Table 6-21	Table 6-19	
		A	B	C	D	E	F	G = A+B+C+D+E+F
1	Lifeline Tier 1	$0.42	$1.09	$0.40	($0.39)	$0.01	$0.00	**$1.53**
2	Lifeline Tier 2	$0.42	$1.09	$0.68	$0.00	$0.01	$0.00	**$2.20**
3	Lifeline Tier 3	$0.42	$1.09	$1.12	$0.00	$0.01	$0.12	**$2.76**
4	Residential Tier 1	$0.42	$1.09	$0.40		$0.01	$0.00	**$1.92**
5	Residential Tier 2	$0.42	$1.09	$0.68		$0.01	$0.00	**$2.20**
6	Residential Tier 3	$0.42	$1.09	$1.12		$0.01	$0.12	**$2.76**
7	MFR & Mobile	$0.42	$1.09	$0.49		$0.01	$0.03	**$2.03**
8	Comm. & Industrial	$0.42	$1.09	$0.53		$0.01	$0.03	**$2.07**
9	Comm. Irr. & Govt.	$0.42	$1.09	$0.71		$0.01	$0.03	**$2.26**
10	School	$0.42	$1.09	$0.87		$0.01	$0.03	**$2.42**

The next three tables show the proposed commodity rates, fixed charges, and fire charges through FY 2021, escalated according to the proposed Financial Plan in Table 1-1. The values shown in the FY 2017 column of Table 6-23 are from column G of Table 6-22.

Table 6-23: Commodity Charges through FY 2021

Revenue Adjustment	30%	15%	10%	0%	0%
Month Effective	October	March	March	March	March
Customer Classes	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Lifeline Tier 1	$1.53	$1.76	$1.94	$1.94	$1.94
Lifeline Tier 2	$2.20	$2.53	$2.79	$2.79	$2.79
Lifeline Tier 3	$2.76	$3.18	$3.50	$3.50	$3.50
Residential Tier 1	$1.92	$2.21	$2.44	$2.44	$2.44
Residential Tier 2	$2.20	$2.53	$2.79	$2.79	$2.79
Residential Tier 3	$2.76	$3.18	$3.50	$3.50	$3.50
MFR & Mobile	$2.03	$2.34	$2.58	$2.58	$2.58
Commercial and Industrial	$2.07	$2.39	$2.63	$2.63	$2.63
Commercial Irr. and Govt.	$2.26	$2.60	$2.86	$2.86	$2.86
School	$2.42	$2.79	$3.07	$3.07	$3.07

Table 6-24: Fixed Charges through FY 2021

Meter Size	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
	Table 6-7				
5/8"	$24.56	$28.25	$31.08	$31.08	$31.08
1"	$55.68	$64.04	$70.45	$70.45	$70.45
1.5"	$107.55	$123.69	$136.06	$136.06	$136.06
2"	$169.79	$195.26	$214.79	$214.79	$214.79
3"	$315.03	$362.29	$398.52	$398.52	$398.52
4"	$522.50	$600.88	$660.97	$660.97	$660.97
6"	$1,041.20	$1,197.38	$1,317.12	$1,317.12	$1,317.12
8"	$1,663.64	$1,913.19	$2,104.51	$2,104.51	$2,104.51
10"	$3,012.24	$3,464.08	$3,810.49	$3,810.49	$3,810.49
12"	$4,464.59	$5,134.28	$5,647.71	$5,647.71	$5,647.71

Table 6-25: Fire Meter Charges through FY 2021

Meter Size	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
2"	$5.53	$6.36	$6.99	$6.99	$6.99
3"	$16.06	$18.47	$20.32	$20.32	$20.32
4"	$34.22	$39.36	$43.29	$43.29	$43.29
6"	$99.42	$114.33	$125.76	$125.76	$125.76
8"	$211.86	$243.64	$268.00	$268.00	$268.00
10"	$381.00	$438.14	$481.96	$481.96	$481.96
12"	$615.41	$707.72	$778.50	$778.50	$778.50

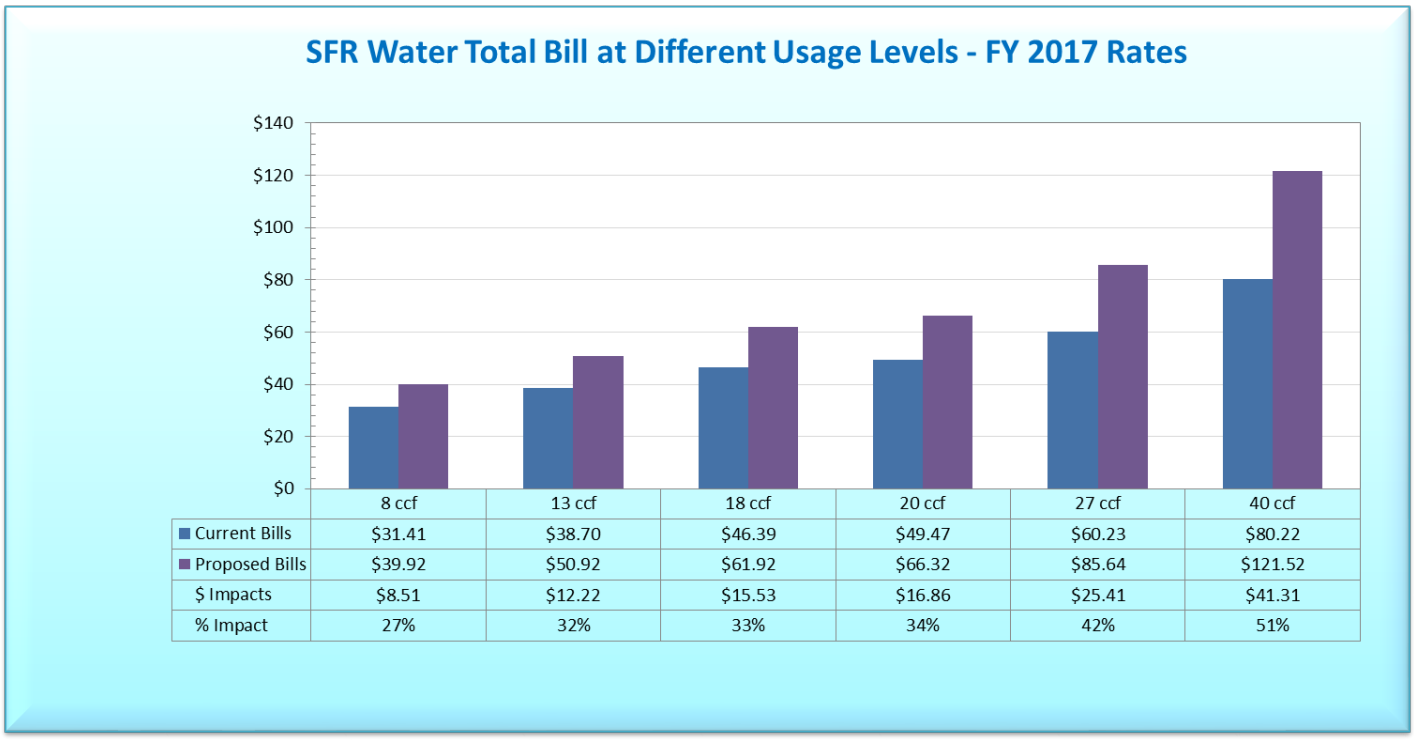
7 BILL IMPACTS

7.1 CUSTOMER BILL IMPACTS

Single Family Bill Impacts

Figure 7-1 shows the single family bill impacts for various use points. The graph shows two sets of bars at different usage points. The blue bars represent the bill assuming the existing rate structure is unchanged yet rates are increased by the current adopted adjustments. The purple bars show the proposed rates that result with the proposed Financial Plan and proposed rate structure. This color scheme remains unchanged for the graphs in this section.

Figure 7-1: Single Family Customer Bill Impacts

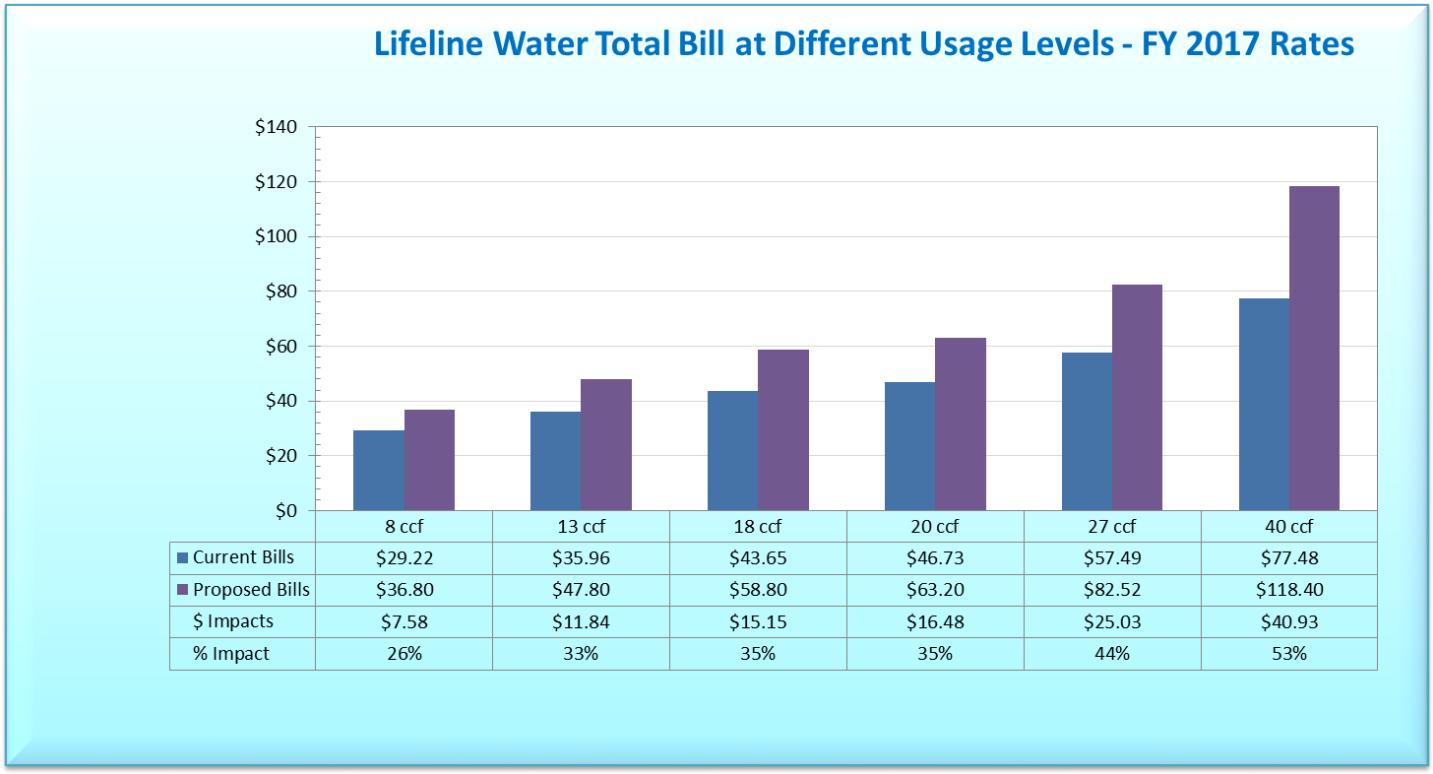


	8 ccf	13 ccf	18 ccf	20 ccf	27 ccf	40 ccf
Current Bills	$31.41	$38.70	$46.39	$49.47	$60.23	$80.22
Proposed Bills	$39.92	$50.92	$61.92	$66.32	$85.64	$121.52
$ Impacts	$8.51	$12.22	$15.53	$16.86	$25.41	$41.31
% Impact	27%	32%	33%	34%	42%	51%

Lifeline Bill Impacts

Figure 7-2 shows Lifeline bill impacts. This class has a discounted tier 1commodity rate relative to SFR customers, but pays the same rate for all usage above tier 1.

Figure 7-2: Multi-family Customer Bill Impacts (5/8" Meter)



	8 ccf	13 ccf	18 ccf	20 ccf	27 ccf	40 ccf
Current Bills	$29.22	$35.96	$43.65	$46.73	$57.49	$77.48
Proposed Bills	$36.80	$47.80	$58.80	$63.20	$82.52	$118.40
$ Impacts	$7.58	$11.84	$15.15	$16.48	$25.03	$40.93
% Impact	26%	33%	35%	35%	44%	53%

Class by Class Bill Impacts

Figures 7-3 through 7-8 show the percentage of accounts that will realize the bill impact shown at the bottom of the figure. For example, Figure 7-3 shows that 40% of SFR customers will see a 5$ to $10 increase in their bill. The left axis shows number of bills for each dollar impact bin along with the percentage of customers on top of the blue bar.

Figure 7-3: SFR Class Impacts

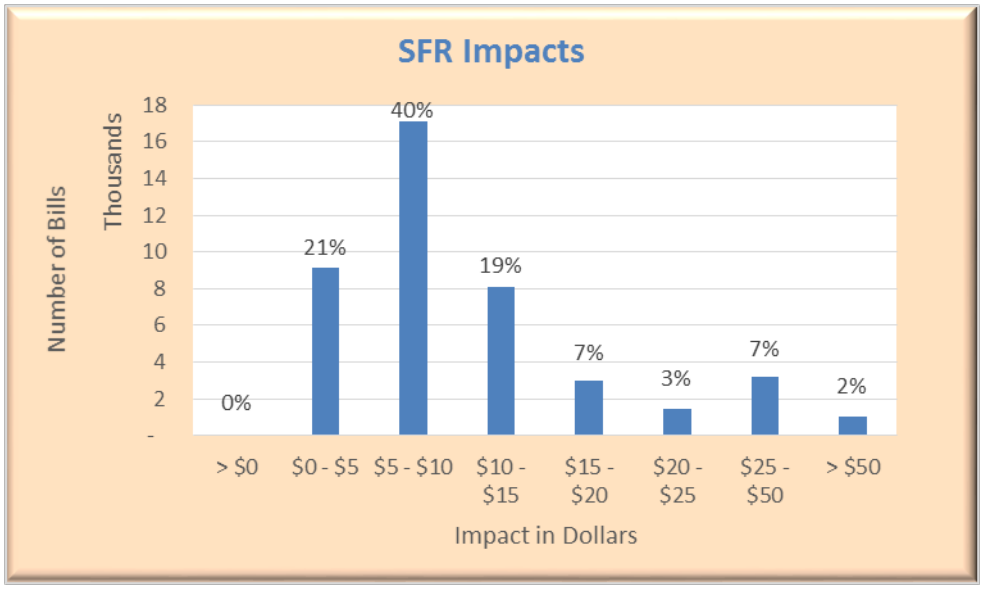


Figure 7-4: Lifeline Class Impacts

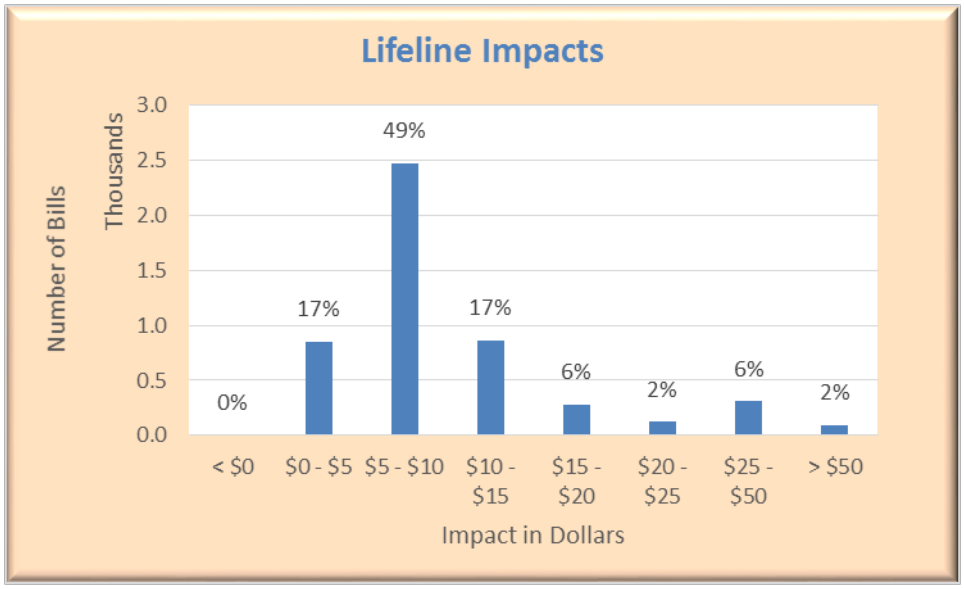


Figure 7-5: MFR Class Impacts

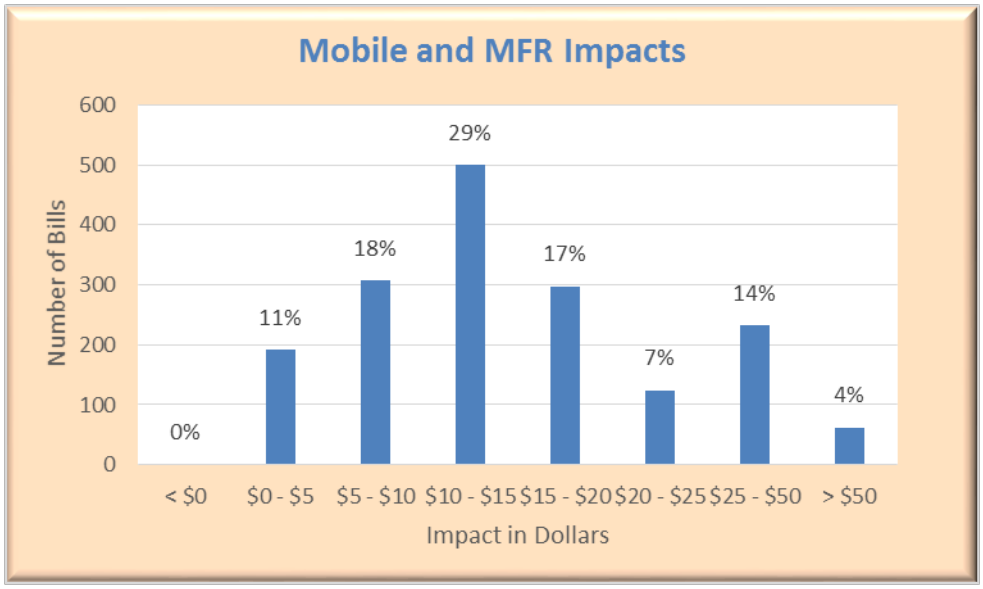


Figure 7-6: Commercial and Industrial Class Impacts

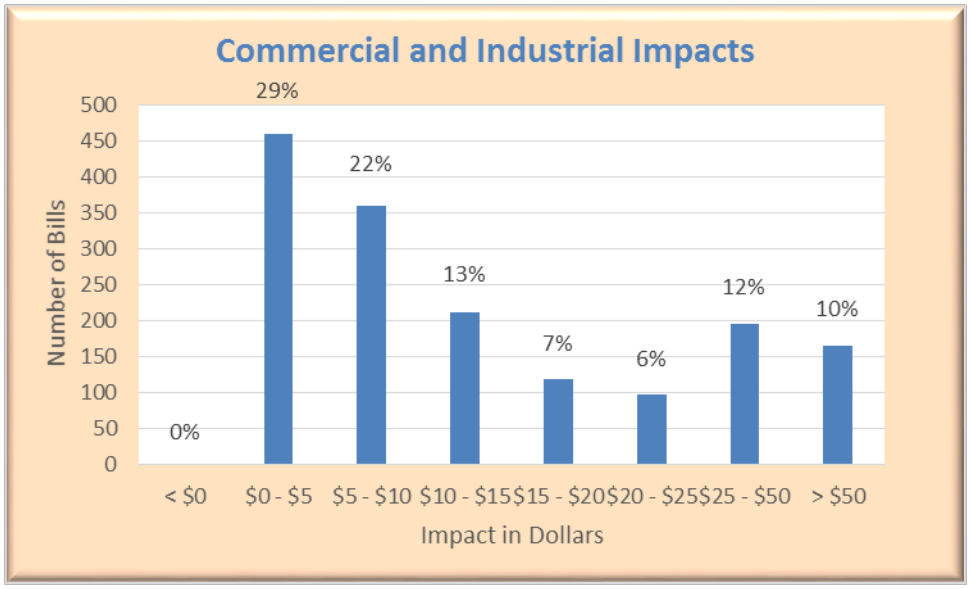


Figure 7-7: Commercial Irrigation and Government Class Impacts

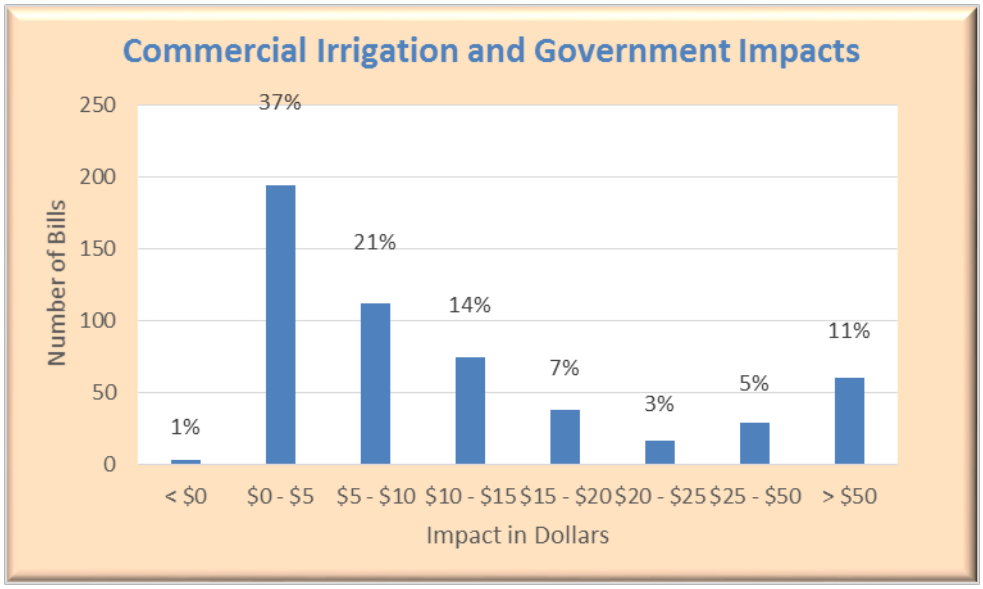
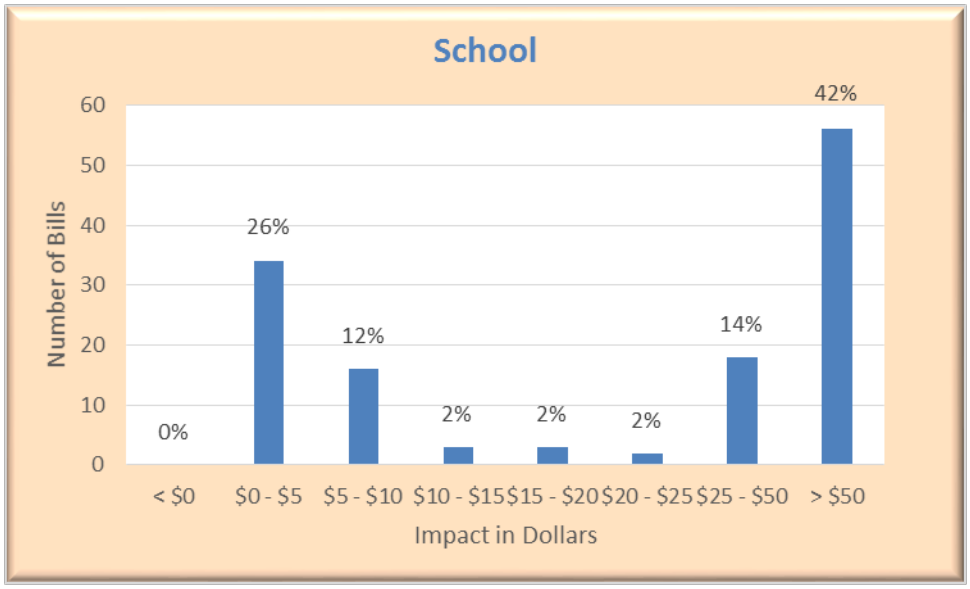


Figure 7-8: School Class Impacts



8 DROUGHT RATES

8.1 DROUGHT RATE BACKGROUND

As of late June, 2016, the City was experiencing a level 3 drought, defined as a 30% reduction in water use[17]. City Staff informed RFC that during drought conditions, the City often has to purchase water from additional sources compared to the plan outlined in Table 3-11. RFC's worked with City Staff to develop Drought Rates and to determine how a drought would likely affect water supply availability and purchase costs during different stages of drought. The drought rates below are based on the increased costs to the City in the event of necessary water purchases from additional sources of supply – which would likely be the McConnell Foundation

The City's "new normal" level of water use is expected to be around 1,810 AF for FY 2017 which is equal to the current Stage 3 drought.

Water Use in each Drought Stage

There are several different stages of drought. RFC estimated the water use cutback needed in Residential (SFR and Lifeline) Tiers 2 and 3 in order to yield the reduction desired in a stage 4 and 5 drought. These percentages are shown in Column B and C. For example, a 21% reduction in Residential Tiers 2 and 3 and no reduction in Tier 1, along with a 12% in non-SFR classes would yield the desired 12% reduction in use during a stage 4 drought as is shown in Column C. Column C also shows the cutbacks relative to drought stage 3. Column D shows the estimated demand in these stages, which is the result of multiplying the percentages in Column C by the "New Normal"[18] value of 1810 AF. The values in Column E show the supply amount needed in order to account for 7.5% water loss.

[17] As of July 5, the City is in a Stage 1 drought, which calls for a 10% reduction in use.
[18] Provided by City Staff.

Table 8-1: Drought Use Cutback Goals by Drought Level

Drought Stage	Drought Stage	Reduction Needed in SFR Tiers 2, 3	% Reduction Relative to Stage 3 for Non-SFR (1815 AF)	Total Customer Demand (Sales - AF)	Total Supply Needed (Inc. Water Loss) [AF]
	(A)	(B)	(C)	(D)	(E)
1	10%	0%	No Reduction	2,324	2,499
2	20%	0%	No Reduction	2,066	2,221
3	30%	0%	No Reduction	1,810	1,946
4	40%	21.%	12%%	1,602	1,723
5	50%	30.%	18%%	1,488	1,600

The drought charges are designed to recover the cost of McConnell Foundation water purchases. The price of McConnell Foundation water is projected to be $400 per AF, which is notably higher than the rate of other supply sources. The drought rates for stages 1 through 3 are designed to recover the additional cost of purchasing McConnell water should CVP reduce the amount of water available.

RFC worked with City Staff to estimate supply sources at different drought levels. These are shown in Table 8-2. Note that the column lettering in this table continues from Table 8-1 into Table 8-2.

Table 8-2: Sources of Supply by Drought Level

Drought Stage	Total Supply Needed (Inc. Water Loss) [AF]	McConnell Purchases (AF)	Shasta County Water Agency Supply (AF)	ACID Supply (AF)	CVP Supply (AF)
	(E)	(F)	(G)	(H)	I = E - F - G- H
1	2,499	138	50	-	2,310
2	2,221	277	40	-	1,905
3	1,946	415	30	-	1,501
4	1,723	553	12	140	1,018
5	1,600	430	12	140	1,018

Table 8-3 shows the calculation of the drought revenue requirement at different stages of drought. The revenue requirement from the first three stages is simply the additional revenue required to meet the cost of McConnell Foundation water purchases. The revenue requirement for the next two drought stages is in Table 8-7 and 8-8. The rates for stages 4 and 5 also recover the loss of revenue due to reduced sales as well. Column J shows McConnell Foundation water purchase costs per AF, Column K shows CVP costs per AF. During stage 1 through 3 droughts, we assumed that the Bureau of Reclamation would limit CVP water and the City would therefore purchase McConnell Foundation water to meet demand. Column L shows the difference between the costs of these two water sources (Column J and K). Column M shows the drought revenue requirement for recovering McConnell water purchase costs, obtained by multiplying Column L of Table 8-3 by the value in Column F of Table 8-2. Finally, the revenue requirement as a percentage of proposed variable revenue is calculated by dividing the values found in Column M by the total projected variable revenue of the proposed rates, found in Appendix D.

Table 8-3: Calculation of Revenue Requirement

Drought Stage	McConnell Cost ($/AF)	CVP Cost ($/AF)	Difference	Drought Rate Revenue Requirement	Revenue Requirement as % of Variable Revenue
	(J)	(K)	L = J-K	M = F x L	(N)
1	$400.00	$120.88	$279.12	$38,589	2.3%
2	$400.00	$120.88	$279.12	$77,177	4.6%
3	$400.00	$120.88	$279.12	$115,766	6.8%
4	$400.00	$120.88	$279.12	$154,354	
5	$400.00	$120.88	$279.12	$120,022	

8.2 DROUGHT CALCULATION

The rates for the first three stages of drought are calculated by multiplying the non-drought proposed rates (Column A) by the values found in Column N of Table 8-3. These three next tables all share the same basic structure. Table 8-4 Column A shows the proposed rates derived in Section 6. Column B shows projected usage in FY 2017. Column C shows projected commodity revenue in FY 2017. Column D shows the rate for the relative stage of drought, which is found by increasing the non-drought rates (column A) by in the percentages shown in Column N of Table 8-3 Column E shows the revenue recovered by those rates. Table 8-5 and Table 8-6 follow the same format.

Table 8-4: Calculation of Stage 1 Drought Rates

Class	Non-Drought Proposed Rate ($/ hcf)	No Reduction Use (cf)	Non Drought Revenue	Stage 1 Rates ($ / hcf)	Stage 1 Recovery
	(A)	(B)	(C)	(D)	(E)
Tier 1 (Lifeline)	$1.53	2,817,766	$43,112	$1.56	$44,095
Tier 1 (SFR)	$1.92	23,204,573	$445,528	$1.96	$455,693
Tier 2	$2.20	15,772,088	$346,986	$2.25	$354,903
Tier 3	$2.76	11,303,134	$311,966	$2.82	$319,084
MFR & Mobile	$2.03	7,545,483	$153,173	$2.08	$156,668
Commercial and Industrial	$2.07	12,601,080	$260,842	$2.12	$266,794
Commercial Irr. & Govt.	$2.26	3,372,674	$76,222	$2.31	$77,962
School	$2.42	2,209,118	$53,461	$2.48	$54,680
Total			**$1,691,291**		**$1,729,879**

Table 8-5: Calculation of Stage 2 Drought Rates

Class	Non-Drought Proposed Rate ($/ hcf)	No Reduction Use (cf)	Non Drought Revenue	Stage 2 Rates ($ / hcf)	Stage 2 Recovery
	(A)	(B)	(C)	(D)	(E)
Tier 1 (Lifeline)	$1.53	2,817,766	$43,112	$1.60	$45,079
Tier 1 (SFR)	$1.92	23,204,573	$445,528	$2.01	$465,858
Tier 2	$2.20	15,772,088	$346,986	$2.30	$362,820
Tier 3	$2.76	11,303,134	$311,966	$2.89	$326,202
MFR & Mobile	$2.03	7,545,483	$153,173	$2.12	$160,163
Commercial and Industrial	$2.07	12,601,080	$260,842	$2.16	$272,745
Commercial Irr. & Govt.	$2.26	3,372,674	$76,222	$2.36	$79,701
School	$2.42	2,209,118	$53,461	$2.53	$55,900
Total			**$1,691,291**		**$1,768,468**

Table 8-6: Calculation of Stage 3 Drought Rates

Class	Non-Drought Proposed Rate ($/ hcf)	Non Drought Use (cf)	Non Drought Revenue	Stage 3 Rates ($ / hcf)	Stage 3 Recovery
	(A)	(B)	(C)	(D)	(E)
Tier 1 (Lifeline)	$1.53	2,817,766	$43,112	$1.63	$46,063
Tier 1 (SFR)	$1.92	23,204,573	$445,528	$2.05	$476,023
Tier 2	$2.20	15,772,088	$346,986	$2.35	$370,736
Tier 3	$2.76	11,303,134	$311,966	$2.95	$333,320
MFR & Mobile	$2.03	7,545,483	$153,173	$2.17	$163,658
Commercial and Industrial	$2.07	12,601,080	$260,842	$2.21	$278,697
Commercial Irr. & Govt.	$2.26	3,372,674	$76,222	$2.41	$81,440
School	$2.42	2,209,118	$53,461	$2.59	$57,120
Total			**$1,691,291**		**$1,807,056**

The drought rates for drought stages 4 and 5 include the recovery of lost revenue due to reduced sales. Therefore we must estimate the cutback in use from each user class. RFC modelled the cutback in use by using City customer use data for FY 2015 and establishing a minimum use level to provide for basic health and sanitation needs. This minimum use level represents essential indoor water use. The remaining use is considered discretionary and is the target of the cutback goals in Table 8-1 Column B.

Table 8-7 shows the Stage 4 drought rate calculation. Tier 1 usages are left unchanged. RFC assumed that Tier 2 and tier 3 usage was reduced by the percentage shown in Stage 4 in Table 8-1 - column B. We assumed the remaining customer classes reduced their usage by the percentage shown in Table 8-1 Column C. Column B in Table 8-7 shows the revenues with the assumed usage reductions and the

proposed FY 2017 non-drought rates. The total in cell B10 shows the result of summing these revenues. The Lost Revenue Line shows the reduction in revenue expected from the cutbacks shown in Line 10 (compared to the totals in Table 8-4, Table 8-5, and Table 8-6 Column C). We also need to recover the increased cost of McConnell Foundation water, found in Table 8-3 Column M. Adding these costs to the lost revenue, yields the total additional revenue to be recovered – shown in B12. The necessary percentage drought rate increase, in B14, is found by dividing the total in B12 by the total projected revenue in B10. The non-drought rates are then escalated by this percentage, resulting in the drought rates in Column C. Column D shows the expected amount of revenue to be recovered during a stage 4 drought. The drought rates for Stage 5 are derived in the exact same manner.

Table 8-7: Stage 4 Rate Calculation

	Class	Drought Stage 4 Reduction in CF	Revenues With Reduction	Drought Rates ($ / hcf)	Drought Rate Recovery
Line		(A)	(B)	(C)	(D)
1	Tier 1 (Lifeline)	2,817,766	$43,112	$1.90	$53,644
2	Tier 1 (SFR)	23,204,573	$445,528	$2.39	$554,366
3	Tier 2	14,175,210	$311,855	$2.74	$388,037
4	Tier 3	7,295,440	$201,354	$3.43	$250,543
5	MFR & Mobile	6,681,502	$135,634	$2.53	$168,769
6	Commercial and Industrial	11,158,218	$230,975	$2.58	$287,400
7	Commercial Irrigation and Govt.	2,986,492	$67,495	$2.81	$83,983
8	School	1,956,167	$47,339	$3.01	$58,904
9					
10	**Total**	**70,275,369**	**$1,483,292**		**$1,845,645**
11	Lost Revenue		$207,999		
12	Plus Increased McConnell Costs		$362,353		
13					
14	**Percentage Increase**		**24%**		

Table 8-8 shows the calculations for Stage 5 drought. These follow the same methodology as Table 8-7.

Table 8-8: Stage 5 Rate Calculation

	Class	Drought Stage 5 Reduction in CF	Revenues With Reduction	Drought Rates ($ / hcf)	Drought Rate Recovery
Line		(A)	(B)	(C)	(D)
1	Tier 1 (Lifeline)	2,817,766	$43,112	$2.00	$56,380
2	Tier 1 (SFR)	23,204,573	$445,528	$2.51	$582,645
3	Tier 2	13,304,928	$292,708	$2.88	$382,793
4	Tier 3	5,674,802	$156,625	$3.61	$204,828
5	MFR & Mobile	6,204,529	$125,952	$2.65	$164,715
6	Commercial and Industrial	10,361,665	$214,486	$2.71	$280,497
7	Commercial Irrigation and Govt.	2,773,295	$62,676	$2.96	$81,966
8	School	1,816,522	$43,960	$3.16	$57,489
9					
10	**Total**	**58,666,756**	**$1,385,047**		**$1,811,313**
11	Lost Revenue		$306,243		
12	Plus Increased McConnell Costs		$426,266		
13					
14	**Percentage Increase**		**31%**		

Table 8-9 shows a summary of the drought rates at different levels of drought, and the surcharge for each HCF of water at that level, which is the difference between the drought rate and the base COS rate.

Table 8-9: Drought Rates and Surcharge Totals

Line	Drought Rate Summary	No Drought	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
1	Tier 1 (Lifeline)	$1.53	$1.56	$1.60	$1.63	$1.90	$2.00
2	Tier 1 (SFR)	$1.92	$1.96	$2.01	$2.05	$2.39	$2.51
3	Tier 2	$2.20	$2.25	$2.30	$2.35	$2.74	$2.88
4	Tier 3	$2.76	$2.82	$2.89	$2.95	$3.43	$3.61
5	MFR & Mobile	$2.03	$2.08	$2.12	$2.17	$2.53	$2.65
6	Comm. & Industrial	$2.07	$2.12	$2.16	$2.21	$2.58	$2.71
7	Commercial Irr. and Govt.	$2.26	$2.31	$2.36	$2.41	$2.81	$2.96
8	School	$2.42	$2.48	$2.53	$2.59	$3.01	$3.16
9							
10	**Surcharge**						
11	Tier 1 (Lifeline)		$0.03	$0.07	$0.10	$0.37	$0.47
12	Tier 1 (SFR)		$0.04	$0.09	$0.13	$0.47	$0.59
13	Tier 2		$0.05	$0.10	$0.15	$0.54	$0.68
14	Tier 3		$0.06	$0.13	$0.19	$0.67	$0.85
15	MFR & Mobile		$0.05	$0.09	$0.14	$0.50	$0.62
16	Comm. and Industrial		$0.05	$0.09	$0.14	$0.51	$0.64

9 APPENDIX A: WATER CONSUMPTION DETAIL

Usage Data by Tier (CF)			FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Lifeline							
Tier 1	0 - 1,000	1000	2,633,993	3,208,022	3,295,514	3,383,005	3,470,497
Tier 2	1001 - 5000	5000	1,349,979	1,867,235	1,918,160	1,969,084	2,020,009
Tier 3	> 5,000		59,377	141,967	145,839	149,711	153,583
Subtotal Lifeline			4,043,349	5,217,225	5,359,512	5,501,800	5,644,088
SFR & CSF							
Tier 1	0 - 1,000	1000	22,014,762	26,804,188	27,535,212	28,266,235	28,997,258
Tier 2	1001 - 5000	5000	13,931,599	19,125,509	19,647,114	20,168,719	20,690,324
Tier 3			1,160,900	1,950,639	2,003,838	2,057,037	2,110,237
Subtotal SFR & CSF			37,107,261	47,880,336	49,186,164	50,491,991	51,797,818
MFR & Mobile							
Tier 1	0 - 1,000	1000	1,175,154	1,516,328	1,557,682	1,599,037	1,640,391
Tier 2	1001 - 5000	5000	4,608,303	5,946,197	6,108,366	6,270,535	6,432,704
Tier 3			64,292	82,958	85,220	87,483	89,745
Subtotal MFR & Mobile			5,847,749	7,545,483	7,751,269	7,957,055	8,162,841
(5/8" Meters get charged an excessive consumption rate)							
Commercial & Industrial							
Tier 1	0 - 1,000	1000	802,771	1,035,834	1,064,084	1,092,334	1,120,584
Tier 2	1001 - 5000	5000	8,845,568	11,413,636	11,724,917	12,036,198	12,347,479
Tier 3			117,498	151,610	155,745	159,879	164,014
Subtotal Commercial & Industrial			9,765,837	12,601,080	12,944,746	13,288,411	13,632,077
Commercial Irrigation							
Tier 1	0 - 1,000	1000	159,008	205,172	210,768	216,363	221,959
Tier 2	1001 - 5000	5000	1,722,289	2,222,308	2,282,916	2,343,525	2,404,133
Tier 3			27,814	35,889	36,867	37,846	38,825
Subtotal Commercial Irrigation			1,909,111	2,463,369	2,530,551	2,597,734	2,664,917
School							
Tier 1	0 - 1,000	1000	73,757	95,171	97,766	100,362	102,958
Tier 2	1001 - 5000	5000	1,634,333	2,108,817	2,166,330	2,223,843	2,281,356
Tier 3			3,976	5,130	5,270	5,410	5,550
Tier 4			1,712,066	2,209,118	2,269,367	2,329,615	2,389,864
Government							
Tier 1	0 - 1,000	1000	43,209	55,754	57,274	58,795	60,315
Tier 2	1001 - 5000	5000	661,502	853,552	876,830	900,109	923,388
Tier 3			0	0	0	0	0
Subtotal Government			704,711	909,305	934,104	958,904	983,703

Private Fire Line						
Tier 1	0 - 1,000	0	0	0	0	0
Tier 2	1001 - 5000	0	0	0	0	0
Tier 3	0	0	0	0	0	0
Subtotal Private Fire Line		0	0	0	0	0
TOTAL USAGE (CF)		61,090,084	78,825,915	80,975,713	83,125,510	85,275,308
TOTAL USAGE (HCF)		610,901	788,259	809,757	831,255	852,753
TOTAL USAGE (AF)		1,402	1,810	1,859	1,908	1,958

10 APPENDIX B: PROJECTED FY 2017 USAGE BY TIER AND CLASS

SFR	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Tier 1	1,664,156	1,748,839	1,752,701	1,843,189	1,985,235	2,091,707	2,196,620	2,192,762	2,185,604	2,020,081	1,807,412	1,716,266
Tier 2	454,287	534,000	594,489	814,535	1,177,844	1,651,867	2,273,271	2,189,857	2,059,637	1,368,656	676,952	518,512
Tier 3	139,657	170,516	166,350	252,301	477,474	1,237,880	2,738,193	2,179,647	1,868,938	742,999	197,646	190,255
Total	2,258,101	2,453,355	2,513,540	2,910,026	3,640,553	4,981,454	7,208,084	6,562,266	6,114,179	4,131,736	2,682,010	2,425,033

Lifeline	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Tier 1	196,931	204,754	204,073	213,513	229,476	248,077	289,184	289,666	283,363	248,497	213,296	196,935
Tier 2	48,838	55,412	55,592	66,085	95,450	150,345	265,411	254,518	218,542	129,672	66,906	51,408
Tier 3	13,527	39,806	22,225	11,445	21,356	91,510	257,041	201,497	176,650	51,151	21,876	33,195
Total	259,296	299,972	281,891	291,043	346,282	489,932	811,636	745,681	678,555	429,320	302,078	281,538

Class Groupings	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Commercial and Industrial	752,871	795,726	746,771	998,411	986,930	1,291,180	1,576,797	1,612,986	1,311,967	993,508	564,182	969,751
Commercial Irrigation and Government	176,994	78,774	149,890	111,604	394,855	465,413	565,928	431,674	514,028	293,891	95,976	93,645
School	18,069	33,774	38,220	53,567	161,313	206,655	454,983	456,862	385,583	302,526	72,592	24,974

11 APPENDIX C: FY 2017 PROJECTED USAGE ANALYSIS TIER AND CLASS

SFR	Total	Absolute Max	Coincidental Max	Average	Peak Calc
Tier 1	23,204,573	2,196,620	2,196,620	1,933,714	1.14
Tier 2	14,313,908	2,273,271	2,273,271	1,192,826	1.91
Tier 3	10,361,855	2,738,193	2,738,193	863,488	3.17
Total	47,880,336	7,208,084	7,208,084	3,990,028	1.81

Lifeline	Total	Absolute Max	Coincidental Max	Average	Peak Calc
Tier 1	2,817,766	289,666	289,184	234,814	1.23
Tier 2	1,458,180	265,411	265,411	121,515	2.18
Tier 3	941,279	257,041	257,041	78,440	3.28
Total	5,217,225	811,636	811,636	434,769	1.87

Class Groupings	Total	Absolute Max	Coincidental Max	Average	Peak Calc
Commercial and Industrial	12,601,080	1,612,986	1,576,797	1,050,090	1.54
Commercial Irrigation and Government	3,372,674	565,928	565,928	281,056	2.01
School	2,209,118	456,862	454,983	184,093	2.48

12 APPENDIX D: REVENUE PROOF OF VARIABLE RATES

Customer Class	Proposed Rate ($/ hcf)	Usage (cf)	Usage (hcf)	Revenue From Proposed Rates
Lifeline Tier 1	$1.53	2,817,766	28,178	$43,112
Lifeline Tier 2	$2.20	1,458,180	14,582	$32,080
Lifeline Tier 3	$2.76	941,279	9,413	$25,979
Residential Tier 1	$1.92	23,204,573	232,046	$445,528
Residential Tier 2	$2.20	14,313,908	143,139	$314,906
Residential Tier 3	$2.76	10,361,855	103,619	$285,987
MFR & Mobile	$2.03	7,545,483	75,455	$153,173
Commercial and Industrial	$2.07	12,601,080	126,011	$260,842
Commercial Irrigation and Gov	$2.26	3,372,674	33,727	$76,222
School	$2.42	2,209,118	22,091	$53,461
Total		**78,825,915**		**$1,691,291**
COS Amount				$1,684,647