ALAMEDA COUNTY WATER DISTRICT

2018 Water Rate Update Study

Final Report / December 7, 2018

RAFTELIS

ACWD
ALAMEDA COUNTY WATER DISTRICT

RAFTELIS

December 7, 2018

Jon Wunderlich
Manager of Finance
Alameda County Water District
43885 S. Grimmer Blvd.
Fremont, CA 94538

Subject: 2018 Water Rate Study Update Report

Dear Mr. Wunderlich,

Raftelis is pleased to provide this 2018 Water Rate Update Study Report (Report) for the Alameda County Water District (District). The contents of this Report include the updated five-year financial plan for the District for fiscal year (FY) 2018/19 to FY 2022/23 and the calculated water rates for FY 2018/19 and FY 2019/20.

The major objectives of the study include the following:

- Update the District's five-year financial plan to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding to meet debt obligations and fund necessary capital expenditures;
- Calculate updated water rates for FY 2018/19 and FY 2019/20; and
- Develop water shortage emergency stage rates for FY 2018/19 and FY 2019/20 to ensure collection of sufficient revenues during periods of reduced water demand due to potential drought or other water shortage emergencies.

This Report summarizes the key findings and recommendations related to the development of the financial plan, the associated water rates, and the newly proposed water shortage emergency stage rates. It has been a pleasure working with you, and we thank you, Michael Yee, Martin Koran, and other District staff for the support provided during this study.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.

Sanjay Gaur
Vice President

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Table of Contents

1. Executive Summary....1
1.1. Background of the Study....1
1.2. Financial Plan Development....2
1.3. Proposed Two-Year Water Rates....3
1.4. Proposed Two-Year Water Shortage Emergency Stage Rates....5
2. Introduction....7
2.1. Background of the Study....7
2.2. Key Information Used in the Study....9
2.3. Key Assumptions Used in the Study....9
3. Legal Framework and Rate Setting Methodology....11
3.1. California Constitution – Article XIII D, Section 6 (Proposition 218)....11
3.2. California Constitution – Article X, Section 2....11
3.3. Cost-Based Rate-Setting Methodology....11
4. Financial Plan Development....14
4.1. Water Revenue Requirements....14
4.1.1. Revenues From Current Rates....14
4.1.2. Miscellaneous Revenues....16
4.1.3. O&M Expenses....16
4.1.4. Debt Service Obligations....19
4.1.5. Capital Improvement Program....20
4.2. Water Financial Plan....21
4.2.1. Status Quo Financial Plan (No Revenue Increase)....21
4.2.2. Proposed Financial Plan....24
5. Proposed Water Rates & Customer Impact Analysis....29
5.1. Proposed Water Rates....29
5.2. Customer Impact Analysis....29
6. Water Shortage Emergency Stage Rates....32
6.1. Water Shortage Emergency Stage Rates Background....32
6.2. Derivation of FY 2018/19 Unit Stage Rates....33

6.3. Proposed Water Shortage Emergency Stage Rates 34
6.4. Process for Activating Water Shortage Emergency Stage Rates 35
6.5. Water Shortage Emergency Stage Rates Customer Impact Analysis 36

List of Tables

Table 1-1: Pension/OPEB Advance Funding and Revenue Adjustments 2
Table 1-2: Proposed Water Rates for FY 2018/19 and FY 2019/20 4
Table 1-3: Proposed Stage Rates for FY 2018/19 and FY 2019/20 6
Table 2-1: Cost Escalation Factors 9
Table 2-2: Projected New Accounts 10
Table 2-3: Billed Demand 5-Year Forecast 10
Table 4-1: Current Bimonthly Meter Service Charges and Projected 5-Year Service Connections 14
Table 4-2: Projected Revenues from Current Consumption Charges 15
Table 4-3: Projected Revenues from Current Water Rates 15
Table 4-4: Projected Miscellaneous Revenues 16
Table 4-5: Water Supply Information and Unit Cost 17
Table 4-6: Water Supply All-In Costs 18
Table 4-7: CalPERS/OPEB Liabilities Advance Funding 19
Table 4-8: Budgeted and Projected Water O&M Expenses 19
Table 4-9: Annual Debt Service 20
Table 4-10: Status Quo Financial Plan 23
Table 4-11: Changes in Revenue Requirements for FY 2018/19 and FY 2019/20 24
Table 4-12: Proposed 5-Year Revenue Adjustments 25
Table 4-13: Proposed Financial Plan 26
Table 5-1: Proposed Water Rates for FY 2018/19 and FY 2019/20 29
Table 6-1: Water Shortage Emergency Stages and Usage Reductions (FY 2018/19) 32
Table 6-2: Projected Consumption Charge Revenue by Stage 33
Table 6-3: Projected Variable Water Supply Cost Savings by Stage 34
Table 6-4: Derivation of Unit Stage Rates 34
Table 6-5: Proposed Stage Rates for FY 2018/19 and FY 2019/20 35

List of Figures

Figure 1-1: Water Supply Sources in a Typical Year 1
Figure 1-2: Projected Water Debt Coverage Ratios 3
Figure 1-3: Projected General Fund (GF) Ending Balances 3

Figure 1-4: SFR Customer Bill Impact Analysis 5
Figure 2-1: Water Supply Sources in a Typical Year 7
Figure 4-1: Projected Capital Expenditures and Funding Sources 21
Figure 4-2: Water Operating Financial Plan 27
Figure 4-3: Projected Debt Coverage Ratios under Proposed Revenue Adjustments 28
Figure 4-4: Projected General Fund Ending Balances 28
Figure 5-1: Single Family Customer Bill Impact Analysis 30
Figure 5-2: Customer Bill Impact Analysis 31
Figure 6-1: Sample FY 2018/19 SFR Bimonthly Bills with Stage 2 Water Shortage 37

List of Appendices

APPENDIX A: ACWD 2017 Water Rate Update Study Report
APPENDIX B: ACWD 2015 Water Rate Study Report

Glossary

Terms	Descriptions
AF	Acre foot / Acre feet, 1 AF = 435.6 CCF
AWWA	American Water Works Association
CCF	Centum Cubic Feet = 100 cubic feet = 748 gallons = 1 unit
CIP	Capital Improvement Plan
COS	Cost of Service
EMU	Equivalent Meter Unit
FPM	Financial Plan Model
FY	Fiscal Year (July 1 – June 30)
FIF	Facilities Improvement Fund
GF	General Fund
IRP	Integrated Resource Plan
M1 Manual	"Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1", 6th edition published by AWWA
MD	Max Day Peaking Factor
MFR	Multi-Family Residential
MGD	Million Gallons per Day, 1 MGD = 1,120 AF/year
MH	Max Hour Peaking Factor
OPEB	Other Postemployment Benefits
O&M	Operations and Maintenance
PAYGO	Pay-As-You-Go CIP
R&R	Replacement and refurbishment
RFC	Raftelis Financial Consultants, Inc.
SFPUC	San Francisco Public Utilities Commission
SFR	Single Family Residential
SWP	State Water Project
UWMP	Urban Water Management Plan
WTP	Water Treatment Plant

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1. Executive Summary

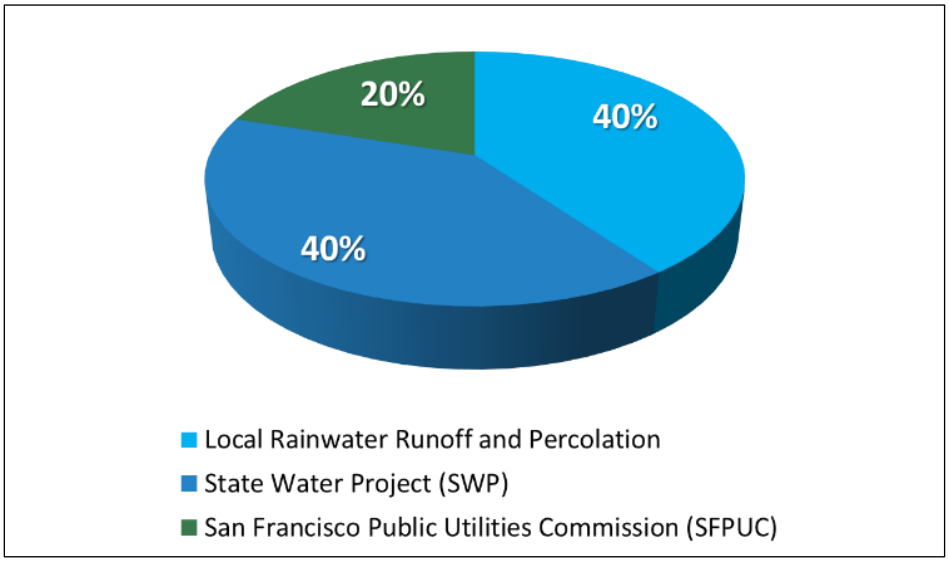
1.1. Background of the Study

The Alameda County Water District (ACWD or District) provides water services to more than 356,000 residents through more than 84,000 water meter connections in Fremont, Union City, Newark, and the southern portion of Hayward. The District operates and maintains approximately 900 miles of transmission and distribution pipelines, 13 reservoirs and tanks, a surface water treatment facility with 26.0 million gallons per day (MGD) capacity (another surface water treatment facility with 4.0 MGD capacity was temporarily decommissioned due to lower water demands as a result of the drought), a desalination facility with 12.5 MGD capacity, and a blending facility with 48.0 MGD capacity.

The District currently has three primary sources of water supply:

- San Francisco Public Utilities Commission (SFPUC)
- Local rainwater runoff and percolation
- The State Water Project (SWP)

Figure 1-1: Water Supply Sources in a Typical Year



The District recently emerged from a period of financial challenges resulting primarily from the effects of the recent California drought. Water demand dropped from 40.5 MGD in FY 2013/14 to 31.9 MGD in FY 2016/17, which then increased to approximately 34.0 MGD in FY 2017/18. The reduction in water demand from pre-drought levels has significantly reduced revenues from the District's consumption charges. Based on direction from District staff, this Study assumes level demand of 34.0 MGD throughout the Study period in recognition of the fact that water consumption is highly unlikely to increase to pre-drought levels as a result of recent conservation efforts and changes in water use habits. Other key factors influencing this Study include additional advance funding of pension and other post-employment benefits (OPEB), additional expenses related to Los Vaqueros Reservoir and the California WaterFix, and significant capital expenditures for the implementation of advanced metering infrastructure (AMI).

The District engaged Raftelis Financial Consultants, Inc. (Raftelis) to provide analytical support necessary to conduct an update of the District's five-year financial plan and develop a two-year water rate schedule. District

staff used the existing Financial Plan Model (FPM) developed for the 2015 Water Rate Study (see Appendix B) and updated for the 2017 Water Rate Update Study (see Appendix A) to update the FPM's assumptions and data inputs to generate the financial plan results presented in this Study. Raftelis provided assistance in updating the financial plan and additionally developed new uniform (per unit of consumption) water shortage emergency stage rates for implementation in FY 2018/19 to ensure sufficient rate revenue recovery in periods of reduced water sales due to potential drought or other water shortage emergencies. The major objectives of the Study include the following:

1. Develop a five-year financial plan to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding for debt obligations and capital replacement and refurbishment (R&R) needs;
2. Calculate proposed water rates for FY 2018/19 and FY 2019/20 in a way that is consistent with District policies, that complies with general "cost of service" principles, and that is in compliance with Proposition 218 requirements;
3. Develop water shortage emergency stage rates for FY 2018/19 and FY 2019/20 to ensure collection of sufficient revenues during periods of reduced water demand due to drought and/or other factors affecting water supply availability; and,
4. Conduct customer impact analysis for the proposed rates.

1.2. Financial Plan Development

This Study utilized the existing FPM developed by Raftelis and used in the District's 2015 Water Rate Study and 2017 Water Rate Update Study. The FPM was updated by District staff with the most recent financial information available at the time of analysis, including the FY 2018/19 amended budget, June 2018 Board adopted capital improvement plan (CIP), updated water supply costs along with 5-year billed water demand forecast, and revised assumptions associated with cost escalations, projected account growth, and CalPERS pension/OPEB advance funding options.

In the absence of any rate adjustments or new debt issuances in FY 2018/19 and FY 2019/29, the District is projected to have a cumulative two-year deficit of approximately $24.3 M. The FPM was utilized to help the District identify appropriate revenue adjustments and new debt issuances required over the Study period to generate sufficient water revenues to meet the District's short-term and long-term obligations and to avoid significant rate fluctuations. The FPM was also used to evaluate the level of revenues that will maintain appropriate reserves and provide adequate debt service coverage. During a public District Board workshop on October 25, 2018, the District Board of Directors provided input to District staff and Raftelis to consider a revenue adjustment of 4% in FY 2018/19 and 4% in FY 2019/20. To prevent the need more significant rate fluctuations, the Board also provided input to consider using $14.5M in new debt proceeds to help fund CIP expenditures in FY 2019/20. The planned level of advance Pension/OPEB funding and two-year revenue adjustments consistent with the Board's input are shown below in Table 1-1.

Table 1-1: Pension/OPEB Advance Funding and Revenue Adjustments

Fiscal Year	Pension / OPEB Advance Funding $	Revenue Adjustments
FY 2018/19	$8,152,000	4.0%
FY 2019/20	$7,192,000	4.0%

Under the proposed financial plan, the District will maintain debt coverage of at least 200%, which will help the District to maintain its current credit rating as shown in Figure 1-2 and to meet General Fund reserve targets as

shown in Figure 1-3. The financial plan as proposed intends to minimize the need for significant rate increases while ensuring financial sufficiency.

Figure 1-2: Projected Water Debt Coverage Ratios

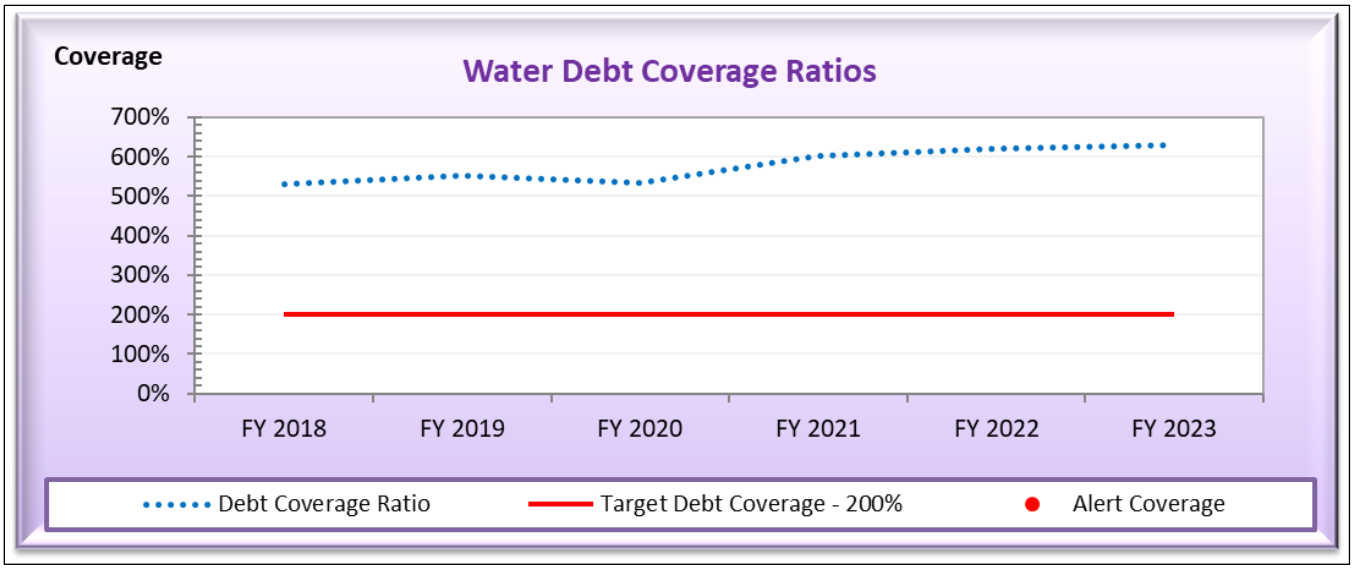
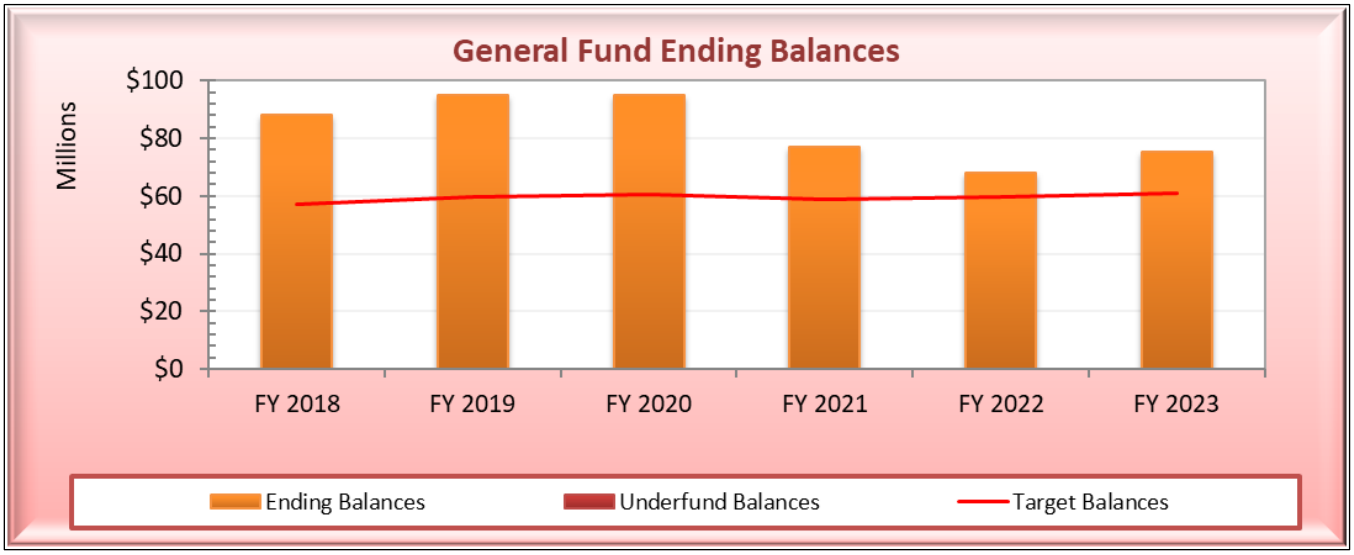


Figure 1-3: Projected General Fund (GF) Ending Balances



1.3. Proposed Two-Year Water Rates

Government Code §54999.7(c) requires that water and wastewater agencies must conduct a cost of service study a minimum of every 10 years. The District conducted a comprehensive cost of service rate study for its water service in 2015 and documented the results and findings in its 2015 Water Rate Study Report (see Appendix B). This Study focuses on updating the financial plan to incorporate the latest financial information and cost projections for the next five years. The revenue adjustments recommended in the financial plan were applied across current rates proportionately to calculate the proposed rates for FY 2018/19 and FY 2019/20. Table 1-2 shows the proposed water rates for FY 2018/19 and FY 2019/20. Note that Outside District consumption charges are assessed to 24 accounts located just north of the District's service area. These Outside District customers do not contribute to

collected property tax within the District and therefore are assessed a higher consumption charge per hundred cubic feet (CCF) of water delivered to help compensate for this.

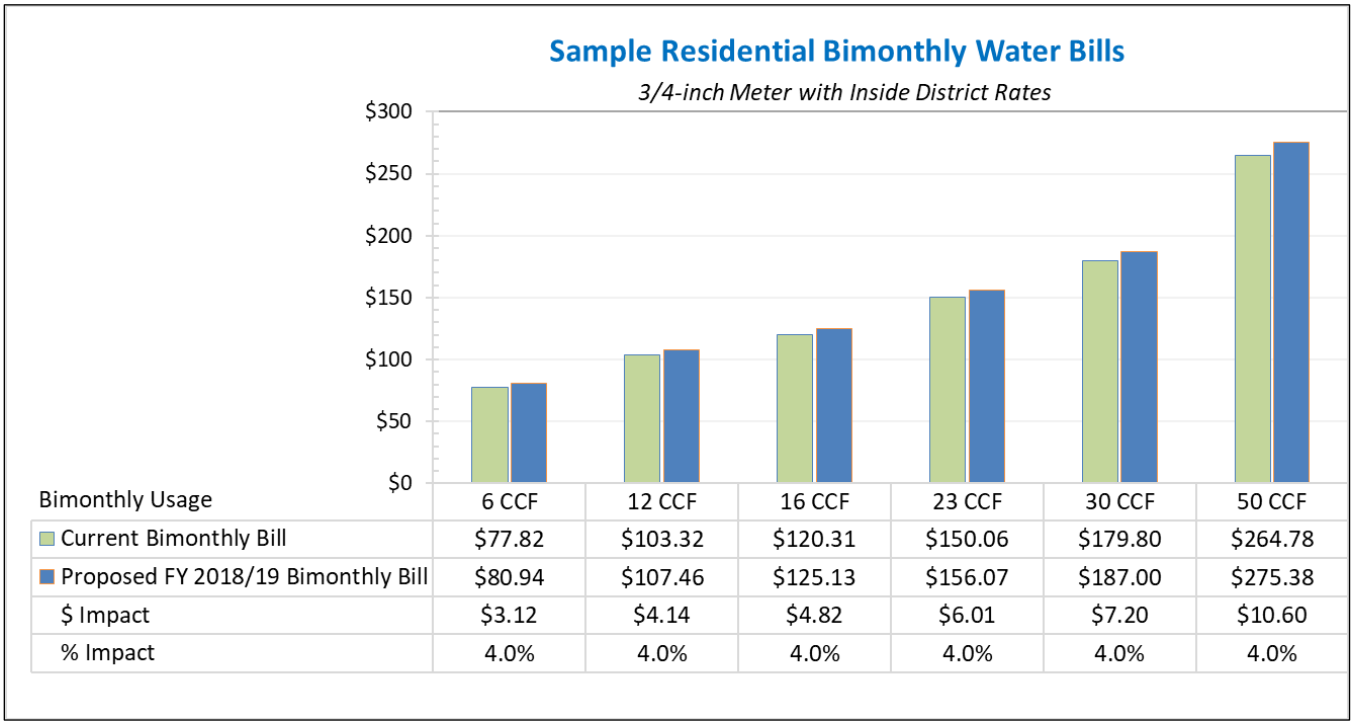
Table 1-2: Proposed Water Rates for FY 2018/19 and FY 2019/20[1]

	Current	FY 2018/19	FY 2019/20
Effective Date	**March 1, 2018**	**March 1, 2019**	**March 1, 2020**
Proposed Revenue Adjustments		**4.0%**	**4.0%**
Bimonthly Meter Service Charge			
5/8-inch	$52.33	$54.43	$56.61
3/4-inch	$52.33	$54.43	$56.61
1-inch	$80.70	$83.93	$87.29
1 1/2-inch	$151.59	$157.66	$163.97
2-inch	$236.67	$246.14	$255.99
3-inch	$506.08	$526.33	$547.39
4-inch	$903.11	$939.24	$976.81
6-inch	$2,278.54	$2,369.69	$2,464.48
8-inch	$3,980.09	$4,139.30	$4,304.88
10-inch	$5,965.22	$6,203.83	$6,451.99
Consumption Charge			
Inside District	$4.249 / CCF	$4.419 / CCF	$4.596 / CCF
Outside District	$4.885 / CCF	$5.081 / CCF	$5.285 / CCF

Before implementing any rate structure recommendations, it is important to understand how the proposed rate structure would impact the District's customers. Figure 1-4 shows the water bills of a typical Single Family Residential customer with ¾" meter for bimonthly billing period at various water consumption levels under current and proposed FY 2018/19 rates. The bimonthly water bills under the current rates are illustrated by the green bars and the bimonthly water bills assuming the proposed FY 2018/19 rates are shown by the blue bars in Figure 1-4.

[1] Rates are rounded up to the nearest $0.01 for bimonthly meter services charges and $0.001 for consumption charges

Figure 1-4: SFR Customer Bill Impact Analysis



Bimonthly Usage	6 CCF	12 CCF	16 CCF	23 CCF	30 CCF	50 CCF
Current Bimonthly Bill	$77.82	$103.32	$120.31	$150.06	$179.80	$264.78
Proposed FY 2018/19 Bimonthly Bill	$80.94	$107.46	$125.13	$156.07	$187.00	$275.38
$ Impact	$3.12	$4.14	$4.82	$6.01	$7.20	$10.60
% Impact	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%

1.4. Proposed Two-Year Water Shortage Emergency Stage Rates

The District Board provided input to Raftelis to develop water shortage emergency stage rates to be implemented during declared water shortage emergencies. Water shortage emergencies can have significant impacts on an agency's financial stability. Therefore, water shortage emergency stage rates can function as a cohesive and fiscally sound response to drought, water supply interruptions from natural disasters, or other water shortage emergencies. Temporary stage rates are a mechanism to maintain revenue stability and achieve debt coverage requirements in the short term.

Raftelis developed uniform (per unit of consumption) water shortage emergency stage rates to be assessed per unit (CCF) of water delivered to customers during four different water shortage emergency stages. The percent reduction in water demand during each water shortage emergency stage was defined in the District's Water Shortage Contingency Plan in its most recent Urban Water Management Plan (UWMP) and is summarized below in Table 1-3. Note that Stage 0 represents normal status quo water supply conditions. During Stage 0, no unit stage rates are to be in effect. For Stage 1 through Stage 4 unit stage rates to become effective, each water shortage emergency stage must attain District Board adoption and customers must be given 30 days advance notice prior to implementation.

Table 1-3 shows the proposed water shortage emergency stage rates for FY 2018/19 and FY 2019/20. Each unit stage rate is designed to recover the anticipated reduction in net revenues during each water shortage emergency stage. The effective Inside District and Outside District consumption charges at each water shortage emergency stage are determined simply by adding the unit stage rate to the proposed consumption charges (from Table 1-2). This represents the effective dollar amount that each customer will be charged per CCF of water delivered during each stage.

Table 1-3: Proposed Stage Rates for FY 2018/19 and FY 2019/20[2]

Water Shortage Contingency Plan Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Water Sales (per Fiscal Year)	38,080 AF	34,272 AF	30,464 AF	26,656 AF	19,040 AF
FY 2018/19 (Effective March 1, 2019)					
Unit Stage Rate	$0.000 / CCF	$0.474 / CCF	$1.066 / CCF	$1.831 / CCF	$4.242 / CCF
Consumption Charge (Inside District)	$4.419 / CCF	$4.893 / CCF	$5.485 / CCF	$6.250 / CCF	$8.661 / CCF
Consumption Charge (Outside District)	$5.081 / CCF	$5.555 / CCF	$6.147 / CCF	$6.912 / CCF	$9.323 / CCF
FY 2019/20 (Effective March 1, 2020)					
Unit Stage Rate	$0.000 / CCF	$0.493 / CCF	$1.109 / CCF	$1.905 / CCF	$4.412 / CCF
Consumption Charge (Inside District)	$4.596 / CCF	$5.089 / CCF	$5.705 / CCF	$6.501 / CCF	$9.008 / CCF
Consumption Charge (Outside District)	$5.285 / CCF	$5.778 / CCF	$6.394 / CCF	$7.190 / CCF	$9.697 / CCF

[2] Unit Stage Rates are rounded up to the nearest $0.001.

2. Introduction

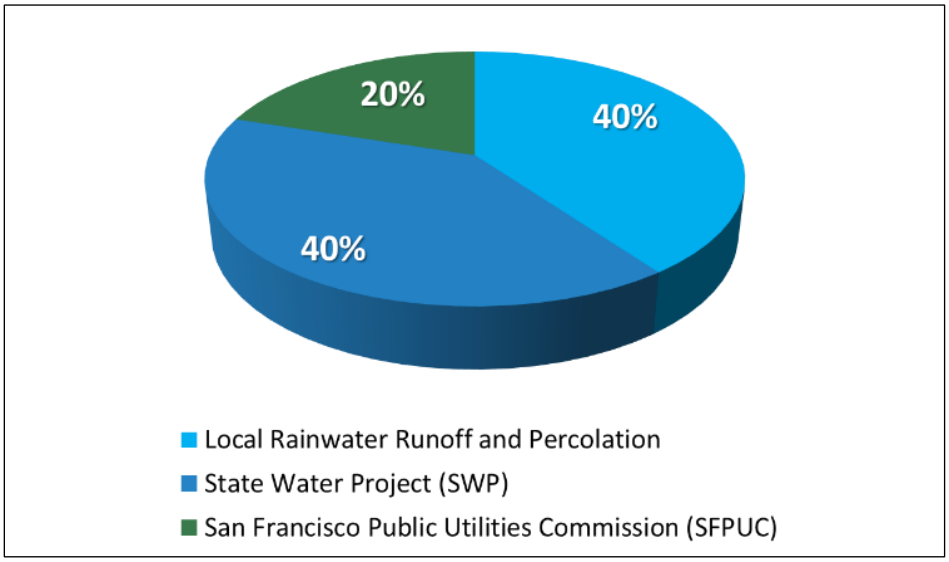
2.1. Background of the Study

The Alameda County Water District (ACWD or District) provides water services to more than 356,000 residents through more than 84,000 water meter connections in Fremont, Union City, Newark, and the southern portion of Hayward. The District operates and maintains approximately 900 miles of transmission and distribution pipeline system, 13 reservoirs and tanks, a surface water treatment facility with 26.0 million gallons per day (MGD) capacity (another surface water treatment facility with 4 MGD capacity was temporarily decommissioned due to lower water demands as a result of the drought), a desalination facility with 12.5 MGD capacity, and a blending facility with 48 MGD capacity.

The District currently has three primary sources of water supply:

- San Francisco Public Utilities Commission (SFPUC)
- Local rainwater runoff and percolation
- The State Water Project (SWP)

Figure 2-1: Water Supply Sources in a Typical Year



The SWP and SFPUC supplies are imported into the District service area through the South Bay Aqueduct and Hetch Hetchy Aqueduct, respectively. Local supplies include fresh groundwater from the Niles Cone Groundwater Basin (underlying the District service area), desalinated brackish groundwater from portions of the groundwater basin previously impacted by seawater intrusion, and surface water from the Del Valle Reservoir.

The primary source of recharge for the Niles Cone Groundwater Basin is from percolation of runoff from the Alameda Creek watershed. To a lesser degree, a portion of ACWD's SWP supplies are also used for local groundwater percolation. Infiltration of rainfall and applied water also contribute to local groundwater recharge.

Before being supplied to District customers, the source water supplies are treated to meet and surpass all state and federal drinking water standards. The District treats SWP and local surface water from Del Valle Reservoir at its surface water treatment plant. The Newark Desalination Facility treats brackish groundwater to remove salts and

other impurities, and the Blending Facility blends treated San Francisco water with local fresh groundwater (with higher hardness) to provide a blended supply with lower overall hardness.

It is the mission of the District to provide a reliable supply of high quality water at a reasonable price to our customers. To fulfill this mission, the District will:

- Provide prompt, courteous, and responsive customer service.
- Ensure that sound, responsible financial management practices are observed in the conduct of District business.
- Plan, design, and operate facilities efficiently, effectively and safely, bearing in mind the District's responsibility to be a good neighbor and a good steward of the environment.
- Promote ethical behavior in the conduct of District affairs and facilitate the public's involvement in the planning and development of District policy.
- Recruit and retain a qualified, productive workforce and maintain a workplace environment where diversity and excellence are valued and where creativity, teamwork, and open communication are actively encouraged.

The provision of clean, safe, and reliable drinking water is a capital and labor-intensive operation. To ensure that the District continues to fulfill its mission of providing a reliable supply of high quality water, it must provide consistent and on-going infrastructure operations and maintenance and assure the adequate management of its water resources, including the importation of water as needed.

The District recently emerged from a period of financial challenges resulting primarily from effects of the recent California drought. Water demand dropped from 40.5 MGD in FY 2013/14 to 31.94 MGD in FY 2016/17, which then increased to approximately 34.00 MGD in FY 2017/18. The reduction in water demand from pre-drought levels has significantly reduced revenues from the District's consumption charges. Based on direction from District staff, this Study assumes level demand of 34.00 MGD throughout the Study period in recognition of the fact that water consumption is highly unlikely to increase to pre-drought levels as a result of recent conservation efforts and changes in water use habits. Other key factors influencing the results of the five-year financial plan contained in this Study include additional advance funding of pension and other post-employment benefits (OPEB), additional expenses related to Los Vaqueros Reservoir and the California WaterFix, and significant capital expenses for the implementation of advanced metering infrastructure (AMI) in the District.

The District engaged Raftelis Financial Consultants, Inc. (Raftelis) to provide analytical support necessary to conduct an update of the District's five-year financial plan and two-year water rates. District staff used the existing Financial Plan Model (FPM) developed for the 2015 Water Rate Study (see Appendix B) and updated for the 2017 Water Rate Update Study (see Appendix A), and updated the FPM's assumptions and data inputs to generate the financial plan results presented in this Study. Raftelis provided assistance in updating the financial plan, and additionally developed new water shortage emergency stage rates for implementation in FY 2018/19 to ensure sufficient rate revenue recovery in periods of reduced water sales due to potential drought or other water shortage emergencies. The major objectives of the Study include the following:

1. Develop financial plans to ensure financial sufficiency, meet operation and maintenance (O&M) costs, ensure sufficient funding for debt obligations and capital replacement and refurbishment (R&R) needs;
2. Calculate proposed water rates in a way that is consistent with District policies, comply with general "cost of service" principles, and that is in compliance with Proposition 218 requirements;
3. Develop water shortage emergency stage rates to ensure collection of sufficient revenues during periods of reduced water demand due to drought and/or other factors affecting water supply availability; and
4. Conduct customer impact analysis for the proposed rates.

This Report provides an overview of the Study and includes findings and recommendations for the District's financial plan and water rates.

2.2. Key Information Used in the Study

The Study utilized the following key information provided by the District:

1. Amended FY 2018/19 Budget
2. Reserve Policy
3. June 2018 Board Adopted CIP
4. Water supply cost projections
5. Beginning fund balances as of July 1, 2018
6. Bimonthly billing data extracts for all water accounts in FY 2017/18
7. Advance payment of Pension/OPEB liabilities
8. Additional expenses related to the Los Vaqueros Reservoir
9. Additional expenses related to the California WaterFix
10. Adjustments to costs and revenue based on updated information

The updated financial plan utilizes the District's FY 2018/19 Amended Budget as the baseline for future projections, consistent with best practices. Final actual budget figures are typically not available at the time a study is conducted. Additional current data in relation to water demand revenue, water supply costs, and development activity are also included in the baseline. The Study is focused on the District's General Fund revenues and expenses and excludes the Facilities Improvement Fund expenses. The Facilities Improvement Fund supports growth related projects and is funded by Facilities Connection Charges instead of water rates.

2.3. Key Assumptions Used in the Study

The Study period is from FY 2018/19 to FY 2022/23. Various types of assumptions and inputs were incorporated into the Study based on directions from District staff. The cost escalation factors are shown in Table 2-1. The general inflation rate of 3% is based on a historical Consumer Price Index (CPI) range of 3-3.5%. SFPUC water cost increases are based on 2018 updates from the Bay Area Water Supply and Conservation Agency. State Water Project (SWP) rate adjustments are based on California Department of Water Resources (DWR) Bulletin 132-18 Appendix B. All other inflationary assumptions were determined based on union negotiations, historical increases in the expenses, actuarial reports, and District staff estimates.

Table 2-1: Cost Escalation Factors

Inflationary Category	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
General	3.00%	3.00%	3.00%	3.00%
Salary	3.00%	3.00%	3.00%	3.00%
Benefits	4.00%	4.00%	4.00%	4.00%
Medical	7.50%	7.25%	7.00%	6.75%
OPEB	3.00%	3.00%	3.00%	3.00%
Utilities	5.00%	5.00%	5.00%	5.00%
SFPUC Water Cost	0.00%	0.00%	0.00%	9.00%
SWP Water Cost	-11.08%	2.88%	1.07%	-6.34%

Table 2-2 shows ACWD staff's estimates of new water service accounts to be added to the District system for the Study period. The number of new accounts shown for FY 2018/19 are based on the District's budget forecast.

Note that the increase in 5/8" meters represents Multi-Family Residential (MFR) growth, the increase in 1" meters represents Single Family Residential (SFR) growth, and the increase in 2" meters represents all other non-residential growth.[3] For FY 2018/19 through FY 2022/23, it is assumed that the district will add 639 accounts per fiscal year.

Table 2-2: Projected New Accounts[4]

Meter Size	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
5/8-inch	577	460	460	460	460
1-inch	104	155	155	155	155
2-inch	10	24	24	24	24
Total	**691**	**639**	**639**	**639**	**639**

Table 2-3 shows the five-year demand forecast prepared by ACWD staff in both MGD and CCF. Although an increase in water usage occurred in FY 2016/17 and FY 2017/18 as the recent drought receded, a level demand of 34.0 MGD is anticipated throughout the Study period for financial planning purposes. This reflects the effect of recent conservation efforts and changes in water consumption habits.

Table 2-3: Billed Demand 5-Year Forecast

Description	FY 2016/17 Actual	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
Billed Demand (MGD)	31.94	34.00	34.00	34.00	34.00	34.00	34.00
Billed Demand (CCF)[5]	15,582,632	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648
% Change	12.2%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%

[3] The increase in 2" meters specifically represents non-residential growth of all meter sizes in 2" meter equivalents.
[4] Note that in all report tables, totals may not add up precisely due to rounding.
[5] 1 MGD = 1,120 AFY, 1AFY = 435.6 CCF/year → 1 MGD = 487,872 CCF/year.

3. Legal Framework and Rate Setting Methodology

3.1. California Constitution – Article XIII D, Section 6 (Proposition 218)

Proposition 218 added Article XIII C and XIII D to the California Constitution and 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 set forth in Article XIII D and are as follows:

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

As stated in AWWA's *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1*, 6th edition *(M1 Manual)*, "water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." Proposition 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 the costs and the rates charged. Raftelis follows industry standard rate setting methodologies set forth by the *M1 Manual* to ensure this study meets Proposition 218 requirements and develops rates that do not exceed the proportionate cost of providing water services.

3.2. California Constitution – Article X, Section 2

Article X, Section 2 of the California Constitution (established in 1976) states in part the following:

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

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

3.3. Cost-Based Rate-Setting Methodology

As stated in the *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.

Calculate Revenue Requirement

The rate-making process starts by determining the test year (rate setting year) revenue requirement. The revenue requirement should sufficiently fund the utility's O&M, debt service, capital expenses and other identified costs with funding to reserves (positive cash) or using reserves (negative cash), all based on a long-term financial plan.

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. Functionalize costs. Examples of functions are supply, treatment, transmission, distribution, storage, meter servicing, and customer billing and collection.
2. Allocate functionalized costs to cost causation components. Cost causation components include base, maximum day, maximum hour[6], conservation, public fire protection, meter service, and customer servicing and billing costs.
3. Distribute the cost causation 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.

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[7]). 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.

Rate 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 promoting water 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.

Rate Adoption

Rate adoption is the last step of the rate-making process to comply with Proposition 218. Raftelis documents the rate study results in this study report to serve as the utility's administrative record and a public education tool about the proposed changes, the rationale and justifications behind the changes, and their anticipated financial impacts in lay terms.

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

[7] 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 relative demands during the peak month, day, and hour event.

Government Code §54999.7(c) requires that water and wastewater agencies must conduct a cost of service study a minimum of every 10 years. The District already conducted a comprehensive cost of service rate study for its water service in 2015 and documented the results and findings in the "Alameda County Water District 2015 Water Rate Study Report" dated March 23, 2015 (see Appendix B). As the District is retaining the same uniform rate structure and because a cost of service study was conducted for the District as recently as 2015, an updated cost of service study is not needed at this time. Rather, this Study focuses on the financial plan development to incorporate the latest financial information and cost projections for the next five years. The proposed revenue adjustments resulting from the financial plan are applied across all categories of the current rates to calculate the proposed rates for FY 2018/19 and FY 2019/20.

4. Financial Plan Development

4.1. Water Revenue Requirements

4.1.1. REVENUES FROM CURRENT RATES

The current water rates were determined in the 2017 Water Rate Update Study (see Appendix A) and became effective on March 1, 2018. Water service customers currently pay bimonthly service charges based on meter size, shown in Table 4-1, and consumption charges for all water usage, shown in Table 4-2. Table 4-1 also shows the projected number of service connections by customer class for the Study period. The projected number of service connections were provided by ACWD staff and include an estimated 639 new connections in 5/8", 1", and 2" meters per year from FY 2019/2020 through the end of the Study period (from Table 2-2).

Additionally, the District plans to implement a new residential fire line policy on March 1, 2019 when the proposed FY 2018/19 water rates are anticipated to become effective. The current residential fire line policy states that all residential fire line accounts shall be billed based on the smallest meter (but not less than 1") that could provide adequate service absent the fire sprinkler system. Under the current policy, all 1 ½" residential fire line accounts are billed at the 1" meter rate.

The proposed residential fire line policy states that all residential fire line accounts shall be billed based on the smallest meter capable of providing adequate service absent the fire sprinkler system. Under the proposed policy, 1,618 residential fire line accounts with a 1 ½" meter will be billed at the 5/8" and 3/4" rate (based on the number of fixtures and lot size). All other residential fire line accounts will be billed at the rate of the next smallest meter. Changes in the number of 3/4", 1", and 1 ½" Fire Line accounts between FY 2018/19 and FY 2019/20 as shown in Table 4-1 reflect the implementation of the new residential fire line policy. District staff estimates that implementation of the new residential fire line policy will reduce revenues from bimonthly meter service charges by approximately $1.2 million annually.

Table 4-1: Current Bimonthly Meter Service Charges and Projected 5-Year Service Connections

Meter Size	FY 2016/17 Rates	Current Rates	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
5/8-inch	$49.84	$52.33	24,314	24,891	25,351	25,811	26,271	26,731
3/4-inch	$49.84	$52.33	42,050	42,050	49,348	49,348	49,348	49,348
1-inch	$76.86	$80.70	10,837	10,941	5,416	5,571	5,726	5,881
1 1/2-inch Fire Line	$76.86	$80.70	2,085	2,085	467	467	467	467
1 1/2-inch	$144.38	$151.59	1,759	1,759	1,759	1,759	1,759	1,759
2-inch	$225.40	$236.67	2,814	2,824	2,848	2,872	2,896	2,920
3-inch	$481.99	$506.08	216	216	216	216	216	216
4-inch	$860.11	$903.11	102	102	102	102	102	102
6-inch	$2,170.04	$2,278.54	51	51	51	51	51	51
8-inch	$3,790.57	$3,980.09	24	24	24	24	24	24
10-inch	$5,681.17	$5,965.22	3	3	3	3	3	3
Total			**84,255**	**84,946**	**85,585**	**86,224**	**86,863**	**87,502**

Revenues from current consumption charges are calculated using projected bill demand in CCF (previously shown in Table 2-3) multiplied by the current consumption charge of $4.249/CCF. The projected current revenue represents the projected amount of revenue that the District would collect from consumption charges throughout the Study period in the absence of any proposed rate increases. Note that the consumption charge revenue in FY 2017/18 ($68,247,113) accounts for the fact that previous FY 2016/17 rates were in effect for eight months of FY 2017/18.

Table 4-2: Projected Revenues from Current Consumption Charges

Line #	Description	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
1	Billed Demand (CCF)	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648
2	Current Consumption Charge ($/CCF)	$4.047/$4.249[8]	$4.249	$4.249	$4.249	$4.249	$4.249
3	**Projected Revenues** *[Line 1] x [Line 2]*	**$68,247,113**	**$70,480,916**	**$70,480,916**	**$70,480,916**	**$70,480,916**	**$70,480,916**

Table 4-3 summarizes the projected revenues from current rates. Annual service charges revenues are calculated using current bimonthly service charges and number of accounts (shown in Table 4-1) for six billing periods and for each meter size. The calculation for service charge revenues for ¾" meters in FY 2019/20 is shown below.

$$Bimonthly\ service\ charge \times number\ of\ accounts\ with\ 5/8"\ meter \times 6\ billing\ periods\ per\ year$$
$$\$52.33 \times 25{,}351\ accounts \times 6\ billing\ periods = \$7{,}959{,}707$$

This calculation is repeated for all meter sizes and then summed to arrive at the current service charges revenues as shown in Table 4-3, along with revenues from consumption charges calculated from Table 4-2. Note that FY 2017/18 service charge revenues account for the fact that the previous FY 2016/17 rates (shown in Table 4-1) were in effect for eight months of FY 2017/18. Additionally, the projected bimonthly service charge revenue in FY 2018/19 ($35,085,788 as shown in Table 4-3) is calculated as described above and then reduced by $435,877[9] to account for the FY 2018/19 fiscal effect of implementing the proposed residential fire line policy. Revenues from current rates under projected account growth and billed demand are forecast to increase from $102.4M in FY 2017/18 to $105.8M in FY 2022/23.

Table 4-3: Projected Revenues from Current Water Rates

Description	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
Service Charges	$34,156,795	$35,085,788	$34,532,962	$34,786,524	$35,040,086	$35,293,648
Consumption Charges	$68,247,113	$70,480,916	$70,480,916	$70,480,916	$70,480,916	$70,480,916
Total	**$102,403,908**	**$105,566,705**	**$105,013,878**	**$105,267,440**	**$105,521,003**	**$105,774,565**

[8] The calculation of consumption charge revenues in FY 2017/18 takes into account that current rates were effective for two bimonthly billing periods only. During the first four bimonthly billing periods of FY 2017/18, the previous consumption charge of $4.047 / CCF was in effect.

[9] Calculated by ACWD staff to account for the new residential fire line policy being in effect for four months (March-June) during FY 2018/19.

4.1.2. MISCELLANEOUS REVENUES

In addition to revenue from rates, the District also receives miscellaneous revenues from different sources such as property tax, other revenues (including other service charges such as turn on and turn off fees), interest revenues, etc. to offset the District's operating costs. These revenues are shown in Table 4-4.

In addition to the ad valorem property tax revenues received from the Alameda County Assessor (County), the District receives an override property tax amount that helps pay for the groundwater portion of both the fixed and variable costs of SWP water purchased by the District. The District projects such costs annually and requests that the County collect the projected amount. The annual request to the County is adjusted for prior year over or under collections of tax revenue, and actual prior year's State Water Project expenses. ACWD Staff assumes a property tax override of 67.7% of SWP expenses throughout the Study period.

Customer jobs revenues include payments made by developers for capital expenditures benefitting specific development projects. Other revenues include revenues from fire line service charges, backflow testing charges, account establishment charges, the buy-in component of facilities connection charges, fire flow testing, lease of property, scrap sales, sales of fixed assets, grants, reimbursements, licenses/permits, late bill payment fees, residential service line insurance, and other minor miscellaneous revenues.

Table 4-4: Projected Miscellaneous Revenues

Description	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
Groundwater Replenishment Revenues	$421,809	$458,506	$498,396	$541,757	$588,890	$640,123
State Water Contract Tax	$5,373,000	$4,132,528	$5,458,934	$5,487,987	$5,506,839	$5,537,957
Ad Valorem Property Tax (1%)	$5,161,421	$5,336,909	$5,518,364	$5,705,988	$5,899,992	$6,100,592
Interest revenues[10]	$1,315,788	$1,342,104	$1,899,767	$1,719,743	$1,452,583	$1,437,594
Customer Jobs Revenue	$4,800,496	$5,530,515	$3,605,000	$3,605,000	$3,605,000	$3,605,000
Other Revenues	$2,489,198	$9,133,048	$10,223,500	$8,691,239	$8,081,184	$7,001,251
Total	**$19,561,711**	**$25,933,610**	**$27,203,961**	**$25,751,715**	**$25,134,488**	**$24,322,517**

4.1.3. O&M EXPENSES

4.1.3.1. Water Supply Costs

The District currently has three primary sources of water supply:

- SFPUC
- Local rainwater runoff and percolation
- SWP

[10] Calculated based on available General Fund balances and an assumed 2% in annual interest earnings throughout the Study period.

These sources of water have varying amounts of availability and costs. Based on projections and inputs from District staff, the respective sources of water, per unit price, and expected purchase quantities are shown in Table 4-5.

The current water supply costs are summarized in the FY 2018/19 column in Table 4-5. The District has a minimum purchase obligation of 8,602 acre feet (AF) from SFPUC representing the annual "take or pay" contract with that source. It is assumed that the District will purchase the annual contractual minimum take of 8,602 AF from the SFPUC throughout the Study period. Next, the District uses a matching amount of 8,602 AF of groundwater and additional 8,470 AF from the District's desalination plant. Throughout the Study period, it is assumed that 2,000 AF of the 5,800 AF typically acquired from Lake Del Valle will be used for groundwater replenishment, which leaves 3,800 AF available to supply the District's customers. The remaining demand of up to 25,500 AF per year is assumed to be met by SWP water**.** Table 4-5 shows that only 11,918 AF of the available 25,500 AF SWP water supply will be required to meet annual demand throughout the Study period. Additionally, water supply unit costs are shown for each source in Table 4-5 below.

Table 4-5: Water Supply Information and Unit Cost

Description	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
Water Demand (MGD)	34.00	34.00	34.00	34.00	34.00	34.00
Water Demand (CCF)	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648	16,587,648
Non-Revenue Water	8%	8%	8%	8%	8%	8%
Total Production (CCF)	18,030,052	18,030,052	18,030,052	18,030,052	18,030,052	18,030,052
Total Production (AF)	41,391	41,391	41,391	41,391	41,391	41,391
Water Supply to Meet Water Demand (AF)						
SFPUC – Min	8,602	8,602	8,602	8,602	8,602	8,602
Groundwater - Min	8,602	8,602	8,602	8,602	8,602	8,602
Desal Water - Min	8,470	8,470	8,470	8,470	8,470	8,470
Lake Del Valle	3,800	3,800	3,800	3,800	3,800	3,800
SWP	11,918	11,918	11,918	11,918	11,918	11,918
Water Supply Unit Cost ($/AF)						
SFPUC – Min	$1,786	$1,786	$1,786	$1,786	$1,786	$1,947
Groundwater - Min	$122	$128	$135	$141	$148	$156
Desal Water - Min	$145	$146	$154	$161	$169	$178
Lake Del Valle	$0	$0	$0	$0	$0	$0
SWP	$57	$62	$55	$57	$58	$54
Desal Water - to Max	$145	$146	$154	$161	$169	$178
SFPUC - Max Limit	$1,786	$1,786	$1,786	$1,786	$1,786	$1,947
Groundwater - Max	$122	$128	$135	$141	$148	$156

The AF quantities for each source are multiplied by the corresponding unit price. The sum of the product of the price and quantity of each source, plus the fixed costs and other direct operating costs such as blending costs and treatment costs, equal the District's "total all-in water supply costs" for each fiscal year, as shown in Table 4-6. For the purposes of these calculations, ACWD staff assumes that there will be sufficient water supply from existing sources and therefore no supply reduction during the Study period. Additionally, the District is participating in a Semi-tropic water storage program with the SWP to create additional water storage for use during drought periods.

The annual costs for participation in the Semi-tropic storage project is approximately $1.0M annually and is also shown in Table 4-6 below.

Table 4-6: Water Supply All-In Costs

Description	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
SFPUC						
Fixed	$2,935,236	$2,935,236	$2,935,236	$2,935,236	$2,935,236	$2,935,236
Min	$15,362,114	$15,362,114	$15,362,114	$15,362,114	$15,362,114	$16,748,451
Max	$0	$0	$0	$0	$0	$0
Blending Cost	$363,302	$452,798	$466,382	$480,373	$494,784	$509,628
SWP or SBA						
Fixed	$7,457,396	$7,897,534	$8,060,418	$8,103,332	$8,131,179	$8,177,143
Variable	$684,302	$741,379	$659,208	$678,223	$685,510	$642,048
Treatment Cost	$911,056	$1,252,205	$1,289,771	$1,328,464	$1,368,318	$1,409,367
Groundwater						
Min	$1,050,685	$1,103,241	$1,158,403	$1,216,323	$1,277,140	$1,340,997
Max	$0	$0	$0	$0	$0	$0
Blending Cost	$363,302	$452,798	$466,382	$480,373	$494,784	$509,628
Desal Water						
Facility Operation	$764,810	$958,417	$987,169	$1,016,784	$1,047,288	$1,078,706
Min	$996,400	$1,221,314	$1,274,423	$1,329,950	$1,388,006	$1,448,713
Max	$0	$0	$0	$0	$0	$0
Lake Del Valle						
Water Cost	$0	$0	$0	$0	$0	$0
Treatment Cost	$290,483	$399,256	$411,234	$423,571	$436,278	$449,366
Semi-tropic						
Fixed	$979,500	$1,009,500	$1,039,785	$1,070,979	$1,103,108	$1,136,201
Total All-in Water Supply Costs	**$32,158,587**	**$33,785,791**	**$34,110,524**	**$34,425,722**	**$34,723,745**	**$36,385,484**
Incremental Increase ($)		$1,627,204	$324,733	$315,198	$298,023	$1,661,739
Incremental Increase (%)		5%	1%	1%	1%	5%

4.1.3.2. Advance CalPERS/OPEB Liabilities Funding

The District is planning to continue its advance funding of CalPERS pension and OPEB liabilities. The updated five-year financial plan presented in this Study includes advance funding of pension and OPEB unfunded liabilities assuming a discount rate of 6.5% and accelerated funding over a period of 15 years, beginning in FY 2017/18. Table 4-7 shows annual advance funding of pension and OPEB liabilities as determined by District staff. Note that although the CalPERS/OBEB liabilities advance funding shown in Table 4-7 decreases each year throughout the Study period, actuarially determined contributions increase. The actuarially determined contributions are required annual payments and are included as part of the Benefits & CalPERS (Line 3) and OPEB (Line 5) costs shown in Table 4-8. The actuarially determined contributions and advance funding amounts collectively represent a level contribution throughout the Study period that does not vary by year.

Table 4-7: CalPERS/OPEB Liabilities Advance Funding

Fiscal Year	CalPERS/OPEB Liabilities Advance Funding
FY 2018/19	$8,152,000
FY 2019/20	$7,192,000
FY 2020/21	$6,590,000
FY 2021/22	$5,963,000
FY 2022/23	$5,423,000

4.1.3.3. O&M Expenses

Table 4-8 summarizes budgeted and projected O&M expenses during the Study period. Table 4-8 shows water supply costs (Line 1) as determined in Table 4-6 and the cost of CalPERS pension/ OPEB advance funding (Line 7) as shown in Table 4-7. Other expenses in Lines 2-6 are projected based on the FY 2018/19 amended budget and forecasted using inflation factors previously defined in Table 2-1. Note that the CalPERS/OPEB costs for advance funding (Line 7) are in addition to CalPERS (Line 3) and OPEB (Line 5) costs already included in the District's O&M budget. Total expenses include incremental O&M expenses associated with Los Vaqueros Reservoir and California WaterFix.

Table 4-8: Budgeted and Projected Water O&M Expenses

Line #	Description	FY 2017/18 Actual	FY 2018/19 Projected	FY 2019/20 Projected	FY 2020/21 Projected	FY 2021/22 Projected	FY 2022/23 Projected
1	Water Supply Costs	$32,158,587	$33,785,791	$34,110,524	$34,425,722	$34,723,745	$36,385,484
2	Labor	$25,436,644	$26,606,185	$27,275,893	$28,093,477	$28,935,588	$29,802,963
3	Benefits & CalPERS	$9,709,089	$10,221,067	$12,800,964	$13,897,195	$14,556,331	$14,200,841
4	Medical	$6,297,733	$7,066,882	$7,567,123	$8,086,793	$8,624,831	$9,179,963
5	OPEB	$4,101,000	$3,503,000	$3,609,000	$3,719,000	$3,832,000	$3,948,000
6	Other O&M Costs	$8,896,654	$7,778,504	$8,977,969	$10,117,812	$10,566,482	$11,157,263
7	CalPERS / OPEB Advance Funding	$5,182,500	$8,152,000	$7,192,000	$6,590,000	$5,963,000	$5,423,000
8	**Total O&M**	**$91,782,207**	**$97,113,429**	**$101,533,473**	**$104,929,999**	**$107,201,977**	**$110,097,514**

4.1.4. DEBT SERVICE OBLIGATIONS

The District is currently obligated to annual debt service payments for three revenue bonds:

- 2009 Water System Refunding Revenue Bonds (2009 Bond);
- 2012 Revenue Bonds (2012 Bond); and
- 2015 Water System Revenue Bonds (2015 Bond)

The District issued the 2015 Water Revenue Bonds at an average interest rate of 3.4% and has used the $30 million of bond proceeds to execute critical capital projects including seismic hardening of major water mains and storage facilities, replacing aging infrastructure, improving water supply reliability, and improving water quality and production reliability. The annual debt service associated with the three existing revenue bonds is shown in Table 4-9.

Additionally, the District plans to fund 50% of AMI project costs in FY 2019/20 with an additional $14.8M bond issuance. This proposed debt issue assumes a 4% interest rate over 30 years. Available debt proceeds to fund AMI capital expenditures in FY 2019/20 are expected to equal $14.5M after accounting for assumed issuance costs of

2% of the total debt issuance. The newly proposed debt issuance is expected to result in annual debt service payments of $855,649. Total annual debt service throughout the Study period is shown in Table 4-9 and is determined by summing total current debt service and proposed debt service in each fiscal year.

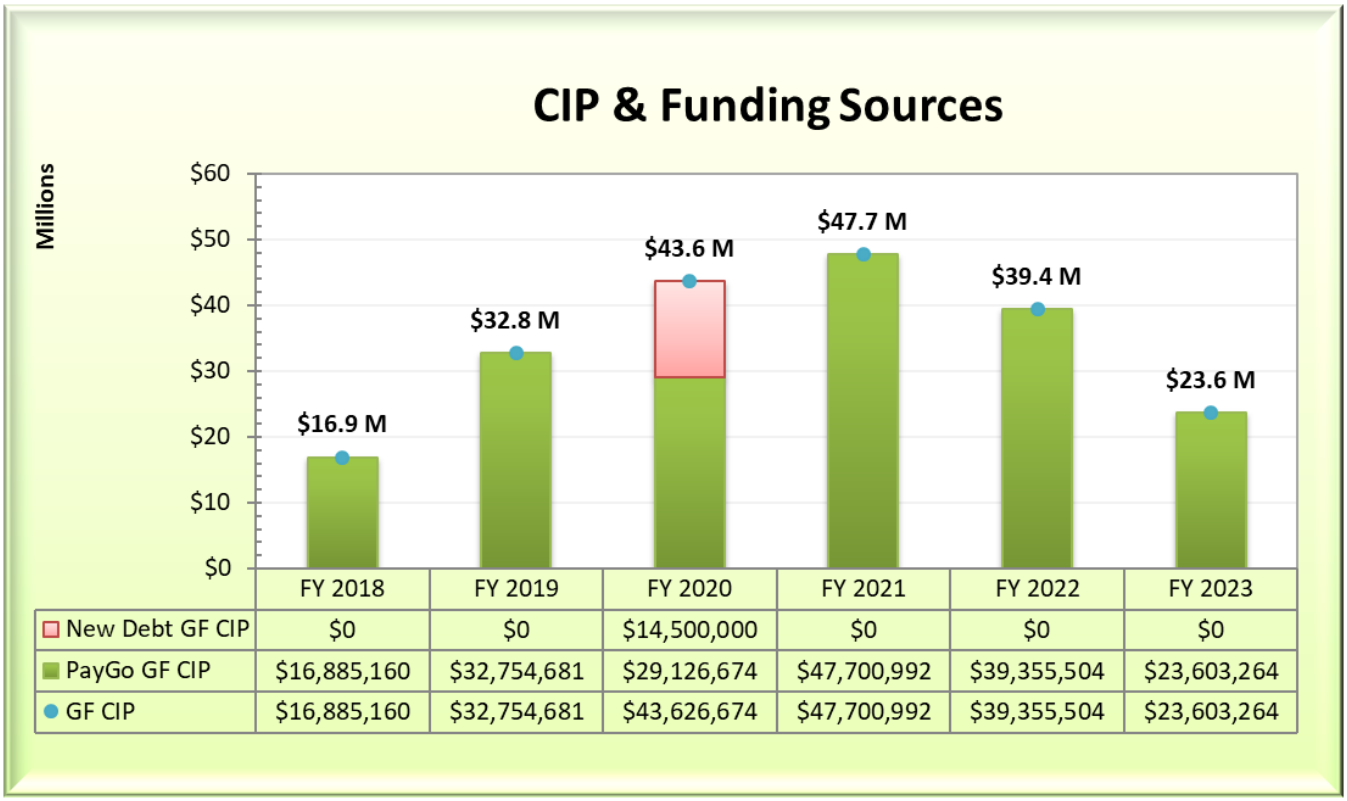
Table 4-9: Annual Debt Service

Description	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
Current Debt						
2009 Revenue Bonds	$2,863,700	$2,862,575	$2,866,875	$0	$0	$0
2012 Revenue Bonds	$1,886,681	$1,885,481	$1,883,881	$3,905,381	$3,853,631	$3,798,631
2015 Revenue Bonds	$1,622,900	$1,622,900	$1,626,650	$1,623,900	$1,624,900	$1,624,400
Total Current Debt	$6,373,281	$6,370,956	$6,377,406	$5,529,281	$5,478,531	$5,423,031
Proposed Debt	$0	$0	$855,649	$855,649	$855,649	$855,649
Total Debt Service	**$6,373,281**	**$6,370,956**	**$7,233,056**	**$6,384,931**	**$6,334,181**	**$6,278,681**

4.1.5. CAPITAL IMPROVEMENT PROGRAM

The District plans to finance its capital projects over the Study Period with the combination of PAYGO funding (shown in the green bars in Figure 4-1) and new debt proceeds (red bars). Figure 4-1 summarizes the projected capital expenditures to be funded by the General Fund during the Study period, as provided by the District. The $14.5M in new debt funding in FY 2019/20 (represented in Figure 4-1 by the red bar) is anticipated to fund 50% of the $29M in capital expenditures associated with the District's AMI project and is described in detail in Section 4.1.4 above. Please note that Figure 4-1 only shows capital expenditures associated with the General Fund and excludes CIP associated with the Facilities Improvement Fund, which is funded using Facilities Connection Charges.

Figure 4-1: Projected Capital Expenditures and Funding Sources



	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
New Debt GF CIP	$0	$0	$14,500,000	$0	$0	$0
PayGo GF CIP	$16,885,160	$32,754,681	$29,126,674	$47,700,992	$39,355,504	$23,603,264
GF CIP	$16,885,160	$32,754,681	$43,626,674	$47,700,992	$39,355,504	$23,603,264

4.2. Water Financial Plan

4.2.1. STATUS QUO FINANCIAL PLAN (NO REVENUE INCREASE)

This Study utilized the FPM developed by Raftelis and used in the District's 2015 Water Rate Study and 2017 Water Rate Update Study. The FPM was updated with the most recent financial information available at the time of analysis, including the FY 2018/19 amended budget, June 2018 Board Adopted CIP, updated water supply costs along with 5-year billed water demand forecast, and revised assumptions associated with cost escalations, projected account growth, and CalPERS pension/OPEB advance funding options (discussed in Section 4.1).

Table 4-10 displays the pro forma of the District's General Fund under current rates over the Study period without any revenue adjustment. All projections shown in the table are based upon the District's current rate structure. The pro forma combines the revenues from current rates (Table 4-3), miscellaneous revenues (Table 4-4), O&M expenses (Table 4-8), annual debt service payments (Table 4-9)[11], and General Fund capital expenditures (Figure 4-1) to project the debt coverage ratio and projected General Fund ending balances in each fiscal year throughout the Study period.

Under the "status-quo" Financial Plan scenario, summarized in Table 4-10, the General Fund will face significant negative net income[12] in each fiscal year over the Study period. Revenues generated from current rates and other miscellaneous revenues will be inadequate to sufficiently recover operating expenses, debt service, and PAYGO capital expenditures throughout the Study period, as shown by negative net cash balance in Table 4-10. Although

[11] The status quo financial plan includes current debt service only (i.e. excludes the proposed debt issuance in FY 2019/20.
[12] Net Income = Total Revenues – Total O&M Expenses.

the status quo financial plan results in the District exceeding its target debt coverage ratio of 200% in each fiscal year, the ending balance of the General Fund is projected to decrease from $93.6M in FY 2018/19 to $14.2M in FY 2022/23. This demonstrates that the District will clearly be unable to maintain fiscal sustainability and solvency under the current rates and shows the necessity for rate increases to ensure financial sufficiency.

Table 4-10: Status Quo Financial Plan

Description	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
REVENUES					
Revenues from Current Rates	$105,566,705	$105,013,878	$105,267,440	$105,521,003	$105,774,565
Revenue Adjustments	$0	$0	$0	$0	$0
GW Replenishment Rev	$458,506	$498,396	$541,757	$588,890	$640,123
State Water Contract Tax	$4,132,528	$5,458,934	$5,487,987	$5,506,839	$5,537,957
Ad Valorem Property Tax	$5,336,909	$5,518,364	$5,705,988	$5,899,992	$6,100,592
Interest Revenues[13]	$1,342,104	$1,676,371	$1,204,375	$706,544	$384,480
Customer Jobs Revenue	$5,530,515	$3,605,000	$3,605,000	$3,605,000	$3,605,000
Other Revenues	$9,133,048	$10,223,500	$8,691,239	$8,081,184	$7,001,251
TOTAL REVENUES	**$131,500,315**	**$131,994,443**	**$130,503,787**	**$129,909,452**	**$129,043,968**
EXPENSES					
Water Related Supply Costs	$33,785,791	$34,110,524	$34,425,722	$34,723,745	$36,385,484
CalPERS/OPEB Advance Funding	$8,152,000	$7,192,000	$6,590,000	$5,963,000	$5,423,000
Other O&M Expenses	$55,175,638	$60,230,949	$63,914,277	$66,515,232	$68,289,030
TOTAL EXPENSES	**$97,113,429**	**$101,533,473**	**$104,929,999**	**$107,201,977**	**$110,097,514**
NET REVENUES	**$34,386,886**	**$30,460,970**	**$25,573,788**	**$22,707,474**	**$18,946,454**
GF CIP EXPENDITURES					
PAYGO	$32,754,681	$43,626,674	$47,700,992	$39,355,504	$23,603,264
Existing Debt Financing	$0	$0	$0	$0	$0
New Debt Financing	$0	$0	$0	$0	$0
DEBT SERVICE					
Existing Debt Service	$6,370,956	$6,377,406	$5,529,281	$5,478,531	$5,423,031
New Debt Service	$0	$0	$0	$0	$0
TOTAL DEBT SERVICE	**$6,370,956**	**$6,377,406**	**$5,529,281**	**$5,478,531**	**$5,423,031**
NET GF CASH BALANCES	**($4,738,751)**	**($19,543,110)**	**($27,656,486)**	**($22,126,561)**	**($10,079,841)**
Beginning GF Balances	**$98,328,839**	**$93,590,088**	**$74,046,978**	**$46,390,492**	**$24,263,931**
Ending GF Balances	**$93,590,088**	**$74,046,978**	**$46,390,492**	**$24,263,931**	**$14,184,091**
Target GF Balances[14]	$59,430,955	$59,292,748	$56,489,264	$56,552,655	$56,616,045
Debt Coverage Ratio[15]	**530%**	**515%**	**505%**	**457%**	**393%**
Target Debt Coverage Ratios	200%	200%	200%	200%	200%

[13] Calculated based on available General Fund balances assuming no revenue adjustments. Note that interest revenues under the status quo are less than what is shown in Table 4-4 for the proposed financial plan (to be described in detail in the following subsection). This is because lower cash reserves are available for investment under the status quo.

[14] Based on the District's current financial policies for its O&M Reserve, Emergency Reserve, 2009 Debt Service Reserve, Management Retirement Bonus Reserve, Rate Stabilization Reserve, and Capital Reserve.

[15] Debt Coverage Ratio = (Net Revenues including Facilities Connection Charges – Customer Jobs Revenue + Interest Revenues (including Facilities Improvement Fund Interest Revenues)/ Total Debt Service.

4.2.2. PROPOSED FINANCIAL PLAN

The District's financial plan was prepared for a five-year Study period spanning from FY 2018/19 through FY 2022/23. However, Table 4-11 focuses on the financial plan for FY 2018/19 and FY 2019/20, corresponding with the two-year rates proposed in this Report. Table 4-11 shows the District's revenues in the absence of any revenue adjustments (see also Table 4-10) and shows the annual changes in revenue requirements for FY 2018/19 and FY 2019/20. The financial plan combines the revenues from current rates (Table 4-3), miscellaneous revenues (Table 4-4), O&M expenses (Table 4-8), annual debt service payments (Table 4-9) and General Fund capital expenditures (Figure 4-1).

Table 4-11: Changes in Revenue Requirements for FY 2018/19 and FY 2019/20

Description	FY 2018/19	FY 2019/20	2-year Total
Rate Revenues at Current Rates	$105,566,705	$105,013,878	$210,580,583
Revenue Adjustments	$0	$0	$0
Other Revenues	$25,933,610	$26,980,565	$52,914,175
Total Revenues	$131,500,315	$131,994,443	$263,494,758
Revenue Requirements			
O&M Expenses			
Water Supply Costs	$33,785,791	$34,110,524	$67,896,315
Labor	$26,606,185	$27,275,893	$53,882,078
Benefits & CalPERS	$10,221,067	$12,800,964	$23,022,031
Medical	$7,066,882	$7,567,123	$14,634,005
OPEB	$3,503,000	$3,609,000	$7,112,000
Other O&M Costs	$7,778,504	$8,977,969	$16,756,473
CalPERS/OPEB Advance Funding	$8,152,000	$7,192,000	$15,344,000
Debt Service	$6,370,956	$6,377,406	$12,748,362
PAYGO CIP	$32,754,681	$43,626,674	$76,381,355
Total Revenue Requirements	**$136,239,066**	**$151,537,553**	**$287,776,619**
Surplus / (Deficit) Net Cash Flows	**($4,738,751)**	**($19,543,110)**	**($24,281,862)**

Under current rates and without any new debt issuance in FY 2019/20 to help fund CIP, the District will have an estimated cumulative total deficit of approximately $24.3 M (shown in Table 4-11). The FPM was utilized to help the District identify appropriate revenue adjustments and new debt issuances required over the Study period to generate sufficient water revenues to meet the District's short-term and long-term obligations and to avoid significant rate fluctuations. The FPM was also used to evaluate the level of revenues that will maintain appropriate reserves and provide adequate debt service coverage. During a public District Board workshop on October 25, 2018, the District Board of Directors provided input to District staff and Raftelis to proceed with a revenue adjustment of 4% in FY 2018/19 and 4% in FY 2019/20. To prevent the need more significant rate fluctuations, the Board also suggested using $14.5M in new debt proceeds to help fund CIP expenditures in FY 2019/20. The two-year revenue adjustments consistent with the Board's decision are shown below in Table 4-12. The revenue adjustments shown for FY 2020/21 through FY 2022/23 are for planning purposes only and are subject to the District Board's approval in the later years.

Table 4-12: Proposed 5-Year Revenue Adjustments

Fiscal Year	Effective Date	Revenue Adjustment
FY 2018/19 Proposed	March 1, 2019	4%
FY 2019/20 Proposed	March 1, 2020	4%
FY 2020/21 Estimated	February 1, 2021	3%
FY 2021/22 Estimated	February 1, 2022	3%
FY 2022/23 Estimated	February 1, 2023	3%

Similar to the status quo financial plan shown in Table 4-10, Table 4-13 shows the proposed financial plan but with the revenue adjustments shown in Table 4-12. The pro forma combines the revenues from current rates (Table 4-3), the revenue from increases in rates consistent with the proposed adjustments (Table 4-12), miscellaneous revenues (Table 4-4), O&M expenses (Table 4-8), annual debt service payments (Table 4-9) and General Fund capital project expenditures (Figure 4-1) to project the debt coverage ratios and projected General Fund ending balances throughout the Study period.

The proposed financial plan differs from the status quo financial plan because of its inclusion of additional rate revenues resulting from the proposed revenue adjustments as well as the proposed debt issuance in FY 2019/20 to help fund CIP. Although the net General Fund cash balances show a deficit in FY 2018/19 through FY 2021/22 due to the planned capital expenditures during those years, the overall General Fund balance and reserve account balances will remain within a fiscally healthy range and the debt coverage will exceed the target debt coverage ratio of 200%, allowing the District to maintain its AAA financial bond rating. General Fund reserves are planned to be drawn down between FY 2018/19 and FY 2021/22 to enable PAYGO funding to be used to fund the majority of the District's CIP without necessitating larger revenue adjustments. Total reserve balances begin increasing again in FY 2022/23 (as shown by the positive Net GF Cash Balance in Table 4-13). In summary, the proposed financial plan ensures financial sufficiency and solvency for the District to meet projected expenditures and financial obligations including debt service, debt coverage and reserve targets while minimizing the need for substantially large revenue adjustments.

Table 4-13: Proposed Financial Plan

Description	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23
REVENUES					
Revenues from Current Rates	$105,566,705	$105,013,878	$105,267,440	$105,521,003	$105,774,565
Revenue Adjustments	$1,407,556	$5,656,748	$10,013,039	$13,503,903	$17,115,679
GW Replenishment Rev	$458,506	$498,396	$541,757	$588,890	$640,123
State Water Contract Tax	$4,132,528	$5,458,934	$5,487,987	$5,506,839	$5,537,957
Ad Valorem Property Tax	$5,336,909	$5,518,364	$5,705,988	$5,899,992	$6,100,592
Interest Revenues	$1,342,104	$1,899,767	$1,719,743	$1,452,583	$1,437,594
Customer Jobs Revenue	$5,530,515	$3,605,000	$3,605,000	$3,605,000	$3,605,000
Other Revenues	$9,133,048	$10,223,500	$8,691,239	$8,081,184	$7,001,251
TOTAL REVENUES	$132,907,871	$137,874,587	$141,032,194	$144,159,393	$147,212,761
EXPENSES					
Water Related Supply Costs	$33,785,791	$34,110,524	$34,425,722	$34,723,745	$36,385,484
CalPERS/OPEB Advance Funding	$8,152,000	$7,192,000	$6,590,000	$5,963,000	$5,423,000
Other O&M Expenses	$55,175,638	$60,230,949	$63,914,277	$66,515,232	$68,289,030
TOTAL EXPENSES	$97,113,429	$101,533,473	$104,929,999	$107,201,977	$110,097,514
NET REVENUES	$35,794,442	$36,341,113	$36,102,195	$36,957,416	$37,115,247
GF CIP EXPENDITURES					
PAYGO	$32,754,681	$29,126,674	$47,700,992	$39,355,504	$23,603,264
Existing Debt Financing	$0	$0	$0	$0	$0
New Debt Financing	$0	$14,500,000	$0	$0	$0
DEBT SERVICE					
Existing Debt Service	$6,370,956	$6,377,406	$5,529,281	$5,478,531	$5,423,031
New Debt Service	$0	$855,649	$855,649	$855,649	$855,649
TOTAL DEBT SERVICE	$6,370,956	$7,233,056	$6,384,931	$6,334,181	$6,278,681
NET GF CASH BALANCES	**($3,331,195)**	**($18,616)**	**($17,983,728)**	**($8,732,268)**	**$7,233,302**
Beginning GF Balances	**$98,328,839**	**$94,997,644**	**$94,979,028**	**$76,995,300**	**$68,263,032**
Ending GF Balances	**$94,997,644**	**$94,979,028**	**$76,995,300**	**$68,263,032**	**$75,496,334**
Target GF Balances	$59,782,844	$60,706,935	$58,992,524	$59,928,630	$60,894,965
Debt Coverage Ratio	**552%**	**535%**	**602%**	**620%**	**629%**
Target Debt Coverage Ratios	200%	200%	200%	200%	200%

In addition to Table 4-13, the proposed financial plan is also displayed graphically in Figure 4-2, Figure 4-3, and Figure 4-4. Figure 4-2 shows how the proposed revenue adjustments along with revenues from current rates and other miscellaneous revenues are projected to generate adequate revenues to fund all O&M expenses, including water supply costs, additional advance funding of pension CalPERS/OPEB, and debt service obligations for current bonds. The projected revenues under proposed revenue adjustments will also generate additional funding

for capital expenditures and/or funding reserves for future use (as shown by positive red bars in Figure 4-2). Current revenues are represented by the red line in Figure 4-2 below.

Figure 4-2: Water Operating Financial Plan

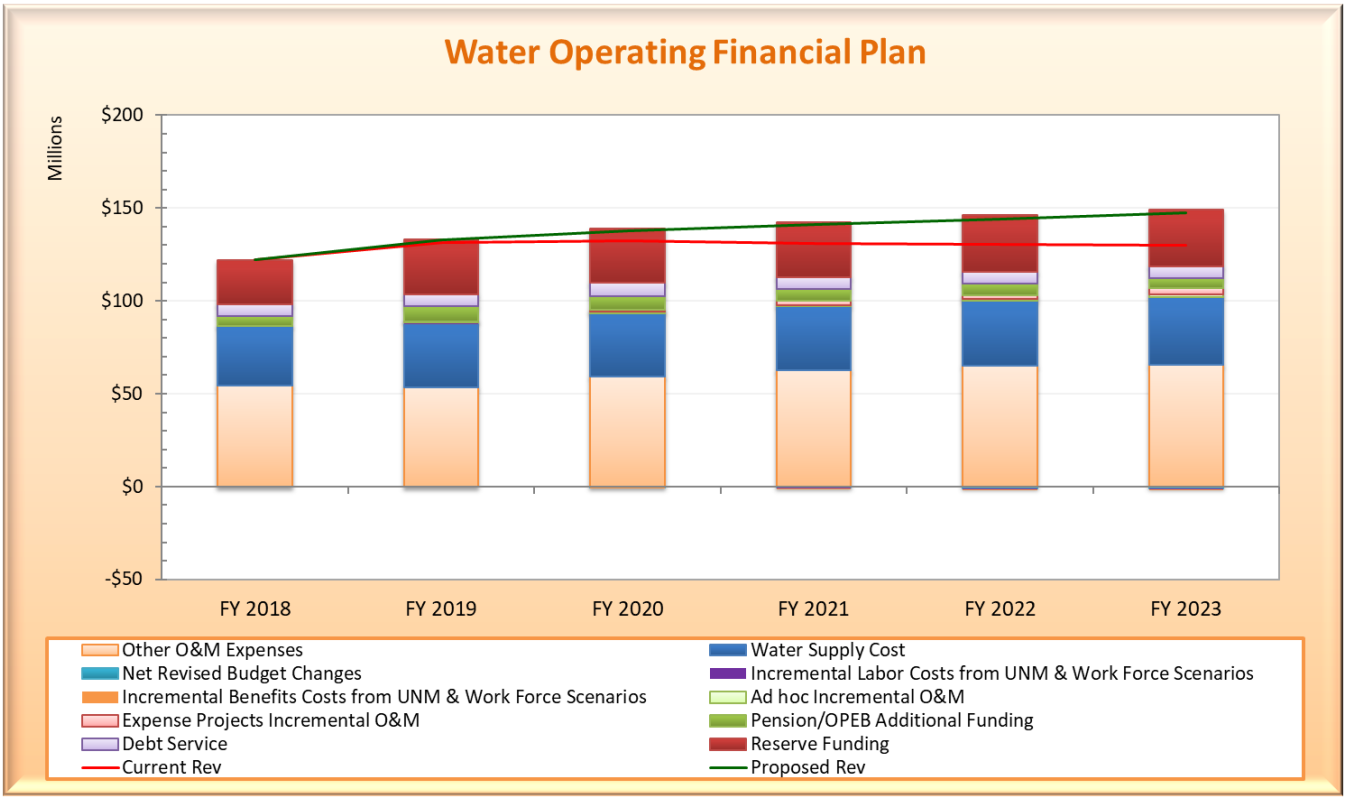
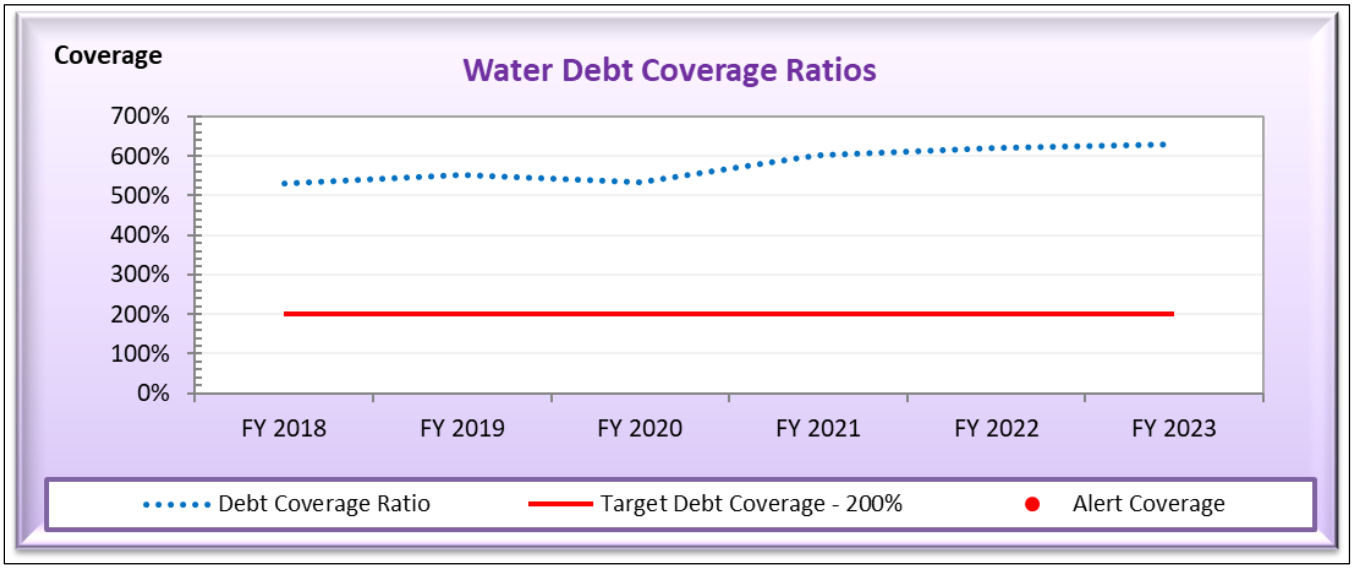


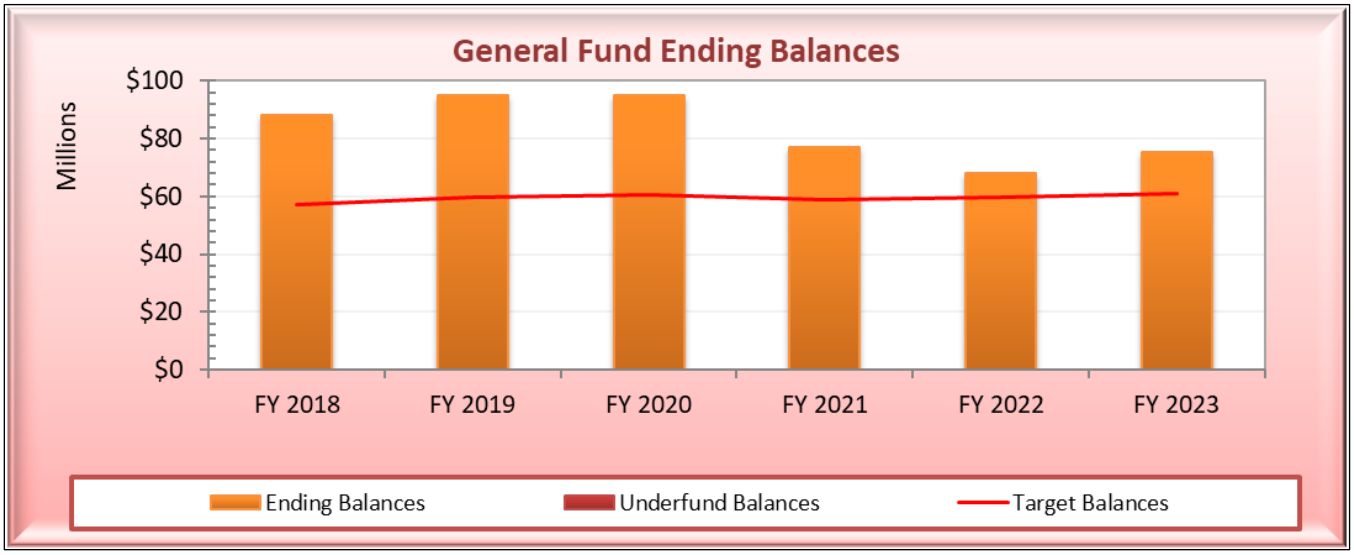
Figure 4-3 illustrates how the proposed revenue adjustments will ensure that the District's projected debt coverage (dotted blue line) exceeds its 200% debt coverage target (red line) set by the District Board in its financial policies. The proposed adjustments will bolster the District's projected debt coverage throughout the Study period and assist the District in maintaining its credit rating.

Figure 4-3: Projected Debt Coverage Ratios under Proposed Revenue Adjustments



Finally, Figure 4-4 shows the projected General Fund ending balances (orange bars) exceeding the minimum target balances[16] (red line) under proposed financial plan. It is common practice for an agency to maintain its reserve balances in exceedance of its minimum targets to provide risk protection against volatile water sales and water supply conditions as well as other unknown risks and unforeseen conditions. Note that under the status quo financial plan, General Fund ending balances are projected to fail to meet target balances beginning in FY 2020/21 and result in unacceptable diminishment of reserves by FY 2022/23. This demonstrates the necessity for the proposed revenue adjustments and new debt issuance included in the proposed financial plan.

Figure 4-4: Projected General Fund Ending Balances



[16] Established by the District's current financial policy

5. Proposed Water Rates & Customer Impact Analysis

5.1. Proposed Water Rates

The District conducted a comprehensive cost of service rate study for its water service in 2015 and documented the results in the 2015 Water Rate Study Report (see Appendix B). Because the District conducted a comprehensive cost of service study in 2015 and because the rate structure is unchanged, a new cost of service study is not necessary at this time. Instead, the proposed revenue adjustments resulting from the proposed financial plan presented in Section 4.2.2 will be applied across all categories of the current rates to calculate the proposed rates for FY 2018/19 and FY 2019/20 as shown in Table 5-1. The proposed rates in FY 2018/19 and FY 2019/20 are thusly calculated by increasing the prior fiscal year's rates by 4%. The rates are planned to be implemented on March 1 of each corresponding fiscal year. Note that Outside District consumption charges are assessed to 24 accounts located in the city of Hayward. These Outside District customers do not contribute to collected property tax within the District and therefore are assessed a higher consumption charge to compensate for this.

Table 5-1: Proposed Water Rates for FY 2018/19 and FY 2019/20[17]

	Current	FY 2018/19	FY 2019/20
Effective Date	**March 1, 2018**	**March 1, 2019**	**March 1, 2020**
Proposed Revenue Adjustments		**4.0%**	**4.0%**
Bimonthly Meter Service Charge			
5/8-inch	$52.33	$54.43	$56.61
3/4-inch	$52.33	$54.43	$56.61
1-inch	$80.70	$83.93	$87.29
1 1/2-inch	$151.59	$157.66	$163.97
2-inch	$236.67	$246.14	$255.99
3-inch	$506.08	$526.33	$547.39
4-inch	$903.11	$939.24	$976.81
6-inch	$2,278.54	$2,369.69	$2,464.48
8-inch	$3,980.09	$4,139.30	$4,304.88
10-inch	$5,965.22	$6,203.83	$6,451.99
Consumption Charge			
Inside District	$4.249 / CCF	$4.419 / CCF	$4.596 / CCF
Outside District	$4.885 / CCF	$5.081 / CCF	$5.285 / CCF

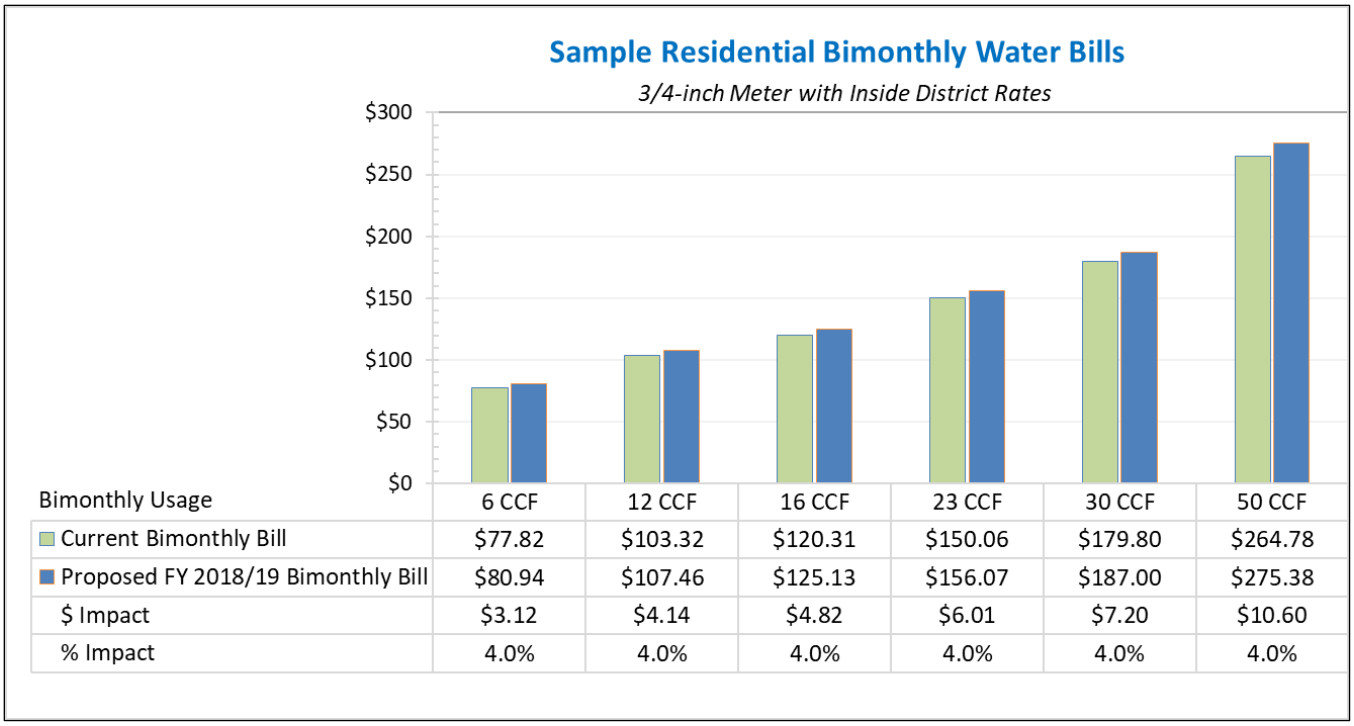
5.2. Customer Impact Analysis

Before implementing any rate structure recommendations, it is important to understand how the proposed rate structure would impact the District's customers. Figure 5-1 shows the water bills of a typical Single Family Residential customer with ¾" meter for bimonthly billing period at various water consumption levels under current

[17] Rates are rounded up to the nearest $0.01 for bimonthly service charges and $0.001 for consumption charges

and proposed FY 2018/19 rates. The bimonthly water bills under the current rates are illustrated by the green bars and the bimonthly water bills assuming the proposed FY 2018/19 rates are shown by the blue bars in Figure 5-1.

Figure 5-1: Single Family Customer Bill Impact Analysis

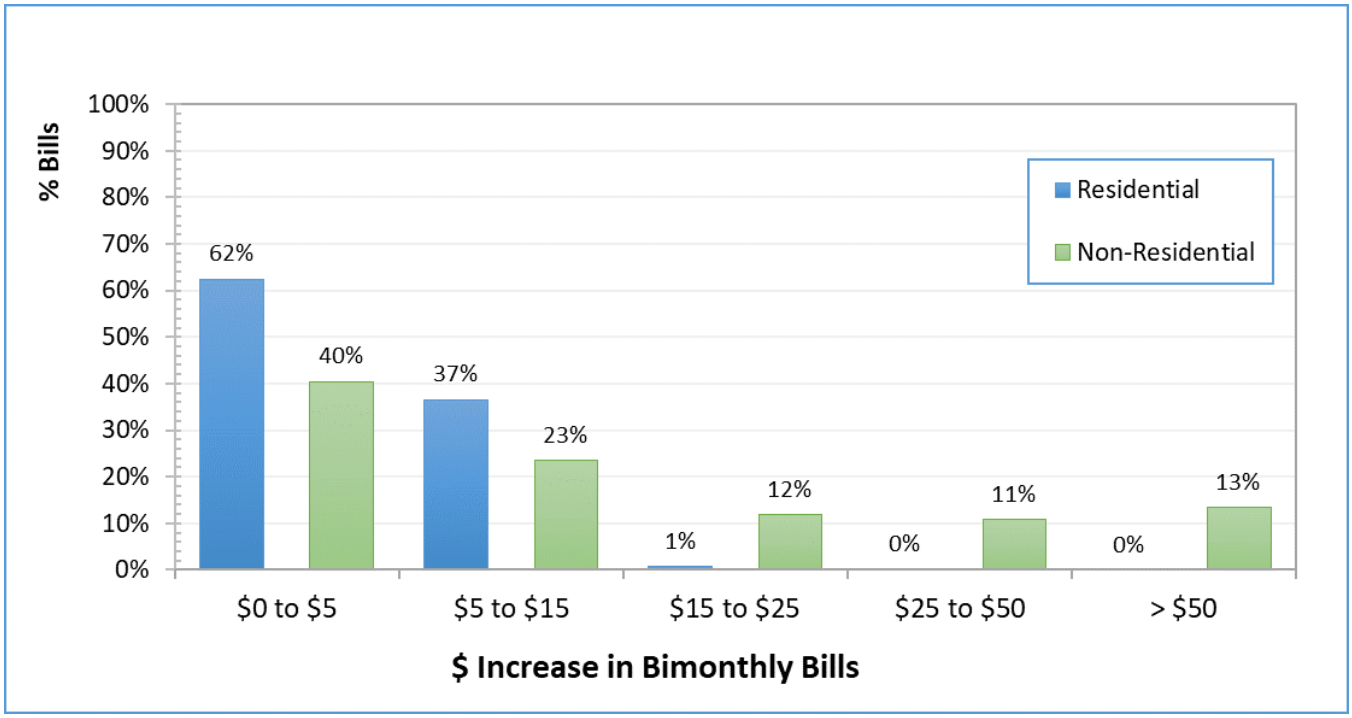


Bimonthly Usage	6 CCF	12 CCF	16 CCF	23 CCF	30 CCF	50 CCF
Current Bimonthly Bill	$77.82	$103.32	$120.31	$150.06	$179.80	$264.78
Proposed FY 2018/19 Bimonthly Bill	$80.94	$107.46	$125.13	$156.07	$187.00	$275.38
$ Impact	$3.12	$4.14	$4.82	$6.01	$7.20	$10.60
% Impact	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%

Figure 5-2 summarizes and compares bill impacts for single family and multi-family residential customers (represented by the blue bars) and all other non-residential (represented by the green bars). The analysis was conducted comparing current and proposed rates based on detailed account-level water consumption data for FY 2017/18.

Water users at all level of consumption will see a 4% increase in their bimonthly bills for FY 2018/19. Most residential bimonthly bills (approximately 62%) will increase less than $5. Residential accounts with larger water meters and/or higher water consumption will mainly constitute the remaining 38% of residential bimonthly bills expected to increase by more than $5. For example, a typical residential account with a ¾" meter and use of 16 CCF will see a 4% increase in their current bimonthly bill of $120.31 of $125.13 (see Figure 5-1). However, a 4% increase will equal $10.60 (see Figure 5-1) for a water customer with a ¾" meter and using 50 CCF per bimonthly billing period. Non-residential customers will experience larger dollar increases bimonthly bills because non-residential accounts tend to have larger sized water meters and greater water usage.

Figure 5-2: Customer Bill Impact Analysis



6. Water Shortage Emergency Stage Rates

6.1. Water Shortage Emergency Stage Rates Background

This section documents the development of water shortage emergency stage rates to be implemented during water shortage emergency situations. This section provides an overview of the water shortage emergency stages, corresponding revenue impacts, unit stage rate calculations, and a summary of proposed consumption charges at each stage for FY 2018/19 and FY 2019/20. Additionally, the process for activating water shortage emergency stage rates is described in detail in Section 6.4. The stage rates calculated in this section are separate charges independent from the charges derived in Section 5.1.

Water shortage emergencies can have significant impacts on an agency's financial stability. Depending upon water supply sources, fixed and variable costs, and other revenue sources, water sales reductions can have a major effect on a water service provider. Raftelis recommends that the District utilize water shortage emergency stage rates as part of a cohesive and fiscally sound response to water shortage emergencies. Temporary stage rates are a mechanism to maintain revenue stability and achieve debt coverage requirements in the short term.

Based on input from the District Board, Raftelis developed uniform (per unit of consumption) water shortage emergency stage rates to be assessed per unit (CCF) of water delivered to customers during four different water shortage emergency stages. The percent reduction in water demand during each water shortage emergency stage was defined in the District's Water Shortage Contingency Plan from its most recent Urban Water Management Plan (UWMP) and is summarized below in Table 6-1. Note that Stage 0 represents normal status quo water supply conditions. During Stage 0, no unit stage rates are to be in effect. For Stage 1 through Stage 4 unit stage rates to become effective, each water shortage emergency stage must attain District Board adoption and customers must be given 30 days advance notice prior to implementation.

Table 6-1 also shows projected water sales (in CCF and AF), as well as projected water supply after taking into account non-revenue water. Stage 0 water sales and supply for FY 2018/19 were previously determined in Table 4-2 and Table 4-5 respectively. Water sales for Stage 1 through Stage 4 are determined by decreasing Stage 0 sales by the corresponding demand reduction percentage shown.

Table 6-1: Water Shortage Emergency Stages and Usage Reductions (FY 2018/19)

Water Shortage Emergency Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Water Sales (CCF)	16,587,648	14,928,883	13,270,118	11,611,354	8,293,824
Projected Water Sales (AF)	38,080	34,272	30,464	26,656	19,040
Projected Water Supply (AF)[18]	41,391	37,252	33,113	28,974	20,696

[18] Takes into account an assumed 8% water loss factor.

6.2. Derivation of FY 2018/19 Unit Stage Rates

Unit stage rates are designed to recover the projected decrease in net revenues experienced during each water shortage emergency stage. To calculate unit stage rates for FY 2018/19, Raftelis adhered to the following steps:

1. Determine the lost revenue at each stage of reduction.
2. Account for variable water supply cost savings to offset a portion of the revenue loss.
3. Divide the lost revenue at each stage by the respective estimated sales at each stage.

The projected water sales revenues in FY 2018/19 are calculated using proposed consumption charges and estimated water sales at each stage (shown previously in Table 6-1). Total consumption charge revenue at each stage is calculated by multiplying projected water sales at each stage by the proposed FY 2018/19 consumption charge and is shown in Table 6-2 below. Also shown in Table 6-2 is the revenue reduction at each stage relative to Stage 0, which is the first of two components required to later determine the net revenue reduction at each stage.

Table 6-2: Projected Consumption Charge Revenue by Stage

Water Shortage Emergency Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Water Sales (CCF)	16,587,648	14,928,883	13,270,118	11,611,354	8,293,824
Proposed FY 2018/19 Consumption Charge ($/CCF)	$4.419	$4.419	$4.419	$4.419	$4.419
Base Revenue	$73,300,817	$65,970,735	$58,640,653	$51,310,572	$36,650,408
Projected Revenue Loss	**$0**	**$7,330,082**	**$14,660,163**	**$21,990,245**	**$36,650,408**

Water supply cost savings represents the second component used to determine net revenue reduction at each stage. As water sales decrease by stage, the District's variable water supply costs will also decrease, resulting in a partial offset of the loss in consumption charge revenue at each stage. Table 6-3 below outlines the determination of the reduction in purchased water supply variable costs as water demand is reduced at each stage. Total water supply required at each stage was determined previously in Table 6-1. Water supply availability and variable unit costs were previously outlined in Table 4-5. Projected variable water supply costs in Table 6-3 are determined by multiplying the unit rate for each supply source by the corresponding AF supplied for each stage. Projected water supply cost savings represent the reduction in variable water supply costs at each stage relative to Stage 0 variable water supply costs.

Table 6-3: Projected Variable Water Supply Cost Savings by Stage

Water Shortage Emergency Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Water Supply	41,391 AF	37,252 AF	33,113 AF	28,974 AF	20,696 AF
Projected Water Supply by Source					
SFPUC – Min ($1,786/AF)	8,602 AF	8,602 AF	8,602 AF	8,602 AF	8,602 AF
Groundwater – Min ($128/AF)	8,602 AF	8,602 AF	8,602 AF	8,602 AF	8,602 AF
Desal Water – Min ($146/AF)	8,470 AF	8,470 AF	8,470 AF	8,470 AF	3,492 AF
Lake Del Valle ($0/AF)	3,800 AF	3,800 AF	3,800 AF	3,301 AF	0 AF
SWP ($62/AF)	11,918 AF	7,779 AF	3,640 AF	0 AF	0 AF
Projected Variable Water Supply Costs	$18,445,641	$18,188,162	$17,930,682	$17,704,262	$16,976,196
Projected Water Supply Cost Savings	**$0**	**$257,479**	**$514,959**	**$741,379**	**$1,469,445**

Table 6-4 shows the derivation of the proposed FY 2018/19 unit stage rates. Net revenue loss in each stage can then be determined by subtracting the projected water supply cost savings (from Table 6-3) from the projected consumption charge revenue loss (from Table 6-2). Unit stage rates in FY 2018/19 are then determined by dividing the net revenue loss at each stage by the corresponding projected water sales in CCF (from Table 6-1). Each FY 2018/19 unit stage rate is therefore designed to recover the anticipated reduction in net revenues during each water shortage emergency stage.

Table 6-4: Derivation of Unit Stage Rates

Water Shortage Emergency Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Revenue Loss	$0	$7,330,082	$14,660,163	$21,990,245	$36,650,408
Projected Water Supply Cost Savings	$0	$257,479	$514,959	$741,379	$1,469,445
Net Revenue Loss	**$0**	**$7,072,602**	**$14,145,205**	**$21,248,866**	**$35,180,963**
Projected Water Sales (CCF)	16,587,648	14,928,883	13,270,118	11,611,354	8,293,824
Unit Stage Rate ($/CCF)	**$0.000**	**$0.474**	**$1.066**	**$1.831**	**$4.242**

6.3. Proposed Water Shortage Emergency Stage Rates

Table 6-5 shows the proposed water shortage emergency stage rates for FY 2018/19 and FY 2019/20. Reduction in water demand and projected water sales were previously shown in Table 6-1. The unit stage rates for FY 2018/19 were calculated above in Table 6-4. Unit Stage Rates in FY 2019/20 are calculated by increasing the FY 2018/19 Unit Stage Rates by the proposed 4% revenue adjustment for FY 2019/20.The effective Inside District and Outside District consumption charges at each water shortage emergency stage are determined simply by adding the unit stage rate to the proposed consumption charges (from Table 5-1). This represents the effective dollar amount that each customer will be charged per CCF of water delivered during each stage.

Table 6-5: Proposed Stage Rates for FY 2018/19 and FY 2019/20[19]

Water Shortage Emergency Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Reduction in Water Demand	0%	10%	20%	30%	Up to 50%
Projected Water Sales (per Fiscal Year)	38,080 AF	34,272 AF	30,464 AF	26,656 AF	19,040 AF
FY 2018/19 (Effective March 1, 2019)					
Unit Stage Rate	$0.000 / CCF	$0.474 / CCF	$1.066 / CCF	$1.831 / CCF	$4.242 / CCF
Consumption Charge (Inside District)	$4.419 / CCF	$4.893 / CCF	$5.485 / CCF	$6.250 / CCF	$8.661 / CCF
Consumption Charge (Outside District)	$5.081 / CCF	$5.555 / CCF	$6.147 / CCF	$6.912 / CCF	$9.323 / CCF
FY 2019/20 (Effective March 1, 2020)					
Unit Stage Rate	$0.000 / CCF	$0.493 / CCF	$1.109 / CCF	$1.905 / CCF	$4.412 / CCF
Consumption Charge (Inside District)	$4.596 / CCF	$5.089 / CCF	$5.705 / CCF	$6.501 / CCF	$9.008 / CCF
Consumption Charge (Outside District)	$5.285 / CCF	$5.778 / CCF	$6.394 / CCF	$7.190 / CCF	$9.697 / CCF

6.4. Process for Activating Water Shortage Emergency Stage Rates

Water Code Section 350 and Section 31026 authorizes ACWD's Board to declare a water shortage emergency when it determines that ordinary water demands cannot be met without depleting water supplies to the extent that there would be insufficient water for human consumption, sanitation, and fire protection. Annually staff assesses imported and local water supplies, current and forecasted demand, and production constraints as follows:

Beginning each December, staff compiles projected supplies and compares it to projected demands. The comparison is called the "Water Supply Outlook," and is typically presented at Board Committee meetings to keep the Board informed of water supply conditions. The following process is used:

1. Assess Current Year Supply Volumes
    a. Determine available water from the SWP
    b. Determine available water from the SFPUC
    c. Determine volumes of local groundwater and surface water available
2. Assess current and forecasted demand
    a. Use most recent UWMP patterns, and make refinements based on recent actual demands and projected near-term development projects coming online
3. Optimize ACWD production
    a. ACWD optimizes production from various facilities to meet demands, water quality, available supplies, and reduce cost
4. Monthly re-assess supplies, demands, and production schedules until the final SWP allocation is known, or if conditions significantly change

If dry conditions persist, ACWD will make arrangements with its Semitropic Groundwater Banking accounts to return previously banked water to supplement supplies. To the extent that there are not any constraints on the conveyance of water, ACWD will return Semitropic supplies sufficient to meet Water Production Targets and maintain the Niles Cone Groundwater levels above identified thresholds (per the District's Urban Water

[19] Unit Stage Rates are rounded up to the nearest $0.001.

Management Plan). If additional supplies are needed, ACWD also will seek dry-year transfer supplies. The Water Supply Outlook typically becomes finalized around April or May, when the majority of rainfall has occurred, and final allocations are received from the SWP and SFPUC. In extremely dry conditions, demands could be projected to exceed supplies even with supplemental supplies such as Semitropic withdrawal and dry year transfers. In such cases, ACWD may draw on local groundwater storage from the Niles Cone Groundwater Basin. While the dry-year storage is intended to be used during dry periods, it may not be sufficient for an extended dry period: the groundwater system requires replenishment from freshwater sources, without which saltwater intrusion would occur.

According to its adopted UWMP, ACWD limits use of local groundwater dry-year storage to no more than 10,000 AF/year. The ACWD UWMP may trigger 10% shortage conditions earlier in water shortage emergencies, but helps prevent the need to trigger 20% or more drastic shortage conditions in longer water shortage emergencies. The long-term critical minimum operating levels, as measured in ACWD's two primary indicator monitoring wells, are +15 feet Mean Sea Level (MSL) for the Above Hayward Fault subbasin and 0 feet MSL for the Below Hayward Fault (BHF) subbasin. However, a short-term level of -5 feet MSL at the BHF indicator well is the expected worst case for a multi-year critical drought and represents the minimum temporary operating elevation that can occur without inducing long-term damage to the groundwater basin, provided it is a temporary and an end-of-drought end point. The UWMP protects the subbasins from long term damage from potential saltwater intrusion from the neighboring San Francisco Bay (specific for the Below Hayward Fault Subbasin) and to maintain the production capacity of the District's and local private well owners' wells.

If demands cannot be met within this framework of assessing all available water supplies, optimizing ACWD production, and determining water demand, the Board would consider declaring a water shortage emergency, which can only be declared by the Board at a properly noticed public hearing in accordance with Water Code Section 350 et seq. The Ordinance that declares a water shortage emergency would specify the emergency stage, authorize specified water use restrictions and the appropriate stage rate, and take any other necessary actions. Following Board adoption of a water shortage emergency stage rate, the District would provide customers 30 days advance notice of stage rate implementation.

Stage rates have been developed based on the water shortage emergency stages defined in the District's Water Shortage Contingency Plan which is established in its UWMP.

The proposed stage rates were calculated to recover the lost revenue from reduced water use during a water shortage emergency. District operating costs could increase or decrease during a water shortage emergency depending on its cause. However, for purposes of the analysis, the District assumed minor cost reduction from lower water delivery costs.

6.5. Water Shortage Emergency Stage Rates Customer Impact Analysis

Figure 6-1 shows a sample bimonthly bill for a District customer with a 3/4" meter under four different scenarios:

1. Bimonthly usage of 16 CCF charged at current FY 2017/18 rates
2. Bimonthly usage of 16 CCF charged at proposed FY 2018/19 rates with no water shortage (Stage 0)
3. Bimonthly usage of 16 CCF charged at proposed FY 2018/19 rates under Stage 2 emergency water shortage (20% demand reduction)
4. Bimonthly usage of 12.8 CCF charged at proposed FY 2018/19 rates under Stage 2 emergency water shortage (20% demand reduction)

Each scenario is represented by a stacked bar in Figure 6-1 below. Note that scenarios 1 and 2 are identical to the sample bimonthly bills at 16 CCF of usage shown previously in Figure 5-1. Scenario 3 shows that a customer with a 3/4" meter consuming 16 CCF per bimonthly billing period will see a $17.06 increase in the bimonthly bill during a declared Stage 2 water emergency shortage relative to no water shortage (Scenario 2). The $17.06 represents additional revenue collected when Stage 2 unit rates are in effect. Scenario 4 demonstrates that the same sample customer can avoid such bill increases during a declared Stage 2 water emergency shortage simply by reducing bimonthly water usage by 20% from 16 CCF to 12.8 CCF.

Figure 6-1: Sample FY 2018/19 SFR Bimonthly Bills with Stage 2 Water Shortage

	Scenario 1 Current Bill (16 CCF)	Scenario 2 Proposed FY 2018/19 Bill: No Water Shortage (16 CCF)	Scenario 3 Proposed FY 2018/19 Bill: Stage 2 Shortage (16 CCF)	Scenario 4 Proposed FY 2018/19 Bill: Stage 2 Shortage (12.8 CCF)
Fixed Charge	$52.33	$54.43	$54.43	$54.43
Commodity Charge	$67.98	$70.70	$70.70	$56.56
Stage Rate Surcharge	$0.00	$0.00	$17.06	$13.64
Total Bimonthly Bill	$120.31	$125.13	$142.19	$124.64

APPENDIX

APPENDIX A: "ACWD 2017 WATER RATE UPDATE STUDY REPORT"

Attached as a separate file labeled: "ACWD 2018 Water Rate Update Study Report Appendix – ACWD 2017 Water Rate Update Study Report"

APPENDIX B: "ACWD 2015 WATER RATE STUDY REPORT"

Attached as a separate file labeled: "ACWD 2018 Water Rate Update Study Report Appendix – ACWD 2015 Water Rate Study Report"