CITY OF BEVERLY HILLS
Water Rate Study

January 5, 2019 – Final Report

CITY OF BEVERLY HILLS
345 Foothill Road
Beverly Hills, CA 90210

FINAL REPORT

WATER RATE STUDY

January 5, 2019

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January 5, 2019

Ms. Shana Epstein
Director of Public Works
City of Beverly Hills
345 Foothill Road
Beverly Hills, CA 90210

Subject: Water Rate Study – Final Report

Dear Ms. Epstein:

We are pleased to submit this water rate study, which is the culmination of a lengthy study process that has encompassed a wide range of modifications and refinements including:

- Restructuring the quantity charge structures for the single and multi-family customer classes.
- The addition of irrigation customer classes.
- The addition of a water reliability charge quantity charge rate.
- The conversion of the Outside City rates to a cost-based differential.
- The addition of revenue stabilization factors for use during water shortages.

We would like to express our thanks to City staff and the members of the Public Works Commission and the Public Works Liaison Committee for their diligent efforts in assisting us with this study.

Very truly yours,

HF&H CONSULTANTS, LLC

John W. Farnkopf, P.E., Senior Vice President
Rick Simonson, C.M.C., Vice President

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ACRONYMS

AMI	Automated Meter Infrastructure
AWWA	American Water Works Association
EMU	Equivalent Meter Unit
FY	Fiscal Year
CCF or HCF	Hundred cubic feet of metered water sold; 748 gallons; a cube of water 4.6 feet on edge
CIP	Capital Improvement Project
GPD	Gallons Per Day
ISF	Internal Services Fund – reimbursement by the Water Fund for services provided by the General Fund
O&M	Operations and Maintenance
MWD	Metropolitan Water District of Southern California, the City's wholesale water supplier
PAYGo	Pay-As-You-Go, in reference to funding capital improvements from cash rather than from borrowed sources of revenue
PDR	La Brea Subarea Preliminary Design Report
WEP	Water Enterprise Plan – the program approved by the City Council to improve the City's water supply reliability includes personnel and capital expenses

ACKNOWLEDGEMENTS

City Council
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Councilmember Lili Bosse
Councilmember Lester Friedman
Councilmember Robert Wunderlich

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LIMITATIONS

This document was prepared solely for the City of Beverly Hills in accordance with the contract between the City and HF&H and is not in intended for use by any other party for any other purpose.

In preparing this study, we relied on information and instructions from the City, which we consider accurate and reliable and did not independently verify.

Rounding differences caused by stored values in electronic models may exist.

This document represents our understanding of relevant laws, regulations, and court decisions but should not be relied upon as legal advice. Questions concerning the interpretation of legal authorities referenced in this document should be referred to a qualified attorney.

WATER RATE STUDY

SECTION 1. EXECUTIVE SUMMARY

1.1 BACKGROUND

The City provides water service to residents and businesses in Beverly Hills (Inside City customers) and a portion of West Hollywood (Outside City customers). The City is presently entirely reliant on the Metropolitan Water District of Southern California for its potable water supply but has plans underway to develop local groundwater.

1.2 FINDINGS AND RECOMMENDATIONS

HF&H makes the following findings and recommendations.

1. **Annual rate increases.** Revenue generated by annual rate increases shall not exceed 3% in total, as previously approved by Council on December 19, 2017 for the period FY 2017-18 through FY 2021-22.

2. **Cost of service analysis of rate components.** A cost of service analysis was performed to allocate the revenue requirements to the components associated with the service (meter size) and quantity charges (volume of water used). The analysis indicated that the revenue from existing service charge rates is 5.5% below the cost of service and the revenue from existing quantity charge rates is 2.6% below the cost of service. Adjusting the respective rates accordingly will provide the additional 3% increase in revenue needed to cover the increase in the revenue requirement for FY 2018-19. (See **Table 4-6.**).

3. **Cost of service analysis of service charge revenue.** Service charges are charged for water and fire service. In order to generate 5.5% more revenue from service charges, water service charges should be increased 6.9%. No increase is recommended in fire service charges. Nor will there be a difference between inside and outside City customers.

4. **Cost of service analysis of quantity charge revenue.** In order to generate 2.6% more revenue from quantity charges, the cost of service analysis indicates that the quantity charge revenues for each class need to change as follows: 5.2% increase for single family residential customers; 6.6% increase for multi-family residential customers; and, a 5.4% decrease for commercial customers. (See **Table 4-6.**) These percentages are the necessary changes in revenue, not the changes in rates. Revenue changes are achieved by increasing or decreasing rates. In years when rates are not being restructured to align with the cost of service, all current rates would be increased or decreased by the respective percentages by class. However, in the current rate study, rates are being restructured to align with the cost of service. As

a result, different percentage increases in the service charge and Quantity Charges will occur. The derivation of these rate increases is explained in the next two sections of this report.

5. **Single family residential quantity charge rate structure.** Analysis of the single family tier structure indicates that the current number of four tiers should be retained but that the sizes of the tiers need to be adjusted to correspond with the service levels customers require ranging from non-seasonal base demand to average day, maximum day, and maximum hour peaking. (See **Tables 5-1 and 5-2.**)

6. **Multi-family residential quantity charge rate structure.** Analysis of multi-family customer water use data indicates that the range of demand service levels is very narrow across the range of consumption from base to extra capacity demand, indicating the current four-tier structure should be reduced to a two-tier structure. (See **Tables 5-3 and 5-4.**)

7. **Commercial quantity charge rate structure.** Analysis of customer billing data indicates that the current uniform quantity charge rate structure (no tiers) is still applicable. (See **Table 5-5.**)

8. **Outside City rates.** Outside City rates are currently 1.25 times higher than Inside City rates, which was an approximation of the additional cost to serve Outside City customers. It is recommended that the 1.25 multiplier be replaced with rates that are based on more exacting cost analysis. The additional costs identified should be applied to the quantity charges only. The service charges to both Inside City and Outside City customers will be the same. **(See Tables 5-9 and 5-14.)**

9. **Create irrigation customer classes.** Irrigation is a significant component of total water use in the City, particularly among single family customers. It is a discretionary water use that warrants special attention because it may need to be curtailed at higher levels during shortages. We recommend creating separate irrigation customer classes. (See **Section 5.5.**)

10. **Implement water shortage revenue stabilization factors.** Revenue stabilization factors are designed to offset the amount of revenue shortfall caused by conservation during specific Council-adopted water shortage stages. **(See Section 5.6.)**

11. **Implement a water reliability charge.** The City Council is undertaking the expansion of the City's water system in order to diversify and expand its sources of supply. By doing so, reliability will be improved during shortages. In addition, the need to rely on purchased water from Metropolitan Water District (MWD) will be reduced. In return for these benefits, a new, separate water reliability charge is proposed that would provide a steady source of funding over the lifecycle of the

Water Enterprise Plan (WEP). The water reliability charge is an additional uniform quantity charge rate that applies to both Inside and Outside City customers. The Inside City water reliability charge is less than the Outside City water reliability charge due to a subsidy provided from the Beverly Hills General Fund. **(See Section 5.7.)**

12. **Pass-through Charges.** The cost of MWD water is the single largest component of the City's revenue requirements. Because the City has no control over MWD's wholesale water rate, this cost is simply passed through to the City's customers. MWD provides projections of its future wholesale water rates, which are built into the rate projections in this study. California Government Code Section 53756 authorizes water suppliers to adjust their rates in response to changes in pass-through costs. As part of the Proposition 218 process, as the City did with last year's rate increase, we recommend that the City incorporate annual MWD pass-through adjustments in its rates. The pass-through adjustment allows Beverly Hills to adjust quantity charges to track any difference between the MWD rates that were included in the model and the actual rates adopted each year by MWD. The pass-through adjustment can be made by providing 30-day notice in the customer bills without triggering the need for a Proposition 218 protest process.

This report documents the rates proposed for adoption by the City. The first rate adjustment is proposed to become effective in March 8, 2019 with subsequent adjustments every January 1 thereafter, through January 2022. The City mailed notices to rate payers in compliance with the protest procedure provided for in Article XIIID. The noticed rates are the highest rates that the City Council can adopt.

Tables 1-1 through **1-3** summarizes the current and recommended quantity charge rates, service charge rates, and water reliability charge, respectively.

Table 1-1. Current and Recommended Quantity Charge Rates

Current Quantity Charge Rates			Recommended Quantity Charge Rates					
					$/HCF			
	Tier Size	$/HCF		Tier Size	3/8/2019	1/1/2020	1/1/2021	1/1/2022
Inside City								
Single Family			**Single Family**					
Tier 1	0 - 10 HCF	$4.02	Tier 1	0 - 26 HCF	$3.34	$3.44	$3.54	$3.65
Tier 2	11 - 55 HCF	$5.30	Tier 2	27 - 48 HCF	$6.51	$6.71	$6.91	$7.12
Tier 3	56 - 120 HCF	$8.36	Tier 3	49 - 86 HCF	$9.58	$9.87	$10.17	$10.48
Tier 4	Over 120 HCF	$16.15	Tier 4	Over 86 HCF	$13.61	$14.02	$14.44	$14.87
Multi Family			**Multi Family**					
Tier 1	0 - 4 HCF	$4.02	Tier 1	0 - 8 HCF	$4.26	$4.39	$4.52	$4.66
Tier 2	5 - 9 HCF	$5.30	Tier 2	Over 8 HCF	$12.17	$12.54	$12.92	$13.31
Tier 3	10 - 16 HCF	$8.36						
Tier 4	Over 16 HCF	$16.15						
Commercial		$6.86	**Commercial**		$6.63	$6.83	$7.03	$7.24
Outside City								
Single Family			**Single Family**					
Tier 1	0 - 10 HCF	$5.01	Tier 1	0 - 26 HCF	$4.16	$4.28	$4.41	$4.54
Tier 2	11 - 55 HCF	$6.63	Tier 2	27 - 48 HCF	$7.33	$7.55	$7.78	$8.01
Tier 3	56 - 120 HCF	$10.45	Tier 3	49 - 86 HCF	$10.40	$10.71	$11.03	$11.36
Tier 4	Over 120 HCF	$20.18	Tier 4	Over 86 HCF	$14.43	$14.86	$15.31	$15.77
Multi Family			**Multi Family**					
Tier 1	0 - 4 HCF	$5.01	Tier 1	0 - 8 HCF	$5.08	$5.23	$5.39	$5.55
Tier 2	5 - 9 HCF	$6.63	Tier 2	Over 8 HCF	$12.99	$13.38	$13.78	$14.19
Tier 3	10 - 16 HCF	$10.45						
Tier 4	Over 16 HCF	$20.18						
Commercial		$8.58	**Commercial**		$7.45	$7.67	$7.90	$8.14

Table 1-2. Current and Recommended Water Service Charge Rates

	Current		Recommended (Inside and Outside City)			
Meter Size	Inside City	Outside City	3/8/2019	1/1/2020	1/1/2021	1/1/2022
	$ per bi-monthly bill		$ per bi-monthly bill			
1"	$44.66	$55.83	$48.97	$50.44	$51.95	$53.51
1.5"	$77.41	$96.77	$85.88	$88.46	$91.11	$93.84
2"	$116.72	$145.91	$130.17	$134.08	$138.10	$142.24
3"	$208.43	$260.53	$248.28	$255.73	$263.40	$271.30
4"	$339.44	$424.30	$381.16	$392.59	$404.37	$416.50
6"	$666.96	$833.69	$750.25	$772.76	$795.94	$819.82
8"	$1,071.86	$1,339.82	$1,193.15	$1,228.94	$1,265.81	$1,303.78
10"	$1,857.96	$2,322.44	$3,112.42	$3,205.79	$3,301.96	$3,401.02

Table 1-3. Recommended Water Reliability Charge rates

	Effective Date			
Customer Class	**3/1/2019**	**1/1/2020**	**1/1/2021**	**1/1/2022**
	$/HCF	$/HCF	$/HCF	$/HCF
All Classes - Inside City	$0.23	$0.24	$0.25	$0.26
All Classes - Outside City	$0.38	$0.39	$0.40	$0.41

SECTION 2. INTRODUCTION

2.1 STUDY PURPOSE

The City is responsible for setting rates in compliance with California law. Voters passed Proposition 218 in November 1996, which enacted Article XIIID of the California Constitution. Article XIIID, Section 6, requires that fees and charges for water service shall not exceed the proportional cost of service.

One key purpose of this report is to document that the proposed rates comply with the relevant laws in California for setting tiered water rates. Another key purpose is to ensure that the rates generate sufficient revenue from conserving levels of demand to fund the water enterprises operating and capital costs as well as to maintain adequate reserves.

2.2 STUDY PROCESS

This study has been conducted in close collaboration with a working group of City staff, the City's Public Works Commission, the Public Works Commission's Rates Ad Hoc Committee, and the City's Public Works Liaison Committee. Over 30 meetings were held to develop alternative funding strategies, to review and refine the alternatives, and to select the preferred alternative.

2.3 CURRENT RATES

The City charges the sum of a service charge and a quantity charge, which are shown in **Tables 2-1** and **2-2.** This rate structure has been in effect for a number of years.

For single family residential and multi-family residential customers, the quantity charge varies depending on the amount of metered water use in each two-month billing period. This form of rate structure is referred to as a tiered or increasing block rate quantity charge. The quantity charges for single family residential and multi-family residential customers are the same as they increase across four tiers; the size of the tiers is smaller for multi-family residential customers. For example, Tier 1 water use is 0-4 HCF for multi-family residential customers and 0-10 HCF for single family residential customers; see **Figure 2-3**). Single family residential customers are billed per residence and multi-family residential customers are billed per dwelling unit.

For Commercial customers, the quantity charge is currently a constant amount that is not tiered. This form of rate structure is referred to as a uniform quantity charge. Commercial customers are billed bi-monthly per account. The Commercial quantity charge was tiered at one time but is currently a uniform charge regardless of the level of demand.

The service charge is fixed based on the size of the service connection. Customers pay the same service charge each billing period based on the size of their service connection.

The City currently charges Outside City water customers service and quantity charge rates that are 25% higher than Inside City rates. The purpose of the 1.25 multiplier is to recover the additional costs of serving customers located outside Beverly Hills.

Table 2-1. Current Bi-monthly Service Charge Rates

Meter Size	Inside City $/HCF	Outside City $/HCF
1"	$44.66	$55.83
1.5"	$77.41	$96.77
2"	$116.72	$145.91
3"	$208.43	$260.53
4"	$339.44	$424.30
6"	$666.96	$833.69
8"	$1,071.86	$1,339.82

Table 2-2. Current Bi-monthly Quantity Charge Rates

Customer Class	Tier Size	Inside City $/HCF	Outside City $/HCF
Single Family			
Tier 1	0 - 10 HCF	$4.02	$5.01
Tier 2	11 - 55 HCF	$5.30	$6.63
Tier 3	56 - 120 HCF	$8.36	$10.45
Tier 4	Over 120 HCF	$16.15	$20.18
Multi Family			
Tier 1	0 - 4 HCF	$4.02	$5.01
Tier 2	5 - 9 HCF	$5.30	$6.63
Tier 3	10 - 16 HCF	$8.36	$10.45
Tier 4	Over 16 HCF	$16.15	$20.18
Commercial	Uniform (no tiers)	$6.86	$8.58

SECTION 3. REVENUE REQUIREMENTS

To determine whether additional rate revenue is required, projected operating and capital expenses are compared with projected revenue from current rates. Annual surpluses and deficits are then applied to the reserve funds. Rates are then increased so that the expenses are covered and operating and capital reserves are maintained. At the December 19, 2017 City Council Meeting, Council approved annual revenue increases of 3% per year for the period FY 2017-18 through FY 2021-22. The following sections summarize the methodology for determining the annual revenue requirements, the necessary 3% annual revenue increases, and the projected impact these results will have on the Water Enterprise fund balance.

3.1 EXPENSE PROJECTIONS

A spreadsheet model was developed to derive revenue requirements for FY 2017-18 through FY 2021-22. The revenue requirements represent the costs that must be covered by revenue from rates and other sources, such as reserves. The City's operating and capital budget for FY 2017-18 served as the starting point for projecting the City's expenses and revenues over the five-year financial planning period. The escalation factors summarized in **Table 3-1** were incorporated in the model for projecting expenses and revenues.

Table 3-1. Key Modeling Assumptions

Expense Category	2017/18	2018/19	2019/20	2020/21	2021/22
Personnel	Per Budget	3.0%	3.0%	3.0%	3.0%
Material & Supplies	Per Budget	4.0%	4.0%	4.0%	4.0%
Contractual Services	Per Budget	3.0%	3.0%	3.0%	3.0%
ISF Charges	Per Budget	3.0%	3.0%	3.0%	3.0%
Proj. Admin. and CIP Mgmt. Charges	Per Budget	3.3%	3.3%	3.3%	3.0%
Miscellaneous	Per Budget	3.0%	3.0%	3.0%	3.0%
General Inflation	3.0%	3.0%	3.0%	3.0%	3.0%
MWD Cost of Water ($/AF)	$997.00	$1,034.00	$1,072.50	$1,107.50	$1,143.50
Construction Cost Inflation	2.5%	2.5%	2.5%	2.5%	2.5%
Water Sales (HCF)	4,178,352	4,318,340	4,418,488	4,518,986	4,619,886

The application of these assumptions to the O&M and capital expenses is summarized in **Table 3-2**.

Table 3-2. Total Annual Projected Net Revenue Requirements

	Budgeted	Projected			
	2017/18	2018/19	2019/20	2020/21	2021/22
O&M Expenses					
Personnel Services	$4,792,704	$4,933,172	$5,081,113	$5,233,492	$5,390,443
Materials and Supplies	$1,854,407	$1,910,039	$1,967,340	$2,026,360	$2,087,151
Purchased Water	$11,396,460	$12,176,961	$12,887,463	$13,594,949	$14,355,408
Contractual Services	$1,293,935	$1,332,753	$1,372,735	$1,413,917	$1,456,335
ISF Charges	$6,946,140	$7,154,525	$7,369,160	$7,590,235	$7,817,942
Project Admin. and CIP Mgmt. Charges	$1,383,498	$1,434,688	$1,482,032	$1,530,939	$1,581,460
Other Miscellaneous	$1,125,695	$1,159,465	$1,194,249	$1,230,077	$1,266,979
Subtotal, O&M Expenses	$28,792,838	$30,101,603	$31,354,093	$32,619,970	33,955,718
Capital Expenses					
Transfer to Reserves for PayGo Projs	$7,061,200	$7,061,200	$1,439,467	$1,940,615	$2,301,200
Debt Service on Existing Bond	$5,984,688	$5,995,488	$5,994,888	$4,927,425	$4,366,075
Subtotal, Capital Expenses	$13,045,888	$13,056,688	$7,434,355	$6,868,040	$6,667,275
Total Expenses	**$41,838,726**	**$43,158,290**	**$38,788,448**	**$39,488,010**	**$40,622,993**
Less: Non-Operating Revenues[1]	($924,357)	($930,359)	($936,540)	($942,907)	($949,465)
Contributions (from)/to Reserves	($3,827,639)	($4,019,575)	$1,502,700	$1,990,142	$2,077,774
Net Revenue Requirement	**$37,086,730**	**$38,208,357**	**$39,354,607**	**$40,535,246**	**$41,751,303**
% Change		3.0%	3.0%	3.0%	3.0%

[1] Non-operating revenues include late fees, ordinance violation penalties, interest earnings, etc.

The net revenue requirement for FY 2018-19 of $38,208,357 will be used in the cost of service analysis and rate design for rates effective March 8, 2019 (see **Sections 4 and 5**).

3.2 RESERVE FUNDS

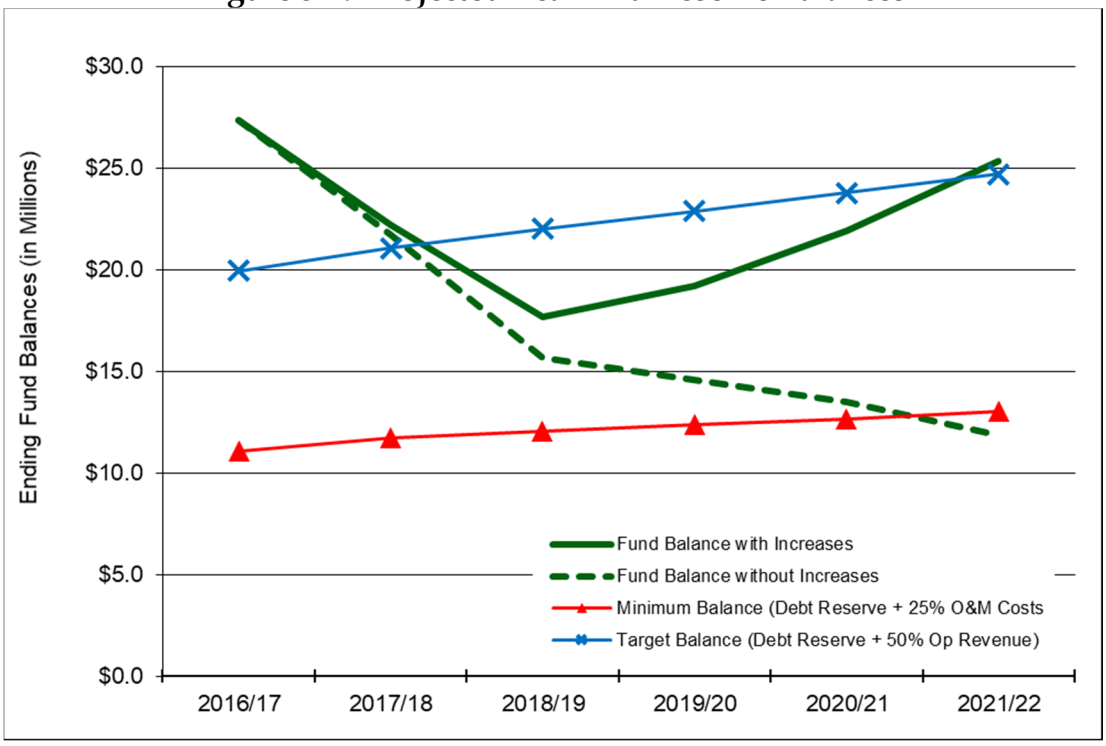
The 3% annual revenue increases are required to cover the net O&M and capital expenses summarized in **Table 3-2**. In addition to covering annual expenses, water rates need to generate revenue to maintain adequate operations and capital reserves. To determine what constitutes adequate reserve amounts, the reserve balance was subdivided into operations and capital reserves. In this way, it is possible to set recommended target balances for each purpose.

Figure 3-1 shows the minimum fund balance (red line; triangle symbols) that is recommended. The minimum fund balance represents the working capital that is needed to meet month-to-month cash flow for O&M expenses and the required debt service reserve for the City's outstanding debt. **Figure 3-1** also shows the recommended target balance. The target balance is derived by adding a contingency for capital improvements to the minimum fund balance and is based on the City's current Council-approved policy, which states the target reserve is to equal the debt service reserve amount plus 50% of gross annual user revenue. With this contingency, the City should have sufficient cash on hand to fund its cash-funded capital improvements without cash flow constraints. This

contingency is also available to help fund short-term deficits such as emergency expenditures and revenue shortfalls resulting from low water sales.

Figure 3-1 shows the combined balance for the operating and capital reserves that is projected based on the 3% annual revenue increases. With the proposed rate adjustments, the City's reserve fund balance (solid green line) will be above the minimum balance (red line with triangle symbols), which covers the City's operating reserve requirements and is projected to reach the target reserve balance (blue line with "X" symbols) by FY 2021-22.

Figure 3-1. Projected Year-End Reserve Balances



Revenue increases are achieved by increasing rates. In years when rates are not being restructured to align with the cost of service, rates would be increased by the same percentage to generate the required revenue increase. For example, the 3% revenue increase would be achieved with a 3% across-the-board increase in the current service charges and residential and commercial volumetric charges. Such was the case for FY 2017-18; however, in the current rate study for rates to be effective during FY 2018-19, rates are being restructured to align with the cost of service. As a result, different percentage increases in the service charge and quantity charges will occur. The derivation of these rate increases is explained in the next two sections of this report.

SECTION 4. COST OF SERVICE ANALYSIS

4.1 GENERAL APPROACH

The revenue requirement analysis establishes how much revenue is required from rates. The next step in the analysis is determining the cost of service by customer class. The cost of service analysis performed in this study follows a procedure that has been long established by the American Water Works Association (AWWA), which is referred to as the "base/extra capacity method." This method allocates the revenue requirements to the components of the rate structure.

The base/extra capacity method in the AWWA M1 Manual contains three categories: base, maximum day, and maximum hour. Base capacity is determined by the average daily flow during the year. The average daily flow determines how much base capacity is needed to provide that flow. Maximum day capacity is determined by the flow on the maximum day of the year. In other words, the maximum day capacity is greater than the base capacity, including the base capacity plus the additional capacity needed to provide for the maximum day flow of the year. Maximum hour capacity is determined by the flow during the maximum hour on the maximum day. In other words, the maximum hour capacity is greater than the maximum day capacity by the amount of peak hour that occurs during the maximum day flow.

We have refined AWWA's version of the base/extra capacity method. What AWWA considers "base" capacity is not purely base capacity because AWWA defines "base" as average day capacity. Average day capacity includes average peaking, which is greater than how "base" is defined in this report. In this report, "base" demand does not include peaking. We have introduced a fourth category that corresponds to base demand with no peaking, which we call Base Day. This Base Day demand is derived from average winter demand, when there is the least amount of peaking. Hence, in addition to Average Day, Maximum Day, and Maximum Hour categories, we have added Base Day.

4.2 COST OF SERVICE ALLOCATIONS

As the name implies, cost of service analysis (COS) is a process of determining how much water service costs to provide capacity to meet customer demands. In order to provide water service, infrastructure must be constructed, operated, and maintained, which must be paid for from cash or debt. The type and size of infrastructure depends on how much service customers require. Water systems are designed to provide sufficient capacity to meet customer demands for service wherever, whenever, and for as long as demanded.

Although each customer places unique demands on the system, water system design is based on the maximum or peak demand for service placed on the system by all customers

during the peak demand period. The size of the infrastructure that is needed will depend on the maximum demand. Higher demands will obviously require larger, more costly infrastructure as well as increased operating and O&M costs. Here, the goal of a cost of service analysis is to allocate the cost of the capacity to meet the peak demand in proportion to how much of the capacity is required by each customer. The proportions correspond to the maximum amount of capacity provided by the infrastructure. This means that customers that place greater demands on the infrastructure – customers with greater service needs (i.e., higher peak demands) – will be apportioned a greater share of the operating and capital costs of the infrastructure required to meet that demand.

It is important to realize that once the peak demand is used to design the infrastructure, the capacity is available at all times, not just during peak demands. The capacity is available for the potential peak when it occurs. During off-peak demands, the same facilities are being used, but the capital cost of the facilities is determined by the peak demand only, and it is the peak demand that is used to allocate costs. Note that the costs are not allocated only to those who peak. Those who do not peak as much are also using the same facilities. Consequently, they are allocated a share of the costs of the facilities in proportion to their contribution to the peak demand, even though their contribution to peaking may be significantly less.

A cost of service analysis determines the unit cost of the services provided to the City's water customers. Inside City and Outside City customers, and each customer class therein, is charged the same unit cost for its share of the services that it requires. In this way, the total revenue requirement is proportioned between the fixed service charges and the quantity charges; the quantity charges are further proportioned among the customer classes. This methodology is consistent with industry standards promulgated by the American Water Works Association[1] and referred to as the "base/extra capacity method."

The analysis involves a sequence of steps that is summarized in **Figure 4-1**. The sequence leads to determining how much revenue should be recovered from fixed, service charges and from variable, quantity charges for each customer class. The derivation of the rates for the service and quantity charges is described in **Section 5**.

[1] American Water Works Association, *Principles of Water Rates, Fees, and Charges* (Seventh Edition, 2017).

Figure 4-1. Cost-of-Service Analysis

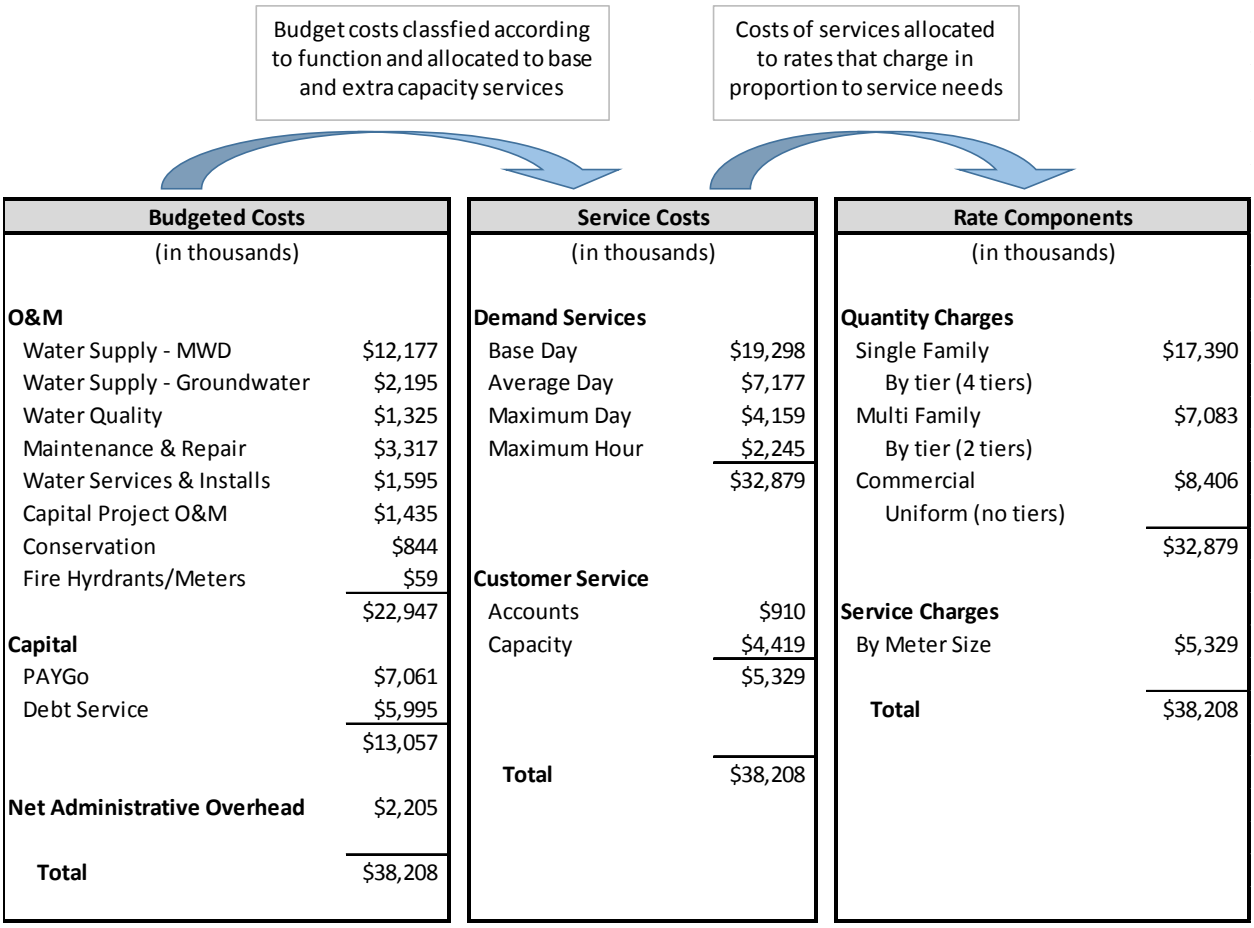


Table 4-1 shows the derivation of the allocation factors associated with each level of demand. The factors are based on meter reading data from the City's automated meter infrastructure (AMI), which is capable of reading customer meters at hourly intervals. The AMI has a software interface known as Water Tracker, which allows customers to monitor their water use and allows aggregation of the data by customer class. This data can be aggregated to determine the flow that corresponds to the functions provided to meet customer demands:

- Base, non-seasonal demand, when there is minimal peaking.
- Average day demand, which includes non-seasonal demand plus average daily peaking.
- Maximum day demand, which includes average day demand plus peaking on the maximum day of the year.
- Maximum hour demand, which includes maximum day demand plus peaking at the maximum hour on the maximum day.

Table 4-1. Demand Allocation Factors - Systemwide

	Demand Service Levels				
	Base Day	Average Day	Maximum Day	Maximum Hour	
Demand (HCF per day)[1]	7,270	10,802	17,371		
÷24 hours	24	24	24		
Demand (HCF per hour)[1]	303	450	724	1,211	
Incremental Change		147	274	487	
Allocation Percentage Calculations					Total HCF
Base Day	303				303
% of Total	100%				100%
Average Day	303	147			450
% of Total	67%	33%			100%
Maximum Day	303	147	274		724
% of Total	42%	20%	38%		100%
Maximum Hour	303	147	274	487	1,211
% of Total	25%	12%	23%	40%	100%

[1] Source: 2017 AMI data

The flows shown in **Table 4-1** are the aggregate flows for the entire water system. The resulting factors are used to allocate the functionalized costs into the four demand service categories. In turn, the costs for each of the demand service categories are allocated among the customer classes using the AMI data aggregated at the customer class level (see discussion in **Section 5**).

For purposes of allocating costs associated with meeting Average Day demands, 67% is allocated to the Average Day service and 33% is allocated to the Base Day service, as shown in **Table 4-1**. Maximum Day demand includes Base Day, Average Day, and Maximum Day components. Maximum Hour demand has all four service levels of demand. While system capacity is essentially designed to meet peak demands, it is important to understand that the cost of facilities that are sized for peak demands is not borne by only customers that peak.

Using distribution pipelines as an example, they are sized to meet Maximum Hour demands. Even though they are sized for the highest level of service, lower peak demands are also accommodated by these pipelines. Hence, the cost of the pipelines is not allocated 100% to the Maximum Hour service level. The cost is apportioned across the lower service levels, too, as shown in **Table 4-2**. Thus the costs of peaking are shared by all customers and not exclusively allocated to those who peak the most.

Table 4-2. Demand Allocation Factors – Systemwide Flows

Operating and Capital Expenses	Demand Service Levels				Customer Service
	Non-Peaking Base	Extra Capacity Peaking			
		Average Day	Maximum Day	Maximum Hour	
Source of Supply					
Groundwater extraction	67%	33%			
Water treatment	67%	33%			
MWD purchased water	67%	33%			
MWD readiness-to-serve charge					100%
Transmission					
Conveyance	42%	20%	38%		
Pumping	42%	20%	38%		
Balancing storage	42%	20%	38%		
Distribution					
Conveyance	25%	12%	23%	40%	
Pumping	25%	12%	23%	40%	
Water quality	25%	12%	23%	40%	
Balancing storage	25%	12%	23%	40%	
Conservation	25%	12%	23%	40%	
Customer Services					
Admin, billing, meter reading, installs					100%

Table 4-3 shows the allocation of the functionalized costs to the demand and customer service categories. Costs associated with the demand services are allocated using the factors in **Table 4-1**, which are based on systemwide AMI data. Costs associated with customer service are used for calculating water and fire service charges.

Table 4-3. Functional Cost Allocations (FY 2018-19)

Costs to be Allocated		Allocation Factor	Demand Services				Subtotal - Demand Services	Subtotal - Customer Service	Total
			Base Day	Average Day	Maximum Day	Maximum Hour			
O&M Expenses									
Water Supply									
Groundwater	$2,195,498	Average Day	$1,477,575	$717,923	$0	$0	$2,195,498	$0	$2,195,498
Water Treatment	$662,375	Average Day	$445,780	$216,595	$0	$0	$662,375	$0	$662,375
MWD - Quantity Charge	$10,968,651	Average Day	$7,381,927	$3,586,725	$0	$0	$10,968,651	$0	$10,968,651
MWD - Readiness-to-Serve Charge	$1,208,310	Customer Service	$0	$0	$0	$0	$0	$1,208,310	$1,208,310
Water Quality - Distribution	$662,375	Max Hour	$165,675	$80,498	$149,714	$266,488	$662,375	$0	$662,375
Maintenance & Repair	$3,317,471	Max Day	$1,388,334	$674,562	$1,254,575	$0	$3,317,471	$0	$3,317,471
Water Services & Installations	$1,595,271	Customer Service	$0	$0	$0	$0	$0	$1,595,271	$1,595,271
Capital Project O&M	$1,434,688	CIP Composite	$648,473	$315,079	$259,038	$60,255	$1,282,845	$151,843	$1,434,688
Conservation	$843,626	Max Hour	$211,011	$102,526	$190,681	$339,409	$843,626	$0	$843,626
Fire (e.g., hydrants, meters, etc.)	$58,812	Customer Service	$0	$0	$0	$0	$0	$58,812	$58,812
Subtotal - O&M Expenses	**$22,947,078**		**$11,718,774**	**$5,693,908**	**$1,854,008**	**$666,152**	**$19,932,842**	**$3,014,236**	**$22,947,078**
Capital Expenses									
PAYGo projects	$7,061,200	CIP Composite	$3,191,631	$1,550,747	$1,274,927	$296,560	$6,313,865	$747,335	$7,061,200
Debt Service	$5,995,488	D/S Composite	$1,718,078	$834,778	$1,552,550	$1,564,555	$5,669,961	$325,526	$5,995,488
Subtotal - Capital Expenses	**$13,056,688**		**$4,909,709**	**$2,385,526**	**$2,827,477**	**$1,861,115**	**$11,983,826**	**$1,072,861**	**$13,056,688**
		CIP Composite	*37.6%*	*18.3%*	*21.7%*	*14.3%*	*91.8%*	*8.2%*	*100.0%*
Total O&M and Capital	**$36,003,765**		**$16,628,484**	**$8,079,434**	**$4,681,485**	**$2,527,266**	**$31,916,669**	**$4,087,097**	**$36,003,765**
		Exp Composite	*46.2%*	*22.4%*	*13.0%*	*7.0%*	*88.6%*	*11.4%*	*100.0%*
Internal Service Funds (Overhead)	$7,154,525	Fixed/Variable	$4,525,823	$0	$0	$0	$4,525,823	$2,628,701	$7,154,525
Non-Operating Revenue	($930,358)	Customer Service	$0	$0	$0	$0	$0	($930,358)	($930,358)
Contribution From Reserves	($4,019,575)	Exp Composite	($1,856,457)	($902,014)	($522,656)	($282,152)	($3,563,278)	($456,297)	($4,019,575)
Net Revenue Requirement	**$38,208,357**		**$19,297,850**	**$7,177,421**	**$4,158,829**	**$2,245,114**	**$32,879,214**	**$5,329,144**	**$38,208,358**

Note: Numbers may not sum exactly due to rounding
Allocation factors from Table 4-2.

Table 4-4 shows the derivation of the customer class allocation factors that are applied to the demand service allocations at the bottom of **Table 4-3**. The allocation factors apportion the cost of the demand service among the customer classes. It can be seen that the allocation to single family customers increases with each level of demand because of the peak irrigation demands that single family customers place on the facilities relative to the multi-family and commercial classes. The resulting allocations establish the cost of providing service to each customer class for each level of demand.[2] The allocated demand service costs are used to determine the quantity charge rates for each class and for each tier for those classes with tiered rates.

Table 4-4. Demand Allocation Factors – Customer Classes

	Demand Services				Total
	Base Day	Average Day	Maximum Day	Maximum Hour	
Net Demand Services Revenue Requirement[1]	**$19,297,850**	**$7,177,421**	**$4,158,829**	**$2,245,114**	**$32,879,214**
Units of Service (HCF) by Customer Class[2]					
Single Family	3,318	6,065	10,969	1,039	
Multi Family	1,890	2,072	2,203	87	
Commercial	2,062	2,665	4,200	84	
Total Units of Service	7,270	10,802	17,371	1,211	
Proportional Allocation to Customer Classes					
(% of Total Units of Service)					
Single Family	45.64%	56.15%	63.14%	85.82%	
Multi Family	26.00%	19.18%	12.68%	7.21%	
Commercial	28.36%	24.67%	24.18%	6.97%	
Total	100.00%	100.00%	100.00%	100.00%	
Net Revenue Requirement by Customer Class					
Single Family	$8,807,681	$4,029,907	$2,626,081	$1,926,737	$17,390,405
Multi Family	$5,016,593	$1,376,746	$527,344	$161,921	$7,082,605
Commercial	$5,473,576	$1,770,767	$1,005,405	$156,456	$8,406,204
Total	**$19,297,850**	**$7,177,421**	**$4,158,829**	**$2,245,114**	**$32,879,214**

Note: Numbers may not sum exactly due to rounding
[1] Net demand services revenue requirement from Table 4-3.
[2] Source: 2017 AMI data.

The customer service costs are the basis for the water and fire service charge rates. Service charge rates are based on the size of the service connection and are independent of whether the customer is single family, multi-family, commercial, or irrigation. The derivation of the quantity and service charge rates is described in **Section 5**. Important conclusions about the cost of base and extra capacity demand are indicated in **Table 4-4**. $19.3 million (59%) of the total $32.9 million is related to non-seasonal base day demand.

[2] Note that the flows for Base Day, Average Day, and Maximum Day are for 24-hour periods and that the flow for Maximum Hour is for a one-hour period.

In effect, if there were no peak demands, the facilities could be sized much smaller, reducing the cost to 59% of the current cost. However, peaking occurs and the cost to provide extra capacity for this service increases incrementally.

The resulting average cost of service allocations shown in **Table 4-5** indicate that Single Family Residential customers are the most costly to serve ($8.03 per HCF); Multi Family customers are the least costly to service ($7.03 per HCF) and Commercial customers are in between ($7.35 per HCF). These results are in line with expectations as those customer which tend to peak the most are more costly to serve. Analysis of the City's AMI data indicates Single Family customers peak the most and Multi Family customers peak the least.

Table 4-5. Average Cost of Service

	Quantity Charge Rev. Req.[1]	Proj. FY2018/19 Demand (HCF)	Average Cost per HCF
Single Family	$17,390,405	2,166,786	$8.03
Multi Family	$7,082,605	1,007,664	$7.03
Commercial	$8,406,204	1,143,890	$7.35
Total	$32,879,214	4,318,340	$7.61

Rates need to be designed to generate each class's share of the revenue requirement related to quantity charges and fixed service charges. **Table 4-6** compares the revenue projected from current rates to the cost of service by customer class for the quantity charges and the revenue projected from current rates to the cost of service for the fixed serve charge. **Table 4-6** indicates that the revenue from existing quantity charge rates differs from each class' share of the cost of service. Single family and multi-family quantity charge rates need to increase to bring them in line with the cost of serving the respective classes and commercial rates need to decrease; service charges for all classes need to general 5.5% more revenue in total.

Table 4-6. Current Rate Revenue Compared With the Cost of Service

			FY 2018-19		Difference	
Customer Class		**Current***		**COS**	**$**	**%**
Quantity Charges						
Single Family	$	15,129,244	$	15,914,148	$ 784,904	5.2%
Multi Family	$	6,131,867	$	6,538,400	$ 406,533	6.6%
Commercial	$	8,179,100	$	7,740,991	$ (438,109)	-5.4%
Subtotal	$	29,440,211	$	30,193,538	$ 753,327	2.6%
% of Total		*85.4%*		*87.5%*		
Service Charges	$	5,049,510	$	5,329,143	$ 279,633	5.5%
% of Total		*14.6%*		*15.5%*		
Grand Total	$	34,489,721	$	35,522,681	$ 1,032,960	3.0%

* Current revenue at current rates and projected FY 2018-19 demand

Section 5 provides the recommended modifications to the quantity charges and service charges in order to meet the current cost of service requirements shown in **Table 4-6**.

SECTION 5. RATE DESIGN

5.1 DESIGN OBJECTIVES

The rate design analysis links the revenue requirements identified in Section 2 with the water rates necessary to achieve full cost recovery. The focus of this process is to set rates and substantiate that each rate reflects its fair and proportionate share of system costs.

Setting rates in California is subject to key laws and court decisions of which Article XIIID of the California Constitution is most important. Article XIIID has three substantive provisions that must be met: (1) the revenue from rates must not exceed the cost of providing service, (2) the revenue from rates must be used for providing service, and (3) the fees and charges must be proportional to the cost of providing the service. In meeting these provisions, the water supplier is responsible for meeting the burden of proof. The first two provisions are more closely related to developing revenue requirements and revenue projections. The last provision is the primary objective in rate structure design.

The *San Juan Capistrano* decision is a 2015 appellate court decision that found that tiered rates must be proportionate to the cost of service across the range of consumption. While acknowledging that such an analysis may be complex, no formulas, rules, or specific procedures are prescribed in the decision for how to set tiered rates, only that each tier must be cost-based.

The City has historically charged water customers the combination of a fixed service charge and a variable quantity charge based on metered water use. As previously discussed, this is a very common set of charges that is prevalent throughout the water industry. This section explains the derivation of the Quantity and service charge rates that reflect the projected cost of service.

5.2 SUMMARY OF RATE DESIGN MODIFICATIONS

Based on discussion with City staff, the Public Works Commission, and the City Council/Public Works Liaison Committee, and careful review of the cost of service analysis, the following rate design elements were discussed, and in some cases modified from current, as noted. The calculation of rates and the rationale for any recommended modifications follow this section.

- Maintain three separate customer classes for quantity charge rates: single family, multi family, and commercial.
- Maintain four tiers for single family quantity charge rates and adjust the breakpoints of the four tiers based on current water demand patterns.

- Reduce the number of multi-family quantity charge tiers from four to two and adjust the breakpoints based on current water demand patterns.
- Maintain a uniform (no tiers) quantity charge rate for commercial customers.
- Replace the 1.25 multiplier on the quantity charge rates for outside city customers, which was an approximation of the additional cost to service outside city customers, with rates that are based on a more exacting cost analysis.
- Create irrigation rates for each customer class.
- Develop rate stabilization factors to be applied to quantity charge rates during declared water shortages to maintain revenue stability.
- Derive 15.0% of rate revenue from service charges rates, which is a slight increase from the current 14.6%, to maintain revenue stability.
- Develop a water reliability charge to cover the WEP costs.

5.3 QUANTITY CHARGE RATE DESIGN AND CALCULATIONS

The City has separate quantity charges for single family residential, multi-family residential, and commercial customers, which is appropriate as different levels of service are being provided to the average customer within each class. However, within the single family and multi-family customer classes, we have identified some recommended changes in the number and/or size of the tiers. Our analysis of historical customer water use data, by customer class, has led to our recommended changes. Each class' rate design is described below.

The quantity charges calculated in Section 5.3.A (Single Family Residential), Section 5.3.B (Multi Family Residential), and Section 5.3.C (Commercial), which are the same for Inside City and Outside City customers, reflect the cost to provide service before adjustments for contributions and services provided by the City's General Fund. Adjustments to these calculated rates due to the General Fund contributions and service impact the Inside City customer rates differently than Outside City customer rates. The rationale and calculations for adjusting the rates can be found in **Section 5.3.D** and the resulting adjusted quantity charge rates for Inside City and Outside City customers can be found in **Section 5.3.E**.

A. Single Family Residential Quantity Charges

Tiered rate structures are well suited to single family residential quantity charges because of the wide variation in peak demand patterns. The use of four tiers has been in place for the City's single family residential customers and continues to be appropriate. With four tiers, it is possible to size tiers corresponding to non-seasonal base demand, average day demand, maximum day demand, and maximum hour peak demand. The size of the tiers

is based on the demand pattern for single family customers using AMI data. The proposed breakpoints align the cost associated with each level of demand with the demand in each tier.

The rate for each tier is calculated by dividing the cost of service associated with each tier (see **Table 4-4)** by the quantity of water subject to the rate in each tier. The size of the tiers is based on the demand pattern for single family customers using AMI data, which is summarized in **Table 5-1**. The division between each tier – the "breakpoint" – corresponds to the four base/extra capacity levels of demand.

Table 5-1. Single Family Tier Structure - Breakpoints

Single Family	Base Day	Average Day	Maximum Day	Maximum Hour
HCF per Day[1]	3,318	6,065	10,969	
÷ days per billing period	60	60	60	
HCF per billing period	199,079	363,900	658,146	
÷ Single Family dwelling units	7,623	7,623	7,623	
Average flow per dwelling unit (HCF)	**26**	**48**	**86**	**> 86**

[1] Source: 2017 AMI data.

The rate for each tier is the quotient of the cost of service divided by the demand within the tier. **Table 5-2** shows the step-wise calculation. For example, the Tier 1 rate applies to all billed water usage. Any bi-monthly water use that exceeds the Tier 1 breakpoint will be subject to the Tier 2 rate. The quantity charge will be the sum of the amounts for the successive tiers. Whereas low water use will only pay the Tier 1 quantity charge rate, high water use will pay the sum of the quantity charges for each tier. **Table 5-2** tabulates the cost increment for each of the four levels of demand. The quantity charge rate for each tier sums the increments that are added with each successive tier.

Table 5-2 shows the calculation of the per-unit cost to be paid by both Inside and Outside City single family customers, before adjustments for general fund contributions for non-operating lease revenue and general fund service reimbursements. The total revenue requirement for the class was distributed across the tiers as shown in **Table 4-4.**

Table 5-2. Single Family Tier Structure - Rates

Single Family Cost-of-Service per Unit	Tier 1 Base Day	Tier 2 Average Day	Tier 3 Maximum Day	Tier 4 Maximum Hour
Demand services revenue requirement[1]	**$8,807,681**	**$4,029,907**	**$2,626,081**	**$1,926,737**
Demand per Tier				
Tier 1: 0 - 26 HCF	892,880			
Tier 2: 27 - 48 HCF	418,778	418,778		
Tier 3: 49 - 86 HCF	376,905	376,905	376,905	
Tier 4: over 86 HCF	478,223	478,223	478,223	478,223
÷ Total HCF per Tier	**2,166,786**	**1,273,906**	**855,128**	**478,223**
Cost-of-Service per Unit (HCF)	**$4.06**	**$3.16**	**$3.07**	**$4.03**

Single Family Unit Cost Calculation	Tier 1	Tier 2	Tier 3	Tier 4
Maximum Hour Component				$4.03
Maximum Day Component			$3.07	$3.07
Average Day Component		$3.16	$3.16	$3.16
Base Day Component	$4.06	$4.06	$4.06	$4.06
Unit Cost per HCF (by Tier)	**$4.06**	**$7.23**	**$10.30**	**$14.33**

[1] Net revenue requirement from Table 4-4.

B. Multi-Family Residential Quantity Charges

The multi-family quantity charge rate structure is also tiered. The derivation of the multi-family quantity charge rate structure follows the same steps as the single family quantity charge rate structure. The size of the multi-family tiers is based on the demand pattern for multi-family customers using AMI data. For single family customers, the demand pattern is broader than it is for multi-family customers because of the variation in dwelling unit size, which is larger for single family customers, and in lot size, which for multi-family customers consists of common landscape area, if any. In both cases, smaller dwelling and lot sizes result in a much narrower range of demand for multi-family customers, as shown in **Table 5-3.** The separation between base, non-seasonal demand and peak demand is so close that the number of tiers for multi-family customers should be reduced from the current four tiers to two tiers to avoid tiers that are only one HCF in size.

Table 5-3. Multi Family Tier Structure - Breakpoints

Multi Family	Base Day	Average Day	Maximum Day	Maximum Hour
HCF per Day[1]	1,890	2,072	2,203	
÷ days per billing period	60	60	60	
HCF per billing period	113,389	124,320	132,162	
÷ Multi Family dwelling units	13,645	13,645	13,645	
Average flow per dwelling unit (HCF)	**8**	**9**	**10**	**> 10**

1 Source: 2017 AMI data.

It is recommended that the Tier 1 breakpoint for the proposed rate structure be set at 8 HCF, which is the base day demand as shown in **Table 5-3**. With this breakpoint, the proposed Tier 1 rate remains at a similar amount as the current Tier 1 rate and the proposed Tier 2 rate is comparable to the current Tier 4 rate. With this design, the proposed Tier 1 rate remains affordable for base day demand, which includes minimal peaking. The proposed Tier 2 rate covers the costs associated with higher rates of peaking, which are attenuated compared to single family peaking but that nonetheless exist.

Table 5-4 shows the calculation of the per-unit cost to be paid by both Inside and Outside City multi-family customers, before adjustments for general fund contributions for non-operating lease revenue and general fund service reimbursements. The total revenue requirement for the class was distributed across the tiers as shown in **Table 4-4.**

Table 5-4. Multi Family Tier Structure - Rates

Multi Family Cost-of-Service per Unit	Tier 1	Tier 2		
	Base Day	Average Day	Maximum Day	Maximum Hour
Demand services revenue requirement[1]	**$5,016,593**	**$1,376,746**	**$527,344**	**$161,921**
Demand per Tier				
Tier 1: 0 - 8 HCF per Dwelling Unit	746,582			
Tier 2: Over 8 HCF per Dwelling Unit	261,082	261,082	261,082	261,082
÷ Total HCF per Tier	**1,007,664**	**261,082**	**261,082**	**261,082**
Cost-of-Service per Unit (HCF)	**$4.98**	**$5.27**	**$2.02**	**$0.62**

Multi Family Unit Cost Calculation	Tier 1	Tier 2
Maximum Hour Component		$0.62
Maximum Day Component		$2.02
Average Day Component		$5.27
Base Day Component	$4.98	$4.98
Unit Cost per HCF (by Tier)	**$4.98**	**$12.89**

Note: Numbers may not sum exactly due to rounding
1 Net revenue requirement from Figure I-5.

C. Commercial Quantity Charges

The commercial quantity charges are a uniform, untiered rate that does not vary depending on the level of consumption. This structure has been in place for over ten years. We recommend maintaining the current structure because the commercial class is not homogeneous the way the residential classes are. The types of customers, the amounts of their water use, and the seasonality of their water use are so diverse as to make it problematic to determine the location of breakpoints. For that reason, tiered rates are not well suited for the commercial customer class.

Table 5-5 shows the calculation of the per-unit cost to be paid by both Inside and Outside City commercial customers, before adjustments for general fund contributions for non-operating lease revenue and general fund service reimbursements. The total revenue requirement for the commercial class was distributed across the tiers as shown in **Table 4-4.**

Table 5-5. Calculation of Commercial Quantity Charge Rate
(before General Fund contribution adjustments)

Commercial Cost-of-Service per Unit	Uniform Rate - No Tiers			
	Base Day	Average Day	Maximum Day	Maximum Hour
Demand services revenue requirement[1]	$5,473,576	$1,770,767	$1,005,405	$156,456
÷ Total HCF	1,143,890	1,143,890	1,143,890	1,143,890
Cost-of-Service per Unit (HCF)	$4.79	$1.55	$0.88	$0.14

Commercial Unit Cost Calculation	Uniform Rate
Maximum Hour Component	$0.14
Maximum Day Component	$0.88
Average Day Component	$1.55
Base Day Component	$4.79
Unit Cost per HCF	**$7.35**

D. Quantity Charge Rate Adjustments

The quantity charge rates summarized in **Table 5-6** reflect the cost to provide service before adjustments for contributions and services provided by the City's General Fund. At this point, both Inside City and Outside City customers would pay the same quantity charge rates because the services provided to Inside and Outside City customers are approximately the same.

Table 5-6. Summary of Cost-of-Service Quantity Charge Rates
(before General Fund contribution adjustments)

	Tier Size	$/HCF
Single Family[1]		
Tier 1	0 - 26 HCF	$4.06
Tier 2	27 - 48 HCF	$7.23
Tier 3	49 - 86 HCF	$10.30
Tier 4	Over 86 HCF	$14.33
Multi Family[2]		
Tier 1	0 - 8 HCF	$4.98
Tier 2	Over 8 HCF	$12.89
Commercial[3]	no tiers	$7.35

[1] From Table 5-2
[2] From Table 5-4
[3] From Table 5-6

During our analysis, we found the City's General Fund has contributed to the Water Enterprise in two ways: 1) the General Fund has reimbursed the Water Enterprise for the lease of two properties owned by the Water Enterprise but leased out at below market rates; and, 2) the General Fund has incurred costs to serve water customers for public safety services, governmental facilities, and right-of-way maintenance. These contributions have not been accounted for in the revenue requirement used to derive the quantity charge rates shown in **Table 5-6**. The contributions (one of cash and one of services) impact the quantity charge rates in different ways.

The following subsections discuss the rationale and calculations for adjusting the quantity charge rates for Inside City and Outside City customers. The adjusted quantity charge rates are summarized in **Section 5.3.E**.

Non-Operating Lease Revenue Credit

The Water Enterprise owns two properties that are no longer used to provide water service. One property is located at 333 La Cienega/Robertson Yard and was formerly the site of the City's water treatment plant. The other property is located at 345 Foothill and previously used by Water Enterprise for storage. Both properties are now leased for non-utility purposes. The City has entered into leases of these properties, at below-market rates, and has agreed to reimburse the Water Enterprise at market rates starting in FY 2016-17. The differential between the market and below-market rates has been estimated (based on a market survey done by the City) to be $3,109,000.

The revenue from the general fund for these leases will be credited to the quantity charge rates shown in **Table 5-6**, for both Inside City and Outside City customers because these revenues are the result of leasing properties that are owned by the Water Enterprise and both Inside City and Outside City customers support the Water Enterprise. **Table 5-7** shows the calculation and the resulting credit to each tier within each customer class at $0.72 per HCF. Originally, the Public Works Commission was presented with a recommendation which provided the lease revenue credit to only the Inside City customers, which resulted in a $0.82 per HCF credit to Inside City customers and no credit to Outside City customers. However, the Public Works Commission has recommended spreading the lease revenue credit to both Inside City and Outside City customers.

Table 5-7. Quantity Charge Rate Adjustment for Lease Revenue Credit

	FY 2018-19
Lease Revenue Contributions	$3,109,000
Total Projected Flow (HCF)	4,318,340
Lease Revenue Credit ($/HCF)	$0.72

General Fund Services Provided to the Water Enterprise

Generally speaking, City enterprise funds receive administrative services from the General Fund for which reimbursement is appropriately due. One category of these services is considered governmental overhead of which the City Manager, City Attorney, Finance, IT, and Human Resources are examples. The reimbursements from the enterprises are typically based on overhead cost allocation plans that derive the reimbursements using commonly accepted cost allocation formulae. The Water Enterprise currently reimburses the General Fund for overhead through the annual budgeting process.

A second category of services is related to specific activities that are directly charged to the enterprise. Public Works engineering associated with enterprise capital improvements is an example. The Water Enterprise also reimburses the General Fund for these services.

A third category of services is typically not considered to be overhead (therefore not included in the annual overhead cost allocation payment from the Water Enterprise to the General Fund) and is not charged directly as is the case with the second category. These services can include public safety, the use of governmental facilities such as city halls and corporation yards, and right-of-way maintenance.

As part of the cost of service analysis, we conducted a cost-based analysis[3] which indicated the City's General Fund is projected to incur approximately $2,440,000 in costs to

[3] *Cost Allocation Study*. Prepared for the City of Beverly Hills by HF&H Consultants, LLC. November 6, 2017.

provide public safety, governmental facilities, and right-of-way maintenance to the Water Enterprise. Of the total $2,440,000, the General Fund incurs $2,015,000 per year to serve Inside City customers and $425,000 per year to serve Outside City customers.

For Inside City customers, these costs are covered by property taxes paid to the City; therefore, no adjustment to the quantity charge rates will be made to the Inside City customers for this item.[4]

Outside City customers do not contribute property taxes to the City; therefore, an adjustment needs to be made to the Outside City quantity charges rates so the General Fund can recoup the cost of these services. The reimbursement by Outside City customers (through the quantity charge rate adjustment) for public safety services, governmental facilities, and right-of-way maintenance is required to maintain parity with Inside City customers, which has previously been paying the entire cost through property tax revenue.

The entire $425,000 cost can be recovered by adding $0.82 per HCF **(**see **Table 5-8)** to the Outside City quantity charges for its single family, multi family, and commercial customers.

Table 5-8. Quantity Charge Rate Adjustment for General Fund Services

		Inside City Customers				Outside City Customers			
Service	FY 2018-19 Projected Cost[1]		Allocation[2]	Less: Amount Covered by Property Taxes	Net needed from Rates		Allocation[2]	Less: Amount Covered by Property	Net needed from Rates
Public Safety	$743,050	82.6%	$613,759	($613,759)	$0	17.4%	$129,291	$0	$129,291
Government Facility	$359,066	82.6%	$296,588	($296,588)	$0	17.4%	$62,477	$0	$62,477
Right-of-Way Maintenance	$1,340,947	82.6%	$1,107,622	($1,107,622)	$0	17.4%	$233,325	$0	$233,325
	$2,443,063			($2,017,970)	$0			$0	$425,093
								Proj. FY 2018-19 Flow (HCF)	516,562
				Quantity Charge rate adjustment:	None			Quantity Charge rate adjustment: ($ per HCF)	$0.82

[1] Cost Allocation Study. Prepared for the City of Beverly Hills by HF&H Consultants, LLC. November 6, 2017.

[2] Based on proportional share of total water connections

E. Adjusted Quantity Charge Rates

Table 5-9 summarizes the recommended FY 2018-19 quantity charge rates, to be effective March 8, 2019. The recommended rates reflect the cost of service calculations that resulted in the common FY 2018-19 quantity charge rates paid by both Inside City and Outside City customers (see **Table 5-6**), with the recommended adjustments to reflect the contributions made by the City's General Fund (discussed in **Section 5.3.B**).

[4] The City plans to continue to cover Beverly Hills' share of these three enterprise reimbursements with property tax revenue and not to include them in the Inside City quantity charge water rates.

Table 5-9. Recommended FY 2018-19 Quantity Charge Rates (effective 3/8/2019)

		Cost-of-Service Analysis	Adjustments		
	Tier Size	$/HCF[1]	Lease Revenue[2]	General Fund Cost Allocation[3]	**Total ($/HCF)**
Inside City					
Single Family					
Tier 1	0 - 26 HCF	$4.06	($0.72)	$0.00	$3.34
Tier 2	27 - 48 HCF	$7.23	($0.72)	$0.00	$6.51
Tier 3	49 - 86 HCF	$10.30	($0.72)	$0.00	$9.58
Tier 4	Over 86 HCF	$14.33	($0.72)	$0.00	$13.61
Multi Family					
Tier 1	0 - 8 HCF	$4.98	($0.72)	$0.00	$4.26
Tier 2	Over 8 HCF	$12.89	($0.72)	$0.00	$12.17
Commercial		$7.35	($0.72)	$0.00	$6.63
Outside City					
Single Family					
Tier 1	0 - 26 HCF	$4.06	($0.72)	$0.82	$4.16
Tier 2	27 - 48 HCF	$7.23	($0.72)	$0.82	$7.33
Tier 3	49 - 86 HCF	$10.30	($0.72)	$0.82	$10.40
Tier 4	Over 86 HCF	$14.33	($0.72)	$0.82	$14.43
Multi Family					
Tier 1	0 - 8 HCF	$4.98	($0.72)	$0.82	$5.08
Tier 2	Over 8 HCF	$12.89	($0.72)	$0.82	$12.99
Commercial		$7.35	($0.72)	$0.82	$7.45

[1] From Table 5-6
[2] From Table 5-7
[3] From Table 5-8

Table 5-10 compares the current and recommended quantity charge rates to be effective March 8, 2019 (derived in **Table 5-9**) with subsequent 3% annual adjustments, which corresponds with the respective annual increases in the Water Enterprises revenue requirement as shown in **Table 3-2.**

Table 5-10. Current and Recommended Quantity Charge Rates

Current Quantity Charge Rates			Recommended Quantity Charge Rates					
					$/HCF			
	Tier Size	$/HCF		Tier Size	3/8/2019	1/1/2020	1/1/2021	1/1/2022
Inside City								
Single Family			**Single Family**					
Tier 1	0 - 10 HCF	$4.02	Tier 1	0 - 26 HCF	$3.34	$3.44	$3.54	$3.65
Tier 2	11 - 55 HCF	$5.30	Tier 2	27 - 48 HCF	$6.51	$6.71	$6.91	$7.12
Tier 3	56 - 120 HCF	$8.36	Tier 3	49 - 86 HCF	$9.58	$9.87	$10.17	$10.48
Tier 4	Over 120 HCF	$16.15	Tier 4	Over 86 HCF	$13.61	$14.02	$14.44	$14.87
Multi Family			**Multi Family**					
Tier 1	0 - 4 HCF	$4.02	Tier 1	0 - 8 HCF	$4.26	$4.39	$4.52	$4.66
Tier 2	5 - 9 HCF	$5.30	Tier 2	Over 8 HCF	$12.17	$12.54	$12.92	$13.31
Tier 3	10 - 16 HCF	$8.36						
Tier 4	Over 16 HCF	$16.15						
Commercial		$6.86	**Commercial**		$6.63	$6.83	$7.03	$7.24
Outside City								
Single Family			**Single Family**					
Tier 1	0 - 10 HCF	$5.01	Tier 1	0 - 26 HCF	$4.16	$4.28	$4.41	$4.54
Tier 2	11 - 55 HCF	$6.63	Tier 2	27 - 48 HCF	$7.33	$7.55	$7.78	$8.01
Tier 3	56 - 120 HCF	$10.45	Tier 3	49 - 86 HCF	$10.40	$10.71	$11.03	$11.36
Tier 4	Over 120 HCF	$20.18	Tier 4	Over 86 HCF	$14.43	$14.86	$15.31	$15.77
Multi Family			**Multi Family**					
Tier 1	0 - 4 HCF	$5.01	Tier 1	0 - 8 HCF	$5.08	$5.23	$5.39	$5.55
Tier 2	5 - 9 HCF	$6.63	Tier 2	Over 8 HCF	$12.99	$13.38	$13.78	$14.19
Tier 3	10 - 16 HCF	$10.45						
Tier 4	Over 16 HCF	$20.18						
Commercial		$8.58	**Commercial**		$7.45	$7.67	$7.90	$8.14

5.4 SERVICE CHARGE RATES

Service charge rates are fixed rates charged per account that are billed each billing period. The service charge rates are graduated in proportion to the capacity of the service serving a property. Service charge rates are charged for water service and for those customers with separate services for fire service.

A. Water Service Charge Rates

The cost of service analysis determined how much of the revenue requirement is attributable to the customer service function. The function has two components – customer accounts and customer capacity – each of which is itemized in the cost of service analysis in **Table 5-12**. Costs attributable to customer accounts are allocated to customers in proportion to the number of accounts. Costs attributable to customer capacity are allocated to customers in proportion to the capacity of their services. The sum of the two components equals the service charge rate per connection.

Table 5-11 lists the units of service corresponding to each of the cost components. The 9,923 meters are used for apportioning the customer accounts cost component.

Capacity costs associated with the distribution system are apportioned among the connections in proportion to the capacity associated with each connection. Accounts are converted to Equivalent Meter Units (EMUs) to apportion the customer capacity cost component. An EMU represents the number of 1-inch meters to which a larger meter is equivalent. For example, a 2-inch meter provides 3.2 times as much capacity as a 1-inch meter. The capacity multipliers are based on the safe maximum operating capacity by meter size per the current AWWA standards included in Table B-2 of AWWA's M-1 manual, seventh edition. For example, the 1,121 2-inch meters equal 3,587 EMUs. There are 16,251 total EMUs. In effect, the 9,923 services of various sizes have the equivalent capacity as 16,251 1-inch meters.

Table 5-11. Service Charge Units of Service

Service Size	Total # of Meters	Meter Ratings (gpm)	Capacity Multiplier*	EMUs
	a	b	c = b ÷ 50	d = a * c
1"	6,671	50	1.00	6,671
1-1/2"	1,879	100	2.00	3,758
2"	1,121	160	3.20	3,587
3"	147	320	6.40	941
4"	87	500	10.00	870
6"	17	1,000	20.00	340
8"	0	1,600	32.00	0
10"	1	4,200	84.00	84
Total Meters	**9,923**		**Total EMUs**	**16,251**

* Capacity multiplier assumes 1" meter = 1 EMU = 50 gals/min

Table 5-12 derives the unit costs for the customer accounts and customer capacity cost components. Each account is allocated $12.07 for the customer account cost component. That amount represents the costs incurred to maintain an account regardless of the capacity of the service. Each account is also allocated $36.91 per EMU. That amount represents a portion of the cost of providing distribution system capacity for each account, and increases based on the capacity of the meter.

Table 5-12. Service Charge Unit Costs

FY 2018-19 Customer Service Expenses	Customer Account Component	Customer Capacity Component	Total
O&M Expenses	1,314,939	1,699,297	$3,014,236
Capital Expenses	$560,872	$511,989	$1,072,861
Administrative Overhead	$173,886	$2,454,815	$2,628,701
Non-Operating Revenue	($1,139,780)	($246,875)	($1,386,655)
Total FY 2018-19	**$909,918**	**$4,419,226**	**$5,329,143**
Less: Fire Service Revenue	($191,542)	($820,376)	($1,011,918)
Net Revenue Requirement	$718,376	$3,598,850	$4,317,225
Units of Service	**9,923** Meters	**16,251** EMUs	
Unit Cost (bi-monthly)	**$12.07** per Account	**$36.91** per EMU	

Source: FY 2015-19 Customer Service Expenses from Table 4-3
Source: Units of service from Figure 5-11

Table 5-13 combines the customer service and capacity components into a single service charge for each size service.

Table 5-13. Recommended Monthly Service Charge Rates (effective 3/8/2019)

Service Size	Account Component ($/bi-month)	Capacity Component $/EMU	Capacity Multiplier	Capacity Component Total	Fixed Service Charge ($/bi-month)
	a	b	c	d = b * c	e = a + d
1"	$12.07	$36.91	1.00	$36.91	$48.97
1-1/2"	$12.07	$36.91	2.00	$73.82	$85.88
2"	$12.07	$36.91	3.20	$118.11	$130.17
3"	$12.07	$36.91	6.40	$236.22	$248.28
4"	$12.07	$36.91	10.00	$369.09	$381.16
6"	$12.07	$36.91	20.00	$738.18	$750.25
8"	$12.07	$36.91	32.00	$1,181.09	$1,193.15
10"	$12.07	$36.91	84.00	$3,100.36	$3,112.42

Source: Figures 5-11 and 5-12.

Tables 5-14 compares the current and recommended service charge rates. Historically, the City charged separate rates for Inside and Outside City customers. We recommend a single set of service charge rates that does not differentiate between a customer's location within the City's service area. In this way, the increased cost of serving Outside City customers will be recovered from only the quantity Charge rates.

The service charge rates projected for 1/1/2020 and the subsequent two years are based on the proposed rates to be effective March 8, 2019 with 3% annual adjustments, which corresponds with the respective annual increases in the Water Enterprises revenue requirement as shown in **Figure 3-2.**

Table 5-14. Current and Recommended Water Service Charge Rates

	Current		Recommended (Inside and Outside City)			
Meter Size	Inside City	Outside City	3/8/2019	1/1/2020	1/1/2021	1/1/2022
	$ per bi-monthly bill		$ per bi-monthly bill			
1"	$44.66	$55.83	$48.97	$50.44	$51.95	$53.51
1.5"	$77.41	$96.77	$85.88	$88.46	$91.11	$93.84
2"	$116.72	$145.91	$130.17	$134.08	$138.10	$142.24
3"	$208.43	$260.53	$248.28	$255.73	$263.40	$271.30
4"	$339.44	$424.30	$381.16	$392.59	$404.37	$416.50
6"	$666.96	$833.69	$750.25	$772.76	$795.94	$819.82
8"	$1,071.86	$1,339.82	$1,193.15	$1,228.94	$1,265.81	$1,303.78
10"	$1,857.96	$2,322.44	$3,112.42	$3,205.79	$3,301.96	$3,401.02

B. Fire Service Charge Rates

All customers pay service charges based on the size of their connection. Some customers have additional Fire Service connections. Fire Service connections are for sprinkler systems that provide water on a stand-by basis for fire suppression. Revenue from fire service charges covers about 3% of the total revenue requirement. The cost of service analysis is currently limited in deriving the full cost of fire service because costs directly related to fire service are not identified in the budget. As a result, the allocation is limited by the level of detail in the budget's cost breakdown. For that reason, it would be appropriate to maintain the current Fire Service rates on March 8, 2019 until such time as budget detail is sufficient to allow for thorough cost of service analysis.

It is recommended that the Outside City Fire Service rates be set equal to the Inside City Fire Service rates effective March 8, 2019. Subsequently, each January 1 thereafter, we recommend 3% annual adjustments which correspond with the respective annual increases in the projected revenue requirement as shown in **Figure 3-2.**

Table 5-15. Current and Recommended Bi-monthly Fire Service Rates

	Current		Recommended (Inside and Outside City)			
Meter Size	Inside City	Outside City	3/8/2019	1/1/2020	1/1/2021	1/1/2022
2" or smaller	$27.20	$34.00	$27.20	$28.02	$28.86	$29.73
2 1/2"	$40.56	$50.71	$40.56	$41.78	$43.03	$44.32
3"	$59.08	$73.86	$59.08	$60.85	$62.68	$64.56
4"	$114.11	$142.64	$114.11	$117.53	$121.06	$124.69
6"	$311.62	$389.53	$311.62	$320.97	$330.60	$340.52
8"	$652.26	$815.32	$652.26	$671.83	$691.98	$712.74
10"	$1,164.63	$1,455.79	$1,164.63	$1,199.57	$1,235.56	$1,272.63

5.5 IRRIGATION CUSTOMER CLASS AND RATES

Meeting the needs for irrigation is an increasing challenge in California. Legislation has been in place that calls for a 20% reduction in urban water use by 2020. The Governor recently signed SB 606 which places further conditions on urban water suppliers to eliminate excessive water use. Irrigation is one of the easiest types of water use to eliminate excessive use. Improving irrigation efficiency is facilitated by separately metering irrigation. This is recognized by the City, which is requiring new customers with potentially significant irrigation to install separate irrigation meters. Requiring the installation of separate irrigation services leads to creating an irrigation class or classes.

It is not uncommon to see a single irrigation class. This class is typically for large turf irrigation at municipal parks, industrial parks, and commercial sites such as golf courses. Residential irrigation is usually not included. In Beverly Hills' case, separate irrigation meters can be mandatory for any class – single family, multi family, and commercial (which includes municipal irrigation). In this case, it is appropriate to establish irrigation classes within the single family, multi family, and commercial classes.

A. Review of Current Irrigation Water Use

In our review of water use during 2017, we found the following:

- There are currently 245 irrigation meters in place, which is 2.5% of the total meters currently connected.
- The aggregated outdoor water use from irrigation meters is currently only 3% of total water use in the City by all customer classes.
- The quantity charge revenue from the aggregated irrigation customers is 12% of the total seasonal quantity charge revenue. This is not surprising because irrigation demand is inherently seasonal. If the irrigation class were to double in size, it could amount to a quarter of the seasonal demand.
- In non-drought years, variations in seasonal water demand can fluctuate by 5% to 10%, which is slightly greater than the current total demand of the aggregated irrigation customers.

- The growth in the number of irrigation services is likely to vary by irrigation subclass.

None of the irrigation subclasses is currently large enough to warrant a separate rate because the number of services in each subclass is so small.

B. Recommendation

The proposed irrigation subclasses would be charged the same rates as the domestic subclass within each class. These irrigation customers would pay service and quantity charges as though they were domestic customers. However, during water shortages, it is proposed that irrigation water use would be reduced six times more than domestic water use.

It was recommended that the City review the irrigation quantity charge rates in the future to evaluate whether to continue to charge irrigation customers the same quantity charge rates as the domestic customers in the same class.

The point at which the irrigation customers become a large enough class in the aggregate to warrant a separate rate is not an absolute point. The class should be large enough so that seasonal fluctuations are not so great that deriving cost allocation factors based on demand are reasonably stable. The problem is compounded because irrigation demand is inherently seasonal. Multi-year averages of irrigation demand can smooth the fluctuations.

A doubling in size of the irrigation class would be a reasonable point to re-evaluate whether a separate rate is warranted for the aggregated irrigation class. However, at twice its size, the irrigation class would still be a distant third in size compared with the domestic subclasses. At that time, the question should also be considered as to whether a change is warranted simply because it becomes possible to calculate a separate irrigation rate with reasonable stability. It is possible that, if the cost of service analysis accounts for the fact that irrigation water may be interruptible during water shortage conditions, therefore less reliable, a new irrigation rate may be lower than continuing to charge the irrigation subclasses the same rate as the domestic subclasses.

5.6 WATER SHORTAGE REVENUE STABILIZATION FACTORS

During prolonged shortages, customers are required to conserve or even ration their water use. These shortages can include locally declared water shortages caused by facility operations, State mandated reductions, or natural disasters including droughts. The magnitude of the water savings can significantly reduce water sales revenue from quantity charges.

During shortages, costs do not decrease in direct proportion to decreases in water use because typically over 70% of the costs are fixed regardless of how much water is supplied. Hence, a 10% reduction in water use may only reduce costs about 3% (i.e., 10% of the 30% of costs that vary in proportion to water use). Because the City only receives 15% of its revenue from fixed charges, a 10% reduction in water sales results in an 8.5% reduction in revenue (i.e., 10% of 85% of the revenue from quantity charges). This means that, in a year-long 10% shortage, 97% of the costs are incurred while only 91.5% of the revenue is received, which is a 5.5% revenue shortfall.

Ten percent shortages are not uncommon or as severe as the 2016 shortage, when the State mandated a 32% reduction for the City. Reserves may be able to cover the revenue shortfall during brief rationing periods. For longer or more severe rationing periods, rate increases are needed to offset this revenue shortfall in order to maintain service levels. On average, the rate increases are designed to be revenue neutral. In other words, customers that reduce their demand by the required amount will pay quantity charge rates, which when multiplied by their reduced demand, will generate only enough quantity charge revenue to cover costs.

The City proposes to use Water Shortage Revenue Stabilization Factors to make the rate adjustments that are needed during shortages declared by the City Council to offset the revenue shortfalls caused by conservation. Although the rate increases are designed to be revenue neutral, they must be implemented in compliance with the Proposition 218 protest process. Revenue stabilization adjustments can be implemented that would eliminate the need for a Proposition 218 process every time revenue-neutral adjustments are needed during shortages.

A. Methodology

Since the passage of Proposition 218, water shortages have occurred that have led an increasing number of water suppliers to adopt revenue stabilization adjustments that do not trigger the Proposition 218 protest process each time an adjustment is made. This is accomplished by including the Water Shortage Revenue Stabilization Adjustment procedure in the Proposition 218 notice at the time rates are adopted in compliance with Proposition 218. The notice describes the process, which rate payers have the right to protest. Barring a majority protest, the adjustment process is adopted as part of the rate increase and can be implemented as needed during the term of the adopted rate increases.

The adjustment process includes factors by which quantity charge rates are adjusted in conjunction with the reduction stages in the Water Shortage Contingency Plan. The factors are only applied to the quantity charge rates and not to the service charge rates to give effect only to customer's changes in water demand. The City's current *Water Shortage Contingency Plan* is based on the same reduction in water use for all classes in each of the five stages. As part of the recommended Water Shortage Revenue Stabilization Adjustments, it is proposed that the shortage reductions will vary by customer class. Each

class' reduction will be determined by reducing "outdoor" water use (seasonal water use) six times more than "indoor" (average winter water use) water use.[5] It is assumed that seasonal "outdoor" water demand is primarily for irrigation, which is a lower beneficial use than non-seasonal "indoor" demand, which is primarily related to health and safety needs.

B. Analysis

Based on calendar year 2017 AMI data, the resulting reductions are summarized in **Table 5-16.** The reductions shown represent the customer class reductions required to achieve the reduction associated with each shortage stage. The customer class reductions are greater or less than the overall average for each stage depending on how much of each class' water demand is seasonal.

Table 5-16. Shortage Reductions by Class

Shortage Reductions By Class					
Class	Stage A 5% Reduction	Stage B 10% Reduction	Stage C 20% Reduction	Stage D 30% Reduction	Stage E 50% Reduction
Single Family	6%	12%	24%	36%	58%
Multi Family	3%	5%	11%	16%	31%
Commercial	4%	7%	15%	22%	40%
Irrigation	11%	22%	45%	67%	100%

Table 5-17 shows the calculation of each customer class' respective shortage reduction required during each shortage stage. The annual demand for each class is separated into indoor and outdoor water use where indoor water use is defined as the period from January through March multiplied times four to get the annualized indoor water use over 12 months. Subtracting indoor water use from the total annual water use determines the seasonal outdoor water use. In the case of the irrigation customer class, all of the demand is considered to be outdoor water use.

The percentage reductions for each customer class required to achieve the overall reduction for a particular stage are derived so that outdoor consumption is reduced six times indoor consumption. In a Stage A shortage, a 1.9% reduction in indoor water use and an 11.4% reduction in outdoor water use are required to achieve an overall 5% reduction. Applying the same reduction factors to each class results in different overall reductions for the class based on the relative proportions of their indoor and outdoor water use.

To achieve the 5% Stage A reduction, single family and irrigation customers are required to conserve more than 5% because they have higher seasonal use compared to multi-

[5] This 6-to-1 reduction formula was implemented by the San Francisco Public Utilities Commission during the 1987-1992 drought.

family and commercial customers. This pattern is consistently repeated for Stages A, B, C, and D. Note that the 50% reduction required in Stage E is so great that all outdoor water use is eliminated and indoor water use has to be cut back 24.5%, which is a 4.8-to-1.0 relationship, not 6.0-to-1.0. In Stage E, a 100% reduction in water use by irrigation customers is required.

Table 5-17. Calculation of Shortage Reductions by Stage and Customer Class

5% Stage A Reduction									
	Baseline Annual Demand (HCF)			Reductions					
Class	Total	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Total	Total
Single Family	2,124,994	1,172,836	952,157	1.9%	11.4%	22,239	108,326	130,564	6%
Multi Family	737,223	676,030	61,193	1.9%	11.4%	12,818	6,962	19,780	3%
Commercial	898,704	717,328	181,376	1.9%	11.4%	13,602	20,635	34,236	4%
Irrigation	113,132	-	113,132	1.9%	11.4%	-	12,871	12,871	11%
Total	3,874,052	2,566,194	1,307,859	1.9%	11.4%	48,659	148,793	197,452	**5%**
10% Stage B Reduction									
	Baseline Annual Demand (HCF)			Reductions					
Class	Total	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Total	Total
Single Family	2,124,994	1,172,836	952,157	3.7%	22.3%	43,633	212,537	256,170	12%
Multi Family	737,223	676,030	61,193	3.7%	22.3%	25,150	13,659	38,809	5%
Commercial	898,704	717,328	181,376	3.7%	22.3%	26,687	40,486	67,173	7%
Irrigation	113,132	-	113,132	3.7%	22.3%	-	25,253	25,253	22%
Total	3,874,052	2,566,194	1,307,859	3.7%	22.3%	95,470	291,936	387,405	**10%**
20% Stage C Reduction									
	Baseline Annual Demand (HCF)			Reductions					
Class	Total	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Total	Total
Single Family	2,124,994	1,172,836	952,157	7.4%	44.6%	87,265	425,075	512,340	24%
Multi Family	737,223	676,030	61,193	7.4%	44.6%	50,300	27,318	77,619	11%
Commercial	898,704	717,328	181,376	7.4%	44.6%	53,373	80,972	134,346	15%
Irrigation	113,132	-	113,132	7.4%	44.6%	-	50,506	50,506	45%
Total	3,874,052	2,566,194	1,307,859	7.4%	44.6%	190,939	583,871	774,810	**20%**
30% Stage D Reduction									
	Baseline Annual Demand (HCF)			Reductions					
Class	Total	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Total	Total
Single Family	2,124,994	1,172,836	952,157	11.2%	67.0%	130,898	637,612	768,510	36%
Multi Family	737,223	676,030	61,193	11.2%	67.0%	75,451	40,978	116,428	16%
Commercial	898,704	717,328	181,376	11.2%	67.0%	80,060	121,459	201,518	22%
Irrigation	113,132	-	113,132	11.2%	67.0%	-	75,759	75,759	67%
Total	3,874,052	2,566,194	1,307,859	11.2%	67.0%	286,409	875,807	1,162,216	**30%**
50% Stage E Reduction									
	Baseline Annual Demand (HCF)			Reductions					
Class	Total	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Total	Total
Single Family	2,124,994	1,172,836	952,157	24.5%	100.0%	287,551	952,157	1,239,708	58%
Multi Family	737,223	676,030	61,193	24.5%	100.0%	165,746	61,193	226,939	31%
Commercial	898,704	717,328	181,376	24.5%	100.0%	175,871	181,376	357,247	40%
Irrigation	113,132	-	113,132	24.5%	100.0%	-	113,132	113,132	100%
Total	3,874,052	2,566,194	1,307,859	24.5%	100.0%	629,168	1,307,859	1,937,026	**50%**

The service charge rates are fixed and generate about 15% of the total rate revenue regardless of shortages. The remaining 85% of revenue is generated by the quantity charge rates. In deriving the revenue stabilization factors, the factors will only apply to the quantity charge rates because fluctuations in water use correlate with fluctuations in variable costs. Each customer class has its own set of revenue stabilization factors corresponding to its reduction in each stage of shortage.

The formula for the revenue stabilization factors comprises conservation and variable cost components. The conservation component adjusts to account for the required reduction in water demand. The variable cost component adjusts to account for the portion of variable costs that is covered by the quantity charges. The revenue stabilization factors are the product of the conservation component multiplied by the variable cost component. Each component is defined as follows:

Revenue Stabilization Factor = Conservation Component multiplied times Variable Cost Component, where

Conservation Component = $1/(1 - a)$, where

a = required percentage reduction, which varies by customer class.

Variable Cost Component = $(b - (c * a))/b$, where

a = required percentage reduction, which varies by customer class;

b = percentage of revenue from total service and quantity charges for all customer classes that is attributable to quantity charges, an amount that is currently 85%; and

c = percentage of total revenue requirement covered by service and quantity charges that varies based on fluctuations in demand, an amount that is currently 35%.[6]

The following example illustrates how the formula determined the 1.039 revenue stabilization factor in **Table 5-18** for the single family customer class in a Stage A shortage in which an overall conservation goal of 5% if required.

Conservation Component: $1/(1 - a) = 1/(1 - 0.0614) = 1.0654$, where

[6] The cost of MWD water is the largest example of a variable cost, which varies with water demand.

a = required percentage reduction is 6.14% for the single family customer class (see **Figure V-17**, where a rounded 6% is shown).

Variable Cost Component: $(b - (c * a))/b = (0.85 - (0.35 * 0.0614))/0.85 = 0.9747$, where

a = 6.14% reduction for single family customers in a Stage A shortage.

b = 85% of total rate revenue is generated by quantity charges; and

c = 35% of revenue requirement is related to variable costs.

Revenue Stabilization Factor = 1.0654 * 0.9747 = 1.0385 or 1.039 rounded.

The single family residential quantity charge rates in effect under non-shortage conditions would be multiplied by 1.039 to derive the quantity charge rates to be in effect during a Stage A water shortage. **Table 5-18** shows the adjustment factors that would be applied to the rates that would normally be in effect absent declared shortages.[7]

Table 5-18. Water Shortage Revenue Stabilization Factors by Class

Revenue Stabilization Factors By Class					
Class	Stage A 5% Reduction	Stage B 10% Reduction	Stage C 20% Reduction	Stage D 30% Reduction	Stage E 50% Reduction
Single Family	1.039	1.081	1.187	1.333	1.824
Multi Family	1.016	1.033	1.069	1.110	1.262
Commercial	1.023	1.048	1.103	1.170	1.388
Irrigation	1.076	1.169	1.474	2.192	n/a

To be applied to the non-shortage rates in effect prior to the shortage has been declared.

C. Implementation

The recommended water shortage revenue stabilization adjustments in **Table 5-18** are implemented only during periods of declared shortages. The adjustments can go in either direction from stage to stage depending on whether the level of reduction is increasing or decreasing during the shortage. At least 30 days prior to making the adjustment, notice must be provided to rate payers, which can be included in the customer's bills. No protest process is required.

[7] In Stage E, there is no adjustment factor in **Table 5-18** for irrigation because irrigation is 100% curtailed. Irrigation water use in Stage E is prohibited and would be subject to sanctions.

They act similarly to the pass-through adjustment for the cost of MWD purchased water, which was incorporated into the Proposition 218 notice in last year's rate increase. The pass-through adjustment allows the City to adjust quantity charge rates to track any difference between the MWD rates that were included in the model and the actual rates adopted each year by MWD. The pass-through adjustment can also be made by providing 30-day notice in the customer bills without triggering the need for a Proposition 218 protest process.

5.7 WATER RELIABILITY CHARGE

The City Council is considering the development of local water supplies in order to diversify and expand its sources of supply. By doing so, reliability will be improved during shortages. In addition, the need to rely on purchased water from Metropolitan Water District will be reduced. In return for these benefits, a new, separate water reliability charge is proposed that would provide a steady source of funding over the lifecycle of the WEP project.

The water reliability charge will pay for the cost of developing local water supplies that will augment existing water supplies, thereby improving reliability by reducing the impact of water shortages. This new charge would be created so that customers will understand and help pay for the improved level of service that will lessen the level of cutback during shortages.

This new charge would be uniformly applied to all water use, on a per-HCF basis. The effect of applying an equal, uniform rate to all water use is that the same cost of additional reliability is paid for all water used by all customers. The principle is that all customers get the same benefit of improved reliability regardless of their customer class or their level of water use.

To determine the necessary per-unit charge to fund the La Brea Subarea water reliability project, we develop a 30-year cash flow model (See Appendix A-1 and A-2). The capital expenses are based on the La Brea Subarea Preliminary Design Report (PDR) prepared by Michael Baker International, in association with Richard C. Slade & Associates, LLC and Carollo Engineers. The La Brea Subarea project is anticipated to add 1,700 acre feet per year of additional ground water supply to the City, which amounts to approximately 18% of the Water Enterprise's total water supply. The project includes the following components:

1. Three (3) groundwater production wells in the La Brea Subarea
2. Raw water transmission main from the production wells to the Foothill Water Treatment Plant (approximately 4 miles)

The project is anticipated to be producing the 1,700 acre feet of groundwater by FY 2023-24. Projected expenses for the project are based on the PDR, which projects a cost of

$60.3M ($55.8 million in capital expenses and $4.5 million in additional staffing and O&M expenses; **Table 5-19**) to bring the La Brea Subarea wells to full production by FY 2023-24. Certain adjustments were made to the PDR cost projections through discussions with staff. For example, land acquisitions were originally projected to occur in FY 2016-17 and FY 2017-18; while some of the land was acquired in 2018, the remaining acquisitions are now projected to occur between now and the end of FY 2019-20. The land acquisition costs in the cash-flow analysis were inflated and shifted to later dates to reflect the new projections. After start up, operating costs are estimated to be $2.15 million 2018 dollars) annually.

Table 5-19. Projected Water Reliability Construction Costs

	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	Total
Capital Expenses								
Preliminary Design Report	$0	$874,182	$0	$0	$0	$0	$0	
Land Acquisition (3rd Well Site)	$9,000,000	$2,787,250	$2,787,250	$0	$0	$0	$0	
CEQA	$0	$327,818	$0	$0	$0	$0	$0	
Final Design	$0	$1,678,092	$1,296,326	$1,335,216	$0	$0	$0	
Engineerings Svcs During Const.	$0	$542,766	$559,049	$575,821	$593,095	$610,888	$0	
Construction Mgmt and Inspection	$0	$687,503	$708,128	$729,372	$751,254	$773,791	$0	
Well Drilling (3 sites)	$0	$1,122,941	$2,313,258	$0	$0	$0	$0	
Transmission Main	$0	$0	$3,664,342	$3,774,272	$3,887,500	$0	$0	
Well Equipping (3 sites)	$0	$464,553	$0	$3,107,874	$3,201,110	$0	$0	
Treatment Plant	$0	$0	$0	$0	$3,092,381	$3,200,302	$0	
System Permitting & Testing	$0	$0	$0	$0	$0	$660,375	$680,186	
Total Capital Expenses	$9,000,000	$8,485,106	$11,328,354	$9,522,555	$11,525,340	$5,245,356	$680,186	$55,786,896
Operational Expenses								
O&M per PDR	$0	$0	$0	$347,782	$358,216	$368,962	$380,031	
Additional City Staffing								
Project Manager 3	$0	$206,837	$212,895	$219,135	$225,562	$232,182	$239,000	
Water Treatment Operator 1	$0	$0	$0	$0	$0	$163,573	$168,480	
Pump/Well Mechanic	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	
Pump/Well Electrician	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	
Total Operational Expenses	$0	$425,382	$437,997	$798,772	$822,588	$1,010,692	$1,040,866	$4,536,298
Annual Expenditures (until start up)	$9,000,000	$8,910,488	$11,766,351	$10,321,327	$12,347,928	$6,256,049	$1,721,052	$60,323,193

Due to the front loading of capital expenses during the first six to seven years of the project, simply raising water rates would be too much of a burden on current rate payers. Therefore, working with staff, and input from the Public Works Commission and Public Works Liaison Committee, we developed the following funding strategy, which would require a combination of the water reliability charge, issuing debt, and the use of reserves.

1. **$41.85 million Revenue Bond.** To be issued in FY 2019-20 for a 30-year term at 4% interest. Annual debt service payments would be made from revenues generated by the water reliability charge.

2. **Water Enterprise Reserves.** $12,500,000 in reserves is available during the construction period, on an as-needed basis. The reserves are drawn down during the construction period and subsequently restored as quickly as possible from revenues generated from the water reliability charge.
3. **Water Reliability Charge Revenue.** Revenue generated by the water reliability charge, over a 30-year period, will be used to cover annual O&M costs, restore reserves, and make debt service payments for any debt-funded costs during construction.

We developed a 30-year cash flow model to calculate the uniform quantity charge rates to be charged equally to Inside City and Outside City customers (see **Appendix A-1**), on all water use, and the same rate for all customer classes (i.e., single family, multi family, and commercial). Based on the funding strategy described above, the average unit cost equals $0.38 per HCF starting in 2019, with annual $0.01 increases through 2049.

The potential is being explored whereby the City of Beverly Hills' general fund would subsidize a portion of the water reliability charge for Inside City customers through a $10 million cash contribution during the construction phase of the project. With a $10 million subsidy, the water reliability charge for Inside City customers would be reduced from $0.38 per HCF to $0.23 per HCF starting in 2019. The Outside City customer rate would not change. We modeled the impacts of the $10 million cash contribution (see **Appendix A-2**). The $10 million contribution would reduce the amount of the revenue bond to be issued from $41.85 million to $31.85 million, saving approximately $7.1 million in interest expense over the 30-year period. The combination of the $10 million cash contribution and the $7.1 million in interest cost savings results in a subsidy to the Inside City water reliability charge of $0.15 per HCF. The Outside City customer water reliability charge remains unchanged. The results are summarized in **Table 5-20**.

Table 5-20. Summary of Water Reliability Charge Analyses and Recommended Rates

Assumptions:	No GF Subsidy	With GF Subsidy	
Bond (30yrs, 4.0%)	$41.85M	$31.85M	
Total Interest Incurred	$30.5M	$23.4M	
Contribution from Reserves	$12.5M	$12.5M	
General Fund Subsidy Amount	--	$10M	
Interest Savings from GF Subsidy	--	$7.1M	
Inside City Subsidy for 30 years ($/hcf)	$0.00	$0.15	
Rates per HCF			
Annual Rate Increase	1 cent per HCF	1 cent per HCF	
	Inside & Outside	**Inside**	**Outside**
Fiscal Year	$/HCF		
FY 2018-19 (Year 1)	$0.38	$0.23	$0.38
FY 2019-20	$0.39	$0.24	$0.39
FY 2020-21	$0.40	$0.25	$0.40
FY 2021-22	$0.41	$0.26	$0.41
FY 2022-23	$0.42	$0.27	$0.42
FY 2023-24	$0.43	$0.28	$0.43
FY 2024-25	$0.44	$0.29	$0.44
FY 2025-26	$0.45	$0.30	$0.45
FY 2026-27	$0.46	$0.31	$0.46
FY 2027-28	$0.47	$0.32	$0.47
FY 2028-29	$0.48	$0.33	$0.48
FY 2029-30	$0.49	$0.34	$0.49
FY 2030-31	$0.50	$0.35	$0.50
FY 2031-32	$0.51	$0.36	$0.51
FY 2032-33	$0.52	$0.37	$0.52
FY 2033-34	$0.53	$0.38	$0.53
FY 2034-35	$0.54	$0.39	$0.54
FY 2035-36	$0.55	$0.40	$0.55
FY 2036-37	$0.56	$0.41	$0.56
FY 2037-38	$0.57	$0.42	$0.57
FY 2038-39	$0.58	$0.43	$0.58
FY 2039-40	$0.59	$0.44	$0.59
FY 2040-41	$0.60	$0.45	$0.60
FY 2041-42	$0.61	$0.46	$0.61
FY 2042-43	$0.62	$0.47	$0.62
FY 2043-44	$0.63	$0.48	$0.63
FY 2044-45	$0.64	$0.49	$0.64
FY 2045-46	$0.65	$0.50	$0.65
FY 2046-47	$0.66	$0.51	$0.66
FY 2047-48	$0.67	$0.52	$0.67
FY 2048-49 (Year 30)	$0.68	$0.53	$0.68
Total Revenue from Charges (Year 1 through Year 30)			
Inside City Customers	$60.4M	$43.3M	
Outside City Customers	$8.0M	$8.0M	
Total	$68.8M	$51.4M	

SECTION 6. CUSTOMER BILL IMPACTS

Based on the recommended quantity charge rates summarized in **Table 5-10**, the recommended service charge rates summarized in **Table 5-14**, and the recommended water reliability charge rates summarized in **Table 5-20** (with general fund subsidy), the bi-monthly customer bill impacts were evaluated.

Tables 6-1 through **6-3** provides sample bills impacts for Inside City customers. **Tables 6-4** through **6-6** provide sample bills impacts for Outside City customers. Each table includes the bill impacts for low (half of average), average, and high (three time average) water use for each customer class. The multi-family sample bill impacts are based on a 10-unit complex which is the most-common size within the City's service area.

Table 6-1. Bill Impacts – Inside City Customers – Low Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1"	24					
Service Charge			$44.66	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$114.40	$80.16	$82.56	$85.04	$87.59
Water Reliability Charge			$0.00	$5.52	$5.76	$6.00	$6.24
Total Bill			$159.06	$134.65	$138.76	$142.99	$147.34
$ Change				($24.41)	$4.11	$4.23	$4.35
Multi Family (10 units)	1"	45					
Service Charge			$44.66	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$213.80	$213.00	$219.39	$225.97	$232.75
Water Reliability Charge			$0.00	$10.35	$10.80	$11.25	$11.70
Total Bill			$258.46	$272.32	$280.63	$289.17	$297.96
per Dwelling Unit			$25.85	$27.23	$28.06	$28.92	$29.80
$ Change per Dwelling Unit				$1.39	$0.83	$0.85	$0.88
Commercial	1"	63					
Service Charge			$44.66	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$432.18	$417.69	$430.22	$443.13	$456.42
Water Reliability Charge			$0.00	$14.49	$15.12	$15.75	$16.38
Total Bill			$476.84	$481.15	$495.78	$510.83	$526.31
$ Change				$4.31	$14.63	$15.05	$15.48

Table 6-2. Bill Impacts – Inside City Customers – Average Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1"	48					
Service Charge			$44.66	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$241.60	$230.06	$236.96	$244.07	$251.39
Water Reliability Charge			$0.00	$11.04	$11.52	$12.00	$12.48
Total Bill			$286.26	$290.07	$298.92	$308.02	$317.38
$ Change				$3.81	$8.85	$9.10	$9.36
Multi Family (10 units)	1"	90					
Service Charge			$44.66	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$425.80	$462.50	$476.38	$490.67	$505.39
Water Reliability Charge			$0.00	$20.70	$21.60	$22.50	$23.40
Total Bill			$470.46	$532.17	$548.41	$565.12	$582.30
per Dwelling Unit			$47.05	$53.22	$54.84	$56.51	$58.23
$ Change per Dwelling Unit				$6.17	$1.62	$1.67	$1.72
Commercial	1.5"	126					
Service Charge			$77.41	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$864.36	$835.38	$860.44	$886.25	$912.84
Water Reliability Charge			$0.00	$28.98	$30.24	$31.50	$32.76
Total Bill			$941.77	$950.24	$979.14	$1,008.86	$1,039.45
$ Change				$8.47	$28.90	$29.73	$30.58

Table 6-3. Bill Impacts – Inside City Customers – High Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1.5"	144					
Service Charge			$77.41	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$1,209.70	$1,383.48	$1,424.98	$1,467.73	$1,511.77
Water Reliability Charge			$0.00	$33.12	$34.56	$36.00	$37.44
Total Bill			$1,287.11	$1,502.48	$1,548.00	$1,594.84	$1,643.05
$ Change				$215.37	$45.52	$46.84	$48.21
Multi Family (10 units)	1.5"	270					
Service Charge			$77.41	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$2,787.50	$2,653.10	$2,732.69	$2,814.67	$2,899.11
Water Reliability Charge			$0.00	$62.10	$64.80	$67.50	$70.20
Total Bill			$2,864.91	$2,801.08	$2,885.95	$2,973.28	$3,063.16
per Dwelling Unit			$286.49	$280.11	$288.59	$297.33	$306.32
$ Change per Dwelling Unit				($6.38)	$8.49	$8.73	$8.99
Commercial	2"	378					
Service Charge			$116.72	$130.17	$134.08	$138.10	$142.24
Quantity Charge			$2,593.08	$2,506.14	$2,581.32	$2,658.76	$2,738.53
Water Reliability Charge			$0.00	$86.94	$90.72	$94.50	$98.28
Total Bill			$2,709.80	$2,723.25	$2,806.12	$2,891.36	$2,979.05
$ Change				$13.45	$82.87	$85.24	$87.69

Table 6-4. Bill Impacts – Outside City Customers – Low Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1"	24					
Service Charge			$55.83	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$142.92	$99.84	$102.84	$105.92	$109.10
Water Reliability Charge			$0.00	$9.12	$9.36	$9.60	$9.84
Total Bill			$198.75	$157.93	$162.63	$167.47	$172.45
$ Change				($40.82)	$4.70	$4.84	$4.98
Multi Family (10 units)	1"	45					
Service Charge			$55.83	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$266.70	$254.00	$261.62	$269.47	$277.55
Water Reliability Charge			$0.00	$17.10	$17.55	$18.00	$18.45
Total Bill			$322.53	$320.07	$329.61	$339.42	$349.51
per Dwelling Unit			$32.25	$32.01	$32.96	$33.94	$34.95
$ Change per Dwelling Unit				($0.25)	$0.95	$0.98	$1.01
Commercial	1"	63					
Service Charge			$55.83	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$540.54	$469.35	$483.43	$497.93	$512.87
Water Reliability Charge			$0.00	$23.94	$24.57	$25.20	$25.83
Total Bill			$596.37	$542.26	$558.44	$575.09	$592.21
$ Change				($54.11)	$16.18	$16.65	$17.13

Table 6-5. Bill Impacts – Outside City Customers – Average Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1"	48					
Service Charge			$55.83	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$302.04	$269.42	$277.50	$285.83	$294.40
Water Reliability Charge			$0.00	$18.24	$18.72	$19.20	$19.68
Total Bill			$357.87	$336.63	$346.66	$356.98	$367.59
$ Change				($21.24)	$10.03	$10.32	$10.61
Multi Family (10 units)	1"	90					
Service Charge			$55.83	$48.97	$50.44	$51.95	$53.51
Quantity Charge			$531.90	$536.30	$552.39	$568.96	$586.03
Water Reliability Charge			$0.00	$34.20	$35.10	$36.00	$36.90
Total Bill			$587.73	$619.47	$637.93	$656.91	$676.44
per Dwelling Unit			$58.77	$61.95	$63.79	$65.69	$67.64
$ Change per Dwelling Unit				$3.17	$1.85	$1.90	$1.95
Commercial	1.5"	126					
Service Charge			$96.77	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$1,081.08	$938.70	$966.86	$995.87	$1,025.74
Water Reliability Charge			$0.00	$47.88	$49.14	$50.40	$51.66
Total Bill			$1,177.85	$1,072.46	$1,104.46	$1,137.38	$1,171.25
$ Change				($105.39)	$32.00	$32.92	$33.87

Table 6-6. Bill Impacts – Outside City Customers – High Water Use

	Meter Size	Water Use (HCF)	Current Bill	Proposed 3/8/2019	Proposed 1/1/2020	Proposed 1/1/2021	Proposed 1/1/2022
Single Family	1.5"	144					
Service Charge			$96.77	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$1,512.02	$1,501.56	$1,546.61	$1,593.01	$1,640.80
Water Reliability Charge			$0.00	$54.72	$56.16	$57.60	$59.04
Total Bill			$1,608.79	$1,642.16	$1,691.22	$1,741.72	$1,793.68
$ Change				$33.37	$49.06	$50.49	$51.96
Multi Family (10 units)	1.5"	270					
Service Charge			$96.77	$85.88	$88.46	$91.11	$93.84
Quantity Charge			$3,483.20	$2,874.50	$2,960.74	$3,049.56	$3,141.04
Water Reliability Charge			$0.00	$102.60	$105.30	$108.00	$110.70
Total Bill			$3,579.97	$3,062.98	$3,154.49	$3,248.67	$3,345.59
per Dwelling Unit			$358.00	$306.30	$315.45	$324.87	$334.56
$ Change per Dwelling Unit				($51.70)	$9.15	$9.42	$9.69
Commercial	2"	378					
Service Charge			$145.91	$130.17	$134.08	$138.10	$142.24
Quantity Charge			$3,243.24	$2,816.10	$2,900.58	$2,987.60	$3,077.23
Water Reliability Charge			$0.00	$143.64	$147.42	$151.20	$154.98
Total Bill			$3,389.15	$3,089.91	$3,182.08	$3,276.90	$3,374.45
$ Change				($299.24)	$92.17	$94.82	$97.55

APPENDIX A.

WATER RELIABILITY CHARGE CASH FLOW

Water Reliability Charge 30-year Cash Flow Analysis (No General Fund contribution)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Assumptions												
Annual Inflation - Expenses	3.0%											
Annual Interest Rate - Bonds	4.0%											
Annual Interest Rate - GF Loan	3.0%											
WR Charge Year 1 (2019) - unsubsidized	$0.38											
Annual change in WR Charge	$0.01											
Inside City Subsidy ($/HCF)	$0.00											
Results												
Inside City WRC Revenue	$60,420,000											
Outside City WRC Revenue	$7,950,000											
2049 Ending Cash Balance	($369,492)											
Annual Ending Cash Balance	$0	$406,512	$29,742,261	$18,721,034	$5,716,205	$746,256	$554,304	$392,174	$284,017	$230,162	$230,949	$286,726
Interest on Bond(s)	$30,752,015											
Interest on GF Loan	$0											
Reserves Remaining to be Paid	$0											
Fiscal Year Ending:	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Revenues												
Water Reliability Charge Revenue												
Inside City Customers												
Inside City Flow (HCF)		1,900,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000
$/HCF WR Charge		$0.38	$0.39	$0.40	$0.41	$0.42	$0.43	$0.44	$0.45	$0.46	$0.47	$0.48
Subtotal - Inside City	$0	$722,000	$1,482,000	$1,520,000	$1,558,000	$1,596,000	$1,634,000	$1,672,000	$1,710,000	$1,748,000	$1,786,000	$1,824,000
Outside City Customers												
Inside City Flow (HCF)		250,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
$/HCF WR Charge		$0.38	$0.39	$0.40	$0.41	$0.42	$0.43	$0.44	$0.45	$0.46	$0.47	$0.48
Subtotal - Outside City	$0	$95,000	$195,000	$200,000	$205,000	$210,000	$215,000	$220,000	$225,000	$230,000	$235,000	$240,000
Total Water Reliability Charge Revenue	$0	$817,000	$1,677,000	$1,720,000	$1,763,000	$1,806,000	$1,849,000	$1,892,000	$1,935,000	$1,978,000	$2,021,000	$2,064,000
General Fund Contributions	$9,000,000											
General Fund Loans												
Bond Proceeds			$41,845,000									
Transfer in from Reserves	$0	$8,500,000	$0	$0	$0	$1,900,000	$2,100,000	$0	$0			
Total Revenue	**$9,000,000**	**$9,317,000**	**$43,522,000**	**$1,720,000**	**$1,763,000**	**$3,706,000**	**$3,949,000**	**$1,892,000**	**$1,935,000**	**$1,978,000**	$2,021,000	$2,064,000
Expenditures												
Capital Expenses												
Preliminary Design Report	$0	$874,182	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$9,000,000	$2,787,250	$2,787,250	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$327,818	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$1,678,092	$1,296,326	$1,335,216	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$542,766	$559,049	$575,821	$593,095	$610,888	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$687,503	$708,128	$729,372	$751,254	$773,791	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$1,122,941	$2,313,258	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$3,664,342	$3,774,272	$3,887,500	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$464,553	$0	$3,107,874	$3,201,110	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$3,092,381	$3,200,302	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$660,375	$680,186	$0	$0	$0	$0	$0
Subtotal Capital Expenses	$9,000,000	$8,485,106	$11,328,354	$9,522,555	$11,525,340	$5,245,356	$680,186	$0	$0	$0	$0	$0
Operational Expenses												
O&M per PDR	$0	$0	$0	$347,782	$358,216	$368,962	$380,031	$1,467,870	$1,511,906	$1,557,263	$1,603,981	$1,652,100
Additional Staffing												
Project Manager 3	$0	$206,837	$212,895	$219,135	$225,562	$232,182	$239,000	$246,170	$253,556	$261,162	$268,997	$277,067
Water Treatment Operator 1	$0	$0	$0	$0	$0	$163,573	$168,480	$173,535	$178,741	$184,103	$189,626	$195,315
Pump/Well Mechanic	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	$130,477	$134,392	$138,423	$142,576	$146,853
Pump/Well Electrician	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	$130,477	$134,392	$138,423	$142,576	$146,853
Total Operational Expenses	$0	$425,382	$437,997	$798,772	$822,588	$1,010,692	$1,040,866	$2,148,530	$2,212,986	$2,279,375	$2,347,756	$2,418,189
Debt Service			$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900
Reserves Repayment												
Less: MWD Water Purchase Savings								($2,514,300)	($2,589,729)	($2,667,421)	($2,747,443)	($2,829,867)
Net Expenditures/(Cost Savings)	**$9,000,000**	**$8,910,488**	**$14,186,251**	**$12,741,227**	**$14,767,828**	**$8,675,949**	**$4,140,952**	**$2,054,130**	**$2,043,157**	**$2,031,855**	**$2,020,213**	**$2,008,223**
Net Operating Suprlus/(Shortfall)	$0	$406,512	$29,335,749	($11,021,227)	($13,004,828)	($4,969,949)	($191,952)	($162,130)	($108,157)	($53,855)	$787	$55,777
Cash Balance for WR Expenditures	**$0**	**$406,512**	**$29,742,261**	**$18,721,034**	**$5,716,205**	**$746,256**	**$554,304**	**$392,174**	**$284,017**	**$230,162**	**$230,949**	$286,726

Water Reliability Charge 30-year Cash Flow Analysis (No General Fund contribution)

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Assumptions												
Annual Inflation - Expenses												
Annual Interest Rate - Bonds												
Annual Interest Rate - GF Loan												
WR Charge Year 1 (2019) - unsubsidized												
Annual change in WR Charge												
Inside City Subsidy ($/HCF)												
Results												
Inside City WRC Revenue												
Outside City WRC Revenue												
2049 Ending Cash Balance												
Annual Ending Cash Balance	$397,853	$564,702	$787,653	$1,067,099	$1,403,446	$1,297,110	$1,248,521	$1,258,122	$1,326,367	$1,453,727	$1,640,685	$1,387,738
Interest on Bond(s)												
Interest on GF Loan												
Reserves Remaining to be Paid												
Fiscal Year Ending:	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Revenues												
Water Reliability Charge Revenue												
Inside City Customers												
Inside City Flow (HCF)	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000
$/HCF WR Charge	$0.49	$0.50	$0.51	$0.52	$0.53	$0.54	$0.55	$0.56	$0.57	$0.58	$0.59	$0.60
Subtotal - Inside City	$1,862,000	$1,900,000	$1,938,000	$1,976,000	$2,014,000	$2,052,000	$2,090,000	$2,128,000	$2,166,000	$2,204,000	$2,242,000	$2,280,000
Outside City Customers												
Inside City Flow (HCF)	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
$/HCF WR Charge	$0.49	$0.50	$0.51	$0.52	$0.53	$0.54	$0.55	$0.56	$0.57	$0.58	$0.59	$0.60
Subtotal - Outside City	$245,000	$250,000	$255,000	$260,000	$265,000	$270,000	$275,000	$280,000	$285,000	$290,000	$295,000	$300,000
Total Water Reliability Charge Revenue	$2,107,000	$2,150,000	$2,193,000	$2,236,000	$2,279,000	$2,322,000	$2,365,000	$2,408,000	$2,451,000	$2,494,000	$2,537,000	$2,580,000
General Fund Contributions												
General Fund Loans												
Bond Proceeds												
Transfer in from Reserves												
Total Revenue	$2,107,000	$2,150,000	$2,193,000	$2,236,000	$2,279,000	$2,322,000	$2,365,000	$2,408,000	$2,451,000	$2,494,000	$2,537,000	$2,580,000
Expenditures												
Capital Expenses												
Preliminary Design Report	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Capital Expenses	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operational Expenses												
O&M per PDR	$1,701,663	$1,752,713	$1,805,295	$1,859,454	$1,915,237	$1,972,694	$2,031,875	$2,092,831	$2,155,616	$2,220,285	$2,286,893	$2,355,500
Additional Staffing												
Project Manager 3	$285,379	$293,940	$302,759	$311,841	$321,197	$330,832	$340,757	$350,980	$361,510	$372,355	$383,525	$395,031
Water Treatment Operator 1	$201,174	$207,210	$213,426	$219,829	$226,424	$233,216	$240,213	$247,419	$254,842	$262,487	$270,362	$278,472
Pump/Well Mechanic	$151,259	$155,797	$160,471	$165,285	$170,243	$175,351	$180,611	$186,029	$191,610	$197,359	$203,279	$209,378
Pump/Well Electrician	$151,259	$155,797	$160,471	$165,285	$170,243	$175,351	$180,611	$186,029	$191,610	$197,359	$203,279	$209,378
Total Operational Expenses	$2,490,735	$2,565,457	$2,642,421	$2,721,693	$2,803,344	$2,887,444	$2,974,068	$3,063,290	$3,155,188	$3,249,844	$3,347,339	$3,447,759
Debt Service	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900
Reserves Repayment						$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$1,000,000
Less: MWD Water Purchase Savings	($2,914,763)	($3,002,206)	($3,092,272)	($3,185,040)	($3,280,591)	($3,379,009)	($3,480,379)	($3,584,791)	($3,692,334)	($3,803,104)	($3,917,197)	($4,034,713)
Net Expenditures/(Cost Savings)	**$1,995,872**	**$1,983,152**	**$1,970,049**	**$1,956,554**	**$1,942,653**	**$2,428,336**	**$2,413,589**	**$2,398,399**	**$2,382,754**	**$2,366,640**	**$2,350,042**	**$2,832,947**
Net Operating Suprlus/(Shortfall)	$111,128	$166,848	$222,951	$279,446	$336,347	($106,336)	($48,589)	$9,601	$68,246	$127,360	$186,958	($252,947)
Cash Balance for WR Expenditures	$397,853	$564,702	$787,653	$1,067,099	$1,403,446	$1,297,110	$1,248,521	$1,258,122	$1,326,367	$1,453,727	$1,640,685	$1,387,738

Water Reliability Charge 30-year Cash Flow Analysis (No General Fund contribution)

	2042	2043	2044	2045	2046	2047	2048	2049
Assumptions								
Annual Inflation - Expenses								
Annual Interest Rate - Bonds								
Annual Interest Rate - GF Loan								
WR Charge Year 1 (2019) - unsubsidized								
Annual change in WR Charge								
Inside City Subsidy ($/HCF)								
Results								
Inside City WRC Revenue								
Outside City WRC Revenue								
2049 Ending Cash Balance								
Annual Ending Cash Balance	$1,195,400	$1,064,199	$994,679	$987,401	$1,042,941	$1,161,894	$1,344,873	($369,492)
Interest on Bond(s)								
Interest on GF Loan								
Reserves Remaining to be Paid								
Fiscal Year Ending:	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**
Revenues								
Water Reliability Charge Revenue								
Inside City Customers								
Inside City Flow (HCF)	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	1,900,000
$/HCF WR Charge	$0.61	$0.62	$0.63	$0.64	$0.65	$0.66	$0.67	$0.68
Subtotal - Inside City	$2,318,000	$2,356,000	$2,394,000	$2,432,000	$2,470,000	$2,508,000	$2,546,000	$1,292,000
Outside City Customers								
Inside City Flow (HCF)	500,000	500,000	500,000	500,000	500,000	500,000	500,000	250,000
$/HCF WR Charge	$0.61	$0.62	$0.63	$0.64	$0.65	$0.66	$0.67	$0.68
Subtotal - Outside City	$305,000	$310,000	$315,000	$320,000	$325,000	$330,000	$335,000	$170,000
Total Water Reliability Charge Revenue	$2,623,000	$2,666,000	$2,709,000	$2,752,000	$2,795,000	$2,838,000	$2,881,000	$1,462,000
General Fund Contributions								
General Fund Loans								
Bond Proceeds								
Transfer in from Reserves								
Total Revenue	$2,623,000	$2,666,000	$2,709,000	$2,752,000	$2,795,000	$2,838,000	$2,881,000	$1,462,000
Expenditures								
Capital Expenses								
Preliminary Design Report	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$0	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$0	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Capital Expenses	$0	$0	$0	$0	$0	$0	$0	$0
Operational Expenses								
O&M per PDR	$2,426,165	$2,498,950	$2,573,919	$2,651,136	$2,730,670	$2,812,590	$2,896,968	$2,983,877
Additional Staffing								
Project Manager 3	$406,882	$419,089	$431,661	$444,611	$457,949	$471,688	$485,839	$500,414
Water Treatment Operator 1	$286,827	$295,431	$304,294	$313,423	$322,826	$332,511	$342,486	$352,761
Pump/Well Mechanic	$215,659	$222,129	$228,793	$235,657	$242,726	$250,008	$257,508	$265,234
Pump/Well Electrician	$215,659	$222,129	$228,793	$235,657	$242,726	$250,008	$257,508	$265,234
Total Operational Expenses	$3,551,192	$3,657,728	$3,767,460	$3,880,484	$3,996,898	$4,116,805	$4,240,309	$4,367,518
Debt Service	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900	$2,419,900
Reserves Repayment	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,500,000
Less: MWD Water Purchase Savings	($4,155,755)	($4,280,427)	($4,408,840)	($4,541,105)	($4,677,339)	($4,817,659)	($4,962,189)	($5,111,054)
Net Expenditures/(Cost Savings)	**$2,815,338**	**$2,797,201**	**$2,778,520**	**$2,759,279**	**$2,739,460**	**$2,719,047**	**$2,698,021**	**$3,176,365**
Net Operating Suprlus/(Shortfall)	($192,338)	($131,201)	($69,520)	($7,279)	$55,540	$118,953	$182,979	($1,714,365)
Cash Balance for WR Expenditures	$1,195,400	$1,064,199	$994,679	$987,401	$1,042,941	$1,161,894	$1,344,873	($369,492)

Water Reliability Charge 30-year Cash Flow Analysis (with $10 million General Fund contribution)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Assumptions												
Annual Inflation - Expenses	3.0%											
Annual Interest Rate - Bonds	4.0%											
Annual Interest Rate - GF Loan	3.0%											
WR Charge Year 1 (2019) - unsubsidized	$0.38											
Annual change in WR Charge	$0.01											
Inside City Subsidy ($/HCF)	$0.15											
Results												
Inside City WRC Revenue	$43,320,000											
Outside City WRC Revenue	$7,950,000											
2049 Ending Cash Balance	($120,462)											
Annual Ending Cash Balance	$0	$10,121,512	$29,465,562	$18,452,636	$5,456,108	$494,460	$310,809	$156,980	$57,124	$11,570	$20,658	$84,736
Interest on Bond(s)	$23,402,985											
Interest on GF Loan	$0											
Reserves Remaining to be Paid	$0											
Fiscal Year Ending:	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Revenues												
Water Reliability Charge Revenue												
Inside City Customers												
Inside City Flow (HCF)		1,900,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000
$/HCF WR Charge		$0.23	$0.24	$0.25	$0.26	$0.27	$0.28	$0.29	$0.30	$0.31	$0.32	$0.33
Subtotal - Inside City	$0	$437,000	$912,000	$950,000	$988,000	$1,026,000	$1,064,000	$1,102,000	$1,140,000	$1,178,000	$1,216,000	$1,254,000
Outside City Customers												
Inside City Flow (HCF)		250,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
$/HCF WR Charge		$0.38	$0.39	$0.40	$0.41	$0.42	$0.43	$0.44	$0.45	$0.46	$0.47	$0.48
Subtotal - Outside City	$0	$95,000	$195,000	$200,000	$205,000	$210,000	$215,000	$220,000	$225,000	$230,000	$235,000	$240,000
Total Water Reliability Charge Revenue	$0	$532,000	$1,107,000	$1,150,000	$1,193,000	$1,236,000	$1,279,000	$1,322,000	$1,365,000	$1,408,000	$1,451,000	$1,494,000
General Fund Contributions	$9,000,000	$10,000,000										
General Fund Loans												
Bond Proceeds			$31,845,000									
Transfer in from Reserves	$0	$8,500,000	$0	$0	$0	$1,900,000	$2,100,000	$0	$0			
Total Revenue	**$9,000,000**	**$19,032,000**	**$32,952,000**	**$1,150,000**	**$1,193,000**	**$3,136,000**	**$3,379,000**	**$1,322,000**	**$1,365,000**	**$1,408,000**	$1,451,000	$1,494,000
Expenditures to Start Up												
Capital Expenses												
Preliminary Design Report	$0	$874,182	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$9,000,000	$2,787,250	$2,787,250	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$327,818	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$1,678,092	$1,296,326	$1,335,216	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$542,766	$559,049	$575,821	$593,095	$610,888	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$687,503	$708,128	$729,372	$751,254	$773,791	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$1,122,941	$2,313,258	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$3,664,342	$3,774,272	$3,887,500	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$464,553	$0	$3,107,874	$3,201,110	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$3,092,381	$3,200,302	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$660,375	$680,186	$0	$0	$0	$0	$0
Total Capital Expenses	$9,000,000	$8,485,106	$11,328,354	$9,522,555	$11,525,340	$5,245,356	$680,186	$0	$0	$0	$0	$0
Operational Expenses												
O&M per PDR	$0	$0	$0	$347,782	$358,216	$368,962	$380,031	$1,467,870	$1,511,906	$1,557,263	$1,603,981	$1,652,100
Additional Staffing												
Project Manager 3	$0	$206,837	$212,895	$219,135	$225,562	$232,182	$239,000	$246,170	$253,556	$261,162	$268,997	$277,067
Water Treatment Operator 1	$0	$0	$0	$0	$0	$163,573	$168,480	$173,535	$178,741	$184,103	$189,626	$195,315
Pump/Well Mechanic	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	$130,477	$134,392	$138,423	$142,576	$146,853
Pump/Well Electrician	$0	$109,273	$112,551	$115,927	$119,405	$122,987	$126,677	$130,477	$134,392	$138,423	$142,576	$146,853
Total Operational Expenses	$0	$425,382	$437,997	$798,772	$822,588	$1,010,692	$1,040,866	$2,148,530	$2,212,986	$2,279,375	$2,347,756	$2,418,189
Debt Service			$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600
Reserves Repayment												
Less: MWD Water Purchase Savings								($2,514,300)	($2,589,729)	($2,667,421)	($2,747,443)	($2,829,867)
Net Expenditures/(Cost Savings)	**$9,000,000**	**$8,910,488**	**$13,607,950**	**$12,162,926**	**$14,189,527**	**$8,097,648**	**$3,562,651**	**$1,475,829**	**$1,464,856**	**$1,453,554**	**$1,441,912**	**$1,429,922**
Net Operating Suprlus/(Shortfall)	$0	$10,121,512	$19,344,050	($11,012,926)	($12,996,527)	($4,961,648)	($183,651)	($153,829)	($99,856)	($45,554)	$9,088	$64,078
Cash Balance for WR Expenditures	**$0**	**$10,121,512**	**$29,465,562**	**$18,452,636**	**$5,456,108**	**$494,460**	**$310,809**	**$156,980**	**$57,124**	**$11,570**	**$20,658**	$84,736

Water Reliability Charge 30-year Cash Flow Analysis (with $10 million General Fund contribution)

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Assumptions												
Annual Inflation - Expenses												
Annual Interest Rate - Bonds												
Annual Interest Rate - GF Loan												
WR Charge Year 1 (2019) - unsubsidized												
Annual change in WR Charge												
Inside City Subsidy ($/HCF)												
Results												
Inside City WRC Revenue												
Outside City WRC Revenue												
2049 Ending Cash Balance												
Annual Ending Cash Balance	$4,164	$4,314	$5,566	$4,313	$4,961	$4,926	$5,638	$5,540	$6,086	$6,747	$7,006	$7,360
Interest on Bond(s)												
Interest on GF Loan												
Reserves Remaining to be Paid												
Fiscal Year Ending:	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Revenues												
Water Reliability Charge Revenue												
Inside City Customers												
Inside City Flow (HCF)	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000
$/HCF WR Charge	$0.34	$0.35	$0.36	$0.37	$0.38	$0.39	$0.40	$0.41	$0.42	$0.43	$0.44	$0.45
Subtotal - Inside City	$1,292,000	$1,330,000	$1,368,000	$1,406,000	$1,444,000	$1,482,000	$1,520,000	$1,558,000	$1,596,000	$1,634,000	$1,672,000	$1,710,000
Outside City Customers												
Inside City Flow (HCF)	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
$/HCF WR Charge	$0.49	$0.50	$0.51	$0.52	$0.53	$0.54	$0.55	$0.56	$0.57	$0.58	$0.59	$0.60
Subtotal - Outside City	$245,000	$250,000	$255,000	$260,000	$265,000	$270,000	$275,000	$280,000	$285,000	$290,000	$295,000	$300,000
Total Water Reliability Charge Revenue	$1,537,000	$1,580,000	$1,623,000	$1,666,000	$1,709,000	$1,752,000	$1,795,000	$1,838,000	$1,881,000	$1,924,000	$1,967,000	$2,010,000
General Fund Contributions												
General Fund Loans												
Bond Proceeds												
Transfer in from Reserves												
Total Revenue	$1,537,000	$1,580,000	$1,623,000	$1,666,000	$1,709,000	$1,752,000	$1,795,000	$1,838,000	$1,881,000	$1,924,000	$1,967,000	$2,010,000
Expenditures to Start Up												
Capital Expenses												
Preliminary Design Report	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenses	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operational Expenses												
O&M per PDR	$1,701,663	$1,752,713	$1,805,295	$1,859,454	$1,915,237	$1,972,694	$2,031,875	$2,092,831	$2,155,616	$2,220,285	$2,286,893	$2,355,500
Additional Staffing												
Project Manager 3	$285,379	$293,940	$302,759	$311,841	$321,197	$330,832	$340,757	$350,980	$361,510	$372,355	$383,525	$395,031
Water Treatment Operator 1	$201,174	$207,210	$213,426	$219,829	$226,424	$233,216	$240,213	$247,419	$254,842	$262,487	$270,362	$278,472
Pump/Well Mechanic	$151,259	$155,797	$160,471	$165,285	$170,243	$175,351	$180,611	$186,029	$191,610	$197,359	$203,279	$209,378
Pump/Well Electrician	$151,259	$155,797	$160,471	$165,285	$170,243	$175,351	$180,611	$186,029	$191,610	$197,359	$203,279	$209,378
Total Operational Expenses	$2,490,735	$2,565,457	$2,642,421	$2,721,693	$2,803,344	$2,887,444	$2,974,068	$3,063,290	$3,155,188	$3,249,844	$3,347,339	$3,447,759
Debt Service	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600
Reserves Repayment	$200,000	$175,000	$230,000	$289,000	$344,000	$402,000	$459,000	$518,000	$576,000	$635,000	$695,000	$755,000
Less: MWD Water Purchase Savings	($2,914,763)	($3,002,206)	($3,092,272)	($3,185,040)	($3,280,591)	($3,379,009)	($3,480,379)	($3,584,791)	($3,692,334)	($3,803,104)	($3,917,197)	($4,034,713)
Net Expenditures/(Cost Savings)	**$1,617,571**	**$1,579,851**	**$1,621,748**	**$1,667,253**	**$1,708,352**	**$1,752,035**	**$1,794,288**	**$1,838,099**	**$1,880,453**	**$1,923,339**	**$1,966,741**	**$2,009,646**
Net Operating Suprlus/(Shortfall)	($80,571)	$149	$1,252	($1,253)	$648	($35)	$712	($99)	$547	$661	$259	$354
Cash Balance for WR Expenditures	$4,164	$4,314	$5,566	$4,313	$4,961	$4,926	$5,638	$5,540	$6,086	$6,747	$7,006	$7,360

Water Reliability Charge 30-year Cash Flow Analysis (with $10 million General Fund contribution)

	2042	2043	2044	2045	2046	2047	2048	2049
Assumptions								
Annual Inflation - Expenses								
Annual Interest Rate - Bonds								
Annual Interest Rate - GF Loan								
WR Charge Year 1 (2019) - unsubsidized								
Annual change in WR Charge								
Inside City Subsidy ($/HCF)								
Results								
Inside City WRC Revenue								
Outside City WRC Revenue								
2049 Ending Cash Balance								
Annual Ending Cash Balance	$8,323	$8,423	$9,204	$10,227	$14,068	$14,322	$15,602	($120,462)
Interest on Bond(s)								
Interest on GF Loan								
Reserves Remaining to be Paid								
Fiscal Year Ending:	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**
Revenues								
Water Reliability Charge Revenue								
Inside City Customers								
Inside City Flow (HCF)	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	3,800,000	1,900,000
$/HCF WR Charge	$0.46	$0.47	$0.48	$0.49	$0.50	$0.51	$0.52	$0.53
Subtotal - Inside City	$1,748,000	$1,786,000	$1,824,000	$1,862,000	$1,900,000	$1,938,000	$1,976,000	$1,007,000
Outside City Customers								
Inside City Flow (HCF)	500,000	500,000	500,000	500,000	500,000	500,000	500,000	250,000
$/HCF WR Charge	$0.61	$0.62	$0.63	$0.64	$0.65	$0.66	$0.67	$0.68
Subtotal - Outside City	$305,000	$310,000	$315,000	$320,000	$325,000	$330,000	$335,000	$170,000
Total Water Reliability Charge Revenue	$2,053,000	$2,096,000	$2,139,000	$2,182,000	$2,225,000	$2,268,000	$2,311,000	$1,177,000
General Fund Contributions								
General Fund Loans								
Bond Proceeds								
Transfer in from Reserves								
Total Revenue	$2,053,000	$2,096,000	$2,139,000	$2,182,000	$2,225,000	$2,268,000	$2,311,000	$1,177,000
Expenditures to Start Up								
Capital Expenses								
Preliminary Design Report	$0	$0	$0	$0	$0	$0	$0	$0
Land Acquisition (3rd Well Site)	$0	$0	$0	$0	$0	$0	$0	$0
CEQA	$0	$0	$0	$0	$0	$0	$0	$0
Final Design	$0	$0	$0	$0	$0	$0	$0	$0
Engineerings Svcs During Const (ESDC)	$0	$0	$0	$0	$0	$0	$0	$0
Construction Mgmt and Inspection	$0	$0	$0	$0	$0	$0	$0	$0
Well Drilling (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0
Transmission Main	$0	$0	$0	$0	$0	$0	$0	$0
Well Equipping (3 sites)	$0	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0
System Permitting & Testing	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenses	$0	$0	$0	$0	$0	$0	$0	$0
Operational Expenses								
O&M per PDR	$2,426,165	$2,498,950	$2,573,919	$2,651,136	$2,730,670	$2,812,590	$2,896,968	$2,983,877
Additional Staffing								
Project Manager 3	$406,882	$419,089	$431,661	$444,611	$457,949	$471,688	$485,839	$500,414
Water Treatment Operator 1	$286,827	$295,431	$304,294	$313,423	$322,826	$332,511	$342,486	$352,761
Pump/Well Mechanic	$215,659	$222,129	$228,793	$235,657	$242,726	$250,008	$257,508	$265,234
Pump/Well Electrician	$215,659	$222,129	$228,793	$235,657	$242,726	$250,008	$257,508	$265,234
Total Operational Expenses	$3,551,192	$3,657,728	$3,767,460	$3,880,484	$3,996,898	$4,116,805	$4,240,309	$4,367,518
Debt Service	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600	$1,841,600
Reserves Repayment	$815,000	$877,000	$938,000	$1,000,000	$1,060,000	$1,127,000	$1,190,000	$215,000
Less: MWD Water Purchase Savings	($4,155,755)	($4,280,427)	($4,408,840)	($4,541,105)	($4,677,339)	($4,817,659)	($4,962,189)	($5,111,054)
Net Expenditures/(Cost Savings)	**$2,052,037**	**$2,095,900**	**$2,138,219**	**$2,180,978**	**$2,221,159**	**$2,267,746**	**$2,309,720**	**$1,313,064**
Net Operating Suprlus/(Shortfall)	$963	$100	$781	$1,022	$3,841	$254	$1,280	($136,064)
Cash Balance for WR Expenditures	$8,323	$8,423	$9,204	$10,227	$14,068	$14,322	$15,602	($120,462)