

# Placer County Water Agency

**Water Cost of Service and Rate Study**  
Final Report / March 15, 2022





March 15, 2022

Joe Parker  
Director of Financial Services  
Placer County Water Agency  
144 Ferguson Rd  
Auburn, CA 95603

**Subject: Water Cost of Service and Rate Study**

Dear Mr. Parker,

Raftelis is pleased to provide this Water Cost of Service and Rate Study Report to Placer County Water Agency. The overall purpose of the study was to develop a proposed five-year schedule of water rates for 2023 through 2027 that is fair, equitable, and align with the requirements of Proposition 218.

The major goals of the study were to:

- » Develop a five-year financial plan for PCWA's Water Division to ensure sufficient funding to cover operating and capital needs, maintain adequate reserves, and meet debt coverage requirements
- » Conduct cost of service analyses to ensure a strong nexus between costs incurred and proposed rates
- » Develop a five-year schedule of proposed water rates in compliance with Proposition 218 requirements

This report details the results and recommendations related to the development of the proposed financial plan, cost of service analyses, and rate calculations. It has been a pleasure working with you and we thank you, Carrie Parks, and other PCWA staff for the support provided to Raftelis during this study.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kevin Kostiuk'.

**Kevin Kostiuk**  
*Project Manager*

A handwritten signature in brown ink, appearing to read 'Charles Diamond'.

**Charles Diamond**  
*Lead Analyst*

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## List of Abbreviations

**AF:** Acre-feet

**AWWA:** American Water Works Association

**CIP:** Capital Improvement Plan

**COS:** Cost of Service

**CPI:** Consumer Price Index

**GPM:** Gallons per minute

**HCF:** One hundred cubic feet

**M1 Manual:** American Water Works Association's *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices - M1 Seventh Edition*

**Max Day:** Maximum day water demand

**Max Hour:** Maximum hour water demand

**O&M:** Operations and maintenance

**R&R:** Renewal and replacement

**RCLD:** Replacement Cost Less Depreciation

**Study Period:** the rate-setting period of this study which extends through 2027

**UWMP:** 2020 Urban Water Management Plan

**WCCs:** Water Connection Charges

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# 1. Executive Summary

## 1.1. Study Overview

In 2021, Placer County Water Agency (PCWA) contracted with Raftelis Financial Consultants, Inc. (Raftelis) to conduct a Water Cost of Service and Rate Study (Study) across all four service classes within PCWA's Water Division. The four service classes are: Treated Retail, Treated Resale, Untreated Retail, and Untreated Resale. Treated refers to the potable system while untreated refers to the raw water system. Retail refers to water delivery to end users who are PCWA customers. Resale refers to wholesale customers who provide water to their own customers.

PCWA's last rate study, conducted in 2017, provided the basis for water rates in effect since in January 2018. Since 2018, PCWA increased its water rates each January based on annual changes in the Consumer Price Index (CPI). This report presents the proposed financial plan projections, cost allocations between water service classes, cost of service analyses for each service class, and the resulting proposed five-year schedule of water rates for 2023 through 2027. The major objectives of the Study include the following:

- » Develop a five-year financial plan that sufficiently funds the Water Division's operations and maintenance (O&M) expenses, debt service payments, and capital renewal and replacement (R&R) expenditures while adequately funding reserves and achieving debt coverage requirements;
- » Evaluate the existing water rate structure and recommend changes (if necessary);
- » Conduct cost of service analyses for the combined Water Division and individually for each service class;
- » Develop fair and equitable water rates that adequately recover costs, provide revenue stability for recovering fixed costs, and maintain affordable water service while aligning with the requirements of Proposition 218.

## 1.2. Rate Study Process

This rate study was conducted using industry-standard principles outlined by the American Water Works Association's *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1 (seventh edition)*. The overall rate study process is outlined below:

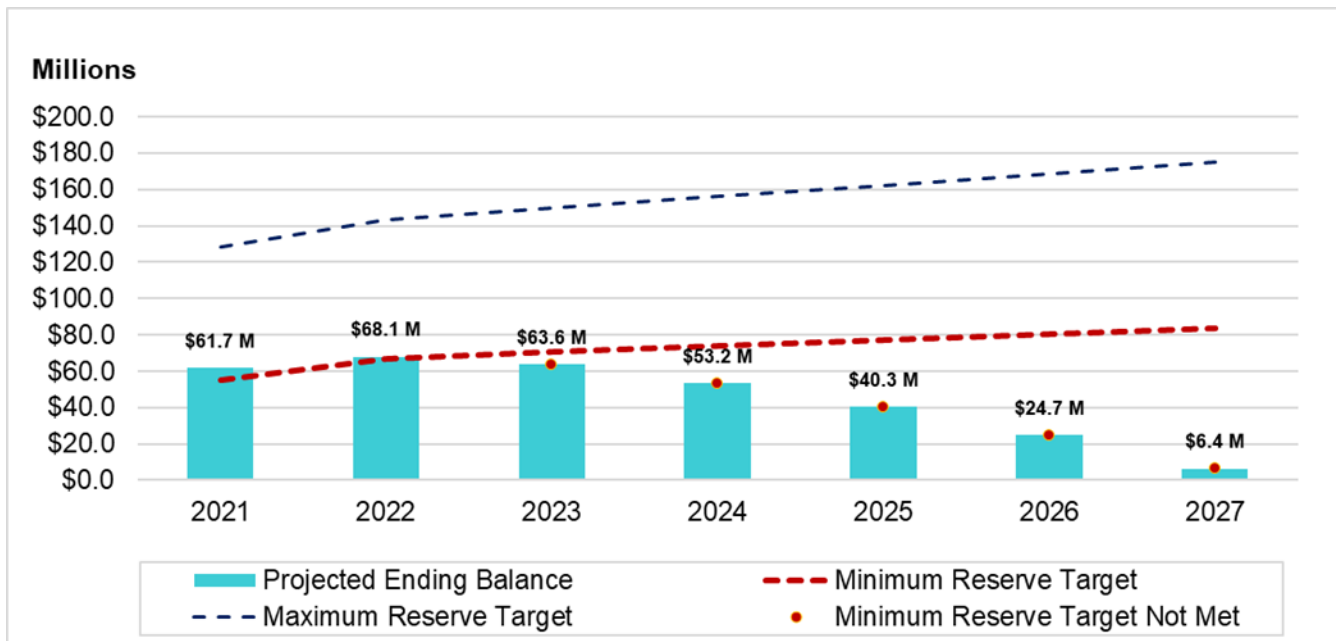
1. **Financial Plan:** Develop cash flow projections for PCWA's Water Division to determine the amount of revenue required from water rates each year through 2027.
2. **Cost of Service Analysis:** Allocate costs first to each service class and then to customers within each service class based on cost causation attributable to various customer groups within the water system.
3. **Rate Design:** Develop a five-year schedule of rates for 2023-2027, based on the results of the financial plan and cost of service analyses.
4. **Record Preparation and Rate Adoption:** Develop a study report to document the results of the Study (i.e., this report). Proposed rates may be adopted by PCWA's Board of Directors only after holding a public hearing in accordance with Proposition 218 requirements.

## 1.3. Financial Plan

Raftelis conducted a status quo cash flow analysis to evaluate whether current 2022 water rates can adequately fund the Water Division's various expenses over the study period. Annual projections of revenues, O&M expenses, debt service payments, and capital R&R expenditures through 2027 were developed with input from PCWA staff.

Raftelis projects that, with no rate increases over the next five years, the Water Division’s reserves are projected to fall below the target level by the end of 2023 and become severely depleted by the end of the study period in 2027. (see Figure 1-1). This demonstrates a clear need for revenue adjustments (i.e., rate revenue increases).

**Figure 1-1: Water Division Cash Balance under Status Quo Financial Plan (NO RATE INCREASES)**

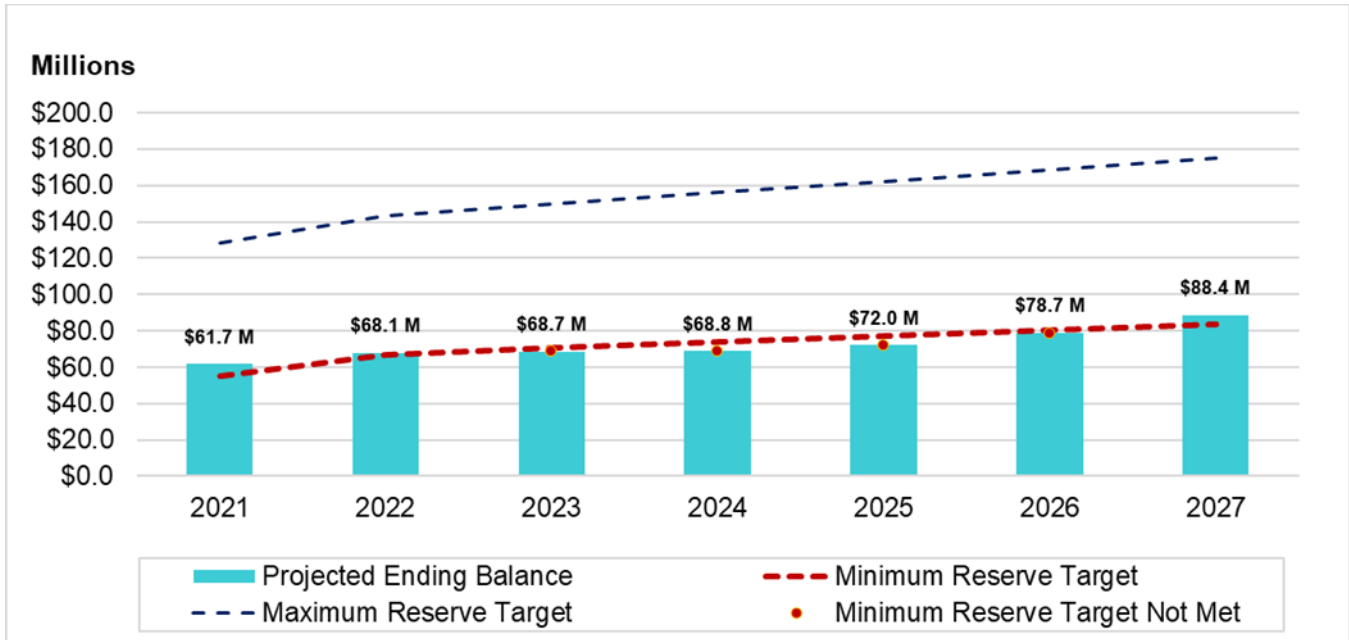


Raftelis worked closely with PCWA staff to identify financial plan options for PCWA’s Board of Directors to consider. After the presentation and evaluation of multiple financial plan scenarios at various meetings with PCWA’s Finance Committee and Board of Directors, Raftelis was instructed to proceed with the proposed revenue adjustments presented below (see Table 1-1). With the inclusion of proposed revenue adjustments, reserves are projected to drop slightly below the target level between 2023-2026 before reaching the target level in 2027 (see Figure 1-2). Raftelis and PCWA staff determined that the magnitude of revenue adjustments necessary to meet the reserve target in all years is not feasible due to the unacceptably high customer bill increases that would occur. A key consideration in selecting the proposed revenue adjustments was creating balance between the competing priorities of financial sufficiency and customer affordability.

**Table 1-1: Proposed Revenue Adjustment Schedule**

Description	2023	2024	2025	2026	2027
Effective Month	Jan. 2023	Jan. 2024	Jan. 2025	Jan. 2026	Jan. 2027
Revenue Adjustment	8.0%	8.0%	7.0%	7.0%	6.0%

Figure 1-2: Water Division Cash Balance under Proposed Financial Plan (WITH RATE INCREASES)



## 1.4. Current Water Rate Structure

All four of PCWA’s service classes are currently subject to a rate structure consisting of three components: Fixed Charges, Renewal and Replacement (R&R) Charges, and Commodity Rates. Each component is described below.

**Fixed Charges:** Current Fixed Charges are charged based on meter size (for metered customers) and charged per service (for unmetered customers) with the following exceptions:

- » Treated Retail Multiple Dwelling Unit customers are charged based on both the number of water meters and the number of dwelling units.
- » Treated Resale and Treated Retail Industrial customers are charged per “Unit of Capacity.”<sup>1</sup>
- » Treated Retail Private Fire Protection customers are charged based on fire line connection size.

**Renewal and Replacement (R&R) Charges:** Current R&R Charges are charged based on meter size (for metered customers) and charged per service (for unmetered customers) with the following exceptions:

- » Treated Resale and Treated Retail Industrial customers are charged per Unit of Capacity.
- » Untreated metered customers are subject to the same R&R Charges regardless of meter size.

**Commodity Rates:** Current Commodity Rates are charged per unit of water delivered (for metered customers) or ordered (for unmetered customers).

- » Metered customers are charged per hundred cubic feet (HCF) of water delivered during each monthly billing period.
- » Unmetered customers are charged based on the number of Miners’ Inches<sup>2</sup> ordered; the monthly rate per Miners’ Inch varies by season (i.e., summer versus winter).

<sup>1</sup> A Unit of Capacity is a unit of measure for the maximum daily demand on the capacity of PCWA’s treated water system that is required to serve a customer. One Unit of Capacity is 1,150 gallons per day, as of 2021.

<sup>2</sup> A Miners’ Inch is a unit of measure that refers to the size of the orifice through which water is delivered to the customer.

## 1.5. Proposed Changes to Water Rate Structure

Raftelis worked closely with PCWA staff to evaluate potential changes to the existing rate structure. Only the following relatively minor changes to the Treated Retail rate structure are recommended at this time:

- 1. Fixed Charges for Multiple Dwelling Unit Service:** For Fixed Charges only, Multiple Dwelling Unit customers are currently charged based on two distinct charge components: 1) a Dwelling Unit charge based on the number of dwelling units and 2) a Meter Component Charge based on the number of water meters. To simplify the rate structure and better align with industry standards, Raftelis recommends that Multiple Dwelling Unit Service be charged a Fixed Charge based only on meter size beginning in 2023. This will align the Fixed Charge rate structure for Multiple Dwelling Unit customers with other Treated Retail customers.
- 2. Fixed Charges for Private Fire Protection Service:** PCWA provides Private Fire Protection service to fire lines with a separate water meter (referred to as a dedicated fire line) as well as to connections with a water meter for both non-fire-related Residential/Commercial water service and private fire protection (referred to as Residential Fire and Commercial Fire, respectively). Dedicated fire lines and Residential/Commercial Fire connections are currently subject to the same Fixed Charges based on connection size. All Residential Fire and Commercial Fire connections currently have a 1-inch connection. Raftelis recommends that a separate charge rate be established for 1-inch Residential/Commercial Fire connections. This is necessary so that certain meter-related costs can be allocated to dedicated fire lines, but not to Residential/Commercial Fire connections. This proposed change will improve rate structure defensibility and better align with industry standards.

## 1.6. Cost of Service Analyses

The proposed financial plan determines the amount of revenue that must be recovered from water rates in each year over the study period. The purpose of a cost of service analysis is to appropriately allocate this total rate revenue requirement to water customers for recovery by water rates. This study is unique due to the inclusion of five distinct cost of service analyses. This includes an initial cost of service analysis (to first allocate costs between the four service classes), followed by a distinct cost of service analysis for each of the four service classes.

Table 1-2 shows the results of the service level cost of service, which allocates costs between the four service classes. Cost of service analyses are always conducted based on a single year, referred to as the “test year.” Typically, the current year or prior year is selected as the test year when conducting a cost of service analysis. However, due to the impacts of COVID-19 on water use characteristics, 2020-2022 were all deemed as insufficiently representative by Raftelis and PCWA staff. Therefore, 2019 is used as the test year throughout all five cost of service analyses.

Under the “revised” service level cost of service, Treated Retail and Untreated Resale classes experience a decrease in the proportion of allocated 2019 costs compared to actual 2019 rates, whereas Treated Resale and Untreated Retail experience an increase. Note that these cost allocations are based on actual 2019 costs, and do not take into account the impact of proposed revenue adjustments shown in Table 1-1. These distributional impacts are a common result of cost of service analyses, as cost allocations are updated and refined based on more recent data to better reflect cost causation within the water system.

**Table 1-2: Revenue Comparison by Service Class – 2019 Actuals versus Revised Cost of Service**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Description	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale	Total
1	Revised Cost of Service (2019)	\$39,464,582	\$9,026,683	\$4,318,347	\$265,316	<b>\$53,074,927</b>
2	Actual Rate Revenues (2019)	\$39,754,921	\$8,848,220	\$4,184,187	\$287,598	<b>\$53,074,927</b>
3	Difference (\$)	(\$290,339)	\$178,462	\$134,159	(\$22,283)	<b>\$0</b>
4	Difference (%)	-0.7%	2.0%	3.2%	-7.7%	<b>0.0%</b>
5						
6	Annual Demand (Delivered)	23,807 AF	9,977 AF	54,571 AF	2,294 AF	<b>90,649 AF</b>
7	Proposed \$/AF Allocation (2019)	\$1,658	\$905	\$79	\$116	<b>\$585</b>
8	Current \$/AF Allocation (2019)	\$1,670	\$887	\$77	\$125	<b>\$585</b>

## 1.7. Proposed Water Rates

Raftelis developed an updated five-year schedule of water rates based on the results of the proposed financial plan and cost of service analyses. Currently adopted 2022 rates proposed rates through 2027 are shown in Table 1-3 through Table 1-6. Separate rate tables are provided for treated water service, private fire protection service, untreated metered water service, and untreated Miners' Inch water service. Proposed 2023 rates are calculated based on the direct results of the cost of service analyses and the proposed 2023 revenue adjustment of 8%. Beyond 2023, all proposed rates are calculated by increasing the prior year proposed rates by the proposed revenue adjustment in each year.



**Table 1-3: Proposed Five-Year Treated Water Rate Schedule**

Treated Water Rates	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
5/8-inch	\$20.14	\$22.87	\$24.70	\$26.43	\$28.29	\$29.99
3/4-inch	\$28.25	\$32.65	\$35.27	\$37.74	\$40.39	\$42.82
1-inch	\$44.50	\$52.20	\$56.38	\$60.33	\$64.56	\$68.44
1-1/2-inch	\$85.06	\$101.08	\$109.17	\$116.82	\$125.00	\$132.50
2-inch	\$133.75	\$159.74	\$172.52	\$184.60	\$197.53	\$209.39
3-inch	\$287.95	\$345.49	\$373.13	\$399.25	\$427.20	\$452.84
4-inch	\$490.82	\$589.90	\$637.10	\$681.70	\$729.42	\$773.19
6-inch	\$1,099.47	\$1,323.12	\$1,428.97	\$1,529.00	\$1,636.03	\$1,734.20
8-inch	\$1,302.34	\$1,567.53	\$1,692.94	\$1,811.45	\$1,938.26	\$2,054.56
Resale and Industrial Service (per Unit of Capacity)	\$19.83	\$27.90	\$30.14	\$32.25	\$34.51	\$36.59
<b>Renewal and Replacement Charge (per month)</b>						
5/8-inch	\$19.93	\$20.41	\$22.05	\$23.60	\$25.26	\$26.78
3/4-inch	\$29.91	\$30.61	\$33.06	\$35.38	\$37.86	\$40.14
1-inch	\$49.85	\$51.01	\$55.10	\$58.96	\$63.09	\$66.88
1-1/2-inch	\$99.70	\$102.01	\$110.18	\$117.90	\$126.16	\$133.73
2-inch	\$159.52	\$163.22	\$176.28	\$188.62	\$201.83	\$213.94
3-inch	\$348.95	\$357.04	\$385.61	\$412.61	\$441.50	\$467.99
4-inch	\$598.18	\$612.06	\$661.03	\$707.31	\$756.83	\$802.24
6-inch	\$1,345.92	\$1,377.13	\$1,487.31	\$1,591.43	\$1,702.84	\$1,805.02
8-inch	\$1,595.17	\$1,632.16	\$1,762.74	\$1,886.14	\$2,018.17	\$2,139.27
Resale and Industrial Service (per Unit of Capacity)	\$16.00	\$11.45	\$12.37	\$13.24	\$14.17	\$15.03
<b>Commodity Rates (per HCF)</b>						
<u>Residential Tiered Rates</u>						
Tier 1 (First 900 cubic feet)	\$1.64	\$1.82	\$1.97	\$2.11	\$2.26	\$2.40
Tier 2 (Next 1,900 cubic feet)	\$1.86	\$2.19	\$2.37	\$2.54	\$2.72	\$2.89
Tier 3 (Over 2,800 cubic feet)	\$2.00	\$2.38	\$2.58	\$2.77	\$2.97	\$3.15
<u>Non-Residential Uniform Rates</u>						
Commercial and Governmental	\$1.76	\$1.94	\$2.10	\$2.25	\$2.41	\$2.56
Landscape	\$1.86	\$2.23	\$2.41	\$2.58	\$2.77	\$2.94
Industrial and Resale	\$0.43	\$0.47	\$0.51	\$0.55	\$0.59	\$0.63
Construction	\$3.52	\$2.69	\$2.91	\$3.12	\$3.34	\$3.55
<u>Customers Involuntarily Deprived of Untreated Water Service (CIDUWS)</u>						
Tier 1 (First 900 cubic feet)	\$1.64	\$1.82	\$1.97	\$2.11	\$2.26	\$2.40
Tier 2 (Next 1,900 cubic feet)	\$1.86	\$2.19	\$2.37	\$2.54	\$2.72	\$2.89
Tier 3 (Over 2,800 cubic feet)	\$0.21	\$0.23	\$0.25	\$0.27	\$0.29	\$0.31

**Table 1-4: Proposed Five-Year Private Fire Protection Rate Schedule**

Private Fire Protection Rates	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
1-inch (Residential Fire & Commercial Fire)	\$0.32	\$0.14	\$0.16	\$0.18	\$0.20	\$0.22
1-inch	\$0.32	\$2.95	\$3.19	\$3.42	\$3.66	\$3.88
2-inch	\$1.99	\$3.67	\$3.97	\$4.25	\$4.55	\$4.83
3-inch	\$5.76	\$5.30	\$5.73	\$6.14	\$6.57	\$6.97
4-inch	\$12.28	\$8.11	\$8.76	\$9.38	\$10.04	\$10.65
6-inch	\$35.66	\$18.20	\$19.66	\$21.04	\$22.52	\$23.88
8-inch	\$75.99	\$35.61	\$38.46	\$41.16	\$44.05	\$46.70
10-inch	\$136.64	\$61.79	\$66.74	\$71.42	\$76.42	\$81.01
12-inch	\$220.71	\$98.08	\$105.93	\$113.35	\$121.29	\$128.57
14-inch	\$331.06	\$145.71	\$157.37	\$168.39	\$180.18	\$191.00
16-inch	\$470.35	\$205.84	\$222.31	\$237.88	\$254.54	\$269.82
<b>Commodity Rates (per HCF)</b>						
Uniform <sup>3</sup>	\$3.52	\$1.49	\$1.61	\$1.73	\$1.86	\$1.98

**Table 1-5: Proposed Five-Year Untreated Water Rate Schedule (Metered Customers)**

Untreated Water Rates (Metered Customers)	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
5/8-inch	\$10.27	\$13.32	\$14.39	\$15.40	\$16.48	\$17.47
3/4-inch	\$13.65	\$18.30	\$19.77	\$21.16	\$22.65	\$24.01
1-inch	\$20.43	\$28.26	\$30.53	\$32.67	\$34.96	\$37.06
1-1/2-inch	\$37.34	\$53.17	\$57.43	\$61.46	\$65.77	\$69.72
2-inch	\$57.64	\$83.05	\$89.70	\$95.98	\$102.70	\$108.87
3-inch	\$121.92	\$177.69	\$191.91	\$205.35	\$219.73	\$232.92
4-inch	\$206.50	\$302.21	\$326.39	\$349.24	\$373.69	\$396.12
6-inch	\$460.24	\$675.77	\$729.84	\$780.93	\$835.60	\$885.74
8-inch	\$544.83	\$800.29	\$864.32	\$924.83	\$989.57	\$1,048.95
10-inch	\$1,289.12	\$1,896.07	\$2,047.76	\$2,191.11	\$2,344.49	\$2,485.16
<b>Renewal and Replacement Charge (per month)</b>						
All Meter Sizes	\$10.09	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
<b>Commodity Rates (per HCF)</b>						
Retail	\$0.21	\$0.23	\$0.25	\$0.27	\$0.29	\$0.31
Resale	\$0.30	\$0.28	\$0.31	\$0.34	\$0.37	\$0.40

<sup>3</sup> Customers with Residential Fire or Commercial Fire water service are subject to Treated Retail Residential Tiered or Commercial Commodity Rates, but are not subject to this rate (which applies only to dedicated private fire lines).

**Table 1-6: Proposed Five-Year Untreated Water Rate Schedule (Miners' Inch Customers)**

Untreated Water Rates (Miners' Inch Customers)	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
Retail	\$5.88	\$10.58	\$11.43	\$12.24	\$13.10	\$13.89
Resale	\$7.99	\$10.58	\$11.43	\$12.24	\$13.10	\$13.89
<b>Renewal and Replacement Charge (per month)</b>						
Retail	\$5.88	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
Resale	\$7.99	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
<b>Commodity Rates (per Miners' Inch per month)</b>						
<u>Summer</u>						
Retail	\$67.96	\$73.01	\$78.86	\$84.39	\$90.30	\$95.72
Resale	\$186.58	\$177.76	\$191.99	\$205.43	\$219.82	\$233.01
<u>Winter</u>						
Retail	\$80.90	\$85.50	\$92.34	\$98.81	\$105.73	\$112.08
Resale	\$220.24	\$222.79	\$240.62	\$257.47	\$275.50	\$292.03

## 1.8. Customer Bill Impacts

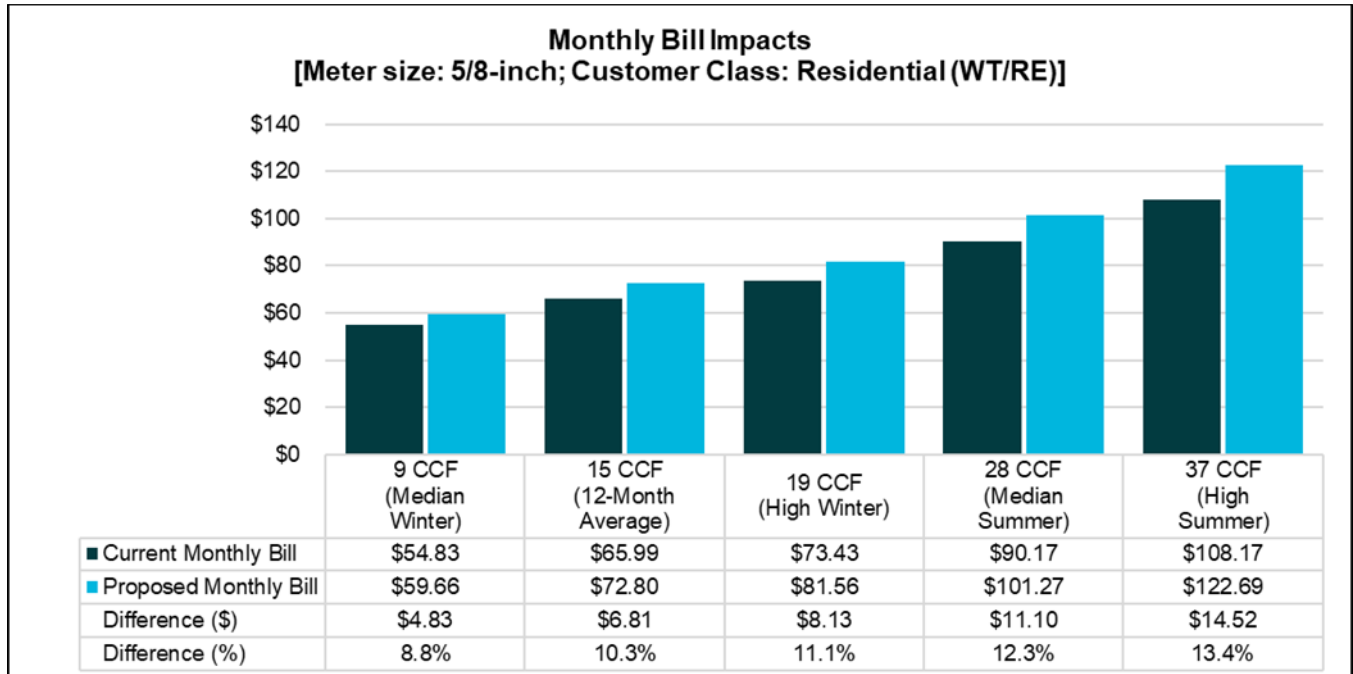
Section 1.8 includes a comparison of sample monthly bills based on currently adopted 2022 rates and proposed 2023 rates for each of the four service classes. Bill impacts are shown for 2023 only, as the first year of proposed rates is when distributional impacts resulting from the updated cost of service analyses will be experienced by customers. Beyond 2023, all customers will experience uniform annual bill increases equal to the proposed revenue adjustment percentages shown previously in Table 1-1.<sup>4</sup>

### 2023 Treated Retail Residential Monthly Bill Impacts

Figure 1-3 shows sample monthly water bills for Treated Retail Residential customers. Sample bills shown are for a customer with a 5/8-inch water meter at varying levels of water use under both current 2022 rates and proposed 2023 rates. Note that over 90% of Residential customers have a 5/8-inch water meter. The five water use levels shown are representative of recent Residential water use characteristics based on historical water use data.

<sup>4</sup> Assuming no changes in billing units of service (e.g., changes in water use, Units of Capacity, meter size, etc.).

**Figure 1-3: 2023 Monthly Bill Impacts for Treated Retail Residential Customers**



### 2023 Treated Resale & Industrial Monthly Bill Impacts

Table 1-7 shows sample monthly water bills for Treated Resale customers and PCWA’s single Industrial customer. Sample bills are shown based on both current 2022 rates and proposed 2023 rates. PCWA’s Treated Resale customers include the City of Lincoln, California American Water Company, and five other smaller users (whose combined bills are shown below under “Other Treated Resale.” Industrial impacts are included because Industrial customers are subject to the same rates as Treated Resale customers. All sample bills shown are calculated based on actual Units of Capacity and average monthly water use in 2019.

**Table 1-7: 2023 Monthly Bill Impacts for Treated Resale & Industrial Customers**

Monthly Bill Impacts	Current 2022	Proposed 2023	Difference (\$)	Difference (%)
City of Lincoln (WT/R2)	\$712,048	\$781,293	\$69,245	9.7%
Cal American Water Company (WT/R3)	\$68,978	\$75,672	\$6,693	9.7%
Other Treated Resale (WT/RS)	\$15,963	\$17,509	\$1,546	9.7%
Industrial	\$21,268	\$23,326	\$2,058	9.7%

### 2023 Untreated Retail Monthly Bill Impacts

Figure 1-4 and Figure 1-5 show sample monthly water bills for Untreated Retail Miners’ Inch customers. Sample bills are shown for both summer and winter based on both current 2022 rates and proposed 2023 rates under four different ordered water quantities ranging from one-half to three Miners’ Inches. Figure 1-6 shows sample monthly water bills for Untreated Retail metered customers with a 3/4-inch meter under three different monthly water use levels ranging from low to high.

Figure 1-4: 2023 Monthly Bill Impacts for Untreated Retail Miners' Inch Customers (Summer)

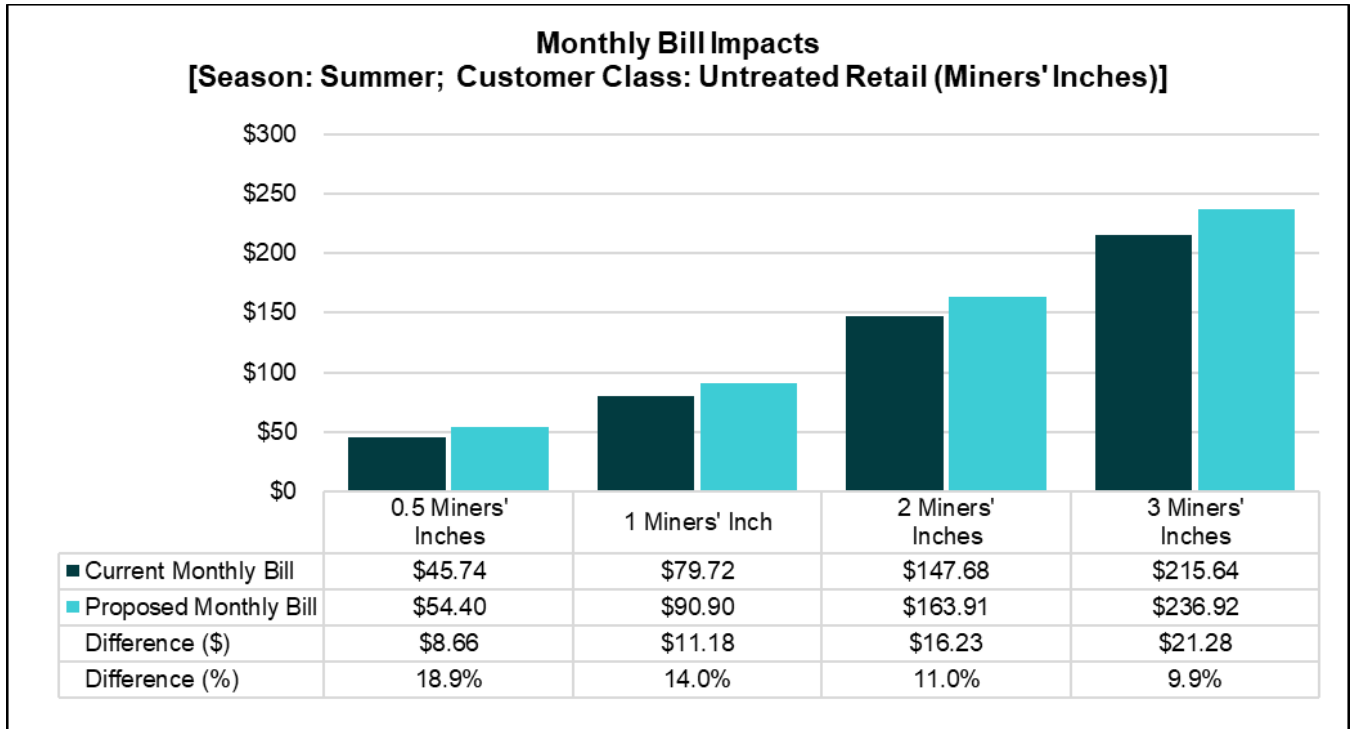


Figure 1-5: 2023 Monthly Bill Impacts for Untreated Retail Miners' Inch Customers (Winter)

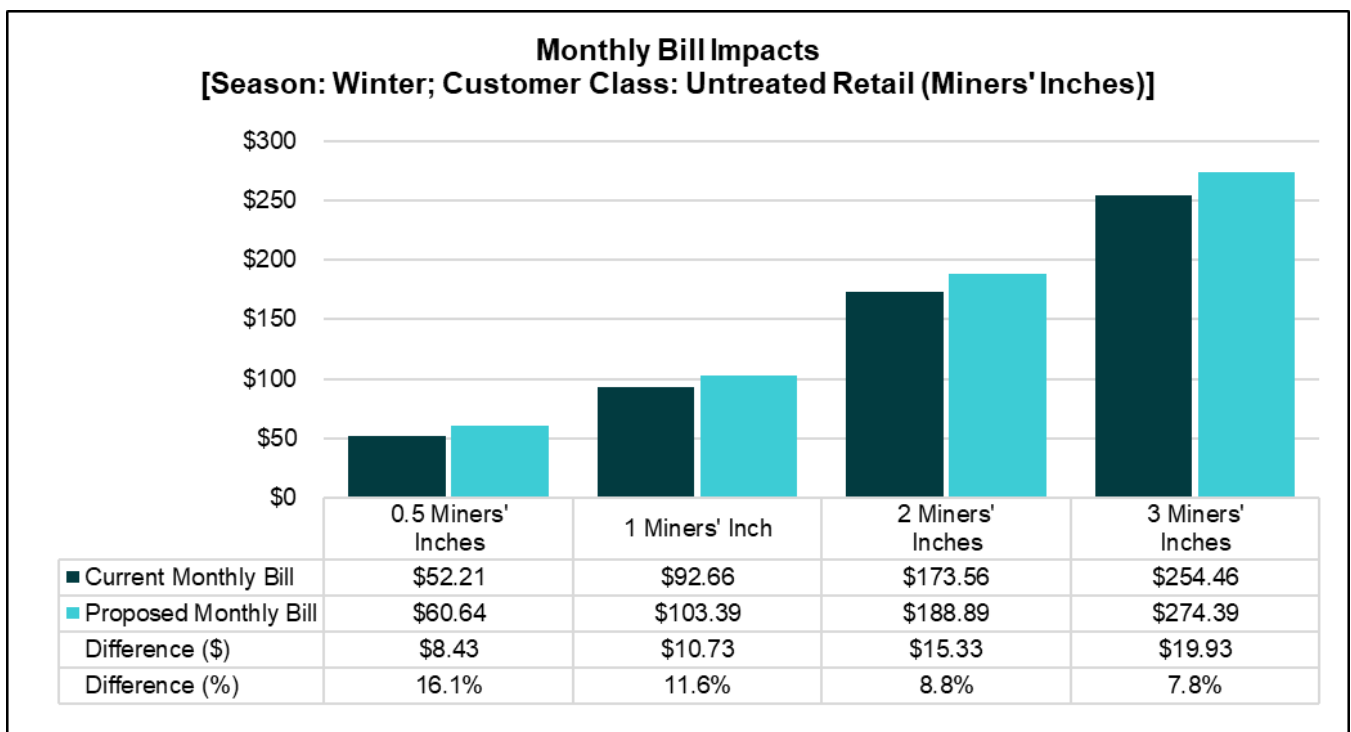
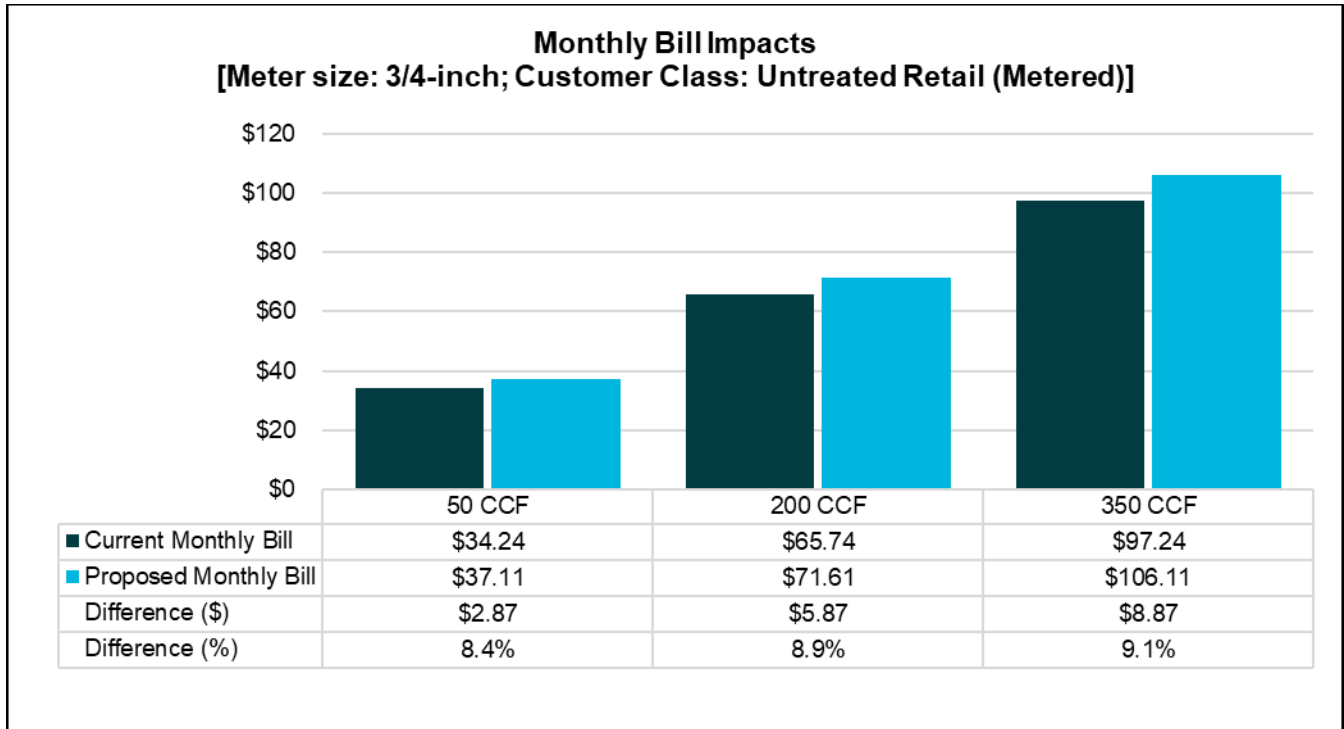


Figure 1-6: 2023 Monthly Bill Impacts for Untreated Retail Metered Customers



### 2023 Untreated Resale Monthly Bill Impacts

Table 1-8 shows sample monthly water bills for PCWA’s six Untreated Resale customers. Sample bills are shown based on both current 2022 rates and proposed 2023 rates. All sample bills shown are calculated based on average monthly water use (for metered customers) and the number of Miners’ Inches ordered each season (for unmetered customers) in 2019.

Table 1-8: 2023 Monthly Bill Impacts for Untreated Resale Customers

Monthly Bill Impacts	Current 2022	Proposed 2023	Difference (\$)	Difference (%)
<b>Monthly Bills (Metered Customers)</b>				
Dutch Flat Mutual Water Company	\$641.69	\$684.56	\$42.87	6.7%
Christian Valley Park CSD	\$4,761.78	\$4,688.43	(\$73.35)	-1.5%
Meadow Vista County Water District	\$13,298.35	\$12,701.46	(\$596.88)	-4.5%
<b>Monthly Summer Bills (Miners' Inch Customers)</b>				
Alpine Meadows Water Association	\$1,881.78	\$1,795.49	(\$86.29)	-4.6%
Heather Glen CSD	\$575.72	\$551.17	(\$24.55)	-4.3%
Weimar Water Company	\$6,173.12	\$5,883.97	(\$289.15)	-4.7%
<b>Monthly Winter Bills (Miners' Inch Customers)</b>				
Alpine Meadows Water Association	\$1,777.90	\$1,800.21	\$22.31	1.3%
Heather Glen CSD	\$456.46	\$463.47	\$7.01	1.5%
Weimar Water Company	\$4,420.78	\$4,473.69	\$52.91	1.2%

# 2. Introduction

## 2.1. Study Overview

In 2021, Placer County Water Agency (PCWA) contracted with Raftelis Financial Consultants, Inc. (Raftelis) to conduct a Water Cost of Service and Rate Study (Study) across all four service classes within PCWA's Water Division. The four service classes are: Treated Retail, Treated Resale, Untreated Retail, and Untreated Resale. Treated refers to the potable system while untreated refers to the raw water system. Retail refers to water delivery to end users who are PCWA customers. Resale refers to wholesale customers who provide water to their own customers.

This Study presents the proposed financial plan projections, cost allocations between water service classes, cost of service analyses for each service class, and resulting water rates for implementation beginning in January 2023. PCWA's last rate study was conducted in 2017, which provided the basis for water rates in effect since January 2018. This report compiles the proposed water rates and charges, and contains a description of the rate study process, methodology, results, and recommendations for PCWA rates. PCWA wishes to establish fair and equitable rates that:

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

## 2.2. Study Objectives

The major objectives of the Study include the following:

- » Develop a five-year financial plan that sufficiently funds the Water Division's operations and maintenance (O&M) expenses, debt service payments, and capital renewal and replacement (R&R) expenditures while adequately funding reserves and achieving debt coverage requirements;
- » Evaluate the existing water rate structure and recommend changes (if necessary);
- » Conduct cost of service analyses for the combined Water Division and individually for each service class;
- » Develop fair and equitable water rates that adequately recover costs, provide revenue stability for recovering fixed costs, and maintain affordable water service while remaining compliant with the requirements of Proposition 218.

This Study was prepared using the principles established by the American Water Works Association's (AWWA) *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1 (seventh edition)*, referred to hereafter as the "M1 Manual." The M1 Manual's general principles of rate structure design are described in Section 2.4.

## 2.3. Legal Requirements

### 2.3.1. CALIFORNIA CONSTITUTION - ARTICLE XIII D, SECTION 6 (PROPOSITION 218)

Proposition 218, reflected in the California Constitution as Article XIII D, was enacted in 1996 to ensure that rates and fees are reasonable and proportional to the cost of providing service. The principal requirements as they relate to public water service are as follows:

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

As stated in the AWWA's M1 Manual, "water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers." Raftelis follows industry standard rate setting methodologies set forth by the AWWA's M1 Manual to ensure the water cost of service analysis presented in this study meets Proposition 218 requirements and establishes rates that do not exceed the proportionate cost of providing water services on a parcel basis. The methodology in the Manual M1 is a nationally recognized industry ratemaking standard which courts have recognized as consistent with Proposition 218.

### 2.3.2. CALIFORNIA CONSTITUTION ARTICLE X, SECTION 2

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

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

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

In addition, Section 106 of the California Water Code declares that the highest priority use of water is for domestic purposes, with irrigation secondary. To meet the objectives of Article X, Section 2, Water Code Section 375 et seq., a water purveyor may utilize its water rate design to incentivize the efficient use of water. PCWA inherited inclining tier (also known as "conservation based" or simply "tiered") water rates in 1968 when the lower system was purchased from PG&E to incentivize customers to use water in an efficient manner. The tiered rates (as well as rates for uniform rate classes) must be based on the proportionate costs incurred to provide water to customer classes and on a parcel basis within each customer class to achieve compliance with Proposition 218.



When properly designed and differentiated by customer class, tiered rates allow a water utility to send conservation price signals to customers while proportionately allocating the costs of service. Due to heightened interest in water use efficiency and conservation, tiered water rates are ubiquitous, especially in California. Tiered rates meet the requirements of Proposition 218 as long as the tiered rates reasonably reflect the proportionate cost of providing service on a parcel basis in each tier.

## 2.4. Rate-Setting Methodology

This study was conducted using industry-standard principles outlined by the AWWA's M1 Manual. The process and approach Raftelis utilized to determine rates for the study is informed by PCWA's policy objectives, the current system of rates, and the legal requirements in California (namely, Proposition 218). The resulting financial plan, cost of service analyses, and rate design process follows four key steps, outlined below, to determine proposed rates that fulfill PCWA's objectives, meet industry standards, and comply with relevant regulations.

### 2.4.1. STEP 1: FINANCIAL PLAN DEVELOPMENT

The rate-making process begins with the development of a multi-year financial plan. The financial plan projects annual revenues under existing rates as well as various revenue requirements including operating expenses, capital expenditures, and reserve funding. If existing rates generate revenues that are insufficient to adequately fund all revenue requirements, the appropriate magnitude of annual "revenue adjustments" (i.e., rate increases) is evaluated. The key result of the multi-year financial plan is the amount of revenue from water rates required each year to adequately fund all revenue requirements.

### 2.4.2. STEP 2: COST OF SERVICE ANALYSIS

The annual cost of providing water service is distributed among customer classes commensurate with their service requirements. This study is unique due to the inclusion of five distinct cost of service analyses. These five cost of service analyses include an initial cost of service analysis to first allocate costs between the four service classes, followed by a distinct cost of service analysis for each of the four service classes. A cost of service analysis typically involves the following steps:

- 1. Calculate revenue requirement:** The cost of service process starts by determining the test year (rate-setting year) revenue requirement, which for this study is 2019.
- 2. Functionalize costs:** Operating and capital costs are categorized based on function. Examples of functions are water supply, treatment, distribution, and customer service.
- 3. Allocate functionalized costs to cost components:** Functionalized costs are next allocated to cost components. Examples of cost components include water supply, base delivery, maximum day, maximum hour, conservation, meter service, and customer service.
- 4. Distribute cost causation components:** The portion of the total rate revenue requirement attributed to each cost causation component is allocated to customers in proportion to their demands on and use of the water system.

A cost of service analysis considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking costs). Peaking costs are costs that are incurred during times of peak water use. There are additional costs associated with designing, constructing, operating, and maintaining facilities to meet peak demands. These peak demand costs need to be allocated to those imposing such costs on the water system. In other words, not all customer classes share the same responsibility for peaking-related costs.

### **2.4.3.STEP 3: RATE DESIGN**

Proposed rates are calculated based on the results of the proposed financial plan and cost of service analyses. Within the legal framework and industry standards, properly designed rates should support and optimize a blend of various utility objectives, such as promoting water conservation, affordability for essential needs, and revenue stability among other objectives. Rates may also act as a public information tool in communicating policy objectives to customers.

### **2.4.4.Step 4: REPORT PREPARATION AND RATE ADOPTION**

The final step in a rate study is to develop a study report in conjunction with the rate adoption process. The study report documents the study results and presents the methodologies, rationale, justifications, and calculations used to determine the proposed rates. Proposed rates may not be implemented until formal adoption by PCWA's Board of Directors after a public hearing. Proposition 218 requires that PCWA retail customers be mailed a public hearing notice detailing any proposed rate changes no fewer than 45 days before the public hearing date.

# 3. Financial Plan

The financial plan provides multi-year financial projections for PCWA'S Water Division based on projected revenues, O&M expenses, R&R expenditures, and debt service payments. The primary results of the financial plan include annual cash flow, reserve balance, and debt coverage projections, which together determine the amount of water rate revenues required by PCWA'S Water Division in each year to achieve financial sufficiency over the five-year planning horizon.

The following subsections describe the assumptions and calculation methodologies used to project revenues, O&M expenses, debt service, R&R expenditures, and reserve targets. The financial plan timeframe spans from 2021 through 2027. No revenue adjustments (i.e., rate increases) are considered prior to 2023, as implementation of updated rates is planned to occur beginning in January 2023. Note that all revenues and expenditures associated with Water Connection Charges (WCCs) are excluded from the financial plan cash flow projections presented in this section. However, WCC-related revenues and debt service are accounted for in debt coverage calculations.

## 3.1. Water Division Revenue from Existing Rates

In order to evaluate the need for water rate increases, annual Water Division revenues are first projected over the financial plan study period under a status quo scenario (i.e., no change in the current 2022 rates). This requires the projection of rate revenues based on existing water rates and projected billing units of service. PCWA'S water customers are currently billed monthly. Existing water rates are shown separately for treated water service, private fire protection service, untreated water service for metered customers, and untreated water service for unmetered (i.e., Miners' Inch) customers in Table 3-1 through Table 3-4. The existing water rate structure consists of the following rates and charges:

- » **Fixed Charges:**
  - Current monthly Fixed Charges are generally designed to recover customer service costs, meter-related costs, and other fixed costs.
  - Current Fixed Charges are charged based on meter size (for metered customers) and charged per service (for unmetered customers) with the following exceptions:
    - Treated Retail Multiple Dwelling Unit customers are charged based on both the number of water meters and the number of dwelling units.
    - Treated Resale and Treated Retail Industrial customers are charged per "Unit of Capacity."<sup>5</sup>
    - Treated Retail Private Fire Protection customers are charged based on fire line connection size.
- » **Renewal and Replacement (R&R) Charges:**
  - Current monthly R&R Charges are generally designed to recover capital R&R expenditures.
  - Current R&R Charges are charged based on meter size (for metered customers) and charged per service (for unmetered customers) with the following exceptions:
    - Treated Resale and Treated Retail Industrial customers are charged per Unit of Capacity.
    - Untreated metered customers are subject to the same R&R Charges regardless of meter size.
- » **Commodity Rates:**

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<sup>5</sup> A Unit of Capacity is a unit of measure for the maximum daily demand on the capacity of PCWA'S treated water system that is required to serve a customer. One Unit of Capacity is 1,150 gallons per day as of 2021.

- Current Commodity Rates are generally designed to recover water supply costs, other variable costs, a portion of capacity-related costs, and other costs.
- Metered customers are charged per hundred cubic feet (hcf) of water delivered during each monthly billing period:
  - Treated Retail Residential customers (including customers involuntarily deprived of water service [CIDUWS]) are subject to a three-tier Commodity Rate structure; monthly tier allotments determine the amount of water charged at each tiered rate per monthly billing period.
  - All other metered customers are subject to uniform Commodity Rates (i.e., no tiers).
- Unmetered customers are charged based on the number of Miners' Inches<sup>6</sup> ordered; the monthly rate per Miners' Inch varies by season (i.e., summer versus winter).

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<sup>6</sup> A Miners' Inch is a unit of measure inherited from Placer County's historical gold mining era. It is equivalent to 0.025 cubic feet per second (CFS) [1/40<sup>th</sup> of a CFS].

**Table 3-1: Existing Treated Water Rates**

<b>Treated Water Rates</b>	<b>2021</b>	<b>2022</b>
<b>Fixed Charge (per month)<sup>7</sup></b>		
5/8-inch	\$19.24	\$20.14
3/4-inch	\$26.98	\$28.25
1-inch	\$42.50	\$44.50
1-1/2-inch	\$81.24	\$85.06
2-inch	\$127.75	\$133.75
3-inch	\$275.02	\$287.95
4-inch	\$468.79	\$490.82
6-inch	\$1,050.11	\$1,099.47
8-inch	\$1,243.88	\$1,302.34
Multiple Dwelling Unit Service (per Dwelling Unit Charge)	\$15.50	\$16.23
Multiple Dwelling Unit Service (per Meter Component Charge)	\$3.73	\$3.91
Resale and Industrial Service (per Unit of Capacity)	\$18.94	\$19.83
<b>Renewal and Replacement Charge (per month)</b>		
5/8-inch	\$19.04	\$19.93
3/4-inch	\$28.57	\$29.91
1-inch	\$47.61	\$49.85
1-1/2-inch	\$95.22	\$99.70
2-inch	\$152.36	\$159.52
3-inch	\$333.29	\$348.95
4-inch	\$571.33	\$598.18
6-inch	\$1,285.50	\$1,345.92
8-inch	\$1,523.56	\$1,595.17
Resale and Industrial Service (per Unit of Capacity)	\$15.28	\$16.00
<b>Commodity Rates (per HCF)</b>		
<u>Residential Tiered Rates</u>		
Tier 1 (First 900 cubic feet)	\$1.57	\$1.64
Tier 2 (Next 1,900 cubic feet)	\$1.78	\$1.86
Tier 3 (Over 2,800 cubic feet)	\$1.91	\$2.00
<u>Non-Residential Uniform Rates</u>		
Commercial and Governmental	\$1.68	\$1.76
Landscape	\$1.78	\$1.86
Industrial and Resale	\$0.41	\$0.43
Construction	\$3.36	\$3.52
<u>Customers Involuntarily Deprived of Untreated Water Service (CIDUWS)</u>		
Tier 1 (First 900 cubic feet)	\$1.57	\$1.64
Tier 2 (Next 1,900 cubic feet)	\$1.78	\$1.86
Tier 3 (Over 2,800 cubic feet)	\$0.20	\$0.21

**Table 3-2: Existing Private Fire Protection Rates**

<b>Private Fire Protection Rates</b>	<b>2021</b>	<b>2022</b>
<b>Fixed Charge (per month)</b>		
1-inch	\$0.31	\$0.32
2-inch	\$1.90	\$1.99
3-inch	\$5.50	\$5.76
4-inch	\$11.73	\$12.28
6-inch	\$34.06	\$35.66
8-inch	\$72.58	\$75.99
10-inch	\$130.51	\$136.64
12-inch	\$210.80	\$220.71
14-inch	\$316.20	\$331.06
16-inch	\$449.24	\$470.35
<b>Commodity Rates (per HCF)</b>		
Uniform <sup>8</sup>	\$3.36	\$3.52

**Table 3-3: Existing Untreated Water Rates (Metered Customers)**

<b>Untreated Water Rates (Metered Customers)</b>	<b>2021</b>	<b>2022</b>
<b>Fixed Charge (per month)</b>		
5/8-inch	\$9.81	\$10.27
3/4-inch	\$13.04	\$13.65
1-inch	\$19.51	\$20.43
1-1/2-inch	\$35.66	\$37.34
2-inch	\$55.05	\$57.64
3-inch	\$116.45	\$121.92
4-inch	\$197.23	\$206.50
6-inch	\$439.58	\$460.24
8-inch	\$520.37	\$544.83
10-inch	\$1,231.25	\$1,289.12
<b>Renewal and Replacement Charge (per month)</b>		
All Meter Sizes	\$9.64	\$10.09
<b>Commodity Rates (per HCF)</b>		
Retail	\$0.20	\$0.21
Resale	\$0.29	\$0.30

<sup>7</sup> Customers with Residential Fire or Commercial Fire water service are charged for the meter size that would be required if fire service were not included.

<sup>8</sup> Customers with Residential Fire or Commercial Fire water service are subject to Treated Retail Residential Tiered or Commercial Commodity Rates, but are not subject to this rate (which applies only to dedicated private fire lines).

**Table 3-4: Existing Untreated Water Rates (Miners' Inch Customers)**

<b>Untreated Water Rates (Miners' Inch Customers)</b>	<b>2021</b>	<b>2022</b>
<b>Fixed Charge (per month)</b>		
Retail	\$5.62	\$5.88
Resale	\$7.63	\$7.99
<b>Renewal and Replacement Charge (per month)</b>		
Retail	\$5.62	\$5.88
Resale	\$7.63	\$7.99
<b>Commodity Rates (per Miners' Inch per month)</b>		
<u>Summer</u>		
Retail	\$64.91	\$67.96
Resale	\$178.20	\$186.58
<u>Winter</u>		
Retail	\$77.27	\$80.90
Resale	\$210.35	\$220.24

Annual growth assumptions are necessary to project billing units of service and rate revenues over the study period. PCWA staff provided Raftelis with the actual number of billing units of service by service class and customer class for 2020. Table 3-5 shows annual account growth and water demand factor assumptions used to project the number of billing units of service each year through 2027. Annual account growth represents the assumed annual increase in the number of connections by service class. The annual water demand factor represents the ratio of current year to prior year water demand per customer. All the assumptions shown below are consistent with the 2020 Urban Water Management Plan (UWMP), with the following exceptions:

- » **Treated Retail Annual Account Growth:** PCWA staff directed Raftelis to assume 1.7% annual account growth based on actual recent account growth.
- » **Treated Resale Annual Water Demand Factor:** PCWA staff directed Raftelis to adjust the 2020 UWMP projections by omitting water demand associated with the Placer Vineyards development.
- » **Untreated Resale Annual Water Demand Factor:** Water demand associated with agency-wide water sales (San Juan Water District, City of Roseville, and Sacramento Suburban Water District) is omitted, as it is not considered part of PCWA's Water Division.

**Table 3-5: Growth Assumptions**

<b>Growth Assumptions</b>	<b>2021-2025</b>	<b>2026-2027</b>
<b>Annual Account Growth</b>		
Treated Retail	1.7%	1.7%
Treated Resale	0.0%	0.0%
Untreated Retail	0.0%	0.0%
Untreated Resale	0.0%	0.0%
<b>Annual Water Demand Factor</b>		
Treated Retail	100.0%	100.0%
Treated Resale	103.7%	101.8%
Untreated Retail	99.6%	99.5%
Untreated Resale	99.4%	100.0%

Raftelis projected the number of billing units of service over the study period by applying the growth assumptions from Table 3-5 to actual 2020 billing units of service (see Table 3-6 through Table 3-9). Fixed billing units of service are projected by increasing prior year values by the associated annual account growth assumption. Water sales in both HCF and Miners' Inches are projected by first increasing prior year values by the associated annual account growth assumption and then multiplying by the associated annual water demand factor.



**Table 3-6: Treated Retail Billing Units of Service**

Treated Retail	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b>Water Meters subject to Fixed Charges (excludes Industrial, Multi-Unit, &amp; Agricultural Multi-Unit)</b>								
5/8-inch	32,906	33,465	34,034	34,613	35,201	35,800	36,408	37,027
3/4-inch	2,181	2,218	2,256	2,294	2,333	2,373	2,413	2,454
1-inch	1,008	1,025	1,043	1,060	1,078	1,097	1,115	1,134
1-1/2-inch	436	443	451	459	466	474	482	491
2-inch	214	218	221	225	229	233	237	241
3-inch	74	75	77	78	79	81	82	83
4-inch	8	8	8	8	9	9	9	9
6-inch	6	6	6	6	6	7	7	7
8-inch	1	1	1	1	1	1	1	1
<b>Total</b>	<b>36,834</b>	<b>37,460</b>	<b>38,097</b>	<b>38,745</b>	<b>39,403</b>	<b>40,073</b>	<b>40,754</b>	<b>41,447</b>
<b>Water Meters subject to R&amp;R Charges (excludes Industrial)</b>								
5/8-inch	33,107	33,670	34,242	34,824	35,416	36,018	36,631	37,253
3/4-inch	2,235	2,273	2,312	2,351	2,391	2,432	2,473	2,515
1-inch	1,176	1,196	1,216	1,237	1,258	1,279	1,301	1,323
1-1/2-inch	598	608	619	629	640	651	662	673
2-inch	355	361	367	373	380	386	393	399
3-inch	113	115	117	119	121	123	125	127
4-inch	18	18	19	19	19	20	20	20
6-inch	8	8	8	8	9	9	9	9
8-inch	2	2	2	2	2	2	2	2
<b>Total</b>	<b>37,612</b>	<b>38,251</b>	<b>38,902</b>	<b>39,563</b>	<b>40,236</b>	<b>40,920</b>	<b>41,615</b>	<b>42,323</b>
<b>Multi-Unit &amp; Agricultural Multi-Unit Customers</b>								
Meters	778	791	805	818	832	846	861	875
Dwelling Units	9,784	9,950	10,119	10,292	10,466	10,644	10,825	11,009
<b>Industrial Customers</b>								
Units of Capacity	425	432	440	447	455	462	470	478
<b>Private Fire Protection Connections</b>								
1-inch	4,482	4,558	4,636	4,714	4,795	4,876	4,959	5,043
2-inch	42	43	43	44	45	46	46	47
3-inch	0	0	0	0	0	0	0	0

Treated Retail	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
4-inch	224	228	232	236	240	244	248	252
6-inch	423	430	438	445	453	460	468	476
8-inch	251	255	260	264	269	273	278	282
10-inch	84	85	87	88	90	91	93	95
12-inch	21	21	22	22	22	23	23	24
14-inch	0	0	0	0	0	0	0	0
16-inch	0	0	0	0	0	0	0	0
<b>Total</b>	<b>5,527</b>	<b>5,621</b>	<b>5,717</b>	<b>5,814</b>	<b>5,913</b>	<b>6,013</b>	<b>6,115</b>	<b>6,219</b>
<b>Water Use (HCF)</b>								
<u>Residential</u>								
Tier 1	3,664,865	3,727,167	3,790,529	3,854,968	3,920,503	3,987,151	4,054,933	4,123,866
Tier 2	2,852,017	2,900,501	2,949,810	2,999,957	3,050,956	3,102,822	3,155,570	3,209,215
Tier 3	1,704,282	1,733,255	1,762,720	1,792,687	1,823,162	1,854,156	1,885,677	1,917,733
<b>Subtotal</b>	<b>8,221,164</b>	<b>8,360,924</b>	<b>8,503,059</b>	<b>8,647,611</b>	<b>8,794,621</b>	<b>8,944,129</b>	<b>9,096,180</b>	<b>9,250,815</b>
<u>Non-Residential</u>								
Commercial and Governmental	1,645,489	1,673,462	1,701,911	1,730,844	1,760,268	1,790,193	1,820,626	1,851,576
Landscape	1,248,169	1,269,388	1,290,967	1,312,914	1,335,233	1,357,932	1,381,017	1,404,495
Industrial	195,566	198,891	202,272	205,710	209,207	212,764	216,381	220,059
Construction	38,382	39,035	39,698	40,373	41,060	41,758	42,468	43,190
<b>Subtotal</b>	<b>3,127,606</b>	<b>3,180,776</b>	<b>3,234,849</b>	<b>3,289,841</b>	<b>3,345,769</b>	<b>3,402,647</b>	<b>3,460,492</b>	<b>3,519,320</b>
<u>CIDUWS</u>								
Tier 1	6,363	6,472	6,582	6,693	6,807	6,923	7,041	7,160
Tier 2	7,196	7,318	7,443	7,569	7,698	7,829	7,962	8,097
Tier 3	116,603	118,585	120,601	122,651	124,736	126,857	129,013	131,206
<b>Subtotal</b>	<b>130,162</b>	<b>132,375</b>	<b>134,625</b>	<b>136,914</b>	<b>139,241</b>	<b>141,608</b>	<b>144,016</b>	<b>146,464</b>
<u>Other</u>								
Private Fire Protection	1,470	1,495	1,520	1,546	1,573	1,599	1,626	1,654
<b>Subtotal</b>	<b>1,470</b>	<b>1,495</b>	<b>1,520</b>	<b>1,546</b>	<b>1,573</b>	<b>1,599</b>	<b>1,626</b>	<b>1,654</b>
<b>Total (HCF)</b>	<b>11,480,402</b>	<b>11,675,569</b>	<b>11,874,054</b>	<b>12,075,913</b>	<b>12,281,203</b>	<b>12,489,984</b>	<b>12,702,313</b>	<b>12,918,253</b>

**Table 3-7: Treated Resale Billing Units of Service**

Treated Resale	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b>Units of Capacity</b>								
City of Lincoln	16,089	16,089	16,440	16,440	16,440	16,440	16,440	16,440
California American	1,481	1,481	1,481	1,481	1,481	1,481	1,481	1,481
Other Treated Resale	328	328	384	384	384	384	384	384
<b>Total</b>	<b>17,897</b>	<b>17,897</b>	<b>18,305</b>	<b>18,305</b>	<b>18,305</b>	<b>18,305</b>	<b>18,305</b>	<b>18,305</b>
<b>Water Use (HCF)</b>								
City of Lincoln	4,275,870	4,433,696	4,597,347	4,767,038	4,942,993	5,125,443	5,218,151	5,312,536
California American	509,709	528,522	548,031	568,259	589,234	610,983	622,034	633,285
Other Treated Resale	133,207	138,124	143,222	148,508	153,990	159,674	162,562	165,502
<b>Total (HCF)</b>	<b>4,918,786</b>	<b>5,100,342</b>	<b>5,288,599</b>	<b>5,483,805</b>	<b>5,686,217</b>	<b>5,896,099</b>	<b>6,002,747</b>	<b>6,111,323</b>

**Table 3-8: Untreated Retail Billing Units of Service**

Untreated Retail	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b><u>Metered Customers</u></b>								
<b>Water Meters</b>								
5/8-inch	16	16	16	16	16	16	16	16
3/4-inch	123	123	123	123	123	123	123	123
1-inch	88	88	88	88	88	88	88	88
1-1/2-inch	11	11	11	11	11	11	11	11
2-inch	10	10	10	10	10	10	10	10
3-inch	2	2	2	2	2	2	2	2
4-inch	3	3	3	3	3	3	3	3
6-inch	0	0	0	0	0	0	0	0
8-inch	0	0	0	0	0	0	0	0
10-inch	0	0	0	0	0	0	0	0
<b>Total</b>	<b>253</b>	<b>253</b>	<b>253</b>	<b>253</b>	<b>253</b>	<b>253</b>	<b>253</b>	<b>253</b>
<b>Water Use (HCF)</b>								
Metered Water Use	133,602	133,105	132,610	132,116	131,624	131,135	130,423	129,716
<b><u>Miners' Inch Customers</u></b>								
<b>Connections</b>								
Summer	4,009	4,009	4,009	4,009	4,009	4,009	4,009	4,009
Winter	2,610	2,610	2,610	2,610	2,610	2,610	2,610	2,610
<b>Water Use (Miners' Inches)</b>								
Summer	6,349	6,325	6,302	6,278	6,255	6,232	6,198	6,164
Winter	2,672	2,662	2,652	2,642	2,632	2,623	2,608	2,594

**Table 3-9: Untreated Resale Billing Units of Service**

Untreated Resale	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b><u>Metered Customers</u></b>								
<b>Water Meters</b>								
5/8-inch	0	0	0	0	0	0	0	0
3/4-inch	0	0	0	0	0	0	0	0
1-inch	5	5	5	5	5	5	5	5
1-1/2-inch	0	0	0	0	0	0	0	0
2-inch	3	3	3	3	3	3	3	3
3-inch	0	0	0	0	0	0	0	0
4-inch	0	0	0	0	0	0	0	0
6-inch	1	1	1	1	1	1	1	1
8-inch	1	1	1	1	1	1	1	1
10-inch	0	0	0	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>
<b>Water Use (HCF)</b>								
Metered Water Use	826,838	821,658	816,510	811,394	806,311	801,259	801,259	801,259
<b><u>Miners' Inch Customers</u></b>								
<b>Connections</b>								
Summer	3	3	3	3	3	3	3	3
Winter	3	3	3	3	3	3	3	3
<b>Water Use (Miners' Inches)</b>								
Summer	46	46	45	45	45	45	45	45
Winter	30	30	30	29	29	29	29	29

Calculated water rate revenue under existing rates in each year over the study period is shown in Table 3-10. All rate revenue projections are calculated using the methodology described below based on existing rates (from Table 3-1 through Table 3-4) and projected billing units of service (from Table 3-6 through Table 3-9). Rate revenues in 2021 are projected based on 2021 rates. All rate revenues in 2022-2027 are projected based on 2022 rates. This provides a status quo scenario from which to evaluate whether current 2022 rates will generate sufficient revenue over the next five years. This step is necessary to establish a baseline scenario from which to evaluate the need for potential rate increases through 2027.

### **Fixed Charge Revenue Calculations:**

#### Treated Retail Multiple Dwelling Unit Service:

$$\text{Annual Fixed Charge Revenue} = \{([\text{monthly dwelling unit charge}] \times [\text{number of dwelling units}]) + ([\text{monthly meter charge}] \times [\text{number of water meters}])\} \times [12 \text{ months}]$$

#### Treated Retail Industrial & Treated Resale Service:

$$\text{Annual Fixed Charge Revenue} = [\text{monthly charge}] \times [\text{units of capacity}] \times [12 \text{ months}]$$

#### Unmetered (Miners' Inch) customers:

$$\text{Annual Fixed Charge Revenue} = [\text{monthly charge}] \times [\text{number of summer accounts}] \times [6 \text{ months}] + [\text{monthly charge}] \times [\text{number of winter accounts}] \times [6 \text{ months}]$$

#### All other customers:

$$\text{Annual Fixed Charge Revenue} = [\text{monthly charge}] \times [\text{number of connections}] \times [12 \text{ months}]$$

### **R&R Charge Revenue Calculations:**

#### Treated Retail Industrial & Treated Resale Service:

$$\text{Annual R\&R Charge Revenue} = [\text{monthly charge}] \times [\text{units of capacity}] \times [12 \text{ months}]$$

#### Unmetered (Miners' Inch) customers:

$$\text{Annual Fixed Charge Revenue} = [\text{monthly charge}] \times [\text{number of summer accounts}] \times [6 \text{ months}] + [\text{monthly charge}] \times [\text{number of winter accounts}] \times [6 \text{ months}]$$

#### All other customers:

$$\text{Annual R\&R Charge Revenue} = [\text{monthly charge}] \times [\text{number of connections}] \times [12 \text{ months}]$$

### **Commodity Rate Revenue Calculations:**

#### Metered customers:

$$\text{Annual Commodity Rate Revenue} = [\text{rate per HCF}] \times [\text{annual water use in HCF}]$$

#### Unmetered (Miners' Inch) customers:

$$\text{Annual Commodity Rate Revenue} = [\text{monthly summer charge per Miners' Inch}] \times [\text{number of summer Miners' Inches}] \times [6 \text{ months}] + [\text{monthly winter charge per Miners' Inch}] \times [\text{number of winter Miners' Inches}] \times [6 \text{ months}]$$

**Table 3-10: Water Rate Revenue from Existing Rates**

Water Rate Revenue	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b>Treated Retail</b>							
Fixed Charges	\$12,739,940	\$13,563,770	\$13,794,354	\$14,028,858	\$14,267,348	\$14,509,893	\$14,756,562
R&R Charges	\$11,337,526	\$12,070,171	\$12,275,364	\$12,484,045	\$12,696,273	\$12,912,110	\$13,131,616
Commodity Rates	\$19,660,619	\$20,907,149	\$21,262,570	\$21,624,034	\$21,991,643	\$22,365,501	\$22,745,714
<b>Subtotal</b>	<b>\$43,738,084</b>	<b>\$46,541,089</b>	<b>\$47,332,288</b>	<b>\$48,136,937</b>	<b>\$48,955,265</b>	<b>\$49,787,504</b>	<b>\$50,633,892</b>
<b>Treated Resale</b>							
Fixed Charges	\$4,067,660	\$4,355,817	\$4,355,817	\$4,355,817	\$4,355,817	\$4,355,817	\$4,355,817
R&R Charges	\$3,281,618	\$3,514,527	\$3,514,527	\$3,514,527	\$3,514,527	\$3,514,527	\$3,514,527
Commodity Rates	\$2,091,140	\$2,274,098	\$2,358,036	\$2,445,073	\$2,535,323	\$2,581,181	\$2,627,869
<b>Subtotal</b>	<b>\$9,440,418</b>	<b>\$10,144,442</b>	<b>\$10,228,381</b>	<b>\$10,315,418</b>	<b>\$10,405,667</b>	<b>\$10,451,526</b>	<b>\$10,498,214</b>
<b>Untreated Retail</b>							
Fixed Charges	\$286,134	\$299,417	\$299,417	\$299,417	\$299,417	\$299,417	\$299,417
R&R Charges	\$252,460	\$264,152	\$264,152	\$264,152	\$264,152	\$264,152	\$264,152
Commodity Rates	\$3,724,282	\$3,884,835	\$3,870,377	\$3,855,972	\$3,841,621	\$3,820,788	\$3,800,068
<b>Subtotal</b>	<b>\$4,262,876</b>	<b>\$4,448,404</b>	<b>\$4,433,946</b>	<b>\$4,419,541</b>	<b>\$4,405,190</b>	<b>\$4,384,357</b>	<b>\$4,363,637</b>
<b>Untreated Resale</b>							
Fixed Charges	\$14,946	\$15,649	\$15,649	\$15,649	\$15,649	\$15,649	\$15,649
R&R Charges	\$1,431	\$1,498	\$1,498	\$1,498	\$1,498	\$1,498	\$1,498
Commodity Rates	\$324,782	\$334,954	\$332,855	\$330,770	\$328,698	\$328,698	\$328,698
<b>Subtotal</b>	<b>\$341,160</b>	<b>\$352,102</b>	<b>\$350,003</b>	<b>\$347,918</b>	<b>\$345,845</b>	<b>\$345,845</b>	<b>\$345,845</b>
<b>Total</b>	<b>\$57,782,537</b>	<b>\$61,486,037</b>	<b>\$62,344,618</b>	<b>\$63,219,813</b>	<b>\$64,111,968</b>	<b>\$64,969,232</b>	<b>\$65,841,587</b>

In addition to rate revenue, the Water Division collects revenues from miscellaneous charges, rental income, interest earnings on cash reserves, and other non-rate revenues. Other Water Division revenue projections through 2027 are shown in Table 3-11. Budgeted values are used in 2021 and 2022. To ensure sufficiently conservative revenue projections beyond 2022, other Water Division revenues are assumed to remain level at 2022 budget levels, with the exception of interest earnings. Interest earnings beyond 2022 are projected by multiplying the average annual reserve balance (projected in later subsections) by an assumed 1% annual interest rate on cash reserves. Note that Water Connection Charges (WCCs) are excluded below.

**Table 3-11: Other Water Division Revenue (excluding Water Connection Charges)**

Other Water Division Revenue	2021 Budget	2022 Budget	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
Growers Untreated (Zone 5) Water Sales	\$550,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000
Engineering Charges	\$750,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000
Customer Service Charges	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000
Contributions in Aid of Construction	\$139,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000
Interest Earnings <sup>9</sup>	\$900,000	\$900,000	\$680,255	\$683,930	\$700,757	\$750,019	\$831,436
Rental Income	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000
Other Revenue	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
Grants	\$100,000	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>	<b>\$3,279,000</b>	<b>\$3,405,000</b>	<b>\$3,185,255</b>	<b>\$3,188,930</b>	<b>\$3,205,757</b>	<b>\$3,255,019</b>	<b>\$3,336,436</b>

<sup>9</sup> Projected interest earnings beginning in 2023 were estimated by Raftelis based on projected Water Division cash balances and an assumed 1.0% interest rate.



### 3.2. Water Division O&M Expenses

Raftelis projected annual Water Division operations and maintenance (O&M) expenses over the study period by escalating 2022 budgeted values by annual inflationary factors shown in Table 3-12. Inflationary assumptions were established by Raftelis and PCWA staff based on historical increases, industry trends and expectations, and consideration of historically high inflation at the time the study analysis was conducted. Raftelis assigned each line item in the Water Division operating budget to one of the expense categories shown in Table 3-12 in order to apply the inflationary increases in each year of the study period. While the projections were primarily determined by applying annual inflationary increases, Raftelis incorporated per direction from PCWA staff the following additional adjustments:

- » \$250,000 in annual recurring costs were added in 2023 to the Treated Water Maintenance Department to account for labor and benefits associated with two new employees to better support operations and maintenance of the water system.
- » \$100,000 in one-time costs were added in 2023 to Treated Water Maintenance Department to account for new equipment associated with two new employees.
- » Purchased water costs (Field Admin Department) & electricity costs (Pumping Department) were increased annually in proportion to water demand increases (in addition to annual inflationary increases).

**Table 3-12: O&M Expense Inflationary Assumptions**

Annual O&M Expense Inflation	2023-2024	2025-2027
General Expenses	5.0%	3.0%
Salaries & Benefits	6.0%	6.0%
Utilities	7.0%	5.0%
Chemicals	7.0%	5.0%
Water Purchases	6.0%	4.0%

Projected Water Division O&M expenses are shown in Table 3-13. The O&M projections shown exclude depreciation (which is a non-cash expense) and debt service payments (which are incorporated separately in the financial plan projections). Optional unaccrued additional liability (UAL) pension payments are shown separately from all other O&M expenses due to the large discretionary payment of \$21.5 million in 2021. O&M expenses are projected to increase by an average of 5.2% per year over the study period.

**Table 3-13: Water Division O&M Expenses**

<b>Water Division O&amp;M Expenses</b>	<b>2021 Budget</b>	<b>2022 Budget</b>	<b>2023 Projected</b>	<b>2024 Projected</b>	<b>2025 Projected</b>	<b>2026 Projected</b>	<b>2027 Projected</b>
<b>Customer Services</b>							
Customer Service & Collections	\$2,776,032	\$3,031,834	\$3,205,532	\$3,389,242	\$3,565,602	\$3,751,730	\$3,948,187
Meter Reading	\$1,112,506	\$1,128,424	\$1,190,340	\$1,255,681	\$1,312,575	\$1,372,311	\$1,435,043
Water Efficiency	\$870,396	\$895,998	\$946,144	\$999,117	\$1,047,110	\$1,097,625	\$1,150,800
<b>Subtotal</b>	<b>\$4,758,934</b>	<b>\$5,056,256</b>	<b>\$5,342,016</b>	<b>\$5,644,040</b>	<b>\$5,925,287</b>	<b>\$6,221,666</b>	<b>\$6,534,030</b>
<b>Facility Maintenance</b>							
Facilities Maintenance	\$1,162,941	\$1,272,120	\$1,342,598	\$1,417,044	\$1,476,135	\$1,537,954	\$1,602,637
<b>Subtotal</b>	<b>\$1,162,941</b>	<b>\$1,272,120</b>	<b>\$1,342,598</b>	<b>\$1,417,044</b>	<b>\$1,476,135</b>	<b>\$1,537,954</b>	<b>\$1,602,637</b>
<b>Field Services</b>							
Canal Operations	\$1,607,318	\$1,805,304	\$1,910,435	\$2,021,723	\$2,131,586	\$2,247,664	\$2,370,319
Field Admin	\$5,298,066	\$5,829,222	\$6,229,013	\$6,657,868	\$6,994,596	\$7,319,452	\$7,660,432
Vehicle & Equipment Maintenance	\$928,824	\$954,835	\$1,013,358	\$1,075,509	\$1,132,029	\$1,191,638	\$1,254,509
Treated Water Maintenance	\$3,538,593	\$3,710,793	\$4,269,104	\$4,404,196	\$4,622,904	\$4,853,320	\$5,096,104
Raw Water Maintenance	\$2,319,688	\$2,326,979	\$2,464,137	\$2,609,408	\$2,756,613	\$2,912,353	\$3,077,130
Inventory Warehouse	\$248,481	\$254,730	\$269,932	\$286,041	\$302,874	\$320,707	\$339,599
<b>Subtotal</b>	<b>\$13,940,970</b>	<b>\$14,881,863</b>	<b>\$16,155,978</b>	<b>\$17,054,745</b>	<b>\$17,940,601</b>	<b>\$18,845,134</b>	<b>\$19,798,093</b>
<b>General Manager's Office</b>							
General & Administrative	\$148,094	\$148,334	\$157,234	\$166,668	\$176,668	\$187,268	\$198,504
<b>Subtotal</b>	<b>\$148,094</b>	<b>\$148,334</b>	<b>\$157,234</b>	<b>\$166,668</b>	<b>\$176,668</b>	<b>\$187,268</b>	<b>\$198,504</b>
<b>Non-Departmental</b>							
General & Administrative <sup>10</sup>	\$2,963,100	\$2,387,700	\$2,530,962	\$2,682,820	\$2,843,789	\$3,014,416	\$3,195,281
<b>Subtotal</b>	<b>\$2,963,100</b>	<b>\$2,387,700</b>	<b>\$2,530,962</b>	<b>\$2,682,820</b>	<b>\$2,843,789</b>	<b>\$3,014,416</b>	<b>\$3,195,281</b>
<b>Service Level Support</b>							
Service Level Support	\$6,423,000	\$6,744,150	\$7,081,358	\$7,435,425	\$7,658,488	\$7,888,243	\$8,124,890
<b>Subtotal</b>	<b>\$6,423,000</b>	<b>\$6,744,150</b>	<b>\$7,081,358</b>	<b>\$7,435,425</b>	<b>\$7,658,488</b>	<b>\$7,888,243</b>	<b>\$8,124,890</b>

<sup>10</sup> Excludes optional UAL pension payment, which is shown separately below the O&M expense total on the following page.

Water Division O&M Expenses	2021 Budget	2022 Budget	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected
<b>Technical Services</b>							
Confined Space	\$46,000	\$0	\$0	\$0	\$0	\$0	\$0
Engineering	\$3,341,364	\$3,292,927	\$3,481,214	\$3,680,334	\$3,871,353	\$4,072,917	\$4,285,629
Natural Resource Management	\$140,702	\$99,957	\$105,954	\$112,312	\$119,050	\$126,193	\$133,765
Operational Technology	\$1,300,352	\$1,389,998	\$1,466,676	\$1,547,618	\$1,618,518	\$1,693,006	\$1,771,278
Pumping	\$575,000	\$673,250	\$724,988	\$780,867	\$825,505	\$870,067	\$917,154
Water Quality Monitoring	\$397,628	\$364,633	\$384,275	\$404,985	\$421,904	\$439,616	\$458,163
Water Treatment	\$2,830,819	\$3,054,892	\$3,242,643	\$3,442,051	\$3,625,945	\$3,819,994	\$4,024,771
Plant Maintenance	\$1,815,247	\$2,069,858	\$2,185,762	\$2,308,212	\$2,419,335	\$2,536,270	\$2,659,338
Treated Water Distribution	\$1,285,354	\$1,150,407	\$1,217,902	\$1,289,370	\$1,361,715	\$1,438,249	\$1,519,218
Raw Water OT Support	\$70,500	\$70,500	\$74,025	\$77,726	\$80,058	\$82,460	\$84,934
Drinking Water Operations	\$1,511,609	\$2,111,717	\$2,240,351	\$2,376,998	\$2,481,762	\$2,591,448	\$2,706,299
<b>Subtotal</b>	<b>\$13,314,575</b>	<b>\$14,278,139</b>	<b>\$15,123,791</b>	<b>\$16,020,474</b>	<b>\$16,825,146</b>	<b>\$17,670,220</b>	<b>\$18,560,547</b>
<b>Total O&amp;M Expenses<sup>11</sup></b>	<b>\$42,711,614</b>	<b>\$44,768,562</b>	<b>\$47,733,937</b>	<b>\$50,421,216</b>	<b>\$52,846,115</b>	<b>\$55,364,901</b>	<b>\$58,013,983</b>
<i>Optional UAL Pension Payment</i>	<i>\$21,523,768</i>	<i>\$300,000</i>	<i>\$318,000</i>	<i>\$337,080</i>	<i>\$357,305</i>	<i>\$378,743</i>	<i>\$401,468</i>

<sup>11</sup> Excludes optional UAL pension payments shown below.

### 3.3. Water Division Debt Service

PCWA staff provided Raftelis with a schedule of existing debt service payments over the study period for the Water Division associated with outstanding Certificates of Participation (COPs), State Revolving Fund (SRF) Loans, and Improvement District debt. The financial plan cash flow projections exclude debt service payments allocated for recovery by Water Connection Charges (WCCs). Therefore, the portion of debt service to be recovered by WCCs is excluded from the subtotals shown in Table 3-14 below. However, total debt service is shown both inclusive and exclusive of the WCC funded portion. This is because total debt service including the WCC funded portion is required to calculate debt coverage.

**Table 3-14: Water Division Existing Debt Service**

Water Division Debt Service (excluding WCC Funded)	2021	2022	2023	2024	2025	2026	2027
<b>COPs</b>							
Series 2021	\$504,436	\$1,133,225	\$1,133,850	\$1,133,225	\$1,131,350	\$1,128,225	\$1,128,725
Series 2018	\$172,332	\$171,202	\$171,062	\$264,672	\$264,302	\$270,452	\$270,282
Series 2016	\$649,216	\$648,795	\$649,357	\$648,982	\$647,670	\$647,248	\$647,623
Series 2013	\$1,019,250	\$1,018,125	\$1,014,750	\$0	\$0	\$0	\$0
<b>Subtotal</b>	<b>\$2,345,235</b>	<b>\$2,971,347</b>	<b>\$2,969,019</b>	<b>\$2,046,879</b>	<b>\$2,043,322</b>	<b>\$2,045,925</b>	<b>\$2,046,630</b>
<b>Loans Payable</b>							
SRF Loan - Auburn WTP	\$1,252,306	\$1,252,306	\$1,252,306	\$1,252,306	\$1,252,306	\$1,252,306	\$1,252,306
SRF Loan - Electric St.	\$489,026	\$489,026	\$489,026	\$489,026	\$489,026	\$489,026	\$489,026
<b>Subtotal</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>	<b>\$1,741,332</b>
<b>Improvement District Debt</b>							
ID No. 10	\$0	\$0	\$1,134	\$0	\$0	\$0	\$0
ID No. 11	\$0	\$0	\$1,195	\$0	\$0	\$0	\$0
<b>Subtotal</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,329</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Total (excluding WCC Funded)</b>	<b>\$4,086,566</b>	<b>\$4,712,678</b>	<b>\$4,712,680</b>	<b>\$3,788,211</b>	<b>\$3,784,653</b>	<b>\$3,787,256</b>	<b>\$3,787,961</b>
<i>Total (including WCC Funded)</i>	<i>\$7,150,412</i>	<i>\$7,762,825</i>	<i>\$7,762,154</i>	<i>\$7,913,575</i>	<i>\$7,903,575</i>	<i>\$7,976,200</i>	<i>\$7,975,575</i>

### 3.4. Water Division CIP (R&R Only)

The financial plan cash flow projections exclude all growth-related Capital Improvement Plan (CIP) projects, which are to be funded by WCCs. The only CIP project costs included are associated with renewal and replacement (R&R) projects. Raftelis worked closely with PCWA staff to develop projections of R&R expenditures over the study period based on the following considerations:

- » Projected R&R costs in 2021 and 2022 are set equal to 2021 and 2022 R&R projects costs from PCWA’s five-year proposed CIP budget (as of the time the study analysis was conducted)
- » Projected R&R costs in 2023-2027 are set equal to annual average R&R costs from Brown and Caldwell’s *Analysis of 25-year Renewal and Replacement Program – Update 2020* after accounting for the difference in total 2021-2022 R&R project costs between Brown and Caldwell’s projections and PCWA’s five-year proposed CIP budget (resulting in \$17.3 million per year in R&R project costs between 2023-2027 before accounting for inflation).
- » In addition to the R&R project cost described above, \$1 million per year in additional raw water system R&R costs were added in 2022-2027 per direction from PCWA staff.

All R&R project costs in Brown and Caldwell’s *Analysis of 25-year Renewal and Replacement Program – Update 2020* were provided in 2020 US Dollars. Therefore, the annual inflationary assumptions shown in Table 3-15 are applied to account for capital cost escalation over the study period. Inflation through 2024 is assumed to be higher than in 2025 onwards due to current inflationary trends within the broader US economy.

**Table 3-15: Capital Inflationary Assumptions**

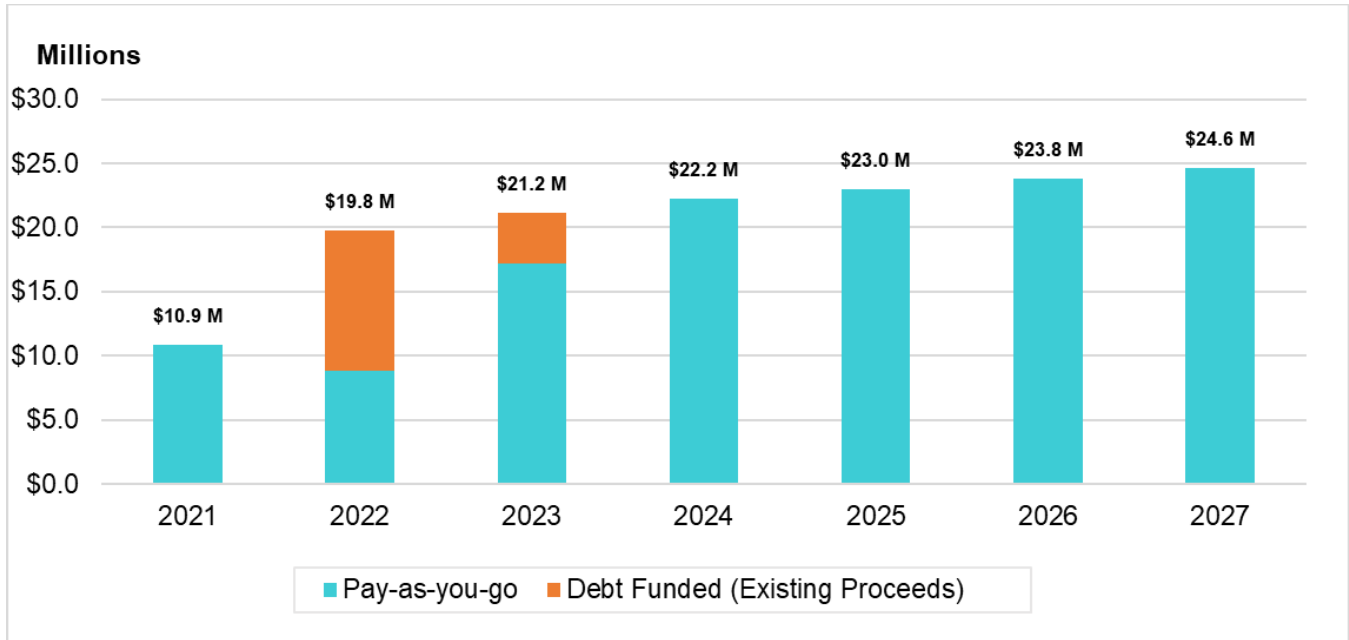
Annual Inflation	2021-2024	2025-2027
R&R Projects	5.0%	3.5%

Annual Water Division R&R project costs by funding source are shown in Table 3-16 and in Figure 3-1. PCWA staff indicated that \$15 million in existing debt proceeds (2021 issuance) will be reimbursed and available to fund R&R project costs in 2022-2023. All other R&R project costs are assumed to be funded by Water Division rates and reserves (i.e., pay-as-you-go). All increases in total R&R project costs beyond 2023 are due to inflation only. Annual average R&R project costs amount to \$20.8 million over the course of the study period (including inflation).

**Table 3-16: Water Division CIP (R&R only)**

Water Division CIP (R&R only)	2021	2022	2023	2024	2025	2026	2027
<b>Funding Source</b>							
Existing Debt Proceeds	\$0	\$11,000,000	\$4,000,000	\$0	\$0	\$0	\$0
Pay-as-you-go	\$10,889,300	\$8,784,500	\$17,168,798	\$22,227,237	\$23,005,191	\$23,810,372	\$24,643,736
<b>Total R&amp;R</b>	<b>\$10,889,300</b>	<b>\$19,784,500</b>	<b>\$21,168,798</b>	<b>\$22,227,237</b>	<b>\$23,005,191</b>	<b>\$23,810,372</b>	<b>\$24,643,736</b>

Figure 3-1: Water Division CIP (R&R only)



### 3.5. Financial Policies

Key financial policies incorporated into the financial plan projections include debt coverage requirements and reserve targets. Financial plan results presented in subsequent sections are evaluated in part by comparing projected debt coverage and reserve levels to the financial policy requirements/targets outlined below.

#### 3.5.1. DEBT COVERAGE

The Water Division is required to meet debt coverage requirements on its outstanding debt. The required debt coverage ratio is 1.20, meaning that the Water Division’s annual net operating revenues (i.e., total revenues less operating expenses) must amount to at least 1.20 times the amount of total annual debt service (including the portion to be funded by WCCs). Failure to meet debt service coverage may result in technical default, which without foreseeable remedial action such as implementing rate increases, could result in a downgrade of credit rating, higher costs in future debt issuance, or even denial of credit.

#### 3.5.2. RESERVES

A reserve policy is a written document that establishes reserve goals and targets. It provides guidelines for sound financial management with an overall long-range perspective to maintain financial solvency and mitigate financial risks associated with revenue instability, volatile capital costs, and emergencies. Adopting and adhering to a sustainable reserve policy enhances financial management transparency and can help achieve or maintain a preferred credit rating for future debt issues. Reserves can offset unanticipated reductions in revenues, fluctuations in costs, and fiscal emergencies such as revenue shortfalls, asset failure, and natural disaster. Capital reserves set funds aside for capital asset replacement.

The appropriate amount of reserves and reserve types are determined by a variety of factors, such as the size of the operating budget, the amount of outstanding debt, the type of rate structure, and risk of natural disaster. PCWA’s Water Division reserve policy is shown in Table 3-17 below, which provides the basis for determining target levels for each reserve. No reserve target for the adopted “Specific Activities, Programs and Special Projects Reserve” is

included below, as the target can vary significantly from year to year based on recommended staff levels. However, an additional “Informal Working Capital Reserve” is included below per direction from PCWA staff (note that this reserve is not included within PCWA’s formally adopted reserve policy).

**Table 3-17: Water Division Financial Policies**

<b>Financial Policy</b>	<b>Minimum Target</b>	<b>Maximum Target</b>
<b>Debt Coverage</b>		
Debt Coverage Ratio	1.20	N/A
<b>Reserve Balance</b>		
Operating Reserve	100 days of O&M	150 days of O&M
Capital Reserve	Next 2 years of R&R	Next 5 years of R&R
Liabilities Reserve	50% of employee leave balance	100% of employee leave balance
Informal Working Capital Reserve	100 days of O&M	100 days of O&M

Reserve targets levels in each year over the study period (see Table 3-18) are calculated based on PCWA’s formal reserve policy (from Table 3-17):

- » The Operating Reserve target is equal to  $[100 \text{ or } 150 \text{ days} \div 365 \text{ days per year}] \times [\text{annual O\&M expenses (from Table 3-13)}]$ .
- » The Capital target is based on the next 2 or 5 years of R&R costs (from Table 3-16) <sup>12</sup>
- » The Liabilities Reserve target is equal to 50% or 100% of the employee leave balance (\$2.2 million in 2021, which is assumed to increase each subsequent year by 6%).
- » The Informal Working Capital Reserve is equal to  $[100 \text{ days} \div 365 \text{ days per year}] \times [\text{annual O\&M expenses (from Table 3-13)}]$ .

<sup>12</sup> For the purposes of the Capital Reserve Target calculation, R&R project costs are assumed to continue to increase by 3.5% per year beyond 2027 due to inflation.

**Table 3-18: Water Division Reserve Targets**

<b>Water Division Reserve Targets</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>
<b>Minimum Reserve Target</b>							
Operating Reserve	\$11,701,812	\$12,265,359	\$13,077,791	\$13,814,032	\$14,478,388	\$15,168,466	\$15,894,242
Capital Reserve	\$30,673,800	\$40,953,298	\$43,396,035	\$45,232,428	\$46,815,563	\$48,454,108	\$50,150,002
Liabilities Reserve	\$1,100,000	\$1,166,000	\$1,235,960	\$1,310,118	\$1,388,725	\$1,472,048	\$1,560,371
Informal Working Capital Reserve	\$11,701,812	\$12,265,359	\$13,077,791	\$13,814,032	\$14,478,388	\$15,168,466	\$15,894,242
<b>Total</b>	<b>\$55,177,424</b>	<b>\$66,650,017</b>	<b>\$70,787,577</b>	<b>\$74,170,610</b>	<b>\$77,161,064</b>	<b>\$80,263,088</b>	<b>\$83,498,856</b>
<b>Maximum Reserve Target</b>							
Operating Reserve	\$17,552,718	\$18,398,039	\$19,616,686	\$20,721,048	\$21,717,582	\$22,752,699	\$23,841,363
Capital Reserve	\$97,075,026	\$109,996,098	\$114,855,334	\$119,192,802	\$123,364,551	\$127,682,310	\$132,151,191
Liabilities Reserve	\$2,200,000	\$2,332,000	\$2,471,920	\$2,620,235	\$2,777,449	\$2,944,096	\$3,120,742
Informal Working Capital Reserve	\$11,701,812	\$12,265,359	\$13,077,791	\$13,814,032	\$14,478,388	\$15,168,466	\$15,894,242
<b>Total</b>	<b>\$128,529,556</b>	<b>\$142,991,497</b>	<b>\$150,021,731</b>	<b>\$156,348,117</b>	<b>\$162,337,969</b>	<b>\$168,547,571</b>	<b>\$175,007,537</b>



### 3.6. Water Division Status Quo Financial Plan

To evaluate the need for revenue adjustments (i.e., water rate increases), Raftelis first developed a status quo financial plan. The status quo financial plan assumes that current 2022 water rates will remain in effect over the study period. The Water Division status quo financial plan (see Table 3-19) combines projected revenues (from Table 3-10 and Table 3-11), O&M expenses (from Table 3-13), debt service payments (from Table 3-14), and R&R expenditures (from Table 3-16) to develop cash flow projections through 2027. Projected ending cash balances in each year are compared to projected reserve targets (from Table 3-18). Debt coverage is calculated based on total debt service including the WCC funded portion (from Table 3-14) and compared to the debt coverage requirement (from Table 3-17).

The status quo financial plan (see Table 3-19, Figure 3-2, and Figure 3-3) demonstrates that in the absence of any revenue adjustments, Water Division reserves are projected to fall below the target level by the end of 2023 and become severely depleted by the end of the study period in 2027. Revenues under the status quo financial plan are sufficient to cover O&M expenses and debt service each year. However, reserves must be drawn down and depleted to cover projected R&R expenditures each year beginning in 2023. Projected debt coverage (shown both with and without WCC revenue) meets the requirement in each year, but steadily declines after 2022. The results of the status quo financial plan clearly illustrate that revenue adjustments are necessary over the next five years to provide sufficient funding for R&R projects and maintain adequate reserves.

**Table 3-19: Water Division Status Quo Financial Plan Pro Forma (NO RATE INCREASES)**

Line	Water Division (excl. WCCs)	2021	2022	2023	2024	2025	2026	2027
1	<b>Water Division Cash Flow</b>							
2	<b>Revenue</b>							
3	Water Rate Revenue	\$57,782,537	\$61,486,037	\$62,344,618	\$63,219,813	\$64,111,968	\$64,969,232	\$65,841,587
4	Growers Untreated Water Sales	\$550,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000
5	Engineering Charges	\$750,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000
6	Customer Service Charges	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000
7	Contr. in Aid of Construction	\$139,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000
8	Interest Earnings <sup>13</sup>	\$900,000	\$900,000	\$655,317	\$581,206	\$464,892	\$323,325	\$154,720
9	Rental Income	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000
10	Other Revenue	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
11	Grants	\$100,000	\$0	\$0	\$0	\$0	\$0	\$0
12	<b>Total Revenue</b>	<b>\$61,061,537</b>	<b>\$64,891,037</b>	<b>\$65,504,934</b>	<b>\$66,306,020</b>	<b>\$67,081,860</b>	<b>\$67,797,557</b>	<b>\$68,501,307</b>
13								
14	<b>O&amp;M Expenses</b>							
15	Customer Services	\$4,758,934	\$5,056,256	\$5,342,016	\$5,644,040	\$5,925,287	\$6,221,666	\$6,534,030
16	Facility Maintenance	\$1,162,941	\$1,272,120	\$1,342,598	\$1,417,044	\$1,476,135	\$1,537,954	\$1,602,637
17	Field Services	\$13,940,970	\$14,881,863	\$16,155,978	\$17,054,745	\$17,940,601	\$18,845,134	\$19,798,093
18	General Manager's Office	\$148,094	\$148,334	\$157,234	\$166,668	\$176,668	\$187,268	\$198,504
19	Non-Departmental	\$2,963,100	\$2,387,700	\$2,530,962	\$2,682,820	\$2,843,789	\$3,014,416	\$3,195,281
20	Service Level Support	\$6,423,000	\$6,744,150	\$7,081,358	\$7,435,425	\$7,658,488	\$7,888,243	\$8,124,890
21	Technical Services	\$13,314,575	\$14,278,139	\$15,123,791	\$16,020,474	\$16,825,146	\$17,670,220	\$18,560,547
22	<b>Total O&amp;M Expenses</b>	<b>\$42,711,614</b>	<b>\$44,768,562</b>	<b>\$47,733,937</b>	<b>\$50,421,216</b>	<b>\$52,846,115</b>	<b>\$55,364,901</b>	<b>\$58,013,983</b>
23								
24	<b>Net Revenue<sup>14</sup></b>	<b>\$18,349,923</b>	<b>\$20,122,475</b>	<b>\$17,770,997</b>	<b>\$15,884,804</b>	<b>\$14,235,745</b>	<b>\$12,432,656</b>	<b>\$10,487,325</b>
25								
26	<b>Additional Expenses</b>							
27	Optional UAL Pension Payments	\$21,523,768	\$300,000	\$318,000	\$337,080	\$357,305	\$378,743	\$401,468
28	<b>Total Additional Expenses</b>	<b>\$21,523,768</b>	<b>\$300,000</b>	<b>\$318,000</b>	<b>\$337,080</b>	<b>\$357,305</b>	<b>\$378,743</b>	<b>\$401,468</b>
29								
30	<b>Debt Service</b>							
31	COPs	\$2,345,235	\$2,971,347	\$2,969,019	\$2,046,879	\$2,043,322	\$2,045,925	\$2,046,630

<sup>13</sup> Interest earnings differ from what was previously shown in Table 3-11. This is because the depletion of reserves under the status quo results in lower interest earnings than in the proposed scenario.

<sup>14</sup> = [Line 12] – [Line 22]

Line	Water Division (excl. WCCs)	2021	2022	2023	2024	2025	2026	2027
32	Loans Payable	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332
33	Improvement District Debt	\$0	\$0	\$2,329	\$0	\$0	\$0	\$0
34	<b>Total Debt Service</b>	<b>\$4,086,566</b>	<b>\$4,712,678</b>	<b>\$4,712,680</b>	<b>\$3,788,211</b>	<b>\$3,784,653</b>	<b>\$3,787,256</b>	<b>\$3,787,961</b>
35								
36	<b>Net Operating Cash Flow<sup>15</sup></b>	<b>(\$7,260,411)</b>	<b>\$15,109,797</b>	<b>\$12,740,318</b>	<b>\$11,759,513</b>	<b>\$10,093,787</b>	<b>\$8,266,657</b>	<b>\$6,297,896</b>
37								
38	<b>R&amp;R by Funding Source</b>							
39	Existing Debt Proceeds	\$0	\$11,000,000	\$4,000,000	\$0	\$0	\$0	\$0
40	Pay-as-you-go	\$10,889,300	\$8,784,500	\$17,168,798	\$22,227,237	\$23,005,191	\$23,810,372	\$24,643,736
41	<b>Total R&amp;R</b>	<b>\$10,889,300</b>	<b>\$19,784,500</b>	<b>\$21,168,798</b>	<b>\$22,227,237</b>	<b>\$23,005,191</b>	<b>\$23,810,372</b>	<b>\$24,643,736</b>
42								
43	<b>Net Cash Flow<sup>16</sup></b>	<b>(\$18,149,711)</b>	<b>\$6,325,297</b>	<b>(\$4,428,480)</b>	<b>(\$10,467,724)</b>	<b>(\$12,911,404)</b>	<b>(\$15,543,715)</b>	<b>(\$18,345,840)</b>
44								
45	<b>Water Division Cash Balance</b>							
46	Beginning Cash Balance <sup>17</sup>	\$79,898,006	\$61,748,295	\$68,073,592	\$63,645,112	\$53,177,387	\$40,265,983	\$24,722,268
47	Net Cash Flow	(\$18,149,711)	\$6,325,297	(\$4,428,480)	(\$10,467,724)	(\$12,911,404)	(\$15,543,715)	(\$18,345,840)
48	<b>Ending Cash Balance</b>	<b>\$61,748,295</b>	<b>\$68,073,592</b>	<b>\$63,645,112</b>	<b>\$53,177,387</b>	<b>\$40,265,983</b>	<b>\$24,722,268</b>	<b>\$6,376,428</b>
49	<i>Minimum Reserve Target Balance</i>	<i>\$55,177,424</i>	<i>\$66,650,017</i>	<i>\$70,787,577</i>	<i>\$74,170,610</i>	<i>\$77,161,064</i>	<i>\$80,263,088</i>	<i>\$83,498,856</i>
50	<i>Maximum Reserve Target Balance</i>	<i>\$128,529,556</i>	<i>\$142,991,497</i>	<i>\$150,021,731</i>	<i>\$156,348,117</i>	<i>\$162,337,969</i>	<i>\$168,547,571</i>	<i>\$175,007,537</i>
51								
52	<b>Water Division Debt Coverage</b>							
53	Debt Coverage (excl. WCCs) <sup>18</sup>	2.55	2.59	2.29	2.01	1.80	1.56	1.31
54	Debt Coverage (incl. WCCs) <sup>19</sup>	3.39	3.37	3.06	2.77	2.56	2.31	2.07
55	<i>Required Debt Coverage</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>

<sup>15</sup> = [Line 24] – [Line 28] – [Line 34]

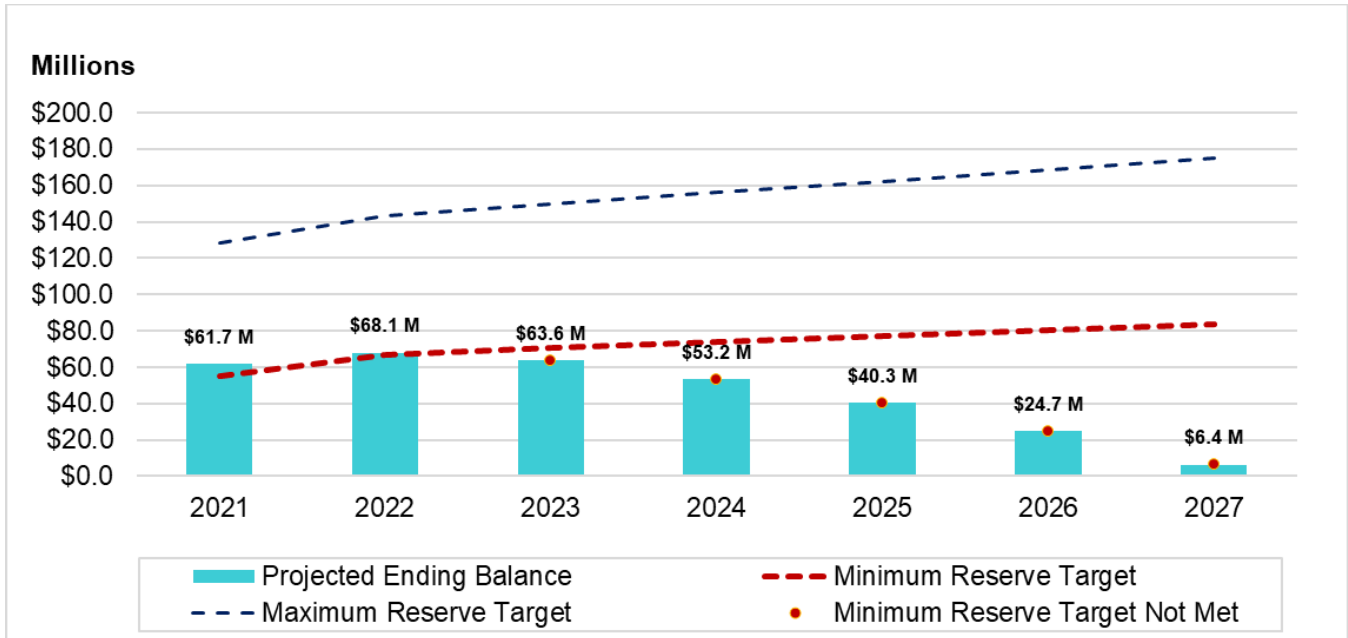
<sup>16</sup> = [Line 36] – [Line 40]

<sup>17</sup> Beginning cash balance in 2021 was provided by PCWA staff

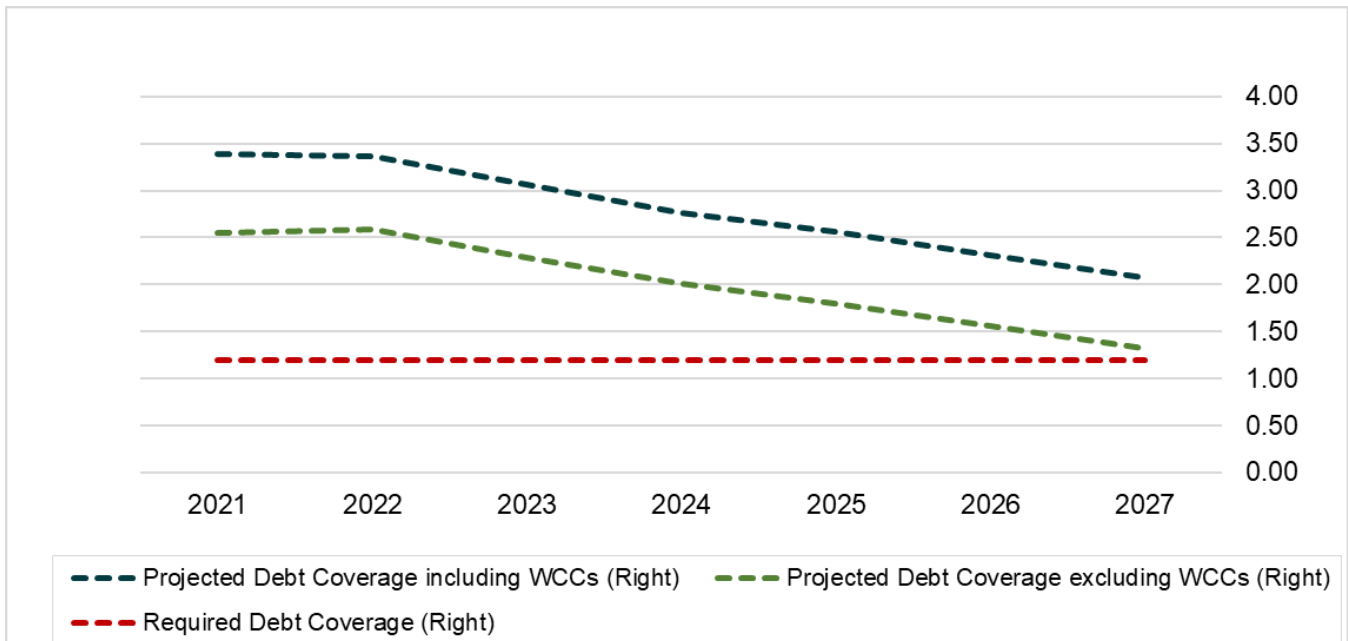
<sup>18</sup> = [Net revenue (Line 24) – grants (Line 11)] ÷ [total debt service including WCC portion (from Table 3-14)]

<sup>19</sup> = [Net revenue (Line 24) – grants (Line 11) + Water Connection Charge revenue (\$6 million per year per 2021 budget)] ÷ [total debt service including WCC portion (from Table 3-14)]

**Figure 3-2: Water Division Cash Balance under Status Quo Financial Plan (NO RATE INCREASES)**



**Figure 3-3: Water Division Debt Coverage under Status Quo Financial Plan (NO RATE INCREASES)**



### 3.7. Water Division Proposed Financial Plan

PCWA’s Water Division must increase its revenues from water rates over the study period to adequately fund its R&R expenditures and maintain sufficient reserve levels. Raftelis worked closely with PCWA staff to identify financial plan options for PCWA’s Board of Directors to consider. After the presentation and evaluation of multiple financial plan scenarios at various meetings with PCWA’s Finance Committee and Board of Directors, Raftelis was instructed to proceed with the proposed revenue adjustments presented below (see Table 3-20). Revenue adjustments are shown as annual percent increases in rate revenue and represent incremental increases in rate revenue collected as a result of proposed rate increases. The proposed financial plan provides for 8% revenue adjustments in 2023 and 2024, 7% in 2025 and 2026, and 6% in 2027. All revenue adjustments are proposed to be implemented in January of each year.

**Table 3-20: Proposed Revenue Adjustment Schedule**

Description	2023	2024	2025	2026	2027
Effective Month	Jan. 2023	Jan. 2024	Jan. 2025	Jan. 2026	Jan. 2027
Revenue Adjustment	8.0%	8.0%	7.0%	7.0%	6.0%

Key factors resulting in the need for the proposed revenue adjustments include:

- » **Significant R&R project costs:** The proposed financial plan assumes approximately \$20.8 million in annual R&R project costs over the study period, representing a significant increase relative to historical R&R. Revenue increases are needed to cover these R&R expenditures, which are assumed to be funded by rates and reserves.
- » **Modest rate increases since prior rate study:** The prior rate study established rates adopted in 2018. Since 2018, rates have increased annually on average by 2.98%<sup>20</sup> per year based on actual changes in the Consumer Price Index (CPI), compared to annual average water rate increases of 5.09% among public water utilities in the US.<sup>21</sup> Revenue increases are now needed to ensure adequate cost recovery after four years of relatively modest rate increases.

The increases in annual rate revenue resulting from the proposed revenue adjustments are calculated based on revenue from current rates and the proposed revenue adjustment percentages (see Table 3-21). All revenue adjustment calculations account for the cumulative impact of annual revenue adjustments.

The proposed Water Division financial plan (see Table 3-22, Figure 3-4, Figure 3-5) shows cash flow, cash balance, and debt coverage projections after incorporation of additional rate revenue from revenue adjustments (from Table 3-21). Proposed financial plan results are calculated in the same manner as the status quo financial plan proforma (from Table 3-19).

Under the proposed financial plan, reserves are projected to drop slightly below the target level in 2023-2026 before reaching the target level in 2027. Debt coverage is projected to remain well above the required ratio throughout the study period. Raftelis and PCWA staff determined that the magnitude of revenue adjustments necessary to meet the reserve target in all years is not feasible due to the unacceptably high customer bill increases that would occur. A key consideration in selecting the proposed revenue adjustments was creating balance between the competing priorities of financial sufficiency and customer affordability.

<sup>20</sup> Average of 3.5% (2019), 2.9% (2020), 0.8% (2021), and 4.7% (2022)

<sup>21</sup> 15-year average, per Raftelis’ 2019 *Water and Wastewater Rate Survey*.

**Table 3-21: Water Rate Revenue including Proposed Revenue Adjustments**

Line	Description	2021	2022	2023	2024	2025	2026	2027
1	Rate Revenue from Existing Rates	\$57,782,537	\$61,486,037	\$62,344,618	\$63,219,813	\$64,111,968	\$64,969,232	\$65,841,587
2								
3	<b>Year</b>	<b>Revenue Adjustment</b>						
4	2021	N/A	\$0	\$0	\$0	\$0	\$0	\$0
5	2022	N/A		\$0	\$0	\$0	\$0	\$0
6	2023	8.0%		\$4,987,569	\$5,057,585	\$5,128,957	\$5,197,539	\$5,267,327
7	2024	8.0%			\$5,462,192	\$5,539,274	\$5,613,342	\$5,688,713
8	2025	7.0%				\$5,234,614	\$5,304,608	\$5,375,834
9	2026	7.0%					\$5,675,930	\$5,752,142
10	2027	6.0%						\$5,275,536
11	<b>Total Revenue Adjustments</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,987,569</b>	<b>\$10,519,777</b>	<b>\$15,902,845</b>	<b>\$21,791,419</b>	<b>\$27,359,553</b>
12								
13	<b>Total Rate Revenue<sup>22</sup></b>	<b>\$57,782,537</b>	<b>\$61,486,037</b>	<b>\$67,332,187</b>	<b>\$73,739,590</b>	<b>\$80,014,813</b>	<b>\$86,760,651</b>	<b>\$93,201,140</b>

<sup>22</sup> = [Line 1] + [Line 11]

**Table 3-22: Water Division Proposed Financial Plan Pro Forma (INCLUDING RATE INCREASES)**

Line	Water Division (excl. WCCs)	2021	2022	2023	2024	2025	2026	2027
1	<b>Water Division Cash Flow</b>							
2	<b>Revenue</b>							
3	Water Rate Revenue	\$57,782,537	\$61,486,037	\$67,332,187	\$73,739,590	\$80,014,813	\$86,760,651	\$93,201,140
4	Growers Untreated Water Sales	\$550,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000	\$576,000
5	Engineering Charges	\$750,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000	\$850,000
6	Customer Service Charges	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000	\$650,000
7	Contr. in Aid of Construction	\$139,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000	\$239,000
8	Interest Earnings	\$900,000	\$900,000	\$680,255	\$683,930	\$700,757	\$750,019	\$831,436
9	Rental Income	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000	\$115,000
10	Other Revenue	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000
11	Grants	\$100,000	\$0	\$0	\$0	\$0	\$0	\$0
12	<b>Total Revenue</b>	<b>\$61,061,537</b>	<b>\$64,891,037</b>	<b>\$70,517,442</b>	<b>\$76,928,521</b>	<b>\$83,220,570</b>	<b>\$90,015,670</b>	<b>\$96,537,576</b>
13								
14	<b>O&amp;M Expenses</b>							
15	Customer Services	\$4,758,934	\$5,056,256	\$5,342,016	\$5,644,040	\$5,925,287	\$6,221,666	\$6,534,030
16	Facility Maintenance	\$1,162,941	\$1,272,120	\$1,342,598	\$1,417,044	\$1,476,135	\$1,537,954	\$1,602,637
17	Field Services	\$13,940,970	\$14,881,863	\$16,155,978	\$17,054,745	\$17,940,601	\$18,845,134	\$19,798,093
18	General Manager's Office	\$148,094	\$148,334	\$157,234	\$166,668	\$176,668	\$187,268	\$198,504
19	Non-Departmental	\$2,963,100	\$2,387,700	\$2,530,962	\$2,682,820	\$2,843,789	\$3,014,416	\$3,195,281
20	Service Level Support	\$6,423,000	\$6,744,150	\$7,081,358	\$7,435,425	\$7,658,488	\$7,888,243	\$8,124,890
21	Technical Services	\$13,314,575	\$14,278,139	\$15,123,791	\$16,020,474	\$16,825,146	\$17,670,220	\$18,560,547
22	<b>Total O&amp;M Expenses</b>	<b>\$42,711,614</b>	<b>\$44,768,562</b>	<b>\$47,733,937</b>	<b>\$50,421,216</b>	<b>\$52,846,115</b>	<b>\$55,364,901</b>	<b>\$58,013,983</b>
23								
24	<b>Net Revenue<sup>23</sup></b>	<b>\$18,349,923</b>	<b>\$20,122,475</b>	<b>\$22,783,505</b>	<b>\$26,507,305</b>	<b>\$30,374,454</b>	<b>\$34,650,769</b>	<b>\$38,523,593</b>
25								
26	<b>Additional Expenses</b>							
27	Optional UAL Pension Payments	\$21,523,768	\$300,000	\$318,000	\$337,080	\$357,305	\$378,743	\$401,468
28	<b>Total Additional Expenses</b>	<b>\$21,523,768</b>	<b>\$300,000</b>	<b>\$318,000</b>	<b>\$337,080</b>	<b>\$357,305</b>	<b>\$378,743</b>	<b>\$401,468</b>
29								
30	<b>Debt Service</b>							
31	COPs	\$2,345,235	\$2,971,347	\$2,969,019	\$2,046,879	\$2,043,322	\$2,045,925	\$2,046,630
32	Loans Payable	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332	\$1,741,332
33	Improvement District Debt	\$0	\$0	\$2,329	\$0	\$0	\$0	\$0

<sup>23</sup> = [Line 12] – [Line 22]

Line	Water Division (excl. WCCs)	2021	2022	2023	2024	2025	2026	2027
34	<b>Total Debt Service</b>	<b>\$4,086,566</b>	<b>\$4,712,678</b>	<b>\$4,712,680</b>	<b>\$3,788,211</b>	<b>\$3,784,653</b>	<b>\$3,787,256</b>	<b>\$3,787,961</b>
35								
36	<b>Net Operating Cash Flow<sup>24</sup></b>	<b>(\$7,260,411)</b>	<b>\$15,109,797</b>	<b>\$17,752,825</b>	<b>\$22,382,014</b>	<b>\$26,232,496</b>	<b>\$30,484,770</b>	<b>\$34,334,164</b>
37								
38	<b>R&amp;R by Funding Source</b>							
39	Existing Debt Proceeds	\$0	\$11,000,000	\$4,000,000	\$0	\$0	\$0	\$0
40	Pay-as-you-go	\$10,889,300	\$8,784,500	\$17,168,798	\$22,227,237	\$23,005,191	\$23,810,372	\$24,643,736
41	<b>Total R&amp;R</b>	<b>\$10,889,300</b>	<b>\$19,784,500</b>	<b>\$21,168,798</b>	<b>\$22,227,237</b>	<b>\$23,005,191</b>	<b>\$23,810,372</b>	<b>\$24,643,736</b>
42								
43	<b>Net Cash Flow<sup>25</sup></b>	<b>(\$18,149,711)</b>	<b>\$6,325,297</b>	<b>\$584,027</b>	<b>\$154,777</b>	<b>\$3,227,306</b>	<b>\$6,674,397</b>	<b>\$9,690,429</b>
44								
45	<b>Water Division Cash Balance</b>							
46	Beginning Cash Balance <sup>26</sup>	\$79,898,006	\$61,748,295	\$68,073,592	\$68,657,619	\$68,812,396	\$72,039,701	\$78,714,099
47	Net Cash Flow	(\$18,149,711)	\$6,325,297	\$584,027	\$154,777	\$3,227,306	\$6,674,397	\$9,690,429
48	<b>Ending Cash Balance</b>	<b>\$61,748,295</b>	<b>\$68,073,592</b>	<b>\$68,657,619</b>	<b>\$68,812,396</b>	<b>\$72,039,701</b>	<b>\$78,714,099</b>	<b>\$88,404,528</b>
49	<i>Minimum Reserve Target Balance</i>	<i>\$55,177,424</i>	<i>\$66,650,017</i>	<i>\$70,787,577</i>	<i>\$74,170,610</i>	<i>\$77,161,064</i>	<i>\$80,263,088</i>	<i>\$83,498,856</i>
50	<i>Maximum Reserve Target Balance</i>	<i>\$128,529,556</i>	<i>\$142,991,497</i>	<i>\$150,021,731</i>	<i>\$156,348,117</i>	<i>\$162,337,969</i>	<i>\$168,547,571</i>	<i>\$175,007,537</i>
51								
52	<b>Water Division Debt Coverage</b>							
53	Debt Coverage (excl. WCCs) <sup>27</sup>	2.55	2.59	2.94	3.35	3.84	4.34	4.83
54	Debt Coverage (incl. WCCs) <sup>28</sup>	3.39	3.37	3.71	4.11	4.60	5.10	5.58
55	<i>Required Debt Coverage</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>	<i>1.20</i>

<sup>24</sup> = [Line 24] – [Line 28] – [Line 34]

<sup>25</sup> = [Line 36] – [Line 40]

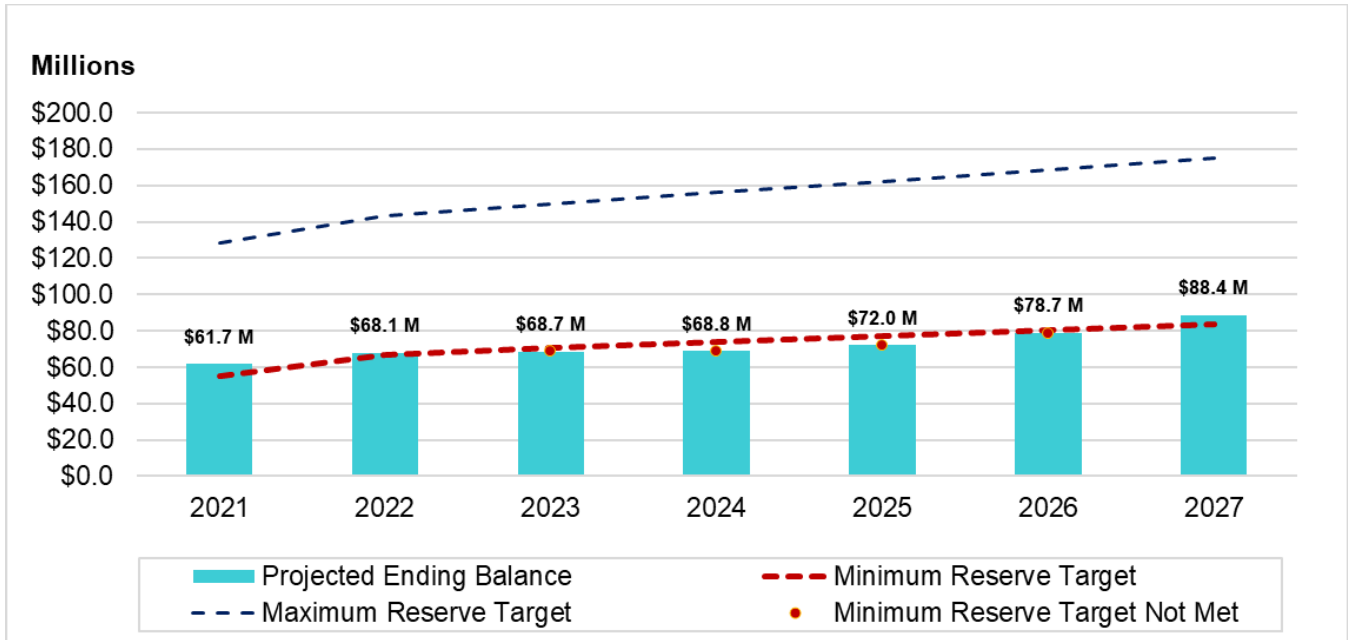
<sup>26</sup> Beginning cash balance in 2021 was provided by PCWA staff

<sup>27</sup> = [Net revenue (Line 24) – grants (Line 11)] ÷ [total debt service including WCC portion (from Table 3-14)]

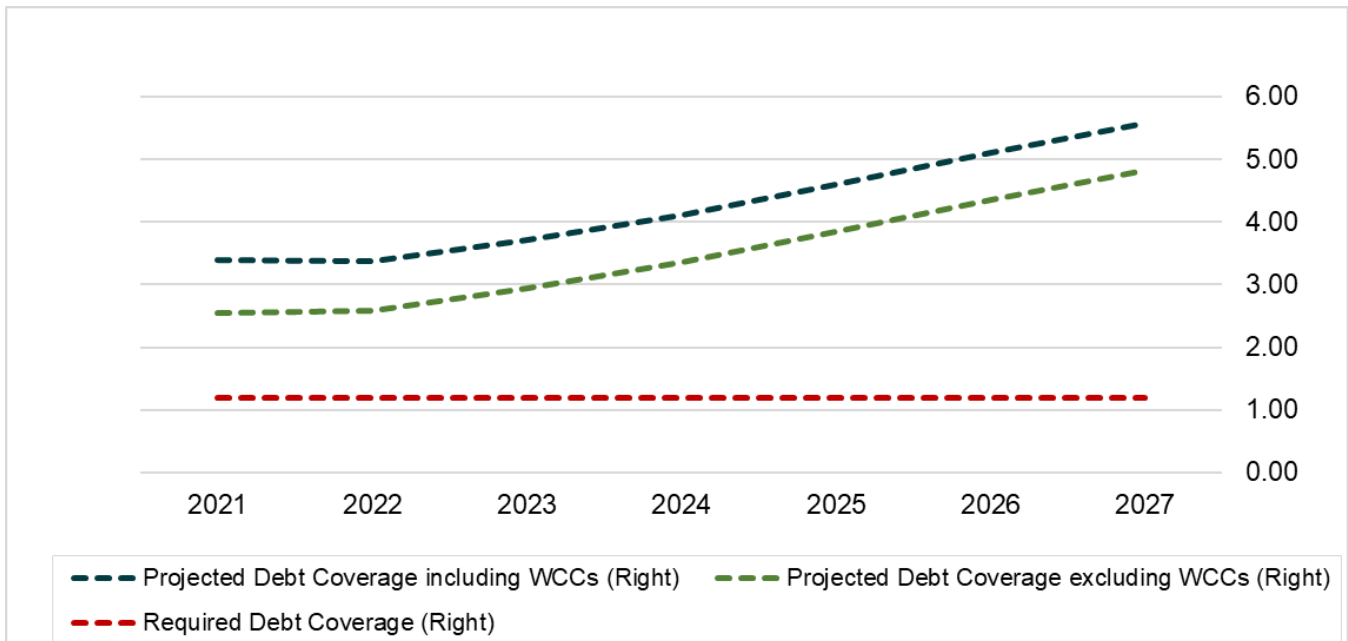
<sup>28</sup> = [Net revenue (Line 24) – grants (Line 11) + Water Connection Charge revenue (\$6 million per year per 2021 budget)] ÷ [total debt service including WCC portion (from Table 3-14)]



**Figure 3-4: Water Division Cash Balance under Proposed Financial Plan (WITH RATE INCREASES)**



**Figure 3-5: Water Division Debt Coverage under Proposed Financial Plan (WITH RATE INCREASES)**



# 4. Service Level Cost of Service

The service level cost of service analysis presented in this section is the first of five distinct cost of service analyses conducted as part of the study. The overall goal is to allocate the total rate revenue requirement to the four service classes: Treated Retail, Treated Resale, Untreated Retail, and Untreated Resale. Cost of service analyses are always conducted based on a single year, referred to as the “test year.” Typically, the current year or prior year is selected as the test year when conducting a cost of service analysis. However, due to the impacts of COVID-19 on water use characteristics, 2020-2022 were all deemed as insufficiently representative by Raftelis and PCWA staff. Therefore, 2019 is used as the test year throughout all five cost of service analyses. All costs and billing units of service presented in Section 4 through Section 8 are reflective of 2019 actuals unless noted otherwise.

## 4.1. Test Year Revenue Requirement

The first step in the service level cost of service analysis is to define the test year rate revenue requirement. Because the test year is a historical rather than current year, the total rate revenue requirement is simply equal to actual Water Division water rate revenue in 2019 (see Table 4-1). The total rate revenue requirement is divided into two components: the operating revenue requirement (equal to 2019 actual O&M expenses) and the capital revenue requirement (equal to total rate revenue less O&M expenses).

**Table 4-1: 2019 Rate Revenue Requirement**

[A] Line	[B] Rate Revenue Requirement	[C] 2019	[D] Notes
1	Operating Revenue Requirement	\$40,512,266	<i>Actual O&amp;M expenses (excl. depreciation)</i>
2	Capital Revenue Requirement	\$12,562,661	<i>= [Line 3] – [Line 1]</i>
3	Total Rate Revenue Requirement	\$53,074,927	<i>Actual Water Division rate revenue</i>

## 4.2. Test Year Customer Account Information

The number of customer connections and quantity of water demanded must be determined for each service class for the test year. The number of customer connections in 2019 are shown by water meter size for metered customers (see Table 4-2) and by season for unmetered Miners’ Inch customers (see Table 4-3). Total Miners’ Inches ordered in each season in 2019 is also shown in Table 4-3. Note that while all treated water services are metered, untreated water services include both metered and unmetered customers.

Water demand in 2019 by service class is shown in two distinct ways: based on “ordered” water (see Table 4-4) and based on “delivered” water (see Table 4-5). Ordered and delivered water is the same for metered customers, but varies for unmetered Miners’ Inch customers. Ordered water represents the maximum potential water that unmetered customers could theoretically take based on size of their connection.<sup>29</sup> However, Untreated Retail Miners’ Inch customers often take less than ordered. Delivered water therefore represents actual water deliveries to PCWA’s Water Division customers.

<sup>29</sup> Based on the conversion factor of 1 Miners’ Inch to 18.1 acre-feet per year

**Table 4-2: 2019 Metered Connections**

[A] Line	[B] Meter Size	[C] Treated Retail	[D] Treated Resale	[E] Untreated Retail	[F] Untreated Resale	[G] Total
1	5/8-inch	32,460	0	16	0	32,476
2	3/4-inch	2,125	0	123	0	2,248
3	1-inch	1,158	0	88	5	1,251
4	1-1/2-inch	595	2	11	0	608
5	2-inch	349	0	12	3	364
6	3-inch	119	0	2	0	121
7	4-inch	19	3	2	0	24
8	6-inch	9	1	0	1	11
9	8-inch	3	1	0	1	5
10	10-inch	0	0	0	0	0
11	12-inch	0	2	0	0	2
12	16-inch	0	1	0	0	1
13	18-inch	0	1	0	0	1
14	24-inch	0	0	0	0	0
11	<b>Total</b>	<b>36,837</b>	<b>11</b>	<b>254</b>	<b>10</b>	<b>37,112</b>

**Table 4-3: 2019 Unmetered Connections (Miners' Inch Customers)**

[A] Line	[B] Unmetered Customers	[C] Treated Retail	[D] Treated Resale	[E] Untreated Retail	[F] Untreated Resale	[G] Total
1	<b>Number of Connections</b>					
2	Summer	N/A	N/A	4,004	3	4,007
3	Winter	N/A	N/A	2,603	3	2,606
4						
5	<b>Number of Miners' Inches</b>					
6	Summer	N/A	N/A	6,347	46	6,393
7	Winter	N/A	N/A	2,670	30	2,700

**Table 4-4: 2019 Ordered Water Demand (AF)**

[A] Line	[B] Ordered Water Demand (AF)	[C] Treated Retail	[D] Treated Resale	[E] Untreated Retail	[F] Untreated Resale	[G] Total
1	Metered	23,807	9,977	302	1,606	35,692
2	Unmetered	N/A	N/A	81,599	688	82,287
3	<b>Total</b>	<b>23,807</b>	<b>9,977</b>	<b>81,901</b>	<b>2,294</b>	<b>117,979</b>

**Table 4-5: 2019 Delivered Water Demand (AF)**

[A] Line	[B] Delivered Water Demand (AF)	[C] Treated Retail	[D] Treated Resale	[E] Untreated Retail	[F] Untreated Resale	[G] Total
1	Metered	23,807	9,977	302	1,606	35,692
2	Unmetered	N/A	N/A	54,269	688	54,957
3	<b>Total</b>	<b>23,807</b>	<b>9,977</b>	<b>54,571</b>	<b>2,294</b>	<b>90,649</b>

### 4.3. Service Class Cost of Service Allocation Methodology

The 2019 revenue requirement identified in Section 4.1 must be recovered from the four service classes in proportion to the costs incurred to provide service to each class. To appropriately distribute costs to each service class, we identify different allocation bases for doing so. This list of possible allocation bases becomes the methodology for assigning costs from the total water system budget to each of the four service classes. Raftelis worked with PCWA staff to determine the allocation bases during the prior rate study in 2017, which are maintained in this study. Table 4-6 lists the possible bases to use in allocating operating and capital expenses. More complete descriptions follow Table 4-6.

**Table 4-6: Service Class Cost of Service Allocation Bases**

[A]	[B]	[C]
Line	Allocation Basis	Description
1	Annual Demand (Delivered)	Annual water demand less undelivered Miners' Inch water
2	Annual Demand (Ordered)	Annual ordered demand
3	Annual Demand (Treated)	Treated water demand only
4	Max Period (Canal)	Max period to average period
5	Max Period (Pumping)	Max period to average period
6	Max Day	Max day to average day
7	Max Hour	Max hour to average hour
8	Number of Accounts	Count of accounts
9	Metered Connections	Count of water meters
10	Indirect	Proportional share of all other costs

- » **Annual Demand (Delivered)** – Based on 2019 delivered water.
- » **Annual Demand (Ordered)** – Based on 2019 ordered water.
- » **Annual Demand (Treated)** – All 2019 water deliveries to the Treated Retail and Treated Resale class through the potable water system.
- » **Max Period (Canal)** – The ratio of water use in the maximum billing period of use to the average billing period of use. Relates a function of system peaking at a seasonal level.
- » **Max Period (Pumping)** – Same as Max Period (Canal); however, only relates to the Treated water system since all pumping goes to the treated system.
- » **Max Day** – The ratio of use on the maximum demand day of the year relative to the average day. Ratio provided by PCWA staff.
- » **Max Hour** – The ratio of use at the max hour of the max day relative to average day. Ratio provided by PCWA staff.
- » **Number of Accounts** – Count of 2019 customer accounts in each service class.
- » **Metered Connections** – Count of 2019 metered connections in each service class.
- » **Indirect** – Any costs that are unable to be assigned using one of the defined bases are allocated proportional to the share of all other costs of the service class.

Applying the values for each service class to the possible allocation bases yields Table 4-7. This table represents the possible assignments of costs and the relative share to each service class based on the selection. All values within Table 4-7 were either calculated using 2019 data or provided by PCWA staff.

**Table 4-7: Service Level Cost of Service Cost Allocation Methodology**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Allocation Basis	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale
1	Annual Demand (Delivered)	23,807 AF	9,977 AF	54,571 AF	2,294 AF
2	Annual Demand (Ordered)	23,807 AF	9,977 AF	81,901 AF	2,294 AF
3	Annual Demand (Treated)	23,807 AF	9,977 AF	N/A	N/A
4	Max Period (Canal)	1.73	1.65	1.50	1.64
5	Max Period (Pumping)	1.73	1.65	N/A	N/A
6	Max Day	2.00	2.00	N/A	N/A
7	Max Hour	3.20	2.00	N/A	N/A
8	Number of Accounts	36,837	11	4,258	13
9	Metered Connections	36,837	11	254	10
10	Indirect	63.6%	19.7%	16.1%	0.6%

To assign the operating and capital expenses using the methodology above, we translate the values into percentages (see Table 4-8). Annual Demand (Delivered), Annual Demand (Ordered), Annual Demand (Treated), Number of Accounts, Metered Connections, and Equivalent Connections are all calculated using the values in Table 4-7. Max Day and Max Hour costs are only assigned to treated classes. Max Period Canal uses the respective Annual Demand (Ordered) and Max Period (Canal) peaking factor to calculate a weighted demand figure that is then translated into percentages. Max Period (Pumping) uses the same calculation steps as Max Period (Canal) but is only assigned to the two treated service classes. Lastly, Indirect assigns costs categorized as “General” in proportion to the share of all other costs already assigned and it is therefore a result of the other allocation bases.

**Table 4-8: Service Level Cost of Service Cost Allocation Methodology (%)**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Allocation Basis	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale
1	Annual Demand (Delivered)	26.26%	11.01%	60.20%	2.53%
2	Annual Demand (Ordered)	20.18%	8.46%	69.42%	1.94%
3	Annual Demand (Treated)	70.47%	29.53%	0.00%	0.00%
4	Max Period (Canal)	28.80%	11.47%	57.10%	2.63%
5	Max Period (Pumping)	71.51%	28.49%	0.00%	0.00%
6	Max Day	70.47%	29.53%	0.00%	0.00%
7	Max Hour	79.24%	20.76%	0.00%	0.00%
8	Number of Accounts	89.59%	0.03%	10.36%	0.03%
9	Metered Connections	99.26%	0.03%	0.68%	0.03%
10	Indirect	63.58%	19.73%	16.09%	0.59%

## 4.4. Functionalized Expenses & Cost Components

The principles and methodology of a cost of service analysis were described in Section 2.4.2. A cost of service analysis distributes a utility’s revenue requirements (costs) to each customer class. After determining a utility’s revenue requirements, the next step is to functionalize the costs. The functionalization of costs allows us to better allocate costs to the cost components.

While the cost allocations between the four service classes is not a cost of service study in the traditional sense, functionalizing costs and allocating to cost components in this early step allows us to carry those components through to the individual cost of service analyses for each service class.

#### 4.4.1. OPERATING EXPENSE FUNCTIONS

PCWA operating expense functions (i.e., cost categories) include those shown in Table 4-9. Table 4-9 also shows the total 2019 O&M costs associated with each function.

**Table 4-9: Operating Functions and 2019 Costs**

[A]	[B]	[C]
Line	Function	2019 O&M Expenses
1	Other Operating Expenses	\$513,261
2	Administration	\$2,028,768
3	Human Resources	\$29,051
4	Customer Service	\$1,995,871
5	Meter Reading	\$862,917
6	Water Efficiency	\$814,705
7	Facilities Maintenance	\$1,115,973
8	Inventory Adjustments	\$11,461
9	Vehicle & Equipment Maintenance	\$1,085,972
10	Warehouse	\$279,067
11	Maintenance	\$3,600,971
12	Canal Operations	\$3,484,984
13	Canal Cleaning	\$61,551
14	Weed And Brush Control	\$771,050
15	Natural Resource Management	\$124,252
16	Engineering	\$13,161,032
17	Water Treatment	\$4,671,019
18	Water Quality Monitoring	\$637,710
19	Purchased Water	\$3,991,862
20	American River Pumps	\$16,924
21	Ophir Pump Station	\$500,694
22	Treated Water Distribution	\$753,172
23	<b>Total</b>	<b>\$40,512,266</b>

#### 4.4.2. CAPITAL EXPENSES (ASSETS) FUNCTIONS

PCWA asset functions include those found in Table 4-10. Table 4-10 also shows the total value associated with each group of functionalized capital assets. These functions are identified within PCWA's asset detail.

**Table 4-10: Capital Functions and Asset Values**

[A]	[B]	[C]
Line	Function	Capital Asset Value <sup>30</sup>
1	Canal	\$18,884,977
2	Design WTP	\$5,358,487
3	General Plant	\$11,367,589
4	Office Furniture & Equip	\$79,630
5	Pipelines	\$255,216,790
6	Pipelines Raw	\$16,259,453
7	Power Operated Equipment	\$1,830,239
8	Pumping	\$132,349,548
9	Reservoir	\$1,895,051
10	Safety Equipment	\$11,483
11	Source of Supply	\$10,122,088
12	Structure	\$7,360,005
13	Study	\$582,815
14	Tools & Shop Equipment	\$136,618
15	Vehicle / Equipment	\$2,266,031
16	Water Storage	\$13,145,964
17	Water Treatment Plant	\$100,996,134
18	Water System Hydroelectric	\$2,914,359
19	<b>Total</b>	<b>\$580,777,261</b>

## 4.5. Cost Causation Components

### 4.5.1. OPERATING COST COMPONENTS

Organizing the costs in terms of end function provides a direct correlation between the cost component and the rate. This process couples the cost incurred by the utility and the benefit delivered to the customer and the demand and burden that the customer places on the utility's system and/or water resources. The costs incurred are generally responsive to the specific service requirements or cost drivers imposed on the system and its water resources by its customers. The principal service requirements that drive costs include the annual volume of water consumed, the peak water demands incurred, and the number of customers or meter equivalents in the system. The operating cost components include:

1. **Water Supply** costs, which are related to the purchase of raw water supplies.
2. **Canal** costs are associated with the operations and management of the extensive raw water transmission system. These costs vary with the total quantity of water used within the water system under average conditions.
3. **Treatment** costs are incurred in treating raw water to potable water standards before entering the potable distribution system. These costs include facilities, power, and chemicals among others. Treatment capabilities but must be sized to provide service during max day conditions. Maximum day demand is the maximum amount of water used in a single day in a year. Maximum hour demand is the maximum usage in an hour on the maximum usage day.

<sup>30</sup> Asset value based on Replacement Cost Less Depreciation (RCLD).

4. **Distribution** costs are related to the system of pipes, pumps, and other infrastructure between PCWA treatment plants and the service connection. Distribution and storage facilities (reservoirs), as well as the capital and O&M costs associated with those facilities, are designed to meet the peak demands placed on the system by customers. Therefore, extra capacity<sup>31</sup> costs include the O&M and capital costs associated with meeting peak customer demand in excess of the average annual rate of use or base use requirements.
5. **Treated Supply** costs are the same as for the Water Supply component, however, these supplies are only purchased for meeting Treated Retail and/or Treated Resale demand.
6. **Reservoirs** include costs associated with surface water reservoirs.
7. **Treated Storage** includes the costs of operating and maintaining water tanks and other reservoirs as part of the treated water system to meet the max day demand of customers. For Treated Resale, this component is incorporated into the Water Supply component.
8. **Pumping** includes the costs of moving Middle Fork American surface water from the river to treatment facilities and includes the American River pumps and Ophir Pump Station.
9. **Meter** costs include servicing and maintenance related to metered connections.
10. **Customer** costs are directly associated with serving customers, irrespective of the amount of water used, and generally include meter reading, bill generation, accounting, customer service, and collection expenses.
11. **Conservation** costs include all costs of funding, administering, and executing water conservation and efficiency related programs or services.
12. **General** costs are incurred in operating and maintaining the water system that are not otherwise recovered through the other functionalized cost components. These costs are allocated to the other cost components in proportion to the relative share of the other cost components.

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

Table 4-11 shows the allocation of functionalized operating expenses to the cost components. The top row of Table 4-11 shows the cost components and the leftmost column shows the cost functions. Raftelis worked in conjunction with PCWA staff during the prior rate study in 2017 to determine the appropriate assignments of expenses to one or more cost components. This methodology was reviewed and confirmed by Raftelis and PCWA staff during the course of this study.

Customer service and meter reading costs are allocated 50/50 to Meter and Customer. Warehouse is allocated 50/50 to Treatment and Distribution. Engineering costs are allocated to Water Supply, Canal, Treatment, Distribution, Treated Supply, Reservoirs, Treated Storage, and General proportional to the share of each of those cost components' asset values. Purchased water is allocated based on the share that is purchased for the whole water system (both treated and untreated) and the share dedicated to the treated system only. All other assignments are based on a one-to-one relationship between the function and cost component.

Applying the assignment percentages in Table 4-11 to the functionalized totals from Table 4-9 yields the O&M schedule in Table 4-12 below. Table 4-13 summarizes the expenses by cost component.

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<sup>31</sup> The terms extra capacity, peaking, and capacity costs are used interchangeably.



**Table 4-11: Allocation of Functionalized O&M Expenses to Cost Components (%)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]	[N]	[O]
Line	Function	Water Supply	Canal	Treatment	Distribution	Treated Supply	Reservoirs	Treated Storage	Pumping	Meter	Customer	Conservation	General	Total
1	Other Operating Expenses												100.0%	100.0%
2	Administration												100.0%	100.0%
3	Human Resources												100.0%	100.0%
4	Customer Service									50.0%	50.0%			100.0%
5	Meter Reading									50.0%	50.0%			100.0%
6	Water Efficiency											100.0%		100.0%
7	Facilities Maintenance												100.0%	100.0%
8	Inventory Adjustments												100.0%	100.0%
9	Vehicle & Equipment Maintenance												100.0%	100.0%
10	Warehouse			50.0%	50.0%									100.0%
11	Maintenance				100.0%									100.0%
12	Canal Operations		100.0%											100.0%
13	Canal Cleaning		100.0%											100.0%
14	Weed And Brush Control		100.0%											100.0%
15	Natural Resource Management												100.0%	100.0%
16	Engineering	1.7%	6.1%	21.5%	43.9%	22.8%	0.3%	2.3%					1.3%	100.0%
17	Water Treatment			100.0%										100.0%
18	Water Quality Monitoring			100.0%										100.0%
19	Purchased Water <sup>32</sup>	88.1%				11.9%								100.0%
20	American River Pumps								100.0%					100.0%
21	Ophir Pump Station								100.0%					100.0%
22	Treated Water Distribution				100.0%									100.0%

<sup>32</sup> Nevada Irrigation District (NID), Middle Fork American River water, City of Roseville, and NID/Lincoln purchased water costs are allocated to Treated Supply, as these costs are incurred to serve treated water customers.

**Table 4-12: Allocation of Functionalized O&M Expenses to Cost Components (\$)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]	[N]	[O]
Line	Function	Water Supply	Canal	Treatment	Distribution	Treated Supply	Reservoirs	Treated Storage	Pumping	Meter	Customer	Conservation	General	Total
1	Other Operating Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$513,261	\$513,261
2	Administration	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,028,768	\$2,028,768
3	Human Resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$29,051	\$29,051
4	Customer Service	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$997,935	\$997,935	\$0	\$0	\$1,995,871
5	Meter Reading	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$431,459	\$431,459	\$0	\$0	\$862,917
6	Water Efficiency	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$814,705	\$0	\$814,705
7	Facilities Maintenance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,115,973	\$1,115,973
8	Inventory Adjustments	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,461	\$11,461
9	Vehicle & Equipment Maintenance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,085,972	\$1,085,972
10	Warehouse	\$0	\$0	\$139,534	\$139,534	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$279,067
11	Maintenance	\$0	\$0	\$0	\$3,600,971	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,600,971
12	Canal Operations	\$0	\$3,484,984	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,484,984
13	Canal Cleaning	\$0	\$61,551	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$61,551
14	Weed And Brush Control	\$0	\$771,050	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$771,050
15	Natural Resource Management	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$124,252	\$124,252
16	Engineering	\$229,377	\$796,410	\$2,834,496	\$5,783,485	\$2,999,182	\$42,944	\$297,902	\$0	\$0	\$0	\$0	\$177,236	\$13,161,032
17	Water Treatment	\$0	\$0	\$4,671,019	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,671,019
18	Water Quality Monitoring	\$0	\$0	\$637,710	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$637,710
19	Purchased Water	\$3,514,939	\$0	\$0	\$0	\$476,923	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,991,862
20	American River Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,924	\$0	\$0	\$0	\$0	\$16,924
21	Ophir Pump Station	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$500,694	\$0	\$0	\$0	\$0	\$500,694
22	Treated Water Distribution	\$0	\$0	\$0	\$753,172	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$753,172
23	<b>Total</b>	<b>\$3,744,316</b>	<b>\$5,113,995</b>	<b>\$8,282,758</b>	<b>\$10,277,161</b>	<b>\$3,476,105</b>	<b>\$42,944</b>	<b>\$297,902</b>	<b>\$517,618</b>	<b>\$1,429,394</b>	<b>\$1,429,394</b>	<b>\$814,705</b>	<b>\$5,085,973</b>	<b>\$40,512,266</b>

**Table 4-13: Allocation of Operating Expenses by Cost Component**

[A]	[B]	[C]	[D]
Line	Cost Component	2019 O&M Expenses (\$)	2019 O&M Expenses (%)
1	Water Supply	\$3,744,316	9.2%
2	Canal	\$5,113,995	12.6%
3	Treatment	\$8,282,758	20.4%
4	Distribution	\$10,277,161	25.4%
5	Treated Supply	\$3,476,105	8.6%
6	Reservoirs	\$42,944	0.1%
7	Treated Storage	\$297,902	0.7%
8	Pumping	\$517,618	1.3%
9	Meter	\$1,429,394	3.5%
10	Customer	\$1,429,394	3.5%
11	Conservation	\$814,705	2.0%
12	General	\$5,085,973	12.6%
13	<b>Total</b>	<b>\$40,512,266</b>	<b>100.0%</b>

#### 4.5.2. CAPITAL COST COMPONENTS

The process for allocating capital expenses follows the same logic as for operating expenses. The capital cost components include:

1. **Water Supply** relates to water supply infrastructure including wells and some components of storage facilities.
2. **Canal** relates to the series of transmission conduits and the improvements of these assets.
3. **Distribution** relates to system pipes, pumps, other infrastructure between PCWA treatment plants and the service connection.
4. **Treatment** relates to water treatment plant assets.
5. **Treated Supply** includes pumping assets for acquiring raw water for delivery to PCWA treatment plants.
6. **Reservoirs** include surface water reservoir assets.
7. **Treated Storage** includes tanks for meeting max day demands of the treated water distribution system.
8. **General** refers to non-water assets (e.g., offices, vehicles, etc.) used by PCWA to carry out essential water system activities.

Table 4-14 shows the allocation of functionalized assets to the cost components. The top row of Table 4-14 shows the cost components and the leftmost column shows the asset functions. Raftelis worked in conjunction with PCWA staff during the prior rate study in 2017 to determine the appropriate assignments of expenses to one or more cost components. This methodology was reviewed and confirmed by Raftelis and PCWA staff during the course of this study.

All assignments are based on a one-to-one relationship between the function and cost component. Applying the assignment methodology in Table 4-14 with the functionalized totals from Table 4-10 yields the capital allocations in Table 4-15. Table 4-16 summarizes the asset values (RCLD) by cost component in column C, and applies the percentages in column D to the capital revenue requirement in column E (from Table 4-1). This methodology uses the proportional share of system assets as a proxy for capital R&R investment. Therefore, the capital R&R revenue requirement is assigned to the cost components in the same proportions.

**Table 4-14: Allocation of Functionalized Capital Assets to Cost Components (%)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Function	Water Supply	Canal	Distribution	Treatment	Treated Supply	Reservoirs	Treated Storage	General	Total
1	Canal		100.0%							100.0%
2	Design WTP				100.0%					100.0%
3	General Plant				100.0%					100.0%
4	Office Furniture & Equipment								100.0%	100.0%
5	Pipelines			100.0%						100.0%
6	Pipelines Raw		100.0%							100.0%
7	Power Operated Equipment								100.0%	100.0%
8	Pumping					100.0%				100.0%
9	Reservoir						100.0%			100.0%
10	Safety Equipment								100.0%	100.0%
11	Source of Supply	100.0%								100.0%
12	Structure				100.0%					100.0%
13	Study								100.0%	100.0%
14	Tools & Shop Equipment								100.0%	100.0%
15	Vehicle / Equipment								100.0%	100.0%
16	Water Storage							100.0%		100.0%
17	Water Treatment Plant				100.0%					100.0%
18	Water System Hydroelectric								100.0%	100.0%

**Table 4-15: Allocation of Functionalized Capital Assets to Cost Components (\$)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Function	Water Supply	Canal	Distribution	Treatment	Treated Supply	Reservoirs	Treated Storage	General	Total
1	Canal	\$0	\$18,884,977	\$0	\$0	\$0	\$0	\$0	\$0	<b>\$18,884,977</b>
2	Design WTP	\$0	\$0	\$0	\$5,358,487	\$0	\$0	\$0	\$0	<b>\$5,358,487</b>
3	General Plant	\$0	\$0	\$0	\$11,367,589	\$0	\$0	\$0	\$0	<b>\$11,367,589</b>
4	Office Furniture & Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$79,630	<b>\$79,630</b>
5	Pipelines	\$0	\$0	\$255,216,790	\$0	\$0	\$0	\$0	\$0	<b>\$255,216,790</b>
6	Pipelines Raw	\$0	\$16,259,453	\$0	\$0	\$0	\$0	\$0	\$0	<b>\$16,259,453</b>
7	Power Operated Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,830,239	<b>\$1,830,239</b>
8	Pumping	\$0	\$0	\$0	\$0	\$132,349,548	\$0	\$0	\$0	<b>\$132,349,548</b>
9	Reservoir	\$0	\$0	\$0	\$0	\$0	\$1,895,051	\$0	\$0	<b>\$1,895,051</b>
10	Safety Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,483	<b>\$11,483</b>
11	Source of Supply	\$10,122,088	\$0	\$0	\$0	\$0	\$0	\$0	\$0	<b>\$10,122,088</b>
12	Structure	\$0	\$0	\$0	\$7,360,005	\$0	\$0	\$0	\$0	<b>\$7,360,005</b>
13	Study	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$582,815	<b>\$582,815</b>
14	Tools & Shop Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$136,618	<b>\$136,618</b>
15	Vehicle / Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,266,031	<b>\$2,266,031</b>
16	Water Storage	\$0	\$0	\$0	\$0	\$0	\$0	\$13,145,964	\$0	<b>\$13,145,964</b>
17	Water Treatment Plant	\$0	\$0	\$0	\$100,996,134	\$0	\$0	\$0	\$0	<b>\$100,996,134</b>
18	Water System Hydroelectric	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,914,359	<b>\$2,914,359</b>
19	<b>Total</b>	<b>\$10,122,088</b>	<b>\$35,144,430</b>	<b>\$255,216,790</b>	<b>\$125,082,214</b>	<b>\$132,349,548</b>	<b>\$1,895,051</b>	<b>\$13,145,964</b>	<b>\$7,821,176</b>	<b>\$580,777,261</b>

**Table 4-16: Capital Revenue Requirement by Cost Component**

[A]	[B]	[C]	[D]	[E]
Line	Cost Component	Capital Assets (\$)	Capital Assets (%)	2019 Capital Revenue Requirement
1	Water Supply	\$10,122,088	1.7%	\$218,949
2	Canal	\$35,144,430	6.1%	\$760,201
3	Distribution	\$255,216,790	43.9%	\$5,520,536
4	Treatment	\$125,082,214	21.5%	\$2,705,625
5	Treated Supply	\$132,349,548	22.8%	\$2,862,823
6	Reservoirs	\$1,895,051	0.3%	\$40,991
7	Treated Storage	\$13,145,964	2.3%	\$284,357
8	General	\$7,821,176	1.3%	\$169,178
9	<b>Total</b>	<b>\$580,777,261</b>	<b>100.0%</b>	<b>\$12,562,661</b>

## 4.6. O&M Allocation of Cost Components

Now that the operating and capital revenue requirement has been functionalized and allocated to the various cost components, the Cost Allocation Methodology from Table 4-8 is used to distribute the revenue requirement to the four service classes.

Table 4-17 shows the cost component in column B and the total expense in column H. The selection of “Allocation Method” in column C distributes the cost to each of the service classes based on the proportional share of that method. For example, the Customer component (line 10) is allocated based on the number of accounts with 89.59% of costs assigned to Treated Retail, 0.03% to Treated Resale, 10.36% to Untreated Retail, and 0.03% to Untreated Resale. The same method of distributing costs is used for the remaining cost components.

**Table 4-17: Preliminary Allocation of 2019 Operating Revenue Requirement to Service Classes**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Line	Cost Component	Allocation Method	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale	Total
1	Water Supply	Annual Demand (Ordered)	\$755,554	\$316,649	\$2,599,302	\$72,811	<b>\$3,744,316</b>
2	Canal	Max Period (Canal)	\$1,472,709	\$586,818	\$2,920,224	\$134,245	<b>\$5,113,995</b>
3	Treatment	Max Day	\$5,836,646	\$2,446,112	\$0	\$0	<b>\$8,282,758</b>
4	Distribution	Max Hour	\$8,143,972	\$2,133,189	\$0	\$0	<b>\$10,277,161</b>
5	Treated Supply	Annual Demand (Treated)	\$2,449,521	\$1,026,583	\$0	\$0	<b>\$3,476,105</b>
6	Reservoirs	Max Period (Canal)	\$12,367	\$4,928	\$24,522	\$1,127	<b>\$42,944</b>
7	Treated Storage	Max Day	\$209,924	\$87,978	\$0	\$0	<b>\$297,902</b>
8	Pumping	Max Period (Pumping)	\$370,134	\$147,484	\$0	\$0	<b>\$517,618</b>
9	Meter	Metered Connections	\$1,418,802	\$424	\$9,783	\$385	<b>\$1,429,394</b>
10	Customer	No. of Accounts	\$1,280,541	\$382	\$148,018	\$452	<b>\$1,429,394</b>
11	Conservation	Annual Demand (Treated)	\$574,102	\$240,604	\$0	\$0	<b>\$814,705</b>
12	General	Indirect	\$3,233,696	\$1,003,684	\$818,586	\$30,008	<b>\$5,085,973</b>
13	<b>Total</b>		<b>\$25,757,968</b>	<b>\$7,994,835</b>	<b>\$6,520,435</b>	<b>\$239,028</b>	<b>\$40,512,266</b>

## 4.7. Capital Allocation of Cost Components

Table 4-18 shows the distribution of capital revenue requirements to the service classes. Like the O&M expenses in Table 4-17, cost components are shown in column B and the total expense in column H. The selection of “Allocation Method” in column C distributes the cost to each of the service classes based on the proportional share of that method. Note that the total cost of \$12,562,661 matches the total capital revenue requirement in Table 4-1.

**Table 4-18: Preliminary Allocation of 2019 Capital Revenue Requirement to Service Classes**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Line	Cost Component	Allocation Method	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale	Total
1	Water Supply	Annual Demand (Ordered)	\$44,181	\$18,516	\$151,994	\$4,258	<b>\$218,949</b>
2	Canal	Max Period (Canal)	\$218,920	\$87,231	\$434,095	\$19,956	<b>\$760,201</b>
3	Distribution	Max Hour	\$4,374,661	\$1,145,876	\$0	\$0	<b>\$5,520,536</b>
4	Treatment	Max Day	\$1,906,584	\$799,041	\$0	\$0	<b>\$2,705,625</b>
5	Treated Supply	Annual Demand (Treated)	\$2,017,358	\$845,466	\$0	\$0	<b>\$2,862,823</b>
6	Reservoirs	Max Period (Canal)	\$11,805	\$4,704	\$23,407	\$1,076	<b>\$40,991</b>
7	Treated Storage	Max Day	\$200,379	\$83,978	\$0	\$0	<b>\$284,357</b>
8	General	Indirect	\$107,565	\$33,386	\$27,229	\$998	<b>\$169,178</b>
9	<b>Total</b>		<b>\$8,881,452</b>	<b>\$3,018,197</b>	<b>\$636,725</b>	<b>\$26,287</b>	<b>\$12,562,661</b>

## 4.8. Total Cost to Serve Each Class

The Canal, Distribution, and Treated Storage cost components have adjustments made beyond the allocation bases in Table 4-8 and used in Table 4-17 and Table 4-18. Those adjustments are described below.

**Canal** – The Canal system is dual purposed. It provides transmission of raw water to PCWA treatment facilities as well as arterial canals for raw water users. The canal provides for reliable service for the treated water system. These classes are uninterruptible whereas the Untreated Retail agricultural users are interruptible. PCWA staff has estimated a reliability factor of 2.2 for treated water customers and the Canal cost allocations reflect this reliability.

**Distribution** – The distribution system is designed to provide water from PCWA treatment facilities to treated water connections. Within the system there are tens of thousands of customers utilizing distribution pipe of varying sizes. The length of distribution and the diameter of the pipe serving Treated Retail and Treated Resale customers is considered when allocating distribution costs. PCWA’s Treated Resale customers utilize large distribution pipes but only a fraction of the entire system. PCWA staff identified that Treated Resale customers use 20 percent of the distribution system, with the other 80 percent used by Treated Retail customers. This 20/80 split is used to adjust the allocation of Distribution costs between the two service classes, in addition to max hour demand characteristics.

**Treated Storage** – Treated Resale customers take delivery of water from PCWA post-treatment and maintain their own storage facilities. Therefore, treated storage costs are only recovered from Treated Retail customers.

Table 4-19 combines the operating revenue requirement from Table 4-17, the capital revenue requirement from Table 4-18, and the adjustments to Canal, Distribution, and Treated Storage outlined above to determine the total cost to serve each service class for the test year (2019). Note that the total cost to serve the four service classes (\$53,074,927) matches the total revenue requirement from Table 4-1.



**Table 4-19: Final Allocation of 2019 Revenue Requirement to Service Classes**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Cost Component	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale	Total
1	<b>Operating</b>					
2	Water Supply	\$755,554	\$316,649	\$2,599,302	\$72,811	\$3,744,316
3	Canal	\$3,239,960	\$1,290,999	\$448,792	\$134,245	\$5,113,995
4	Treatment	\$5,836,646	\$2,446,112	\$0	\$0	\$8,282,758
5	Distribution	\$9,850,523	\$426,638	\$0	\$0	\$10,277,161
6	Treated Supply	\$2,449,521	\$1,026,583	\$0	\$0	\$3,476,105
7	Reservoirs	\$12,367	\$4,928	\$24,522	\$1,127	\$42,944
8	Treated Storage	\$297,902	\$0	\$0	\$0	\$297,902
9	Pumping	\$370,134	\$147,484	\$0	\$0	\$517,618
10	Meter	\$1,418,802	\$424	\$9,783	\$385	\$1,429,394
11	Customer	\$1,280,541	\$382	\$148,018	\$452	\$1,429,394
12	Conservation	\$574,102	\$240,604	\$0	\$0	\$814,705
13	General	\$3,233,696	\$1,003,684	\$818,586	\$30,008	\$5,085,973
14	<b>Subtotal</b>	<b>\$29,319,748</b>	<b>\$6,904,487</b>	<b>\$4,049,003</b>	<b>\$239,028</b>	<b>\$40,512,266</b>
15						
16	<b>Capital</b>					
17	Water Supply	\$44,181	\$18,516	\$151,994	\$4,258	\$218,949
18	Canal	\$481,624	\$191,908	\$66,713	\$19,956	\$760,201
19	Distribution	\$5,291,361	\$229,175	\$0	\$0	\$5,520,536
20	Treatment	\$1,906,584	\$799,041	\$0	\$0	\$2,705,625
21	Treated Supply	\$2,017,358	\$845,466	\$0	\$0	\$2,862,823
22	Reservoirs	\$11,805	\$4,704	\$23,407	\$1,076	\$40,991
23	Treated Storage	\$284,357	\$0	\$0	\$0	\$284,357
24	General	\$107,565	\$33,386	\$27,229	\$998	\$169,178
25	<b>Subtotal</b>	<b>\$10,144,834</b>	<b>\$2,122,196</b>	<b>\$269,344</b>	<b>\$26,287</b>	<b>\$12,562,661</b>
26						
27	<b>Total</b>	<b>\$39,464,582</b>	<b>\$9,026,683</b>	<b>\$4,318,347</b>	<b>\$265,316</b>	<b>\$53,074,927</b>

## 4.9. Revenue Comparison – Actual 2019 Revenue Versus Revised 2019 Cost of Service

Table 4-20 compares the existing cost of service (based on actual 2019 rate revenues) to the revised 2019 cost of service from Table 4-19. Treated Retail and Treated Resale experience a 0.7% decrease and 2.0% increase respectively. Untreated Retail experiences a 3.2% increase and Untreated Resale experiences a 7.7% decrease. The revised 2019 cost of service allocations provide the basis for proposed COS rate calculations presented in the following four sections.

**Table 4-20: Revenue Comparison by Service Class – 2019 Actuals versus Revised Cost of Service**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Description	Treated Retail	Treated Resale	Untreated Retail	Untreated Resale	Total
1	Revised Cost of Service (2019)	\$39,464,582	\$9,026,683	\$4,318,347	\$265,316	<b>\$53,074,927</b>
2	Actual Rate Revenues (2019)	\$39,754,921	\$8,848,220	\$4,184,187	\$287,598	<b>\$53,074,927</b>
3	Difference (\$)	(\$290,339)	\$178,462	\$134,159	(\$22,283)	<b>\$0</b>
4	Difference (%)	-0.7%	2.0%	3.2%	-7.7%	<b>0.0%</b>
5						
6	Annual Demand (Delivered)	23,807 AF	9,977 AF	54,571 AF	2,294 AF	<b>90,649 AF</b>
7	Proposed \$/AF Allocation (2019)	\$1,658	\$905	\$79	\$116	<b>\$585</b>
8	Current \$/AF Allocation (2019)	\$1,670	\$887	\$77	\$125	<b>\$585</b>

# 5. Treated Retail Cost of Service Analysis & Rate Calculations

## 5.1. Treated Retail Water Rate Revenue Requirement

The Treated Retail cost of service analysis allocates Treated Retail’s share of costs for the test year (2019), which was determined in the service level cost of service analysis in Section 4. Table 5-1 shows the Treated Retail revenue requirement allocation from Table 4-19. The total represents the overall operating and capital revenue requirements allocated to Treated Retail in the service level cost of service analysis. Revised Treated Retail Fixed Charges, R&R Charges, and Commodity Rates for the test year (2019) (developed in the following subsections) are designed to collect the total revenue requirement as shown in Table 5-1 below.

**Table 5-1: 2019 Treated Retail Revenue Requirement**

[A] Line	[B] Service Level COS Component/ Function	[C] Operating	[D] Capital	[E] Total
1	Water Supply	\$755,554	\$44,181	<b>\$799,735</b>
2	Canal	\$3,239,960	\$481,624	<b>\$3,721,584</b>
3	Treatment	\$5,836,646	\$1,906,584	<b>\$7,743,230</b>
4	Distribution	\$9,850,523	\$5,291,361	<b>\$15,141,884</b>
5	Treated Supply	\$2,449,521	\$2,017,358	<b>\$4,466,879</b>
6	Reservoirs	\$12,367	\$11,805	<b>\$24,171</b>
7	Treated Storage	\$297,902	\$284,357	<b>\$582,259</b>
8	Pumping	\$370,134	N/A	<b>\$370,134</b>
9	Meter	\$1,418,802	N/A	<b>\$1,418,802</b>
10	Customer	\$1,280,541	N/A	<b>\$1,280,541</b>
11	Conservation	\$574,102	N/A	<b>\$574,102</b>
12	General	\$3,233,696	\$107,565	<b>\$3,341,260</b>
13	<b>Total</b>	<b>\$29,319,748</b>	<b>\$10,144,834</b>	<b>\$39,464,582</b>

## 5.2. Treated Retail Cost of Service Methodology

The principles and methodology of a cost of service analysis were described in Section 2. A more detailed description of the cost of service methodology used for the Treated Retail service class is provided below. The overall goal is to distribute the 2019 costs of providing water service among Treated Retail customer classes commensurate with their service requirements. The steps of this analysis include the following:

1. **Functionalize costs:** Functions in the Treated Retail cost of service analysis match the cost components included in the service level cost of service.

2. **Allocate functionalized costs to cost components:** Cost components include Supply, Base, Pumping, Maximum Day, Maximum Hour<sup>33</sup>, Conservation, Meters, and Customer Service.
3. **Distribute the cost components:** Distribute cost components, using unit costs, to customer classes in proportion to their demands and burdens on the water system. This is described in the AWWA M1 Manual.

A cost of service analysis considers both the average quantity of water consumed (base costs) and the peak rate at which it is consumed (peaking or capacity costs as identified by maximum day and maximum hour demands).<sup>34</sup> Peaking costs are costs that are incurred during peak times of consumption. There are additional costs associated with designing, constructing, and operating and maintaining facilities to meet peak demands. These peak demand costs need to be allocated to those customers whose water usage patterns generate additional costs for the utility. In other words, not all customer classes and not all customers share the same responsibility for peaking related costs. A cost of service analysis distributes costs to each customer class. The cost components from Section 4 become the **functions** (i.e., cost categories) for the Treated Retail cost of service analysis. These functions include:

1. Water Supply
2. Canal
3. Treatment
4. Distribution
5. Treated Supply
6. Reservoirs
7. Treated Storage
8. Pumping
9. Meter
10. Customer
11. Conservation
12. General

The functionalized costs are then allocated to **cost components**, which provide the basis for rate calculations in later subsections.<sup>35</sup> The cost components include:

1. **Supply** costs are related to the purchase of raw water supplies. As explained in previous sections, PCWA acquires water from numerous sources of supply.
2. **Base** (average) costs vary with the total quantity of water used within the water system under average conditions. These costs may include treatment, transmission and distribution facilities, storage costs, and capital costs associated with serving customers at a constant, or average, annual rate of use. Base costs are therefore spread over all units of water equally.
3. **Pumping** costs are incurred when acquiring and moving raw water through elevation from surface water sources.

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<sup>33</sup> Collectively, maximum day and maximum hour costs are known as peaking costs or capacity costs.

<sup>34</sup> System capacity is the system's ability to supply water to all delivery points at the time when demanded. Coincident peaking factors are calculated for each customer class at the time of greatest system demand. The time of greatest demand is known as peak demand. Both the operating costs and capital asset related costs incurred to accommodate the peak flows are generally allocated to each customer class based upon the class's relative demands during the peak month, day, and hour event.

<sup>35</sup> This Study uses the Base-Extra Capacity methodology set forth in the M1 Manual for functionalizing and allocating costs.

4. **Peaking** (maximum day and maximum hour) costs are divided into maximum day and maximum hour demand. The maximum day demand is the maximum amount of water used in a single day in a year. The maximum hour demand is the maximum usage in an hour on the maximum usage day. Different facilities, such as distribution and storage facilities, and the capital and O&M costs associated with those facilities, are designed to meet the peak demands placed on the system by customers. Therefore, extra capacity<sup>36</sup> costs include the O&M costs associated with meeting peak customer demand in excess of average annual rate of use or base use requirements.
5. **Conservation** costs include all costs of funding, administering, and executing water conservation and efficiency related programs and services, as well as development of alternative and/or supplemental water supplies.
6. **Meter** costs include maintenance costs related to meters and associated services.
7. **Customer** costs are directly associated with serving customers, irrespective of the amount of water used, and generally include meter reading, bill generation, accounting, customer service, and collection expenses.
8. **Private Fire Protection** costs include O&M costs related to maintaining sufficient system capacity to serve private fire connections.

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

### 5.3. Functionalization of O&M Expenses

Table 5-2 shows the functionalization of PCWA O&M expenses for the test year (2019). Functionalizing O&M expenses allows Raftelis to follow the principles of rate setting theory in which the goal is to allocate the O&M expenses to cost components. The totals by function match the summary of the Treated Retail operating revenue requirement in Table 5-1.

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<sup>36</sup> The terms extra capacity, peaking and capacity costs are used interchangeably.

**Table 5-2: Functionalization of 2019 Treated Retail O&M Expenses**

[A]	[B]	[C]
Line	Function	2019 O&M Expenses
1	Water Supply	\$755,554
2	Canal	\$3,239,960
3	Treatment	\$5,836,646
4	Distribution	\$9,850,523
5	Treated Supply	\$2,449,521
6	Reservoirs	\$12,367
7	Treated Storage	\$297,902
8	Pumping	\$370,134
9	Meter	\$1,418,802
10	Customer	\$1,280,541
11	Conservation	\$574,102
12	General	\$3,233,696
13	<b>Total</b>	<b>\$29,319,748</b>

## 5.4. Allocation of Functionalized Expenses to Treated Retail Cost Components

After functionalizing the O&M expenses, the next step is to allocate the functionalized expenses to cost components. To do so, we must identify the system-wide peaking factors shown in column C of Table 5-3. The system-wide peaking factors are used to determine the cost component allocation bases (i.e., percentages) shown in columns D, E, and F of Table 5-3. The system-wide factors for Base and Max Day were provided by PCWA staff and are the same as those used in the cost allocation between service classes in Section 4. Base represents the average day demand throughout the year and is therefore a factor of 1.00. Max Day is the ratio of maximum day demand to base demand (1.00/2.00) or 50.0%. Similarly max hour is the ratio of maximum hour demand, on the maximum day, to base demand (1.20 /3.20 or 37.5%). These factors indicate how much additional capacity is required to meet demand above average daily use. As demand, and therefore capacity, increases, so must the sizing of facilities and pipelines which incur greater costs to construct, maintain, and replace. Functionalized expenses are then allocated to the cost components using these allocation bases. To understand the interpretation of the percentages shown in columns D through F we must first establish the base use as the average daily demand during the year.

As an example, the functionalized expenses that are allocated to the cost components using the maximum day basis (line 2 of Table 5-3) attribute 50.0% (1.00/2.00) of the demand (and therefore costs) to Base (average daily demand) use and the remaining 50.0% (1.00/2.00) to Max Day (peaking) use. Expenses allocated using the Max Hour basis (line 3) assume 31.3% (1.00/3.20) of costs are due to base, 31.3% (1.00/3.20) are allocated to Max Day, and the remaining portion (100.0%-31.3%-31.3%, or, 1.20/3.20) of costs are allocated to the Max Hour. These allocation bases are used to assign the functionalized costs to the cost components.

**Table 5-3: System-Wide Peaking Factors and Allocation to Cost Causation Components**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Description	System Wide Factors	Base	Max Day	Max Hour	Total
1	Base	1.00	100.0%			<b>100.0%</b>
2	Max Day	2.00	50.0%	50.0%	0.0%	<b>100.0%</b>
3	Max Hour	3.20	31.3%	31.3%	37.5%	<b>100.0%</b>

Table 5-4 shows the allocation basis for Treated Retail O&M costs. The column headings of Table 5-4 show the cost components and the row headings show the cost functions. The Treatment, Reservoirs, and Treated Storage functions are allocated on a Max Day basis, as infrastructure associated with these functions are typically designed based on maximum day demand specifications. For example, Treated Storage related costs are allocated 50.0% to Base and 50.0% percent to Max Day. This means that 50.0% of costs are due to meeting base customer demands and the remaining 50.0% of costs are due to meeting Max Day demands. The Distribution function is allocated on a Max Hour basis, as distribution-related infrastructure is typically designed based on maximum hour demand specifications. All other functions are allocated fully to the most closely associated cost component. The percentages in columns D-J are multiplied by the O&M expense amount associated with each function in column C to determine the allocation of O&M expenses by cost component in line 13. The allocation of O&M expenses to cost components in Table 5-4 is then summarized in Table 5-5.

**Table 5-4: Allocation of Functionalized Treated Retail O&M Expenses to Cost Causation Components**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Function	2019 O&M Expenses	Supply	Base	Pumping	Max Day	Max Hour	Conservation	Meters	Customers
1	Water Supply	\$755,554	100.0%							
2	Canal	\$3,239,960		100.0%						
3	Treatment	\$5,836,646		50.0%		50.0%	0.0%			
4	Distribution	\$9,850,523		31.3%		31.3%	37.5%			
5	Treated Supply	\$2,449,521	100.0%							
6	Reservoirs	\$12,367		50.0%		50.0%	0.0%			
7	Treated Storage	\$297,902		50.0%		50.0%	0.0%			
8	Pumping	\$370,134			100.0%					
9	Meter	\$1,418,802							100.0%	
10	Customer	\$1,280,541								100.0%
11	Conservation	\$574,102						100.0%		
12	General	\$3,233,696		100.0%						
13	<b>Total</b>	<b>\$29,319,748</b>	<b>\$3,205,075</b>	<b>\$12,625,401</b>	<b>\$370,134</b>	<b>\$6,151,746</b>	<b>\$3,693,946</b>	<b>\$574,102</b>	<b>\$1,418,802</b>	<b>\$1,280,541</b>



**Table 5-5: Preliminary Treated Retail Operating Revenue Requirement Allocation by Cost Component**

[A]	[B]	[C]
Line	Cost Component	2019 O&M Expenses
1	Supply	\$3,205,075
2	Base	\$12,625,401
3	Pumping	\$370,134
4	Max Day	\$6,151,746
5	Max Hour	\$3,693,946
6	Conservation	\$574,102
7	Meters	\$1,418,802
8	Customers	\$1,280,541
9	<b>Total</b>	<b>\$29,319,748</b>

The preliminary Treated Retail operating revenue requirement allocation by cost component (from Table 5-5) must appropriately distribute a portion of peaking-related costs associated with potable water system capacity needed for fire protection. The following subsections show detailed calculations used to distribute peaking costs associated with fire protection. The methodology used to allocate fire-related peaking costs is consistent with AWWA’s M1 Manual.

Fire hydrant water service is a component of water service that aids in the provision of fire service provided to properties. To meet fire protection demands, PCWA must design, operate, and maintain a water system that meets peak fire demand requirements. Land developers typically install or pay for the fire hydrants and related infrastructure as part of a condition of approval imposed by a land-use agency (city or county) to ensure the availability of an adequate water supply to protect the homes and commercial or industrial facilities that will be constructed pursuant to the land-use approvals. These are property-related expenses as defined by Government Code Section 53750.5 b. which says:

*“The fees or charges for property-related water service imposed or increased pursuant to Section 6 of Article XIII D of the California Constitution may include the costs to construct, maintain, repair, or replace hydrants as needed or consistent with applicable fire codes and industry standards, and may include the cost of water distributed through hydrants. In addition to any other method consistent with Section 6 of Article XIII D of the California Constitution, fees or charges for the aspects of water service related to hydrants and the water distributed through them may be fixed and collected by a public agency, as provided for in Section 53069.9 of the Government Code.”*

Under the proposed Treated Retail cost of service, PCWA’s costs associated with public fire hydrants are allocated for recovery by Fixed Charges. The recovery of public fire protection costs through Fixed Charges allocates the cost of maintaining these assets to the properties that will benefit from their availability if these resources are used. This provides a fair and equitable allocation of the associated costs and it is consistent with Proposition 218 requirements.

Raftelis performed a fire demand analysis to determine the share of system capacity attributable to public fire hydrants, private fire lines, and customer water demands. PCWA staff provided Raftelis with a count of fire hydrants and private fire lines connected to its water system for 2019. Table 5-6 shows the calculation of equivalent fire demand associated with fire hydrants and private fire lines. Each connection size has a fire flow demand factor similar to the hydraulic capacity factor of a water meter. The diameter of the connection (in inches) is raised to the power of 2.63

to determine the fire flow demand factor (column C).<sup>37</sup> The fire flow demand factor (column C) is multiplied by the number of connections (column D) to calculate equivalent fire demand (column E). Total equivalent fire demand is shown for fire hydrants and private fire lines in lines 12 and 25, respectively. The proportional share of equivalent fire demand provides the basis for allocating fire-relating peaking costs in subsequent steps of the Treated Retail cost of service analysis.

**Table 5-6: Equivalent Fire Demand**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Connection Size	Fire Demand Factor	Unit Count	Equivalent Fire Demand	% of Equivalent Fire Demand
1	<b>Public Hydrants</b>				
2	1-inch	1.00	0	0	0.00%
3	2-inch	6.19	8	50	0.01%
4	3-inch	17.98	0	0	0.00%
5	4-inch	38.32	32	1,226	0.16%
6	6-inch	111.31	5,427	604,084	77.64%
7	8-inch	237.21	15	3,558	0.46%
8	10-inch	426.58	0	0	0.00%
9	12-inch	689.04	0	0	0.00%
10	14-inch	1,033.51	0	0	0.00%
11	16-inch	1,468.37	0	0	0.00%
12	<b>Subtotal</b>		5,482	608,918	78.26%
13					
14	<b>Private Fire Lines</b>				
15	1-inch	1.00	3,923	3,923	0.50%
16	2-inch	6.19	42	260	0.03%
17	3-inch	17.98	0	0	0.00%
18	4-inch	38.32	223	8,545	1.10%
19	6-inch	111.31	416	46,305	5.95%
20	8-inch	237.21	255	60,488	7.77%
21	10-inch	426.58	84	35,833	4.61%
22	12-inch	689.04	20	13,781	1.77%
23	14-inch	1,033.51	0	0	0.00%
24	16-inch	1,468.37	0	0	0.00%
25	<b>Subtotal</b>		4,963	169,135	21.74%
26					
27	<b>Total</b>		10,445	778,053	100.0%

Peaking units of service are developed to attribute peaking costs (Max Day and Max Hour) to each customer class and to fire protection. Table 5-7 shows the calculation of peaking units of service for non-fire related Treated Retail water service. This provides a basis to attribute peaking costs to specific customer classes based on actual 2019 water

<sup>37</sup> Per the Hazen-Williams equation and AWWA *Manual M1*; Note that meter size and connection size vary for private fire lines.

use patterns. Raftelis estimated Max Day (column C) and Max Hour (column D) factors based on analysis of account-level 2019 water use data and system-wide peaking factors (from Table 5-3). Actual 2019 water use in column E was provided by PCWA staff, and is divided by 365 days to determine average daily water use in column F. Average daily water use (column F) is then multiplied by the Max Day factor (column C) to determine Max Day demand (column G). Max Day requirements (column H) are determined by subtracting average daily water use (column F) from Max Day demand (column G). Max Hour requirements (column J) are similarly calculated. Max Hour demand (column H) equals average daily water use (column F) multiplied by the Max Hour factor (column D). Max Hour requirements (column J) equal Max Hour demand (column H) less Max Day demand (column G).

**Table 5-7: Peaking Units by Customer Class and Tier**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Line	Customer Class	Max Day Factor	Max Hour Factor	Annual Water Use (cGal)	Average Day Demand (cGal/Day)	Max Day Demand (cGal/Day)	Max Hour Demand (cGal/Day)	Max Day Requirements (cGal/Day)	Max Hour Requirements (cGal/Day)
1	Residential Tier 1 (incl. CIDUWS)	1.26	2.01	3,466,474	9,497	11,925	19,079	2,427	7,155
2	Residential Tier 2 (incl. CIDUWS)	1.86	2.98	2,446,315	6,702	12,480	19,968	5,778	7,488
3	Residential Tier 3 (excl. CIDUWS)	2.17	3.47	1,372,015	3,759	8,156	13,050	4,397	4,894
4	CIDUWS Tier 3 <sup>38</sup>	N/A	N/A	84,790	232	N/A	N/A	N/A	N/A
5	Commercial/Governmental	1.46	2.33	1,669,765	4,575	6,669	10,671	2,095	4,002
6	Landscape	1.93	3.09	1,066,324	2,921	5,643	9,029	2,722	3,386
7	Industrial	N/A	N/A	168,564	462	N/A	N/A	N/A	N/A
8	Construction	2.68	4.29	93,142	255	685	1,096	430	411
9	Fire Protection <sup>39</sup>	N/A	N/A	2,784	8	N/A	N/A	N/A	N/A
10	<b>Total</b>			<b>10,370,173</b>	<b>28,411</b>	<b>45,558</b>	<b>72,893</b>	<b>17,849</b>	<b>27,335</b>

<sup>38</sup> Exempt because CIDUWS Tier 3 is based on the Untreated Retail commodity rate, and is therefore omitted from most steps of the Treated Retail cost of service analysis.

<sup>39</sup> Exempt because Fire Protection peaking cost allocations are based on equivalent fire demand (Table 5-6) rather than maximum day/hour requirements associated with Fire Protection water use.

Table 5-8 shows the methodology used to calculate peaking units of service associated with fire protection based on assumptions provided by PCWA staff regarding the duration and water flow rate in gallons per minute (gpm) associated with fighting a fire in PCWA’s service area:

$$\text{Max Day Requirements (HCF/day)} = \text{Duration of Fire (hrs)} \times \text{Water Use Rate (gpm)} \times 60 \text{ mins/hr} \div 748.05 \text{ gallons/HCF}$$

$$\text{Max Hour Requirements (HCF/day)} = [\text{Water Use Rate (gpm)} \times 60 \text{ mins/hr} \times 24 \text{ hours/day} \div 748.05 \text{ gallons/HCF}] - \text{Max Day Requirements (HCF/day)}$$

**Table 5-8: Peaking Units for Fire Protection**

[A]	[B]	[C]
Line	Description	Value
1	Duration of Fire (Hours)	4
2	Water Use Rate (gallons per minute)	4,000
3	Max Day Requirements (HCF/Day)	1,283
4	Max Hour Requirements (HCF/Day)	6,417

Table 5-9 shows the distribution of fire-related Max Day and Max Hour requirements (from Table 5-8) to public hydrants versus private fire lines based on proportional equivalent fire demand (from Table 5-6).

**Table 5-9: Allocation of Peaking Units to Public and Private Fire Protection**

[A]	[B]	[C]
Line	Description	Value
1	<b>Max Day Requirements (HCF/Day)</b>	<b>1,283</b>
2	Allocation to Public Fire Protection (78.26%)	1,004
3	Allocation to Private Fire Protection (21.74%)	279
4		
5	<b>Max Hour Requirements (HCF/Day)</b>	<b>6,417</b>
6	Allocation to Public Fire Protection (78.26%)	5,022
7	Allocation to Private Fire Protection (21.74%)	1,395

Peaking units (from Table 5-7 and Table 5-9) are summarized below in Table 5-10. The percentage of Max Day and Max Hour Requirements attributed to each category is shown in columns D and F, respectively.

**Table 5-10: Summary of Total Peaking Units**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Customer Class	Max Day Requirements (HCF/Day)	% of Max Day Requirements	Max Hour Requirements (HCF/Day)	% of Max Hour Requirements
1	Commodity Rate Class Peaking	17,849	93.3%	27,335	81.0%
2	Public Fire Protection	1,004	5.2%	5,022	14.9%
3	Private Fire Protection	279	1.5%	1,395	4.1%
9	<b>Total</b>	<b>19,132</b>	<b>100.0%</b>	<b>33,752</b>	<b>100.0%</b>

The final allocation of the Treated Retail revenue requirement to the cost components is shown in Table 5-11. Treated Retail Commodity Rates are designed to recover the portion of the operating revenue requirement allocated to the Supply, Base, Pumping, Max Day, Max Hour, and Conservation cost components. Treated Retail Fixed Charges are designed to recover the remaining portion of the operating revenue requirement allocated to the Fire Protection, Meter, and Customer cost components. Treated Retail R&R Charges are designed to recover the total capital revenue requirement. Table 5-11 incorporates the following secondary allocations (columns D-G) to the preliminary cost of service allocations (from Table 5-5) to determine the final Treated Retail cost of service in column H:

- » **Allocation of Public Fire Costs (column D):** Fire protection costs associated with fire flow for fire hydrants are allocated to the Meters cost component to recover associated peaking costs from all metered connections. Preliminary Max Day and Max Hour costs associated with fire hydrants are distributed from Max Day and Max Hour to Meters based on the percentage of peaking units associated with public fire hydrants (from Table 5-10). This moves costs between components but the total rate revenue requirement remains the same.
- » **Allocation of Private Fire Costs (column E):** Preliminary peaking costs associated with private fire protection are distributed from Max Day and Max Hour to Fire Protection based on the percentage of peaking units associated with private fire lines (from Table 5-10).
- » **Allocation of Peaking Costs to Meters (column F):** 50% of remaining Max Day and Max Hour costs (after accounting for the allocation of public and private fire costs) are distributed to the Meters cost component to maintain the existing fixed versus variable revenue split and ensure sufficient revenue stability.
- » **Allocation of Base Costs to Meters (column G):** 25% of Base costs are distributed to the Meters cost component to maintain the existing fixed versus variable revenue split and ensure sufficient revenue stability.

**Table 5-11: Treated Retail Final Revenue Requirement Allocation by Cost Component**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Line	Cost Component	Preliminary COS	Peaking to Public Fire	Peaking to Private Fire	Peaking to Meters	Base to Meters	Total
1	<b>Commodity Rates (45.6%)</b>						
2	Supply	\$3,205,075					<b>\$3,205,075</b>
3	Base	\$12,625,401				(\$3,156,350)	<b>\$9,469,051</b>
4	Pumping	\$370,134					<b>\$370,134</b>
5	Max Day	\$6,151,746	(\$322,944)	(\$89,702)	(\$2,869,550)		<b>\$2,869,550</b>
6	Max Hour	\$3,693,946	(\$549,610)	(\$152,661)	(\$1,495,837)		<b>\$1,495,837</b>
7	Conservation	\$574,102					<b>\$574,102</b>
8	<b>Subtotal</b>	<b>\$26,620,404</b>	<b>(\$872,554)</b>	<b>(\$242,363)</b>	<b>(\$4,365,387)</b>	<b>(\$3,156,350)</b>	<b>\$17,983,749</b>
9							
10	<b>Fixed Charges (28.7%)</b>						
11	Private Fire Protection	\$0		\$242,363			<b>\$242,363</b>
12	Meter	\$1,418,802	\$872,554		\$4,365,387	\$3,156,350	<b>\$9,813,094</b>
13	Customer	\$1,280,541					<b>\$1,280,541</b>
14	<b>Subtotal</b>	<b>\$2,699,344</b>	<b>\$872,554</b>	<b>\$242,363</b>	<b>\$4,365,387</b>	<b>\$3,156,350</b>	<b>\$11,335,998</b>
15							
16	<b>R&amp;R Charges (25.7%)</b>						
17	Capital	\$10,144,834					<b>\$10,144,834</b>
18	<b>Subtotal</b>	<b>\$10,144,834</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,144,834</b>
19							
20	<b>Total Treated Retail</b>	<b>\$39,464,582</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$39,464,582</b>

## 5.5. Proposed Treated Retail Rate Structure Changes

As previously explained in Section 3.1, the rate structure for PCWA’s Treated Retail customers consists of three distinct charges: Fixed Charges, R&R Charges, and Commodity Rates. Raftelis worked with PCWA staff to review the existing Treated Retail rate structure and recommend any needed changes. Raftelis also reviewed the existing Residential Commodity Rate tier allotments, and which Raftelis recommends maintaining as is. Only the following relatively minor changes to the Treated Retail rate structure are recommended:

- 1. Fixed Charges for Multiple Dwelling Unit Service:** For Fixed Charges only, Multiple Dwelling Unit customers are currently charged based on two distinct charge components: 1) a Dwelling Unit charge based on the number of dwelling units and 2) a Meter Component Charge based on the number of water meters. To simplify the rate structure and better align with industry standards, Raftelis recommends that Multiple Dwelling Unit Service be charged a Fixed Charge based on meter size only, beginning in 2023. This will align the Fixed Charge rate structure for Multiple Dwelling Unit customers with all other Treated Retail customers, excluding Industrial (which is subject to Treated Resale rates).
- 2. Fixed Charges for Private Fire Protection Service:** PCWA provides Private Fire Protection service to fire lines with a separate water meter (referred to as a dedicated fire line) as well as to connections with a water meter for both non-fire related Residential/Commercial water service and private fire protection (referred to as Residential Fire and Commercial Fire). Dedicated fire lines and Residential/Commercial Fire connections are currently subject to the same Fixed Charges based on connection size. All Residential Fire

and Commercial Fire connections currently have a 1-inch connection. Raftelis recommends that a separate charge be established for 1-inch Residential/Commercial Fire connections. This is necessary so that meter-related costs can be allocated to dedicated fire lines, but not to Residential/Commercial Fire connections. This proposed change will improve rate structure defensibility and better align with industry standards.

## 5.6.COS Fixed Charges (Test Year 2019)

All proposed rates (shown in Section 9) are first calculated directly from the results of the cost of service analyses for each service class in Sections 5-8 for the test year (2019). Proposed rates will not be implemented until 2023. Therefore, all 2019 “COS” rates and charges shown in Sections 5-8 represent intermediate results of the rate design process but will never actually be implemented. However, “revised 2019 COS” rates and charges must be calculated first to provide a basis for calculating proposed rates for 2023 through 2027 in Section 9.

PCWA’s Industrial customers are charged based on Treated Resale rates. Therefore, Industrial rates are omitted from the Treated Retail Fixed Charge calculations. However, Industrial’s share of costs are included in the overall Treated Retail revenue requirement. Therefore, the amount of revenue to be generated by Industrial Fixed Charges under revised 2019 COS Treated Resale rates (determined in Section 6) is reduced from each cost component on a proportional basis.

Treated Retail Fixed Charges for non-fire related water service are calculated for the test year (2019) in this subsection. There are two components that comprise the Fixed Charge for non-fire water service: the Meter Component and Customer Component. The Meter Component recognizes the fact that even when a customer does not use water, PCWA incurs fixed costs in connection with operating and maintaining the system for each connection at all times.

### 5.6.1.METER COMPONENT

The Meter Component collects a portion of meter reading and customer service costs as well as some Peaking and Base costs. Larger meters are more expensive to maintain and replace and have the potential to demand more capacity. Therefore, larger meters exert greater peaking compared to smaller meters. The capacity (peaking) is proportional to the potential flow through each meter size as established by AWWA’s hydraulic capacity ratios. For example, if the flow through a 4-inch meter is 20 times that of a 3/4-inch meter, then the meter capacity component of the fixed meter charge should be 20 times that of the 3/4-inch meter.

In order to create parity across the various meter sizes, each meter size is assigned a factor relative to a 5/8-inch meter, which has a value of 1.00. This establishes the “base” meter size. A given meter size’s ratio relative to the base (that of a 5/8-inch meter) determines the meter equivalency. For this study, Raftelis uses standard AWWA hydraulic capacity ratios as found in the *Manual M22 – Sizing Water Service Lines and Meters, Third Edition*.

Table 5-12 shows total Treated Retail meter equivalencies in the system. The total equivalent meters are calculated by multiplying the number of meters at a specific size by their respective capacity ratio to the 5/8-inch base meter. The total number of equivalent meters within PCWA’s Treated Retail system is determined to be 47,742 for non-fire related water service (excluding Industrial)<sup>40</sup>. An additional 1,040 equivalent meters are attributed to dedicated fire lines, all of which have a 5/8-inch bypass water meter.

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<sup>40</sup> Industrial water rates are based on Treated Resale rates. Therefore, Industrial customers are excluded from the Treated Retail cost of service rate calculations.



**Table 5-12: Treated Retail Meter Equivalencies Calculation**

[A]	[B]	[C]	[D]	[E]	[F = C × E]	[G = D × E]
Line	Meter Size	Count of Meters (excl. Dedicated Fire & Industrial)	Count of Dedicated Fire Meters	Capacity Ratio	Equivalent Meters (excl. Dedicated Fire & Industrial)	Equivalent Meters (excl. Dedicated Fire)
1	5/8-inch	32,460	1,040	1.00	32,460	1,040
2	3/4-inch	2,125	-	1.50	3,188	-
3	1-inch	1,158	-	2.50	2,895	-
4	1-1/2-inch	595	-	5.00	2,975	-
5	2-inch	349	-	8.00	2,792	-
6	3-inch	119	-	17.50	2,083	-
7	4-inch	19	-	30.00	570	-
8	6-inch	8	-	67.50	540	-
9	8-inch	3	-	80.00	240	-
10	<b>Total</b>	<b>36,836</b>	<b>1,040</b>		<b>47,742</b>	<b>1,040</b>

Table 5-13 shows the calculation of the Meter Component unit costs. The total Meter Component (from Table 5-11) is adjusted to account for Industrial Meter costs and is broken out into two sub-components. The first component (line 5) consists of basic meter operating costs only and is equal to the “Preliminary COS” allocation to Meters in Table 5-11. These costs represent meter reading and a portion of customer service-related costs, and are attributable to all water meters including dedicated fire lines. The second component (line 6) consists of all other costs distributed to the Meter cost component in columns D-G of Table 5-11. These costs are attributable all water meters excluding dedicated fire lines. The costs in column D, lines 5-6 are divided by the respective number of equivalent meters in column D (from Table 5-12) and then divided by 12 months to establish a monthly unit cost in column E.

**Table 5-13: Fixed Charge Meter Component Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D ÷ 12]
Line	Description	2019 Costs	Equivalent Meters	Monthly Unit Cost (\$/EMU)
1	Total Meter Costs	\$9,813,094		
2	Less Industrial Meter Costs <sup>41</sup>	(\$108,666)		
3	<b>Total Meter Costs less Industrial</b>	<b>\$9,704,428</b>		
4				
5	Basic Meter Operating Costs (Preliminary COS)	\$1,418,802	48,782	\$2.424
6	COS Adjustments to Meter Allocation	\$8,285,626	47,742	\$14.463
7	<b>Total Meter Costs less Industrial</b>	<b>\$9,704,428</b>		<b>\$16.886</b>

<sup>41</sup> Industrial customers will generate \$122,846 in Fixed Charge revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. Per the final Treated Retail cost allocations, Meter costs comprise 88.5% of Fixed Charge costs (i.e., the Meter and Customer cost components). The Industrial adjustment is therefore  $(\$122,846) \times 88.5\% = (\$108,666)$ .

## 5.6.2. CUSTOMER COMPONENT

The Customer Component recovers costs associated with a portion of meter reading and customer service costs. These costs are uniform for all meter sizes, as it costs the same to bill and provide customer service to a small meter as it does a large meter. Table 5-14 shows the Customer Component calculation. To calculate the Customer Component monthly unit cost, Raftelis divided the total Customer costs (from Table 5-11 and adjusted to account for the Industrial revenue requirement) by the total connections<sup>42</sup> (from Table 5-12) and then divided by 12 months to establish a monthly unit cost in column E.

**Table 5-14: Fixed Charge Customer Component Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D ÷ 12]
Line	Description	2019 Revenue Requirement	Connections	Monthly Unit Cost (\$/EMU)
1	Total Customer Costs	\$1,280,541		
2	Less Industrial Customer Costs <sup>43</sup>	(\$14,180)		
3	<b>Total Customer Costs less Industrial</b>	<b>\$1,266,361</b>	<b>36,836</b>	<b>\$2.865</b>

Table 5-15 shows the calculation of the revised 2019 COS Treated Retail Fixed Charges. The monthly COS charges are the sum of the Meter Component and Customer Component. The Customer Component (from Table 5-14) is uniform for all meter sizes. The Meter Component is the total unit cost per equivalent meter (from line 7 in Table 5-13) multiplied by the respective capacity ratio (from Table 5-12). Revised 2019 COS charges are compared to actual 2019 charges in columns F-H. Unique charges for Multiple Dwelling Unit Service are not calculated for the test year (2019), as Raftelis proposes that PCWA eliminate these charges and begin to charge Multiple Dwelling Unit customers based on meter size only.

<sup>42</sup> Excluding dedicated private fire lines and Industrial customers.

<sup>43</sup> Industrial customers will generate \$122,846 in Fixed Charge revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. Per the final Treated Retail cost allocations, Customer costs comprise 11.5% of Fixed Charge costs (i.e., the Meter and Customer cost components). The Industrial adjustment is therefore  $(\$122,846) \times 11.5\% = (\$14,180)$ .

**Table 5-15: Treated Retail Monthly Fixed Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E = C + D]	[F]	[G]	[H]
Line	Meter Size	Meter Component	Customer Component	2019 COS Fixed Charge	2019 Actual Fixed Charge	Difference (\$)	Difference (%)
1	5/8-inch	\$16.89	\$2.86	<b>\$19.75</b>	\$18.55	\$1.20	6.5%
2	3/4-inch	\$25.33	\$2.86	<b>\$28.19</b>	\$26.02	\$2.17	8.4%
3	1-inch	\$42.22	\$2.86	<b>\$45.08</b>	\$40.97	\$4.11	10.0%
4	1-1/2-inch	\$84.43	\$2.86	<b>\$87.30</b>	\$78.33	\$8.97	11.4%
5	2-inch	\$135.09	\$2.86	<b>\$137.95</b>	\$123.17	\$14.78	12.0%
6	3-inch	\$295.51	\$2.86	<b>\$298.37</b>	\$265.15	\$33.22	12.5%
7	4-inch	\$506.59	\$2.86	<b>\$509.45</b>	\$451.96	\$57.49	12.7%
8	6-inch	\$1,139.82	\$2.86	<b>\$1,142.68</b>	\$1,012.42	\$130.26	12.9%
9	8-inch	\$1,350.90	\$2.86	<b>\$1,353.76</b>	\$1,199.23	\$154.53	12.9%
10	Multiple Dwelling Unit Service (per Dwelling Unit Charge)			N/A	\$14.95	N/A	N/A
11	Multiple Dwelling Unit Service (per Meter Component Charge)			N/A	\$3.60	N/A	N/A

## 5.7. COS R&R Charges (Test Year 2019)

The R&R charge provides the primary source of funds for annual capital projects to maintain PCWA treatment facilities, distribution lines, transmission canals, pump stations, and other capital assets. Routine investment ensures that the system continues to provide the same level of service to all customers. Similar to costs recovered by Fixed Charges, capital costs must be recovered regardless of the amount of water used during a given period. As previously stated, larger meters are able to draw upon the system at a higher rate, both in continuous flow and instantaneous demand. Distribution lines, reservoirs, and treatment plants (among other assets) must be upsized in part to meet capacity needs of customers. With capital expenditures dependent on the capacity requirements of a system it is appropriate to recover the costs based on the size of the meter serving a connection. Even when a customer does not use water, PCWA incurs fixed costs in connection with repair and replacement of system assets to serve each connection.

Just as with Fixed Charges, PCWA's Industrial customers are subject to the same R&R Charges as Treated Resale customers. Therefore, Industrial charges are omitted from the Treated Retail R&R Charge calculations. However, Industrial's share of costs are included in the overall Treated Retail revenue requirement. Therefore, the amount of revenue to be generated by Industrial R&R Charges under revised 2019 COS Treated Resale rates (determined in Section 6) is reduced from the Treated Retail R&R Charge revenue requirement.

The R&R Charge calculation uses the same approach as for the Meter Component of the Fixed Charge. The rationale is the same: larger meters have greater capacity and thus greater potential flow. Table 5-16 shows the calculation of the monthly unit cost per equivalent meter. The R&R monthly unit cost is calculated by dividing the total capital revenue requirement (from Table 5-11, adjusted to account for the Industrial revenue requirement) by the total number of equivalent meters (from Table 5-12) and then divided by 12 monthly billing periods per year.

**Table 5-16: Capital R&R Charge Equivalent Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D ÷ 12]
Line	Description	2019 Revenue Requirement	Equivalent Meters	Monthly Unit Cost (\$/EMU)
1	Capital Costs	\$10,144,834		
2	Less Industrial Capital Costs <sup>44</sup>	(\$50,395)		
3	<b>Total Capital Costs less Industrial</b>	<b>\$10,094,439</b>	<b>47,742</b>	<b>\$17.620</b>

Table 5-17 shows the calculation of the revised 2019 COS R&R charges. The R&R Charges are equal to the monthly unit cost per equivalent meter (from Table 5-16) multiplied by the respective meter ratio (from Table 5-12). Revised 2019 COS charges are compared to actual 2019 charges in columns D-F.

**Table 5-17: Treated Retail Monthly R&R Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Meter Size	2019 COS R&R Charge	2019 Actual R&R Charge	Difference (\$)	Difference (%)
1	5/8-inch	<b>\$17.62</b>	\$18.36	(\$0.74)	-4.0%
2	3/4-inch	<b>\$26.43</b>	\$27.54	(\$1.11)	-4.0%
3	1-inch	<b>\$44.05</b>	\$45.90	(\$1.85)	-4.0%
4	1-1/2-inch	<b>\$88.10</b>	\$91.80	(\$3.70)	-4.0%
5	2-inch	<b>\$140.96</b>	\$146.89	(\$5.93)	-4.0%
6	3-inch	<b>\$308.35</b>	\$321.32	(\$12.97)	-4.0%
7	4-inch	<b>\$528.59</b>	\$550.83	(\$22.24)	-4.0%
8	6-inch	<b>\$1,189.33</b>	\$1,239.36	(\$50.03)	-4.0%
9	8-inch	<b>\$1,409.58</b>	\$1,468.87	(\$59.29)	-4.0%

## 5.8.COS Private Fire Protection Fixed Charges (Test Year 2019)

Private Fire Protection Charges are designed to recover all Private Fire Protection costs (from Table 5-11) as well as a portion of basic meter operating costs (from Table 5-13). Table 5-18 shows the calculation of the Private Fire Protection monthly unit cost. Private Fire Protection costs include Peaking costs associated with maintaining sufficient system capacity for private fire protection service. Therefore, costs are allocated in proportion to equivalent fire demand. The Private Fire Protection revenue requirement (from Table 5-11) is divided by the number of equivalent fire demand units associated with private fire protection (from Table 5-6) and then divided by 12 months to establish a monthly unit cost in column E.

<sup>44</sup> Industrial customers will generate \$50,395 in R&R Charge revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. The Industrial adjustment is therefore (\$50,395).

**Table 5-18: Fixed Charge Customer Component Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D ÷ 12]
Line	Description	2019 Revenue Requirement	Equivalent Fire Demand (Private Fire Only)	Monthly Unit Cost (\$/EMU)
1	Private Fire Protection Costs	\$242,363	169,135	<b>\$0.119</b>

Table 5-19 shows the calculation of revised 2019 COS Private Fire Protection Fixed Charges. The basic meter operating monthly unit cost (from Table 5-13) is added in column C to all dedicated private fire lines, which have a 5/8-inch bypass meter. Residential/Commercial Fire connections are exempt from the Meter Component because these connections do not have a separate water meter. The monthly unit cost per equivalent fire demand unit (from Table 5-18) is multiplied by the respective fire demand factor (from Table 5-6) to determine the Private Fire Protection Component in column D. The revised 2019 COS charge in column E is equal to the sum of the Meter Component and Private Fire Protection Component. Revised 2019 COS charges are compared to actual 2019 charges in columns F-H.

**Table 5-19: Treated Retail Private Fire Protection Monthly Fixed Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E = C + D]	[F]	[G]	[H]
Line	Connection Size	Meter Component	Private Fire Protection Component	2019 COS Fixed Charge	2019 Actual Fixed Charge	Difference (\$)	Difference (%)
1	1-inch (Residential Fire & Commercial Fire)	N/A	\$0.12	<b>\$0.12</b>	\$0.30	(\$0.18)	-60.2%
2	1-inch	\$2.42	\$0.12	<b>\$2.54</b>	\$0.30	\$2.24	747.7%
3	2-inch	\$2.42	\$0.74	<b>\$3.16</b>	\$1.83	\$1.33	72.8%
4	3-inch	\$2.42	\$2.15	<b>\$4.57</b>	\$5.31	(\$0.74)	-13.9%
5	4-inch	\$2.42	\$4.58	<b>\$7.00</b>	\$11.31	(\$4.31)	-38.1%
6	6-inch	\$2.42	\$13.29	<b>\$15.72</b>	\$32.84	(\$17.12)	-52.1%
7	8-inch	\$2.42	\$28.33	<b>\$30.75</b>	\$69.97	(\$39.22)	-56.1%
8	10-inch	\$2.42	\$50.94	<b>\$53.36</b>	\$125.85	(\$72.49)	-57.6%
9	12-inch	\$2.42	\$82.28	<b>\$84.70</b>	\$203.24	(\$118.54)	-58.3%
10	14-inch	\$2.42	\$123.42	<b>\$125.84</b>	\$304.85	(\$179.01)	-58.7%
11	16-inch	\$2.42	\$175.34	<b>\$177.77</b>	\$433.11	(\$255.34)	-59.0%

## 5.9. COS Commodity Rates (Test Year 2019)

### 5.9.1. UNIT COST COMPONENTS DEFINITIONS

Treated Retail Commodity Rates are designed to recover the Supply, Base, Pumping, Peaking (Max Day and Max Hour), and Conservation revenue requirements from Table 5-11. Unit costs per HCF are first developed for each of the aforementioned cost components in order to develop revised 2019 COS Commodity Rates for each customer class and tier. The Commodity Rate components are described in greater detail below:

- » **Supply** relates to the costs to purchase water to meet customer demand.
- » **Base** relates to costs associated with delivering water to all customers at a constant average rate of use – also known as serving customers under average daily demand conditions. Therefore, base costs are spread over all units of water irrespective of customer class or tier.

- » **Pumping** are costs incurred to move raw water from source to treatment. In the context of the PCWA system, pumping relates directly to raw water pumping, the American River pumps, and the Ophir Pump Station. Raw water pumping benefits all customers. Therefore, Pumping costs are spread over all units of water irrespective of customer class or tier.
- » **Peaking**, or extra-capacity, costs represent costs incurred to meet customer peak demands in excess of base use (or average daily demand). Total extra capacity costs are comprised of maximum day and maximum hour demands. Peaking costs are distributed to each tier and class using peaking factors based on 2019 water use data.
- » **Conservation** costs cover water conservation and efficiency programs and efforts.

PCWA’s Industrial Commodity Rate is set equal to the Treated Resale rate and CIDUWS Tier 3 Commodity Rate is set equal to the Untreated Retail rate. Therefore, Industrial and CIDUWS Tier 3 rates are omitted from the Treated Retail Commodity Rate calculations. However, Industrial and CIDUWS Tier 3 costs are included in the overall Treated Retail revenue requirement. Therefore, the amount of revenue to be generated by Industrial and CIDUWS Tier 3 Commodity Rates under revised 2019 COS Treated Resale and Untreated Retail rates (determined in Section 6-7) is reduced from all cost components on a proportional basis.

### 5.9.2.SUPPLY UNIT COST

The Supply component represents the cost to purchase and supply water from various sources. Supply costs are applied uniformly to all customer classes and tiers. Table 5-20 shows the calculation of the Supply unit cost. The Supply revenue requirement (from Table 5-11) is adjusted to account for Industrial and CIDUWS Tier 3 Supply costs and divided by total 2019 Treated Retail water use in HCF excluding Industrial and CIDUWS Tier 3 (from Table 5-7) to determine a unit cost per HCF.

**Table 5-20: Supply Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D]
Line	Description	2019 Revenue Requirement	2019 Water Use (HCF)	Unit Cost (\$/HCF)
1	Supply Costs	\$3,205,075		
2	Less Industrial & CIDUWS Tier 3 Supply Costs <sup>45</sup>	(\$14,925)		
3	<b>Total Supply Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$3,190,151</b>	<b>10,116,819</b>	<b>\$0.315</b>

### 5.9.3.BASE UNIT COST

Base costs are the costs to deliver water under average daily demand conditions. Base costs are applied uniformly to all customer classes and tiers. Table 5-21 shows the calculation of the Base unit cost. The Base revenue requirement (from Table 5-11) is adjusted to account for Industrial and CIDUWS Tier 3 Base costs and divided by total 2019 Treated Retail water use in HCF excluding Industrial and CIDUWS Tier 3 (from Table 5-7) to determine a unit cost per HCF.

<sup>45</sup> Industrial customers will generate \$67,150 in Commodity Rate revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. CIDUWS Tier 3 will generate \$16,593 in Commodity Rate revenue for the test year (2019) under the revised COS Untreated Retail rates developed in Section 7. Per the final Treated Retail cost allocations, Supply costs comprise 17.8% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 17.8\% = (\$14,925)$ .

**Table 5-21: Base Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D]
Line	Description	2019 Revenue Requirement	2019 Water Use (HCF)	Unit Cost (\$/HCF)
1	Base Supply Costs	\$9,469,051		
2	Less Industrial & CIDUWS Tier 3 Base Costs <sup>46</sup>	(\$44,093)		
3	<b>Total Base Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$9,424,958</b>	<b>10,116,819</b>	<b>\$0.932</b>

#### 5.9.4. PUMPING UNIT COST

Pumping costs are related to the American River pumps and Ophir Pump Station. Pumping costs are applied uniformly to all customer classes and tiers. Table 5-22 shows the calculation of the Pumping unit cost. The Pumping revenue requirement (from Table 5-11) is adjusted to account for Industrial and CIDUWS Tier 3 Pumping costs and divided by total 2019 Treated Retail water use in HCF excluding Industrial and CIDUWS Tier 3 (from Table 5-7) to determine a unit cost per HCF.

**Table 5-22: Pumping Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D]
Line	Description	2019 Revenue Requirement	2019 Water Use (HCF)	Unit Cost (\$/HCF)
1	Pumping Costs	\$370,134		
2	Less Industrial & CIDUWS Tier 3 Pumping Costs <sup>47</sup>	(\$1,724)		
3	<b>Total Pumping Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$368,411</b>	<b>10,116,819</b>	<b>\$0.036</b>

#### 5.9.5. PEAKING UNIT COST

Peaking costs are incurred to meet peak customer water demand in excess of base demand conditions (i.e., average day demand). Peaking unit costs vary by customer class and tier based on peak water use characteristics. Before unit costs can be differentiated by customer class and tier, Table 5-23 shows the calculation of Max Day and Max Hour unit costs. The revenue requirement associated with the Max Day and Max Hour cost causation components (from Table 5-11) is adjusted to account for Industrial and CIDUWS Tier 3 Peaking costs and divided by total Max Day and Max Hour requirements not associated with fire protection (from Table 5-10) to determine the Max Day and Max Hour unit costs.

<sup>46</sup> Industrial customers will generate \$67,150 in Commodity Rate revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. CIDUWS Tier 3 will generate \$16,593 in Commodity Rate revenue for the test year (2019) under the revised COS Untreated Retail rates developed in Section 7. Per the final Treated Retail cost allocations, Base costs comprise 52.7% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 52.7\% = (\$44,093)$ .

<sup>47</sup> Per the final Treated Retail cost allocations, Pumping costs comprise 2.1% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 2.1\% = (\$1,724)$ .

**Table 5-23: Max Day and Max Hour Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D]
Line	Description	2019 Revenue Requirement	Peaking Requirements (HCF/Day)	Unit Cost (\$/HCF/Day)
1	Max Day Costs	\$2,869,550		
2	Less Industrial & CIDUWS Tier 3 Max Day Costs <sup>48</sup>	(\$13,362)		
3	<b>Total Max Day Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$2,856,188</b>	<b>17,849</b>	<b>\$160.022</b>
4				
5	Max Hour Costs	\$1,495,837		
6	Less Industrial & CIDUWS Tier 3 Max Hour Costs <sup>49</sup>	(\$6,965)		
7	<b>Total Max Hour Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$1,488,872</b>	<b>27,335</b>	<b>\$54.468</b>

Table 5-24 shows the development of Peaking unit rates for each customer class and tier. Total Max Day and Max Hour unit costs are allocated to each customer class and tier based on Max Day and Max Hour requirements, respectively. Max Day requirements in column D (from Table 5-7) are multiplied by the Max Day unit cost (from Table 5-23) to determine allocated Max Day costs (column F). Max Hour requirements in column E (from Table 5-7) are multiplied by the Max Hour unit cost (from Table 5-23) to determine allocated Max Hour costs (column G). Total peaking costs (column H) equal the sum of Max Day costs (column F) and Max Hour costs (column G). The Peaking unit rate (column I) is calculated by dividing total peaking costs (column H) by 2019 water use in column C (from Table 5-7). Private Fire Protection Commodity Rates are not allocated Peaking costs, as Private Fire Protection Fixed Charges are already allocated Peaking costs associated with providing capacity for fire protection services.

<sup>48</sup> Industrial customers will generate \$67,150 in Commodity Rate revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. CIDUWS Tier 3 will generate \$16,593 in Commodity Rate revenue for the test year (2019) under the revised COS Untreated Retail rates developed in Section 7. Per the final Treated Retail cost allocations, Max Day costs comprise 16.0% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 16.0\% = (\$13,362)$ .

<sup>49</sup> Per the final Treated Retail cost allocations, Max Hour costs comprise 8.3% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 8.3\% = (\$6,965)$ .



**Table 5-24: Peaking Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E]	[F=D×\$160.022]	[G=E×\$54.468]	[H=F+G]	[I=H÷C]
Line	Customer Class/Tier	2019 Water Use (HCF)	Max Day Requirements (HCF/Day)	Max Hour Requirements (HCF/Day)	Max Day Costs	Max Hour Costs	Total Peaking Costs	Peaking Unit Rate (per HCF)
1	Residential Tier 1 (incl. CIDUWS)	3,466,474	2,427	7,155	\$388,437	\$389,702	\$778,139	<b>\$0.224</b>
2	Residential Tier 2 (incl. CIDUWS)	2,446,315	5,778	7,488	\$924,550	\$407,849	\$1,332,399	<b>\$0.545</b>
3	Residential Tier 3 (excl. CIDUWS)	1,372,015	4,397	4,894	\$703,680	\$266,553	\$970,233	<b>\$0.707</b>
4	CIDUWS Tier 3	84,790	N/A	N/A	N/A	N/A	N/A	N/A
5	Commercial/Governmental	1,669,765	2,095	4,002	\$335,209	\$217,962	\$553,171	<b>\$0.331</b>
6	Landscape	1,066,324	2,722	3,386	\$435,572	\$184,429	\$620,001	<b>\$0.581</b>
7	Industrial	168,564	N/A	N/A	N/A	N/A	N/A	N/A
8	Construction	93,142	430	411	\$68,739	\$22,378	\$91,116	<b>\$0.978</b>
9	Fire Protection	2,784	N/A	N/A	N/A	N/A	N/A	N/A
10	<b>Total</b>	<b>10,370,173</b>	<b>17,849</b>	<b>27,335</b>	<b>\$2,856,188</b>	<b>\$1,488,872</b>	<b>\$4,345,060</b>	

### 5.9.6. CONSERVATION UNIT COST

PCWA’s water conservation programs offer a variety of solutions to reduce water use for all customers served by the Agency. Conservation costs are applied uniformly to all customer classes and tiers except for Private Fire Protection water use, which is exempted. Table 5-25 shows the calculation of the Conservation unit cost. The Conservation revenue requirement (from Table 5-11) is adjusted to account for Industrial and CIDUWS Tier 3 Conservation costs and divided by total 2019 Treated Retail water use in HCF excluding Industrial, CIDUWS Tier 3, and Private Fire Protection (from Table 5-7) to determine a unit cost per HCF.

**Table 5-25: Conservation Unit Cost Calculation**

[A]	[B]	[C]	[D]	[E = C ÷ D]
Line	Description	2019 Revenue Requirement	2019 Water Use (HCF) <sup>50</sup>	Unit Cost (\$/HCF)
1	Conservation Costs	\$574,102		
2	Less Industrial & CIDUWS Tier 3 Conservation Costs <sup>51</sup>	(\$2,673)		
3	<b>Total Conservation Costs less Industrial &amp; CIDUWS Tier 3</b>	<b>\$571,429</b>	<b>10,114,035</b>	<b>\$0.056</b>

### 5.9.7. TOTAL COMMODITY RATE CALCULATION

Table 5-26 shows the calculation of revised 2019 COS Commodity Rates. The COS rates in column H are equal to the sum of the Supply unit cost (from Table 5-20), Base unit cost (from Table 5-21), Pumping unit cost (from Table 5-22), Peaking unit cost (from Table 5-24), and Conservation unit cost (from Table 5-25). Revised 2019 COS rates are compared to actual 2019 rates in columns I-K.

Revised 2019 COS Commodity Rates shown in Table 5-26 for CIDUWS Tier 3 and Industrial water use are not calculated as part of the Treated Retail cost of service analysis but are instead based on the results of the Untreated Retail and Treated Resale cost of service analyses. The revised 2019 COS Commodity Rate for CIDUWS Tier 3 is set equal to the revised 2019 COS Untreated Retail metered Commodity Rate (developed subsequently in Section 7). The revised 2019 COS Commodity Rate for Industrial is set equal to the revised 2019 COS Treated Resale Commodity Rate (developed subsequently in Section 6).

<sup>50</sup> Total Treated Retail water use excluding Industrial, CIDUWS Tier 3, and dedicated Private Fire Protection water use (which is not subject to Conservation costs).

<sup>51</sup> Industrial customers will generate \$67,150 in Commodity Rate revenue for the test year (2019) under the revised COS Treated Resale rates developed in Section 6. CIDUWS Tier 3 will generate \$16,593 in Commodity Rate revenue for the test year (2019) under the revised COS Untreated Retail rates developed in Section 7. Per the final Treated Retail cost allocations, Conservation costs comprise 3.2% of the Commodity Rate revenue requirement. The combined adjustment is therefore  $(\$67,150 + \$16,593) \times 3.2\% = (\$2,673)$ .

**Table 5-26: Treated Retail Commodity Rate Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]
Line	Customer Class/ Tier	Supply Component	Base Component	Pumping Component	Peaking Component	Conser- vation Component	2019 COS Commodity Rate (\$/HCF)	2019 Actual Commodity Rate (\$/HCF)	Difference (\$)	Difference (%)
1	Residential Tier 1 (incl. CIDUWS)	\$0.315	\$0.932	\$0.036	\$0.224	\$0.056	<b>\$1.56</b>	\$1.52	\$0.04	2.9%
2	Residential Tier 2 (incl. CIDUWS)	\$0.315	\$0.932	\$0.036	\$0.545	\$0.056	<b>\$1.88</b>	\$1.72	\$0.16	9.6%
3	Residential Tier 3 (excl. CIDUWS)	\$0.315	\$0.932	\$0.036	\$0.707	\$0.056	<b>\$2.05</b>	\$1.84	\$0.21	11.3%
4	CIDUWS Tier 3	N/A	N/A	N/A	N/A	N/A	<b>\$0.20</b>	\$0.19	\$0.01	3.0%
5	Commercial/Gover nmental	\$0.315	\$0.932	\$0.036	\$0.331	\$0.056	<b>\$1.67</b>	\$1.62	\$0.05	3.2%
6	Landscape	\$0.315	\$0.932	\$0.036	\$0.581	\$0.056	<b>\$1.92</b>	\$1.72	\$0.20	11.7%
7	Industrial	N/A	N/A	N/A	N/A	N/A	<b>\$0.40</b>	\$0.40	(\$0.00)	-0.4%
8	Construction	\$0.315	\$0.932	\$0.036	\$0.978	\$0.056	<b>\$2.32</b>	\$3.24	(\$0.92)	-28.5%
9	Fire Protection	\$0.315	\$0.932	\$0.036	N/A	N/A	<b>\$1.28</b>	\$3.24	(\$1.96)	-60.4%

# 6. Treated Resale Cost of Service Analysis & Rate Calculations

## 6.1. Treated Resale Water Rate Revenue Requirement

The Treated Resale cost of service analysis allocates Treated Resale’s share of costs for the test year (2019), which was determined in the service level cost of service analysis in Section 4. Table 6-1 shows the cost to serve the Treated Resale class based on the results of the service level cost of service analysis (from Table 4-19). The Treated Resale cost of service analysis results in the allocation of the Treated Resale operating and capital revenue requirements for recovery by Fixed Charges, R&R Charges, and Commodity Rates for the test year (2019).

The operating revenue requirement is shown by cost component in lines 11-12. Each operating cost component is allocated for recovery, either by Fixed Charges or by Commodity Rates. Costs within the Supply, Treated Supply, Pumping, and Conservation cost components are more variable, and are therefore allocated for recovery by Commodity Rates. The remainder of the operating revenue requirement is allocated for recovery by Fixed Charges. The entire capital revenue requirement (line 12) is allocated for recovery by R&R Charges. The revised Treated Resale cost of service allocations shown below maintain the existing Treated Resale rate revenue split of approximately 80% fixed (from Fixed Charges and R&R charges) and 20% variable (from Commodity Rates). This will help maintain the level of revenue stability provided by existing Treated Resale rates.

**Table 6-1: Treated Resale Cost to Serve and Revenue Recovery**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Cost Component	Associated Charge	Fixed Charge Allocation	R&R Charge Allocation	Commodity Rate Allocation	Total
1	Supply	<i>Commodity Rates</i>	\$0	\$0	\$316,649	<b>\$316,649</b>
2	Canal	<i>Fixed Charges</i>	\$1,290,999	\$0	\$0	<b>\$1,290,999</b>
3	General	<i>Fixed Charges</i>	\$1,003,684	\$0	\$0	<b>\$1,003,684</b>
4	Treatment	<i>Fixed Charges</i>	\$2,446,112	\$0	\$0	<b>\$2,446,112</b>
5	Distribution	<i>Fixed Charges</i>	\$426,638	\$0	\$0	<b>\$426,638</b>
6	Treated Supply	<i>Commodity Rates</i>	\$0	\$0	\$1,026,583	<b>\$1,026,583</b>
7	Reservoirs	<i>Fixed Charges</i>	\$4,928	\$0	\$0	<b>\$4,928</b>
8	Pumping	<i>Commodity Rates</i>	\$0	\$0	\$147,484	<b>\$147,484</b>
9	Meter	<i>Fixed Charges</i>	\$424	\$0	\$0	<b>\$424</b>
10	Customer	<i>Fixed Charges</i>	\$382	\$0	\$0	<b>\$382</b>
11	Conservation	<i>Commodity Rates</i>	\$0	\$0	\$240,604	<b>\$240,604</b>
12	Capital	<i>R&amp;R Charges</i>	\$0	\$2,122,196	\$0	<b>\$2,122,196</b>
13	<b>Total</b>		<b>\$5,173,166</b>	<b>\$2,122,196</b>	<b>\$1,731,320</b>	<b>\$9,026,683</b>

## 6.2.Treated Resale COS Rates & Charges (Test Year 2019)

As previously explained in Section 3.1, the rate structure for PCWA’s Treated Resale customers consist of a monthly Fixed Charge per Unit of Capacity, a monthly R&R Charge per Unit of Capacity, and Commodity Rates per HCF of water delivered each billing period. Raftelis worked with PCWA staff to review the existing Treated Resale rate structure. No changes to the existing rate structure are recommended at this time. Table 6-2 shows the calculation of the revised 2019 COS Treated Resale Fixed Charges, R&R Charges, and Commodity Rates. For Fixed Charges (line 1) and R&R Charges (line 2), the revenue requirement in column C (from Table 6-1) was divided by 2019 Units of Capacity (provided by PCWA staff) and then divided by 12 monthly billing periods per year. Commodity Rates (line 3) are calculated by dividing the Commodity Rate revenue requirement (from Table 6-1) by 2019 Treated Resale water use (from Table 4-5<sup>52</sup>). Revised 2019 COS charges are compared to actual 2019 charges in columns F-H.

**Table 6-2: Treated Resale Monthly Fixed Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Line	Treated Resale	2019 Revenue Requirement	Units of Service	2019 COS Rate	2019 Actual Rate	Difference (\$)	Difference (%)
1	Fixed Charge	\$5,173,166	<i>17,897 Units of Capacity</i>	<b>\$24.09</b>	\$18.26	\$5.83	31.9%
2	R&R Charge	\$2,122,196	<i>17,897 Units of Capacity</i>	<b>\$9.88</b>	\$14.73	(\$4.85)	-32.9%
3	Commodity Rates	\$1,731,320	<i>4,346,093 HCF</i>	<b>\$0.398</b>	\$0.40	(\$0.002)	-0.4%
4	<b>Total</b>	<b>\$9,026,683</b>					

<sup>52</sup> Based on conversion factor of 435.6 CCF per acre-foot.

# 7. Untreated Retail Cost of Service Analysis & Rate Calculations

## 7.1. Cost Allocation – Miners’ Inch And Metered Connections

The Untreated Retail cost of service analysis allocates Untreated Retail’s share of costs for the test year (2019), which was determined in the service level cost of service analysis in Section 4. The Untreated Retail service class consists of both metered and unmetered raw water users. The majority of class customers order water in Miners’ Inches. A minority receive metered raw water deliveries. Like the cost allocation between the four service classes in Section 4, costs are allocated between Miners’ Inch and metered connections within the Untreated Retail class using the same methodology. Table 7-1 shows the pertinent values for the allocation bases used to distribute costs between the two sub-classes. The values are converted into percentages that are then used to distribute the total costs of Untreated Retail service between metered and unmetered Miners’ Inch connections.

**Table 7-1: Allocation between Metered and Miners’ Inch Accounts**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Allocation Basis	Metered Customers (2019)	Miners’ Inch Customers (2019)	Metered Customers (%)	Miners’ Inch Customers (%)
1	Annual Demand (Delivered)	302 AF	54,269 AF	0.6%	99.4%
2	Max Month (Canal)	604 AF	108,539 AF	0.6%	99.4%
3	No. of Connections	254	4,004	6.0%	94.0%
4	No. of Annualized Connections	254	3,304	7.1%	92.9%
5	Metered Connections	254	0	100.0%	0.0%
6	Indirect	1.1%	98.9%	1.1%	98.9%

Table 7-2 shows the total costs of Untreated Retail service (from Table 4-19) distributed to the two sub-classes. Supply is distributed based on annual demand; Canal and Reservoir costs are based on max month (canal); Meter costs are assigned to metered accounts only; and Customer costs are distributed on the basis of services. Capital costs are based on annualized connections, which takes into account the average number of active Miners’ Inch accounts over the course of a full year.<sup>53</sup> General costs are distributed indirectly to all other components based on the relative share of each.

<sup>53</sup> This is necessary because not all Miners’ Inch accounts receive active water service during the winter season.

**Table 7-2: Distribution of Costs to Metered and Miners' Inch Accounts**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Cost Component	Allocation Basis	Metered Customers	Miners' Inch Customers	Total
1	Supply	<i>Annual Demand (Delivered)</i>	\$14,373	\$2,584,929	<b>\$2,599,302</b>
2	Canal	<i>Max Month (Canal)</i>	\$2,482	\$446,310	<b>\$448,792</b>
3	General	<i>Indirect</i>	\$9,022	\$809,564	<b>\$818,586</b>
4	Reservoir	<i>Max Month (Canal)</i>	\$136	\$24,386	<b>\$24,522</b>
5	Meter	<i>Metered Connections</i>	\$9,783	\$0	<b>\$9,783</b>
6	Customer	<i>No. of Connections</i>	\$8,830	\$139,189	<b>\$148,018</b>
7	Capital	<i>No. of Annualized Connections</i>	\$19,231	\$250,113	<b>\$269,344</b>
8	<b>Total</b>		<b>\$63,855</b>	<b>\$4,254,491</b>	<b>\$4,318,347</b>

PCWA staff determined during the prior rate study that approximately 7% of total Untreated Retail General costs are attributable to metered customers as they require a greater degree of indirect support services from PCWA personnel as a function of their service connection. Table 7-3 provides a modified version of Table 7-2 to account for the approximate 7% allocation of General costs to metered customers.

**Table 7-3: Modified Distribution of Costs to Metered and Miners' Inch Accounts**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Cost Component	Allocation Basis	Metered Customers	Miners' Inch Customers	Total
1	Water Supply	<i>Annual Demand (Delivered)</i>	\$14,373	\$2,584,929	<b>\$2,599,302</b>
2	Canal	<i>Max Month (Canal)</i>	\$2,482	\$446,310	<b>\$448,792</b>
3	General	<i>Indirect</i>	\$67,758	\$750,828	<b>\$818,586</b>
4	Reservoir	<i>Max Month (Canal)</i>	\$136	\$24,386	<b>\$24,522</b>
5	Meter	<i>Metered Connections</i>	\$9,783	\$0	<b>\$9,783</b>
6	Customer	<i>No. of Connections</i>	\$8,830	\$139,189	<b>\$148,018</b>
7	Capital	<i>No. of Annualized Connections</i>	\$19,231	\$250,113	<b>\$269,344</b>
8	<b>Total</b>		<b>\$122,591</b>	<b>\$4,195,755</b>	<b>\$4,318,347</b>

## 7.2. Miners' Inch Customers – Rates and Charges

As previously explained in Section 3.1, the rate structure for PCWA's Untreated Retail customers consists of Fixed Charges, R&R Charges, and Commodity Rates. Metered customers and unmetered customers are charged differently, however. Rate calculations are therefore shown separately for Miners' Inch customers and metered customers. Miners' Inch rates are presented first, as the majority of Untreated Retail customers are unmetered. Raftelis worked with PCWA staff to review the existing Untreated Retail rate structure. No changes to the existing rate structure are recommended at this time.

Table 7-4 shows the total operating costs allocable to Miners' Inch customers (from Table 7-3) as well as the percentage of each individual cost associated with the Fixed Component, the Seasonal Component, or the Variable Component. The components are described in more detail in the subsequent subsections. Fourteen percent of Supply costs are recovered on the Fixed Component, all Canal costs are differentiated by the Seasonal Component, and 20% of General costs are differentiated by the Seasonal Component. All other costs are recovered through the Variable Component. Capital costs are to be recovered solely by R&R Charges and are therefore omitted from Table 7-4.

**Table 7-4: Distribution of Miners' Inch Operating Revenue Requirement to Rate Components**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line	Cost Component	% Fixed	% Seasonal	% Variable	Fixed Component	Seasonal Component	Variable Component	Total
1	Supply	14.0%		86.0%	\$361,890	\$0	\$2,223,039	\$2,584,929
2	Canal		100.0%		\$0	\$446,310	\$0	\$446,310
3	General		20.0%	80.0%	\$0	\$150,166	\$600,662	\$750,828
4	Reservoir			100.0%	\$0	\$0	\$24,386	\$24,386
5	Customer				\$0	\$0	\$139,189	\$139,189
6	Total				\$361,890	\$596,476	\$2,987,277	\$3,945,642

### 7.2.1. UNTREATED RETAIL MINERS' INCH FIXED CHARGE CALCULATION (TEST YEAR 2019)

Untreated Retail Fixed Charges for Miners' Inch customers are designed to recover Fixed Component costs. The Fixed Component of Miners' Inch service does not vary with the amount of water delivered. These costs are incurred year-round in maintaining service to canal customers and are spread equally across the customer base. Table 7-5 shows the total number of Miners' Inch accounts. Miners' Inch service is differentiated by two seasons: summer and winter. Summer is designated as primarily April 15 through October 15, which varies based on elevation.

**Table 7-5: Untreated Retail Miners' Inch Accounts**

[A]	[B]	[C]
Line	Accounts	2019
1	Summer Accounts	4,004
2	Winter Accounts	2,603
3	Total	6,607

The revised 2019 COS Fixed Charge for Miners' Inch customers is calculated by dividing the total unmetered Fixed Component costs (from Table 7-4) by total Miners' Inch accounts (from Table 7-5) and then dividing by 6 months per season. Revised 2019 COS charges are compared to actual 2019 charges in lines 6-8.

**Table 7-6: Untreated Retail Miners' Inch Monthly Fixed Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Fixed Costs	\$361,890	
2	Total Accounts	6,607	
3	\$/Season	\$54.77	= [Line 1] ÷ [Line 2]
4	Months per Season	6	
5	<b>2019 COS Charge</b>	<b>\$9.13</b>	= [Line 3] ÷ [Line 4]
6	2019 Actual Charge	\$5.42	
7	Difference (\$)	\$3.71	
8	Difference (%)	68.4%	



## 7.2.2. UNTREATED RETAIL MINERS' INCH R&R CHARGE CALCULATION (TEST YEAR 2019)

Untreated Retail R&R Charges for Miners' Inch customers are designed to recover the capital revenue requirement allocated to Miners' Inch customers (from Table 7-3). Similar to unmetered Fixed Component costs, capital costs do not vary with the amount of water delivered. These costs are incurred year-round in maintaining service to canal customers and are spread equally across the customer base. The revised 2019 COS R&R Charge for Miners' Inch customers is calculated by dividing the total unmetered capital revenue requirement (from Table 7-3) by total Miners' Inch accounts (from Table 7-5) and then dividing by 6 months per season. Revised 2019 COS charges are compared to actual 2019 charges in lines 6-8.

**Table 7-7: Untreated Retail Miners' Inch Monthly R&R Charge Calculation (Test Year 2019)**

[A] Line	[B] Description	[C] 2019	[D] Notes
1	Capital Costs	\$250,113	
2	Total Accounts	6,607	
3	\$/Season	\$37.86	= [Line 1] ÷ [Line 2]
4	Months per Season	6	
5	<b>2019 COS Charge</b>	<b>\$6.31</b>	= [Line 3] ÷ [Line 4]
6	2019 Actual Charge	\$5.42	
7	Difference (\$)	\$0.89	
8	Difference (%)	16.4%	

## 7.2.3. UNTREATED RETAIL MINERS' INCH COMMODITY RATE CALCULATION (TEST YEAR 2019)

Untreated Retail Commodity Rates for Miners' Inch customers are designed to recover Variable Component and Seasonal Component costs allocated to Miners' Inch customers (from Table 7-4). Commodity Rates for unmetered customers are charged per Miners' Inch ordered. Table 7-8 shows the total inches ordered by season in 2019.

**Table 7-8: Untreated Retail Miners' Inches**

[A] Line	[B] Miners' Inches	[C] 2019
1	Summer Miners' Inches	6,347
2	Winter Miners' Inches	2,670
3	<b>Total</b>	<b>9,017</b>

Variable Component costs do not vary by season, and are therefore applied uniformly to summer and winter Commodity Rates. The Variable Component unit cost is calculated by dividing unmetered Variable Component costs (from Table 7-4) by total Miners' Inches ordered (from Table 7-8) and then dividing by 6 months per season.

**Table 7-9: Untreated Retail Miners' Inch Variable Component Calculation**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Variable Costs	\$2,987,277	
2	Total Miners' Inches	9,017	
3	\$/Season	\$331.31	= [Line 1] ÷ [Line 2]
4	Months per Season	6	
5	<b>Monthly Variable Component per Miners' Inch</b>	<b>\$55.22</b>	= [Line 3] ÷ [Line 4]

The Seasonal Component of the Miners' Inch Commodity Rate represents the costs incurred to operating and maintenance of the canal systems as well as general costs. PCWA performs the vast majority of canal cleaning and routine maintenance in the winter time. Water demand during the winter is lowest for irrigation water, and sections of the canal can be interrupted to perform work. PCWA incurs additional costs when this maintenance must be delayed in order to maintain water service for winter customers.

Total Seasonal Component costs (from Table 7-4) are divided equally between summer and winter. The semi-annual cost is then divided by the number of inches ordered in each season (from Table 7-8) and then divided by 6 months per season to determine the monthly Seasonal Component cost per Miners' Inch.

**Table 7-10: Untreated Retail Miners' Inch Seasonal Component Calculation**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Description	2019 Total	Summer	Winter	Notes
1	Seasonal Costs	\$596,476	\$298,238	\$298,238	
2	Total Miners' Inches	9,017	6,347	2,670	
3	\$/Season	N/A	\$46.99	\$111.70	= [Line 1] ÷ [Line 2]
4	Months per Season	N/A	6	6	
5	<b>Monthly Seasonal Component per Miners' Inch</b>	N/A	<b>\$7.83</b>	<b>\$18.62</b>	= [Line 3] ÷ [Line 4]

The revised 2019 COS Commodity Rates for Miners' Inch customers are calculated by summing the Variable Component cost per Miners' Inch (from Table 7-9) and Seasonal Component cost per Miners' Inch (from Table 7-10). Summer and winter Commodity Rates are differentiated solely based on the Seasonal Component cost per Miners' Inch. Revised 2019 COS Commodity Rates are compared to actual 2019 charges in columns F-H.

**Table 7-11: Untreated Retail Monthly Commodity Rate per Miners' Inch Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E = C + D]	[F]	[G]	[H]
Line	Untreated Retail Miners' Inch Customers	Variable Component	Seasonal Component	2019 COS Rate	2019 Actual Rate	Difference (\$)	Difference (%)
1	Summer	\$55.22	\$7.83	<b>\$63.05</b>	\$62.58	\$0.47	0.8%
2	Winter	\$55.22	\$18.62	<b>\$73.84</b>	\$74.50	(\$0.66)	-0.9%

## 7.3. Metered Customers – Rates and Charges

Untreated Retail customers with water meters are subject to Fixed Charges based on meter size, a uniform R&R Charge that does not vary based on meter size, and a uniform Commodity Rate per HCF. The following subsections detail the rate calculations for the test year (2019).

### 7.3.1. FIXED AND VARIABLE COST RECOVERY

The first step in designing Untreated Retail metered rates and charges is determining the portion of the metered operating revenue requirement costs recovered by Fixed Charges versus Commodity Rates. Working in consultation with PCWA staff during the prior rate study in 2017, Raftelis identified the cost recovery assignments shown in columns C-D in Table 7-12. These assignments were reviewed and confirmed during this study. Supply costs, Canal costs, Reservoir costs, and a portion of General and Meter costs are allocated to the Commodity Rate revenue requirement. The remainder of the operating revenue requirement is allocated to the Fixed Charge revenue requirement. Capital costs are to be recovered solely by R&R Charges and are therefore omitted from Table 7-12.

**Table 7-12: Distribution of Metered Operating Revenue Requirement to Rate Components**

[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line	Cost Component	Fixed Charges (%)	Commodity Rates (%)	Fixed Charges (\$)	Commodity Rates (\$)	Total
1	Supply	0.0%	100.0%	\$0	\$14,373	<b>\$14,373</b>
2	Canal	0.0%	100.0%	\$0	\$2,482	<b>\$2,482</b>
3	General	90.0%	10.0%	\$60,982	\$6,776	<b>\$67,758</b>
4	Reservoir	0.0%	100.0%	\$0	\$136	<b>\$136</b>
5	Meter	80.0%	20.0%	\$7,826	\$1,957	<b>\$9,783</b>
6	Customer	100.0%	0.0%	\$8,830	\$0	<b>\$8,830</b>
7	<b>Total</b>			<b>\$77,638</b>	<b>\$25,723</b>	<b>\$103,361</b>

### 7.3.2. UNTREATED RETAIL METERED FIXED CHARGE CALCULATION (TEST YEAR 2019)

The Fixed Charge consists of two components: the Customer Component and Capacity Component. The Capacity Component is consistent with the methodology used to calculate the Treated Retail Meter Component costs per equivalent meter in Section 5.6.1. Meter equivalencies must therefore be determined for the Untreated Retail metered customer base for the test year (2019). Table 7-13 shows total Untreated Retail meter equivalencies in the system. The total equivalent meters are calculated by multiplying the number of meters at a specific size by their respective capacity ratio to the 5/8-inch base meter. The total number of equivalent meters within PCWA's Untreated Retail system is determined to be 667 equivalent meters.

**Table 7-13: Untreated Retail Meter Equivalencies Calculation**

[A]	[B]	[C]	[D]	[E = C × D]
Line	Meter Size	Untreated Retail Water Meters	Capacity Ratio	Equivalent Meters
1	5/8-inch	16	1.00	16
2	3/4-inch	123	1.50	185
3	1-inch	88	2.50	220
4	1-1/2-inch	11	5.00	55
5	2-inch	12	8.00	96
6	3-inch	2	17.50	35
7	4-inch	2	30.00	60
8	6-inch	-	67.50	-
9	8-inch	-	80.00	-
10	10-inch	-	190.00	-
11	<b>Total</b>	<b>254</b>		<b>667</b>

The Customer Component recovers costs associated with a portion of meter reading and customer service costs. These costs are uniform for all meter sizes as it costs the same to bill and provide customer service to a small meter as it does a large meter. Table 7-14 shows the Customer Component monthly unit cost calculation. To calculate the Customer Component monthly unit cost, Raftelis divided the total metered Customer costs (from Table 7-3) by the total number of water meters (from Table 7-13) and then divided by 12 months to establish a monthly unit cost.

**Table 7-14: Untreated Retail Metered Customer Component Calculation**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Customer Costs	\$8,830	
2	Untreated Retail Water Meters	254	
3	<b>Monthly Customer Component per Meter</b>	<b>\$2.90</b>	$= [Line 1] \div [Line 2] \div 12$

The Capacity Component recovers all remaining metered Fixed Charge costs (from Table 7-12) less metered Customer costs (from Table 7-14). These costs increase with meter size and must therefore be appropriately allocated in proportion to meter capacity. Table 7-15 shows the Capacity Component monthly unit cost calculation. To calculate the Capacity Component monthly unit cost per equivalent meter, Raftelis divided Capacity Component costs in line 3 by the total number of equivalent meters in line 4 (from Table 7-13) and then divided by 12 months to establish a monthly unit cost per equivalent meter.

**Table 7-15: Untreated Retail Metered Capacity Component Calculation**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Fixed Charge Costs	\$77,638	
2	Less Customer Component Costs	(\$8,830)	
3	Capacity Component Costs	\$68,808	
4	Untreated Retail Equivalent Meters	667	
5	<b>Monthly Meter Component per Equivalent Meter</b>	<b>\$8.60</b>	$= [Line\ 3] \div [Line\ 4] \div 12$

Table 7-16 shows the calculation of the revised 2019 COS Untreated Retail metered Fixed Charges. The monthly COS charges are the sum of the Customer Component and Capacity Component. The Customer Component (from Table 7-14) is uniform for all meter sizes. The Capacity Component is equal to the unit cost per equivalent meter (from Table 7-15) multiplied by the respective capacity ratio (from Table 7-13). Revised 2019 COS charges are compared to actual 2019 charges in columns F-H.

**Table 7-16: Untreated Retail Metered Monthly Fixed Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E = C + D]	[F]	[G]	[H]
Line	Meter Size	Customer Component	Capacity Component	2019 COS Charge	2019 Actual Charge	Difference (\$)	Difference (%)
1	5/8-inch	\$2.90	\$8.60	<b>\$11.50</b>	\$9.46	\$2.04	21.6%
2	3/4-inch	\$2.90	\$12.90	<b>\$15.80</b>	\$12.58	\$3.22	25.6%
3	1-inch	\$2.90	\$21.51	<b>\$24.40</b>	\$18.81	\$5.59	29.7%
4	1-1/2-inch	\$2.90	\$43.02	<b>\$45.91</b>	\$34.38	\$11.53	33.5%
5	2-inch	\$2.90	\$68.83	<b>\$71.72</b>	\$53.07	\$18.65	35.1%
6	3-inch	\$2.90	\$150.56	<b>\$153.45</b>	\$112.27	\$41.18	36.7%
7	4-inch	\$2.90	\$258.10	<b>\$260.99</b>	\$190.15	\$70.84	37.3%
8	6-inch	\$2.90	\$580.72	<b>\$583.61</b>	\$423.80	\$159.81	37.7%
9	8-inch	\$2.90	\$688.26	<b>\$691.15</b>	\$501.69	\$189.46	37.8%
10	10-inch	\$2.90	\$1,634.61	<b>\$1,637.50</b>	\$1,187.06	\$450.44	37.9%

### 7.3.3. UNTREATED RETAIL METERED R&R CHARGE CALCULATION (TEST YEAR 2019)

Untreated Retail R&R Charges for metered customers are designed to recover the capital revenue requirement allocated to metered customers (from Table 7-3). Monthly R&R Charges for Untreated Retail metered customers do not vary by meter size. The revised 2019 COS monthly R&R Charge for metered customers is therefore calculated by dividing the total metered capital revenue requirement (from Table 7-3) by the total number of Untreated Retail water meters (from Table 7-13) and then dividing by 12 monthly bills per year. Revised 2019 COS charges are compared to actual 2019 charges in lines 4-6 of Table 7-17 below. Note that revised 2019 COS R&R Charges are the same for Untreated Retail metered and unmetered customers due to the allocation of Untreated Retail capital costs based on annualized connections.

**Table 7-17: Untreated Retail Metered Monthly R&R Charge Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Capital Costs	\$19,231	
2	Untreated Retail Water Meters	254	
3	<b>2019 COS Charge</b>	<b>\$6.31</b>	= [Line 1] ÷ [Line 2] ÷ 12
4	2019 Actual Charge	\$9.29	
5	<i>Difference (\$)</i>	<i>(\$2.98)</i>	
6	<i>Difference (%)</i>	<i>-32.1%</i>	

### 7.3.4. UNTREATED RETAIL METERED COMMODITY RATE CALCULATION (TEST YEAR 2019)

Untreated Retail metered Commodity Rates are designed to recover the metered Commodity Rate revenue requirement (from Table 7-12). All Untreated Retail metered customers are subject to the same uniform Commodity Rate per HCF. The revised 2019 COS Commodity Rate for metered customers is therefore calculated by dividing the total metered Commodity Rate revenue requirement (from Table 7-12) by the total 2019 metered water use in HCF (provided by PCWA staff). Revised 2019 COS rates are compared to actual 2019 rates in lines 4-6 of Table 7-18.

**Table 7-18: Untreated Retail Metered Commodity Rate Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	Commodity Rate Revenue Requirement	\$25,723	
2	Untreated Retail Metered Water Use (HCF)	131,444	
3	<b>2019 COS Rate</b>	<b>\$0.20</b>	= [Line 1] ÷ [Line 2]
4	2019 Actual Rate	\$0.19	
5	<i>Difference (\$)</i>	<i>\$0.01</i>	
6	<i>Difference (%)</i>	<i>3.0%</i>	

# 8. Untreated Resale Cost of Service Analysis & Rate Calculations

## 8.1. Cost Allocation – Miners’ Inch and Metered Connections

The Untreated Resale cost of service analysis allocates Untreated Resale’s share of costs for the test year (2019), which was determined in the service level cost of service analysis in Section 4. The Untreated Resale service class consists of both metered and unmetered raw water users. The service class consists of six customers. Three customers order water in Miners’ Inches and three customers receive metered raw water deliveries. Costs are allocated between Miners’ Inch and metered connections within the Untreated Resale class using the same methodology as the Untreated Retail service class. Table 8-1 shows the pertinent values for the allocation bases used to distribute costs between the two sub-classes. The values are then converted into percentages, which are used to distribute the total costs of Untreated Resale service between metered and Miners’ Inch connections.

**Table 8-1: Allocation between Metered and Miners’ Inch Accounts**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Allocation Basis	Metered Customers (2019)	Miners’ Inch Customers (2019)	Metered Customers (%)	Miners’ Inch Customers (%)
1	Annual Demand (Delivered)	1,606 AF	688 AF	70.0%	30.0%
2	Max Month (Canal)	3,213 AF	1,376 AF	70.0%	30.0%
3	No. of Connections	10	3	76.9%	23.1%
4	No. of Annualized Connections	10	3	76.9%	23.1%
5	Metered Connections	10	-	100.0%	0.0%
6	Indirect	70.1%	29.9%	70.1%	29.9%

Table 8-2 shows the total costs of Untreated Resale service (from Table 4-19) distributed to the two sub-classes based on the allocation bases defined in Table 8-1 above. Supply is distributed based on annual demand, Canal and Reservoir costs are based on max month (canal), Meter costs are assigned to metered accounts only, and Customer costs are distributed on the basis of accounts. Capital costs are based on annualized connections, which take into account the average number of active Miners’ Inch accounts over the course of a full year.<sup>54</sup> General costs are distributed indirectly to all other components based on the relative share of each.

<sup>54</sup> This is necessary because not all Miners’ Inch accounts receive active water service during the winter season.

**Table 8-2: Distribution of Costs to Metered and Miners' Inch Accounts**

[A]	[B]	[C]	[D]	[E]	[F]
Line	Cost Component	Allocation Basis	Metered Customers	Miners' Inch Customers	Total
1	Supply	<i>Annual Demand (Delivered)</i>	\$50,982	\$21,829	<b>\$72,811</b>
2	Canal	<i>Max Month (Canal)</i>	\$93,998	\$40,247	<b>\$134,245</b>
3	General	<i>Indirect</i>	\$21,033	\$8,975	<b>\$30,008</b>
4	Reservoir	<i>Max Month (Canal)</i>	\$789	\$338	<b>\$1,127</b>
5	Meter	<i>Metered Connections</i>	\$385	\$0	<b>\$385</b>
6	Customer	<i>No. of Connections</i>	\$348	\$104	<b>\$452</b>
7	Capital	<i>No. of Annualized Connections</i>	\$20,221	\$6,066	<b>\$26,287</b>
8	<b>Total</b>		<b>\$187,756</b>	<b>\$77,560</b>	<b>\$265,316</b>

## 8.2. Miners' Inch Customers – Rates and Charges

As previously explained in Section 3.1, the rate structure for PCWA's Untreated Resale customers consists of Fixed Charges, R&R Charges, and Commodity Rates. Metered customers and unmetered customers are charged differently, however. Rate calculations are therefore shown separately for Miners' Inch customers and metered customers. Raftelis worked with PCWA staff to review the existing Untreated Retail rate structure. No changes to the existing rate structure are recommended at this time.

However, Raftelis recommends that Untreated Resale customers be subject to the same Fixed Charges and R&R Charges as Untreated Retail customers beginning in 2023. This proposed change will simplify the rate structure, and will better reflect similarities between Untreated Retail and Untreated Retail water services. As a result of this change, revised 2019 COS Fixed Charges and R&R Charges presented below are set equal to the revised 2019 COS charges developed for Untreated Retail customers in Section 7. Untreated Resale Commodity Rates however will remain distinct from Untreated Retail Commodity Rates.

### 8.2.1. UNTREATED RESALE MINERS' INCH FIXED CHARGES (TEST YEAR 2019)

Table 8-3 shows the total number of Miners' Inch accounts in the test year (2019). Miners' Inch service is differentiated by two seasons: summer and winter. Summer is designated as May through October. Winter is November through April. Accounts are shown for both seasons. The total number of accounts receiving service during the year is 6 (3 in winter and 3 in summer).

**Table 8-3: Untreated Resale Miners' Inch Accounts**

[A]	[B]	[C]
Line	Accounts	2019
1	Summer Accounts	3
2	Winter Accounts	3
3	<b>Total</b>	<b>6</b>

Table 8-4 shows the revised 2019 COS Fixed Charge for Untreated Resale Miners' Inch customers, which is set equal to the Untreated Retail Miners' Inch Fixed Charge calculated in Table 7-6. Revised 2019 COS charges are compared to actual 2019 charges in lines 2-4. Annualized Fixed Charge revenue for the test year (2019) is calculated in line 6 by multiplying the 2019 COS charge by the number of billing units of service and then



multiplying by 12 monthly billing periods per year. Annualized revenue is required to determine the Commodity Rate revenue requirement in the following subsections.

**Table 8-4: Untreated Resale Miners' Inch Monthly Fixed Charge (Test Year 2019)**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	<b>2019 COS Charge</b>	<b>\$9.13</b>	
2	2019 Actual Charge	\$7.36	
3	<i>Difference (\$)</i>	<i>\$1.77</i>	
4	<i>Difference (%)</i>	<i>24.0%</i>	
5			
6	Annualized Revenue	\$329	= [Line 1] × 3 accounts per season × 12 months

### 8.2.2. UNTREATED RESALE MINERS' INCH R&R CHARGES (TEST YEAR 2019)

Table 8-5 shows the revised 2019 COS R&R Charge for Untreated Resale Miners' Inch customers, which is set equal to the Untreated Retail Miners' Inch R&R Charge calculated in Table 7-7. Revised 2019 COS charges are compared to actual 2019 charges in lines 2-4. Annualized Fixed Charge revenue for the test year (2019) is calculated in line 6 by multiplying the 2019 COS charge by the number of billing units of service and then multiplying by 12 monthly billing periods per year.

**Table 8-5: Untreated Resale Miners' Inch Monthly R&R Charge (Test Year 2019)**

[A]	[B]	[C]	[D]
Line	Description	2019	Notes
1	<b>2019 COS Charge</b>	<b>\$6.31</b>	
2	2019 Actual Charge	\$7.36	
3	<i>Difference (\$)</i>	<i>(\$1.05)</i>	
4	<i>Difference (%)</i>	<i>-14.3%</i>	
5			
6	Annualized Revenue	\$227	= [Line 1] × 3 accounts per season × 12 months

### 8.2.3. UNTREATED RESALE MINERS' INCH COMMODITY RATE CALCULATION (TEST YEAR 2019)

Commodity Rates for unmetered Untreated Resale customers are charged per Miners' Inch ordered. Table 8-6 shows the total inches ordered by season in 2019.

**Table 8-6: Untreated Resale Miners' Inches**

[A]	[B]	[C]
Line	Miners' Inches	2019
1	Summer Miners' Inches	46
2	Winter Miners' Inches	30
3	<b>Total</b>	<b>76</b>

Untreated Resale unmetered Commodity Rates are designed to recover the unmetered portion of the revenue requirement (from Table 8-2) less annualized Fixed Charge and R&R Charge revenue (from Table 8-4 and Table

8-5). Table 8-7 shows the determination of the total Commodity Rate revenue requirement in line 4, which is then divided into two sub-components. These two sub-components include a Seasonal Component in line 6 (equal to unmetered Canal costs from Table 8-2) and a Variable Component in line 7 (equal to the total Commodity Rate revenue requirement less the Seasonal Component).

**Table 8-7: Untreated Resale Miners' Inch Seasonal and Variable Component Allocation**

[A] Line	[B] Description	[C] 2019
1	Miners' Inch Total Cost Allocation	\$77,560
2	Less Miners' Inch Fixed Charge Annualized Revenue	(\$329)
3	Less Miners' Inch R&R Charge Annualized Revenue	(\$227)
4	<b>Miners' Inch Commodity Rate Revenue Requirement</b>	<b>\$77,004</b>
5		
6	Miners' Inch Canal Costs (Seasonal Component)	\$40,247
7	All Other Miner's Inch Costs (Variable Component)	\$36,757
8	<b>Miners' Inch Commodity Rate Revenue Requirement</b>	<b>\$77,004</b>

Variable Component costs do not vary by season, and are therefore applied uniformly to summer and winter Commodity Rates. The Variable Component unit cost is calculated by dividing unmetered Variable Component costs (from Table 8-7) by total Miners' Inches ordered (from Table 8-6) and then dividing by 6 months per season.

**Table 8-8: Untreated Resale Miners' Inch Variable Component Calculation**

[A] Line	[B] Description	[C] 2019	[D] Notes
1	Variable Costs	\$36,757	
2	Total Miners' Inches	76	
3	\$/Season	\$483.64	= [Line 1] ÷ [Line 2]
4	Months per Season	6	
5	<b>Monthly Variable Component per Miners' Inch</b>	<b>\$80.61</b>	= [Line 3] ÷ [Line 4]

The Seasonal Component of the Miners' Inch Commodity Rate represents the costs of operating and maintenance of the canal systems. Total Seasonal Component costs (from Table 8-7) are divided equally between summer and winter. The semi-annual cost is then divided by the number of inches ordered in each season (from Table 8-6) and then divided by 6 months per season to determine the monthly Seasonal Component cost per Miners' Inch.

**Table 8-9: Untreated Resale Miners' Inch Seasonal Component Calculation**

[A] Line	[B] Description	[C] 2019 Total	[D] Summer	[E] Winter	[F] Notes
1	Seasonal Costs	\$40,247	\$20,123	\$20,123	
2	Total Miners' Inches	76	46	30	
3	\$/Season	N/A	\$437.47	\$670.78	= [Line 1] ÷ [Line 2]
4	Months per Season	N/A	6	6	
5	<b>Monthly Seasonal Component per Miners' Inch</b>	N/A	<b>\$72.91</b>	<b>\$111.80</b>	= [Line 3] ÷ [Line 4]

The revised 2019 COS Commodity Rates for Miners' Inch customers are calculated by summing the Variable Component cost per Miners' Inch (from Table 8-8) and Seasonal Component cost per Miners' Inch (from Table 8-9). Summer and winter Commodity Rates are differentiated solely based on the Seasonal Component cost per Miners' Inch. Revised 2019 COS Commodity Rates are compared to actual 2019 rates in columns F-H.

**Table 8-10: Untreated Resale Monthly Commodity Rate per Miners' Inch Calculation (Test Year 2019)**

[A]	[B]	[C]	[D]	[E = C + D]	[F]	[G]	[H]
Line	Untreated Resale Miners' Inch Customers	Variable Component	Seasonal Component	2019 COS Rate	2019 Actual Rate	Difference (\$)	Difference (%)
1	Summer	\$80.61	\$72.91	\$153.52	\$171.81	(\$18.29)	-10.6%
2	Winter	\$80.61	\$111.80	\$192.40	\$202.80	(\$10.40)	-5.1%

## 8.3. Metered Customers – Rates and Charges

Untreated Resale customers with water meters are subject to Fixed Charges based on meter size, a uniform R&R Charge that does not vary based on meter size, and a uniform Commodity Rate per HCF. As described in Section 8.2, Raftelis recommends that Untreated Resale customers be subject to the same Fixed Charges and R&R Charges as Untreated Retail customers. As a result of this change, revised 2019 COS Fixed Charges and R&R Charges presented below are set equal to the revised 2019 COS charges developed for metered Untreated Retail customers in Section 7.

### 8.3.1. UNTREATED RESALE METERED FIXED CHARGES (TEST YEAR 2019)

Table 8-11 shows the revised 2019 COS Fixed Charges by meter size for Untreated Resale metered customers, which are set equal to the Untreated Retail metered Fixed Charges calculated in Table 7-16. Revised 2019 COS charges are compared to actual 2019 charges in columns E-G. Annualized Fixed Charge revenue for the test year (2019) is calculated in column H by multiplying the 2019 COS charge by the number of billing units of service and then multiplying by 12 monthly billing periods per year. Annualized revenue is required to determine the Commodity Rate revenue requirement in the following subsections.

**Table 8-11: Untreated Resale Metered Monthly Fixed Charges (Test Year 2019)**

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H = C × D × 12]
Line	Meter Size	Number of Meters	2019 COS Charge	2019 Actual Charge	Difference (\$)	Difference (%)	Annualized Revenue
1	5/8-inch	-	\$11.50	\$9.79	\$1.71	17.5%	\$0
2	3/4-inch	-	\$15.80	\$13.02	\$2.78	21.4%	\$0
3	1-inch	5	\$24.40	\$19.47	\$4.93	25.3%	\$1,464
4	1-1/2-inch	-	\$45.91	\$34.38	\$11.53	33.5%	\$0
5	2-inch	3	\$71.72	\$53.07	\$18.65	35.1%	\$2,582
6	3-inch	-	\$153.45	\$112.27	\$41.18	36.7%	\$0
7	4-inch	-	\$260.99	\$190.15	\$70.84	37.3%	\$0
8	6-inch	1	\$583.61	\$423.80	\$159.81	37.7%	\$7,003
9	8-inch	1	\$691.15	\$501.69	\$189.46	37.8%	\$8,294
10	10-inch	-	\$1,637.50	\$1,187.06	\$450.44	37.9%	\$0
11	Total	10					\$19,343

### 8.3.2. UNTREATED RESALE METERED R&R CHARGES (TEST YEAR 2019)

Table 8-12 shows the revised 2019 COS R&R Charges for Untreated Resale metered customers, which are set equal to the Untreated Retail metered R&R Charges calculated in Table 7-17. Revised 2019 COS charges are compared to actual 2019 charges in lines 2-4. Annualized R&R Charge revenue for the test year (2019) is calculated in line 6 by multiplying the 2019 COS charge by the number of billing units of service and then multiplying by 12 monthly billing periods per year.

**Table 8-12: Untreated Resale Metered Monthly R&R Charge (Test Year 2019)**

[A] Line	[B] Description	[C] 2019	[D] Notes
1	<b>2019 COS Charge</b>	<b>\$6.31</b>	
2	2019 Actual Charge	\$9.29	
3	<i>Difference (\$)</i>	<i>(\$2.98)</i>	
4	<i>Difference (%)</i>	<i>-32.1%</i>	
5			
6	Annualized Revenue	\$757	= [Line 1] × 10 meters × 12 months

### 8.3.3. UNTREATED RESALE METERED COMMODITY RATE CALCULATION (TEST YEAR 2019)

Commodity Rates for unmetered Untreated Resale customers are charged per CFF of water delivered each billing period. The Untreated Resale metered Commodity Rate revenue requirement (see Table 8-13) is equal to the metered portion of the revenue requirement (from Table 8-2) less annualized Fixed Charge and R&R Charge revenue (from Table 8-11 and Table 8-12).

**Table 8-13: Untreated Resale Metered Commodity Rate Revenue Requirement**

[A] Line	[B] Description	[C] 2019
1	Metered Total Cost Allocation	\$187,756
2	Less Metered Fixed Charge Annualized Revenue	(\$19,343)
3	Less Metered R&R Charge Annualized Revenue	(\$757)
4	<b>Metered Commodity Rate Revenue Requirement</b>	<b>\$167,656</b>

The revised 2019 COS Commodity Rate for metered customers is calculated by dividing the metered Commodity Rate revenue requirement (from Table 8-13) by total Untreated Resale metered water use in HCF (provided by PCWA staff). The revised 2019 COS Commodity Rate is compared to the actual 2019 rate in lines 4-6.

**Table 8-14: Untreated Resale Metered Commodity Rate Calculation (Test Year 2019)**

[A] Line	[B] Description	[C] 2019	[D] Notes
1	Metered Commodity Rate Revenue Requirement	\$167,656	
2	Untreated Resale Metered Water Use (HCF)	699,742	
3	<b>2019 COS Rate</b>	<b>\$0.24</b>	= [Line 1] ÷ [Line 2]
4	2019 Actual Rate	\$0.28	
5	<i>Difference (\$)</i>	<i>(\$0.04)</i>	
6	<i>Difference (%)</i>	<i>-14.4%</i>	

# 9. Proposed Rate Schedule

Raftelis developed an updated five-year schedule of water rates based on the results of the proposed financial plan and cost of service analyses. The calculation of proposed water rates through 2027 is shown in this section. All proposed rates are first calculated directly from the results of the cost of service analyses for each service class (in Sections 5-8) for the test year (2019). Note however that proposed rates will not be implemented until 2023. Therefore, all “revised 2019 COS” rates and charges shown represent intermediate results of the rate design process but will never actually be implemented.

## 9.1. COS Rate Escalation - 2019 to 2022

Before the calculation of proposed water rates for 2023 through 2027, revised 2019 COS rates (calculated in Sections 5-8) must be converted into “revised 2022 COS” rates. This conversion involves increasing all revised 2019 COS rates by a uniform percentage such that revised 2022 COS rates generate the same amount of revenue as actual 2022 water rates (per Table 3-10 from the financial plan analysis).

Table 9-1 shows the calculation of the uniform percentage (i.e., cumulative adjustment) to be applied to convert all revised 2019 COS rates into revised 2022 COS rates. Since the prior rate study established 2018 water rates, PCWA has adjusted its adopted rates each January based on annual changes in the Consumer Price Index (CPI).<sup>55</sup> All CPI adjustments applied to rates after 2019 are shown in lines 1-3. An additional adjustment is added in line 4 to ensure that revised 2022 COS rates generate the exact same amount of water rate revenue as actual 2022 water rates are projected to generate (\$61,486,037 per Table 3-10). This adjustment is necessary due to non-proportional changes in billing units of service between 2019 and 2022. The cumulative adjustment of 7.21% in line 5 represents the cumulative increase of lines 1-4.

**Table 9-1: COS Rate Escalation (2019 to 2022)**

[A] Line	[B] Description	[C] Rate Increase	[D] Notes
1	2020	2.90%	2020 CPI increase
2	2021	0.80%	2021 CPI increase
3	2022	4.70%	2022 CPI increase
4	Additional Adjustment	-1.28%	For revenue reconciliation with proposed financial plan
5	Cumulative Adjustment	7.21%	

Revised 2022 COS rates shown in Table 9-2 through Table 9-5 are calculated by increasing revised 2019 COS rates (calculated in Sections 5-8) by the cumulative adjustment of 7.21% from Table 9-1. Comparisons between revised 2022 COS rates and actual 2022 rates are also provided. Revised 2022 COS rates are designed to recover the same amount of total water rate revenue as actual 2022 rates currently in effect, thus constituting a revenue neutral impact. All differences between revised 2022 COS rates and actual 2022 rates are due to distributional impacts of the revised cost of service analyses presented in Sections 4-8. Separate rate tables are provided for treated water service, private fire protection service, untreated metered water service, and untreated Miners’ Inch water service.

<sup>55</sup> With the exception that no CPI adjustment was applied to Commodity Rates in 2019.

**Table 9-2: 2022 COS Treated Water Rates**

Treated Water Rates	2019 COS	2022 COS	2022 Actual	Difference (\$)	Difference (%)
<b>Fixed Charge (per month)</b>					
5/8-inch	\$19.75	<b>\$21.18</b>	\$20.14	\$1.04	5.1%
3/4-inch	\$28.19	<b>\$30.23</b>	\$28.25	\$1.98	7.0%
1-inch	\$45.08	<b>\$48.33</b>	\$44.50	\$3.83	8.6%
1-1/2-inch	\$87.30	<b>\$93.59</b>	\$85.06	\$8.53	10.0%
2-inch	\$137.95	<b>\$147.91</b>	\$133.75	\$14.16	10.6%
3-inch	\$298.37	<b>\$319.90</b>	\$287.95	\$31.95	11.1%
4-inch	\$509.45	<b>\$546.20</b>	\$490.82	\$55.38	11.3%
6-inch	\$1,142.68	<b>\$1,225.11</b>	\$1,099.47	\$125.64	11.4%
8-inch	\$1,353.76	<b>\$1,451.41</b>	\$1,302.34	\$149.07	11.4%
Resale and Industrial Service (per Unit of Capacity)	\$24.09	<b>\$25.82</b>	\$19.83	\$5.99	30.2%
<b>Renewal and Replacement Charge (per month)</b>					
5/8-inch	\$17.62	<b>\$18.89</b>	\$19.93	(\$1.04)	-5.2%
3/4-inch	\$26.43	<b>\$28.34</b>	\$29.91	(\$1.57)	-5.3%
1-inch	\$44.05	<b>\$47.23</b>	\$49.85	(\$2.62)	-5.3%
1-1/2-inch	\$88.10	<b>\$94.45</b>	\$99.70	(\$5.25)	-5.3%
2-inch	\$140.96	<b>\$151.13</b>	\$159.52	(\$8.39)	-5.3%
3-inch	\$308.35	<b>\$330.59</b>	\$348.95	(\$18.36)	-5.3%
4-inch	\$528.59	<b>\$566.72</b>	\$598.18	(\$31.46)	-5.3%
6-inch	\$1,189.33	<b>\$1,275.12</b>	\$1,345.92	(\$70.80)	-5.3%
8-inch	\$1,409.58	<b>\$1,511.25</b>	\$1,595.17	(\$83.92)	-5.3%
Resale and Industrial Service (per Unit of Capacity)	\$9.88	<b>\$10.59</b>	\$16.00	(\$5.41)	-33.8%
<b>Commodity Rates (per HCF)</b>					
<u>Residential Tiered Rates</u>					
Tier 1 (First 900 cubic feet)	\$1.56	<b>\$1.68</b>	\$1.64	\$0.04	2.3%
Tier 2 (Next 1,900 cubic feet)	\$1.88	<b>\$2.02</b>	\$1.86	\$0.16	8.6%
Tier 3 (Over 2,800 cubic feet)	\$2.05	<b>\$2.19</b>	\$2.00	\$0.19	9.7%
<u>Non-Residential Uniform Rates</u>					
Commercial and Governmental	\$1.67	<b>\$1.79</b>	\$1.76	\$0.03	1.8%
Landscape	\$1.92	<b>\$2.06</b>	\$1.86	\$0.20	10.7%
Industrial and Resale	\$0.40	<b>\$0.43</b>	\$0.43	(\$0.00)	-0.7%
Construction	\$2.32	<b>\$2.49</b>	\$3.52	(\$1.03)	-29.4%
<u>Customers Involuntarily Deprived of Untreated Water Service (CIDUWS)</u>					
Tier 1 (First 900 cubic feet)	\$1.56	<b>\$1.68</b>	\$1.64	\$0.04	2.3%
Tier 2 (Next 1,900 cubic feet)	\$1.88	<b>\$2.02</b>	\$1.86	\$0.16	8.6%
Tier 3 (Over 2,800 cubic feet)	\$0.20	<b>\$0.21</b>	\$0.21	(\$0.00)	-0.1%

**Table 9-3: 2022 COS Private Fire Protection Rates**

Private Fire Protection Rates	2019 COS	2022 COS	2022 Actual	Difference (\$)	Difference (%)
<b>Fixed Charge (per month)</b>					
1-inch (Residential Fire & Commercial Fire)	\$0.12	<b>\$0.13</b>	\$0.32	(\$0.19)	-60.0%
1-inch	\$2.54	<b>\$2.73</b>	\$0.32	\$2.41	752.0%
2-inch	\$3.16	<b>\$3.39</b>	\$1.99	\$1.40	70.4%
3-inch	\$4.57	<b>\$4.90</b>	\$5.76	(\$0.86)	-14.9%
4-inch	\$7.00	<b>\$7.50</b>	\$12.28	(\$4.78)	-38.9%
6-inch	\$15.72	<b>\$16.85</b>	\$35.66	(\$18.81)	-52.8%
8-inch	\$30.75	<b>\$32.97</b>	\$75.99	(\$43.02)	-56.6%
10-inch	\$53.36	<b>\$57.21</b>	\$136.64	(\$79.43)	-58.1%
12-inch	\$84.70	<b>\$90.81</b>	\$220.71	(\$129.90)	-58.9%
14-inch	\$125.84	<b>\$134.92</b>	\$331.06	(\$196.14)	-59.2%
16-inch	\$177.77	<b>\$190.59</b>	\$470.35	(\$279.76)	-59.5%
<b>Commodity Rates (per HCF)</b>					
Uniform <sup>56</sup>	\$1.28	<b>\$1.38</b>	\$3.52	(\$2.14)	-60.9%

**Table 9-4: 2022 COS Untreated Water Rates (Metered Customers)**

Untreated Water Rates (Metered Customers)	2019 COS	2022 COS	2022 Actual	Difference (\$)	Difference (%)
<b>Fixed Charge (per month)</b>					
5/8-inch	\$11.50	<b>\$12.33</b>	\$10.27	\$2.06	20.1%
3/4-inch	\$15.80	<b>\$16.94</b>	\$13.65	\$3.29	24.1%
1-inch	\$24.40	<b>\$26.17</b>	\$20.43	\$5.74	28.1%
1-1/2-inch	\$45.91	<b>\$49.22</b>	\$37.34	\$11.88	31.8%
2-inch	\$71.72	<b>\$76.90</b>	\$57.64	\$19.26	33.4%
3-inch	\$153.45	<b>\$164.52</b>	\$121.92	\$42.60	34.9%
4-inch	\$260.99	<b>\$279.82</b>	\$206.50	\$73.32	35.5%
6-inch	\$583.61	<b>\$625.71</b>	\$460.24	\$165.47	36.0%
8-inch	\$691.15	<b>\$741.00</b>	\$544.83	\$196.17	36.0%
10-inch	\$1,637.50	<b>\$1,755.62</b>	\$1,289.12	\$466.50	36.2%
<b>Renewal and Replacement Charge (per month)</b>					
All Meter Sizes	\$6.31	<b>\$6.76</b>	\$10.09	(\$3.33)	-33.0%
<b>Commodity Rates (per HCF)</b>					
Retail	\$0.20	<b>\$0.21</b>	\$0.21	(\$0.00)	-0.1%
Resale	\$0.24	<b>\$0.26</b>	\$0.30	(\$0.04)	-14.4%

<sup>56</sup> Customers with Residential Fire or Commercial Fire water service are subject to Treated Retail Residential Tiered or Commercial Commodity Rates, but are not subject to this rate (which applies only to dedicated private fire lines).

**Table 9-5: 2022 COS Untreated Water Rates (Miners' Inch Customers)**

Untreated Water Rates (Miners' Inch Customers)	2019 COS	2022 COS	2022 Actual	Difference (\$)	Difference (%)
<b>Fixed Charge (per month)</b>					
Retail	\$9.13	<b>\$9.79</b>	\$5.88	\$3.91	66.5%
Resale	\$9.13	<b>\$9.79</b>	\$7.99	\$1.80	22.5%
<b>Renewal and Replacement Charge (per month)</b>					
Retail	\$6.31	<b>\$6.76</b>	\$5.88	\$0.88	15.0%
Resale	\$6.31	<b>\$6.76</b>	\$7.99	(\$1.23)	-15.3%
<b>Commodity Rates (per Miners' Inch per month)</b>					
<u>Summer</u>					
Retail	\$63.05	<b>\$67.60</b>	\$67.96	(\$0.36)	-0.5%
Resale	\$153.52	<b>\$164.59</b>	\$186.58	(\$21.99)	-11.8%
<u>Winter</u>					
Retail	\$73.84	<b>\$79.16</b>	\$80.90	(\$1.74)	-2.1%
Resale	\$192.40	<b>\$206.28</b>	\$220.24	(\$13.96)	-6.3%

## 9.2. Proposed Five-Year Water Rate Schedule

Proposed water rates for 2023 through 2027 were calculated by increasing the revised 2022 COS rates (from Table 9-2 through Table 9-5) by the proposed financial plan revenue adjustments (from Table 3-20). These annual rate adjustments are shown again in Table 9-6 below. Currently adopted 2022 rates and proposed rates through 2027 are shown in Table 9-7 through Table 9-10. Separate rate tables are provided for treated water service, private fire protection service, untreated metered water service, and untreated Miners' Inch water service.

**Table 9-6: Proposed Five-Year Annual Rate Adjustments**

[A]	[B]	[C]	[D]
Line	Year	Annual Rate Adjustment <sup>57</sup>	Notes
1	2023	8.0%	Equal to 2023 proposed revenue adjustment
2	2024	8.0%	Equal to 2024 proposed revenue adjustment
3	2025	7.0%	Equal to 2025 proposed revenue adjustment
4	2026	7.0%	Equal to 2026 proposed revenue adjustment
5	2026	6.0%	Equal to 2027 proposed revenue adjustment

<sup>57</sup> The annual rate increases shown are relative to revised 2022 COS rates (not 2022 actual rates).



**Table 9-7: Proposed Five-Year Treated Water Rate Schedule**

Treated Water Rates	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
5/8-inch	\$20.14	\$22.87	\$24.70	\$26.43	\$28.29	\$29.99
3/4-inch	\$28.25	\$32.65	\$35.27	\$37.74	\$40.39	\$42.82
1-inch	\$44.50	\$52.20	\$56.38	\$60.33	\$64.56	\$68.44
1-1/2-inch	\$85.06	\$101.08	\$109.17	\$116.82	\$125.00	\$132.50
2-inch	\$133.75	\$159.74	\$172.52	\$184.60	\$197.53	\$209.39
3-inch	\$287.95	\$345.49	\$373.13	\$399.25	\$427.20	\$452.84
4-inch	\$490.82	\$589.90	\$637.10	\$681.70	\$729.42	\$773.19
6-inch	\$1,099.47	\$1,323.12	\$1,428.97	\$1,529.00	\$1,636.03	\$1,734.20
8-inch	\$1,302.34	\$1,567.53	\$1,692.94	\$1,811.45	\$1,938.26	\$2,054.56
Resale and Industrial Service (per Unit of Capacity)	\$19.83	\$27.90	\$30.14	\$32.25	\$34.51	\$36.59
<b>Renewal and Replacement Charge (per month)</b>						
5/8-inch	\$19.93	\$20.41	\$22.05	\$23.60	\$25.26	\$26.78
3/4-inch	\$29.91	\$30.61	\$33.06	\$35.38	\$37.86	\$40.14
1-inch	\$49.85	\$51.01	\$55.10	\$58.96	\$63.09	\$66.88
1-1/2-inch	\$99.70	\$102.01	\$110.18	\$117.90	\$126.16	\$133.73
2-inch	\$159.52	\$163.22	\$176.28	\$188.62	\$201.83	\$213.94
3-inch	\$348.95	\$357.04	\$385.61	\$412.61	\$441.50	\$467.99
4-inch	\$598.18	\$612.06	\$661.03	\$707.31	\$756.83	\$802.24
6-inch	\$1,345.92	\$1,377.13	\$1,487.31	\$1,591.43	\$1,702.84	\$1,805.02
8-inch	\$1,595.17	\$1,632.16	\$1,762.74	\$1,886.14	\$2,018.17	\$2,139.27
Resale and Industrial Service (per Unit of Capacity)	\$16.00	\$11.45	\$12.37	\$13.24	\$14.17	\$15.03
<b>Commodity Rates (per HCF)</b>						
<u>Residential Tiered Rates</u>						
Tier 1 (First 900 cubic feet)	\$1.64	\$1.82	\$1.97	\$2.11	\$2.26	\$2.40
Tier 2 (Next 1,900 cubic feet)	\$1.86	\$2.19	\$2.37	\$2.54	\$2.72	\$2.89
Tier 3 (Over 2,800 cubic feet)	\$2.00	\$2.38	\$2.58	\$2.77	\$2.97	\$3.15
<u>Non-Residential Uniform Rates</u>						
Commercial and Governmental	\$1.76	\$1.94	\$2.10	\$2.25	\$2.41	\$2.56
Landscape	\$1.86	\$2.23	\$2.41	\$2.58	\$2.77	\$2.94
Industrial and Resale	\$0.43	\$0.47	\$0.51	\$0.55	\$0.59	\$0.63
Construction	\$3.52	\$2.69	\$2.91	\$3.12	\$3.34	\$3.55
<u>Customers Involuntarily Deprived of Untreated Water Service (CIDUWS)</u>						
Tier 1 (First 900 cubic feet)	\$1.64	\$1.82	\$1.97	\$2.11	\$2.26	\$2.40
Tier 2 (Next 1,900 cubic feet)	\$1.86	\$2.19	\$2.37	\$2.54	\$2.72	\$2.89
Tier 3 (Over 2,800 cubic feet)	\$0.21	\$0.23	\$0.25	\$0.27	\$0.29	\$0.31

**Table 9-8: Proposed Five-Year Private Fire Protection Rate Schedule**

Private Fire Protection Rates	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
1-inch (Residential Fire & Commercial Fire)	\$0.32	\$0.14	\$0.16	\$0.18	\$0.20	\$0.22
1-inch	\$0.32	\$2.95	\$3.19	\$3.42	\$3.66	\$3.88
2-inch	\$1.99	\$3.67	\$3.97	\$4.25	\$4.55	\$4.83
3-inch	\$5.76	\$5.30	\$5.73	\$6.14	\$6.57	\$6.97
4-inch	\$12.28	\$8.11	\$8.76	\$9.38	\$10.04	\$10.65
6-inch	\$35.66	\$18.20	\$19.66	\$21.04	\$22.52	\$23.88
8-inch	\$75.99	\$35.61	\$38.46	\$41.16	\$44.05	\$46.70
10-inch	\$136.64	\$61.79	\$66.74	\$71.42	\$76.42	\$81.01
12-inch	\$220.71	\$98.08	\$105.93	\$113.35	\$121.29	\$128.57
14-inch	\$331.06	\$145.71	\$157.37	\$168.39	\$180.18	\$191.00
16-inch	\$470.35	\$205.84	\$222.31	\$237.88	\$254.54	\$269.82
<b>Commodity Rates (per HCF)</b>						
Uniform <sup>58</sup>	\$3.52	\$1.49	\$1.61	\$1.73	\$1.86	\$1.98

**Table 9-9: Proposed Five-Year Untreated Water Rate Schedule (Metered Customers)**

Untreated Water Rates (Metered Customers)	2022 Current	2023 Proposed	2024 Proposed	2025 Proposed	2026 Proposed	2027 Proposed
<b>Fixed Charge (per month)</b>						
5/8-inch	\$10.27	\$13.32	\$14.39	\$15.40	\$16.48	\$17.47
3/4-inch	\$13.65	\$18.30	\$19.77	\$21.16	\$22.65	\$24.01
1-inch	\$20.43	\$28.26	\$30.53	\$32.67	\$34.96	\$37.06
1-1/2-inch	\$37.34	\$53.17	\$57.43	\$61.46	\$65.77	\$69.72
2-inch	\$57.64	\$83.05	\$89.70	\$95.98	\$102.70	\$108.87
3-inch	\$121.92	\$177.69	\$191.91	\$205.35	\$219.73	\$232.92
4-inch	\$206.50	\$302.21	\$326.39	\$349.24	\$373.69	\$396.12
6-inch	\$460.24	\$675.77	\$729.84	\$780.93	\$835.60	\$885.74
8-inch	\$544.83	\$800.29	\$864.32	\$924.83	\$989.57	\$1,048.95
10-inch	\$1,289.12	\$1,896.07	\$2,047.76	\$2,191.11	\$2,344.49	\$2,485.16
<b>Renewal and Replacement Charge (per month)</b>						
All Meter Sizes	\$10.09	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
<b>Commodity Rates (per HCF)</b>						
Retail	\$0.21	\$0.23	\$0.25	\$0.27	\$0.29	\$0.31
Resale	\$0.30	\$0.28	\$0.31	\$0.34	\$0.37	\$0.40

<sup>58</sup> Customers with Residential Fire or Commercial Fire water service are subject to Treated Retail Residential Tiered or Commercial Commodity Rates, but are not subject to this rate (which applies only to dedicated private fire lines).

**Table 9-10: Proposed Five-Year Untreated Water Rate Schedule (Miners' Inch Customers)**

<b>Untreated Water Rates (Miners' Inch Customers)</b>	<b>2022 Current</b>	<b>2023 Proposed</b>	<b>2024 Proposed</b>	<b>2025 Proposed</b>	<b>2026 Proposed</b>	<b>2027 Proposed</b>
<b>Fixed Charge (per month)</b>						
Retail	\$5.88	\$10.58	\$11.43	\$12.24	\$13.10	\$13.89
Resale	\$7.99	\$10.58	\$11.43	\$12.24	\$13.10	\$13.89
<b>Renewal and Replacement Charge (per month)</b>						
Retail	\$5.88	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
Resale	\$7.99	\$7.31	\$7.90	\$8.46	\$9.06	\$9.61
<b>Commodity Rates (per Miners' Inch per month)</b>						
<u>Summer</u>						
Retail	\$67.96	\$73.01	\$78.86	\$84.39	\$90.30	\$95.72
Resale	\$186.58	\$177.76	\$191.99	\$205.43	\$219.82	\$233.01
<u>Winter</u>						
Retail	\$80.90	\$85.50	\$92.34	\$98.81	\$105.73	\$112.08
Resale	\$220.24	\$222.79	\$240.62	\$257.47	\$275.50	\$292.03

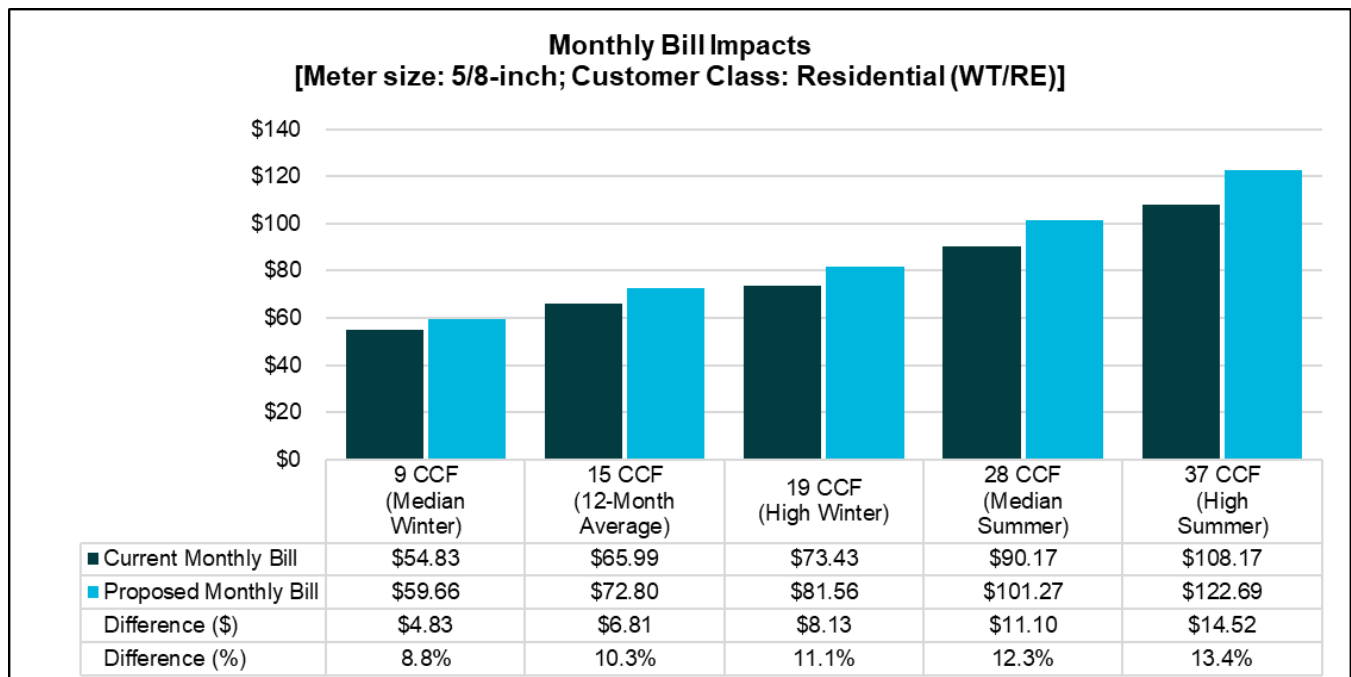
# 10. Customer Bill Impacts

Section 10 includes a comparison of sample monthly bills based on currently adopted 2022 rates and proposed 2023 rates (from Section 9) for each of the four service classes. Bill impacts are shown for 2023 only, as the first year of proposed rates is when distributional impacts resulting from the updated cost of service analyses will be experienced by customers. Beyond 2023, all customers will experience uniform annual bill increases equal to the proposed revenue adjustment percentages.<sup>59</sup>

## 10.1. Treated Retail Residential Bill Impacts

Figure 10-1 shows sample monthly water bills for Treated Retail Residential customers. Sample bills shown are for a customer with a 5/8-inch water meter at varying levels of water use under both current 2022 rates and proposed 2023 Treated Retail water rates. Note that over 90% of Residential customers have a 5/8-inch water meter. The five water use levels shown are representative of recent Residential water use characteristics based on historical water use data.

**Figure 10-1: 2023 Monthly Bill Impacts for Treated Retail Residential Customers**



<sup>59</sup> Assuming no changes in billing units of service (e.g., changes in water use, Units of Capacity, meter size, etc.).

## 10.2. Treated Resale & Industrial Bill Impacts

Table 10-1 shows sample monthly water bills for Treated Resale customers and PCWA’s single Industrial customer. Sample bills are shown based on both current 2022 rates and proposed 2023 Treated Resale water rates. PCWA’s Treated Resale customers include the City of Lincoln, California American Water Company, and five other smaller users (whose combined bills are shown below under “Other Treated Resale.” Industrial impacts are included because Industrial customers are subject to the same rates as Treated Resale customers. All sample bills shown are calculated based on actual Units of Capacity and average monthly water use in 2019.

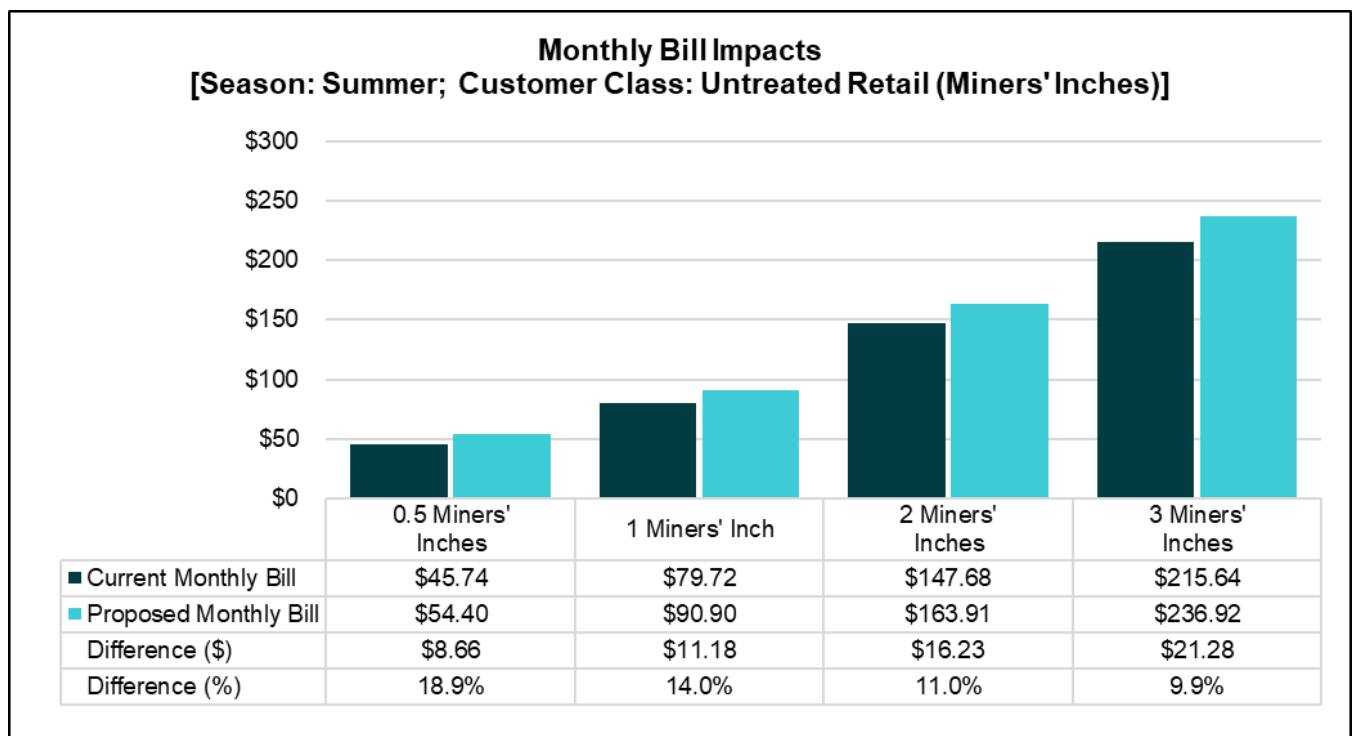
**Table 10-1: 2023 Monthly Bill Impacts for Treated Resale & Industrial Customers**

Monthly Bill Impacts	Current 2022	Proposed 2023	Difference (\$)	Difference (%)
City of Lincoln (WT/R2)	\$712,048	\$781,293	\$69,245	9.7%
Cal American Water Company (WT/R3)	\$68,978	\$75,672	\$6,693	9.7%
Other Treated Resale (WT/RS)	\$15,963	\$17,509	\$1,546	9.7%
Industrial	\$21,268	\$23,326	\$2,058	9.7%

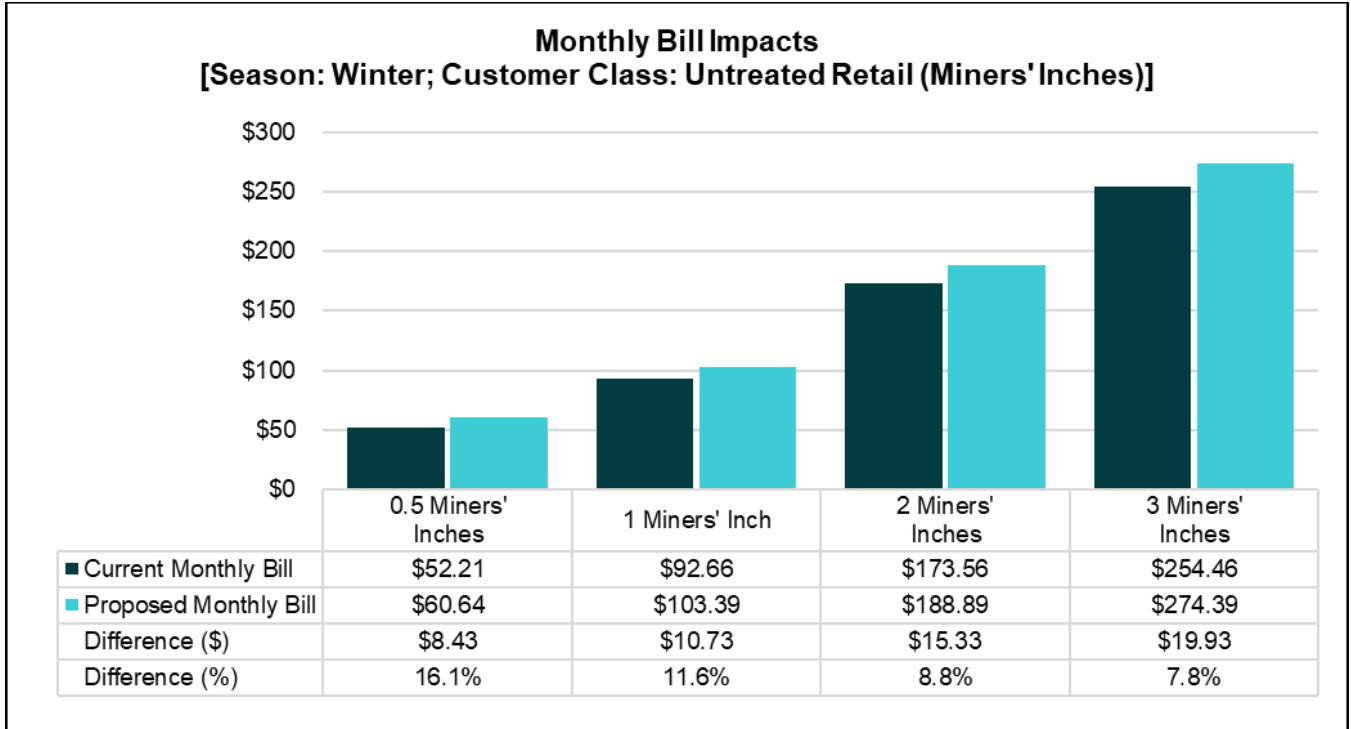
## 10.3. Untreated Retail Bill Impacts

Figure 10-2 and Figure 10-3 show sample monthly water bills for Untreated Retail Miners’ Inch customers. Sample bills are shown for both summer and winter based on both current 2022 rates and proposed 2023 Untreated Retail water rates under four different ordered water quantities ranging from one-half to three Miners’ Inches. Figure 10-4 shows sample monthly water bills for Untreated Retail metered customers with a 3/4-inch meter under three different monthly water use levels ranging from low to high.

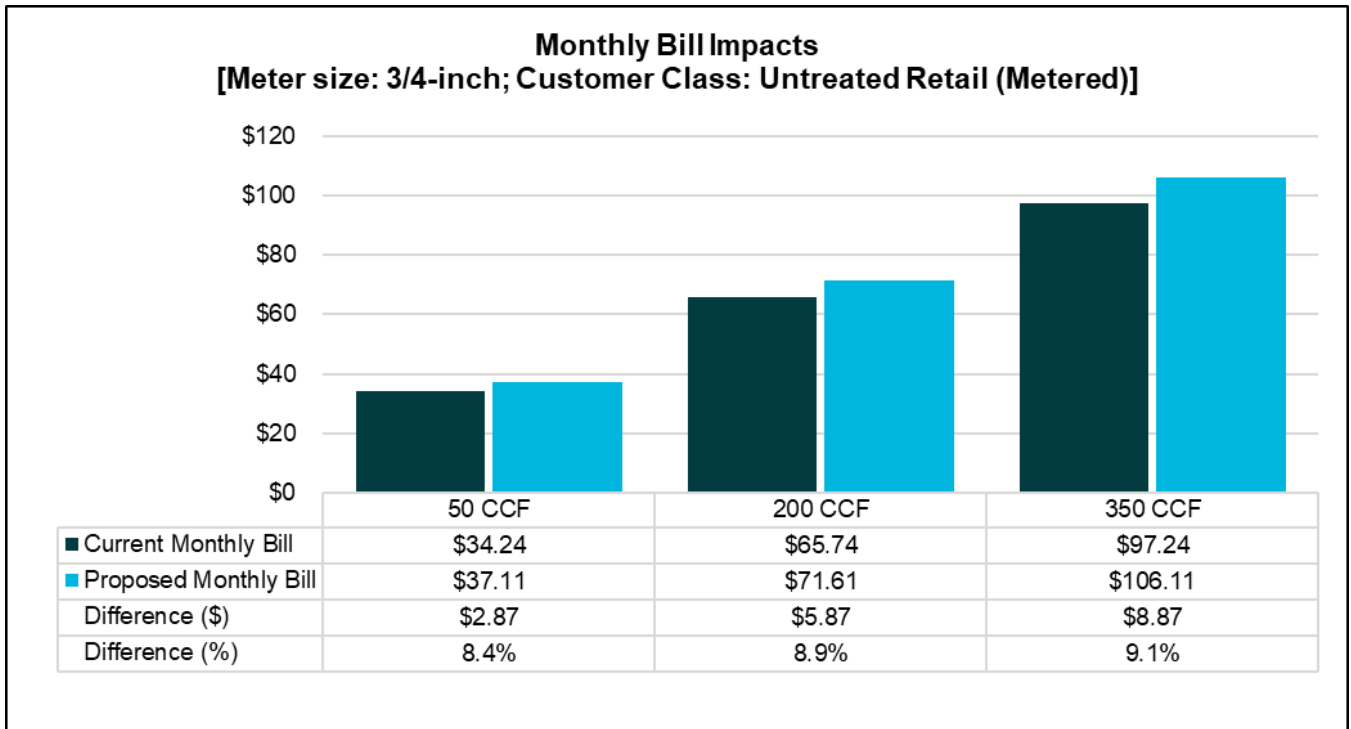
**Figure 10-2: 2023 Monthly Bill Impacts for Untreated Retail Miners’ Inch Customers (Summer)**



**Figure 10-3: 2023 Monthly Bill Impacts for Untreated Retail Miners' Inch Customers (Winter)**



**Figure 10-4: 2023 Monthly Bill Impacts for Untreated Retail Metered Customers**



## 10.4. Untreated Resale Bill Impacts

Table 10-2 shows sample monthly water bills for PCWA’s six Untreated Resale customers. Sample bills are shown based on both current 2022 rates and proposed 2023 Untreated Resale water rates. All sample bills shown are calculated based on average monthly water use (for metered customers) and the number of Miners’ Inches ordered each season (for unmetered customers) in 2019.

**Table 10-2: 2023 Monthly Bill Impacts for Untreated Resale Customers**

Monthly Bill Impacts	Current 2022	Proposed 2023	Difference (\$)	Difference (%)
<b>Monthly Bills (Metered Customers)</b>				
Dutch Flat Mutual Water Company	\$641.69	\$684.56	\$42.87	6.7%
Christian Valley Park CSD	\$4,761.78	\$4,688.43	(\$73.35)	-1.5%
Meadow Vista County Water District	\$13,298.35	\$12,701.46	(\$596.88)	-4.5%
<b>Monthly Summer Bills (Miners' Inch Customers)</b>				
Alpine Meadows Water Association	\$1,881.78	\$1,795.49	(\$86.29)	-4.6%
Heather Glen CSD	\$575.72	\$551.17	(\$24.55)	-4.3%
Weimar Water Company	\$6,173.12	\$5,883.97	(\$289.15)	-4.7%
<b>Monthly Winter Bills (Miners' Inch Customers)</b>				
Alpine Meadows Water Association	\$1,777.90	\$1,800.21	\$22.31	1.3%
Heather Glen CSD	\$456.46	\$463.47	\$7.01	1.5%
Weimar Water Company	\$4,420.78	\$4,473.69	\$52.91	1.2%