

# Coastside

## COUNTY WATER DISTRICT

### Water Shortage Contingency Stage Rate Study

Final Report / January 2022





January 3, 2022

Mary Rogren  
General Manager  
Coastside County Water District  
766 Main Street  
Half Moon Bay, CA 94019

**Subject: Water Shortage Contingency Stage Rate Study Report**

Dear Mary Rogren,

Raftelis Financial Consultants, Inc. (Raftelis), assisted by Water Resources Economics, is pleased to provide this Water Shortage Contingency Stage Rate Study Report to the Coastside County Water District (District). Water shortage contingency stage rates (stage rates) are a tool that will allow the District to reliably recover the necessary revenue to fully fund the water system in times of reduced water demand.

The major objectives of the study include the following:

- Determine water allocations for each customer class during each water shortage stage based on the 2020 Water Shortage Contingency Plan
- Calculate the financial impacts of reduced water sales and changes to water supply sources
- Evaluate various stage rate structures to determine the structure best suited to meet the District's needs
- Develop stage rates that recover the financial impacts of each water shortage stage based on the cost of providing service

The report summarizes the key findings and recommendations related to the development of stage rates for the District. It has been a pleasure to work with the District on this project, and thank you for the support that you, District staff, and the Board of Directors provided during the course of this study.

Sincerely,



**Nancy Phan**  
*Project Manager*  
Raftelis



**Sanjay Gaur**  
*Project Director / Principal*  
Water Resources Economics

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# 1. Executive Summary

## Background

The Coastside County Water District provides treated water service to the City of Half Moon Bay and the communities of Princeton-by-the-Sea, Miramar, and El Granada in San Mateo County. The service area spans 14 square miles and provides service to a population of approximately 18,700 covering 7,600 accounts. The District receives raw water from two sources: local water (surface and groundwater) and imported water purchased from the San Francisco Public Utilities Commission (SFPUC).

Raftelis worked with the District in 2020 on a Water Financial Plan and Rate Study Update. In 2021, the District engaged Raftelis to conduct a Water Shortage Contingency Stage Rate Study to accompany the rates developed in the prior rate study update. The District adopted its latest 2020 Water Shortage Contingency Plan in June 2021, which details the six water shortage stages and the corresponding water usage reductions. The resulting stage rates comply with Proposition 218 requirements and allow the District to reliably recover the necessary revenue to fully fund the water system in times of reduction in water demand.

The major objectives of the study include the following:

- Determine water allocations for each customer class during each water shortage stage based on the 2020 Water Shortage Contingency Plan
- Calculate the financial impacts of reduced water sales and changes to water supply sources
- Evaluate various stage rate structures to determine the structure best suited to meet the District's needs
- Develop stage rates that recover the financial impacts of each water shortage stage based on the cost of providing service

## Legal Framework<sup>1</sup>

The rate-making process, especially for water agencies in California, begins with a review of the legal requirements and framework currently in place. The major legal requirements include Proposition 218 and Article X, Section 2 of the California Constitution, which are outlined in the following sections.

### California Constitution – Article XIII D, Section 6 (Prop 218)

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

1. A property-related charge (such as water and recycled water rates) imposed by a public agency on a parcel shall not exceed the costs required to provide the property-related service.
1. Revenues derived by the charge shall not be used for any purpose other than that for which the charge was imposed.
2. The amount of the charge imposed upon any parcel shall not exceed the proportional cost of service attributable to the parcel.

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<sup>1</sup> Raftelis does not practice law, nor does it provide legal advice. The above discussion provides a general overview of Raftelis' understanding as rate practitioners and is labeled "legal framework" for literary convenience only. The District should consult with its legal counsel for clarification and/or specific guidance.

3. No charge may be imposed for a service unless that service is actually used or immediately available to the owner of the property.
4. A written notice of the proposed charge shall be mailed to the record owner of each parcel at least 45 days prior to the public hearing when the agency considers all written protests against the charge.

As stated in AWWA’s Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices M1, 7th Edition (M1 Manual), “water rates and charges should be recovered from classes of customers in proportion to the cost of serving those customers.” Proposition 218 requires that water rates cannot be “arbitrary and capricious,” meaning that the rate-setting methodology must be sound and that there must be a nexus between the costs and the rates charged. This study follows industry-standard rate-setting methodologies set forth by the M1 Manual and adheres to Proposition 218 requirements by developing rates that do not exceed the proportionate cost of providing water services during each water shortage contingency stage.

## California Constitution – Article X, Section 2

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

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

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

## Process and Approach

Stage rates are governed by the requirements of Proposition 218 and Article X of the California Constitution. The development of the stage rates must show the nexus between the costs of providing water service and the rates charged to customers, must maximize the beneficial use of water (often defined as indoor use for health and hygiene), and must encourage conservation. Since the District has already implemented a water shortage advisory, which asks customers to voluntarily reduce water use by 15 percent, ensuring that water is both used efficiently and conserved when possible is particularly important.

Stage rates are designed to recover lost revenue due to reduction in water use during each stage, to incorporate the potential changes to the District’s water supply sources and their corresponding costs, to align with specific water shortage stages outlined in the 2020 Water Shortage Contingency Plan, and to provide financial flexibility for the District when declaring water shortage stages and implementing the appropriate stage rates. The proposed stage rates are based on the District’s approved water rates for calendar year (CY) 2022, which will go into effect on January 1, 2022.

There are four steps to conducting a stage rate study, which include:

1. Allocating water reductions between various customer classes based on defined water shortage stages
2. Calculating financial impacts to the District in each stage
3. Determining the most appropriate water shortage cost recovery mechanism (rate structure)
4. Evaluating financial impacts to customers

For the first step of the stage rate study, District staff provided the Water Shortage Contingency Plan which was adopted in June 2021 as part of the District’s Urban Water Management Plan. **Table 1-1** shows the overall reduction targets for the entire water system.

**Table 1-1: Water Shortage Stages and Reduction**

Line	Water Shortage Reductions	Baseline	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
1	Overall Target Reduction	0%	≤10%	20%	30%	40%	50%	>50%

The water sales by stage are calculating using the target reductions developed in the Water Shortage Contingency Plan. **Table 1-2** shows the estimated water sales in hundred cubic feet (hcf) for each stage of water shortage that aligns with the percent reductions shown above in **Table 1-1**. Baseline is defined as the water usage estimated in CY 2022.

**Table 1-2: Estimated Water Sales by Stage**

Line	A Water Usage (hcf)	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	All Customer Classes	815,000	727,838	643,850	570,500	497,766	408,064	266,424
2	% Reduction from Baseline	0%	11%	21%	30%	39%	50%	67%

A key step in the stage rate study is to calculate the financial implications for the District during a water shortage. Considerations include:

- How much commodity revenue is expected due to cutbacks?
- How much will this change the District’s water supply mix and the costs associated with each source?
- How will this change the District’s operating costs, if at all?

For the District, these financial consequences include loss of commodity revenue, the severity of which depends on the water shortage stage. Additionally, changes in water purchase costs from the SFPUC are expected to lead to financial consequences with a shift in water supply mix from cheaper local water to more expensive SFPUC water.

The next step in developing stage rates involves determining the most appropriate water shortage cost recovery mechanism is best suited to meet the needs of the District and its policy objectives. Raftelis evaluated three options to recover water shortage costs:

1. Uniform quantity charge
2. Uniform percent increase to quantity charge
3. Fixed charge based on meter size

Based on direction provided by the District’s Board of Directors and staff, the resulting stage rates were developed as a uniform percent increase to the approved quantity charges for CY 2022, which allows for the ability for customers to change their water bill, encourages conservation, and promotes affordability while being simple for customers to understand.

## Proposed Stage Rates

**Table 1-3** shows the proposed stage rates for each customer class for Stages 1 through 6. The stage rates for each stage are calculated based on a percentage increase that is applied to the CY 2022 quantity charges for each customer class. The percentage increase was established by calculating the total financial impacts of each stage of

water shortage to determine the amount of revenue required to recover the lost revenue in each stage. The stage rates are charged per hundred cubic feet (hcf) of water use.

Based on Proposition 218 requirements, the resulting stage rates are the maximum that the Board of Directors can implement. Additional costs charged by SFPUC above those outlined in this study can be passed through to the District’s customers. Pass-through rates are discussed further in the section below. When officially declaring a water shortage stage, the Board has the discretion to implement a lower stage rate, use reserves to make up for lost revenue, defer capital projects to reduce total expenditures, or a combination of those three strategies to best meet the needs of the District and the communities it serves.

**Table 1-3: Proposed Stage Rates (\$/hcf)**

Line	A Customer Class	B Stage 1	C Stage 2	D Stage 3	E Stage 4	F Stage 5	G Stage 6
1	Single Family Residential						
2	Tier 1	\$2.24	\$4.01	\$5.70	\$7.96	\$12.09	\$24.04
3	Tier 2	\$3.27	\$5.87	\$8.34	\$11.64	\$17.68	\$35.15
4	Tier 3	\$3.95	\$7.09	\$10.09	\$14.08	\$21.38	\$42.52
5	Multi-Family Residential	\$2.98	\$5.35	\$7.60	\$10.61	\$16.11	\$32.05
6	Non-Residential	\$3.17	\$5.70	\$8.10	\$11.31	\$17.17	\$34.16

**Table 1-4** shows the combined quantity charges and stage rates. The Baseline quantity charges (Column B) are based on the District’s CY 2022 water rates. The combined rates are equal to the Baseline quantity charges plus the proposed stage rates for each stage detailed in **Table 1-3**.

**Table 1-4: Proposed Quantity Charges and Stage Rates (\$/hcf)**

Line	A Customer Class	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Single Family Residential							
2	Tier 1	\$10.14	\$12.38	\$14.15	\$15.84	\$18.10	\$22.23	\$34.18
3	Tier 2	\$14.83	\$18.10	\$20.70	\$23.17	\$26.47	\$32.51	\$49.98
4	Tier 3	\$17.94	\$21.89	\$25.03	\$28.03	\$32.02	\$39.32	\$60.46
5	Multi-Family Residential	\$13.52	\$16.50	\$18.87	\$21.12	\$24.13	\$29.63	\$45.57
6	Non-Residential	\$14.41	\$17.58	\$20.11	\$22.51	\$25.72	\$31.58	\$48.57

## Pass-Through Rates

During a water shortage, SFPUC can implement its own water shortage contingency stage rates (independent of the District’s proposed stage rates described in this report), which would be applied as an increased cost per hcf of water. The District can pass on any additional water purchase costs it incurs onto its customers using pass-through rates. If SFPUC implements an additional cost per hcf of water as a result of a water shortage, the District may charge its customers a proportion of that rate based on the percentage of the total water supply purchased from SFPUC. The District’s only other source of water is local surface and groundwater which does not require any additional water supply costs to obtain. Therefore, the proportion of the pass-rate charge will be a direct proportion of how much SFPUC water is purchased to meet demand versus how much water is locally available. The equation below shows an example of a pass through rate when SFPUC is charging an additional \$0.50 per hcf of water and the District is purchasing 90 percent of its water from SFPUC and using 10 percent local water sources to meet the rest of demand.

*\$0.50 per hcf additional cost for SFPUC water x 90% SFPUC water purchases = \$0.45 per hcf pass-through rate applied to quantity charges*

Pass-through rates can be applied if SFPUC increases the cost per unit of water due to a water shortage and are in addition to the District’s quantity charge and stage rates (depending on water shortage contingency stage declared by the District).

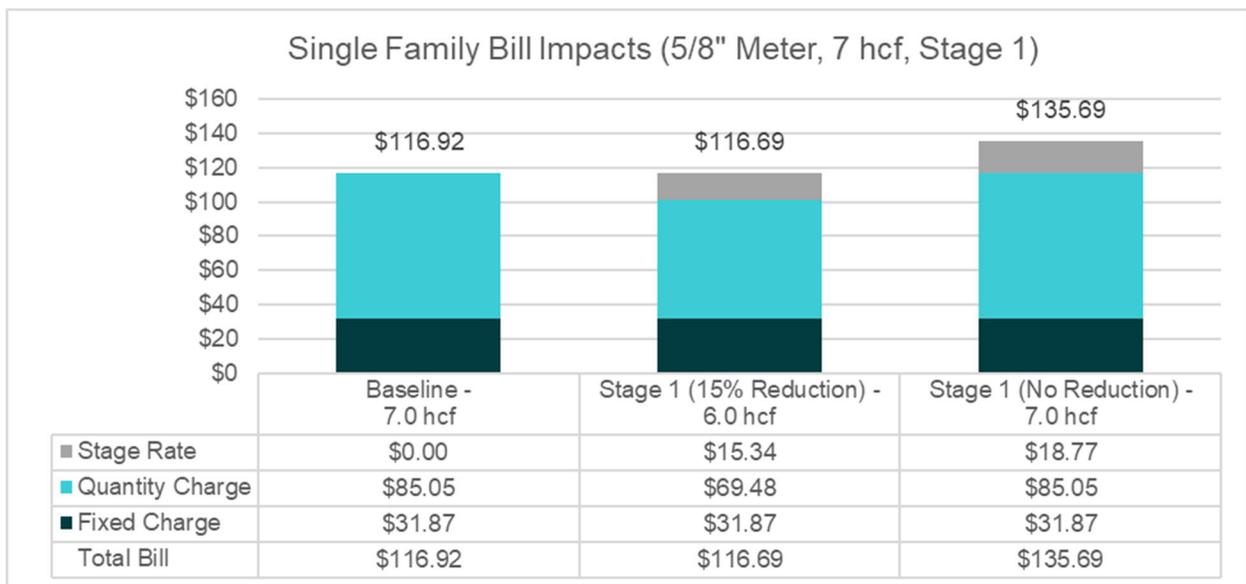
## Customer Impacts

**Figure 1-1, Figure 1-2, and Figure 1-3** show the bill impacts for Stages 1, 2, and 3 of water shortage, respectively, for a Single Family Residential customer with a 5/8” meter using 7 hcf of water per month. The District’s customer base is predominantly residential. Within the Single Family Residential class, the 5/8” meter size is the most common and the average water use per month is approximately 7 hcf.

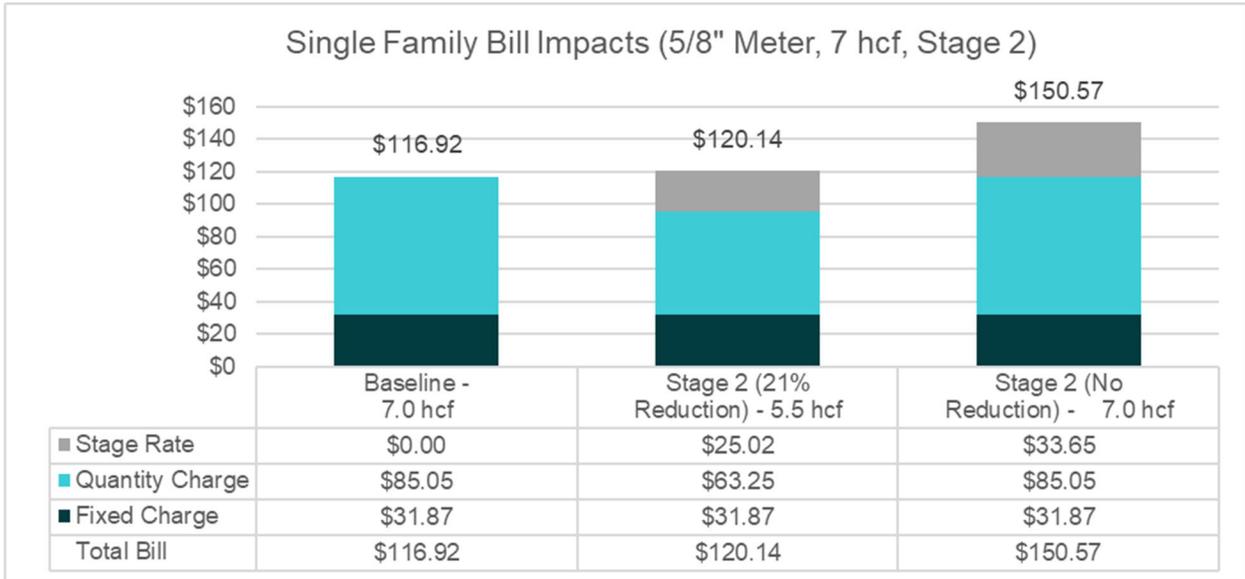
The figures show the impacts in each stage based on the components of the customer bill, which includes the fixed charge by meter size, the quantity charge per hcf of use, and the stage rate per hcf of use. The fixed charge by meter size does not change based on water shortage stages or water usage. The three stacked bars in each figure show the difference between the baseline scenario (no water shortage), the water shortage scenario with commensurate reduction in water use (meaning that the customer reduces their water use based on the declared water shortage stage), and the water shortage scenario without reduction in water use (meaning that the customer does not reduce their water use even when a water shortage stage has been declared).

The figures demonstrate that when the District’s customers comply with the recommended water usage reductions as defined by the Water Shortage Contingency Plan, there will not be a significant impact to their water bill. However, if customers do not comply with the recommended water usage reductions, then the impact to their water bill can be significant. The stage rates are designed to allow the District’s customers to control their water bill, to encourage conservation, and to promote affordability. The results of the customer impact analysis demonstrate the effect of these policy objectives: the customers that reduce their water use based on each water shortage stage will see a minimal impact to their monthly water bill.

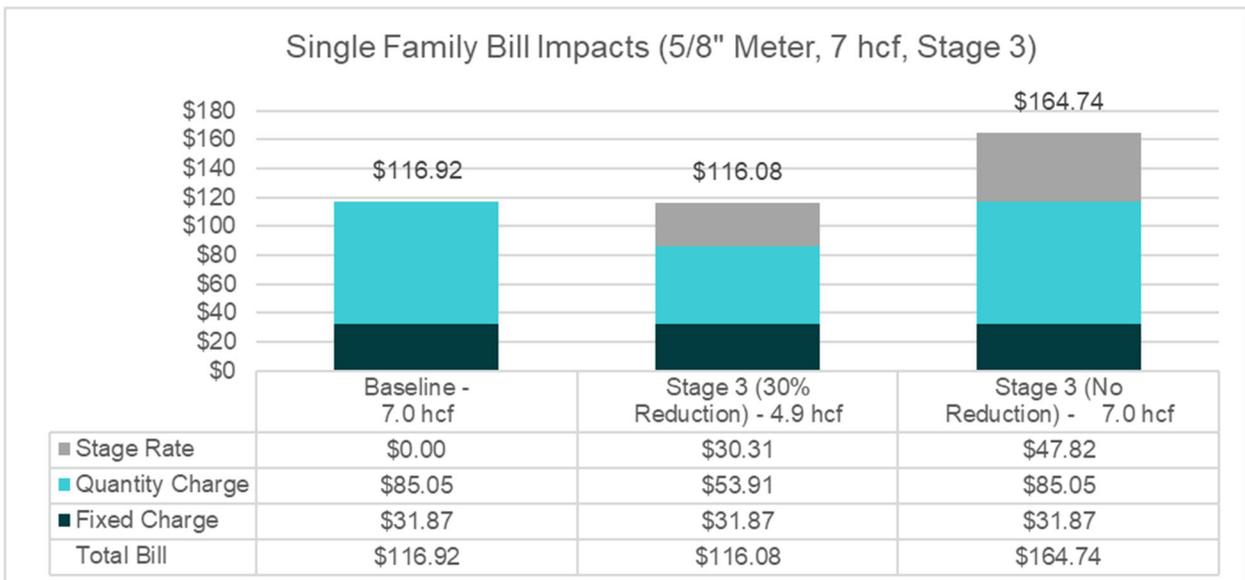
**Figure 1-1: Single Family Residential Customer Impacts (Stage 1)**



**Figure 1-2: Single Family Residential Customer Impacts (Stage 2)**



**Figure 1-3: Single Family Residential Customer Impacts (Stage 3)**



## 2. Water Shortage Allocations and Costs

This section of the report details the water usage allocations and financial impacts of each water shortage stage, which results in the total amount of revenue to be collected from stage rates in each stage. Numbers shown in the tables of this section are rounded. Therefore, hand calculations based on the displayed numbers, such as summing or multiplying, may not equal the exact results shown in this report.

### Water Allocations

The first step in the development of stage rates involves allocating water usage reductions between the District's customer classes based on the water shortage stages defined in the Water Shortage Contingency Plan. **Table 2-1** shows the water usage reductions for Single Family Residential, Multi-Family Residential, and Non-Residential customers for Stages 1 through 6. The water usage reductions for each customer class are designed to meet the target reduction goal for the entire water system in each stage.

**Table 2-1: Water Shortage Stages and Reduction**

Line	A Customer Class	B Stage 1	C Stage 2	D Stage 3	E Stage 4	F Stage 5	G Stage 6
1	Single Family Residential	15%	21%	30%	36%	41%	52%
2	Multi-Family Residential	14%	21%	30%	35%	41%	52%
3	Non-Residential	5%	21%	30%	43%	62%	88%
4							
5	Overall Target Reduction	≤10%	20%	30%	40%	50%	>50%

Water usage by customer class for each water shortage stage are calculated once the water reductions are determined. **Table 2-2** shows the estimated water usage in hcf for each stage of water shortage that aligns with the percent reductions for each class (**Table 2-1**). Baseline use (Column B) is equal to the estimated water use in CY 2022. The percent reduction from Baseline (Line 5) is the difference between the total usage in Stages 1 through 6 compared to the Baseline scenario. Note that the percent reduction from Baseline is approximately equal to the target reduction for the system (**Table 2-1**, Line 5).

**Table 2-2: Estimated Water Usage by Stage**

Line	A Customer Class	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Single Family Residential	425,619	361,776	336,239	297,933	272,396	251,115	204,297
2	Multi-Family Residential	42,781	36,791	33,797	29,946	27,807	25,241	20,535
3	Non-Residential	346,600	329,270	273,814	242,620	197,562	131,708	41,592
4	<b>Total (hcf)</b>	<b>815,000</b>	<b>727,838</b>	<b>643,850</b>	<b>570,500</b>	<b>497,766</b>	<b>408,064</b>	<b>266,424</b>
5	% Reduction from Baseline	0%	11%	21%	30%	39%	50%	67%

**Table 2-3** shows the usage breakdown by tier for Single Family Residential customers that matches the estimated water usage by stage for the entire class (**Table 2-2**, Line 1). The District's customer base is very conservation-oriented and uses a low amount of water per capita, particularly for outdoor irrigation. The usage in the higher tiers is reduced first, with reductions in the first tier occurring only during Stage 6. This methodology prioritizes

usage in the lower tiers (which represents essential water consumption for indoor needs), aligns with the requirements of Article X to maximize the beneficial use of water, and best reflects the usage characteristics and patterns of the District’s customer base.

**Table 2-3: Water Usage by Water Shortage Stage**

Line	A Customer Class	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Single Family Residential	425,619	361,776	336,239	297,933	272,396	251,115	204,297
2	Tier 1	248,638	248,638	248,638	248,638	248,638	248,638	204,297
3	Tier 2	115,905	113,139	87,601	49,296	23,759	2,478	0
4	Tier 3	61,076	0	0	0	0	0	0
5								
6	Multi-Family Residential	42,781	36,791	33,797	29,946	27,807	25,241	20,535
7	Non-Residential	346,600	329,270	273,814	242,620	197,562	131,708	41,592
8	<b>Total (hcf)</b>	<b>815,000</b>	<b>727,838</b>	<b>643,850</b>	<b>570,500</b>	<b>497,766</b>	<b>408,064</b>	<b>266,424</b>

## Financial Impacts

The next step in the stage rate study is to determine the financial impacts to the District during each stage of water shortage. The cost implications of water shortages consider the following:

- Lost quantity charge revenue due to water usage reductions in each water shortage stage
- Potential changes to operating costs, which include water supply sources and the associated costs

For the District, the most significant financial consequence is the loss of consumption-based revenue, the severity of which depends on the water shortage stage. Additionally, water shortage conditions impact the District’s access to local water sources, which necessitates purchasing more expensive imported water from SFPUC to meet customer demands.

The water shortage cost analysis uses CY 2022 rates, shown in **Table 2-4**, to calculate the quantity charge revenue for the Baseline scenario and for Stages 1 through 6. CY 2022 rates will be implemented on January 1, 2022.

**Table 2-4: CY 2022 Quantity Charges (\$/hcf)**

Line	A Quantity Charges (\$/hcf)	B CY 2022
1	Single Family Residential	
2	Tier 1	\$10.14
3	Tier 2	\$14.83
4	Tier 3	\$17.94
5	Multi-Family Residential	\$13.52
6	Non-Residential	\$14.41

**Table 2-5** shows the quantity charge revenue for Stages 1 through 6 compared to the Baseline scenario, which is calculated based on the CY 2022 quantity charges (**Table 2-4**) multiplied by the estimated water usage by water shortage stage for each customer class (**Table 2-3**). The difference in quantity charge revenue (Line 9) is equal to the difference between the Baseline revenue and the estimated revenue for Stages 1 through 6, which represents the amount of lost quantity charge revenue in each stage.

**Table 2-5: Difference in Quantity Charge Revenue**

Line	A Customer Class	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Single Family Residential							
2	Tier 1	\$2,521,186	\$2,521,186	\$2,521,186	\$2,521,186	\$2,521,186	\$2,521,186	\$2,071,573
3	Tier 2	\$1,718,878	\$1,677,846	\$1,299,130	\$731,056	\$352,340	\$36,743	\$0
4	Tier 3	\$1,095,703	\$0	\$0	\$0	\$0	\$0	\$0
5	Multi-Family Residential	\$578,394	\$497,419	\$456,931	\$404,876	\$375,956	\$341,252	\$277,629
6	Non-Residential	\$4,994,510	\$4,744,784	\$3,945,663	\$3,496,157	\$2,846,871	\$1,897,914	\$599,341
7	<b>Total</b>	<b>\$10,908,671</b>	<b>\$9,441,234</b>	<b>\$8,222,909</b>	<b>\$7,153,274</b>	<b>\$6,096,352</b>	<b>\$4,797,095</b>	<b>\$2,948,544</b>
8								
9	<b>Difference in Quantity Charge Revenue</b>		<b>\$1,467,437</b>	<b>\$2,685,762</b>	<b>\$3,755,397</b>	<b>\$4,812,319</b>	<b>\$6,111,576</b>	<b>\$7,960,127</b>

Based on the Water Shortage Contingency Plan, the availability of water from the District’s water supply sources are also impacted due to water shortage. The District currently has two sources of water: local water (surface and groundwater) and imported water purchased from SFPUC. The amount of water available to the District from local water sources is reduced during water shortage conditions, meaning that the District must purchase imported water from SFPUC to meet customer demand.

**Table 2-6** shows the percentage of water supplied by local water and imported water from SFPUC. A significant portion of demand is met using local water during normal conditions. However, under water shortage conditions, the availability of local water is reduced. Beginning in Stage 2, local water sources are depleted, and the District is fully reliant on imported water from SFPUC.

**Table 2-6: Water Supply Sources**

Line	A Water Supply Sources	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Local Water	38%	10%	0%	0%	0%	0%	0%
2	SFPUC	62%	90%	100%	100%	100%	100%	100%

**Table 2-7** shows the water produced from both sources during each stage of water shortage. Water demand (Line 1) is equal to the total estimated water usage for all classes in each stage (**Table 2-3**, Line 8). Water production (Line 3) is equal to water demand plus a portion of system water loss (Line 2). The amount of water produced from each source is based on the percentages from **Table 2-6**.

Although total water production in Stages 1 through 3 is less than Baseline, the amount of water purchased from SFPUC in those stages are actually greater than the amount purchased in the Baseline scenario due to the shifts in water supply availability by source. The District is expected to purchase less water from SFPUC in Stages 4 through 6 compared to the Baseline scenario.

**Table 2-7: Water Production by Source**

Line	A Water Production	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Water Demand (hcf)	815,000	727,838	643,850	570,500	497,766	408,064	266,424
2	System Water Loss	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
3	Water Production (hcf)	886,834	791,989	700,598	620,783	541,639	444,030	289,906
4								
5	Local Water	336,997	79,199	0	0	0	0	0
6	SFPUC	549,837	712,790	700,598	620,783	541,639	444,030	289,906
7	<b>Total (hcf)</b>	<b>886,834</b>	<b>791,989</b>	<b>700,598</b>	<b>620,783</b>	<b>541,639</b>	<b>444,030</b>	<b>289,906</b>

**Table 2-8** shows the estimated water purchase costs from SFPUC for each water shortage stage. The District purchases raw water from SFPUC, which is reflected in the variable rate per hcf of water (Line 1). The amount of water purchased (Line 3) is based on the amount of water produced from SFPUC (**Table 2-7**, Line 6). The water purchase costs (Line 4) are calculated by multiplying the variable rate by the amount of water purchased. The difference in water purchase costs (Line 6) is equal to the difference between the water purchase costs from SFPUC in Stages 1 through 6 compared to the Baseline scenario.

In Stages 1 through 3, due to the reduction in local water supply availability, the costs of purchasing water from SFPUC are greater than in the Baseline scenario. In Stages 4 through 6, the District will see cost savings for purchased water due to significant reductions in water use.

**Table 2-9** shows the total water shortage costs for Stages 1 through 6, which include the lost quantity charge revenue (**Table 2-5**, Line 9) and the difference in water purchase costs from SFPUC (**Table 2-8**, Line 6). The total water shortage costs are the amount of revenue that the proposed stage rates are designed to recover.

**Table 2-10** shows the water shortage revenue requirement and the resulting percent increase needed to recover the necessary water shortage costs. The expected revenue (Line 1) is based on the estimated quantity charge revenue for each stage (**Table 2-5**, Line 7). The water shortage revenue requirement (Line 2) is equal to the expected quantity charge revenue plus the total water shortage costs in each stage (**Table 2-9**, Line 3). The percent increase (Line 3) is calculated based on the percent difference between the water shortage revenue requirement and the expected quantity charge revenue for each stage. For example, the following formula is used to derive the percent increase for Stage 1:

$$\frac{[\text{Stage 1 water shortage revenue requirement (Column C, Line 2)} - \text{Stage 1 expected quantity charge revenue (Column C, Line 1)}]}{\text{Stage 1 expected quantity charge revenue (Column C, Line 1)}}$$

**Table 2-8: SFPUC Water Purchase Costs**

Line	A Water Purchase Costs	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	SFPUC Variable Rate (\$/hcf)	\$3.74	\$3.74	\$3.74	\$3.74	\$3.74	\$3.74	\$3.74
2								
3	Water Purchased (hcf)	549,837	712,790	700,598	620,783	541,639	444,030	289,906
4	Water Purchase Costs from SFPUC	\$2,056,390	\$2,665,835	\$2,620,238	\$2,321,730	\$2,025,728	\$1,660,674	\$1,084,250
5								
6	<b>Difference in Water Purchase Costs</b>		<b>\$609,445</b>	<b>\$563,849</b>	<b>\$265,341</b>	<b>(\$30,662)</b>	<b>(\$395,716)</b>	<b>(\$972,140)</b>

**Table 2-9: Water Shortage Costs**

Line	A Water Shortage Costs to be Recovered	B Stage 1	C Stage 2	D Stage 3	E Stage 4	F Stage 5	G Stage 6
1	Difference in Quantity Charge Revenues	\$1,467,437	\$2,685,762	\$3,755,397	\$4,812,319	\$6,111,576	\$7,960,127
2	Difference in Water Purchase Costs	\$609,445	\$563,849	\$265,341	(\$30,662)	(\$395,716)	(\$972,140)
3	<b>Total</b>	<b>\$2,076,882</b>	<b>\$3,249,610</b>	<b>\$4,020,738</b>	<b>\$4,781,657</b>	<b>\$5,715,860</b>	<b>\$6,987,987</b>

**Table 2-10: Water Shortage Revenue Requirement**

Line	A Water Shortage Revenue Requirement	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Expected Revenue	\$10,908,671	\$9,441,234	\$8,222,909	\$7,153,274	\$6,096,352	\$4,797,095	\$2,948,544
2	Water Shortage Revenue Requirement	\$10,908,671	\$11,518,116	\$11,472,520	\$11,174,012	\$10,878,009	\$10,512,955	\$9,936,531
3	% Increase		22%	40%	56%	78%	119%	237%

# 3. Stage Rates

This section of the report discusses the policy objectives, analyses, and rationale used to determine the stage rate structure and proposed stage rates in each stage. Numbers shown in the tables of this section are rounded. Therefore, hand calculations based on the displayed numbers, such as summing or multiplying, may not equal the exact results shown in this report.

## Stage Rate Structure

Stage rates are designed to recover the financial impacts due to water shortages and are intended as a revenue-generating mechanism. Due to this, stage rates are subject to Proposition 218 requirements, which necessitates a clear nexus between the costs of water shortage and the stage rates charged to the District’s customers.

The next step after determining the water shortage costs by stage is evaluating the water shortage cost recovery mechanism, or stage rate structure, that best meets the needs of the District and its customers. In this study, Raftelis evaluated three options to recover water shortage costs:

1. Uniform quantity charge: the same charge per hcf of water is applied to all quantity charges, regardless of customer class or tier
2. Uniform percent increase to quantity charge: the same percentage increase is applied to all quantity charges, regardless of customer class or tier
3. Fixed charge based on meter size: a monthly fixed charge by meter size, which is not tied to usage, is applied to customer bills

Figure 3-1 shows the policy objectives considered for each stage rate structure. Raftelis worked closely with District staff and the Board of Directors to select the stage rate structure that best meets the policy objectives of the District, which includes allowing customers the option to control their water bills, promoting affordability (especially for beneficial use), and encouraging conservation according to meet the reduction targets in each water shortage stage. Based on direction from the Board of Directors and District staff, Raftelis recommends the uniform percent increase to the quantity charge, which is the stage rate structure best suited to meet the District’s needs.

**Figure 3-1: Policy Objectives for Stage Rate Structures**

Policy Objectives	Uniform Quantity Charge	Uniform Percentage	Monthly Fixed Meter Charge
Easy to understand and administer	★★	★★	★★★
Stability and guaranteed recovery of revenue	★★	★	★★★
Ability to change the bill	★★	★★★	★
Targeted use and conservation	★★	★★★	★
Promotes affordability	★★	★★★	★

## Proposed Stage Rates

**Table 3-1** shows the proposed stage rates for each customer class for Stages 1 through 6. The stage rates for each water shortage stage are calculated based on a percentage increase that is applied to the CY 2022 quantity charges for each customer class. The CY 2022 quantity charges for each class and tier (**Table 2-4**) are multiplied by the percent increase for each water shortage stage (**Table 2-10**) to determine the stage rate.

Based on Proposition 218 requirements, the resulting stage rates are the maximum that the Board of Directors can implement. Additional costs charged by SFPUC above those outlined in this study can be passed through to the District’s customers. When officially declaring a water shortage stage, the Board has the discretion to implement a lower stage rate, use reserves to make up for lost revenue, defer capital projects to reduce total expenditures, or a combination of those three strategies to best meet the needs of the District and the communities it serves.

**Table 3-1: Proposed Stage Rates (\$/hcf)**

Line	A Customer Class	B Stage 1	C Stage 2	D Stage 3	E Stage 4	F Stage 5	G Stage 6
1	Single Family Residential						
2	Tier 1	\$2.24	\$4.01	\$5.70	\$7.96	\$12.09	\$24.04
3	Tier 2	\$3.27	\$5.87	\$8.34	\$11.64	\$17.68	\$35.15
4	Tier 3	\$3.95	\$7.09	\$10.09	\$14.08	\$21.38	\$42.52
5	Multi-Family Residential	\$2.98	\$5.35	\$7.60	\$10.61	\$16.11	\$32.05
6	Non-Residential	\$3.17	\$5.70	\$8.10	\$11.31	\$17.17	\$34.16

**Table 3-2** shows the combined quantity charges and stage rates. The Baseline quantity charges (Column B) are based on the District’s CY 2022 water rates (**Table 2-4**). The combined rates are equal to the Baseline quantity charges plus the proposed stage rates for each stage detailed in **Table 3-1**.

**Table 3-2: Proposed Quantity Charges and Stage Rates (\$/hcf)**

Line	A Customer Class	B Baseline	C Stage 1	D Stage 2	E Stage 3	F Stage 4	G Stage 5	H Stage 6
1	Single Family Residential							
2	Tier 1	\$10.14	\$12.38	\$14.15	\$15.84	\$18.10	\$22.23	\$34.18
3	Tier 2	\$14.83	\$18.10	\$20.70	\$23.17	\$26.47	\$32.51	\$49.98
4	Tier 3	\$17.94	\$21.89	\$25.03	\$28.03	\$32.02	\$39.32	\$60.46
5	Multi-Family Residential	\$13.52	\$16.50	\$18.87	\$21.12	\$24.13	\$29.63	\$45.57
6	Non-Residential	\$14.41	\$17.58	\$20.11	\$22.51	\$25.72	\$31.58	\$48.57

## Customer Impacts

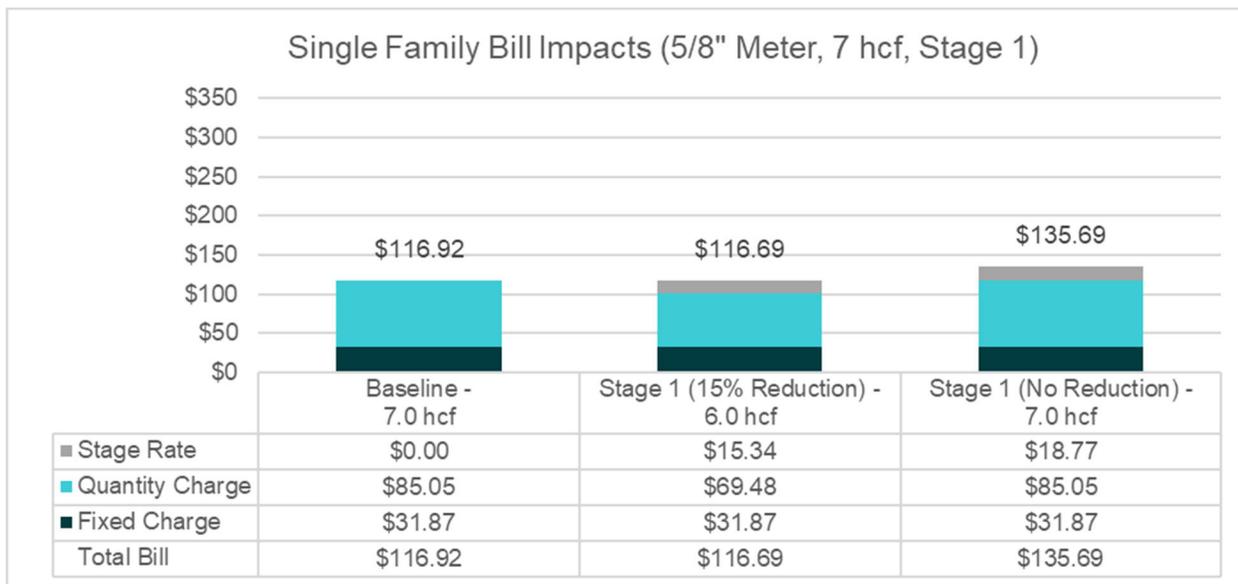
**Figure 3-2** through **Figure 3-7** show the bill impacts for Stages 1 through 6, respectively, for a Single Family Residential customer with a 5/8” meter using 7 hcf of water per month. The District’s customer base is predominantly residential. Within the Single Family Residential class, the 5/8” meter size is the most common and the average water use per month is approximately 7 hcf.

The figures show the impacts in each stage based on the components of the customer bill, which includes the fixed charge by meter size, the quantity charge per hcf of use, and the water shortage charge per hcf of use. The fixed charge by meter size does not change based on water shortage stages or water usage. The three stacked bars in each

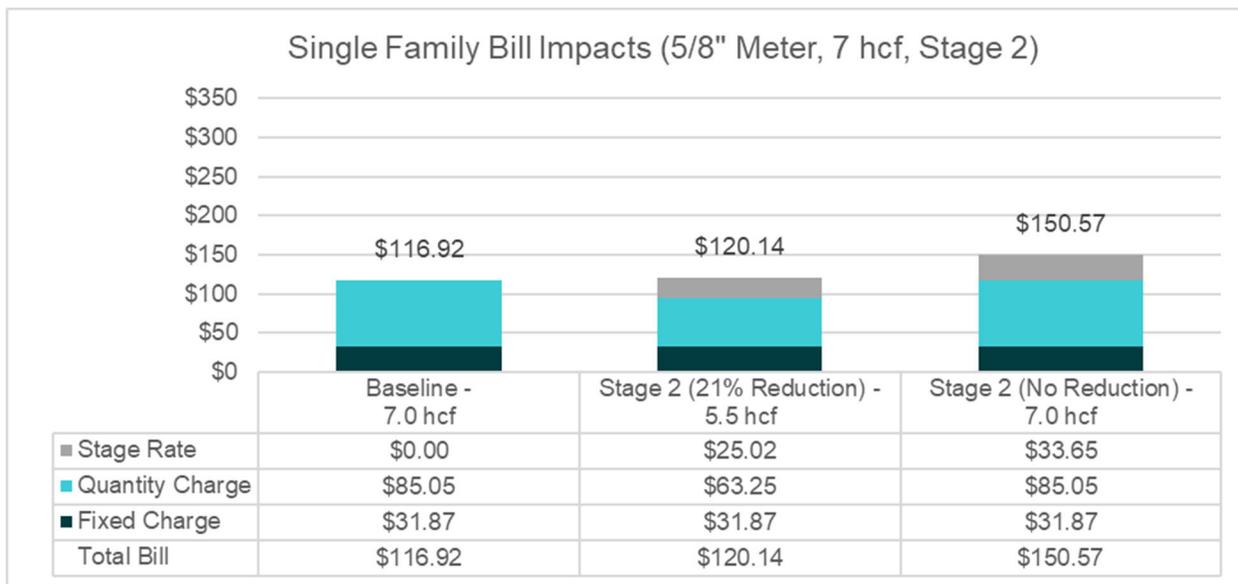
figure show the difference between the baseline scenario (no water shortage), the water shortage scenario with commensurate reduction in water use (meaning that the customer reduces their water use based on the declared water shortage stage), and the water shortage scenario without reduction in water use (meaning that the customer does not reduce their water use even when a water shortage stage has been declared).

The figures demonstrate that when the District’s customers comply with the recommended water usage reductions as defined by the Water Shortage Contingency Plan, the impact to customer bills will be minimal in Stages 1 through 4 and reasonable in Stages 5 and 6 given the severity of the water use reductions. However, if customers do not comply with the recommended water usage reductions, then the impact to their water bill can be significant.

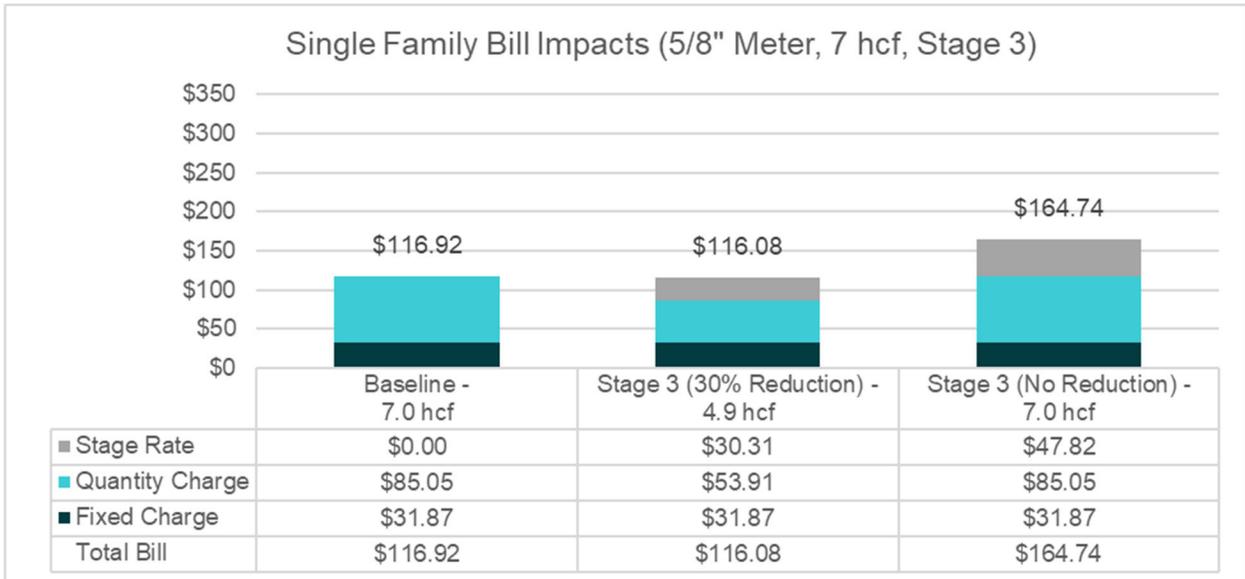
**Figure 3-2: Single Family Residential Customer Impacts (Stage 1)**



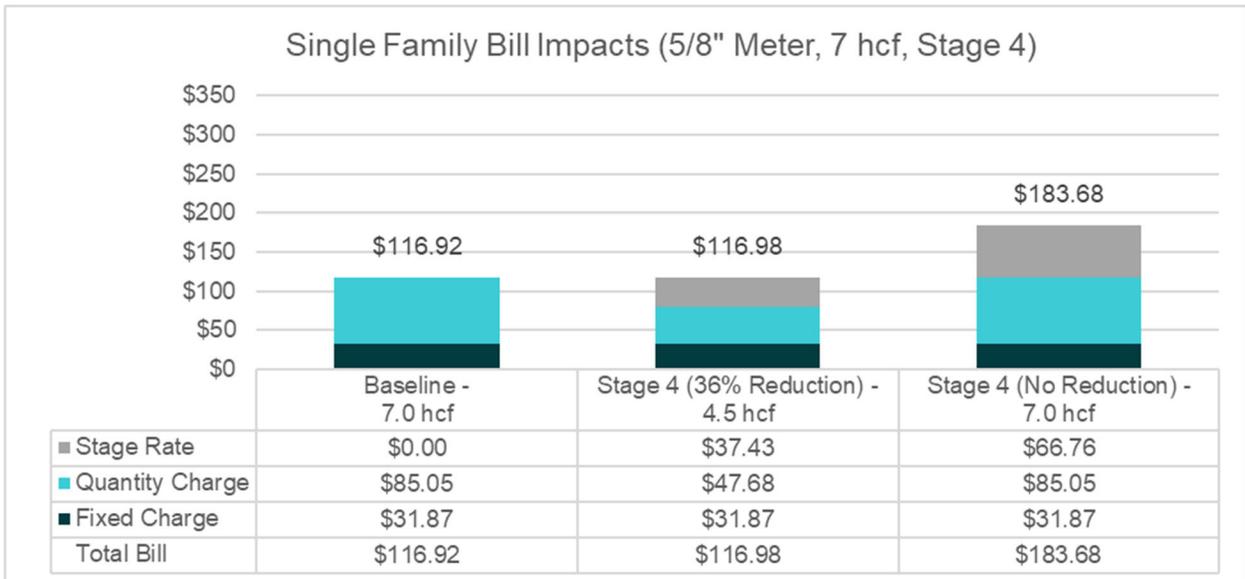
**Figure 3-3: Single Family Residential Customer Impacts (Stage 2)**



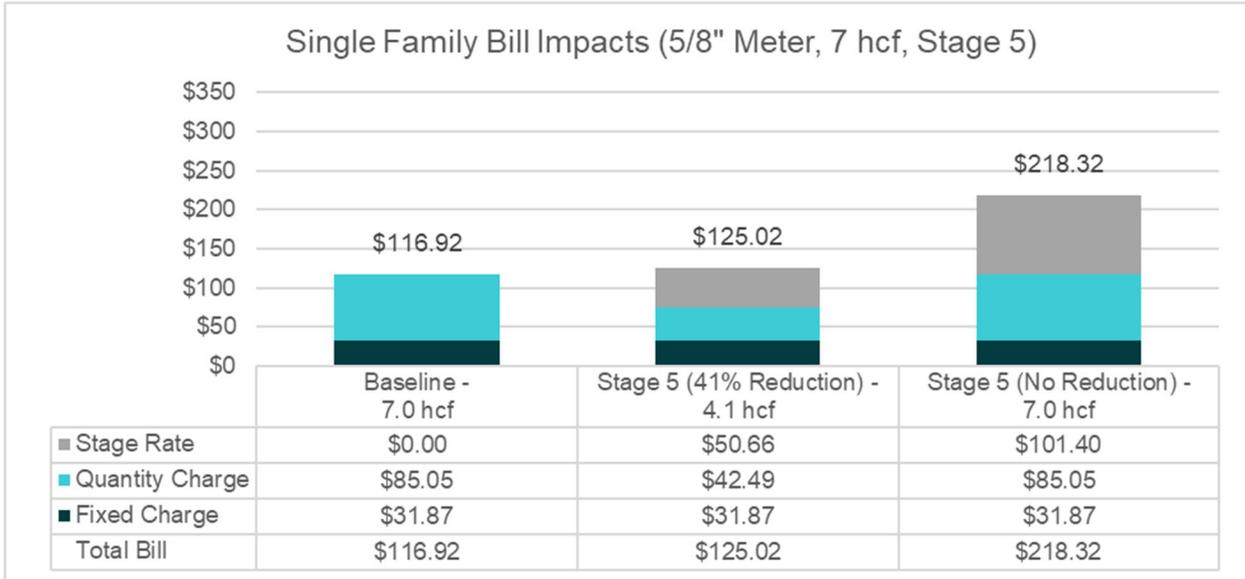
**Figure 3-4: Single Family Residential Customer Impacts (Stage 3)**



**Figure 3-5: Single Family Residential Customer Impacts (Stage 4)**



**Figure 3-6: Single Family Residential Customer Impacts (Stage 5)**



**Figure 3-7: Single Family Residential Customer Impacts (Stage 6)**

