



BIGHORN DESERT VIEW WATER AGENCY

Final Report

Water Rate Study

February 2021

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Section 1. PURPOSE AND OVERVIEW OF THE STUDY

A. Purpose

Bighorn Desert View Water Agency (Agency, BDVWA) retained NBS to conduct a water rate study for a number of reasons, including meeting revenue requirements and updating the water rate structure. The rates resulting from this study were developed in a manner that is consistent with industry standard cost of service principles. In addition to documenting the rate study methodology, this report is provided with the intent of assisting the Agency to maintain transparent communications with its residents and businesses.

In developing new water rates, NBS worked cooperatively with Agency staff and the Agency's Board of Directors (Board) in selecting appropriate rate alternatives. Based on input from Agency staff and the Board, the proposed water rates are summarized in this report.

B. Overview of the Study

Comprehensive rate studies such as this one typically include the following three components, as outlined in **Figure 1**:

1. Preparation of a **Financial Plan**, which identifies the net revenue requirements for the utility.
2. **Cost of Service Analysis**, which determines the cost of providing water service to each customer class.
3. **Rate Design Analysis**, which evaluates different rate design alternatives.

Figure 1. Primary Components of a Rate Study



These steps are intended to follow industry standards and reflect the fundamental principles of cost-of-service rate making embodied in the American Water Works Association (AWWA) Principles of Water Rates, Fees, and Charges¹, also referred to as the M1 Manual. They also address requirements under Proposition 218 that rates not exceed the cost of providing the service, and that they be proportionate to the cost of providing service for all customers. In terms of the chronology of the study, these three steps represent the

¹ Principles of Water Rates, Fees, and Charges, Manual of Water Supply Practices, M1, AWWA, seventh edition, 2017.

order they were performed. Detailed tables and figures documenting the development of the proposed rates are provided in Appendix A.

FINANCIAL PLAN

As a part of this rate study, NBS projected revenues and expenditures on a cash flow basis for the next five years. The amount of rate revenue required that will allow capital projects to be funded and reserves to be maintained at the approved levels, is known as the *net revenue requirement*. Although current rate revenue covers all the net revenue requirements, rate adjustments -- or more accurately, adjustments in the total revenue collected from water rates -- are recommended in order to fund planned capital improvement projects and keep reserve funds at healthy levels. This report presents an overview of the methodologies, assumptions, and data used, along with the financial plans and proposed rates developed in this study².

RATE DESIGN ANALYSIS

Rate Design is typically the stage in the study where NBS, staff and the Board must work closely together, to develop rate alternatives that will meet the Agency's objectives. It is important for the Agency to send proper price signals to its customers about the actual cost of their water usage. This objective is typically addressed through both the magnitude of the rates, and the rate structure design. In other words, both the amount of revenue collected and the way in which the revenue is collected from customers are important to consider.

Several criteria are typically considered in setting rates and developing sound rate structures. The fundamentals of this process have been documented in several rate-setting manuals, such as the AWWA Manual M1. The foundation for evaluating rate structures is generally credited to James C. Bonbright in the *Principles of Public Utility Rates*³ which outlines pricing policies, theories, and economic concepts along with various rate designs. The following is a simplified list of the attributes of a sound structure:

- Rates should be easy to understand from the customer's perspective.
- Rates should be easy to administer from the utility's perspective.
- Rates should promote the efficient allocation of the resource.
- Rates should be equitable and non-discriminating (that is, cost based).
- There should be continuity in the ratemaking philosophy over time.
- Rates should address other utility policies (for example, encouraging conservation & economic development).
- Rates should provide month-to-month and year-to-year revenue stability.

The following are the basic rate design criteria that were considered in this study:

Rate Structure Basics –The vast majority of water rate structures contain a fixed or minimum charge in combination with a volumetric charge. The revenue requirements for each customer class are collected from both fixed monthly meter charges and variable commodity charges. Based on direction from the Board of Directors, the rates proposed in this report are designed to collect 60 percent of rate revenue from the fixed meter charges and 40 percent from the variable commodity charges.

² The complete financial plan is set forth in the Appendix.

³ James C. Bonbright; Albert L. Danielsen and David R. Kamerschen, *Principles of Public Utility Rates*, (Arlington, VA: Public Utilities Report, Inc., Second Edition, 1988), p. 383-384.

Fixed Charges – Fixed charges can be called base charges, minimum monthly charges, customer charges, fixed meter charges, etc. Fixed charges for water utilities typically increase by meter size based on meter equivalent capacity factors. BDVWA refers to this as the Basic Service Charge.

Volumetric (Consumption-Based) Charges – In contrast to fixed charges, variable costs such as purchased water, the cost of electricity used in pumping water, and the cost of chemicals for treatment tend to change with the quantity of water produced. For a water utility, variable charges are generally based on metered consumption and charged on a dollar-per-unit cost (for example, per 100 cubic feet, or hcf).

Uniform (Single-Tier) Water Rates – There are significant variations in the basic philosophy of variable charge rate structure alternatives. Under a uniform (single tier) rate structure, the cost per unit does not change with consumption, and provides a simple and straightforward approach from the perspective of customers regarding their understanding of the rates, and for the utility’s administration and billing of the rates.

Multi-Tiered Water Rates – In contrast to a uniform tier, an inclining block rate structure attempts to send a price signal to customers that their consumption costs are greater as more water is consumed. Tiered water rates are intended to represent the higher costs for customers that contribute more to peak summertime usage and place greater demands on the system. The types of higher costs reflected, for example, in the *highest* tier of the rate structure may include:

- Conservation program costs: intended to encourage customers to eliminate inefficient and wasteful water use, and otherwise reduce consumption during peak periods.
- Replacement Water costs: when consumption exceeds the amount of the Agency’s allocated water rights, the agency incurs additional costs for replacement water in order to meet that increased demand. That replacement water comes at a higher cost.
- Energy costs: during summer months, the Agency may pay more in electric charges to pump, treat and deliver water, and have a higher percentage of its energy bill in higher electricity “tiers”.
- Higher maintenance costs: peak periods tend to have higher numbers of service calls, capacity costs, and system maintenance issues when the water system is running at peak demand.

Section 2. WATER RATE STUDY

A. Key Water Rate Study Issues

The Agency's water rate analysis was undertaken with a few specific objectives, including, but not limited to:

- Avoiding operational deficits and further depletion of reserves.
- Generating additional revenue needed to meet projected funding requirements.
- Continuing to encourage water conservation with a tiered rate structure for residential and agriculture customers.

NBS developed various water rate alternatives as requested by Agency staff over the course of this study. All rate structure alternatives relied on industry standards and cost-of-service principles. The rate alternative that will be implemented, is ultimately the decision of the Board of Directors. The fixed and volume-based charges were calculated based on the net revenue requirements, number of customer accounts, water consumption, and other Agency-provided information.

B. Financial Plan

It is important for municipal utilities to maintain reasonable reserves in order to handle emergencies, fund working capital, maintain a good credit rating, and generally follow healthy financial management practices. Rate adjustments are governed by the need to meet operating and capital costs, maintain adequate debt coverage, and build reasonable reserve funds. The current financial condition of the Agency, with regard to these objectives, is as follows:

- **Meeting Net Revenue Requirements:** For FY 2020/21 through FY 2024/25, the projected net revenue requirement (that is, total annual expenses plus debt service and rate-funded capital costs, less non-rate revenues) for the Agency is approximately \$1.66 million, annually on average. If no rate adjustments are implemented, the Agency is projected to see a \$131,500 deficit by fiscal year 2024/25. With 4% increases to the net revenue requirement, the Agency will see an annual surplus that grows to \$182,000 in fiscal year 2024/25 that will be used to replenish reserve funds as capital investments are made in the water system.
- **Building and Maintaining Reserve Funds:** Reserve funds provide a basis for a utility to cope with fiscal emergencies such as revenue shortfalls, asset failure, and natural disasters, among other events. Reserve policies provide 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. The Agency plans to accumulate approximately \$3,790,000 in reserves by the end of FY 2024/25. These reserve funds for the Utility are considered unrestricted reserves and consist of the following:
 - **The Operating Reserve** should equal approximately 180 days of operating expenses, which is about \$1,000,000 at the end of FY 2024/25. An Operating Reserve is intended to promote financial viability in the event of any short-term fluctuation in revenues and/or expenditures. Fluctuations in revenue can be caused by weather patterns, the natural inflow and outflow of cash during billing cycles, natural variability in demand-based revenue

streams (such as volumetric charges), and – particularly in periods of economic distress – changes or trends in age of receivables.

- **The Emergency Contingencies Reserve** should equal a minimum of \$200,000. This reserve shall be authorized by the Board should cash be needed immediately for needs such as water system repairs or unforeseen circumstances.
- **The Capital Replacement and Refurbishment Reserve** should equal at least 10 percent of net capital assets plus \$1,500,000 for capital emergencies, totaling approximately \$2,180,000 in FY 2024/25, which is set aside to address long-term capital system replacement and rehabilitation needs.
- **Funding Capital Improvement Projects:** The District must also be able to fund necessary capital improvements in order to maintain current service levels. Agency staff has identified roughly \$800,000 (current year dollars) in expected capital expenditures for FY 2020/21 through 2024/25. With the recommended rate adjustments, these expenditures can be funded.
- **Inflation and Growth Projections** – Assumptions regarding cost inflation were made in order to project future revenues and expenses for the study period. The following inflation factors were used in the analysis:
 - No Customer growth over the 5-year rate period is estimated in order to maintain a conservative approach.
 - Electricity cost inflation is 3.5% annually.
 - General cost inflation is 2% annually.
 - Salary cost inflation is 3.3% annually.
 - Benefits cost inflation is 6% annually.
 - Fuel cost inflation is 1% annually.
- **Impact of Annual Rate Adjustment Date:** In the current year, the Agency will only collect two months of the planned revenue increase for FY 2020/21 since rate increases will not be effective until May 1, 2021. However, in future years of the rate plan, the financial plan modeling assumes that rate adjustments occur starting on the January bill of each year. This means that only six months of the planned revenue to be collected from the rate adjustment listed for one fiscal year will be collected in that year. For example, there is a 4 percent adjustment in rate revenue planned for FY 2020/21; meaning, the rates are developed to recover \$1.68 million, which is a 4 percent adjustment over the expected \$1.62 million that would be collected without a rate adjustment. However, because of the timing for when the rates will go into effect, the Financial Plan results in \$1.63 million in rate revenue for FY 2020/21.

Rate adjustments of 4 percent annually in FY 2020/21 through FY 2024/25 will be needed in order to fully fund all operating expenses, planned capital projects, debt service obligations and keep reserves above the recommended targets through FY 2024/25⁴. **Figure 2** summarizes the sources and uses of funds, net revenue requirements, and the recommended annual percent adjustments in total rate revenue recommended for the next 5 years for the Agency.

⁴ Because of the mid-year adjustment to the rates, the full impact of each year's adjustment does not affect revenue until the following year.

Figure 2. Summary of Water Revenue Requirements

Summary of Sources and Uses of Funds and Net Revenue Requirements	Budget	Projected			
	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Sources of Water Funds					
Rate Revenue Under Prevailing Rates	\$ 1,618,617	\$ 1,618,617	\$ 1,618,617	\$ 1,618,617	\$ 1,618,617
<i>Additional Revenue from Rate Increases</i> ¹	10,791	98,412	167,093	238,521	312,807
Non-Rate Revenues	289,832	289,832	289,832	289,832	289,832
Interest Earnings	16,000	6,741	6,825	6,981	7,209
Total Sources of Funds	\$ 1,935,240	\$ 2,013,602	\$ 2,082,367	\$ 2,153,952	\$ 2,228,465
Uses of Water Funds					
Operating Expenses	\$ 1,850,115	\$ 1,868,584	\$ 1,926,253	\$ 1,986,073	\$ 2,046,138
Debt Service	25,000	25,000	25,000	-	-
Rate-Funded Capital Expenses	-	-	52,665	-	-
Total Use of Funds	\$ 1,875,115	\$ 1,893,584	\$ 2,003,918	\$ 1,986,073	\$ 2,046,138
Surplus (Deficiency) after Rate Increase	\$ 60,125	\$ 120,018	\$ 78,449	\$ 167,879	\$ 182,327
Projected Annual Rate Increase	4.00%	4.00%	4.00%	4.00%	4.00%
<i>Cumulative Rate Increases</i>	4.00%	8.16%	12.49%	16.99%	21.67%
Surplus (Deficiency) before Rate Increase	\$ 49,334	\$ 21,606	\$ (88,644)	\$ (70,643)	\$ (130,480)
Net Revenue Requirement ²	\$ 1,569,283	\$ 1,597,011	\$ 1,707,261	\$ 1,689,260	\$ 1,749,097

1. Revenue from rate increases assume an implementation date of May 1, 2021 and then January 1st, 2022 through 2025.

2. Total Use of Funds less non-rate revenues and interest earnings. This is the annual amount needed from water rates.

Figure 3 summarizes the projected reserve fund balances and reserve targets. A summary of the Agency's proposed 5-year financial plan is included in Tables 1 and 2 of Appendix A. The appendix tables include revenue requirements, reserve funds, revenue sources, proposed rate adjustments, and the Agency's capital improvement program. As can be seen in Figure 3, given proposed rate adjustments, reserves meet the minimum target all 5 years of the prop 218 rate period.

Figure 3. Summary of Reserve Funds

Beginning Reserve Fund Balances and Recommended Reserve Targets	Budget	Projected			
	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Operating Reserve Fund (Current Customer Deposits)					
Ending Balance	\$ 912,385	\$ 921,493	\$ 949,933	\$ 979,433	\$ 1,009,054
<i>Recommended Minimum Target</i>	912,385	921,493	949,933	979,433	1,009,054
Emergency Contingencies Reserve Fund					
Ending Balance	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
<i>Recommended Minimum Target</i>	200,000	200,000	200,000	200,000	200,000
Replacement & Refurbishment Reserve Fund					
Ending Balance	\$ 2,258,258	\$ 2,290,793	\$ 2,340,803	\$ 2,425,132	\$ 2,577,838
<i>Recommended Minimum Target</i>	2,033,750	2,086,438	2,118,390	2,151,935	2,181,602
Total Ending Balance	\$ 3,370,643	\$ 3,412,287	\$ 3,490,736	\$ 3,604,565	\$ 3,786,892
Total Recommended Minimum Target	\$ 3,146,135	\$ 3,207,931	\$ 3,268,323	\$ 3,331,368	\$ 3,390,656

C. Cost of Service Analysis

Once the net revenue requirements are determined, the cost-of-service analysis proportionately distributes the revenue requirements to each customer class. The cost-of-service analysis consists of two major

components: (1) the classification of expenses, and (2) the allocation of costs to customer classes. Costs were classified corresponding to the function they serve.

All costs in the Agency's budget are allocated to each component of the rate structure in proportion to the level of service required by customers. The levels of service are related to volumes of peak and non-peak demand, infrastructure capacity, and customer service. These are based on allocation factors, such as water consumption, peaking factors, and number of accounts by meter size. Ultimately, a cost-of-service analysis is intended to result in rates that are proportional to the cost of providing service to each customer.

CLASSIFICATION OF COSTS

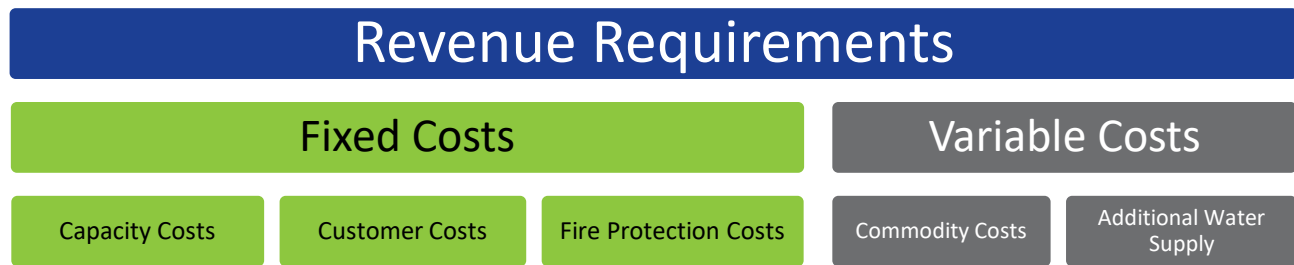
Most costs are not typically allocated 100 percent to fixed or variable categories and, therefore, are allocated to multiple functions of water service. Costs were classified using the commodity-demand method which is found in the AWWA M1 Manual⁵. In accordance with this method, budgeted costs were "classified" into five categories: commodity, additional water supply, capacity, customer and fire protection. The classification process provides the basis for allocating costs to various customer classes based on the cost causation (classification) components described below:

- **Commodity related costs** are those that change as the volume of water produced and delivered changes. These commonly include the costs of chemicals used in the treatment process, energy related to pumping for transmission and distribution, and source of supply.
- **Additional water supply related costs** are associated with the additional water purchased by the Agency to serve its customers.
- **Capacity related costs** are associated with sizing facilities to meet the maximum, or peak demand. This includes both operating costs and capital infrastructure costs incurred to accommodate peak system capacity events.
- **Customer related costs** are associated with having a customer on the water system, such as meter reading, postage and billing.
- **Fire Protection related costs** are associated with providing sufficient capacity in the system for fire meters and other operations and maintenance costs of providing water to properties for private fire service protection.

The Agency's budgeted costs were reviewed and allocated to these cost causation components which are used as the basis for establishing new water rates and translate to fixed and variable charges. Tables 15 through 18 in Appendix A show how the Agency's expenses were classified and allocated to these cost causation components. Additionally, each cost causation component is considered fixed or variable, as summarized in **Figure 4**.

⁵ *Principles of Water Rates, Fees, and Charges, Manual of Water Supply Practices, M1, AWWA, seventh edition, 2017, p. 83.*

Figure 4. Cost Classification Summary



Ideally, utilities should recover all their fixed costs from fixed charges and all of their variable costs from volumetric charges. When this is the case, fluctuations in water sales revenues would be directly offset by reductions or increases in variable expenses. When rates are set in this manner, they provide greater revenue stability for the utility. However, other factors are often considered when designing water rates such as community values, water conservation goals, ease of understanding, and ease of administration.

Based on the Agency's projected costs, the Cost-of-Service Analysis (COSA) resulted in a distribution that is approximately 65 percent fixed and 35 percent variable. The Agency's current rate structure collects approximately 41 percent of revenue from fixed charges and 59 percent from variable charges. The Board of Directors has chosen to move forward with a rate structure that will collect approximately 60 percent of revenue from fixed charges and 40 percent from variable charges. However, a share of the Agency's capacity costs will need to be collected from the variable rates in order to reach this rate structure. Thus, capacity related costs (which are normally considered fixed) will be collected from both fixed and variable rates.

Figure 5 summarizes the allocation of the net revenue requirements to each cost causation component.

Figure 5. Allocation of Water Revenue Requirements

Functional Category	Proposed Rates	
	Adjusted Net Revenue Requirements (2020-21) 60% Fixed / 40% Variable	
Commodity - Related Costs	\$ 532,313	31.6%
Additional Supply Costs	\$ 48,271	2.9%
Capacity - Related Costs (volumetric share)	\$ 92,760	5.5%
Capacity - Related Costs (fixed share)	\$ 811,720	48.2%
Customer - Related Costs	\$ 198,076	11.8%
Fire Protection - Related Costs	\$ 221	0.0%
Total	\$1,683,362	100%

CUSTOMER CLASSES

Customer classes are determined by combining customers with similar demand characteristics and types of use into categories that reflect the cost differentials to serve each type of customer. This process is limited by the desire to not overcomplicate the Agency's rate structure.

For Bighorn Desert View Water Agency, six customer classes were analyzed: residential, agriculture, commercial, institutional, private fire and bulk water. The amount of consumption, the peaking factors and the number of meters by size are used in the cost-of-service analysis to allocate costs to customer classes and determine the appropriate rate structures for each. Definitions of each customer class are provided in Appendix B.

COSTS ALLOCATED TO CUSTOMER CLASSES

Costs are allocated to each customer class based on the customer characteristics of each class in order to reflect the cost differentials to serve each type of customer. **Figure 6** summarizes how the costs for each cost causation component from Figure 5 are allocated to each customer class.

Figure 6. Cost Allocation Methodology

Capacity Related Costs (fixed share)	•Allocated based on the hydraulic capacity of each meter size
Customer Related Costs	•Allocated based on the total number of meters
Fire Protection Related Costs	•Allocated based on the hydraulic capacity of fire meters
Commodity Related Costs	•Allocated based on water consumption by customer class
Additional Water Supply Costs	•Allocated based on additional water purchased
Capacity Related Costs (volumetric share)	•Allocated based on peak consumption by customer class

The costs allocated to each causation component are assigned to each customer class using the cost allocation methodology described in Figure 6. This process is shown in the following sections, in Figure 7 through Figure 11.

Capacity Related Costs

Capacity related costs are those costs associated with constructing and operating the water system to ensure there is enough capacity in the system to meet the demand of each meter connected. Larger meters have the potential to use more of the system's capacity, compared to smaller meters. The potential capacity demanded is proportional to the maximum safe meter capacity of each meter size as established by the AWWA⁶. The meter capacity factors used in this study are shown in the third and fifth columns of **Figure 7**.

⁶ *Principles of Water Rates, Fees, and Charges, Manual of Water Supply Practices, M1, AWWA, seventh edition, 2017, p. 338.*

A “hydraulic capacity factor” (columns two and four in Figure 10) is calculated by dividing the maximum capacity or flow of large meters by the capacity of the base meter size, which is typically the most common residential meter size (in this case a 1-inch meter). For example, Figure 10 shows the hydraulic capacity of a two-inch meter is 3.2 times that of a 1-inch meter and therefore, the capacity component of the fixed meter charge is 3.2 times that of the 1-inch meter.

The actual number of meters by size is multiplied by the corresponding capacity ratios to calculate the total number of equivalent meters. The number of equivalent meters is used as a representation for the potential demand that each customer can place on the water system. The capacity related allocation is summarized in **Figure 8**. Capacity related costs are allocated to each customer class based upon their percentage of peak bi-monthly use.

Figure 7. Hydraulic Capacity Factors

Meter Size	Standard Meters ¹		Fire Service Meters ²	
	Meter Capacity (gpm)	Equivalency to 1 inch	Meter Capacity (gpm)	Equivalency to 1 inch
	<i>Displacement Meters</i>		<i>Displacement Meters</i>	
3/4 inch	30	1.00	30	1.00
1 inch	50	1.00	50	1.00
1.5 inch	100	2.00	100	2.00
2 inch	160	3.20	160	3.20
	<i>Compound Class I Meters</i>		<i>Fire Service Type II</i>	
3 inch	320	6.40	350	7.00
4 inch	500	10.00	700	14.00
6 inch	1,000	20.00	1,600	32.00
8 inch	1,600	32.00	2,800	56.00

1. Meter flow rates are from AWWA M-1 Table B-1.

2. Fire Service meter flow rates are from AWWA M-6 Table 5-3.

Figure 8. Capacity Related Allocation

Customer Class	Average Bi-Monthly Use (hcf)	Peak Bi-Monthly Use (hcf) ¹	Peaking Factor	Max 2-Month Capacity Factor
Residential	29,341	44,281	1.51	82.3%
Agriculture	2,716	6,034	2.22	11.2%
Bulk Water	1,760	2,760	1.57	5.1%
Commercial & Institutional	359	707	1.97	1.3%
Fire Meter	0	0	0.00	0.0%
Total	34,176	53,782		100%

1. Based on peak monthly data (peak day data not available).

Customer Related Costs

The customer related cost allocation is summarized in **Figure 9**. Customer related costs are comprised of those costs relating to reading and maintaining meters, customer billing and collection, and other customer service related costs. The customer service costs do not differ among the various meter sizes; therefore, these costs

are spread equally among all meters. Each customer class is allocated customer related costs based upon the percentage of total meters that are in that class.

Figure 9. Customer Related Cost Allocation

Customer Class	Number of Meters ¹	Percent of Total
Residential	2,522	93.2%
Agriculture	50	1.8%
Bulk Water	121	4.5%
Commercial & Institutional	12	0.4%
Fire Meter	2	0.1%
Total	2,707	100.0%

1. Meter Count is from July/August 2020. BHDVWA charges monthly rates, but bills bi-monthly
Source files: CUSTOMER BILLING DATA 09.18.2020.xlsx

Fire Protection Related Costs

Only Fire Protection meters are allocated this cost component. A direct allocation is made in the functionalization and classification step in the cost-of-service analysis to represent their share of system capacity and other related operations and maintenance costs. The percent of revenue collected over the total revenue was used to allocate these costs to fire protection meters. This cost is spread over the fire meters using the meter equivalency factors in Figure 7.

Commodity Related Costs

The commodity related cost allocation is summarized in **Figure 10**. Commodity related costs are those costs related to the amount of water sold and commonly include the costs of chemicals used in the treatment process, energy related to pumping for transmission and distribution, and source of supply. Each customer class is allocated commodity related costs based upon the percentage of total consumption by that class.

Figure 10. Commodity Related Costs Allocation

Customer Class	Volume (hcf) ¹	Percent of Total Volume
Residential	176,045	85.9%
Agriculture	16,297	7.9%
Bulk Water	10,563	5.2%
Commercial & Institutional	2,152	1.0%
Fire Meter	-	0.0%
Total	205,057	100%

1. Consumption is from September 2019 through August 2020. BDVWA charges monthly rates, but bills customers bi-monthly.
Source files: CUSTOMER BILLING DATA 09.18.2020.xlsx

Figure 11 summarizes the costs allocated to each customer class.

Figure 11. Allocation of Adjusted Net Revenue Requirements

Customer Classes	Classification Components						Cost of Service Net Rev. Req'ts	% of COS Net Revenue Req'ts
	Commodity-Related Costs	Additional Supply Costs	Capacity-Related Costs <i>Volumetric Share</i>	Capacity-Related Costs <i>Fixed Share</i>	Customer-Related Costs	Fire Protection-Related Costs		
Residential	\$ 457,000	\$ 38,855	\$ 76,373	\$ 668,320	\$ 184,539	\$ -	\$ 1,425,088	84.7%
Agriculture	42,306	8,518	10,406	91,064	3,659	-	155,952	9.3%
Bulk Water	27,420	-	4,761	41,661	8,854	-	82,696	4.9%
Commercial & Institutional	5,587	449	1,220	10,675	878	-	18,809	1.1%
Fire Meter	-	449	-	-	146	221	816	0.0%
Total Net Revenue Requirement	\$ 532,313	\$ 48,271	\$ 92,760	\$ 811,720	\$ 198,076	\$ 221	\$ 1,683,362	100%

D. Rate Design Analysis

NBS discussed several water rate alternatives and methodologies with Agency Staff over the course of this study, such as the percentage of revenue collected from fixed vs. variable charges and differentiating rates by customer class. Based on input provided by Agency staff and the Board of Directors, the proposed rates were developed. The following sections describe this process.

The rates proposed in this study make the following modifications to the water rate structure:

1. Update monthly fixed meter charges to collect 60% of the revenue requirement and update volumetric charges to reflect collecting 40% of revenue.
2. Update the volumetric rates for Residential and Agriculture customers as follows:
 - a. Develop a two tier rate structure.
 - b. Establish breakpoint between tier 1 and tier 2 to 25 hcf bi-monthly, which is based on the availability of ground water for customers in the Agency's service area.
3. Keep all non-residential customers on a uniform volumetric rate and impose a single charge for all water consumed.

FIXED CHARGES

The fixed meter charge recognizes that the Agency incurs fixed costs regardless of whether customers use water. There are two components that comprise the fixed meter charge: the customer component and the capacity component, as described in the previous section.

VARIABLE CHARGES

The Agency currently has a uniform volumetric rate for all customers. Based on the Agency's sources of water supply, NBS recommends updating the Residential and Agriculture customers to a two-tiered inclining rate structure.

The goals when setting the tier breakpoint were twofold:

1. The breakpoint for the first tier was set to the 25 hcf⁷, which is the bi-monthly ground water allocated to each customer.
2. The second tier consists of any consumption above 25 hcf and includes the cost of purchased water in addition to base commodity costs.

Figure 12 shows the calculation for the tier breakpoint with 908 acre feet of free ground water production used as the base water allotment.

Figure 12. Tier Breakpoint Calculation

Water Supply Allocation	Based on # of Accounts
Total Water Allocation 2020	908 acre feet
Total Customer Base	2,707 total active accounts
Water Allocated to Each Customer Annual	0.34 acre feet/parcel/year
Conversion to Hundred Cubic Feet	146.1 hcf
HCF Bi-Monthly Allocation Per Customer	24.4 hcf
Bi-Monthly Tier 1 Water	25.00 hcf

Figure 13 shows the calculation for the additional water supply costs that are added in the calculation for the fee of Tier 2 water consumption.

Figure 13. Additional Water Supply Costs

Cost Per Unit for State Water Project Water	Total
Total Cost for Additional Water Supply (70 AF)	\$48,271.27 Total Cost
Cost per Acre Foot	\$689.59 per AF
Cost per HCF	\$1.58 per hcf

Figure 14 presents the full calculation for the variable tiered charges for residential and agriculture customers. The base rate is calculated by dividing the commodity and volumetric capacity costs by the water consumption for residential and agriculture customers.

Figure 14. Residential & Agriculture Customer Tiered Rate Calculation

Customer Classes	Tier Break	Est. Water Consumption (hcf/yr.)	% of Consumption in Tier	Base Rate	Plus Additional Supply Cost	Cost Per Unit of Water	Estimated Revenue
Residential							
Tier 1	25	124,215	70%	\$3.03	\$0.00	\$3.03	\$ 376,341
Tier 2	--	53,094	30%	\$3.03	\$1.58	\$4.61	\$ 244,914
Agriculture							
Tier 1	25	4,052	26%	\$3.23	\$0.00	\$3.23	\$ 13,106
Tier 2	--	11,649	74%	\$3.23	\$1.58	\$4.82	\$ 56,120
Total		193,010					\$ 690,481

Due to the varying consumption characteristics, non-residential/agriculture customers will maintain a uniform volumetric rate because it best represents their cost-of-service. Using the commodity, volumetric capacity and additional supply costs allocated to each customer class, **Figure 15** shows the calculation for

⁷ HCF is one hundred cubic feet of water.

the per unit volumetric charge for each customer class and tier. It is notable to mention that the base rate for residential and agriculture customers is shown in Figure 17, which filters into the calculation in Figure 16.

Figure 15. Calculated Variable Charges for FY 2020/21

Customer Classes	Water Consumption (hcf/yr.)	Commodity Assigned Costs	Capacity Assigned Costs	Additional Supply Costs ¹	Fixed Costs to Recover from Vol. Charges	Target Rev. Req't from Vol. Charges	Base Volumetric Rates (\$/hcf)
Residential	176,045	\$ 457,000	\$ 76,373	<i>See footnote</i>	\$ -	\$ 533,374	\$3.03
Agriculture	16,297	42,306	10,406		-	52,712	\$3.23
Bulk Water	10,563	27,420	4,761	-	50,515	82,696	\$7.83
Commercial & Institutional	2,152	5,587	1,220	719	-	7,525	\$3.58
Fire Meter	0	-	-	180	-	180	\$3.58
Total	205,057	\$ 532,313	\$ 92,760	\$ 898	\$ 50,515	\$ 676,487	

1. Additional water supply costs for Residential and Agriculture customers shown in Figure 14.

E. Current and Proposed Water Rates

The cost-of-service analysis is used to establish the rates for FY 2020/21. In the subsequent four years of the rate study, proposed charges are simply adjusted by the proposed adjustment in total rate revenue needed, to meet projected revenue requirements. **Figure 16** provides a comparison of the current and proposed rates for FY 2020/21 through FY 2024/25. More detailed tables on the development of the proposed charges are documented in Appendix A.

Figure 16. Current and Proposed Water Rates

Water Rate Schedule	Current Rates	Proposed Rates				
		FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Projected Increase in Rate Revenue per Financial Plan:		4.00%	4.00%	4.00%	4.00%	4.00%
Fixed Meter Charges						
Bi-Monthly Fixed Service Charges:						
3/4 inch	\$66.84	\$61.78	\$64.25	\$66.82	\$69.49	\$72.27
1 inch	\$66.84	\$61.78	\$64.25	\$66.82	\$69.49	\$72.27
1.5 inch	\$66.84	\$111.36	\$115.81	\$120.44	\$125.26	\$130.27
2 inch	\$66.84	\$170.86	\$177.69	\$184.80	\$192.19	\$199.88
3 inch	\$66.84	\$329.53	\$342.71	\$356.42	\$370.68	\$385.51
4 inch	--	\$508.03	\$528.35	\$549.48	\$571.46	\$594.32
6 inch	--	\$1,003.87	\$1,044.02	\$1,085.78	\$1,129.21	\$1,174.38
Bi-Monthly Fire Service Charges:						
3/4 inch	\$16.00	\$30.62	\$31.84	\$33.11	\$34.43	\$35.81
1 inch	\$16.00	\$30.62	\$31.84	\$33.11	\$34.43	\$35.81
2 inch	\$16.00	\$71.14	\$73.99	\$76.95	\$80.03	\$83.23
3 inch	\$34.43	\$141.14	\$146.79	\$152.66	\$158.77	\$165.12
4 inch	\$57.38	\$270.09	\$280.89	\$292.13	\$303.82	\$315.97
6 inch	\$114.75	\$601.66	\$625.73	\$650.76	\$676.79	\$703.86
8 inch	\$183.60	\$1,043.76	\$1,085.51	\$1,128.93	\$1,174.09	\$1,221.05
Commodity Charges						
Rate per hcf of Water Consumed:						
Bulk Meters	\$9.57	\$7.83	\$8.14	\$8.47	\$8.81	\$9.16
Commercial, Institutional, Fire & Other	\$3.38	\$3.58	\$3.72	\$3.87	\$4.02	\$4.18
Residential, 3/4" and 1" Meters	\$3.38	--	--	--	--	--
Tiered Rate - Residential Customers:						
Proposed Break						
Tier 1 0-25 hcf	\$3.38	\$3.03	\$3.15	\$3.28	\$3.41	\$3.55
Tier 2 26+ hcf	\$3.38	\$4.61	\$4.80	\$4.99	\$5.19	\$5.40
Tiered Rate - Agriculture Customers:						
Proposed Break						
Tier 1 0-25 hcf	\$3.38	\$3.23	\$3.36	\$3.49	\$3.63	\$3.78
Tier 2 26+ hcf	\$3.38	\$4.82	\$5.01	\$5.21	\$5.42	\$5.64

F. Comparison of Current and Proposed Water Bills

Figure 17 and **Figure 18** compare a range of monthly water bills for the current and proposed water rates as a result of the initial rate adjustment for residential customers (with a 1-inch meter) and non-single family residential customers (the bill comparison for a commercial customer is also a 1-inch meter). These monthly bills are based on typical meter sizes at various consumption levels.

Figure 17. Bi-Monthly Bill Comparison for Single Family Customers

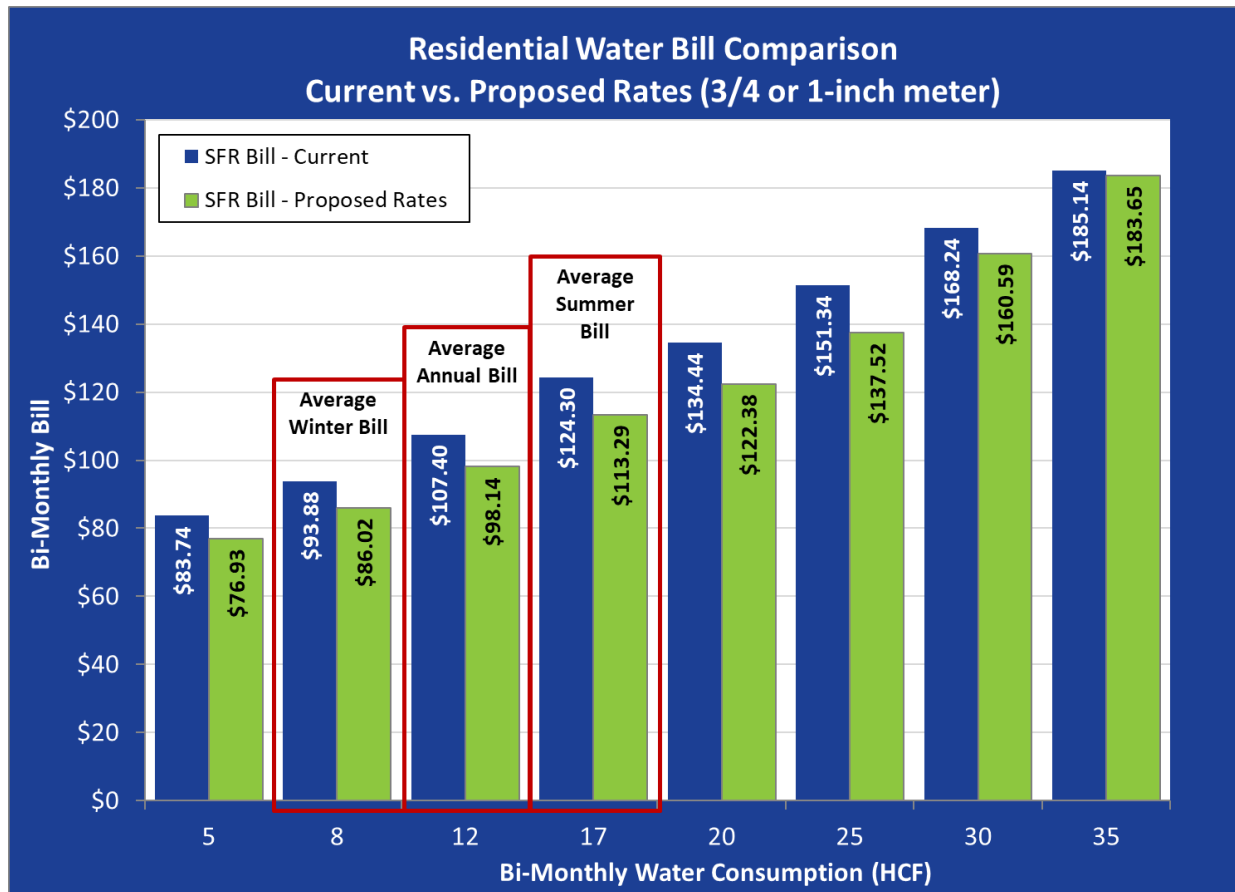
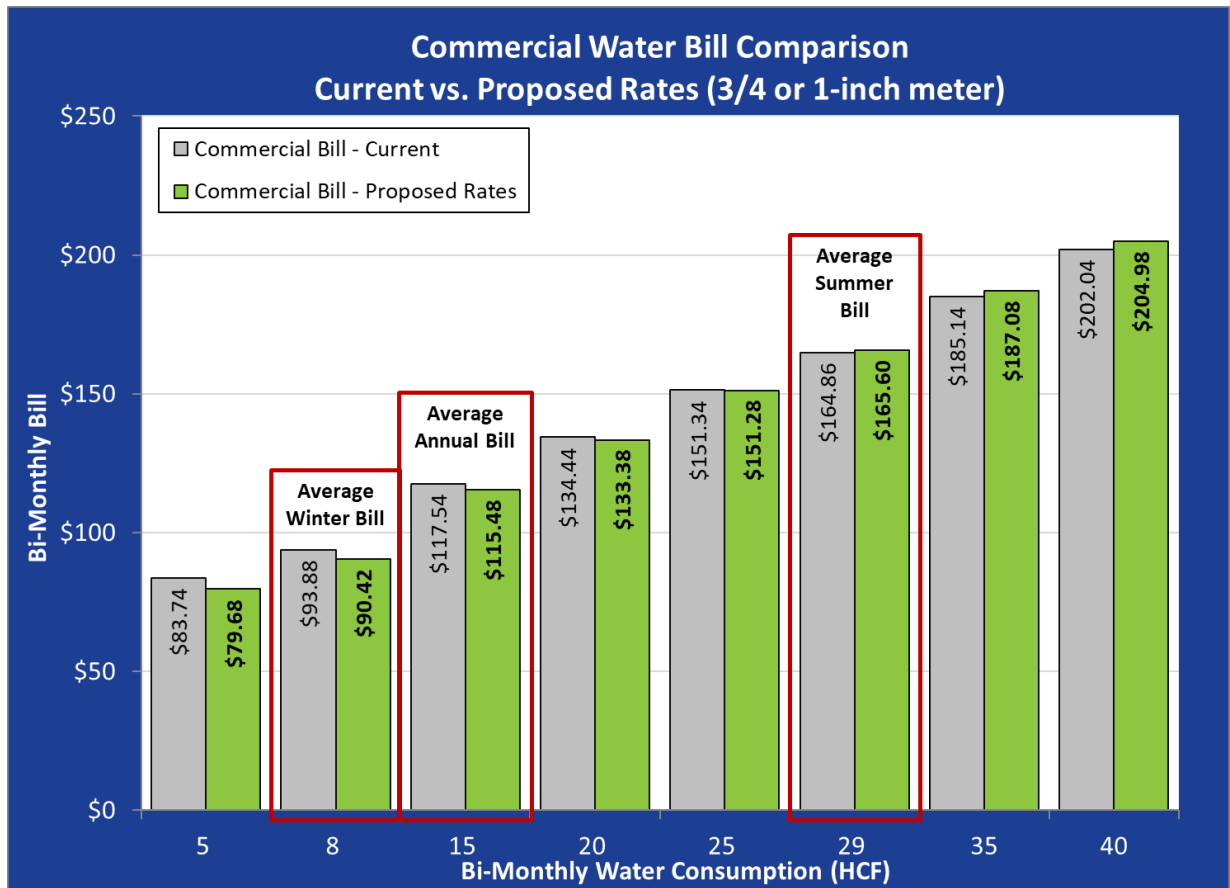


Figure 18. Bi-Monthly Water Bill Comparison for Commercial Customers



Section 3. RECOMMENDATIONS AND NEXT STEPS

A. Consultant Recommendations

NBS recommends the Agency take the following actions:

Approve and accept this Study: NBS recommends the Agency Board formally approve and adopt this Study and its recommendations and proceed with the steps required to implement the proposed rates. This will provide documentation of the rate study analyses and the basis for analyzing potential changes to future rates.

Implement Recommended Levels of Rate Adjustments and Proposed Rates: Based on successfully meeting the Proposition 218 procedural requirements, the Agency should proceed with implementing the 5-year schedule of proposed rates and rate adjustments previously shown in Figure 16. This will help ensure the continued financial health of Agency's water utility.

B. Next Steps

Annually Review Rates and Revenue – Any time an agency adopts new utility rates or rate structures, those new rates should be closely monitored over the next several years to ensure the revenue generated is sufficient to meet the annual revenue requirements. Changing economic and water consumption patterns underscore the need for this review, as well as potential and unseen changing revenue requirements—particularly those related to environmental regulations that can significantly affect capital improvements and repair and replacement costs.

Note: The attached Technical Appendix A provides more detailed information on the analysis of the water revenue requirements, cost-of-service analysis and cost allocations, and the rate design analyses that have been summarized in this report.

C. NBS' Principal Assumptions and Considerations

In preparing this report and the opinions and recommendations included herein, NBS has relied on a number of principal assumptions and considerations with regard to financial matters, conditions, and events that may occur in the future. This information and these assumptions, including Agency's budgets, capital improvement costs, and information from Agency staff were provided by sources we believe to be reliable, although NBS has not independently verified this data.

While we believe NBS' use of such information and assumptions is reasonable for the purpose of this report and its recommendations, some assumptions will invariably not materialize as stated herein and may vary significantly due to unanticipated events and circumstances. Therefore, the actual results can be expected to vary from those projected to the extent that actual future conditions differ from those assumed by us or provided to us by others.

APPENDIX A: WATER RATE STUDY TABLES AND FIGURES

APPENDIX B: CUSTOMER CLASS DEFINITIONS (DRAFT)

This appendix shows the customer class definitions that are currently in progress and subject to change. The definitions will be updated upon final approval of the Board of Directors.

Customer Classes Served

Any person or entity connected to the water system and immediately able to receive water service from the Agency under these rules and regulations will be placed into a unique customer class.

1. Residential Customer: A place where people reside. A legally permitted dwelling and/or “vacation” parcel (e.g. “inactive”) which has a meter connected to the water system and readily able to receive water service.
2. Bulk Hauling Customer and/or (Temporary) Construction Meters: A bulk hauling customer is one who obtains water from one of the Agency’s “bulk water station” facilities. A construction meter is connected to a fire hydrant to supply water to a project on a temporary basis thru application for such.
3. Commercial/Institutional/Industrial/Non-Agriculture: A facility that is neither residential, bulk, nor agriculture. Such facility may or may not have a cross connection control device (backflow device). Examples of such facilities are restaurants, retail stores, schools and other types of “commercial” businesses.
4. Agriculture (Non-Residential and Non-Commercial/Institutional): Agricultural customer classes will be the default class whenever any of the following are met:
 - Cross connection control device mandated per an analysis by staff of the Water Use Questionnaire completed and signed by the customer at time of application for water service (new or renewed).
 - A property with, or without, a permitted residential dwelling but also with irrigation of non-ornamental landscaping or “vegetable gardens”. For reference, and “ornamental landscape” shall be defined as a permanent landscape designed which serves the primary purpose of adding visually pleasing plants to the landscape. Non-ornamental landscaping or crops are those that are harvested on a routine basis and are not a permanent part of the landscape. Such crops could also be defined as specialized botanicals or otherwise botanicals that are harvested for extraction or consumption.
 - Livestock (horses, pigs, cows, poultry, etc.) that are raised for commercial purposes such as food processing or commercial sales.
5. Fire Service Connections: Parcels which have separate and distinct connections for fire sprinklers or on-site fire hydrants or other fire suppression devices or systems. Such fire service connections are static and only consume water during firefighting efforts.