

FINAL REPORT



*Lake Arrowhead Community Services District*  
**Comprehensive  
Water Rate Study**  
January 2016





January 4, 2016

Ms. Catherine Cerri  
Finance Manager  
Lake Arrowhead Community Services District  
27307 State Highway 189, Suite 101  
Lake Arrowhead, California 92352

**Subject:** Comprehensive Water Rate Study Final Report

Dear Ms. Cerri

HDR Engineering, Inc. (HDR) is pleased to present to the Lake Arrowhead Community Services District (District) the final report for the 2015 comprehensive water rate study. The District's comprehensive water rate study was developed to provide a financial plan and rates that generate sufficient revenue to fund the operating and capital needs and develop cost-based and equitable rates for the District's customers. This report outlines the overall approach used to achieve these objectives, along with our findings, conclusions and recommendations.

The District owns and operates a water supply, transmission, and distribution system. The District utilizes ground water, surface water, along with water purchases from the Crestline-Lake Arrowhead Water Agency (CLAWA) to supplement ground water and surface water supplies. The costs associated with developing and purchasing water supplies, plus the costs of distributing water to customers has been developed based on District provided information and included within the development of the proposed water rates.

This study was developed utilizing industry recognized water rate setting principles and methodologies. This report provides the basis for developing and implementing water rates which are cost-based, equitable and defensible to the District's customers.

We appreciate the assistance provided by the District's management team in the development of this study. More importantly, HDR appreciates the opportunity to provide these technical and professional services to the District.

Sincerely yours,  
HDR Engineering, Inc.

A handwritten signature in black ink, appearing to read 'Shawn Koorn', written over a light blue horizontal line.

Shawn Koorn  
Associate Vice President

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**Technical Appendix A –Arrowhead Woods Technical Analyses**

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# Executive Summary

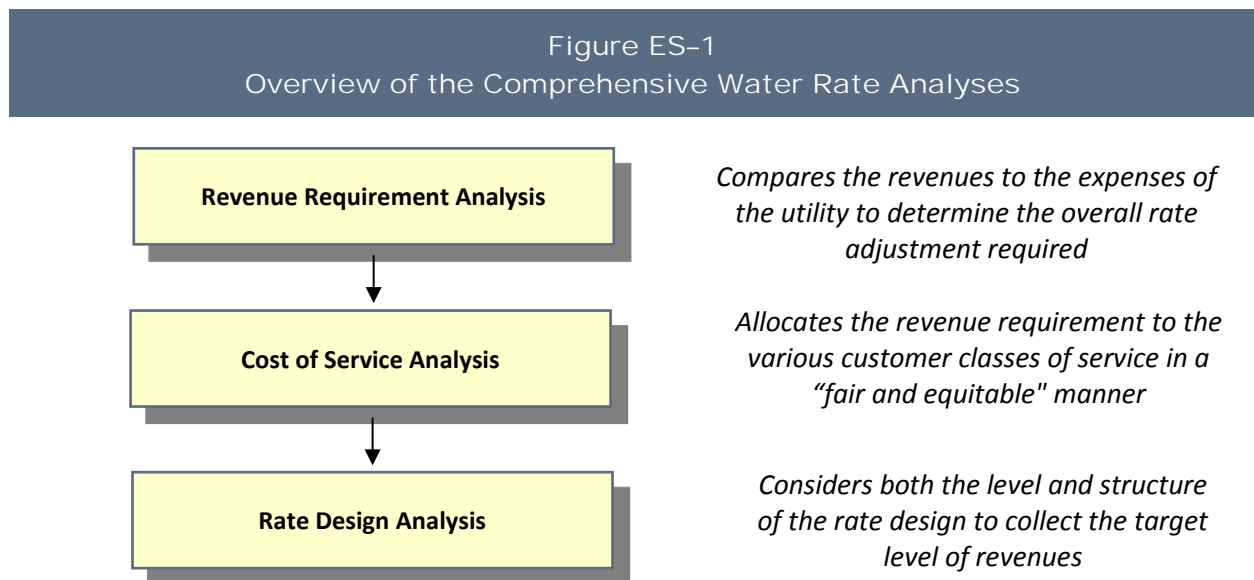
## Introduction

HDR was retained by the Lake Arrowhead Community Services District (District) to conduct a comprehensive water rate study. The objective of the rate study was to review the District's operating and capital costs in order to develop a financial plan and cost-based rates for the District's water system customers. This study determined the adequacy of the existing water rates and provides the framework and cost basis for any needed future adjustments.

The District owns and operates a water transmission and distribution system. The District purchases water from Crestline-Lake Arrowhead Water Agency (CLAWA) and supplements purchased water with local ground water and surface water resources. The District also serves customers in three distinct, and separated, systems which include the Arrowhead Woods, Deer Lodge Park, and Rim Forest water systems. The costs associated with providing water supply, plus the costs of distributing water to customers in each system has been developed based on District provided information and included within the development of the proposed rates. It should be noted that the analysis only developed rates for the Arrowhead Woods and Deer Lodge Park systems. The Rim Forest system was recently acquired by the District and at which time rates for the Rim Forest customers were established.

## Overview of the Rate Study Process

A comprehensive water rate study uses three interrelated analyses to address the adequacy and equity of a utility's rates. These three analyses are a revenue requirement analysis, a cost of service analysis, and a rate design analysis. These three analyses are illustrated below in Figure ES-1.



The above framework for reviewing and evaluating the District’s water rates for Arrowhead Woods and Deer Lodge Park customers was utilized in the development of this study.

## **Key Water Rate Study Results**

The water rate study technical analysis was developed based on the operating and capital costs necessary to provide water service to the District’s customers in Arrowhead Woods and Deer Lodge Park. The water rate analysis resulted in the following findings, conclusions, and recommendations.

- A revenue requirement analysis was developed for the projected time period of FY 2016 through FY 2029 for each system.
- The FY 2015 and FY 2016 budgets were used as the starting point of the analysis.
- Operation and maintenance (O&M) expenses are projected to increase at inflationary levels with no assumed changes to levels of service or anticipated extraordinary expenses.
- The current drought has impacted customer consumption levels, which in turn has reduced overall revenues for the District.
- The District has a “pay-as-you-go” philosophy of funding the majority of capital improvement needs.
- The Arrowhead Woods water system has annual debt service payments of approximately \$1.0 million. Annual debt service payments decline over the time period due to existing debt maturing to approximately \$750,000 per year.
- Additional long-term debt is assumed to fund a future water treatment plant expansion in the final year of the analysis (FY 2029), which is outside the proposed rate setting period.
- Annual rate adjustments for the Arrowhead Woods system over the next five-year time period are needed to support the capital improvement plan. The adjustments are proposed to be 4.5% per year starting January 1, 2016 (FY 2016) through January 1, 2019 (FY 2019), followed by a 5.0% increase January 1, 2020 (FY 2020).
- Annual rate adjustments of 9.5% have been proposed for the Deer Lodge Park system to meet operating and capital improvements needs for this system.
- A cost of service analysis was developed to review the equity of the existing rates between the various customer types for the Arrowhead Woods system.
- The results of the cost of service analysis indicated minor cost differences between the various customer classes of service for the Arrowhead Woods system. The study proposes cost of service adjustments for the commercial and irrigation customer classes of service for the Arrowhead Woods system.
- An analysis of the allocation of costs to the District’s residential water rate tiers, for both the Arrowhead Woods and Deer Lodge Park systems, has been developed as part of the cost of service analysis.

- The study has developed proposed rates for the FY 2016 – FY 2020 time period by class of service (e.g., residential, commercial, irrigation) for the Arrowhead Woods system.
- The study has developed proposed rates for the FY 2016 – FY 2020 time period for the Deer Lodge Park system customers.
- Drought surcharges have been developed for the District to maintain sufficient revenues during mandatory conservation efforts or water shortage events.
- The drought surcharges may be implemented by the District Board as drought levels are declared.

## **Development of the Arrowhead Woods Rate Study**

As noted, the District provides service to three distinct service areas: Arrowhead Woods, Deer Lodge Park, and Rim Forest. For this study the analyses focused on Arrowhead Woods and Deer Lodge Park as Rim Forest rates were recently adopted through a prior process in 2013 when District acquired the system. The revenue requirement analysis for Arrowhead Woods was developed to determine the rate projections for this system based on the specific costs of this system. Provided in the following is a summary of the analyses completed for the Arrowhead Woods water system.

### **Summary of the Arrowhead Woods Water Revenue Requirement Analysis**

A revenue requirement analysis is the first analytical step in the development of the water rate study. This analysis determines the adequacy of the overall water rates. From this analysis, a determination can be made as to the overall level of water rate adjustments needed to provide adequate and prudent funding for both operating and capital needs.

For this study, the revenue requirement was developed for a projected time period of FY 2016 - 2029. The primary financial inputs in the development of the revenue requirement analysis were the District’s FY 2015 and FY 2016 budget documents, FY 2014 billed customer and consumption data, and the District’s capital improvement plan. The District has an established cost allocation methodology that is used in the budgeting process to determine the costs associated with each of the three systems. Therefore, the budgeted expenditures for the Arrowhead Woods system reflect the costs allocation process utilized by the District to reflect the costs associated with the system. In this way, the rates for each system support the costs of operating and maintaining each system.

Once the operating and maintenance expenses have been projected over the time period, the next step is to develop the capital improvement funding plan. The District has, for the most part, operated on a “pay-as-you-go” philosophy of funding capital improvements. This approach utilizes annual revenues, and available reserves, to fund the annual capital improvement needs. As a result, the District’s rates are set at a level to provide sufficient capital funding. This has a direct impact on the level of annual rates over the time period reviewed. Provided below in Table ES-1 is a summary of the amount of the capital funding plan over the five-year rate setting period for the Arrowhead Woods water system.



Table ES-1  
Summary of the Arrowhead Woods Annual Rate Funded Capital (\$000)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Total Capital Improvement Projects	\$4,102	\$1,010	\$1,255	\$1,500	\$2,240
Less: Other Funding (reserves)	3,102	10	5	0	490
<b>Total Rate Funded Capital</b>	<b>\$1,000</b>	<b>\$1,000</b>	<b>\$1,250</b>	<b>\$1,500</b>	<b>\$1,750</b>

As a point of reference, the District's annual depreciation expense is approximately \$1.8 million (2014). This financial plan has placed the District's rate funding for CIP at \$1.75 million by FY 2020. As can be seen, the difference between annual capital improvement needs and rate funded capital is being funded through existing reserves. In this way, the District is attempting to minimize the rate impacts of funding annual capital improvement needs. A more detailed analysis of the capital funding plan for the Arrowhead Woods system is included in Exhibit 4 of the technical appendix A.

Provided below in Table ES-2 is a summary of the revenue requirement analysis (financial plan) for the Arrowhead Woods system. A more detailed analysis of the revenue requirements for Arrowhead Woods can be found in section 3 of this study and in Exhibit 3 of technical appendix A.

Table ES-2  
Summary of the Arrowhead Woods Revenue Requirement Analysis (\$000)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
<b>Revenues</b>					
Rate Revenues	\$5,804	\$5,810	\$5,815	\$5,827	\$5,839
Other Revenues	<u>204</u>	<u>195</u>	<u>236</u>	<u>266</u>	<u>258</u>
<b>Total Revenues</b>	<b>\$6,008</b>	<b>\$6,005</b>	<b>\$6,051</b>	<b>\$6,093</b>	<b>\$6,096</b>
<b>Expenses</b>					
O&M Expenses	\$3,974	\$4,115	\$4,278	\$4,423	\$4,591
Rate Funded Capital	\$1,000	\$1,000	\$1,250	\$1,500	\$1,750
Net Debt Service	841	636	636	636	635
Change in Working Capital	<u>324</u>	<u>653</u>	<u>566</u>	<u>506</u>	<u>418</u>
<b>Total Expenses</b>	<b>\$6,138</b>	<b>\$6,403</b>	<b>\$6,729</b>	<b>\$7,065</b>	<b>\$7,394</b>
Bal./(Def.) of Funds	(\$131)	(\$398)	(\$678)	(\$972)	(\$1,298)
Balance as % of Rev from Rates	2.3%	6.9%	11.7%	16.7%	22.2%
<b>Proposed Rate Adjustments<sup>[1]</sup></b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>

[1] - The proposed rate adjustments will be implemented on January 1 of each year

As can be seen, the revenue requirement has summed the O&M expenses, rate funded capital, net debt service and the change in working capital. The total revenue requirement is then compared to the total sources of funds which are rate revenues, at current rate levels, and other miscellaneous revenues. From this comparison a balance or deficiency of funds in each year can be determined. This balance or deficiency of funds is then compared to the rate revenues to determine the level of rate adjustment needed to meet the revenue requirement. It is important to note the “Bal./(Def.) of Funds” row is cumulative. That is, any adjustments in the initial years will reduce the deficiency in the later years. Over this project time period, the total deficiency of rates is 22.2% for the Arrowhead Woods system.

As can be seen in Table ES-2, a rate transition plan has been developed to adjust rates over this time period. This level of revenues, after the proposed rate adjustment, will be the target revenues used in the development of the cost of service and rate design analyses to develop cost based rates.

Based on the revenue requirement analysis developed herein, HDR has concluded that the District will need to adjust the Arrowhead Woods water rates over the next five years (FY 2016 – FY 2020) to maintain cost-based rates. HDR has reached this conclusion for the following reasons:

- Rate adjustments are necessary to fund the District’s capital improvement needs.
- Rate adjustments are necessary to fund the District’s capital projects on a “pay-as-you-go” basis and avoid the need for the issuance of any long-term debt.
- Rate adjustments are necessary to reflect the reduction in annual water consumption (i.e., per capita use) which may be reflective of the new level of water consumption for the foreseeable future.
- The proposed rate adjustments maintain the District’s strong financial health and provide long-term sustainable funding levels for the District.

In reaching this conclusion, HDR would recommend that the District adopt the proposed rates through FY 2020 in order to provide sufficient funding for the operating and capital needs of the Arrowhead Woods system. Detailed technical exhibits of the revenue requirement analysis have been included within technical appendix A.

### **Summary of the Arrowhead Woods Water Cost of Service Analysis**

A cost of service analysis determines the equitable allocation of the revenue requirement to the various customer classes of service (e.g., single-family, commercial, irrigation). The objective of the cost of service analysis is to determine the fair and equitable manner to collect the revenue requirement.

In summary form, the cost of service analysis began by functionalizing the revenue requirement for the Arrowhead Woods system. The functionalized revenue requirement was then classified into their various cost components. The individual classification totals were then allocated to the various customer classes of service based on the appropriate allocation factors. The

allocated expenses for each customer class were then aggregated to determine each customer class's overall revenue responsibility. Table ES-3 provides the summary of the cost of service analysis.

Table ES-3 Summary of the Arrowhead Woods System Cost of Service Analysis (\$000)				
Class of Service	Present 2016 Rate Revenues	Allocated Costs	\$ Difference	% Difference
Residential	\$5,097	\$5,204	(\$107)	2.1%
Irrigation	177	144	\$33	-18.7%
Commercial & Institutional	<u>530</u>	<u>587</u>	<u>(\$57)</u>	<u>10.7%</u>
<b>Total</b>	<b>\$5,804</b>	<b>\$5,934</b>	<b>(\$131)</b>	<b>2.2%</b>

The cost of service study attempts to align the operating and capital costs to each customer class with their respective benefit (proportional allocation). The results of the analysis show that some cost differences exist between the various customer classes of service. It is important to understand that a cost of service analysis is based on one year's data and corresponding customer information. Total consumption and the costs incurred by the utility will change from year to year. As such, it is appropriate to determine whether these findings are consistent over time, and adjust accordingly.

While some minor cost differences exist, given the range of differences it is recommended that the irrigation and commercial classes of service be adjusted to reflect the cost of service results. Provided below in Table ES-4 is a summary of the proposed cost of service adjustments over the rate setting time period.

Table ES-4 Summary of the Arrowhead Woods System Proposed Cost of Service Adjustments					
Class of Service	Jan 1 2016	Jan 1 2017	Jan 1 2018	Jan 1, 2019	Jan 1, 2020
Residential	4.8%	4.8%	4.5%	4.5%	5.0%
Irrigation	-7.0%	-7.0	4.5%	4.5%	5.0%
Commercial & Institutional	<u>5.2%</u>	<u>5.2%</u>	<u>4.5%</u>	<u>4.5%</u>	<u>5.0%</u>
<b>System Total</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>

As can be seen, the proposed rate adjustments for the District's Arrowhead Woods customers reflect the cost of service results. Irrigation rates are being reduced over the first two year period and commercial and institutional rates are being increased greater than the system average over the first two years to minimize the overall impacts to customers. However, the overall revenue needs of the Arrowhead Woods system are being met through the proposed

rate and cost of service adjustments. As the District continues to monitor rates and cost of service results through future studies, additional cost of service adjustments may be necessary to reflect consumption patterns at that time.

Section 4 of this report provides a detailed discussion of the cost of service analysis conducted for the District's Arrowhead Woods water system. Technical appendix A contains the various exhibits associated with the Arrowhead Woods cost of service analysis.

### **Summary of the Current and Proposed Arrowhead Woods Water Rate Designs**

The final step of the comprehensive rate study process is the design of water rates to collect the desired levels of revenue, based on the results of the revenue requirement and cost of service analyses.

Developing cost-based and equitable rates is of paramount importance in developing proposed water rates. While always a key consideration in developing rates, meeting the legal requirements, and documenting the steps taken to meet the requirements, has been in the forefront with the recent legal challenges in the State of California on water rates. Given this, the development of the District's proposed water rates have been developed to meet the legal requirements of California constitution article XIII D, section 6 (Article XIII D) through the use of generally accepted rate setting methodologies.

The District's residential rate structure is a tiered rate structure with four usage/price tiers. The sizing of the tiers is based on average customer use in the winter period, summer period, peak summer period, and use over peak summer period. As a part of the cost of service study, HDR developed an analysis to demonstrate and support the proposed residential tiered pricing. A more detailed discussion of this analysis is included within Section 3 of this report and the technical analysis is included within technical appendix A.

The District's water rates were developed for the next 5-year time period (FY 16 – FY 20) for each of the customer classes of service. A key component of developing the proposed rates for the District was to maintain or increase the revenue stability through the fixed charge component of the rates. Based on the target level of revenues, using the cost of service adjustments shown in Table ES-4, proposed rates were developed for the Arrowhead Woods residential customers to meet the results of the cost of service analysis. Provided below in Table ES-5 is a summary of the current and proposed residential rates for the Arrowhead Woods system residential customers.

Table ES-5  
Summary of the Proposed Arrowhead Woods Residential Water Rates

	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>4.8%</b>	<b>4.8%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge (\$/CCF)</b>						
0-4 CCF	\$1.18	\$1.22	\$1.26	\$1.30	\$1.34	\$1.39
5-13 CCF	2.24	2.32	2.39	2.47	2.54	2.64
14-30 CCF	6.64	6.87	7.09	7.32	7.54	7.82
31 + CCF	13.84	14.31	14.78	15.25	15.72	16.30

As can be seen, the structure of the residential rates has not been changed, only the level of the rates have been adjusted to meet the results of the revenue requirement and cost of service analysis.

Similar to the single family rates, the commercial proposed rates were adjusted to reflect the overall revenue needs of the Arrowhead Woods system and the cost of service results. In addition, the commercial rates are being transitioned to a uniform rate over the next three years. The transition to a uniform rate was recommended for several reasons. First, only a very few commercial customers have consumption outside the first tier. Second, unlike residential customers, water usage of commercial customers is not homogenous but varies based on the nature of the commercial business. Finally, a uniform rate still provides commercial customers with an incentive to use water efficiently while minimizing the impacts to customers using different amounts who are both using water efficiently. Provided in Table ES-6 is a summary of the current and proposed commercial water rates for the Arrowhead Woods system.

Table ES-6  
Summary of the Proposed Arrowhead Woods Commercial Water Rates

	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>5.2%</b>	<b>5.2%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge <sup>[1]</sup></b>						
Tier 1	\$3.11	\$3.41	\$3.81	N/A	N/A	N/A
Tier 2	6.21	5.50	4.15	N/A	N/A	N/A
Tier 3	12.93	10.50	4.60	N/A	N/A	N/A
All Consumption	N/A	N/A	N/A	\$4.00	\$4.15	\$4.32

[1] For rates in effect beginning January 1, 2016, and 2017, the tiers are based on the size of the meter serving the property. Tier sizes vary by meter size for commercial customers. The larger the meter size the larger the tier size. For rates effective beginning January 1, 2018, 2019, and 2020, the rates are uniform for each one hundred cubic feet of water.

As can be seen in Table ES-6, the commercial customer consumption charge is transitioning to a uniform rate over the next three year period. It is also important to note that there is minimal consumption in Tiers 2 and 3 for the commercial customers.

A similar approach was developed for the irrigation customers in the Arrowhead Woods water system. The current rate structure is a 2 tier consumption rate with a fixed monthly meter charge. The proposed rate structure transitions the irrigation customers to a uniform rate over the next three-year period. Provided in Table ES-7 is a summary of the current and proposed rates for the Arrowhead Woods system irrigation customers.

**Table ES-7**  
Summary of the Proposed Arrowhead Woods Irrigation Water Rates

	Present Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>-7.0%</b>	<b>-7.0%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge <sup>[1]</sup> (\$/CCF)</b>						
Tier 1 – 0-13 CCF	\$2.25	\$3.00	\$4.25	N/A	N/A	N/A
Tier 2 – 14 + CCF	13.84	11.15	8.30	N/A	N/A	N/A
All Consumption	N/A	N/A	N/A	\$7.15	\$7.50	\$7.90

[1] For rates effective beginning January 1, 2018, 2019, and 2020, the rates are uniform for each one hundred cubic feet of water.

This transition to a uniform rate attempts to minimize the customer bill impacts while still meeting the overall revenue needs allocated to the irrigation class of service.

**Table ES-8**  
Comparison of the Proposed Revenues and Allocated Costs (\$000's)

	Present Revenues	Cost of Service Adjustment <sup>[1]</sup>	Target Revenues	Proposed Revenues <sup>[2]</sup>	\$ Difference
<b>Arrowhead Woods</b>					
Residential	\$5,097	4.8%	\$5,342	\$5,344	\$2
Commercial	530	5.2%	557	557	0
Irrigation	<u>177</u>	<u>-7.0%</u>	<u>164</u>	<u>165</u>	<u>1</u>
<b>System Total</b>	<b>\$5,924</b>	<b>4.5%</b>	<b>\$6,194</b>	<b>\$6,197</b>	<b>\$3</b>

[1] The cost of service adjustments are provided in Table ES-4.

[2] For rates effective beginning January 1, 2018, 2019, and 2020, the rates are uniform for each one hundred cubic feet of water.

Based on the proposed cost of service adjustments, the proposed revenues reflect the proportional allocation of costs to the various customer classes of service. The differences are due to rounding of the rates. Overall, the difference between the target revenues and proposed revenues based on the proposed rates is approximately \$3,000 dollars out of a total of over \$6 million.

Section 5 of this report provides a detailed discussion of the present and proposed water rates along with a component by component summary of the water rates for FY 2016 – FY 2020.

### **Summary of the Arrowhead Woods Proposed Drought Surcharges**

As part of the water rate study the District requested the development of drought surcharges to maintain sufficient revenues during drought or water shortage periods. Drought surcharges are an important tool that allows the District to maintain adequate revenues when consumption declines due to voluntary or mandatory conservation resulting from drought conditions, such as the current drought California is experiencing, or other water shortage emergencies (e.g., supply constraints due to infrastructure failure).

When properly designed, drought surcharges address the issues of the financial/revenue impacts of decreased consumption. When a utility enters a drought stage, it is not uncommon for a utility to have a set of drought surcharges to maintain sufficient revenues due to reductions in usage. For purposes of establishing drought surcharges, the District has three different levels reflecting water restrictions. Each subsequent level results in additional reductions in consumption as established in the District’s Ordinance numbers 69 and 79. These three levels are summarized below along with the estimated consumption reductions resulting from additional conservation restrictions.

Level 1 – Limited Irrigation/Outdoor Use

- Approximately a 10% reduction in consumptive use

Level 2 – Minimal Irrigation/Outdoor Use

- Approximately a 25% reduction in consumptive use

Level 3 – Limited Irrigation/Outdoor Use

- Approximately a 40% reduction in consumptive use

In developing the proposed drought surcharges, the monthly meter charge remains fixed at the same level regardless of the drought stage. Based on the targeted conservation savings designated for each drought level, the drought surcharges were developed to maintain the current level of revenues for each customer class of service based on the projections of expenses as developed in the revenue requirement analysis. Provided below in Table ES-9 is a summary of the drought surcharges for each drought level.



Table ES-9  
Summary of the Arrowhead Woods Drought Surcharges – \$/CCF

	<u>Normal Conditions</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Level 3</u>
	0%	10%	25%	40%
<b><u>Residential</u></b>				
All Consumption/Each Tier	<b>\$0.00</b>	<b>\$0.79</b>	<b>\$1.81</b>	<b>\$7.00</b>
<b><u>Commercial</u></b>				
All Consumption/Each Tier	<b>\$0.00</b>	<b>\$0.66</b>	<b>\$2.07</b>	<b>\$6.15</b>
<b><u>Irrigation</u></b>				
All Consumption/Each Tier	<b>\$0.00</b>	<b>\$1.49</b>	<b>\$4.91</b>	<b>\$36.48</b>

The drought rates in Table ES-9 are added to the adopted rates in place at the time the drought stage is declared. The drought surcharges would be applied to each tier of the District’s rates. For example, the proposed rate for the Arrowhead Woods customer first tier is currently \$1.22/CCF and the District declares a Stage 2 drought, then the first tier rate will change to \$3.03/CCF (\$1.22 + \$1.81). The drought surcharge is added to each tier of the District’s rate for all consumption in that tier for each level of the drought. These drought surcharges can be added to the District’s proposed rates, effective January 1, 2016, as directed by the District Board. Implementation of these drought surcharges will help the District maintain revenue levels during drought related consumption reductions.

As noted, the purpose of the drought surcharges is to maintain sufficient revenues during times of declining consumption and subsequent revenues. Therefore, as water rates are adjusted, the drought surcharges will need to be adjusted to reflect the target revenue needs as the development of the drought surcharges are based on current water rates and revenue proposed levels. A more detailed discussion of the drought surcharges is provided in Section 5 of this report.

## Development of the Deer Lodge Park Rate Study

As noted, the rates for the Arrowhead Woods and Deer Lodge Park water systems have been calculated separately to reflect the specific costs of each system. Provided in the following is a summary of the rate analyses completed for the Deer Lodge Park water system.

## Summary of the Deer Lodge Park Water Revenue Requirement Analysis

The starting point of the revenue requirement for the Deer Lodge Park water system was the FY 2015 and FY 2016 adopted budgets. The District budgets O&M separately for each of the water systems. As a result, the O&M expenses identified for the Deer Lodge Park system reflect those costs incurred to provide service to Deer Lodge Park customers. Projected O&M expenses were escalated for future years based on historical inflationary factors. At this time, no capital

improvement projects were identified in the five year rate setting period for Deer Lodge Park. Provided below in Table ES-10 is a summary of the Deer Lodge Park revenue requirement.

Table ES-10 Summary of the Deer Lodge Park Revenue Requirement Analysis (\$000)					
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
<b>Revenues</b>					
Rate Revenues	\$123	\$123	\$123	\$124	\$124
Other Revenues	<u>9</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>11</u>
<b>Total Revenues</b>	<b>\$132</b>	<b>\$132</b>	<b>\$133</b>	<b>\$135</b>	<b>\$135</b>
<b>Expenses</b>					
O&M Expenses	\$184	\$188	\$193	\$197	\$202
Rate Funded Capital	\$0	\$0	\$0	\$0	\$0
Net Debt Service	0	0	0	0	0
Change in Working Capital	<u>(46)</u>	<u>(38)</u>	<u>(28)</u>	<u>(16)</u>	<u>(5)</u>
<b>Total Expenses</b>	<b>\$138</b>	<b>\$150</b>	<b>\$165</b>	<b>\$181</b>	<b>\$197</b>
Bal./ (Def.) of Funds	(\$6)	(\$18.13)	(\$31.59)	(\$46.41)	(\$62.70)
Balance as % of Rev from Rates	4.8%	14.7%	25.6%	37.5%	50.6%
<b>Proposed Rate Adjustments<sup>[1]</sup></b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>

As can be seen in Table ES-10, rate adjustments are necessary for the Deer Lodge Park system to fund the annual operations and maintenance expenses.

Based on the revenue requirement analysis developed herein, HDR has concluded that the District will need to adjust the rates for Deer Lodge Park over the next five years (FY 2016 – FY 2020) to maintain cost-based rates. HDR has reached this conclusion for the following reasons:

- Rate adjustments are necessary to meet the O&M expenses of the Deer Lodge Park water system.

In reaching this conclusion, HDR would recommend that the District adopt the proposed rates through FY 2020 in order to provide sufficient funding for the operating needs of the Deer Lodge Park system. Detailed technical exhibits of the revenue requirement analysis have been included within technical appendix B.

### Summary of the Deer Lodge Park Cost of Service Analysis

A cost of service analysis typically determines the equitable allocation of the revenue requirement to the various customer classes of service (e.g., single-family, commercial, irrigation) to determine the fair and equitable manner to collect the revenue requirement. In addition, the cost of service provides the basis for the pricing of the tiers for the water rate

structure. In the case of the Deer Lodge Park water system there is a single type of customer, residential customers, therefore the cost of service analysis provided the basis for the pricing of the tiers for the Deer Lodge Park customers. A more detailed summary of the analysis is provided in Section 5 of this report.

### Summary of the Current and Proposed Deer Lodge Park Water Rates

The current rate structure includes a monthly fixed charge and a two-tier increasing consumption charge. To reflect the cost of service analysis the monthly fixed fee was increased to reflect the fixed costs on the system and the consumption charges were adjusted to reflect the results of the cost of service study. Provided below in Table ES-11 is a summary of the current and proposed rates for the Deer Lodge Park water system.

Table ES-11 Summary of the Proposed Deer Lodge Park Water Rates						
	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$24.32	\$27.48	\$31.05	\$35.09	\$39.65	\$44.51
1"	59.59	67.34	76.09	85.98	97.16	109.04
1-1/2"	119.17	134.66	152.17	171.95	194.30	218.10
2"	190.43	215.19	243.16	274.77	310.49	348.51
<b>Consumption Charge (\$/CCF)</b>						
Tier 1 – 0-10 CCF	\$3.27	\$3.45	\$3.60	\$3.75	\$3.90	\$4.10
Tier 2 – 11 + CCF	3.90	4.12	4.30	4.48	4.66	4.90

The rates developed for the Deer Lodge Park system reflect the results of the cost of service analysis and overall revenue needs as developed in the revenue requirement analysis. Drought surcharges were also developed for the Deer Lodge Park water system and provided in Table ES-12.

Table ES-12 Summary of the Arrowhead Woods Drought Surcharges – \$/CCF				
	<u>Normal Conditions</u>	<u>Level 1</u>	<u>Level 2</u>	<u>Level 3</u>
	0%	10%	25%	40%
<b>Deer Lodge Park</b>				
All Consumption/Each Tier	<b>\$0.00</b>	<b>\$0.85</b>	<b>\$2.16</b>	<b>\$9.63</b>

The drought surcharges would be applied to each tier of the District's rates for the Deer Lodge Park customers. For example, the proposed rate for the first tier is currently \$3.45/CCF and the District declares a Stage 2 drought, then the first tier rate will change to \$5.61/CCF (\$3.45 + \$2.16). The drought surcharge is added to each tier of the District's rate for all consumption in that tier for each level of the drought. These drought surcharges can be added to the District's proposed rates, effective January 1, 2016, as directed by the District Board. Implementation of these drought surcharges will help the District maintain revenue levels during drought related consumption reductions. A more detailed discussion of the drought surcharges is provided in Section 5 of this report.

## **Water Rate Study Recommendations**

Based on the results of the water rate study, HDR recommends the following:

- Rate adjustments are necessary to prudently fund necessary capital renewal and replacement needs, maintain the District's financial position, and meet financial policies for minimum reserve levels and debt service coverage ratios.
- Water rates for the Arrowhead Woods water system should be adjusted annually 4.5% based on the proposed rates as part of this study starting in January 1, 2016 through January 1, 2019. The January 1, 2020 rate adjustment is a 5.5% adjustment.
- Water rates for the Deer Lodge Park water system should be adjusted annually 9.5% based on the proposed rates as part of this study starting in January 1, 2016 through January 1, 2020.
- The proposed rates reflect the results of the cost of service analysis developed for each system and the proportional allocation of costs to the various customer classes of service.
- Drought surcharges should be adopted based on the need to maintain sufficient revenues for operating and capital needs during water shortages for each system.
- Drought surcharges should be adjusted when water rates are adjusted each year.

## **Summary of the Water Rate Study**

This completes the summary of the development of the comprehensive water rate study for the District. The focus of this study has been the prudent and adequate funding of the utility, particularly as it relates to the needed capital improvement projects and prudent annual funding of renewal and replacement needs. The proposed rate adjustments maintain a fiscally healthy water system. A full and complete discussion of the development of the water rate study can be found in following sections of this report.



# 1. Introduction and Overview

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## 1.1 Introduction

HDR was retained by the Lake Arrowhead Community Services District (District) to conduct a comprehensive water rate study. The objective of the rate study was to review the District's operating and capital costs in order to develop a financial plan and cost-based rates for the District's water system customers.

## 1.2 Goals and Objectives

The District had a number of key objectives in developing the water rate study. These key objectives were as follows:

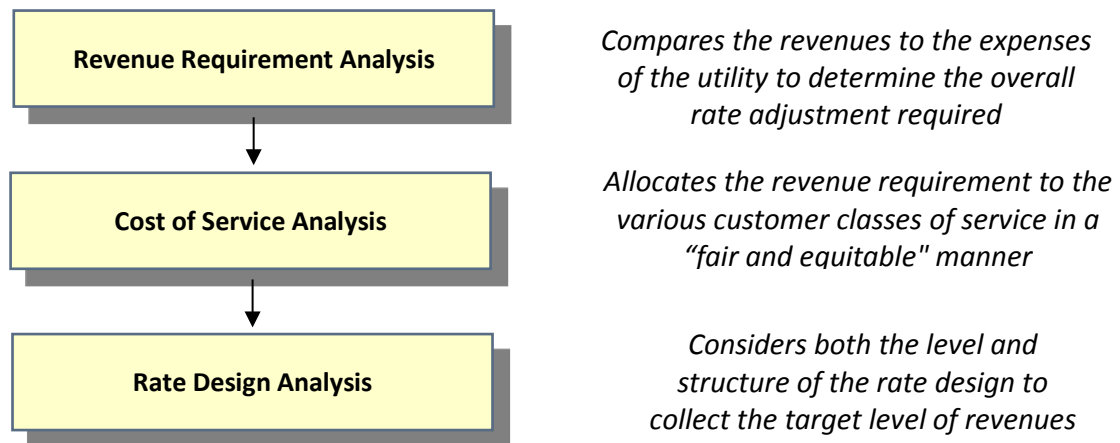
- Develop the study in a manner that is consistent with the principles and methodologies established by the American Water Works Association (AWWA), M1 Manual, Principles of Water Rates, Fees, and Charges.
- In financial planning and establishing the District's rates, review and utilize best industry practices, while recognizing and acknowledging the specific and unique characteristics of the District's systems.
- Review the District's rates utilizing "generally accepted" rate making methodologies to determine adequacy and equity of the utility rates.
- Meet the District's financial planning criteria, particularly as it relates to adequate funding of capital infrastructure and maintenance of adequate and prudent reserve levels.
- Develop a final proposed financial plan which adequately supports the utility's funding requirements, while attempting to minimize overall impacts to rates.
- Provide rates which meet the legal requirements of Article XIII D and recent legal decisions related to Article XIII D.

These key objectives provided a framework for policy decisions in the analysis that follows.

## 1.3 Overview of the Rate Study Process

User rates must be set at a level where a utility's operating and capital expenses are met with the revenues received from customers. This is an important point, as failure to achieve this objective may lead to insufficient funds to maintain system integrity. To evaluate the adequacy of the existing rates, a comprehensive rate study is often performed. A comprehensive water rate study consists of three interrelated analyses. Figure 1-1 provides an overview of these analyses.

Figure 1-1  
Overview of the Comprehensive Water Rate Analyses



The above framework for reviewing and evaluating rates was utilized for the District's water systems.

## 1.4 Organization of the Study

This report is organized in a sequential manner that first provides an overview of utility rate setting principles, followed by sections that detail the specific steps used to review the District's water rates for the Arrowhead Woods and Deer Lodge Park water systems. The following sections comprise the District's water rate study report:

- Section 2 – Overview of Water Rate Setting Principles
- Section 3 – Development of the Revenue Requirement Analysis
- Section 4 – Development of Cost of Service Analysis
- Section 5 – Development of the Proposed Rate Designs

A technical appendix is attached at the end of this report, which details the various technical analyses that were undertaken in the preparation of this study.

## 1.5 Summary

This report will review the comprehensive water rate analyses prepared for the District. This report has been prepared utilizing generally accepted water rate setting techniques.



## 2. Overview of Water Rate Setting Principles

---

### 2.1 Introduction

This section of the report provides background information about the water rate setting process, including descriptions of generally accepted principles, types of utilities, methods of determining a revenue requirement, the cost of service analysis, and rate design. This information is useful for gaining a better understanding of the details presented in Sections 3 through 5 of this report.

### 2.2 Generally Accepted Rate Setting Principles

As a practical matter, all utilities should consider setting their rates around some generally accepted or global principles and guidelines. Utility rates should be:

- Cost-based, equitable, and set at a level that meets the utility’s full revenue requirement.
- Easy to understand and administer.
- Designed to conform to “generally accepted” rate setting techniques.
- Stable in their ability to provide adequate revenues for meeting the utility’s financial, operating, and regulatory requirements.
- Established at a level that is stable from year-to-year from a customer’s perspective.

### 2.3 Determining the Revenue Requirement

Most public utilities use the “cash basis” approach for establishing their revenue requirement and setting rates. This approach conforms to most public utility budgetary requirements and the calculation is easy to understand. A public utility totals its cash expenditures for a period of time to determine required revenues. The revenue requirement for a public utility is usually comprised of the following costs or expenses:

- **Total Operating Expenses:** This includes a utility’s operation and maintenance (O&M) expenses, plus any applicable taxes or transfer payments. Operation and maintenance expenses include the materials, electricity, labor, supplies, etc., needed to keep the utility functioning.
- **Total Capital Expenses:** Capital expenses are calculated by adding debt service payments (principal and interest) to capital improvements financed with rate revenues. In lieu of including capital improvements financed with rate revenues, a utility sometimes includes depreciation expense to stabilize the annual revenue requirement.

Under the “cash basis” approach, the sum of the total O&M expenses plus the total capital expenses equals the utility’s revenue requirement during any selected period of time (historical or projected).

Note that the two portions of the capital expense component (debt service and capital improvements financed from rates) are necessary under the cash basis approach because utilities generally cannot finance all their capital facilities with long-term debt. At the same time, it is often difficult to pay for capital expenditures on a “pay-as-you-go” basis given that some major capital projects may have significant rate impacts upon a utility, even when financed with long-term debt. Many utilities have found that some combination of pay-as-you-go funding and long-term financing will often lead to minimization of rate increases over time.

Public utilities typically use the “cash basis”<sup>1</sup> approach to establish their revenue requirements. An exception occurs if a public utility provides service to a wholesale or contract customer. In this situation, a public utility could use the “utility basis” approach (see Table 2-1) regarding earning a fair return on its investment.

Table 2-1 Cash versus Utility Basis Comparison	
Cash Basis	Utility Basis (Accrual)
+ O&M Expenses	+ O&M Expenses
+ Taxes/Transfer Payments	+ Taxes/Transfer Payments
+ Capital Improv. Funded From Rates (≥ Depreciation Expense)	+ Depreciation Expense
+ Debt Service (Principal + Interest)	+ Return on Investment
= Total Revenue Requirement	= Total Revenue Requirement

## 2.4 Analyzing Cost of Service

After the total revenue requirement is determined, it is allocated to the users of the service. The allocation, usually analyzed through a cost of service analysis, reflects the cost relationships for producing and delivering services. A cost of service analysis requires three analytical steps:

1. Costs are **functionalized** or grouped into the various cost categories related to providing service (supply, distribution, pumping, etc.). This step is largely accomplished by the utility’s accounting system.
2. The functionalized costs are then **classified** to specific cost components. Classification refers to the arrangement of the functionalized data into cost components. For example, a water utility’s costs are typically classified as average day, peak day, or customer-related.
3. Once the costs are classified into components, they are proportionally **allocated** to the customer classes of service (residential, non-residential, irrigation, etc.). The allocation

<sup>1</sup> “Cash basis” as used in the context of rate setting is not the same as the terminology used for accounting purposes and recognition of revenues and expenses. As used for rate setting, “cash basis” simply refers to the specific cost components to be included within the revenue requirement analysis.



is based on each customer class' relative contribution to the cost component (i.e., benefits received from and burdens placed on the system and its resources). For example, customer-related costs are allocated to each class of service based on the total number of customers in that class of service. Once costs are allocated, the revenues from each customer class of service required to achieve cost-based rates can be determined.

## 2.5 Designing Water Rates

Rates that meet the utility's objectives are designed based on both the revenue requirement and the cost of service analysis. This approach results in rates that are strictly cost-based and does not consider other non-cost based goals and objectives (conservation, economic development, ability to pay, revenue stability, etc.). In designing the final proposed rates, factors such as ability to pay, continuity of past rate philosophy, economic development, ease of administration, and customer understanding may typically be taken into consideration.

## 2.6 Economic Theory and Rate Setting

One of the major justifications for a comprehensive rate study is founded in economic theory. Economic theory suggests that the price of a commodity must roughly equal its cost if equity among customers is to be maintained. This statement's implications on utility rate designs are significant. For example, a water utility usually incurs capacity-related costs to meet summer lawn watering needs. It follows that the customers who create excessive peak demands on the system and create the need for upsizing of the distribution system should pay for those oversized facilities in proportion to their contribution to total peaking requirements. When costing and pricing techniques are refined, consumers have a more accurate understanding of what the commodity costs to produce and deliver. This price-equals-cost concept provides the basis for the subsequent analysis and comments.

*“Economic theory suggests that the price of a commodity must roughly equal its cost if equity among customers is to be maintained.”*

## 2.7 Summary

This section of the report has provided a brief introduction to the general principles, techniques, and economic theory used to set water rates. These principles and techniques will become the basis for the District's comprehensive water rate study.



## 3. Development of the Revenue Requirements

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### 3.1 Introduction

This section describes the development of the revenue requirement for the District’s Arrowhead Woods and Deer Lodge Park systems. The District has provided detailed revenue and expenses data, separately for each system, that allowed for the development of the revenue requirement for each system. The revenue requirement analysis is the first analytical step in the comprehensive rate study process. This analysis determines the adequacy of the District’s overall water rates at current rate levels. From this analysis, a determination can be made as to the overall level of rate adjustment needed to provide adequate and prudent funding for both operating and capital needs. HDR developed an independent analysis based on information provided by the District as part of the review of proposed rate adjustments.

### 3.2 Determining the Revenue Requirement

In developing the District’s water revenue requirement, the water utility, as an enterprise fund, must financially “stand on its own” and be properly funded. As a result, the revenue requirement analysis, as developed herein, assumes the full and proper funding needed to operate and maintain the District’s water systems on a financially sound and prudent basis.

### 3.3 Establishing a Time Frame and Approach

The first step in calculating the revenue requirement for the District’s rate study was to establish a time frame for the revenue requirement analysis. For this study, the revenue requirement was developed for a 15-year time period (FY 2015 – FY 2029). This time frame was composed of the Budgets for FY 2015 and FY 2016 and projected through FY 2029, with the focus for rate setting purposes on FY 2016 – FY 2020. Reviewing a multi-year time period is recommended since it attempts to identify any major expenses that may be on the horizon. By anticipating future financial requirements, the District can begin planning for these changes sooner, thereby minimizing short-term rate impacts and overall long-term rates.

The second step in determining the revenue requirement was to decide on the basis of accumulating costs. In this particular case, for the revenue requirement analysis a “cash basis” approach was utilized. The “cash basis” approach is the most common methodology used by municipal utilities to set their revenue requirement. This is also the methodology that the District has historically used to establish its revenue requirement analysis. Table 3-1 provides a summary of the “cash basis” approach and cost components used to develop the District’s water revenue requirement.

Table 3-1  
Overview of the District's "Cash Basis" Revenue Requirements

+	Water Operation and Maintenance Expenses
+	Rate Funded Capital
+	Debt Service (Principal + Interest) – Existing and Future
<u>±</u>	<u>Change in Working Capital</u>
=	Total Water Revenue Requirement
<u>-</u>	<u>Miscellaneous Revenues</u>
=	Net Revenue Requirement (Balance Required from water Rates)

Given a time period around which to develop the revenue requirement and a method to accumulate the costs, the focus shifts to the development and projection of the revenues and expenses of the District's study.

The primary financial inputs in the development of the revenue requirement were the District's FY 2015 and FY 2016 budget documents, FY 2014 and FY 2015 billed customer and consumption data, and the current water capital improvement plan. Presented below is a detailed discussion of the steps and key assumptions contained in the development of the projections of the District's revenue requirement analyses.

### 3.4 Development of the Arrowhead Woods Revenue Requirement

This section will review the development of the revenue requirement for the Arrowhead Woods water system. The District budget provided the detailed O&M and capital expenses for the Arrowhead Woods system. In this way, the rates from the Arrowhead Woods system only fund those expenses that relate to services in the Arrowhead Woods system.

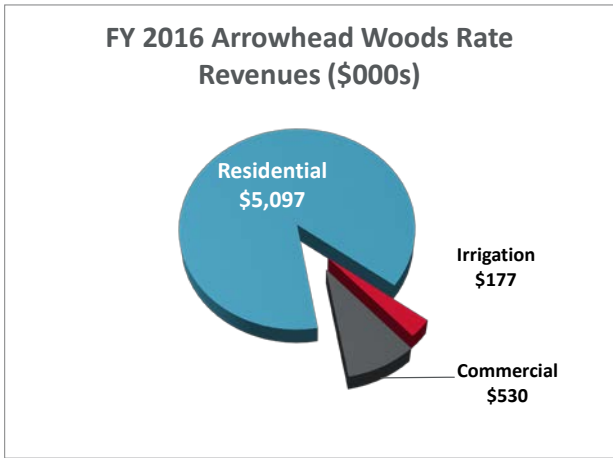
#### 3.4.1 Projecting Rate and Other Miscellaneous Revenues

The first step in developing the revenue requirement analysis was to develop a projection of the water rate revenues, at present rate levels. In general, this process involved developing projected billing units for each customer group (e.g., residential, commercial, etc.). The billing units for each customer group were then multiplied by the applicable current water rates. This method of independently calculating revenues links the projected revenues used within the analysis to the projected billing units. It also helps to confirm that the billing units used within the study are reasonable for purposes of projecting future revenues, allocating costs and, ultimately, establishing proposed rates.

A key aspect of the projection of water rate revenues was to develop a projection of consumption levels considering the current drought. In addition, the State of California has recently implemented additional required conservation savings for 2015 which will impact the level of consumption and resulting consumption based revenues. In discussion with District staff it was determined that calendar year 2014 consumption levels would be used as they appear to reflect the “new normal” consumption levels for the future. These consumption levels were prior to the State mandated conservation requirements, but still during the drought California has been experiencing.

*“ . . . the State of California has recently implemented additional required conservation savings for 2015 which will impact the level of consumption and resulting consumption based revenues.”*

The District has separate rate schedules (structures) for its Arrowhead Woods residential, commercial, and irrigation customers. The majority of the District’s rate revenues are derived from the Arrowhead Woods residential customers. The District also serves a variety of commercial and irrigation customers. In total, and at currently adopted rate levels, the District’s Arrowhead Woods water system is projected to receive approximately \$5.80 million in rate revenue in FY 2016. Over time, the study has assumed a conservative level customer growth of less than 0.5%/year. By FY 2020, the rate revenues, assuming no rate adjustments, are projected to be approximately \$5.84 million based on the assumed customer growth estimates. The development of the revenue projections for the Arrowhead Woods water system is



provided in Exhibit 6 of technical appendix A. The projection of revenues is based on the assumed customer growth provided in Exhibit 2 of technical appendix A and the actual revenue increases are shown in Exhibit 3 of technical appendix A.

In addition to rate revenues, the District’s also budgets for miscellaneous revenues related to providing services in the Arrowhead Woods system. These are revenues related to fire protection charges, interest earnings, and other operating income. In total, the District is projected to annually receive approximately \$230,000 in miscellaneous revenues over the projected planning horizon. The projections of these revenues are shown in Exhibit 3 of technical appendix A.

On a combined basis, taking into account the rate revenues and the miscellaneous revenues, the District’s Arrowhead Woods water system has total projected revenues of approximately \$6.0 million in FY 2016, increasing to approximately \$6.1 million by FY 2020 as shown in Exhibit 3 of technical appendix A.

### 3.4.2 Projecting Operation and Maintenance Expenses

Operation and maintenance (O&M) expenses are incurred by the District to provide water service (supply and distribution of water), operate and maintain the existing infrastructure, as well as purchase water from the Crestline-Lake Arrowhead Water Agency (CLAWA). As noted, the District provided the detailed budgeted O&M expenses and capital improvement needs that specifically relate to the Arrowhead Woods water system. The District develops a separate budget that specifically reflects the costs associated with the Arrowhead Woods water system. The detailed O&M expenses can be found in Exhibit 3 of technical appendix A for the budget years of FY 2015 and FY 2016 for Arrowhead Woods. The budgeted O&M expenses were projected over the time period based on annual inflationary factors. The inflationary factors were based on historical increases in O&M expenses incurred by the District and range from 1.5% to 6.0% per year depending on the type of O&M expense. Provided in Table 3-2 is a summary of the inflationary factors used for the projection of costs for the Arrowhead Woods system.

Table 3-2  
Summary of the Arrowhead Woods Inflationary Factors

Component	FY 2016	FY 2107	FY 2018	FY 2019	FY 2020
Salary	Budget	3.0%	3.0%	3.0%	3.0%
Benefits	Budget	3.5%	3.5%	3.5%	3.5%
Medical Benefits	Budget	6.0%	6.0%	5.0%	5.0%
Materials & Supplies	Budget	2.5%	2.5%	2.5%	2.5%
Equipment	Budget	3.0%	3.0%	3.0%	3.0%
Miscellaneous	Budget	1.5%	1.5%	1.5%	1.5%
Utilities	Budget	4.0%	4.0%	4.0%	4.0%
Insurance	Budget	4.5%	4.5%	3.5%	3.5%

The total O&M expenses for the Arrowhead Woods system are approximately \$3.9 million based on the FY 2016 budget. However, it should be noted that supplemental water fee revenues are used to offset specific costs as provided by the adoption of the supplemental water fee. O&M expenses comprise approximately two-thirds of the total expenses incurred by the District for the Arrowhead Woods system. Over the planning horizon, the total O&M expenses for the Arrowhead Woods system are projected to increase to approximately \$4.6 million by FY 2020 based on assumed inflationary factors provided in Table 3-2. It should also be noted that the adoption of the supplemental water fee revenues is eliminated starting in FY 2026 unless a new fee is adopted by the District Board.

### 3.4.3 Projecting Capital Funding Needs

A key component in the development of the water revenue requirement was properly and adequately funding capital improvement needs. One of the major issues facing many utilities across the U.S. is the amount of deferred capital projects and the funding pressure from

growth/expansion-related improvements. The proper and adequate funding of capital projects is an important issue for all water utilities and is not just a local issue or concern of the District.

In general, there are three types of capital projects that a utility may need to fund. These include the following types:

- Renewal and replacement projects
- Growth/capacity expansion projects
- Regulatory-related projects

A renewal and replacement project is essentially a project required for maintaining the existing system that is in place today. As the existing plant or pipelines become worn out, obsolete, etc., the utility should be making continuous investments to maintain the integrity of the facilities. In contrast to this, a utility may make capital investments to expand the capacity of facilities to accommodate future capacity needs (customers). Finally, certain projects may be a function of a regulatory requirement in which the Federal or State government mandates the need for an improvement to the system to meet a regulatory standard. Understanding these different types of capital projects is important because it may help to explain why costs are increasing and the cost drivers for any needed rate adjustment. In addition, and more importantly, the way in which projects are funded may vary by the type of capital project. For example, renewal and replacement projects may be paid for via rates and funded on a “pay-as-you-go basis”. In contrast to this, growth or capacity expansion projects may be funded via the collection of development or water capacity fees (i.e. growth-related charges) in which new development pays a proportional and equitable share of the cost of facilities necessary to serve their development (impact). Finally, regulatory projects may be funded by a variety of different means, which may include rates, long-term debt, grants, etc.

While the above discussion appears to neatly divide capital projects into three clearly defined categories, the reality of working with specific capital projects may be more complex. For example, a pump may be replaced, but while being replaced, it is up-sized to accommodate greater capacity to serve increasing demands or new development. There are many projects that share these “joint” characteristics. At the same time, projects may not be “replacement” related, but rather “improvement” related.

For purposes of developing the capital funding plan, the District provided its long-term capital improvement plan for the Arrowhead Woods system. Provided in Table 3-3 is the detail of the capital funding plan for the Arrowhead Woods water system. As noted, the focus of the rate study was on the next five-year period for rate setting purposes. While the District has a long-term capital plan, which was included in the development of the rates, Table 3-3 provides the improvements over the next five-year period that are included within the development of the proposed revenue requirement for the Arrowhead Woods system.

Table 3-3  
Summary of the Arrowhead Woods Capital Improvements (\$000)

	FY 2016	FY 2107	FY 2018	FY 2019	FY 2020
<b>Water Treatment Projects</b>					
Bernina WTP Filter Structure Lining	\$0	\$0	\$0	\$0	\$250
<b>Total Treatment Projects</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$250</b>
<b>Water Pumping and Storage</b>					
North Bay Intake Pump Station Replacement	\$2,787	\$0	\$0	\$0	\$0
Banff Tank Replacement (1965)	0	0	0	0	500
Shasta Tank Replacement (1965)	0	0	0	0	820
Banff Fire Flow Improvements	0	0	0	370	0
Shasta Fire Flow Improvements	360	0	0	0	0
Amador Fire Flow Improvements	0	0	0	380	0
Spyglass Fire Flow Improvements	0	0	340	0	0
Kodiak Fire Flow Improvements	0	380	0	0	0
<b>Total Water Pumping and Storage</b>	<b>\$3,147</b>	<b>\$380</b>	<b>\$340</b>	<b>\$750</b>	<b>\$1,320</b>
<b>Water Pipeline Replacement</b>					
Emerald Drive	\$150	\$0	\$0	\$0	\$0
Emerald & Old Mill Replacement	400	0	0	0	0
Replace 12" steel near Burnt Mill (300 LF)	0	75	0	0	0
Replace AC Pipe on Bald Eagle	0	0	360	0	0
Talisman Lane Fire Flow Improvements	0	0	0	0	30
Matterhorn/St. Bernard Improvements	0	0	0	0	40
<b>Total Water Pipeline Replacement</b>	<b>\$550</b>	<b>\$750</b>	<b>\$360</b>	<b>\$0</b>	<b>\$70</b>
<b>Other Water System Improvements</b>					
District Office Upgrades	\$350	\$0	\$0	\$0	\$0
Equipment purchases	55	55	55	55	100
Meter replacements (over 5 years)	0	500	500	500	500
<b>Total Other Improvements</b>	<b>\$405</b>	<b>\$555</b>	<b>\$555</b>	<b>\$555</b>	<b>\$600</b>
<b>To Capital Improvements</b>	<b>\$4,102</b>	<b>\$1,010</b>	<b>\$1,255</b>	<b>\$1,500</b>	<b>\$2,2240</b>
Less: Reserve Funding	\$3,102	\$10	\$5	\$0	\$490
<b>Rate Funded Capital</b>	<b>\$1,000</b>	<b>\$1,000</b>	<b>\$1,250</b>	<b>\$1,500</b>	<b>\$1,750</b>

As can be seen in Table 3-3, there are a number of projects which vary from year-to-year. While the total amount required to fund a project may vary from year to year, the rate study capital funding plan has attempted to provide a consistent funding source for capital improvements. In this case, rates will annually fund an amount ranging from \$1.0 million to \$1.75 million (as highlighted in Table 3-3). As a point of reference, the District's annual depreciation expense is approximately \$1.8 million for FY 2014. A desirable and recommended minimum funding target for rate funded capital is an amount equal to or greater than annual



depreciation expense. While this financial plan has not fully met that target funding level of rates, the level of funding has been increased to a more prudent level. It is important to note and understand that depreciation expense is not the same as replacement cost. Thus, funding an amount which exceeds depreciation expense (i.e. > \$1.8 million) is both prudent and appropriate. In developing this financial plan, HDR and the District have attempted to minimize rate impacts while funding the planned capital improvement projects of the Arrowhead Woods water system.

### 3.4.4 Projection of Debt Service

The District currently has two outstanding debt issues related to improvements on the Arrowhead Woods water system. These are for the 2009 Certificates of Participation (COPs) and the State Revolving Fund (SRF) loan. In total, these two issues have an annual debt service payment of approximately \$600,000 per year. In addition, there is an interfund loan repayment of \$180,000 per year which is completed in FY 2020. Also included in the annual debt component is the PERS repayment of approximately \$160,000 per year with a final payment in FY 2027. No additional long-term debt issues are assumed over the time period to fund the capital improvement program for the Arrowhead Woods water system.

*“No additional long-term debt issues are assumed over the time period . . .”*

### 3.4.5 Change in Working Capital

The final component of the revenue requirement analysis is the change in working capital, or additional transfers to reserve funds to maintain prudent ending fund balances or for future funding of specific projects. The rate analysis assumes an annual transfer to the capital and rate stabilization funds on an annual basis. In addition, any additional balance of funds after the transfers are made, are transferred to the operating fund to maintain minimum fund balances. The annual transfer to the capital fund is used to fund capital improvements in the current and/or following year while the transfer to the rate stabilization fund is to reach target minimum balances in that fund.

### 3.4.6 Summary of the Revenue Requirement

Given the above projections of revenues and expenses, a summary of the water revenue requirement analysis can be developed for the Arrowhead Woods water system. In developing the revenue requirement analysis, consideration was given to the financial planning considerations of the District. In particular, emphasis was placed on attempting to minimize rates, yet still have adequate funds to support the operational activities and capital improvement needs throughout the projected time period. A focus of the analysis, and resulting rate projections, is based on meeting the capital improvement needs of the District. Presented below in Table 3-4 is a summary of the District’s revenue requirement for the Arrowhead Woods system based on projected expenses and current rates. Detailed exhibits of this analysis can be found in technical appendix A.



Table 3-4  
Summary of the Arrowhead Woods Revenue Requirement Analysis (\$000)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
<b>Revenues</b>					
Rate Revenues	\$5,804	\$5,810	\$5,815	\$5,827	\$5,839
Other Revenues	<u>204</u>	<u>195</u>	<u>236</u>	<u>266</u>	<u>258</u>
<b>Total Revenues</b>	<b>\$6,008</b>	<b>\$6,005</b>	<b>\$6,051</b>	<b>\$6,093</b>	<b>\$6,096</b>
<b>Expenses</b>					
O&M Expenses	\$3,974	\$4,115	\$4,278	\$4,423	\$4,591
Rate Funded Capital	\$1,000	\$1,000	\$1,250	\$1,500	\$1,750
Net Debt Service	841	636	636	636	635
Change in Working Capital	<u>324</u>	<u>653</u>	<u>566</u>	<u>506</u>	<u>418</u>
<b>Total Expenses</b>	<b>\$6,138</b>	<b>\$6,403</b>	<b>\$6,729</b>	<b>\$7,065</b>	<b>\$7,394</b>
Bal./(Def.) of Funds	(\$131)	(\$398)	(\$678)	(\$972)	(\$1,298)
Balance as % of Rev from Rates	2.3%	6.9%	11.7%	16.7%	22.2%
<b>Proposed Rate Adjustments<sup>[1]</sup></b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>

[1] - The proposed rate adjustments will be implemented on January 1 of each year, midway through the fiscal year.

As can be seen, the revenue requirement has summed the O&M, rate funded capital, net debt service and the change in working capital for the Arrowhead Woods water system. The total revenue requirement is then compared to the total sources of funds which are the rate revenues, at present rate levels, and other miscellaneous revenues. From this comparison a balance or deficiency of funds in each year can be determined. This balance or deficiency of funds is then compared to the rate revenues to determine the level of rate adjustment needed to meet the revenue requirement. It is important to note the “Bal./(Def.) of Funds” is cumulative. That is, any adjustments in the initial years will reduce the deficiency in the later years. Over this project time period, the total deficiency of rates is 22.2% for the Arrowhead Woods system. Table 3-5 also provides a rate transition plan to adjust rates over this time period to sufficiently fund the Arrowhead Woods O&M and capital needs.

### 3.5 Development of the Deer Lodge Park Revenue Requirement

This section will review the development of the revenue requirement for the Deer Lodge Park water system. The District provided the detailed O&M and capital expenses for the Deer Lodge Park water system. In this way, the rates from the Deer Lodge Park customers only fund those expenses that relate to providing services in the Deer Lodge Park water system.

#### 3.5.1 Projecting Rate and Other Miscellaneous Revenues

The first step in developing the revenue requirement analysis was to develop a projection of the water rate revenues, at present rate levels. The billing units for the Deer Lodge Park

customers were multiplied by the applicable current water rates. This method of independently calculating revenues links the projected revenues used within the analysis to the projected billing units. It also helps to confirm that the billing units used within the study are reasonable for purposes of projecting future revenues, allocating costs and, ultimately, establishing proposed rates.

A key aspect of the projection of water rate revenues was to develop a projection of consumption levels considering the current drought and additional State mandated conservation savings in 2015. In discussion with District staff it was determined that calendar year 2014 consumption levels would be used as they appear to reflect the “new normal” consumption levels for the future. These consumption levels were prior to the State mandated conservation requirements, but still during the drought California has been experiencing.

The District has a single rate schedule for the customers in the Deer Lodge Park water system as the customers are all residential type customers. In total, at currently adopted rate levels, the Deer Lodge Park water system is projected to receive approximately \$123,000 in rate revenue in FY 2016. The calculation of the revenues for the Deer Lodge Park customers is provided in Exhibit 4 of technical appendix B. Over time, the study has assumed a conservative level customer growth of less than 0.5%/year. By FY 2020, the rate revenues, assuming no rate adjustments, are projected to be approximately \$124,000 based on the assumed customer growth estimates. This projection of revenues is based on the customer growth provided in Exhibit 2 of technical appendix B and annual revenues are provided in Exhibit 3 of technical appendix B.

In addition to rate revenues, the District’s also receives miscellaneous revenues related to providing services in the Deer Lodge Park water system. These are revenues related to fire protection charges, interest earnings, and other operating income. In total, the District is projected to annually receive approximately \$10,000 in miscellaneous revenues over the projected planning horizon.

On a combined basis, taking into account the rate revenues and the miscellaneous revenues, the District’s Deer Lodge Park water system has total projected revenues of approximately \$132,000 in FY 2016, increasing to approximately \$134,000 by FY 2020.

### **3.5.2 Projecting Operation and Maintenance Expenses**

Operation and maintenance (O&M) expenses are incurred by the District to provide water service (supply and distribution of water), operate and maintain the existing infrastructure, as well as purchase water from CLAWA. As noted, the District provided detailed O&M expenses that specifically relate to the Deer Lodge Park water system. The budgeted O&M expenses were projected over the time period based on annual inflationary factors. The inflationary factors were based on historical increases in O&M expenses incurred by the District and range from 1.5% to 6.0% per year depending on the type of O&M expense. Provided in Table 3-5 is a summary of the inflationary factors used for the projection of costs for the Deer Lodge Park water system.

Table 3-5  
Summary of the Deer Lodge Park Inflationary Factors

Component	FY 2016	FY 2107	FY 2018	FY 2019	FY 2020
Salary	Budget	3.0%	3.0%	3.0%	3.0%
Benefits	Budget	3.5%	3.5%	3.5%	3.5%
Medical Benefits	Budget	6.0%	6.0%	5.0%	5.0%
Materials & Supplies	Budget	2.5%	2.5%	2.5%	2.5%
Equipment	Budget	3.0%	3.0%	3.0%	3.0%
Miscellaneous	Budget	1.5%	1.5%	1.5%	1.5%
Utilities	Budget	4.0%	4.0%	4.0%	4.0%
Insurance	Budget	4.5%	4.5%	3.5%	3.5%

The total O&M expenses for the Deer Lodge Park water system are approximately \$184,000 based on the FY 2016 budget. Over the rate setting period, the total O&M expenses for the Deer Lodge Park water system are projected to increase to approximately \$202,000 by FY 2020 based on assumed inflationary factors provided in Table 3-5. The detail of the budgeted O&M expenses for the Deer Lodge Park system are included in Exhibit 3 of technical B.

### 3.5.3 Projecting Capital Funding Needs

During the five year rate period there are no significant capital improvement projects planned for the Deer Lodge Park water system. However, current rates should be funding an annual amount of capital that if not used to fund projects is placed in a reserve fund for future capital improvement needs. In this way, rates are set at a level that is sufficient to fund ongoing renewal and replacement of the water system infrastructure. At the current time, there is no funding included within the rates to fund annual renewal and replacements. As the District continues to review the capital improvement needs of the Deer Lodge Park system rates may need to be adjusted to fund capital improvement needs.

### 3.5.4 Projection of Debt Service

At the current time there are no outstanding debt issues related to improvements on the Deer Lodge Park water system. In addition, no long-term debt issues are assumed over the time period to fund the capital improvement program for the Deer Lodge Park water system.

### 3.5.5 Change in Working Capital

The final component of the revenue requirement analysis is the change in working capital, or transfers to reserve funds to maintain prudent ending fund balances or for future funding of specific projects. No transfers to reserves are included within the analysis for the five year rate setting period. However, reserves are being used to fund the annual deficiency of rates from the Deer Lodge Park operating reserve fund on an annual basis over the five year rate setting period.

### 3.5.6 Summary of the Revenue Requirement

Given the above projections of revenues and expenses, a summary of the water revenue requirement analysis can be developed for the Deer Lodge Park water system. The focus of the analysis for the Deer Lodge Park water system, and resulting rate projections, is based on sufficiently funding the annual O&M expenses. Presented below in Table 3-6 is a summary of the District’s revenue requirement for the Deer Lodge Park system based on projected expenses and current rates. Detailed exhibits of this analysis can be found in technical appendix B.

Table 3-6 Summary of the Deer Lodge Park Revenue Requirement Analysis (\$000)					
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
<b>Revenues</b>					
Rate Revenues	\$123	\$123	\$123	\$124	\$124
Other Revenues	<u>9</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>11</u>
<b>Total Revenues</b>	<b>\$132</b>	<b>\$132</b>	<b>\$133</b>	<b>\$135</b>	<b>\$135</b>
<b>Expenses</b>					
O&M Expenses	\$184	\$188	\$193	\$197	\$202
Rate Funded Capital	\$0	\$0	\$0	\$0	\$0
Net Debt Service	0	0	0	0	0
Change in Working Capital	<u>(46)</u>	<u>(38)</u>	<u>(28)</u>	<u>(16)</u>	<u>(5)</u>
<b>Total Expenses</b>	<b>\$138</b>	<b>\$150</b>	<b>\$165</b>	<b>\$181</b>	<b>\$197</b>
Bal./(Def.) of Funds	(\$6)	(\$18)	(\$31)	(\$46)	(\$62)
Balance as % of Rev from Rates	4.8%	14.7%	25.6%	37.5%	50.6%
<b>Proposed Rate Adjustments<sup>[1]</sup></b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>

As can be seen in Table 3-6, rate adjustments are necessary for the Deer Lodge Park system to fund the annual operations and maintenance expenses. As shown in Table 3-6, current revenues do not fund annual O&M expenses. As a result, the reserves for Deer Lodge Park are being used to allow the District to transition rates to cost based levels. At the end of the five year rate setting period, rates for the Deer Lodge Park system are sufficient to fund annual O&M expenses.

### 3.6 Consultant’s Conclusions of the Revenue Requirements

The financial plans (revenue requirements) indicate the need for annual revenue increases to adequately fund the District’s operating and capital needs for the Arrowhead Woods and Deer Lodge Park water systems. The proposed revenue adjustments for the Arrowhead woods system are 4.5% in FY 2016 through FY 2019, followed by a 5.0% in FY 2020. The annual adjustments to the Deer Lodge Park revenues are 9.5% annually starting in FY 2016 through FY

2020. The proposed revenue adjustments for both systems are projected to be implemented on January 1 or each year. HDR has reached this conclusion for the following reasons:

- Revenue adjustments are necessary to prudently fund the District’s operating and maintenance expenses.
- Revenue adjustments are necessary to adequately fund the District’s capital improvement needs.
- Revenue adjustments reflect the baseline new consumption levels reflecting the impact recent conservation has had on customer behavior and water consumption.
- Revenue adjustments are necessary to fund the District’s capital projects on a “pay-as-you-go” basis and avoid the need for the issuance of any long-term debt.
- The proposed rate adjustments maintain the District’s strong financial health of meeting minimum reserve levels and debt service coverage ratios and provide long-term sustainable funding levels for the District.

In reaching this conclusion, HDR would recommend that the District adopt the proposed adjustments through FY 2020 in order to provide the funding for the operating expenses and capital improvement program.



## 4. Development of the Cost of Service Analysis

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### 4.1 Introduction

In the previous section, the revenue requirement analysis focused on the total sources and application of funds required to adequately fund the District's Arrowhead Woods and Deer Lodge Park water systems. This section will provide an overview of the cost of service analysis developed for the Arrowhead Woods and Deer Lodge Park systems. A cost of service analysis is concerned with the equitable allocation of the total revenue requirements, of each system, between the various customer classes of service (e.g., residential, commercial, irrigation) and to pricing tiers for the development of rates, for each system.

### 4.2 Objectives of a Cost of Service Study

There are two primary objectives in conducting a cost of service analysis:

- Allocate the District's revenue requirement among the customer classes of service; and
- Derive average unit costs for subsequent rate designs.

The objectives of the cost of service analysis are different from determining a revenue requirement. As noted in the previous section, a revenue requirement analysis determines the utility's overall financial needs, while the cost of service analysis determines the fair and equitable manner to collect the revenue requirement.

The second rationale for conducting a cost of service analysis is to develop unit costs which can be used in the development of the final rate designs. The cost of service analysis provides a cost per unit of water consumption based on each customer class's equitable (proportional) share of costs. For example, a water utility incurs costs related to demand, average day, peak day, fire protection, and customer-related cost components. A water utility must build sufficient capacity<sup>2</sup> to meet summer peak capacity needs. Therefore, those customers contributing to those peak demands on the system should pay their proportionately higher share of the costs to provide the capacity in the system. The unit costs provide the relationship between these components which can then be used to set cost-based rates.

### 4.3 Overview of the Cost of Service Analyses

A cost of service analysis was developed for both water systems based on the specific costs identified in the development of the revenue requirement analysis for each system. For the Arrowhead Woods water system costs were first allocated between the various customer

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<sup>2</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 demands are generally allocated to each customer class based upon the class's contribution to the peak month, day or hour event.

classes of service and then to tiers for the residential tier pricing. For the Deer Lodge Park water system there is a single class of service, as there are only residential customers, and therefore the costs were allocated to the tiers for the proposed rates. Providing below is a summary of the cost of service analysis completed for the Arrowhead Woods system followed by the cost of service analysis completed for the Deer Lodge Park system.

## 4.4 Arrowhead Woods Cost of Service Analysis

Provided below is a summary of the cost of service analysis completed for the Arrowhead Woods system. The cost of service was based on the FY 2016 revenue requirement as developed in the Section 3 of this report. The expenses included in the analysis are entirely related to providing service to the Arrowhead Woods customers and do not include costs related to the District's other water systems.

### 4.4.1 Determining the Customer Classes of Service

The first step in a cost of service analysis is to determine the customer classes of service. Based on the current rate schedules and customer characteristics for the Arrowhead Woods system, the classes of service used within the cost of service analysis were:

- Residential
- Commercial
- Irrigation

In determining classes of service for cost of service purposes, the objective is to group customers together into similar or homogeneous groups based upon facility requirements and/or demand characteristics. HDR reviewed the current customer classes of service used by the District and found them consistent with typical industry practices.

### 4.4.2 General Cost of Service Procedures

In order to determine the cost to serve each customer class of service on the District's Arrowhead Woods water system, a cost of service analysis is conducted. A cost of service study utilizes a three-step approach to review costs. These steps take the form of **functionalization**, **classification**, and **allocation**. Provided below is a detailed discussion of the water cost of service study conducted for the District Arrowhead Woods system, and the specific steps taken within the analysis. The approach used for the District's study reflects generally accepted cost of service methodologies as outlined in the AWWA M1 manual.

#### 4.4.2.1 Functionalization of Costs

The first analytical step in the cost of service process is called functionalization. Functionalization is the arrangement of expenses and asset (e.g., a water treatment plant) data by major operating functions (e.g., supply, transmission, storage, distribution). Within this study, there was a limited amount of functionalization of the data since it was largely accomplished within the District's system of accounts.



#### 4.4.2.2 Classification of Costs

The second analytical task performed in a cost of service study is the classification of the costs. The classification of costs examines why the expenses were incurred or what type of need is being met. The following cost classifiers were used to develop the cost of service analysis:

- **Commodity Related Costs:** Commodity costs are those costs which tend to vary with the total quantity of water consumed by a customer. Commodity costs are those incurred under average load (demand) conditions and are generally specified for a period of time such as a month or year. Chemicals or utilities (electricity) are examples of commodity-related cost as these costs tend to vary based upon the total demand of water. They also include costs associated with specific sources of supply.
- **Capacity Related Costs:** Capacity costs are those which vary with peak demand, or the maximum rates of flow to customers. System capacity is required when there are large demands for water placed upon the system (e.g., summer lawn watering). For water utilities, capacity related costs are generally related to the sizing of facilities needed to meet a customer's maximum water demand at any point in time. For example, portions of distribution storage reservoirs and mains (pipes) must be adequately sized to meet for this particular type of requirement.
- **Customer Related Costs:** Customer costs are those cost which vary with the number of customers on the water system. They do not vary with system output or consumption levels. These costs are also sometimes referred to as readiness to serve or availability costs. Customer costs may also sometimes be further classified as either actual or weighted. Actual customer costs vary proportionally, from customer to customer, with the addition or deletion of a customer regardless of the size of the customer. An example of an actual customer cost is postage for mailing bills. This cost does not vary from customer to customer, regardless of the size or consumption characteristics of the customer. In contrast, a weighted customer cost reflects a disproportionate cost, from customer to customer, with the addition

#### Water Cost of Service Analysis Terminology

**Functionalization** – The arrangement of the cost data by functional category (e.g., source of supply, treatment, etc.).

**Classification** – The assignment of functionalized costs to cost components (e.g., commodity, capacity, customer and fire protection related).

**Allocation** – Allocating the classified costs to each class of service based upon each class's proportional contribution to that specific cost component.

**Commodity Costs** – Costs that are classified as commodity related vary with the total demand of water (e.g., chemical use at a treatment plant).

**Capacity Costs** – Costs classified as capacity related vary with peak day or peak hour usage. Facilities are often designed and sized around meeting peak demands.

**Fire Protection Costs** – Costs that are related to fire protection services (e.g., hydrants, oversizing of storage and distribution mains).

**Customer Costs** – Costs classified as customer related vary with the number of customers on the system (e.g., metering costs).



or deletion of a customer. Examples of weighted customer costs are items such as meter maintenance expenses, where a large commercial customer requires a significantly more expensive meter than a typical residential customer.

- **Fire Protection Related Costs:** Fire protection costs are those costs related to the public fire protection functions. Usually, such costs are those related to public fire hydrants and the over-sizing of mains and distribution storage reservoirs for fire protection purposes
- **Revenue Related Costs:** Some costs associated with the utility may vary with the amount of revenue received by the utility. An example of a revenue related cost would be a utility tax which is based on the gross utility revenue.

#### 4.4.2.3 Development of Allocation Factors

Once the classification process is complete, and the customer groups have been defined, the various classified costs were allocated to each customer group. The District’s classified costs were allocated to the previously identified customer groups using the following allocation factors.

- **Commodity Allocation Factor (COM):** As noted earlier, commodity-related costs vary with the total water demand. Therefore, the commodity allocation factor was based on the projected total metered consumption plus losses for each class of service for the projected test period using calendar year 2014 consumption data. As noted, the consumption reflects the projected new “baseline” consumption levels. These projected levels are based on estimates of customer behavior changing due to the current drought. It should also be noted that the annual consumption impacts due to the drought can impact the results of the cost of service as it does not reflect ‘normal’ or typical consumption levels or patterns of use in a non-drought period. Provided below is a summary of the commodity allocation factor

Customer Class	Total Consumption (CCF) <sup>[1]</sup>	Average Day Use (MGD) <sup>[2]</sup>	% of Total
Residential	544,803	1.12	85.6%
Irrigation	13,003	0.03	2.0%
Commercial	<u>78,751</u>	<u>0.16</u>	<u>12.4%</u>
Total	636,557	1.30	100.0%

[1] Total consumption includes calendar year 2014 metered sales and losses on the system to equal total production and purchases of water.

[2] MGD is million gallons per day. MGD is calculated by taking the total CCF times 748 gallons times 365 days divided by 1,000,000

- **Capacity Allocation Factor (CAP):** The capacity allocation factor was developed based on the assumed contribution to peak day use of each class. Peak day use by customer class of service was calculated by using peaking factors for each customer group. In this particular case, the peaking factor was defined as the relationship between peak day contribution and average day use and determined for each customer group based on a review of the average month to peak month usage. Given an estimated peaking factor, the peak day contribution

for each class of service was developed. Similar to the commodity allocation factor the peaking data reflects the impacts of the drought and therefore will impact the results of the cost of service analysis as customers respond differently to the conservation goals and programs. Provided below is a summary of the capacity allocation factor.

Customer Class	Peak Day Use (MGD) <sup>[2]</sup>	% of Total
Residential	3.35	86.9%
Irrigation	0.11	2.8%
Commercial	<u>0.40</u>	<u>10.3%</u>
Total	3.86	100.0%

[1] Peak factor is based on the average month to peak month adjusted proportionally to reflect the system peak day event.

[2] Peak day use is the average day use (see commodity allocation factor) times the peak factor.

- **Customer Allocation Factor (AC/WCMS):** Customer costs vary with the number of customers on the system. Two basic types of customer allocation factors were identified – actual and weighted. The allocation factor for actual customer is based on the projection of the number of customers developed within the revenue requirement. The weighted customer allocation factor is for meters and services. This factor attempts to reflect the different costs associated with providing larger sized meters. For example, there is a significant cost difference associated with replacing a 3/4” meter compared to a 6” meter. This cost difference is reflected within the allocation factor. Provided below is a summary of the customer allocation factors.

Customer Class	Number of Accounts <sup>[1]</sup>	% of Total	Equivalent Meters <sup>[2]</sup>	% of Total
Residential	7,701	97.6%	8,264	92.5%
Irrigation	66	0.8%	129	1.4%
Commercial	<u>127</u>	<u>1.6%</u>	<u>540</u>	<u>6.0%</u>
Total	7,894	100.0%	8,932	100.0%

[1] Number of accounts is based on 2014 year end customer data provided by the District.

[2] Equivalent meters are calculated based on the number of meters, by size, for each class and using the AWWA equivalent meter capacity ratios.

- **Public Fire Protection Allocation Factor (FP):** The development of the allocation factor for public fire protection expenses involved an analysis of each class of service and their fire flow requirements. The analysis took into account the gallon per minute fire flow requirements in the event of a fire, along with the duration of the required flow. The fire flow rates used within the allocation factor were based on industry standards and similar experiences with other water cost of service studies. The minimum fire flow requirements are then multiplied by the number of customers in each class of service, and the assumed duration of the fire, to determine the class’ prorated fire flow requirements. Provided below is a summary of the public fire protection allocation factor.

Customer Class	Fire Protection Requirements <sup>[1]</sup>	% of Total
Residential	346,545	95.3%
Irrigation	0	0.0%
Commercial	<u>17,145</u>	<u>4.7%</u>
Total	363,690	100.0%

[1] In 1,000 gallons per minute, based on fire flow requirements and duration of a fire event.

- **Revenue Related Allocation Factor (REV):** The revenue related allocation factor was developed from the projected rate revenues for FY 2016 for each customer class of service. These same revenues were used within the revenue requirement analysis discussed previously. Provided below is a summary of the public fire protection allocation factor.

Customer Class	Projected Revenues <sup>[1]</sup>	% of Total
Residential	\$5,097,146	87.8%
Irrigation	176,657	3.0%
Commercial	<u>529,914</u>	<u>9.1%</u>
Total	\$5,803,718	100.0%

[1] Revenues are based on the projected test period of FY 15/16 prior to any rate adjustments.

Provided in Table 4-1 is a summary of the allocation factors that provides the proportional share of costs that would be allocated to each customer class for each cost classifier for the Arrowhead Woods water system.

Class of Service	COMM	CAP	AC	WCMS	FP	REV
Residential	85.6%	86.9%	97.6%	92.5%	95.3%	87.8%
Irrigation	2.0%	2.8%	0.8%	1.4%	0.0%	3.0%
Commercial & Institutional	<u>12.4%</u>	<u>10.3%</u>	<u>1.6%</u>	<u>6.0%</u>	<u>4.7%</u>	<u>9.1%</u>
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The costs classified to each cost classifier (e.g., commodity, capacity, customer), for each class of service, are then allocated to each customer class of service based on the percentages in Table 4-1. As noted in the above discussion, the basis for the calculation of the allocation factors is based on annual customer use, peaking factors, number of customers, etc. The allocation factors can be found in Exhibit 7 through Exhibit 11 in technical appendix A.

#### 4.4.3 Functionalization and Classification of Plant in Service

The first step of the cost of service is the functionalization and classification of plant in service. In performing the functionalization of plant in service, HDR utilized the District's historical plant

(asset) records. Once the plant assets were functionalized, the analysis shifted to the classification of the asset. The classification process included reviewing each group of assets and determining which cost classifiers the assets were related to. For example, the District's assets were classified as: commodity-related, capacity-related, customer-related, revenue-related, public fire protection-related or direct assignment. Provided below is a summary of the classification process.

Source of supply plant assets, were allocated as both average day and peak day related. Based on the operation of the system, the source of supply assets were 34% to commodity related costs (average day) and 66% to capacity related costs (peak day). This classification reflects the relationship between the District's system peak demand (capacity needs) in relation to the system average day use (base needs). Based on a peak day demand of 3.86 million gallons per day (MGD) and an average day of 1.30 MGD results in 34% being commodity related ( $3.86/1.30=34\%$ ) and 66% being capacity related ( $1-34\%=66\%$ ).

Meters were classified as 100% related to the weighted customer meters and services cost component. This classification reflects the cost differences associated with larger meter sizes to provide service to customers.

Pump stations were classified in the same manner as source of supply, which is to meet both average day and peak day needs based on the system average day to peak day or 34% to commodity related costs (average day) and 66% to capacity related costs (peak day) based on the system average and peak day.

Storage, or water distribution tanks, are typically designed to meet two types of costs – customer peak demands and fire protection. The total storage capacity of the District's reservoirs was examined and consideration given to the capacity required for fire protection purposes under a fire event scenario. This amount of capacity, in relation to the total storage capacity, is considered fire protection related. The balance of storage capacity is in placed to meet customer peak demands. In discussion with District staff on average, 25% of the storage capacity is related to providing fire protection needs from a design standard approach. This resulted in 75% of the storage costs being allocated to peak day, or the capacity cost component and the remaining 25% be allocated to the fire protection component.

Transmission and distribution lines (mains) are typically assumed to provide three types of costs. First, a distribution system must be in place to meet a customer's minimum demand requirements for water. This portion of the distribution main plant investment is considered customer related, or a function of the number of customers on the system. Next, a portion of the distribution system mains is considered a function of peak flow requirements on the system. Distribution mains must be sized to adequately meet the peak flow requirements demanded by customers. This portion of the distribution main plant investment is considered capacity related. Finally, distribution mains must also be sized for fire flow demands. This final portion of over sizing for distribution plant investment is classified as public fire protection related. The allocation of the distribution mains was therefore 25% customer related, 61% capacity, and 14% fire protection related. This classification is based on a minimum system

approach of reviewing the District’s distribution system. A detailed summary of the calculation of this classification is provided in Exhibit 13 of technical appendix A.

General plant (e.g., equipment, vehicles) is assigned in relation to all other plant.

Table 4-2 provides a summary of the basic functionalization and allocation of the major water plant items. A more detailed exhibit of the District’s functionalization and classification of plant investment can be found in Exhibit 12.1 of technical appendix A.

Category	Commodity Related	Capacity Related	Customer Related	Fire Protection
Source of Supply	34%	66%	0%	0%
Meters	0%	0%	100%	0%
Pump Stations	34%	66%	0%	0%
Storage	0%	75%	0%	25%
T&D Mains	0%	61%	25%	14%
General Plant	14%	71%	9%	6%

**4.4.4 Functionalization and Classification of Operating Expenses**

Operating expenses are generally functionalized and classified in a manner similar to the corresponding plant account. For example, maintenance of distribution mains is classified in the same manner (classification percentages) as the plant (asset) account for distribution mains. The District does not separate its O&M expenses by function (e.g., supply, treatment, etc.), which is not an uncommon approach for utilities. As a result, the approach to classify the operating expenses was based on the classification of the plant, or asset data, which reflects the investment made by the District to provide service.

For the District’s study, the revenue requirement for FY 2016 was functionalized and classified based on the approach noted above. As noted earlier, the District utilized a cash basis revenue requirement, which was comprised of operation and maintenance expenses, debt service, and change in working capital. Provided in Table 4-3 is a summary of the classification of the Arrowhead Woods water system revenue requirement to the cost classifiers.

Table 4-3  
Summary of the Classification of the Arrowhead Woods  
Revenue Requirement (\$000)

	Total	Commodity	Capacity	Actual Customer	Weighted Customer	Fire Protection	Revenue
Total Revenue Requirement	\$5,934	\$1,112	\$4,009	\$224	\$294	\$267	\$28

A more detailed version of the classification of the revenue requirement is included in Exhibit 14.1 in technical appendix A.

#### 4.4.5 Major Assumptions of the Cost of Service Study

A number of key assumptions were used within the District’s cost of service study. Below is a brief discussion of the major assumptions used.

- The test period used for the cost of service analysis was FY 2016. The revenue and expense data was previously developed within the revenue requirement study.
- A cash basis approach was utilized which conforms to generally accepted water cost of service approaches and methodologies.
- The classification of plant in service was developed based upon generally accepted cost allocation techniques. Furthermore, they were developed using the District specific data.
- Customer usage figures used within this study were provided for each class of service from FY 14/15 usage information provided by the District and included in Exhibit 6a.
- Capacity (peaking) factors were based upon each customer group’s average to peak month relationship, based on the 2014 consumption data provided by the District in Exhibit 6 of the technical appendix A.

#### 4.4.6 Summary Results of the Cost of Service Analysis

The cost of service analysis began by functionalizing the District’s revenue requirement. The functionalized revenue requirement was then classified into their various cost components. The individual classification totals were then allocated to the various customer classes of service based on the appropriate allocation factors (see Table 4-1). Provided in Table 4-4 is a summary of the allocation of the classified costs (see Table 4-3) to each customer class of service.

Table 4-4  
Summary of the Allocation of the Arrowhead Woods  
Revenue Requirement (\$000)

Cost Classifier	Total Classified Costs	Residential	Irrigation	Commercial & Institutional
Commodity	\$1,112	\$952	\$23	\$138
Capacity	4,009	3,483	114	413
Actual Customer	224	218	2	4
Weighted Customer	294	272	4	18
Fire Protection	267	254	0	13
Revenue	<u>28</u>	<u>24</u>	<u>1</u>	<u>3</u>
<b>Total</b>	<b>\$5,934</b>	<b>\$5,204</b>	<b>\$144</b>	<b>\$587</b>

Provided in Table 4-5 is a summary of the allocation of costs to the customer classes of service.

Table 4-5  
Summary of the Arrowhead Woods System Cost of Service Analysis (\$000)

Class of Service	Present 2016 Rate Revenues	Allocated Costs	\$ Difference	% Difference
<b>Residential</b>	\$5,097	\$5,204	(\$107)	2.1%
<b>Irrigation</b>	177	144	\$33	-18.7%
<b>Commercial &amp; Institutional</b>	<u>530</u>	<u>587</u>	<u>(\$57)</u>	<u>10.7%</u>
<b>Total</b>	<b>\$5,804</b>	<b>\$5,934</b>	<b>(\$131)</b>	<b>2.2%</b>

The cost of service study aligns the operating and capital costs to each customer class with their respective benefit received from and burdens on the water system (proportional allocation). The results of the analysis show that some cost differences exist between the various customer classes of service.

It is important to understand that a cost of service analysis is based on one year's data and corresponding customer information. However, given the expected impact of the drought on customer consumption patterns, current consumption patterns have been assumed to continue into the future. Total demand and the costs incurred by the utility will change from year to year. As such, it is appropriate and prudent to determine whether these findings are consistent over time, and adjust accordingly.

#### 4.4.7 Cost of Service Conclusions and Recommendations

Given the range of cost differences shown in the cost of service results, it is recommended that the irrigation and commercial classes of service be adjusted to reflect the cost of service results.

Given these impacts it is recommended that the District transition to the cost of service results over a two-year period. Specifically, the irrigation class of service will see an overall decrease in rates to reflect the cost of service results while the commercial customers will see a slightly greater increase in rates to reflect the cost of service results.

It is also important to note that one of the unintended consequences of the current drought is the change in consumption patterns that can skew the results of the cost of service analysis given specific customer response to the conservation requirements. Customer responsiveness to the drought can result in an allocation of costs that may not reflect how the system was designed and customer impacts on the system under “normal” conditions. The allocation of costs is based on many different components; however, the two primary components are related to average day use and peak day use. Both of these components are impacted by the current drought. First, average day use (consumption) for customers has been reduced in response to the drought and State Mandated conservation requirements. However, not all customer classes respond to the drought in the same manner. For example, residential customers may be able to reduce consumption at a great proportion of their typical use than a commercial customer given the commercial customers needs to use water for business purposes. In this case, the average day allocation of costs would shift from one class to the other. The second component is related to peak day use and capacity requirements, or how customers place demands on the system. Similar to average day needs, the peak demands and responsiveness to the drought vary by customer class. For example, while a residential customer may respond and minimize outdoor watering and peak demands on the system, a commercial customer may be able to entirely eliminate outdoor watering needs and peak demands on the system. These two different responses to the drought can change the relationship of the cost allocations and of how and why the system was initially designed to operate.

At this time, the cost of service recommendations are based on recent consumption patterns, which are expected to continue into the future, and reflect the impact the drought has had on customer consumption patterns. It is, however, important to take into consideration the impacts that drought can have on cost of service results over the long-term. Based on the results of the study, and current customer consumption patterns, cost of service adjustments have been recommended for the irrigation and commercial customer classes of service. Provided below in Table 4-6 is a summary of the proposed cost of service adjustments over the rate setting time period.



Table 4-6  
Summary of the Arrowhead Woods System  
Proposed Cost of Service Adjustments

Class of Service	FY 2016 Jan 1 2016	FY 2017 Jan 1 2017	FY 2018 Jan 1 2018	FY 2019 Jan 1, 2019	FY 2020 Jan 1, 2020
<b>Residential</b>	4.8%	4.8%	4.5%	4.5%	5.0%
<b>Irrigation</b>	5.2%	5.2%	4.5%	4.5%	5.0%
<b>Commercial &amp; Institutional</b>	<u>-7.0%</u>	<u>-7.0%</u>	<u>4.5%</u>	<u>4.5%</u>	<u>5.0%</u>
<b>System Total</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>

The above adjustments transition rates over a two year period to reflect the results of the cost of service analysis. As the District continues to monitor rates and cost of service results through future studies, additional cost of service adjustments may be necessary to reflect consumption patterns at that time.

## 4.5 Deer Lodge Park Cost of Service Analysis

As noted previously the cost of service analysis first allocates costs to the customer classes of service and then to the applicable tiers for developing the pricing of the rate structure. This section of the report will discuss the analysis developed for the Deer Lodge Park water system.

### 4.5.1 Determining the Customer Classes of Service

The first step in a cost of service analysis is to determine the customer classes of service. Based on the current rate schedules and customer characteristics for the Deer Lodge Park system, there is only one customer class of service, a residential customer class as all customers are residential homes.

### 4.5.2 General Cost of Service Procedures

As noted, there is a single class of service, and customer type, for the Deer Lodge Park water system. As a result, the annual O&M expenses developed in the revenue requirement for Deer Lodge Park were classified to the cost components of commodity, capacity, and customer related based on generally accepted cost of service methodologies as outlined in the AWWA M1 manual.

### 4.5.3 Functionalization and Classification of Operating Expenses

The District does not separate the Deer Lodge Park O&M expenses by function (e.g., supply, treatment, etc.), which is not an uncommon approach for utilities. As a result, the approach to classify the operating expenses was primarily based on the system average day and peak day needs.

For the District’s study, the Deer Lodge Park revenue requirement for FY 2016 was functionalized and classified based on the approach noted above. As noted earlier, the District

utilized a cash basis revenue requirement, which was comprised of operation and maintenance expenses, debt service, and change in working capital. Provided in Table 4-7 is a summary of the classification of the Deer Lodge Park water system revenue requirement to the cost classifiers.

	Total	Commodity	Capacity	Customer
Total Revenue Requirement	\$129	\$37	\$19	\$73

A more detailed analysis of the classification of the revenue requirement is included in Exhibit 5 in technical appendix B.

#### 4.5.4 Major Assumptions of the Cost of Service Study

A number of key assumptions were used within the District’s cost of service study. Below is a brief discussion of the major assumptions used.

- The test period used for the cost of service analysis was FY 2016. The revenue and expense data was previously developed within the revenue requirement study.
- A cash basis approach was utilized which conforms to generally accepted water cost of service approaches and methodologies.
- Customer usage figures used within this study were based on 2014 usage information provided by the District and included in Exhibit 6b.

#### 4.5.5 Cost of Service Conclusions and Recommendations

The results of the cost of service analysis provide the basis for establishing rates for the Deer Lodge Park customers as shown in the rate design section (Section 5) of this report.

### 4.6 Summary of the Cost of Service Analyses

This section of the report has provided the recommendations resulting from the cost of service analyses developed for the District’s Arrowhead Woods and Deer Lodge Park water systems. This analysis was prepared using generally accepted cost of service techniques. The following section of the report will provide a summary of the present and proposed rates for each of the District’s water systems.



## 5. Development of the Rate Designs

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### 5.1 Introduction

The final step of the District's comprehensive water rate study is the design of rates to collect the desired levels of revenues, based on the results of the revenue requirement and cost of service analyses. In reviewing District's rates, consideration is given to the level of the rates and the structure of the rates.

### 5.2 Rate Design Criteria and Considerations

Prudent rate administration dictates that several criteria must be considered when setting utility rates. Some of these rate design criteria are listed below:

- Rates which are easy to understand from the customer's perspective
- Rates which are easy for the utility to administer
- Consideration of the customer's ability to pay
- Continuity, over time, of the rate making philosophy
- Policy considerations (encourage efficient use, economic development, etc.)
- Provide revenue stability from month to month and year to year
- Promote efficient allocation of the resource
- Equitable and non-discriminatory (cost-based)
- Legally Defensible

It is important that the District provide its customers with a proper price signal as to what their consumption and peaking (demand) requirements are costing. This goal may be approached through rate level and structure. When developing the proposed rate designs, all the above listed criteria were taken into consideration. However, it should be noted that it is difficult, if not impossible, to design a rate that meets all the goals and objectives listed above. For example, it may be difficult to design a rate that takes into consideration the customer's ability to pay, and one which is cost-based. In designing rates, there are always trade-offs between these various goals and objectives.

### 5.3 Development of Cost-Based Water Rates

As mentioned, developing cost-based and equitable rates is of paramount importance in developing proposed water rates. While always a key consideration in developing rates, meeting the legal requirements, and documenting the steps taken to meet the requirements, has been in the forefront of this report. HDR would point out that there is no single methodology for allocating costs to the various customer groups. The American Water Works Association M1 Manual clearly delineates various methodologies which may be used to establish cost-based rates. Unfortunately, Article XIII D, section 6 does not prescribe a

methodology for establishing cost-based rates. Given that, HDR developed the District's proposed water rates based on generally accepted rate setting methodologies to meet the requirements of Article XIII D, section 6 to provide an administrative record of the steps taken to establish the District's water rates.

HDR is of the opinion that the proposed rates meet the legal requirements of Article XIII D. HDR reaches this conclusion based upon the following:

- **The revenue derived from water rates does not exceed the funds required to provide the property related service (i.e. water service).** The proposed rates are designed to collect the overall revenue requirements of the District.
- **The revenues derived from water rates shall not be used for any purpose other than that for which the fee or charge is imposed.** The revenues derived from the District's water rates are used exclusively to operate and maintain the District's water system.
- **The amount of a fee or charge imposed upon a parcel or person as an incident of property ownership shall not exceed the proportional costs of the service attributable to the parcel.** This study has focused almost exclusively on the issue of proportional assignment of costs to customer classes of service. The proposed rates have appropriately grouped customers into customer classes of service (single-family, irrigation, and commercial) that reflect the varying consumption patterns and system requirements of each customer class of service. The grouping of customers and rates into these classes of service creates the equity and fairness expected under Article XII D, section 6 by having differing rates by customer classes of service which reflect both the level of revenue to be collected by the utility, but also the manner in which these costs are incurred and equitably assigned to customer classes of service based upon their proportional impacts and demands on the water systems.

The following discussion will provide the development of the proposed water rates to meet the requirements of Article XII D, section 6 for the Arrowhead Woods and Deer Lodge Park water systems.

## 5.4 Development of the Arrowhead Woods Water Rates

The District has a separate rate schedule for customers in the Arrowhead Woods and Deer Lodge Park water systems based on the specific costs, as developed in the previous revenue requirement and cost of service analyses, of providing service to the two separate systems. Provided in the following is a review of the present, and proposed, water rates for the Arrowhead Woods water rates.

### 5.4.1 Overview of the Arrowhead Woods Current Water Rates

The District has a separate rate schedule for the Arrowhead Woods residential, commercial and institutional, and irrigation customers. The residential rate structure includes a monthly fixed charge that varies by meter size and a four tier consumption rate structure. The commercial and institutional rate also includes a monthly fixed charge that varies by meter size and a three

tier consumption rate structure that also varies by meter size (e.g., the larger the meter the larger the tier sizes). Finally, the irrigation rate structure also includes a monthly fixed charge that varies by meter size and a two tier consumption rate structure. Provided in Table 5-1 is a summary of the current water rates for the Arrowhead Woods water system.

Table 5-1 Summary of the Current Arrowhead Woods Water Rates					
Residential		Commercial & Institutional		Irrigation	
<b>Monthly Fixed Fee (\$/Meter Size)</b>		<b>Monthly Fixed Fee (\$/Meter Size)</b>		<b>Monthly Fixed Fee (\$/Meter Size)</b>	
3/4" or Less	\$34.38	3/4" or Less	\$34.38	3/4" or Less	\$34.38
1"	84.23	1"	84.23	1"	84.23
1-1/2"	168.46	1-1/2"	168.46	1-1/2"	168.46
2"	269.19	2"	269.19	2"	269.19
3"	538.72	3"	538.72	3"	538.72
4"	841.60	4"	841.60	4"	841.60
6"	1,683.21	6"	1,683.21	6"	1,683.21
<b>Consumption Charge (\$/CCF)</b>		<b>Consumption Charge (\$/CCF) <sup>[1]</sup></b>		<b>Consumption Charge (\$/CCF)</b>	
Tier 1: 0-4 CCF	\$1.18	Tier 1	\$3.11	Tier 1: 0-13 CCF	\$2.25
Tier 2: 5-13 CCF	2.24	Tier 2	6.21	Tier 2: 14+ CCF	13.84
Tier 3: 14-30 CCF	6.64	Tier 3	12.93		
Tier 4: 31 + CCF	13.84				

[1] The tiers for commercial and institutional customers vary based on the size of the meter.

#### 5.4.2 Overview of the Proposed Arrowhead Woods Water Rates

The revenue requirement analysis was used to determine the adequate and prudent level of funding needed to operate and maintain the Arrowhead Woods water system. The results of the revenue requirement analysis indicated the need for annual revenue adjustments for FY's 2016 – FY 2020. The proposed rates to be developed in this section of the report will assume these revenue targets for each of the fiscal years reviewed. The cost of service analysis indicated cost differences, and costs of service adjustments are recommended. Provided in Table 5-2 is a summary of the overall adjustments to each customer class of service for the Arrowhead Woods system based on the total revenue needs and cost of service adjustments.

Table 5-2  
Summary of the Arrowhead Woods System  
Proposed Cost of Service Adjustments

Class of Service	Jan 1 2016	Jan 1 2017	Jan 1 2018	Jan 1, 2019	Jan 1, 2020
<b>Residential</b>	4.8%	4.8%	4.5%	4.5%	5.0%
<b>Irrigation</b>	5.2%	5.2%	4.5%	4.5%	5.0%
<b>Commercial &amp; Institutional</b>	<u>-7.0%</u>	<u>-7.0%</u>	<u>4.5%</u>	<u>4.5%</u>	<u>5.0%</u>
<b>System Total</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>

In addition to the target revenue adjustments, it is proposed that the current residential rate structure be maintained and only the level of the rates be adjusted. However, it is proposed that the commercial and institutional and irrigation rate structure transition over a three year period to a uniform rate structure, or a rate structure that charges the same price for all consumption.

This change to the commercial and institutional rate structure is proposed for several reasons. First, only a very few commercial customers have consumption outside the first tier. Second, unlike residential customers, commercial customers' water usage is not homogenous, rather it varies based on the type commercial business. Finally, a uniform rate still provides commercial customers with an incentive to use water efficiently while minimizing the impacts to customers using different amounts who are both using water efficiently.

Similarly, the irrigation rate is proposed to transition to a uniform rate as well. This was primarily recommended as customer consumption patterns for irrigation customers vary significantly, depending on a number of factors, and the use of tier pricing may, or may not, reflect the cost impacts on the system.

The transition over a three year period is proposed to allow customers sufficient time to adjust consumption patterns as necessary and minimize the bill impacts based on a large change in the rate structure and resulting bill impacts.

### 5.4.3 Development of the Proposed Residential Water Rates

As noted, the District's Arrowhead Woods residential customer's rate structure includes a monthly fixed fee that varies by meter size and a four tier consumption charge. The sizing of the tiers is based on typical customer consumption levels in the winter, summer, and peak summer. These tiers are defined as follows:

- **Tier 1** – 0 to 4 CCF<sup>3</sup>                    0 – 2,992 gallons
- **Tier 2** – 5 – 13 CCF                        2,993 – 9,724 gallons
- **Tier 3** – 14 to 30 CCF                    9,725 – 22,440 gallons
- **Tier 4** – Over 30 CCF                    Over 22,440 gallons

The above tier sizes and break points were established during the District’s prior rate study. Tier 1 was developed on the average customer winter water use (i.e., indoor). Tier 2 was established around typical annual residential water use needs. Consumption in these first two tiers reflects 78% of the total residential water use. Tier 3 was based on customer peak use needs and reflects 14% of the residential water use. Tier 4 is all water consumption greater than the typical customer peak use levels and remaining 8% of the total residential consumption. Consumption in this final tier occurs primarily in the summer months only. HDR, in reviewing these block sizes and the tiered pricing, considered the current customer demand patterns of the customers using water in each tier block. For the average customer the tier sizes reflect the typical consumption patterns for current customers. Given this, the tier sizes have been maintained for the purpose of this study.

The next step of the rate design for the Arrowhead Woods residential customers was to develop the pricing of the tiers based on the cost of service analysis. HDR reviewed the consumption in each tier and the peaking in each tier (capacity requirements) to allocate costs to each tier. It should be noted that given the seasonality of the District’s customer base the monthly accounts with a zero read, or no consumption, were excluded from the development of the average customer use for this review. Provided in Table 5-3 is a summary of this review.

Table 5-3 Summary of Monthly Residential Customer Demand Patterns				
	<b>Tier 1 (0–4 CCF)</b>	<b>Tier 2 (5–13 CCF)</b>	<b>Tier 3 (14–30 CCF)</b>	<b>Tier 4 (30+ CCF)</b>
<b>Total Use In CCF (FY 14)</b>	<b>196,578</b>	<b>152,852</b>	<b>61,816</b>	<b>35,314</b>
<b>Average Use In CCF (FY 14)</b>	<b>2.03</b>	<b>7.38</b>	<b>17.85</b>	<b>46.93</b>
<b>Peak Use Factor <sup>[1]</sup></b>	<b>1.25</b>	<b>1.72</b>	<b>2.56</b>	<b>3.02</b>
Peak Use in Relation to Tier 1	1.00	1.37	2.04	2.41
Proportion A – All Tiers	14.7%	20.1%	29.9%	35.3%
Proportion B – Tiers 2, 3 and 4	0.0%	23.6%	35.1%	41.4%

[1] Peak use factor was calculated based on the peak monthly use in each tier vs. the average monthly use in each tier. This reflects the various demands placed on the system by each tier of consumption.

As Table 5-3 indicates, the average use of a Tier 1 customer is approximately 2 CCF. This volume, when compared to a Tier 4 customer that uses on average 47 CCF, which is about

<sup>3</sup> A CCF is one hundred cubic feet. 1 CCF = 748 gallons

twenty three times greater than the Tier 1 customer's demand. Stated another way, a customer in Tier 4 is approximately the same as twenty three (23) Tier 1 customers. The utility can serve twenty three Tier 1 customers for every Tier 4 customer that it serves. However, on a peaking factor basis the tier 4 customers place almost a three times greater capacity need on the system given this level of consumption.

Using these demands, proportions can be developed based upon the amount of capacity that is demanded by a consumer when they consume water in a specific tier. The implications of customer demands upon a water system are immense and for the most part relate to the sizing and construction of facilities to meet these excessively large demands. The peak factor relationships shown in Table 1 will be used later in this analysis in the assignment of certain and specific costs to tiers. Given that overview of the residential tier blocks, the discussion can shift to the pricing used for each rate tier.

**Pricing of the District's Water Rate Tiers** - There are at least three techniques or approaches that may be used to demonstrate (i.e. cost justify) the individual pricing of the District's tiered rates. These techniques or approaches were:

- Cost differences in the District's water supply (i.e., stacking of water supply resources to tiers)
- Direct assignment of costs to specific (upper) tiers (e.g., conservation program costs, etc.)
- Capacity cost differences from high peak use consumers (relationship of average use to peak use)

Each of these technical approaches, as they relate to the District's analysis and development of tiered rates are discussed in more detail below.

**Cost Differences in the District's Water Supply Costs** – The District produces (pumping and treating) water from both surface water and ground water supplies. In addition, the District purchases water from the Crestline-Lake Arrowhead Water Agency (CLAWA) through two separate contracts. Given these different sources of water an analysis was developed, working with District staff, to determine the cost of each of the water supplies. These costs are then be allocated to the various tiers based on the supply available and total use in each tier.

The first step in the analysis was to review the District's operating costs for pumping and treating surface and ground water. The District tracks costs by functional component (e.g., groundwater pumping, surface water treatment) which provides the total cost for both surface water and ground water. Next, the total water pumped for each was provided through District records. This provided a cost per 100 cubic fee (CCF) for each of the two water supply components. The costs for purchased water from CLAWA were also reviewed which provided a cost per CCF for each of the contracts from CLAWA. Provided in Table 5-4 is a summary of the water supply costs for each supply.



Table 5-4  
Summary of the Water Supply Costs

	Surface Water	Ground Water	CLAWA 1	CLAWA 2
\$/CCF	\$0.30	\$3.27	\$2.64	\$5.79

As can be seen in Table 5-4, the cost of water varies significantly for each of the various sources of supply. Given these costs, the next step was to determine which consumption tier each cost would be allocated to. The first step of this analysis was to review the total consumption by tier for the residential customer class of service to allocate their proportional share of the cost of each water supply component. Next, based on the residential customers proportional share of the total water produced, or purchased, from each source, and the amount of consumption in each block for the residential customers, the costs were allocated to a specific tier, or tiers. For example, there is sufficient surface water to supply all Tier 1 residential customer needs as well as a portion of Tier 2 residential customer needs. Therefore, surface water costs were allocated to the first tier and second tier. Likewise, groundwater is available for residential customer needs in Tier 2 for the remaining needs after surface water. This results in Tier 2 being allocated both surface water costs and ground water costs. Purchased water from CLAWA is then used in both Tiers 3 and 4. Provided In Table 5-5 is a summary of the allocation of water supply costs to the various tiers.

Table 5-5  
Summary of the Allocation of Water Cost to Residential Tiers

	Tier 1	Tier 2	Tier 3	Tier 4
Surface Water (\$/CCF)	\$0.30	\$0.30	\$0.00	\$0.00
Ground Water (\$/CCF)	0.00	3.26	0.00	0.00
CLAWA 1 (\$/CCF)	0.00	0.00	2.64	2.64
CLAWA 2 (\$/CCF)	<u>0.00</u>	<u>0.00</u>	<u>5.79</u>	<u>5.79</u>
Total	\$0.30	\$3.56	\$8.43	\$8.43

As shown in Table 5-5, the first cost of the tier components for water supply varies by tier based on the availability of supply for consumption use in each tier.

**Cost of Operations and Maintenance Expenses** – The District also incurs other O&M costs in addition to producing or purchasing water supply. These costs are related to distribution pumping, distribution maintenance and operations, and administration. These costs were split into two different components, distribution pumping, and all other O&M. However, both of these costs are allocated between the various tiers based on the total cost of each component divided by the total consumption for residential customers. This resulted in the same \$/CCF rate being allocated to each tier. Provided in Table 5-6 is a summary of the allocated conservation and other O&M costs to each Tier.

Table 5-6 Summary of the Allocation of O&M Cost to Residential Tiers				
	Tier 1	Tier 2	Tier 3	Tier 4
Pumping (\$/CCF)	\$0.42	\$0.42	\$0.42	\$0.42
Other O&M Expenses (\$/CCF)	<u>2.43</u>	<u>2.43</u>	<u>2.43</u>	<u>2.43</u>
Total (\$/CCF)	\$2.85	\$2.85	\$2.85	\$2.85

As can be seen, the rate per CCF for each of the O&M components is allocated equally to all tiers as these costs don't vary depending on a customer's use by tier.

**Direct Assignment of Specific Costs** – In the development of the analysis, there was one cost which appeared to benefit specific tiers and, as such, was directly assigned to specific tiers. This cost was the conservation program which was based on the District's current budget and excluded from the above discussion of O&M.

The water conservation program costs were assigned to Tiers 2, 3 and 4 in the approximate proportions of water peak demand characteristics on the District's system (See Table 5-3 Proportion B) which would reasonably reflect where the District incurs costs when focusing its conservation efforts. Approximately 24% of the capacity demand profile is related to Tier 2, another 35% of the capacity demand profile is related to Tier 3, and the balance or 41% of the conservation program costs were assigned to Tier 4. The residential customer class share of the conservation program costs are \$181,503 and is allocated to the tiers based on the previously discussed percentages. This assignment of costs seems appropriate and equitable given that conservation programs are primarily focused on the most inefficient or wasteful customers. Provided below in Table 5-7 is a summary of the allocation of conservation related costs.

Table 5-7 Summary of the Allocation of Conservation Cost to Residential Tiers				
	Tier 1	Tier 2	Tier 3	Tier 4
Conservation Costs (\$/CCF)	\$0.00	\$0.26	\$0.38	\$0.45

**Capacity Cost Differences from the District's High Peak Use Consumers** – The final type of cost incurred by the District that may reflect cost differences by price tiers is capacity related costs. As noted, as capacity use increases, there is an impact to infrastructure. At the same time, not all capacity costs are related to, or a function of the sizing of infrastructure. To better understand the District's capacity costs and the assignment of certain capacity-related costs to the various pricing tiers, the focus of the analysis shifted to the cost of service analysis developed in Section 4 of this report.

The cost of service analysis provided the classification of costs to the cost components as noted in Section 4 of this report, this is the same cost allocation as provided in Table 4-3. Provided in Table 5-8 is a summary of the cost of service analysis.

Table 5-8  
Summary of the Classification of the Arrowhead Woods  
Revenue Requirement (\$000)

	Total	Commodity	Capacity	Actual Customer	Weighted Customer	Fire Protection	Revenue
Total Revenue Requirement	\$5,934	\$1,112	\$4,009	\$224	\$294	\$267	\$28

The costs shown in Table 5-8 reflect the total water revenue requirements of the District. As noted above, certain costs may vary by pricing tier based upon capacity. Given that, the next step was to analyze the capacity related costs (\$4.0 million) contained in Table 5.

In reviewing the capacity-related costs they were split into two types of capacity: operational capacity and infrastructure capacity. The operational capacity costs are, as the name suggests, related to the operation and maintenance of the utility. These costs do not vary by tier, as shown in Table 5-6. In contrast, infrastructure capacity costs are related to the physical capital costs associated with infrastructure capacity. The approximately \$4.0 million in capacity costs is not entirely related to residential customers. Of that amount, the cost of service analysis allocated approximately \$3.5 million to the residential customers (see Table 4-4). A more detailed breakout of the capacity costs for residential is shown below in Table 5-9.

Table 5-9  
Summary of the FY 2016 Single-Family Residential Capacity Costs (\$000)

	Total Capacity	Residential Capacity	Operational Capacity	Infrastructure Capacity
O&M Costs	\$2,381	\$2,069	\$2,069	\$0
Rate Funded Capital	709	616	0	616
Net Debt Service	827	718		718
Change in Working Capital	<u>229</u>	<u>199</u>	<u>2</u>	<u>197</u>
<b>Total Costs</b>	<b>\$4,147</b>	<b>\$3,603</b>	<b>\$2,071</b>	<b>\$1,532</b>
<i>Less: Misc Revenues</i>	<u>138</u>	<u>120</u>	<u>69</u>	<u>51</u>
<b>Net Total Costs</b>	<b>\$4,009</b>	<b>\$3,483</b>	<b>\$2,002</b>	<b>\$1,481</b>

As shown in Table 5-9, the residential capacity costs of \$3.5 million were then segregated between operational capacity and infrastructure capacity. The operational capacity costs of \$2.0 million are not the focus of this discussion since they are not related to over-sizing of infrastructure, and were previously allocated as part of the water supply and other O&M expenses. Rather, the focus of the analysis is on the infrastructure capacity costs which totaled approximately \$1.5 million.

There were two primary costs associated with the infrastructure capacity costs. These were the rate funded capital, net debt service, and transfer to capital reserves. The capacity related portion of the infrastructure capacity costs are allocated to all four tiers, but assigned to be reflective of the differences in capacity (peak factors) use by the various tiers. The proportions assigned to each tier are based on the percentages as provided in Table 5-3, the row labeled “Proportion A – All Tiers”. In essence, the largest users on the system, placing the greatest demands receives a larger proportional share of the costs than the lower use/low demand customers. There were also miscellaneous revenues which were assigned to tiers based upon the way in which all other capacity-related costs were assigned in the cost of service analysis developed in Section 4 of this report. Provided in Table 5-10 is a summary of the allocation of the infrastructure capacity costs to the tiers.

	Infrastructure Costs	Tier 1 (0–20 CCF)	Tier 2 (20–40 CCF)	Tier 3 (40–60 CCF)	Tier 4 (60+ CCF)
O&M Costs	\$0	\$0	\$0	\$0	\$0
Rate Funded Capital	616	90	124	184	217
Net Debt Service	718	105	144	215	254
Change in Working Capital	<u>197</u>	<u>29</u>	<u>40</u>	<u>59</u>	<u>70</u>
<b>Total Costs</b>	<b>\$1,532</b>	<b>\$225</b>	<b>\$308</b>	<b>\$458</b>	<b>\$541</b>
Less: Misc. Revenues	<u>(\$51)</u>	<u>(\$7)</u>	<u>(\$10)</u>	<u>(\$15)</u>	<u>(\$18)</u>
<b>Net Total Costs</b>	<b>\$1,481</b>	<b>\$217</b>	<b>\$298</b>	<b>\$443</b>	<b>\$523</b>

As noted, the total infrastructure costs were allocated to each tier based on the peaking factor of each tier as shown in Table 5-3 “Proportion A – All Tiers”. It should be noted, that the totals shown in Table 5-10 reflect only the costs associated with infrastructure capacity. Using the costs above in Table 5-10 and dividing by the total consumption in each tier (see Table 5-3) results in the unit costs for the infrastructure capacity related costs. Table 5-11 provides a summary of the unit costs for the infrastructure capacity costs.

Table 5-11 Summary of the FY 2016 Infrastructure Capacity Unit Cost by Tier				
	Tier 1 (0–20 CCF)	Tier 2 (20–40 CCF)	Tier 3 (40–60 CCF)	Tier 4 (60+ CCF)
O&M Costs (\$/CCF)	\$0.00	\$0.00	\$0.00	\$0.00
Rate Funded Capital (\$/CCF)	0.46	0.81	2.98	6.16
Net Debt Service (\$/CCF)	\$0.54	\$0.95	\$3.48	\$7.18
Change in Working Capital (\$/CCF)	<u>0.15</u>	<u>0.26</u>	<u>0.95</u>	<u>1.97</u>
<b>Total Costs (\$/CCF)</b>	<b>\$1.14</b>	<b>\$2.01</b>	<b>\$7.41</b>	<b>\$15.31</b>
Less: Misc. Revenues (\$/CCF)	(\$0.04)	(\$0.05)	(\$0.08)	(\$0.09)
<b>Net Total Costs (\$/CCF)</b>	<b>\$1.10</b>	<b>\$1.96</b>	<b>\$7.34</b>	<b>\$15.22</b>

**Summarizing the Analysis of Pricing to Tiers** – The final step in the analysis is to summarize the costs which were assigned to each of the pricing tiers using the above analysis. Table 5-12 provides a summary of this analysis.

Table 5-12 Summary of the FY 2016 Rates By Tiers (\$/CCF)				
	Tier 1 (0–20 CCF)	Tier 2 (20–40 CCF)	Tier 3 (40–60 CCF)	Tier 4 (60+ CCF)
Water Supply Costs (Table 5-5)	\$0.30	\$3.56	\$8.43	\$8.43
O&M Expenses (Table 5-6)	2.85	2.85	2.85	2.85
Conservation Costs (Table 5-7)	0.00	0.26	0.38	0.45
Infrastructure Costs (Table 5-11)	<u>1.10</u>	<u>1.96</u>	<u>7.34</u>	<u>15.22</u>
<b>Total Tier Related Cost</b>	\$4.25	\$8.63	\$19.00	\$26.96
<i>Current Rates</i>	\$1.18	\$2.24	\$6.64	\$13.84

As can be seen in Table 5-12, while the O&M expenses are the same for all tiers, the other costs all vary by tier depending on how, or why, the cost was incurred. For example, water supply costs vary by tier based on the availability of supply. Similarly, the infrastructure costs vary depending on the peak demands customers place on the system resulting in the oversizing of the system to meet those demands, which results in greater O&M and capital costs for the District. Therefore, they are allocated to those customers that place those impacts on the system.

As shown in Table 5-12, the current rates are less than the calculated unit rate for each tier. In other words, the District could effectively increase the consumption charges but has chosen to collect the difference through the fixed meter charge, which also varies based on the capacity of the meter to reflect the demands customers place on the system. The greater proportion of revenue collected through the fixed charge also reflects the greater proportion of fixed costs the District incurs regardless of the amount of water consumed.

Based on the above analysis, the proposed residential water rates can be developed. As noted above, the tier pricing analysis resulted in consumption rates that could be much higher than currently charged. One of the rate design goals was to maintain the revenue stability of the rates. Given that, it was determined that the current rate structure would be maintained, and only the level of the rates would be adjusted based on the target revenue levels. The fixed charge was increased to maintain the revenue stability of the current rates, and to not increase the consumption charges to levels as identified in Table 5-12. This reflects the high proportion fixed costs incurred by the District. In reviewing the costs, approximately 85% of the District's revenue requirement can be considered fixed. These are items such as salaries and wages, benefits, debt service, etc. The District continues to incur these costs regardless of the level of customer consumption or even if customers do not consume any water. This is an important consideration as a high percentage of the District's residential customers do not consume water on a consistent basis give the seasonal nature of the District's customer base, yet the District must maintain and provide service regardless of consumptive use. As a comparison, the residential rate structure is proposed to collect 70% of the revenue in FY 16 through the fixed charge. The consumption charges were then adjusted proportionally to meet the target revenues reflecting the relationships established in the tier pricing analysis. Provided below in Table 5-13 is a summary of the current and proposed residential rates for the Arrowhead Woods system residential customers.

Table 5-13  
Summary of the Proposed Arrowhead Woods Residential Water Rates

	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>4.8%</b>	<b>4.8%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge (\$/CCF)</b>						
0-4 CCF	\$1.18	\$1.22	\$1.26	\$1.30	\$1.34	\$1.39
5-13 CCF	2.24	2.32	2.39	2.47	2.54	2.64
14-30 CCF	6.64	6.87	7.09	7.32	7.54	7.82
31 + CCF	13.84	14.31	14.78	15.25	15.72	16.30

As can be seen the proposed residential rates, effective January 1, 2016, have been adjusted to reflect the overall revenue needs of the Arrowhead Woods system based on the revenue requirement and cost of service analysis. No changes to the residential rate structure have been recommended and the rates have been adjusted to meet the proportional allocation of costs to the residential customers. The detailed analyses for the District’s Arrowhead Woods residential rates can be found in Exhibits 14 – 19 of technical appendix A.

#### 5.4.4 Development of the Proposed Commercial Water Rates

Table 5-1 provided a summary of the current commercial and institutional rate structure which includes a monthly fixed meter charge and a three tier consumption charge. The tiers vary based on the size of the meter serving a property. The size is meter serves as a proxy for the peak demand that a meter may place on the system. Provided in Table 5-14 is a summary of the tier sizes by meter size.

	3/4 Inch or Less	1-Inch	1-1/2- Inch	2-Inch	3-Inch	4-Inch	6-Inch
Tier 1 (CCF/Mnth)	0-42	0-72	0-145	0-232	0-464	0-725	0-1450
Tier 2 (CCF/Mnth)	43-150	73- 250	146-500	233-800	465-1600	726-2500	1451-5000
Tier 3 (CCF/Mnth)	> 150 -	> 250	> 500	> 800	> 1600	>2500	> 5000

As noted, the commercial rates, are being transitioned to a uniform rate over the next three years. This change to the commercial and institutional rate structure is proposed for several reasons. First, very few commercial customers have consumption beyond the first tier. Second, unlike residential customers, commercial customers’ water usage is not homogenous, rather it varies based on the type commercial business, and can make it difficult for the setting of tiers, which may be why a majority of the consumption is in the first tier of the current rate structure. Finally, a uniform rate still provides commercial customers with an incentive to use water efficiently while minimizing the impacts to customers using different amounts who are both using water efficiently. During the rate transition, the tier sizes are maintained as provided in Table 5-14. Similar to the residential water rate structure the fixed charge has been increased to reflect the higher proportion of fixed costs on the Arrowhead Woods water system, which was noted previously as approximately 85% of the District’s total revenue requirement for the Arrowhead Woods system. Provided in Table 5-15 is a summary of the proposed commercial water rates for the Arrowhead Woods system.

Table 5-15  
Summary of the Proposed Arrowhead Woods Commercial Water Rates

	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>5.2%</b>	<b>5.2%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge <sup>[1]</sup></b>						
Tier 1	\$3.11	\$3.41	\$3.81	N/A	N/A	N/A
Tier 2	6.21	5.50	4.15	N/A	N/A	N/A
Tier 3	12.93	10.50	4.60	N/A	N/A	N/A
All Consumption	N/A	N/A	N/A	\$4.00	\$4.15	\$4.32

[1] Tier sizes vary by meter size for commercial customers (see Table 5-14). The larger the meter size the larger the tier size.

As can be seen in Table 5-15, the commercial customer consumption charge is transitioning to a uniform rate over the next three-year period, based on the overall revenue adjustments that reflect the revenue requirement needs and cost of service recommendations. The transition to a uniform rate over the three year period is recommended to minimize the customer bill impacts by slowly increasing the first tier rate to transition to the uniform rate and cost of service levels.

#### 5.4.5 Development of the Proposed Irrigation Water Rates

A similar approach was developed for the proposed irrigation customer rates in the Arrowhead Woods water system. The current rate structure is a two-tier consumption rate with a fixed monthly meter charge, as shown in Table 5-1, with the tier sizes based on set amounts of consumption which do not vary like the commercial customer tier sizes. The current tier sizes were set during the prior rate study and based on the average use purchased through the District's new development capacity fee. All use greater than that purchased through the fee is included in the second block. Similar to the prior proposed rates the fixed charge is being increased to reflect the high proportion of fixed costs on the Arrowhead Woods system. In addition, the proposed rate structure transitions the irrigation customers to a uniform rate over the next three year period. This rate structure change is recommended as the sizing of the tiers for various types of irrigation customers may not reflect efficient or inefficient use. Given that, a uniform rate, or a rate charged for all consumption, maintains a conservation incentive and



increases the equity between various irrigation customers by not having a set tier for customers with heterogeneous consumption patterns. Provided in Table 5-16 is a summary of the current and proposed rates for the Arrowhead Woods system irrigation customers.

Table 5-16 Summary of the Proposed Arrowhead Woods Irrigation Water Rates						
	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>-7.0%</b>	<b>-7.0%</b>	<b>4.5%</b>	<b>4.5%</b>	<b>5.0%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$34.38	\$36.24	\$38.23	\$40.14	\$42.19	\$44.51
1"	84.23	88.78	93.66	98.34	103.36	109.04
1-1/2"	168.46	177.56	187.33	196.70	206.73	218.10
2"	269.19	283.73	299.34	314.31	330.34	348.51
3"	538.72	567.81	599.04	628.99	661.07	697.43
4"	841.60	887.04	935.83	982.62	1,032.73	1,089.53
6"	1,683.21	1,774.10	1,871.68	1,965.26	2,065.49	2,179.09
<b>Consumption Charge <sup>[1]</sup> (\$/CCF)</b>						
Tier 1 – 0-13 CCF	\$2.25	\$3.00	\$4.25	N/A	N/A	N/A
Tier 2 – 14 + CCF	13.84	11.15	8.30	N/A	N/A	N/A
All Consumption	N/A	N/A	N/A	\$7.15	\$7.50	\$7.90

This transition to a uniform rate attempts to minimize the customer bill impacts while still meeting the target revenue needs and cost of service adjustments for the irrigation class of service. As can be seen during the transition period, the increase in the first tier and decrease in the second tier will have an impact on irrigation customer bills. This transition period will allow irrigation customers ample time to adjust their watering habits and adjust consumption levels as the rate structure moves towards a uniform rate.

#### 5.4.6 Summary of the Proposed Arrowhead Woods Water Rates

The rates for each customer class of service for the Arrowhead Woods systems were designed to meet the results of the revenue requirement and recommended cost of service adjustments. Given the study recommendations, Table 5-17 provides a summary of the revenue targets based on the revenue requirement and cost of service analyses for the FY 15/16 proposed rate adjustments.

Table 5-17  
Comparison of the FY 2016 Proposed Revenues and Allocated Costs (\$000's)

	Present Revenues	Cost of Service Adjustment	Target Revenues	Proposed Revenues <sup>[1]</sup>	\$ Difference
<b>Arrowhead Woods</b>					
Residential	\$5,097	4.8%	\$5,342	\$5,344	\$2
Commercial	530	5.2%	557	557	0
Irrigation	177	-7.0%	164	165	1
<b>Deer Lodge Park</b>	<u>120</u>	<u>9.5%</u>	<u>131</u>	<u>131</u>	<u>0</u>
<b>System Total</b>	<b>\$5,924</b>	<b>4.5%</b>	<b>\$6,194</b>	<b>\$6,197</b>	<b>\$3</b>

Based on the revenue needs as established in the revenue requirement analysis, and recommended cost of service adjustments, the above table provides the adjustments to current rate levels, but customer class of service for the Arrowhead Woods system. The target revenues are then compared to the proposed revenues which are based on the proposed rates and customer billing units (e.g., customer numbers, consumption). As shown, the proposed revenues, calculated on the proposed rates in the prior tables, essentially equal the target revenues based on the revenue needs and cost of service adjustments. The differences are due to rounding of the rates. Overall, the difference between the target revenues and proposed revenues based on the proposed rates is approximately \$3,000 dollars. A more detailed analysis of the projection of the proposed revenues is included in Exhibit 18 of technical appendix A.

## 5.5 Development of the Proposed Deer Lodge Park Water Rates

As noted, the rates for the Deer Lodge Park water system customers were reviewed as part of the study. The rates for Deer Lodge Park are based on the specific costs of the Deer Lodge Park system as provided by the District. Provided below is a summary of the development of the rates for the Deer Lodge Park water system.

### 5.5.1 Overview of the Deer Lodge Park Current Water Rates

The District has a single rate schedule for the Deer Lodge Park water system customers as they are all residential type customers. The rate structure includes a monthly fixed charge that varies by meter size and a two tier consumption rate. The tier sizes were established during the prior rate study completed for the District and reflect average consumption data for the customers in the Deer Lodge Park water system. Provided in Table 5-18 is a summary of the current water rates for the Deer Lodge Park water system.

Table 5-18 Summary of the Current Deer Lodge Park Water Rates	
<b>Monthly Fixed Fee (\$/Meter Size)</b>	
3/4" or Less	\$24.32
1"	59.59
1-1/2"	119.17
2"	190.43
<b>Consumption Charge (\$/CCF)</b>	
Tier 1	\$3.27
Tier 2	3.90

### 5.5.2 Overview of the Proposed Deer Lodge Park Water Rates

The revenue requirement analysis was used to determine the adequate and prudent level of funding needed to operate and maintain the Deer Lodge Park water system. The results of the revenue requirement analysis indicated the need for annual revenue adjustments for FY's 2016 – FY 2020. The proposed rates to be developed in this section of the report will assume these revenue targets for each of the fiscal years reviewed. Given only a single class of service exists in the Deer Lodge Park water system costs are not allocated between the customers. However, the cost of service analysis was used to review the tier pricing for the rates. Provided in Table 5-19 is a summary of the overall adjustments to establish the target revenue needs for the Deer Lodge Park water system based on the results of the revenue requirements provided in Section 3 of this report.

Table 5-19 Summary of the Deer Lodge Park System Proposed Revenue Adjustments					
Class of Service	Jan 1 2016	Jan 1 2017	Jan 1 2018	Jan 1, 2019	Jan 1, 2020
<b>System Total</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>

### 5.5.3 Development of the Proposed Water Rates

As noted, the District's Deer Lodge Park water system rate structure includes a monthly fixed fee that varies by meter size and a two tier consumption charge. The sizing of the tiers is based on typical customer consumption levels (i.e., average customer use) in the winter and summer period. These tiers are defined as follows:

- **Tier 1** – 0 to 10 CCF                      0 – 7,480gallons
- **Tier 2** – Over 10 CCF                      Over 7,480 gallons

The above tier sizes and break points were established during the District’s prior rate study. Tier 1 was developed based on the average customer use in the summer season and Tier 2 is all water consumption greater than the typical customer summer use levels. Consumption in the second tier occurs primarily in the summer months only. HDR, in reviewing these block sizes and the tiered pricing, considered the current customer demand patterns of the customers using water in each tier block. For the average customer the tier sizes reflect the typical consumption patterns for current customers in the Deer Lodge Park water system. Given this, the tier sizes have been maintained for the purpose of this study.

The next step of the rate design for the Deer Lodge Park customers was to develop the pricing of the tiers based on the cost of service analysis. HDR reviewed the consumption in each tier and the peaking in each tier (capacity requirements) to allocate costs to each tier. It should be noted that given the seasonality of the District’s customer base the monthly accounts with a zero read, or no consumption, were excluded from the development of the average customer use for this review. Provided in Table 5-20 is a summary of this review.

Table 5-20 Summary of Monthly Residential Customer Demand Patterns		
	<b>Tier 1 (0–10 CCF)</b>	<b>Tier 2 (&gt; 10 CCF)</b>
<b>Total Use In CCF (14)</b>	<b>9,926</b>	<b>5,164</b>
<b>Peak Use Factor <sup>[1]</sup></b>	<b>1.18</b>	<b>2.19</b>
Peak Use in Relation to Tier 1	1.00	1.86
Proportion Allocation	35.0%	65.0%

[1] Peak use factor was calculated based on the peak monthly use in each tier vs. the average monthly use in each tier. This reflects the various demands placed on the system by each tier of consumption.

As Table 5-20 indicates, the average peaking factor of a Tier 1 customer is approximately 1.18. When compared to a tier 2 customer peaking factor basis the tier 2 customers place almost two times greater capacity need on the system given this level of consumption. Using these peaking factors, proportions can be developed based upon the amount of capacity that is demanded by a consumer when they consume water in each tier. The implications of customer demands upon a water system are immense and for the most part relate to the sizing and construction of facilities to meet these excessively large demands. The peak factor relationships shown in Table 5-20 will be used later in this analysis in the assignment of certain and specific costs to tiers.

A similar analysis as what was completed for the Arrowhead Woods residential customer pricing was also completed for the Deer Lodge Park water system customers. The starting point

of the analysis was the classification of the revenue requirement for Deer Lodge Park. Provided in Table 5-21 is a summary of the classification of the Deer Lodge Park revenue requirement to the various cost components.

Table 5-21 Summary of the Classification of the Deer Lodge Park Revenue Requirement (\$000)				
	<b>Total</b>	<b>Commodity</b>	<b>Capacity</b>	<b>Customer</b>
Total Revenue Requirement	\$129	\$85	\$43	\$1

Next, the costs were allocated to tier 1 or tier 2 to determine the pricing for each tier. In general, the costs were allocated equally to both tiers. In other words, the same cost per CCF for each tier. This was done as minimal infrastructure costs are included in the Deer Lodge Park revenue requirement. The exceptions to an average unit cost allocation to each tier were related to meter costs, utility costs, and other professional services costs that reflect a cost difference in the capacity demands of the customer. Given this allocation to the tiers, a summary of the cost by tier is provided in Table 5-22.

Table 5-22 Summary of the Rates By Tiers (FY 2016)		
	<b>Tier 1 (0–20 CCF)</b>	<b>Tier 2 (20–40 CCF)</b>
<b>Total Tier Related Cost</b>	\$8.24	\$8.92
<i>Current Rates</i>	\$3.27	\$3.90

As shown in Table 5-22, the current rates are less than the calculated unit rate for each tier. In other words, the District could effectively increase the consumption charges but has chosen to collect the difference through the fixed meter charge, which also varies based on the capacity of the meter to reflect the demands customers place on the system. The greater proportion of revenue collected through the fixed charge also reflects the greater proportion of fixed costs the District incurs regardless of the amount of water consumed. A more detailed summary of the classification and allocation of the Deer Lodge Park revenue requirement is provided in Exhibits 6 - 8 of technical appendix B.

Based on the above analysis, the proposed water rates for the Deer Lodge Park water system can be developed. As noted above, the tier pricing analysis resulted in consumption rates that could be much higher than currently charged. One of the rate design goals was to maintain the revenue stability of the rates. Given that, it was determined that the current rate structure would be maintained, and only the level of the rates would be adjusted based on the target revenue levels as established in the revenue requirement analysis. The fixed charge was increased to maintain the revenue stability of the current rates. This also reflects the high

proportion fixed costs incurred by the District to maintain and operate the Deer Lodge Park system. In reviewing the costs, approximately 60% of the District’s revenue requirement can be considered fixed. These are items such as salaries and wages, benefits, etc. The District continues to incur these costs regardless of the level of customer consumption or even if customers do not consume any water. This is an important consideration as a high percentage of the District’s residential customers do not consume water on a consistent basis give the seasonal nature of the District’s customer base, yet the District must maintain and provide service regardless of consumptive use. In comparison, the proposed rates collect 58% of the revenues through the fixed monthly charge. When comparing the tier pricing (Table 5-22), the difference between the tiers is \$0.68. This differential is maintained in the proposed rates. Provided below in Table 5-23 is a summary of the current and proposed residential rates for the Arrowhead Woods system residential customers.

Table 5-23 Summary of the Proposed Deer Lodge Park Water Rates						
	Current Rate	Jan. 1 2016	Jan. 1 2017	Jan. 1 2018	Jan. 1, 2019	Jan. 1, 2020
<b>Proposed Rate Adjustment</b>		<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>9.5%</b>
<b>Monthly Fixed Fee (\$/Meter Size)</b>						
3/4" or Less	\$24.32	\$27.48	\$31.05	\$35.09	\$39.65	\$44.51
1"	59.59	67.34	76.09	85.98	97.16	109.04
1-1/2"	119.17	134.66	152.17	171.95	194.30	218.10
2"	190.43	215.19	243.16	274.77	310.49	348.51
<b>Consumption Charge <sup>[1]</sup> (\$/CCF)</b>						
Tier 1 – 0-10 CCF	\$3.27	\$3.45	\$3.60	\$3.75	\$3.90	\$4.10
Tier 2 – 11 + CCF	3.90	4.12	4.30	4.48	4.66	4.90

The proposed rates for the Deer Lodge Park customers have maintained the current rate structure. However, the monthly fixed charge has been increased to enhance the revenue stability of the rates to more closely match how the District incurs fixed costs for the Deer Lodge Park system. In addition, the consumption charges have been adjusted to reflect the tier pricing to maintain the differential as developed in the cost of service analysis and meet the target revenue levels as established in the revenue requirement analysis.

## 5.6 Development of the Drought Surcharges

As part of the water rate study the District requested the development of drought surcharges to maintain sufficient revenues during drought or water shortage periods. Drought surcharges are an important tool that allows the District to maintain adequate revenues when consumption declines due to voluntary or mandatory conservation resulting from drought

conditions, such as the current drought California is experiencing, or during other water shortage emergencies (e.g., supply constraints due to infrastructure failure).

### **5.6.1 Overview of the Proposed Drought Surcharges**

A drought, or water shortage emergency, certainly creates operational challenges for the District, but it also creates certain financial/rate challenges. As the District is required to increase water conservation efforts and reduce the amount of consumptive use from their customers, the financial impacts are obvious. Reduced consumptive billings will translate into reduced overall revenue. For example, a simple request for a reduction in 10% consumptive use may translate into nearly a 10% reduction in revenues, depending upon the mix of fixed and variable charges in the rate structure.

Drought surcharges are often adopted in advance of the drought or water emergency. At the point when the District declares a drought (specifying the level of conservation needed) the drought surcharges can be implemented by the District's Board. By reviewing and adopting drought surcharges in advance of the actual event, the District is being proactive, but more importantly, the District is provided with sufficient time to carefully analyze the policy and costing decisions associated with drought surcharges.

A water management plan or drought management plan is the typically the foundation for the development of drought surcharges. These documents typically provide a number of key policy items or information needed to develop drought surcharges (triggers for restrictions, phases or stages of restrictions, targeted level of savings, etc.). The District has adopted several ordinances that establish the requirements during times of drought. These ordinances were used in the development of the District's proposed drought surcharges.

### **5.6.2 Development of the Proposed Drought Surcharges**

The water rates being proposed in this water rate study reflect "normal" water conditions, or typical water consumption prior to the recent State mandated drought restrictions. The current drought in California extends back several years, and when including the recent State mandated conservation requirements, current usage characteristics cannot be considered normal use. Given this, the 2014 consumption data (See Exhibit 6 of technical appendix A) used in the rate study was the basis for establishing the revenue and expense projections. In this way the proposed changes in revenue at the various drought levels will reflect typical customer consumption as projected in the rate study. In addition, the District has implemented conservation goals to meet the current State mandated conservation requirements.

For purposes of establishing drought surcharges, the District has three different levels reflecting water restrictions. Each subsequent level results in additional reductions in consumption as established in the District's Ordinance Numbers 69 and 79. These three levels are summarized below along with the estimated consumption reductions resulting from additional conservation restrictions.

Level 1 – Limited Irrigation/Outdoor Use

- Approximately a 10% reduction in consumptive use

Level 2 – Minimal Irrigation/Outdoor Use

- Approximately a 25% reduction in consumptive use

Level 3 – Limited Irrigation/Outdoor Use

- Approximately a 60% reduction in consumptive use

To achieve these water savings under each level, the District would take a number of different actions. These include reducing, or eliminating, outdoor water use, limiting the number of irrigation days, etc. To help achieve the needed savings in each drought level, HDR developed a set of surcharges applicable to each drought level. In developing the drought surcharges HDR has assumed that under each level there will be some level of “voluntary” savings by the customers based on education and individual conservation practices. The remaining savings will need to be achieved through mandatory conservation requirements as established by the District’s conservation and drought levels. These conservation reductions would occur while still recovering only the proportionate cost of providing water service. Provided below in Table 5-24 is a summary of the assumptions regarding voluntary versus price induced savings.

Table 5-24  
Summary of the Estimated Voluntary vs. Price Induced Conservation Savings

	<b>Normal Conditions</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>
Estimated Savings	0.0%	10.0%	25.0%	60.0%

At the same time, during a drought, a utility may incur additional costs over and above the revenue requirements incurred during normal water conditions as a result of each stage of the drought. These additional expenses can be incurred for items such as advertising and notification, additional customer outreach, temporary staffing, enforcement, etc. As a part of developing the District’s proposed drought surcharges no additional or incremental costs have been considered or factored into the drought surcharges.

Based on the District’s ordinances and conservation planning, the development of the proposed drought surcharges takes into consideration where the consumption savings will occur. Typically this first targets discretionary use and then, if needed, non-discretionary use. As an example, discretionary use for a residential customer is often defined as outdoor usage, while non-discretionary water use is typically considered indoor use.

In developing the proposed drought surcharges, the monthly meter charge remains fixed at the same level regardless of the drought stage. Based on the conservation savings estimated for each drought level, the drought surcharges were developed to maintain the current level of revenues for each customer class of service. Provided below in Table 5-25 is a summary of the reduction in consumption for each class of service.



Table 5-25  
Summary of the Reduced Consumption Levels

	<b>Normal Conditions</b>	<b><u>Level 1</u></b>	<b><u>Level 2</u></b>	<b><u>Level 3</u></b>
	<b>0%</b>	<b>10%</b>	<b>25%</b>	<b>60%</b>
<b><u>Arrowhead Woods</u></b>				
<b>Residential</b>				
All Consumption	486,225	439,522	368,559	197,437
% Reduction		-9.6%	-24.2%	-59.4%
<b>Commercial</b>				
All Consumption	12,570	10,956	8,430	2,643
% Reduction		-12.8%	-32.9%	-79.0%
<b>Irrigation</b>				
All Consumption	65,702	56,797	43,407	25,751
% Reduction		-13.6%	-33.9%	-60.8%
<b><u>Deer Lodge Park</u></b>				
All Consumption	15,090	12,360	9,619	4,232
% Reduction		-18.1%	-36.3%	-72.0%
<b><u>Total</u></b>				
All Consumption	579,587	519,635	430,015	230,063
% Reduction		-10.3%	-25.8%	-60.3%

As shown in Table 5-25 the overall target reductions reflect the targeted conservation savings at each drought level based on the District’s conservation practices. The increased savings on the irrigation and commercial consumption is the elimination of outdoor watering needs that are required as part of the District’s conservation goals as noted in Ordinance 69 and 79.

The next step of the analysis is to determine the impact of the reduced consumption on annual revenues. Provided in Table 5-26 is a summary of the reduced consumption based revenues resulting from the conservation reductions in consumption.

Table 5-26  
Summary of the Reduced Consumption Revenues

	<u>Normal Conditions</u> 0%	<u>Level 1</u> 10%	<u>Level 2</u> 25%	<u>Level 3</u> 60%
<b><u>Arrowhead Woods</u></b>				
<b>Residential</b>				
Reduced Consumption Revenues	\$0	\$348,021	\$667,884	\$1,382,184
<b>Commercial</b>				
Reduced Consumption Revenues	\$0	\$16,363	\$41,399	\$96,426
<b>Irrigation</b>				
Reduced Consumption Revenues	\$0	\$37,622	\$89,792	\$158,329
<b><u>Deer Lodge Park</u></b>				
Reduced Consumption Revenues	\$0	\$10,458	\$20,776	\$40,746
<b><u>Total</u></b>				
Reduced Consumption Revenues	\$0	\$412,465	\$819,852	\$1,677,685

As shown above, the reduction in consumption results in a reduction in consumption revenues. This amount of revenue loss is the basis for the drought surcharges. To develop the actual drought rates, the revenue loss for each customer class of service is divided by the consumption remaining at each stage of the drought. For example, for the residential customers at a level 1 drought, the reduction in revenue of \$348,021 is divided by the remaining consumption at level 1 of 439,522 CCF (See Table 5-24) to determine the drought surcharge of \$0.79 per CCF. This drought surcharge would then be added to all consumption billed at the level 1 drought. Provided in Table 5-27 is a summary of the drought surcharges for each level.

Table 5-27  
Summary of the Drought Surcharges – \$/CCF

	<u>Normal Conditions</u> 0%	<u>Level 1</u> 10%	<u>Level 2</u> 25%	<u>Level 3</u> 60%
<b><u>Arrowhead Woods</u></b>				
<b>Residential</b>				
All Consumption	\$0.00	\$0.79	\$1.81	\$7.00
<b>Commercial</b>				
All Consumption	\$0.00	\$0.66	\$2.07	\$6.15
<b>Irrigation</b>				
All Consumption	\$0.00	\$1.49	\$4.91	\$36.48
<b><u>Deer Lodge Park</u></b>				
All Consumption	\$0.00	\$0.85	\$2.16	\$9.63

As noted, the drought surcharges in Table 5-27 are added to the adopted rates in place at the time the drought stage is declared. The drought surcharges would be applied to each tier of the District’s rates. For example, the proposed rate for the Arrowhead Woods customer first tier is currently \$1.22/CCF and if the District declares a Stage 2 drought, then the first tier rate would change to \$3.03/CCF (\$1.22 + \$1.81). These drought surcharges can be added to the District’s proposed rates, effective January 1, 2016, as directed by the District Board. Implementation of these drought surcharges will help the District maintain revenue levels during drought related consumption reductions.

To better understand how the drought surcharges work, Table 5-28 shows a comparison of the residential monthly bill assuming a customer does, and does not, adjust their consumption in response to the requested savings in each drought stage based on an Arrowhead Woods residential customer.

Table 5-28 Arrowhead Woods Residential Drought Surcharge Bill Impacts <sup>[1]</sup>				
	<u>Normal Conditions</u> 0%	<u>Level 1</u> 10%	<u>Level 2</u> 25%	<u>Level 3</u> 60%
<b>Customer Using 8 CCF</b>				
Assuming No Change in Use – 8 CCF	\$50.40	\$56.73	\$64.90	\$106.40
Assuming Reduced Usage - Revised CCF Usage	8.0	7.0	6.0	3.0
Total Bi-Monthly Bill	\$48.54	\$51.76	\$54.77	\$59.04
<b>Customer Using 10 CCF</b>				
Assuming No Change in Use – 10 CCF	\$53.18	\$61.10	\$73.16	\$123.19
Assuming Reduced Usage - Revised CCF Usage	10.0	9.0	8.0	4.0
Total Bi-Monthly Bill	\$53.18	\$57.99	\$63.04	\$67.26
<b>Customer Using 12 CCF</b>				
Assuming No Change in Use – 12 CCF	\$57.82	\$67.32	\$81.43	\$141.83
Assuming Reduced Usage - Revised CCF Usage	12.0	11.0	9.0	5.0
Total Bi-Monthly Bill	\$67.32	\$64.21	\$67.17	\$45.54

[1] Assumes a 3/4” meter charge for a typical residential customer.

As can be seen in the above table, if a customer does not modify his or her consumption, their utility bill will increase substantially. However, if the he or she does do respond and provide the requested savings, his or her bill will not increase much beyond his or her prior bill while providing the District with sufficient revenue to maintain normal operations. It should also be noted that depending on the level of conservation a customer may end in a lower consumption

tier which would also reduce the overall bill. However, with uniform drought surcharges the target level of revenue should still be met.

### 5.6.3 Annual Adjustments to the Drought Surcharges

As noted, the purpose of the drought surcharges is to maintain sufficient revenues during times of declining consumption and subsequent revenues. Therefore, as water rates are adjusted, the drought surcharges will need to be adjusted to reflect the target revenue needs as the development of the drought surcharges are based on current water rates and revenue proposed levels. The adjustment of the drought surcharges to reflect the maximum changes in rates is based on the percentage basis to reflect the change in the overall consumption revenues. It should be noted that this is not the same as the overall rate adjustment, only the percentage change in the consumption revenues resulting from the rate increase. Provided in Table 5-29 is a summary of the proposed drought surcharges for the five-year rate setting period.

Table 5-29  
Summary of the Proposed Drought Surcharges – \$/CCF

	January 1, 2016	January 1, 2017	January 1, 2018	January 1, 2019	January 1, 2020
<b><u>Arrowhead Woods</u></b>					
<b>Residential</b>					
Level 1 – All Consumption	\$0.79	\$0.82	\$0.84	\$0.87	\$0.90
Level 2 – All Consumption	\$1.81	\$1.87	\$1.93	\$1.99	\$2.06
Level 3 – All Consumption	\$7.00	\$7.22	\$7.46	\$7.68	\$7.97
<b>Commercial</b>					
Level 1 – All Consumption	\$0.66	\$0.69	\$0.72	\$0.75	\$0.78
Level 2 – All Consumption	\$2.07	\$2.17	\$2.25	\$2.34	\$2.43
Level 3 – All Consumption	\$6.15	\$6.45	\$6.69	\$6.95	\$7.23
<b>Irrigation</b>					
Level 1 – All Consumption	\$1.49	\$1.35	\$1.41	\$1.48	\$1.56
Level 2 – All Consumption	\$4.91	\$4.45	\$4.65	\$4.88	\$5.13
Level 3 – All Consumption	\$36.48	\$33.05	\$34.56	\$36.23	\$38.14
<b><u>Deer Lodge Park</u></b>					
Level 1 – All Consumption	\$0.85	\$0.89	\$0.93	\$0.97	\$1.01
Level 2 – All Consumption	\$2.16	\$2.16	\$2.16	\$2.16	\$2.16
Level 3 – All Consumption	\$9.63	\$9.63	\$9.63	\$9.63	\$9.63

As noted, the above drought surcharges are added to the water rates adopted for the time specified time period. Updating the drought surcharges each time the water rates are updated will maintain the sufficient revenue levels necessary to fund the operating and capital needs of the water utility during times of drought and reduced consumption levels. Technical Appendix C provides the detailed calculations of the drought surcharges.

## 5.7 Water Rate Study Recommendations

Based on the results of the water rate study, HDR recommends the following:

- Water rate revenues for the Arrowhead Woods system should be adjusted 4.5% annually in FY 2016 through FY 2019 followed by a 5.5% adjustment in FY 2020.
- Water rate revenues for the Deer Lodge Park system should be adjusted by 9.5% annually in FY 2016 through FY 2020.
- The rates are proposed to be implemented and effective on January 1 of each year (e.g., January 1, 2016, January 1, 2017).
- When funds are available, increase the level of annual replacement funding to transition towards meeting annual depreciation expense levels.
- Drought rates should be adopted based on the need to maintain sufficient revenues for operating and capital needs.
- Drought rates should be adjusted whenever water rates are adjusted.

## 5.8 Summary of the Water Rate Study

This completes the analysis for the District's Arrowhead Woods and Deer Lodge Park water system. This study has provided a comprehensive review and development of proposed water rates, and drought surcharges, for the District. Adoption of the proposed water rates and drought surcharges will allow the District to meet their current and projected water system financial obligations and capital improvement needs for the time period reviewed.



## Technical Appendix A – Arrowhead Woods

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## Technical Appendix B – Deer Lodge Park

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## Technical Appendix C – Drought Surcharges

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