

Water Rate Review 2015

Glenmore-Ellison Improvement District

August 2015 (FINAL)

Prepared for



Prepared by





Executive Summary

In keeping with the Board of Trustee's Guiding Principles that all water consumption be metered, the District completed a rate review using the Econics' WaterWorth™ model in 2015. Some of the key areas of focus included assurance of full cost recovery, support for agriculture, consideration for water conservation, emphasis on moving to metering, and assurance of fairness and equity.

The revenue requirements for operating and maintaining the water service are budgeted at \$4,2 million for 2016 and projected to increase at an inflation rate of about 1.6%. The revenues from user rates are expected to recover about \$4,0 million of these expenses with the balance being recovered from other sources. Any revenues generated in excess of the budgeted amount will be placed into a revenue stabilization reserve fund to be used during the transition to metering in cases where demand projections were overstated resulting in revenue loss. Parcel taxes are also levied on customers and these revenues are used for infrastructure renewal projects and are not included in the scope of work for this rate review.

In all, ten customer categories are defined: six are domestic use categories, one is commercial, and three are specific to irrigation uses. Metered residential customers will see an inclined block rate structure as a way of encouraging conservation while giving residents control over their costs. All other metered customers will see a uniform rate. All unmetered customers, with the exception of residents in the Ellison area, will see a rate structure that incentivizes adoption of metering. As most of the costs of providing service are fixed costs, the rate structure will include a fixed charge component as well as the variable charge. The fixed charge is applied in different ways (e.g.: by meter size or by number of domestic units) depending on which method was deemed to be the best proxy for accounting for the level of service conferred to the customer class.

The proposed rate structure outlined in section 4 provides an optimal distribution of cost responsibility while addressing the several other key objectives. Developing a rate structure that is simple, effective and equitable is a challenging process involving many iterations while trying to balance several objectives, some of which compete with one another. The methodology used is based on the AWWA M1 Manual on Principles of Water Rates Fees and Charges 6th Edition. A mathematical model was developed to facilitate the process. This model should be updated from time to time with current data on customer consumption and the rate structure revisited and tested for equity and effectiveness.



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Acknowledgements

Econics would like to thank District staff for assistance and support with this project.



Analysis in this report was completed using WaterWorth™, a proprietary modeling tool that facilitates water services financial analysis, revenue forecasting and development of rate structures. More information about WaterWorth™ can be found online at www.econics.com.



1.0 OVERVIEW

1.1 INTRODUCTION

1.2 OBJECTIVES OF A RATE REVIEW

1.3 THE REVIEW PROCESS



1.1 Introduction

The Glenmore-Ellison Improvement District (GEID) owns and operates a water supply system that serves a population of about 15,600 residents of the City of Kelowna and Regional District of Central Okanagan. In addition there are as many as 1,600 students living on the University of British Columbia Okanagan campus (UBCO) from Sept through April.

The system has gradually expanded over the years and it now provides services to residential, commercial, institutional, and agricultural customers within the portions of City and Regional District boundaries. The GEID is among the minority of water suppliers in the province of BC that have incorporated metering and water pricing as important components in the effective management of water demand.

As a result of the metering program and the introduction of volume pricing water consumption is forecasted to decline in the short and long term. A significant contributor to this trend is owed to updates to the building code; new regulations are causing the proliferation of water efficient appliances and devices. While decreases in water demand are desirable outcomes, they can also present challenges. For water suppliers that have adopted metering, reduced demand can present a negative impact to revenues. Water rates must be adjusted regularly in response to changes in demand.

In order to maintain a sustainable level of delivery of water service, water suppliers must ensure that revenues are not only sufficient to recover annual operations and maintenance costs but also provide for the long term requirements for infrastructure replacement. The latest research shows that there is a growing deficit in water and wastewater infrastructure investment in Canada. This can lead to challenges in assuring safe and secure water supplies, and meeting regulatory requirements for the foreseeable future.

Developing and managing a rate structure that is simple to understand and administer, effective and equitable, and generates sufficient revenues in the face of changing demand is a challenging process. The process involves iterating through scenarios while trying to balance several objectives, some of which compete with one another. To facilitate this process, the District has adopted Econics' WaterWorth™ model, which is based in part on the AWWA M1 Manual on Principles of Water Rates Fees and Charges 6th Edition, projects demand, impacts on billings, and changes to revenues. By maintaining this model, the District can more effectively manage the sustainable delivery of water services to the community.



1.1 Introduction (continued)

In keeping with the Board of Trustee's Guiding Principles that all water consumption be metered, the District completed a rate review using the WaterWorth™ model in 2015. Some of the key areas of focus included:

- assurance of full cost recovery through sufficient and stable revenues;
- support for agriculture (grade A lands with farm status) as per the Board's mandate to support farmers and protect agriculture in general;
- consideration for conservation of water as it is felt the District should take an active role in given the effects of global warming and drought conditions; and,
- assurance of fairness and equity in the rate structure.

This report which provides a summary of the water rate review undertaken in 2015, has the following sections:

- Part 1 provides an overview of the rate review process;
- Part 2 summarises the current situation with community water use and revenue generation;
- Part 3 identifies revenue requirements and distribution of cost responsibility;
- Part 4 provides the proposed rate scenario; and,

A glossary of terminology, an explanation of the volume units of measure used in the report, and typical household water usage can be found in the Appendices.



1.2 Objectives of a Rate Review

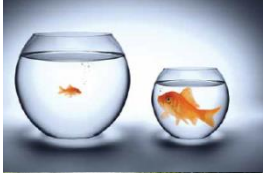
The following describes the key objectives, or motivators that influence the design of user rates for water and wastewater utility services provided to communities.



Revenue Sufficiency: first and foremost, a rate structure (combined with other sources of revenue such as developer fees, infrastructure renewal fees, property taxes, and others) must generate sufficient revenue to recover the costs of providing water services, both now and into the future.



Revenue Stability: income from rates needs to be reasonably stable from year to year. Rate structures with a variable component give consumers more control over their costs, while also exposing the service provider to revenue variability as demand fluctuates over time depending on variations in factors such as climate, the economy, and population.



Equity & Fairness: people expect to pay for water services in a fair manner. For example, people or customer categories that use less water may reasonably expect to pay less if this means that they are imposing fewer costs on the system.



Resource Conservation: pricing is one of many ways to encourage residents and businesses to use water more efficiently. In simple terms, if people and businesses are charged more, they will use less, all else being equal.






Public Acceptability: no rate structure will work if the community rejects it. Among other things, this means it must be affordable. Changes also need to be introduced with careful communication. Sufficient time and a smooth transition can allow people to plan for new costs or make fixture or equipment changes in their homes and businesses.



Understandable: a rate structure should be easy to understand. For example, it should empower customers to easily make decisions about how they use water, ideally ones that are in line with the goals of the organization.

1.3 The Review Process

The process of reviewing and designing rates can be described using the analogy of making and eating a pie. The first step is to determine how big the pie should be (that is, how much revenue do you need for the long term?). Next is to determine how to cut the pie into equitable slices (representing the costs imposed on the different customer categories: single family, commercial, etc.). Step 3 is to deal with each individual piece of pie (involving designing a rate structure to achieve the required objectives for each customer category).

Best Practice	Analogy	Benefits
<p>1 Full Cost Recovery</p>		<ul style="list-style-type: none"> • Revenue Sufficiency • Long Term Sustainability • Supports Political Stability
<p>2 Establish Cost of Service & Equity</p>		<ul style="list-style-type: none"> • Establishing Fairness • Public Acceptability
<p>3 Design Rates to Meet Objectives</p>		<ul style="list-style-type: none"> • Promote Conservation • Reduce Revenue Volatility • Minimize Billing Impacts



2.0 CURRENT SITUATION

2.1 CUSTOMER CATEGORIES

2.2 POPULATION

2.3 CUSTOMER SUMMARY

2.4 WATER CONSUMPTION

2.5 REVENUES

2.6 REVENUE STABILITY

2.7 PERFORMANCE - EQUITY



2.1 Customer Categories

The following describes the different customer categories that are either currently recognized in the District’s rates bylaw or are proposed new for an updated bylaw.

Customer Category	Descriptions
Residential	Services to single family dwelling, duplex and four-plex units that are <u>currently metered</u> .
Residential (NM)	Services to single family dwelling, duplex and four-plex units that are <u>not yet metered</u> .
Residential (Ellison)	Services to single family dwelling, duplex and four-plex units that are in the Ellison area and are <u>not yet required to be metered</u> .
Multifamily	Services that are shared by six or more single family dwelling units, including townhomes and bare land stratas, and larger stratas. These customers will have some outdoor green space; typically less green space per capita than Residential and more than apartment complexes.
Apartments	Services to multi-storey buildings where there may be typically one owner with tenants renting units. Apartments will have some outdoor green space but typically much less green space per capita than Multifamily or Residential.
Commercial	Services to individual and stratified non-domestic use including commercial customers, government owned facilities such as schools, and light industrial operations.
General Irrigation	Services for the purpose of summer irrigation including non farm-status properties over 1 acre, golf courses, cemeteries, medians and parks that are <u>currently on meters</u> .
General Irrigation (NM)	Services for the purpose of summer irrigation that are <u>not yet metered</u> .
Agricultural	Services to Grade A lots, currently classified as properties over 1 acre to which chlorinated water is provided, and which are classified as having farm status by BC Assessment.
UBCO Housing	Service to the student and staff domestic housing facilities on the UBCO campus.
UBCO Campus	Service for all other non-housing UBCO campus uses.

2.2 Population

Some data validation checks were conducted. First, by multiplying the number of known domestic units by the estimated dwelling density to derive a population for each of the domestic use categories. Results are tabulated and add up to Statistics Canada population estimates thereby giving a high degree of confidence in the billing data. Average per-capita demands are also evaluated by dividing the measured annual water use by the estimated populations. These are compared with benchmarks and give another measure of confidence in the billing data.

Table 1: Serviced Population Estimates (2014*)

Customer Class	Services		Population		Water Demand	
	Total Service Connections	Domestic Units	Density	Population	Annual Water Use (ML)	Average per capita demand (LCD)
Residential	580	646	2.50	1,614	256	434
Residential (NM)	1,935	2,154	2.50	5,384	1,161	591
Res (Ellison)	175	195	2.50	487	105	591
Multifamily	34	1,874	2.50	4,685	580	339
Apartments	16	1,677	2.00	3,354	276	225
UBCO Housing	1	838	2.00	1,676	83	135
total	2,741	7,383		17,200	2,459	

Note: residential domestic units are higher than the service connections to account for separate suites.

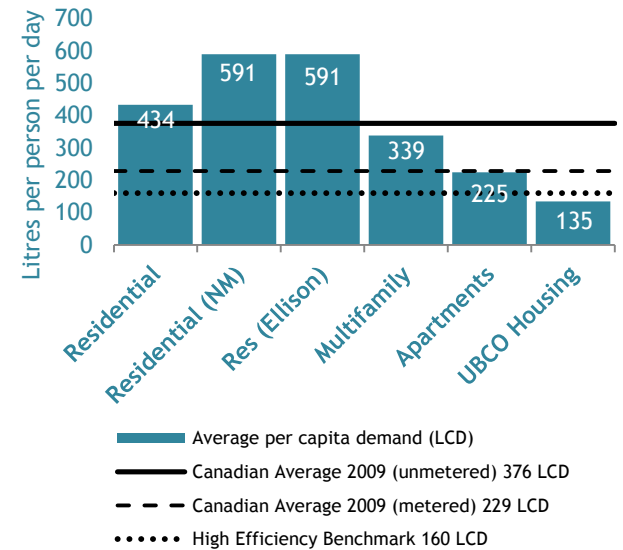


Figure 1: Average Daily Per Capita Demand (2014*)

Figure 1 depicts how much water is used in the community in terms of litres per capita per day (LCD). It shows that average demand is comparable to Canadian benchmarks. Because of the arid conditions in the Okanagan Valley per capita demand tends to be higher than the Canadian average. Unmetered Residential use is higher because these customers have not yet seen their consumption and these tend to be older homes with less efficient appliances. Multifamily facilities including apartments and UBCO housing have lower per capita demand typically because more people are sharing greenspace.



2.3 Customer Summary

Table 2 below provides a summary of information from the billing system relating to each customer category.

Table 2: Customer Summary (2014*)

Customer Class	Total Service Connections	Annual Water Use (m3)	Variable Revenues	Fixed Revenues	Total Revenues	Average Sector Price (\$/m3)	% revenue contribution	% water consumption	% total fixed revenues	Average per capita demand (LCD)	Average Day Demand (m3/day)
Residential	580	255,800		389,261	389,261	\$1.52	9.9%	4.6%	100.0%	434	701
Residential (NM)	1,935	1,161,000		1,298,654	1,298,654	\$1.12	33.1%	20.8%	100.0%	591	3,181
Res (Ellison)	175	105,000		117,449	117,449	\$1.12	3.0%	1.9%	100.0%	591	288
Multifamily	34	579,500	43,308	877,032	920,340	\$1.59	23.5%	10.4%	95.3%	339	1,588
Apartments	16	275,500		543,348	543,348	\$1.97	13.9%	4.9%	100.0%	225	755
Commercial	121	199,800	80,626	151,970	232,596	\$1.16	5.9%	3.6%	65.3%		547
General Irrigation	120	447,500	47,307	9,270	56,577	\$0.13	1.4%	8.0%	16.4%		1,226
General Irrigation (NM)	189	258,700		<u>see note below</u>					4.6%		709
Agricultural	240	2,156,500			197,000	\$0.09	5.0%	38.6%			5,908
UBCO Housing	1	82,600		129,924	129,924	\$1.57	3.3%	1.5%	100.0%	135	226
UBCO Campus	2	69,700	35,637	618	36,255	\$0.52	0.9%	1.2%	1.7%		191
Total	3,413	5,591,600	\$206,878	\$3,517,526	\$3,921,404	\$0.70	100.00%	100.00%	90%	891	15,319

*Note: information is based on 2014 actual billing data. Consumption for the unmetered categories (Residential NM, Res Ellison, and General Irrigation NM) are estimated based on known consumptive patterns of the metered categories.

General Irrigation (NM) have been contributing only through taxes towards asset replacement which is not in scope for this analysis and therefore no revenue information is provided.



2.4 Consumption

The pie graph at the right shows how total production breaks down between customer categories, including non-revenue water. The bottom graph shows a *best-fit** approximation of the demand distribution throughout the year. Non-revenue water is determined as the difference between total production and billed consumption and is assumed to be constant throughout the year.

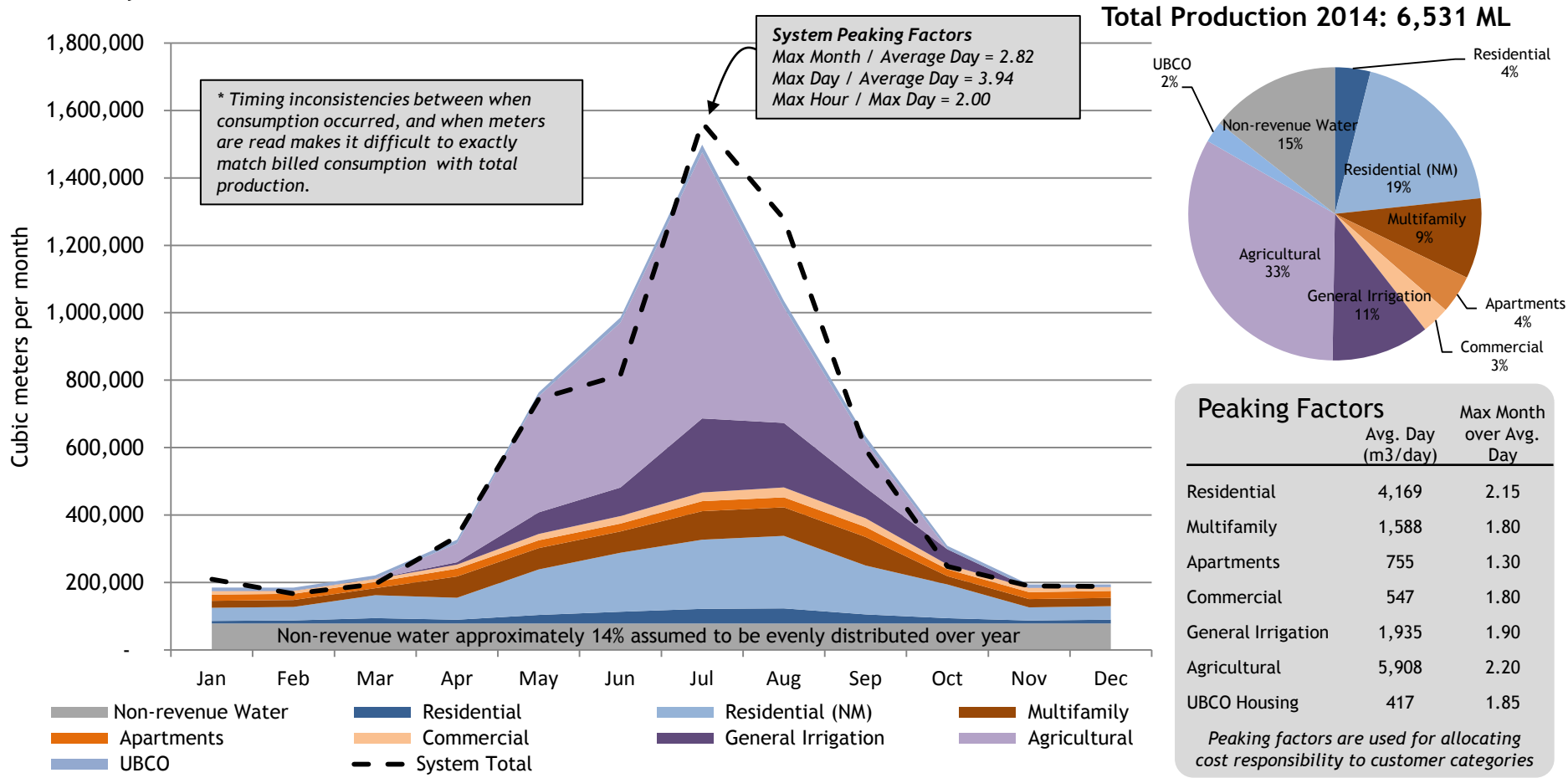


Figure 2: Estimated Billable Demand Compared with Total Production (2014)



2.4.1 Residential Consumption

The left-hand figure below shows the total annual consumption of the 536 Residential metered accounts ordered from lowest to highest. The right-hand figure shows pie graph at the right shows the average consumption of the 20 accounts centered at the median and at the third quartile.

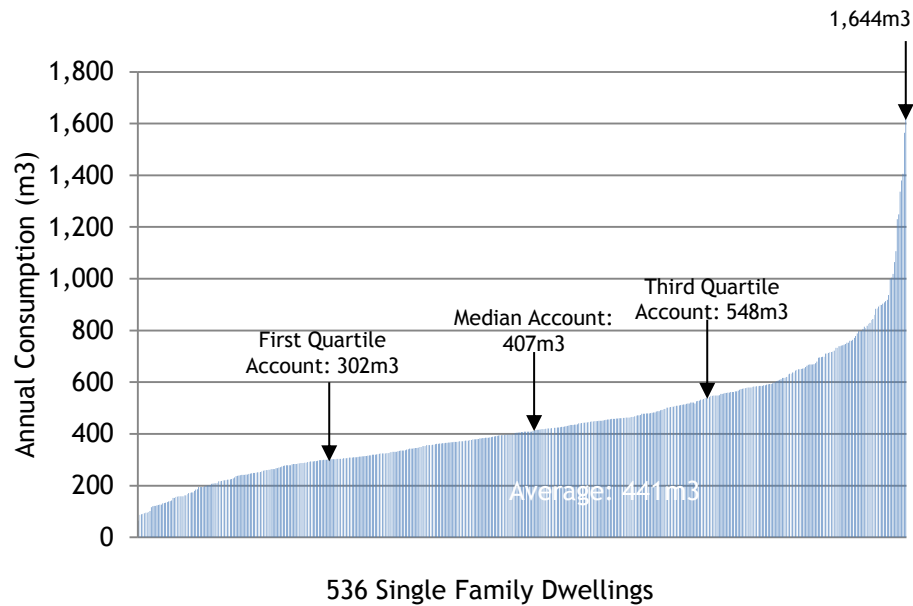


Figure 3: Consumption Profile of Residential Metered Accounts (2014)

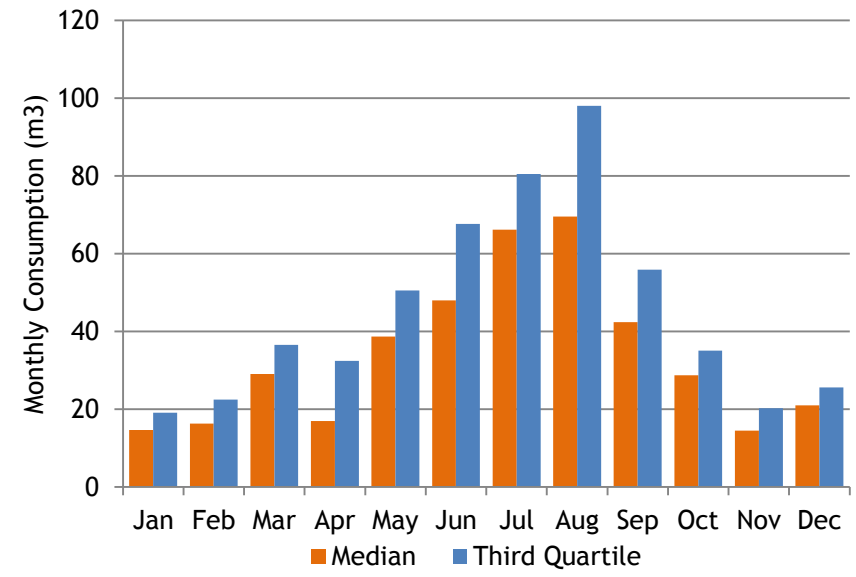


Figure 4: Average Consumption of Median and Third Quartile Metered Residential (2014)



2.5 Revenues

Revenues received from each customer category are shown here.

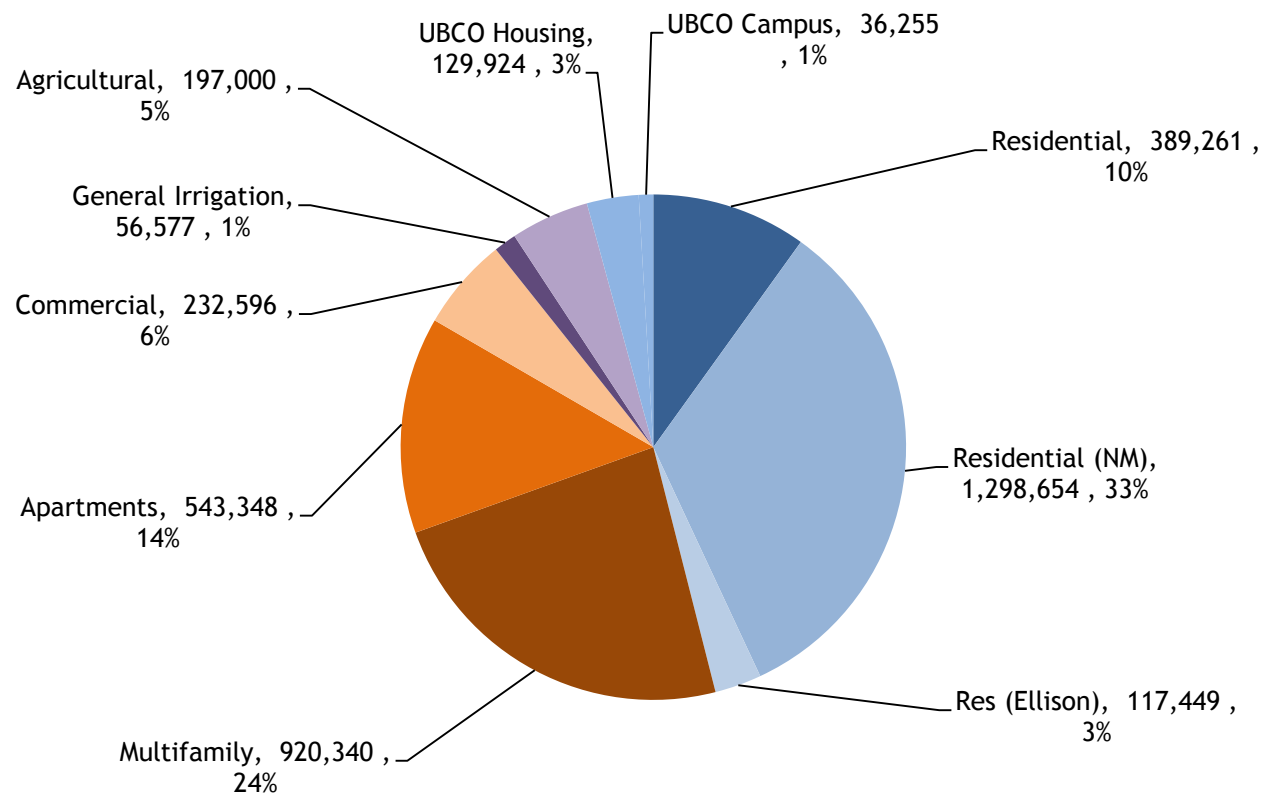


Figure 5: Revenues by Customer Category (2014)
Total = \$3,921,404



2.6 Revenue Stability

Fixed and variable portions of revenues are shown here. A high portion of fixed revenues contributes to greater revenue stability. A high portion of variable revenues contributes to greater conservation as customers have a financial incentive to be more efficient. Variable rates can also be thought of as more equitable because people and businesses who use water services more efficiently, putting less demand on the system, will pay less. Note that a certain portion of variable revenues can be viewed as being “as good as fixed” because some usage is essentially non-discretionary (e.g., water used for cooking, cleaning, drinking, etc.).

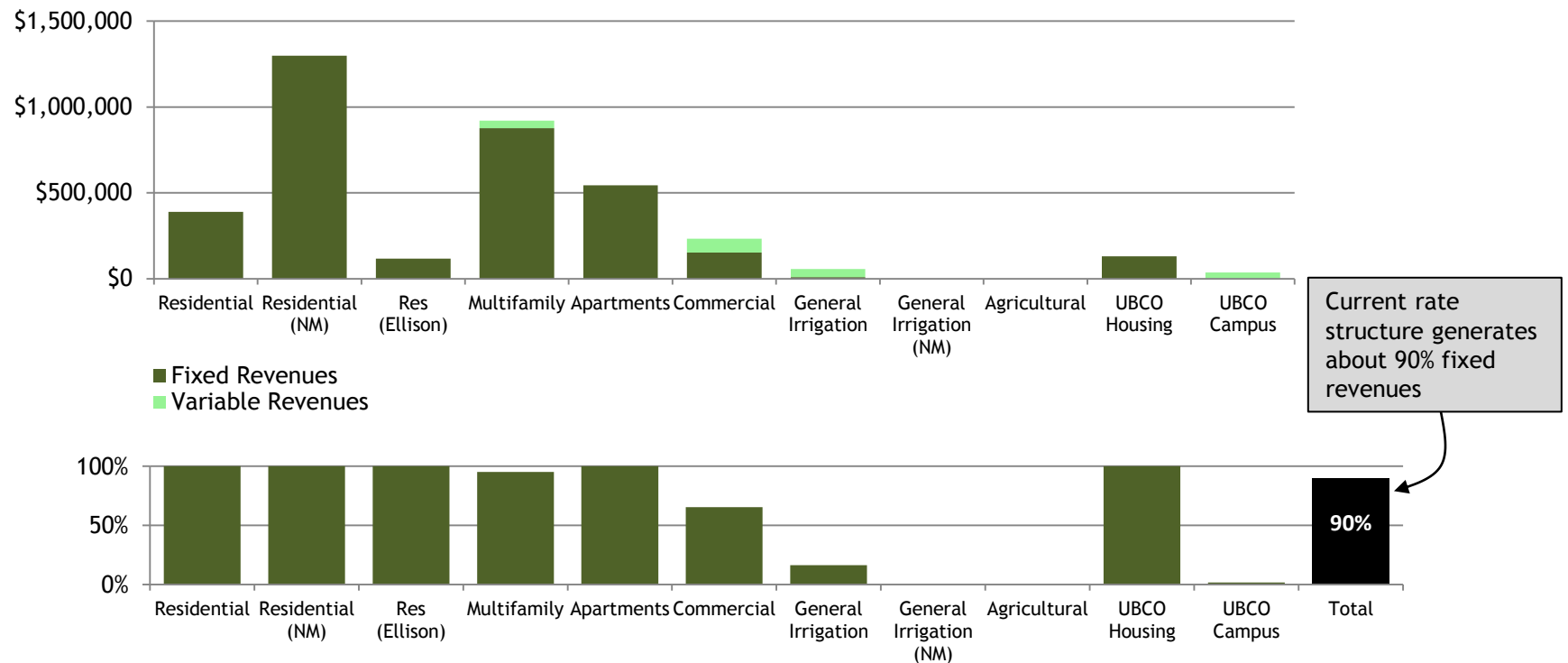


Figure 6: Fixed Revenue By Customer Category (2014 Billings)



2.7 Rate Performance - Equity

These figures provide simplified indicators of equity, comparing water demand with revenue contributions and comparing average cost of water to total system average cost.

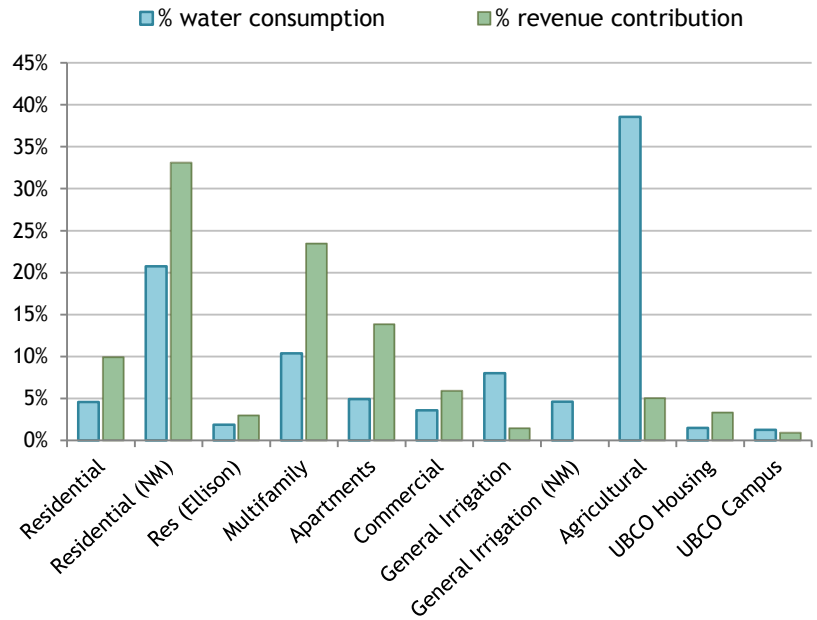


Figure 7: Comparison of Water Use and Revenue Contribution (2014)

The difference between the percentage of water consumed (blue bar) and the percentage of revenue contributed (green bar) may indicate inequities in the price structure.

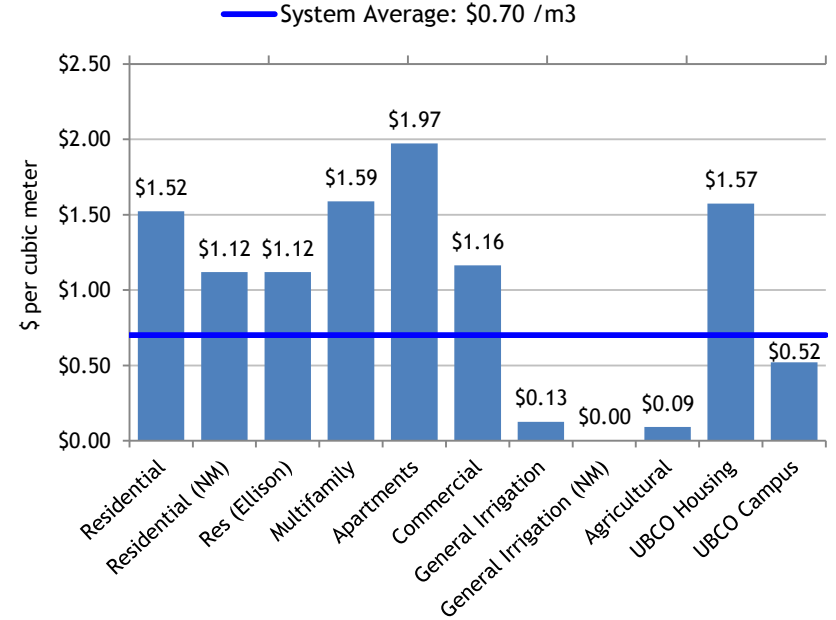


Figure 8: Average Price of Water by Category (2014)

The average price of water for each customer category is calculated by dividing the revenue collected by the volume of water delivered to customers in that category.



3.0 COST OF SERVICE

3.1 Revenue Requirements

3.2 Service Levels and Service Unit Costs

3.3 Customer Cost Allocation



3.0 Cost of Service

3.1 Revenue Requirements

The pie chart at the right shows a breakdown of expected 2016 operating and maintenance expenses, including some transfers to infrastructure reserves. The chart at the left shows a 20 year forecast of operating and maintenance costs projected with an inflationary increase of 2% for most line items (transfers to reserves are not inflated). Note that some portion of these expenses (approx. \$186,000) are covered through non-user-fee based sources. The remaining amount, \$4,028,000 will be recovered through the fixed and variable charges to customers.

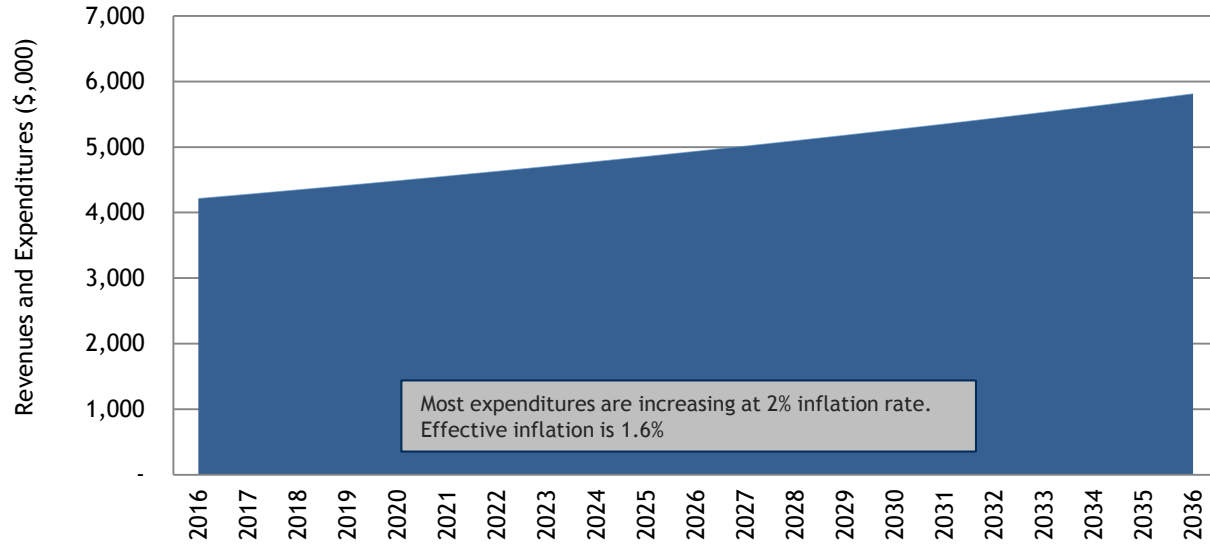


Figure 9: Expenditures (20 Year Projection)

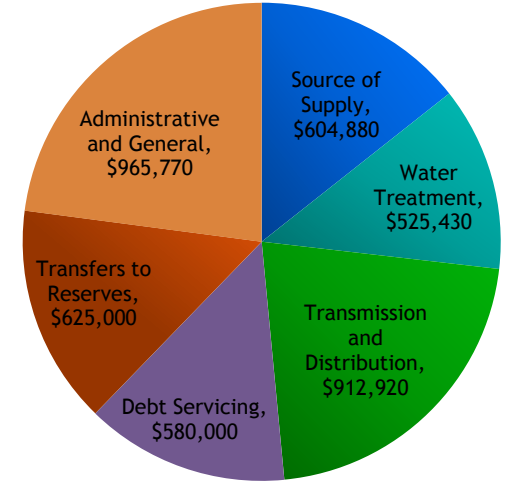


Figure 10: Breakdown of Expenses (2016) Total = \$4,214,000



3.2 Service Levels and Service Unit Costs

The costs of operating and maintaining the water utility are subdivided into functional components as shown in the table below. The Level of Service of each functional component is described in the table and the Units of Service shown. The Costs apportioned to each functional component is shown and the total adds up to the total revenue requirements from user fees and charges for the year shown. The Cost of Service divided by the Units of Service gives the Unit Cost of Service. These Unit Costs will be applied to each customer category depending on their portion of Units of Service “consumed”.

Note: the functional service components below don’t match the breakdown of expenses on the previous page which were a more arbitrary breakdown of expenses. Also, the total in this table reflects only those revenues that are generated through user fees and charges. The difference between total expenses on previous page and the cost of service total here is covered through other revenue sources.

Table 3: 2016 Levels of Service, Cost of Service and Unit Costs

Functional Service Component	Description	Units of Service	Cost of Service	Unit Cost of Service
Administration	Administrative and customer support services to customers including: management, planning, call support, billing, and other administrative functions.	3,871 accounts	\$193,387	\$49.96 per account
Service Connections	Maintenance of meters and other service connection related costs.	9,206 equivalent meters	\$313,803	\$34.09 per equiv. meters
Base Service	Basic operations and maintenance costs: supply, treatment, storage, and distribution.	5,443,615 m3	\$897,373	\$0.16 per m3
Max Day Extra Capacity	Costs associated with extra capacity provided during peak periods.	33,465 m3/day	\$1,324,672	\$39.58 per m3/day
Max Hour Extra Capacity	Costs associated with extra capacity provided during peak periods.	48,379 m3/day	\$518,010	\$10.71 per m3/day
Water Quality	Costs associated with water quality	3,278,844 m3	\$781,251	\$0.24 per m3

Total Cost

\$4,028,495



3.3 Customer Cost Allocations

The units of service shown in the table at the left are “consumed” in varying amounts by the different customer classes. The chart at the right shows the proportion of each service that is “consumed” by each customer class.

Table 4: Apportioning Costs to Customers (2016) using Units of Service and Unit Costs.

Item	Base Service	Max Day Extra Capacity	Max Hour Extra Capacity	Service Connections	Administration	Water Quality	Cost of Service
Unit costs of service	\$0.16	\$39.58	\$10.71	\$34.09	\$49.96	\$0.24	
Unit	m3	m3/day	m3/day	equiv. meters	per bill	m3	
	<u>Units of Service</u>						
Residential	568,101	4,737	6,294	2,100	1,400	568,101	
	\$ 93,651	\$ 187,520	\$ 67,389	\$ 71,587	\$ 69,954	\$ 135,362	\$ 625,463
Residential (NM)	684,462	5,708	7,583	1,728	1,152	684,462	
	\$ 112,833	\$ 225,929	\$ 81,192	\$ 58,916	\$ 57,572	\$ 163,087	\$ 699,528
Res (Ellison)	105,509	880	1,169	266	178	105,509	
	\$ 17,393	\$ 34,827	\$ 12,516	\$ 9,082	\$ 8,875	\$ 25,140	\$ 107,832
Multifamily	582,311	3,806	5,401	1,508	35	582,311	
	\$ 95,993	\$ 150,640	\$ 57,830	\$ 51,412	\$ 1,724	\$ 138,747	\$ 496,347
Apartments	276,836	1,099	1,857	653	16	276,836	
	\$ 45,636	\$ 43,492	\$ 19,885	\$ 22,246	\$ 811	\$ 65,962	\$ 198,033
Commercial	200,566	1,063	1,612	785	123	200,566	
	\$ 33,063	\$ 42,067	\$ 17,263	\$ 26,769	\$ 6,130	\$ 47,789	\$ 173,081
General Irrigation	449,216	2,036	3,267	630	118	449,216	
	\$ 74,053	\$ 80,606	\$ 34,982	\$ 21,474	\$ 5,896	\$ 107,035	\$ 324,046
General Irrigation (NM)	259,692	1,177	1,889	284	189	259,692	
	\$ 42,810	\$ 46,599	\$ 20,223	\$ 9,663	\$ 9,443	\$ 61,877	\$ 190,615
Agricultural	2,164,771	12,299	18,230	993	240		
	\$ 356,860	\$ 486,843	\$ 195,194	\$ 33,848	\$ 11,991		\$ 1,084,735
UBCO Housing	82,183	357	582	25	419	82,183	
	\$ 13,548	\$ 14,124	\$ 6,231	\$ 856	\$ 20,939	\$ 19,582	\$ 75,280
UBCO Campus	69,967	304	495	233	1	69,967	
	\$ 11,534	\$ 12,025	\$ 5,305	\$ 7,949	\$ 51	\$ 16,671	\$ 53,535
Total	897,373	1,324,672	518,010	313,803	193,386	781,251	4,028,495



4.0 PROPOSED RATE STRUCTURE

4.1 Fixed Charges

4.2 Variable Charges

4.3 Total Revenues

4.4 Cost Responsibility Distribution

4.5 Residential Billing Impact



4.1 Fixed Charges

This table shows fixed charges proposed for 2016 on a monthly basis¹. The method for applying the charge varies depending on the customer category. For Residential customers, the charge applies to each billing account². The Multifamily, Apartments and UBCO Housing charge applies for each domestic unit. For Commercial and General Irrigation, the charge varies based on the meter size (see next page); the amount shown here is for the smallest meter (5/8”). The UBCO Campus is also billed based on meter size: the charge shown for UBCO Campus is for two 10” meters. For unmetered General Irrigation customers, the charge applies per acre.

Note: this forecast shows no change to the forecasted figures for 2017-2020, except for unmetered Residential and General Irrigation³. Given the set of assumptions on the transition to metering, it is possible that growth in the region will fund inflation on expenses. In practice, several factors⁴ will impact the long term financial outlook. This plan should be reviewed annually and adjustments should be made to the rates each year based on new data in order to minimize uncertainties and keep up with changing circumstances.

Customer Class	2016	2017	2018	2019
	monthly charges			
Residential	\$/acct \$36.25	0.0% \$36.25	0.0% \$36.25	0.0% \$36.25
Residential (NM) (Note 5)	\$/acct \$75.00	33.3% \$100.00	50.0% \$150.00	100.0% \$300.00
Res (Ellison)	\$/acct \$50.00	2.0% \$51.00	2.0% \$52.00	1.9% \$53.00
Multifamily	\$/unit \$16.40	0.0% \$16.40	0.0% \$16.40	0.0% \$16.40
Apartments	\$/unit \$5.80	0.0% \$5.80	0.0% \$5.80	0.0% \$5.80
Commercial	\$/eqs \$23.96	0.0% \$23.96	0.0% \$23.96	0.0% \$23.96
General Irrigation	\$/eqs \$23.96	0.0% \$23.96	0.0% \$23.96	0.0% \$23.96
General Irrigation (NM)	\$/acre \$35.00	42.9% \$50.00	50.0% \$75.00	300.0% \$300.00
UBCO Housing	\$/unit \$5.80	0.0% \$5.80	0.0% \$5.80	0.0% \$5.80
UBCO Campus	\$ \$2,080	0.0% \$2,080	0.0% \$2,080	0.0% \$2,080

Table 5: Proposed 2016 Fixed Charges

Customer Class	2016
	monthly charges
Residential	\$/acct \$36.25
Residential (NM) (Note 5)	\$/acct \$75.00
Res (Ellison)	\$/acct \$50.00
Multifamily	\$/unit \$16.40
Apartments	\$/unit \$5.80
Commercial	\$/eqs \$23.96
General Irrigation	\$/eqs \$23.96
General Irrigation (NM)	\$/acre \$35.00
UBCO Housing	\$/unit \$5.80
UBCO Campus	\$ \$2,080

- Billing cycles vary, so for Residential customers billed on a quarterly basis, multiply the monthly charge in this table by 3. For General Irrigation, the fixed charge only applies for 6 months of the year.
- There may be additional charges applied for additional suites, duplexes and four-plexes.
- The fixed charge for General Irrigation (NM) and Residential (NM) is increasing in order to emphasize the incentive to those customers to either obtain a meter and switch to the Residential or General Irrigation metered category, or request a service shutoff. It is anticipated that within a few years, these categories will no longer exist.
- For example, as more customers switch to metering, fixed revenues will be replaced by variable revenues. Consumption will decline in response to volume-based pricing which will impact revenues requiring compensating adjustments to the variable rates.
- The Residential (NM) 2016 fixed charge is equal to the annual cost of a metered Residential customers at the 85th percentile.



4.1 Fixed Charges (continued)

This table shows the fixed charges based on meter size which applies to Commercial, General Irrigation and UBCO Campus.

Table 6: Proposed 2016 Meter Size Charge

		Note: subject to change following annual rate review. See note on Page 23.					
Meter Size	2016	2017		2018		2019	
	monthly charge						
5/8"	\$23.96	0.0%	\$23.96	0.0%	\$23.96	0.0%	\$23.96
3/4"	\$31.26	0.0%	\$31.26	0.0%	\$31.26	0.0%	\$31.26
1"	\$41.44	0.0%	\$41.44	0.0%	\$41.44	0.0%	\$41.44
1.5"	\$62.16	0.0%	\$62.16	0.0%	\$62.16	0.0%	\$62.16
2"	\$98.42	0.0%	\$98.42	0.0%	\$98.42	0.0%	\$98.42
3"	\$246	0.0%	\$246	0.0%	\$246	0.0%	\$246
4"	\$363	0.0%	\$363	0.0%	\$363	0.0%	\$363
6"	\$648	0.0%	\$648	0.0%	\$648	0.0%	\$648
8"	\$842	0.0%	\$842	0.0%	\$842	0.0%	\$842
10"	\$1,040	0.0%	\$1,040	0.0%	\$1,040	0.0%	\$1,040

Note: comparing rates with other communities should be undertaken with caution. Many factors make these comparisons inapplicable. For example, GEID is unique in terms of the infrastructure required to obtain, treat and convey water to customers; GEID is a relatively sprawled area compared to other densely urban areas. GEID also has a significant agricultural sector which should be considered when comparing with other communities.



4.2 Variable Charges

This table shows the variable charges applying to those customer categories with metered services. Note the only charge that is changing over the next 4 years beyond 2016 is the General Irrigation. This is to bring that category up to the same level of contribution as the other categories. A transition period is favored over immediately setting this rate to \$0.70 in order to give these customers some time to adapt infrastructure to take advantage of potential efficiencies.

Table 7: Proposed 2016 Variable Charge

			Note: subject to change following annual rate review. See note on Page 23.							
Customer Class			2016		2017		2018		2019	
			\$/cubic meter							
Residential	first 90 m3/qtr	\$0.44	0.0%	\$0.44	0.0%	\$0.44	0.0%	\$0.44	0.0%	\$0.44
	next 75 m3/qtr	\$0.65	0.0%	\$0.65	0.0%	\$0.65	0.0%	\$0.65	0.0%	\$0.65
	balance	\$1.48	0.0%	\$1.48	0.0%	\$1.48	0.0%	\$1.48	0.0%	\$1.48
Multifamily	every m3	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70
Apartments	every m3	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70
Commercial	every m3	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70
General Irrigation	every m3	\$0.20	100.0%	\$0.40	75.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70
UBCO Housing	every m3	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70
UBCO Campus	every m3	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70	0.0%	\$0.70

Note: as is explained on the previous pages with respect to the forecasted figures, these variable charges will likely change as circumstances with the District changes. This forecast is shown here to make the point that under the current status quo conditions, growth is funding inflation.



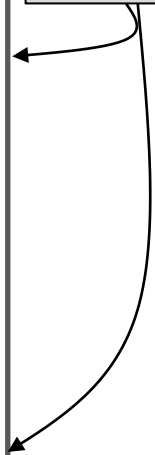
4.3 Total Revenues

This table shows the total revenues generated by each customer category. Note that the total for 2016 exceeds by about \$175,000 the \$4,028,000 user fees-based revenues required as stated earlier. This represents revenues from the General Irrigation (NM) category which will be transferred into reserve for revenue stabilization and not used to recover operations and maintenance costs.

Table 8: Forecasted Revenues 4 Year Financial Model

Customer Class		2015	2016	Note: subject to change following annual rate review. See note on Page 23.		
				2017	2018	2019
Residential	fixed	389,261	609,052	816,739	979,025	1,158,676
	variable	0	378,174	471,632	537,078	629,275
Residential (NM)	fixed	1,298,654	1,037,063	854,678	674,341	0
	variable	0	0	0	0	0
Res (Ellison)	fixed	117,449	106,575	110,337	114,198	118,137
	variable	0	0	0	0	0
Multifamily	fixed	877,032	374,335	379,950	385,650	391,434
	variable	43,308	407,617	409,594	411,581	413,577
Apartments	fixed	543,348	118,470	120,247	122,051	123,882
	variable	0	193,785	194,725	195,670	196,619
Commercial	fixed	151,970	132,409	134,248	136,062	137,952
	variable	80,626	140,396	140,923	141,399	141,930
General Irrigation	fixed	9,270	53,783	87,967	113,947	139,927
	variable	47,307	89,843	209,510	405,040	443,520
General Irrigation (NM)	fixed	0	175,980	151,638	113,729	0
	variable	0	0	0	0	0
Agricultural	taxes	197,000	197,000	197,000	197,000	197,000
UBCO Housing	fixed	129,924	58,616	58,910	59,204	59,500
	variable	0	57,528	57,237	56,948	56,661
UBCO Campus	fixed	618	25,309	25,661	26,007	26,369
	variable	35,637	48,977	49,161	49,327	49,512
Total fixed		3,714,526	2,888,593	2,937,375	2,921,214	2,352,877
Total variable		206,878	1,316,321	1,532,782	1,797,042	1,931,093
Total		3,921,404	4,204,914	4,470,157	4,718,256	4,283,969

Goal is to move non-metered customers to full metering by 2019.





4.4 Cost Responsibility Distribution

This chart shows how the revenues contributed by each category varies from their true cost of service. In order to optimize the equitability across categories, the objective is to adjust rates so that all excess contributors are at the same level. This is challenging to do when several categories share a similar rate component. For example, all non-Residential metered customers pay the same variable rate.

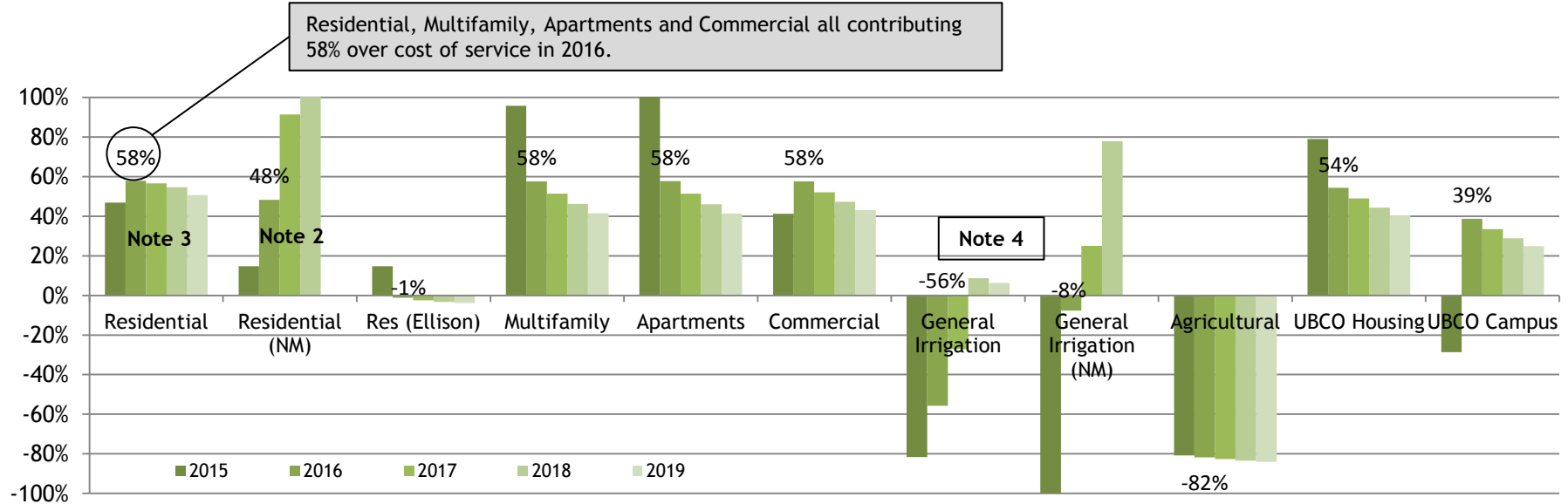


Figure 11: Percent Variation from True Cost of Service

- Notes:
1. The cost of service increases as expenses inflate over the years. Revenue contributions also increase even in cases where the rates are not increasing over the forecast period. This is because the community is growing generating more customers to join the system.
 2. Residential (NM) percent variation is increasing due to increases to the flat charge.
 3. A decline in percent variation occurs as a result of the interaction between cost inflation, community growth and declining demand.
 4. The upward trend for metered General Irrigation is due to the stepped increase to the variable rates from \$0.20 to \$0.70 over next few years. General Irrigation (NM) trending upward for the same reason: increases to the per-acre per-year flat charge.



4.5 Residential Billing Impact

The following table compares billing for Residential metered accounts going from flat charges in 2015 to metered charges in 2016.

Table 9: Billing Examples

Example	GEID 2015 Billing	GEID 2016 Billing
Residential (20 th percentile, 240 m3 per year)	\$603	\$540
Residential (40 th percentile, 360 m3 per year)	\$603	\$603
Residential (60 th percentile, 480 m3 per year)	\$603	\$742
Residential (85 th percentile, 640 m3 per year)	\$603	\$900
Residential unmetered	\$603	\$900

Billings may vary depending on how monthly consumption is distributed between tiers.

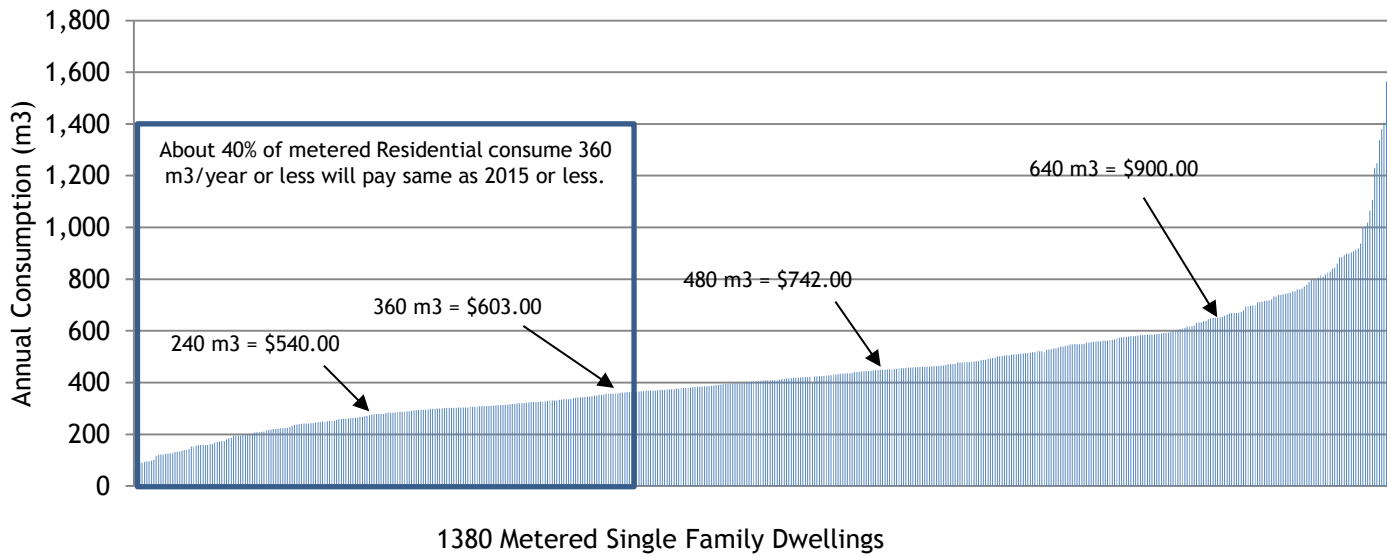


Figure 12: Forecasted Consumption Profile of 2016 Metered Residential Accounts



Appendix 1: Terminology

Definitions for some technical terms and acronyms used in this report.

Cost of Service: this term means how much it costs to deliver a service, and more specifically, how much it costs to deliver the service to a particular group of customers.

Cost Responsibility Redistribution: this term means making adjustments to rates and charges so that one customer category will pay less while another category will pay more. The net effect on overall revenues is typically nil.

Full Cost Recovery: this term means that the sources of revenues to the service are fully covering the costs of owning, maintaining and operating the service, particularly the costs of renewing infrastructure.

LCD: Litres per capita per day. This unit is used to measure consumption on a per person basis. While overall demand may be increasing with population, the LCD is typically decreasing as water efficiencies are gained.

Meter Equivalency Ratio: a numerical comparison of different meter sizes with the smallest available meter typically having a value of 1 and larger meters being equivalent to so many base meters. Eg: a 2” meter is equivalent to 8 5/8” meters. CWWA and AWWA provide guidelines for Meter Equivalency ratios.

Appendix 2: Water Volume Measures Used in This Report

The illustrations below are provided to help readers understand how much water is in the standard units of measure employed in this report

The Cubic Meter

1,000 Litres = 1 cubic meter (m³)



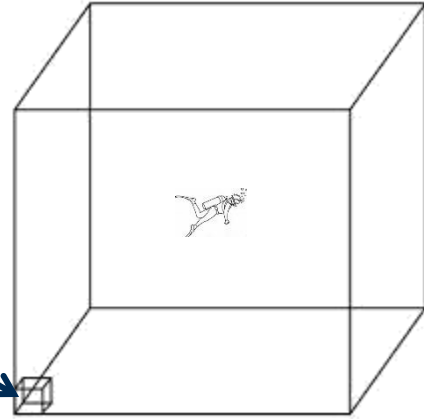
These 5 rain barrels add up to about a cubic meter



Five bath tubs full of water is about equal to a cubic meter.

One Megalitre

1,000 cubic meters



Olympic Size Pool

2.5 ML = 2,500 m³ or 2.5 million Litres





Appendix 3: Water Consumption Fact Sheet

The following figures and table shows typical household water use and the potential cost of leaky appliances.

Figure A3.1: Typical Household Uses of Water

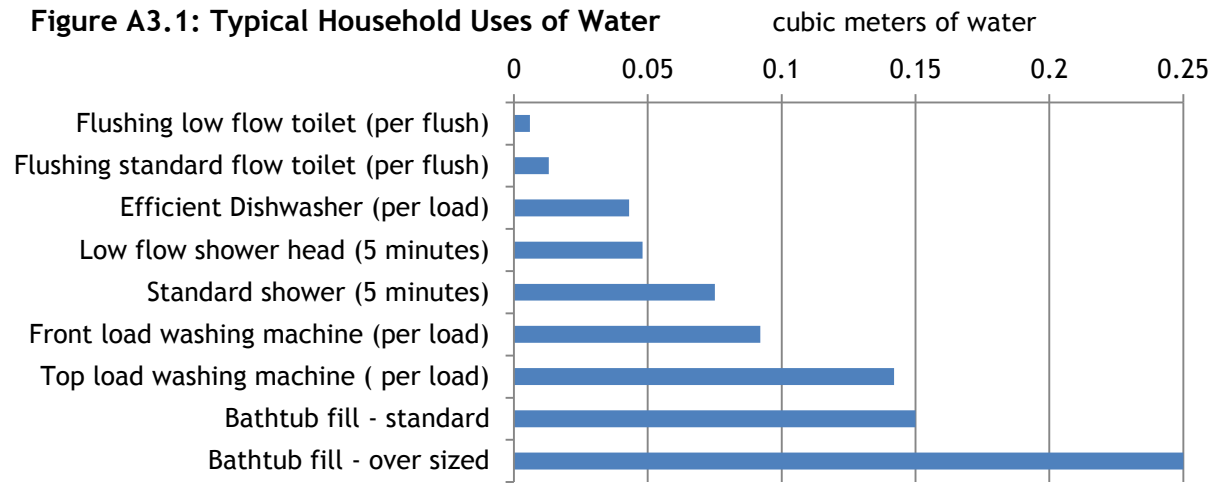


Figure A3.2: Typical Daily Distribution of Use Per Person

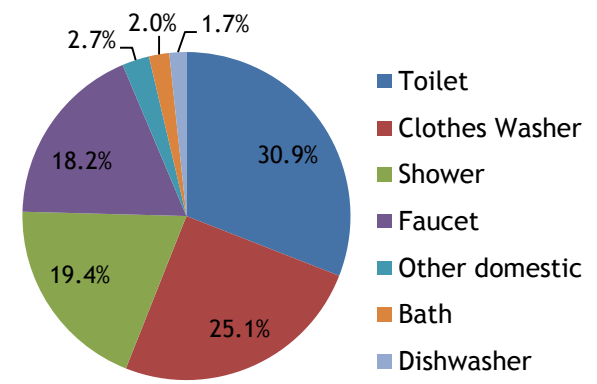


Table A3.3: Cost of Sprinkling

	Annual irrigation volume	Annual cost at highest tier* (\$1.48/m3)
3 standard sprinklers each irrigating for 1 hour for 3.5 days per week for 20 weeks	190m3	\$280.00

* 1 standard sprinkler runs 0.9 m3 per hour