



COASTSIDE COUNTY WATER DISTRICT WATER RATE STRUCTURE UPDATE



May 8, 2015



HF&H Consultants, LLC

Executive Department
State of California

EXECUTIVE ORDER B-29-15

WHEREAS on January 17, 2014, I proclaimed a State of Emergency to exist throughout the State of California due to severe drought conditions; and

WHEREAS on April 25, 2014, I proclaimed a Continued State of Emergency to exist throughout the State of California due to the ongoing drought; and

WHEREAS California's water supplies continue to be severely depleted despite a limited amount of rain and snowfall this winter, with record low snowpack in the Sierra Nevada mountains, decreased water levels in most of California's reservoirs, reduced flows in the state's rivers and shrinking supplies in underground water basins; and

WHEREAS the severe drought conditions continue to present urgent challenges including: drinking water shortages in communities across the state, diminished water for agricultural production, degraded habitat for many fish and wildlife species, increased wildfire risk, and the threat of saltwater contamination to fresh water supplies in the Sacramento-San Joaquin Bay Delta; and

WHEREAS a distinct possibility exists that the current drought will stretch into a fifth straight year in 2016 and beyond; and

WHEREAS new expedited actions are needed to reduce the harmful impacts from water shortages and other impacts of the drought; and

WHEREAS the magnitude of the severe drought conditions continues to present threats beyond the control of the services, personnel, equipment, and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the Government Code, I find that conditions of extreme peril to the safety of persons and property continue to exist in California due to water shortage and drought conditions with which local authority is unable to cope; and

WHEREAS under the provisions of section 8571 of the California Government Code, I find that strict compliance with various statutes and regulations specified in this order would prevent, hinder, or delay the mitigation of the effects of the drought.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the Constitution and statutes of the State of California, in particular Government Code sections 8567 and 8571 of the California Government Code, do hereby issue this Executive Order, effective immediately.



Governor Brown's April 1, 2015 Executive Order declared a State of Emergency and mandates that the State Water Resources Control Board impose 25% restrictions on urban water use through February 28, 2016 compared to water use in 2013. (Page 1 shown here.)

COASTSIDE COUNTY WATER DISTRICT

766 Main Street
Half Moon Bay, CA 94019



WATER RATE STRUCTURE UPDATE

May 8, 2015

HF&H CONSULTANTS, LLC

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May 8, 2015

Mr. David Dickson
General Manager
Coastside County Water District
766 Main Street
Half Moon Bay, California 94019

Subject: Water Rate Structure Update

Dear Mr. Dickson:

HF&H is pleased to submit this water rate structure update of the Coastside County Water District's (District) FY 2015-16 rates. The report summarizes the analysis that was conducted to develop the proposed rates. A copy of the District staff's cost of service analysis is included in the appendix.

California is experiencing a severe drought that has led the District to declare a Stage II shortage. This report describes the development of proposed rate structure modifications that HF&H assisted the District to develop in response to Governor Brown's April 1, 2015 Executive Order B-29-15 (Order). The Order mandates a 25% statewide conservation reduction with individual reductions for each urban water agency. Directive 8 of the Order states that the State Water Resources Control Board (State Water Board) shall work with the California Department of Water Resources, the California Public Utilities Commission and other agencies to support urban water suppliers' actions to implement rates and pricing structures to encourage additional conservation. In the District's case, an additional 8% reduction is mandated starting June 1, 2015 through February 2016.

Furthermore, The State Water Board states that the Fourth District Court of Appeal's recent Decision in *Capistrano Taxpayers Association Inc. v. City of San Juan Capistrano* (G048969) does not foreclose the use of conservation-oriented rate structures.

This report is organized into three sections:

- **Findings and Recommendations** - A summary of the proposed rate structure modifications.
- **FY 2015-16 Revenue Requirement** - The total estimated costs that must be covered by rates.
- **Cost of Service Allocations** - The allocation of the revenue requirement to the residential and non-residential customers.
- **Rate Design** - The derivation of the base service charges and residential and non-residential volume charges, including customer bill impacts.

The District has demonstrated leadership in improving rate payer equity during a time when costs are increasing in compliance with regulatory mandates. It has been a privilege to assist the District with this step forward.

Very truly yours,

HF&H CONSULTANTS, LLC

John W. Farnkopf, P.E., Senior Vice President
Sima Mostafaei, C.M.A., Senior Associate

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ACRONYMS

Base Service	Refers to the costs that all customers pay, regardless of customer class, based on the size of the service connection
Base Volumetric	Represents the uniform costs of delivering water to all of the District's residential customers
FY	Fiscal Year
CCF or HCF	Hundred cubic feet of metered water sold; 748 gallons; a cube of water 4.6 feet on edge
EMU	Equivalent metered unit
GPD	Gallons per Day
GPCD	Gallons per Capita per Day
O&M	Operations and Maintenance
PAYGo	Pay-As-You-Go, in reference to funding capital improvements from cash rather than from borrowed sources of revenue
SFPUC	San Francisco Public Utilities Commission
SWRCB	State Water Resources Control Board

ACKNOWLEDGEMENTS

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LIMITATIONS

This document was prepared solely for Coastside County Water District in accordance with the contract between the District and HF&H and is not intended for use by any other party for any other purpose.

In preparing this analysis, we relied on information and instructions from the District, which we consider to be accurate and reliable and did not independently verify.

Rounding differences caused by stored values in electronic format may exist.

This document addresses relevant laws, regulations, and court decisions but should not be relied upon as legal advice. Questions concerning the interpretation of legal authorities referenced in this document should be referred to a qualified attorney.

COASTSIDE COUNTY WATER DISTRICT



WATER RATE STRUCTURE UPDATE

SECTION 1. FINDINGS AND RECOMMENDATIONS

The proposed modifications were derived to account for the District's increased costs and for decreased revenue resulting from additional customer conservation. The modifications also adjust the residential tiered rate structure to generate the cost of serving the residential customer class.

1. **Severe drought conditions exist.** The State Water Resources Control Board (SWRCB) has mandated an 8% conservation standard for the District beginning June 1, 2015. The SWRCB will direct urban water suppliers to develop rate structures and other pricing mechanisms, including but not limited to surcharges, fees, and penalties, to maximize water conservation consistent with statewide water restrictions.
2. **A 24% revenue increase is needed.** The District's costs are increasing in order to implement a conservation program to comply with the Governor's Executive Order and SWRCB's Resolution 2015-0013 (adopted May 5, 2015):

The State Water Board calls upon urban water suppliers to ensure that adequate personnel and financial resources exist to implement conservation requirements for years 2015 and 2016, should an additional drought year occur. Water suppliers that are facing budget shortfalls due to reduced sales should take immediate steps to raise necessary revenues in a way that actively promotes conservation.

In addition, the unit cost of water supply from the SFPUC will increase approximately 30%. Even with reduced water purchases, the District's cost of SFPUC water will increase. With conservation, the District's revenue from water sales will also decrease. The combined effect of these factors will require an increase in rate revenue of \$1.9 million or 24%.

3. **Customer impacts vary because of cost of service adjustments.** The overall revenue increase of 24% applies differently to the District's base service charges and the residential and non-residential quantity charges because of adjustments in the cost of service derived by District staff. In general, the cost of service analysis shifted costs slightly away from the base service charges to the quantity charges and from the non-residential quantity charges to the residential quantity charges.
4. **Base service charges are projected to increase 18%.** The results of the cost of service analysis increased base service charges (which apply to all customers depending on size of service connection and regardless of customer class) by 18%. The current and proposed base service charges are shown in **Figure 1-1**.

Figure 1-1. Current and Proposed Base Service Charges

Meter Size	Current (Bimonthly)	Proposed (Bimonthly)
5/8"	\$40.13	\$47.45
5/8" for 2 dwelling units	\$80.27	\$94.90
3/4"	\$60.32	\$71.32
3/4" for 2 dwelling units	\$120.64	\$142.63
1"	\$100.54	\$118.87
1.5"	\$194.16	\$229.56
2"	\$321.78	\$380.44
3"	\$703.94	\$832.27
4"	\$2,413.82	\$2,853.84

5. **Residential quantity charge revenue is projected to increase 37%.** Residential tiered rates are designed to generate 37% more revenue, which is caused in part by the shift in the cost of service from the non-residential customers as well as the projected increased costs and reduced consumption. The current and projected quantity charges are shown in **Figure 1-2**.

Figure 1-2. Current and Proposed Residential Quantity Charges

	Current		Proposed			
	Bimonthly Use (HCF)	Quantity Charge (\$/HCF)	Bimonthly Use (HCF)	Base Volumetric (\$/HCF)	Demand Management (\$/HCF)	Quantity Charge (\$/HCF)
Residential Tier 1	1-8	\$6.55	1-4	\$8.35	\$0.00	\$8.35
Tier 2	9-25	\$7.22	5-16	\$8.35	\$0.98	\$9.33
Tier 3	26-40	\$9.38	17-30	\$8.35	\$3.68	\$12.03
Tier 4	41 or more	\$11.61	31 or more	\$8.35	\$7.60	\$15.94

6. **Increases in residential bills vary depending on the amount of water use.** The increases in customer bills with the proposed increases in base service charges and quantity charges ranges from 22% for use in Tier 1 (4 HCF) to 39% or more for use in Tier 4 (31 HCF).
7. **Non-residential quantity charge is projected to increase 15%.** This increase is less than the overall 24% revenue increase because of the shift in the cost of service away from non-residential to residential customers that was determined by the District staff's cost of service analysis. The uniform quantity rate structure

remains in place; the quantity charge increases from \$8.93 to \$10.28 per hundred cubic feet (HCF).

SECTION 2. FY 2015-16 REVENUE REQUIREMENT

Revenue Increases

The revenue requirements used for deriving the proposed rate modifications correspond to the draft budget under development by District staff for FY 2015-16. There are two noteworthy cost areas. First, the SFPUC's rates are increasing approximately 30% for FY 2015-16. The District's projected cost of SFPUC water incorporates the projected conservation reduction required of the District's customers to comply with the SWRCB's emergency regulations. Second, the demand management costs associated with administering and enforcing the District's Stage II conservation program are increasing to fulfill the higher level of customer service that must be provided.

To determine how much additional rate revenue is required, the projected revenue requirement is compared with the projected revenue from current rates. The revenue projection also reflects reduced demand by customers. The shortfall must be covered by an increase in revenue from the base service and quantity charges. This comparison is shown in **Figure 2-1**, which indicates a \$1,908,738 shortfall in projected FY 2015-16 rate revenue when compared with the FY 2015-16 revenue requirement.

Figure 2-1. Revenue Requirement Projections

<u>FY 15-16 Rate Revenue (under current rate structure)</u>			
Base Charges	\$ 1,740,189		
Quantity Charges			
Residential	2,924,376		
Non-residential	3,290,615		
Subtotal - Quantity Charges	\$ 6,214,991		
Total Current Rate Revenue		\$ 7,955,179	
<u>FY 15-16 Revenue Requirement</u>			
Operating Expenses	\$ 4,366,421		
Non-operating Revenue	(1,118,795)		
Electricity	457,452		
SFPUC Water	2,871,946		
Debt Service	823,913		
Contribution to Capital	1,630,000		
Subtotal	\$ 9,030,937		
Demand Management Costs	832,980		
Total Revenue Requirement		\$ 9,863,917	
Shortfall - Increased Costs		\$(1,075,758)	-14%
Shortfall - Demand Management		(832,980)	-10%
Total Revenue Shortfall		\$(1,908,738)	-24%

Rate revenue must be increased 24% in order to cover the projected shortfall because the District's reserves have diminished because of recent conservation and cannot further support rates without the projected rate increase.

The revenue requirements served as the basis for the District's cost of service analysis as described in the next section.

SECTION 3. COST OF SERVICE ALLOCATIONS

Legal Requirements

Cost of service analysis allocates the revenue requirement to customers based on proportionate measures such as the amount of capacity that is required and the level of demand. The industry practice for cost of service analysis is generally described by the American Water Works Association's rate-making Manual M-1, *Principles of Water Rates, Fees, and Charges*. This national manual provides guidance but does not prescribe a single methodology. The M1 Manual's "Overview of the Key Technical Analyses Associated With Cost-Based Rate Making" provides the following guidance:

In establishing cost-based water rates, it is important to understand that a cost-of-service methodology does not prescribe a single approach. Rather, as the First Edition of the M1 manual noted, "the (M1 Manual) is aimed at outlining the basic elements involved in water rates and suggesting alternative rules of procedure for formulating rates, thus permitting the exercise of judgment and preference to meet local conditions and requirements." [AWWA M1 Manual, *Water Rates Manual*, First Edition, 1954, p. 1.] This manual, like those before it, provides the reader with an understanding of the options that make up the generally accepted methodologies and principles used to establish cost-based rates. From the application of these options within the principles and methodologies, a utility may create cost-based rates that reflect the distinct and unique characteristics of that utility and the values of the community.¹

From its earliest days, the AWWA has recognized the need to exercise judgment in deriving reasonable rates. Reasonable rates are not arbitrary, capricious, or discriminatory. Arbitrary rates reflect choices in classifying and allocating costs for which there is no rationale. Capricious rates contain data and assumptions for which there is no factual basis. Discriminatory rates are disproportionate to the cost of providing service. The analyst may exercise judgment to ensure that rates are reasonable in each case.

California court decisions also reflect the need to exercise judgment in cost of service analysis. In affirming tiered rates during California's last major drought in 1986 through 1992, the appellate court found:

¹ *Principles of Water Rates, Fees, and Charges*. AWWA M1 Manual of Water Supply Practices, Sixth Edition, 2012, page 5.

In pursuing a constitutionally and statutorily mandated conservation program, cost allocations for services provided are to be judged by a standard of reasonableness with some flexibility permitted to account for system-wide complexity.²

The State Constitution subsequently was modified in 1996 to add Article XIID, Section 6(b)3, which requires that:

The amount of the fee or charge imposed upon any parcel or person as an incident of property ownership shall not exceed the proportional cost of the service attributable to the parcel.

This requirement applies to charges determined by water rates. Cost of service analysis is the analytical technique used to establish proportional fees and charges.

Subsequent court decisions regarding the cost of service and rate design reflect the challenges in rate setting related to the need to make assumptions to make up for the lack of data and for accounting practices that may not provide sufficient detail.

Apportionment is not a determination that lends itself to precise calculation. [...] That there may be other methods favored by plaintiffs does not render defendant's method unconstitutional.³

While it is clear that the District's water measurement system is not perfect, section 6 [of Article XIID] does not require perfection.⁴

In this rate update, District staff's cost of service analysis, which services as the basis for the rate design, relied on its budgeted costs as the basis for the cost allocations. Assumptions and judgment were required in allocating costs that result in reasonable rates, similar to the assumptions and judgment that most rate studies require and that are permitted within the law.

Cost Allocations

District staff allocated the revenue requirements among three categories: costs associated with the base service charge, costs associated with the base volumetric charge, and demand management costs.

² *Brydon et al. v. East Bay Municipal Utility District et al.*, 1994.

³ *Griffith v. Pajaro Valley Water Management Agency*, 2013.

⁴ *Morgan et al. v. Imperial Irrigation District*, 2014.

- **Base service costs** - Costs associated with the base service charge relate to system capacity, and encompass debt service payments and capital contributions related to pipeline, water supply development, and other infrastructure projects.
- **Base volumetric costs** - Costs associated with the base volumetric component are considered variable costs because they vary based on the total amount of water distributed to customers throughout the system. These costs comprise the annual cost of purchased water from SFPUC, the electricity used for pumping, as well as administrative and overhead operating expenses.
- **Demand volumetric costs** - Costs attributable to demand management include personnel costs dedicated to managing demand, public outreach to high-use consumers to encourage conservation, consulting efforts addressing drought and consumption related issues, and capital improvement projects earmarked for demand management.

Base volumetric and demand management costs were allocated by District staff between the Residential and Non-residential customer classes using the following allocation factors:

- **Flow** - Costs are allocated between residential versus non-residential in proportion to total metered water consumption.
- **Equivalent Meter Units (EMUs)** - Costs are allocated in proportion to meter capacity.

Figure 3-1 presents the revenue requirements by cost category, and with respect to base volumetric and demand management costs, by customer class. The District staff’s complete cost of service analysis can be found in Appendix A of this report.

Figure 3-1. Revenue Requirements by Cost Category (FY 2015-16)

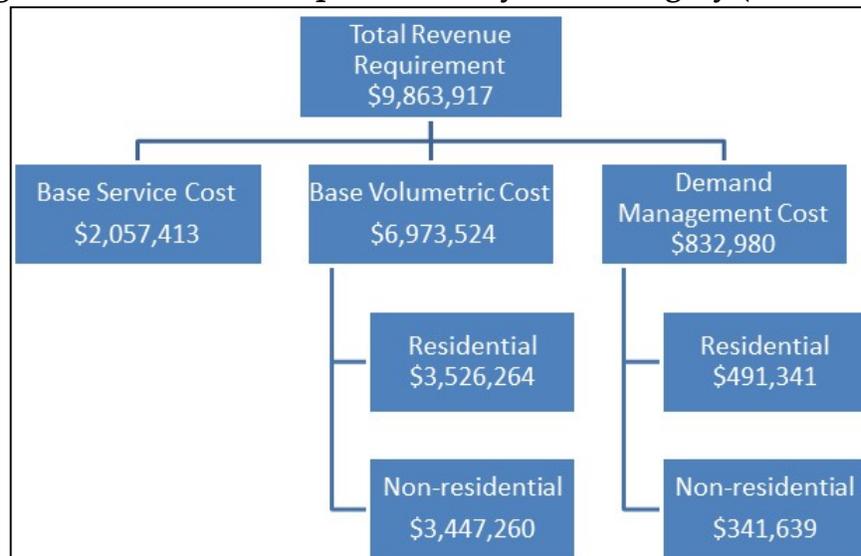


Figure 3-2 compares the revenue from current rates with the projected revenue based on the District staff’s cost of service analysis. The comparison indicates that the greatest shift occurs in the revenue generated from the non-residential quantity charge to the residential quantity charge. The analysis apportions the costs between the customer classes based on demand characteristics and volumes of water, therefore the cost allocated to each class fluctuates over time. The overall revenue increase of 24% applies differently to the District’s base service charges and the residential and non-residential quantity charges because of adjustments in the cost of service derived by District staff. Please refer to Appendix A for the District staff’s cost of service analysis.

Figure 3-2. Cost of Service Summary

	Current Revenue	Revenue Increases	Cost of Service Adjustment	Projected Revenue	Percent Change
Base Service Charges	\$ 1,740,189	\$ 235,321	\$ 81,903	\$ 2,057,413	18%
Quantity Charges					
Residential	2,924,376	886,796	206,433	4,017,605	37%
Non-residential	3,290,615	786,620	(288,336)	3,788,899	15%
Subtotal - Quantity Charge	6,214,991	1,673,416	(81,903)	7,806,504	
Total Rate Revenue	\$ 7,955,179	\$1,908,738	\$ -	\$ 9,863,917	24%

SECTION 4. RATE DESIGN

Current Rates

The District’s rate payers pay the sum of two charges for water service on a bi-monthly basis: a base service charge based on the size of the service connection plus a quantity charge based on metered water use during the billing period⁵. The current rates are summarized in **Figure 4-1**.

Figure 4-1. Current Base Service and Quantity Charges

Base Service Charge (by meter size)	Bi-monthly Charge	
5/8"	\$40.13	
5/8" for 2 dwelling units	\$80.26	
3/4"	\$60.32	
3/4" for 2 dwelling units	\$120.64	
1"	\$100.54	
1.5"	\$194.16	
2"	\$321.78	
3"	\$703.94	
4"	\$2,413.82	
Quantity Charge (\$/HCF)	Bi-monthly Use	Quantity Charge
Residential		
Tier 1	1-8	\$6.55
Tier 2	9-25	\$7.22
Tier 3	26-40	\$9.38
Tier 4	41 or more	\$11.61
Non-residential	per HCF	\$8.93

The meter charges are the same regardless of customer class. In other words, the charge for a meter of a given size is the same for all meters of that size regardless of

⁵ The District currently bills residential customers at bi-monthly intervals. The District is considering converting to monthly billing intervals. The proposed modifications can be adjusted to accommodate either time interval.

which class of customer is served. The quantity charges vary depending on the customer class. The residential quantity charges are tiered and the non-residential quantity charge is a uniform, un-tiered rate.

Residential customers pay tiered consumption charges, also referred to as “increasing block rates.” The current residential increasing block rates comprise four tiers. Residential customers pay rates for successive ranges of consumption (tier or block). The rate in each tier increases as consumption increases in proportion to the increasing cost of serving higher levels of demand, which place burdens on the capacity of the infrastructure as well as on the sources of supply. The total quantity charge is the sum of the consumption in each tier multiplied times the corresponding rate in each tier.

Proposed Rates

Base Service Charges

The current base service charges generate \$1,740,189, and need to increase by 18% in order to generate the \$2,057,413 identified by the revenue requirement and the cost of service analyses. In order to determine the bi-monthly charge by size of connection, the number of active meters are converted to equivalent meter units (EMU) as shown in **Figure 4-2**. The EMU multiplier by meter size is based on capacity and is the same multiplier used to determine the current bi-monthly base service charges. The bi-monthly service charge for one EMU of 1.00 is derived by dividing the total base service costs of \$2,057,413 by the total number of EMUs or 7,227. This quotient was then divided by six to convert from an annual charge of \$284.68 to a bi-monthly charge of \$47.45. The service charges were then graduated using the EMU multipliers, the effect of which is to increase the service charges for the larger services. Note the total FY 2015-16 revenue from base service charges in **Figure 4-2** is equal to the total base service costs presented in **Figure 3-1**.

Figure 4-2. Calculation of Proposed Bi-monthly Base Service Charges

Meter Sizes	Meter Count	EMU Multiplier	Total EMUs	Base Charge (Proposed)	FY15-16 Revenue
5/8"	5,902	1.00	5,902	\$47.45	\$1,680,296
5/8" for 2 dwelling units	15	2.00	30	\$94.90	\$8,541
3/4"	178	1.50	268	\$71.32	\$76,166
3/4" for 2 dwelling units	2	3.01	6	\$142.63	\$1,712
1"	170	2.51	426	\$118.87	\$121,247
1.5"	24	4.84	116	\$229.56	\$33,056
2"	36	8.02	289	\$380.44	\$82,174
3"	4	17.54	70	\$832.27	\$19,974
4"	2	60.14	120	\$2,853.84	\$34,246
	<u>6,333</u>		<u>7,227</u>		<u>\$2,057,413</u>

The total \$2,057,413 in projected revenue from base service charges is 21% of the total rate revenue. As an industry practice and as a guideline of the California Urban Water Conservation Council, it is desirable to cap the revenue from fixed charges like the base service charges at no more than 30%. At this level, customer bills respond to conservation sufficiently to reward efficient use and discourage inefficiency. It is noted that revenue stability is adversely affected as fixed charge revenue is reduced and more revenue is recovered from the volumetric charge; however, there is significant revenue generated by non-seasonal water use, which in combination with the revenue from fixed charges can approach the utility's fixed costs which are at least 70% to 80% of the total costs. Nonetheless, it is critical for the District to monitor its fund balance.

Residential Quantity Charges

Quantity charges are derived for the residential and non-residential customers by dividing their projected metered water use into their respective portions of the revenue requirement. **Figure 4-3** summarizes the projected consumption by fiscal year and by customer class. The quantity projections are consistent with The State Board's emergency regulations, which mandate an 8% overall cutback starting June 1, 2015.

Figure 4-3. Water Consumption by Customer Class

	FY 2013-14 Actual (HCF)	FY 2014-15 Estm Actual (HCF)	FY 2015-16 Projected (HCF)
<u>Residential</u>			
Tiered Charges	514,586	442,659	422,414
% Change		-14%	-5%
<u>Non-residential</u>			
Uniform Charge	406,790	386,364	368,610
% Change		-5%	-5%
<u>Total</u>			
District-wide Consumption	921,376	829,023	791,024
% Change		-10%	-5%

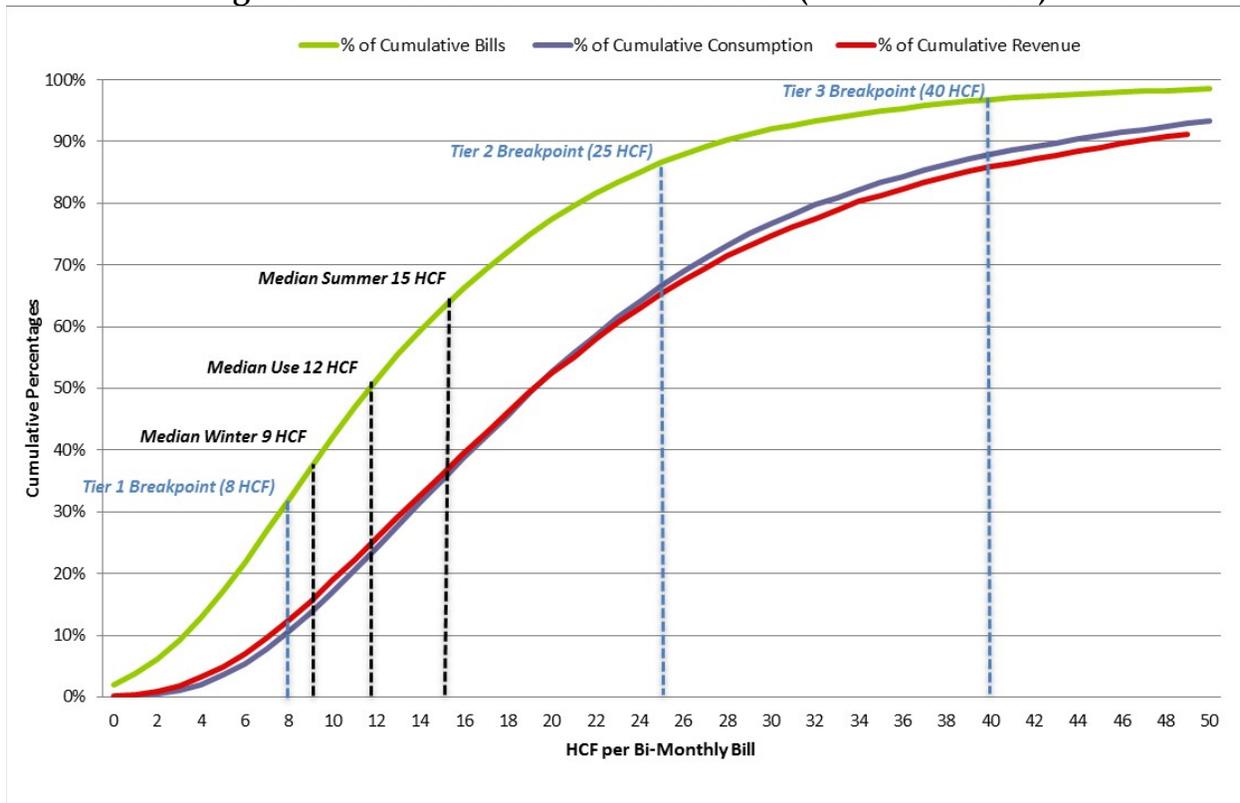
Residential Tiered Quantity Charge

Designing tiered rates involves two steps: (1) determining the “breakpoints” between tiers where the rate per tier changes and (2) determining the price or rate per tier. The quantity charge breakpoints were derived using FY 2014-14 actual customer meter readings in HCF, and subsequently factoring down the consumption to the projected FY 2015-16 consumption based on estimated cutbacks provided by District staff.

The District’s current residential tier structure contains three breakpoints that form four tiers. Using customer billing data, it is possible to identify logical breakpoints for separating one tier from the next. Statistical parameters can also be calculated to identify breakpoints, such as median winter and summer demand. Because customers are billed bi-monthly, the lowest and highest two billing periods were used for calculating the winter and summer medians, respectively. The results yielded a winter median of 9 HCF, and a summer median of 15 HCF per bi-monthly billing period.

Figure 4-4 is a bill distribution curve that cumulatively plots bills from smallest to largest based on the individual customer bills for FY 2014-14 based on the District’s customer billing data. With a bill distribution curve it is possible to determine the number of bills and associated water and revenue across the range of consumption. The median value for all bills at 50% on the y-axis indicates that half of the total bills are 12 HCF. Bills up to 20 HCF represent 50% of the water and bills up to 20 HCF represent 50% of the revenue.

Figure 4-4. Residential Bill Distribution (FY 2014-14 Data)



Median values are useful in rate design. For example, the winter median of 9 HCF means that half of the bills in the lowest bi-monthly billing period in the year were below 9 HCF and half were above. The District’s current Tier 1 breakpoint (8 HCF) is close to the winter median bill. The current breakpoints for Tiers 2 and 3 (25 and 40 HCF, respectively) are greater than the 15 HCF summer median bill, indicating that the upper tiers provide for significant additional water use, which is primarily irrigation. During a drought emergency, irrigation needs to be targeted so that rates can be set accordingly.

Upon review with District staff, it is proposed that the breakpoints should be modified to align with the District’s reduced demand. It is recommended that the current Tier 1 breakpoint of 8 HCF be reduced by half to 4 HCF (50 gallons per day [GPD]), approximately half of the winter median. This is a very low level of demand that provides little if any water for irrigation in a small household. It is District staff’s intention to set the Tier 1 breakpoint at a level that provides water for only indoor essential uses.

The current Tier 2 breakpoint of 25 HCF reflects water demands from several years ago. Since that time, water use has gradually declined as plumbing retrofits have replaced water using appliances with more efficient appliances. The public’s general awareness

of the need to avoid waste has also become stronger. In effect, times have changed under years of normal water supply such that a breakpoint of 25 HCF exceeds non-drought water needs for conserving households.

The current summer median water use of 15 HCF reflects not only long-term gradual reductions in per capita water use but conservation efforts during the drought. It is District staff’s intention to set the Tier 2 breakpoint at 16 HCF consistent with current needs, including a reasonable allocation for summer irrigation.

The current Tier 3 breakpoint is so high compared to current water use that only 3% of bills fall in this tier, which has virtually no practical effect (see **Figure 4-4**). District staff chose 30 HCF as the breakpoint, which is approximately two times the summer median, a very generous amount during times of drought.⁶

Figure 4-5 compares the current tier structure with the proposed tier structure.

Figure 4-5. Current and Proposed Residential Tier Structures (Bi-monthly)

Tier Breakpoints	Current Tier Structure	Proposed Tier Structure
Tier 1	0-8 units	0-4 units
Tier 2	9-25 units	5-16 units
Tier 3	26-40 units	17-30 units
Tier 4	Over 40 units	Over 30 units

Residential Price per Tier

The prices or rates per tier were derived to recover the cost of providing service to the residential customer class, which in total is \$4,017,604. This cost comprises two components that were calculated in the District staff’s cost of service analysis: (1) base volumetric component of \$3,526,264 and (2) demand management component of \$491,341 (refer to **Figure 2-2**). Each component was analyzed separately and combined to form the price per tier.

The base volumetric component represents the uniform costs of delivering water to all of the District’s residential customers; therefore a uniform base volumetric rate was calculated by dividing the cost allocation of \$3,526,264 by total projected residential water demand for FY 2015-16 of 422,414 HCF. **Figure 4-6** presents the revenue associated with the residential base volumetric component of \$8.35 per HCF for FY 2015-16:

⁶ We note that the recommended breakpoints do not correspond exactly with half of the winter median (4.5 HCF) for the Tier 1 breakpoint or the summer median (15 HCF) for the Tier 2 breakpoint. Instead, District staff chose values that could be evenly divided by two if the billing period were reduced from bi-monthly to monthly, which is being considered.

Figure 4-6. Total Revenue from Residential Base Volumetric Component

	FY 2015-16 Projected HCF	Base Volumetric \$/HCF	Base Volumetric Revenue
<u>Residential Breakpoints</u>			
1-4	127,674	\$8.35	\$ 1,065,808
5-16	231,115	\$8.35	1,929,322
17-30	55,671	\$8.35	464,735
31 or more	7,954	\$8.35	66,399
Total Residential	422,414		\$ 3,526,264

The demand management component of \$491,341 is allocated to higher tiers only because higher users require greater levels of outreach and management to encourage conservation. As a result, no demand management costs are assigned to Tier 1 users. District staff reviewed the line items in the demand management budget and allocated each item to Tiers 2, 3, and 4 as summarized in **Figure 4-7** using the following allocation methodologies:

- For program management costs associated with demand management, District staff allocated the cost across Tiers 2, 3, and 4 based upon projected consumption (in HCF) within each of the respective tiers;
- For public outreach and consulting costs, District staff allocated the costs across Tiers 2, 3, and 4 by allocating 20% of costs to Tier 2; 60% of costs to Tier 3 and the remainder to Tier 4, as costs in these respective categories are largely targeted toward Tier 3 users. Less than 2% of the water is in the top tier, whilst Tier 3 currently houses 13% of total demand; this is indicative of the level of conservation effort required to further cut back customer bills from Tier 3 to lower tiers. Previous conservation efforts have been effective in reducing most customer use from Tier 4 to lower tiers.

Figure 4-7. Calculation of Residential Demand Management Component

	Demand Management Costs	Projected HCF	Demand Management \$/HCF
<u>Residential Breakpoints</u>			
1-4	\$ -	127,674	\$0.00
5-16	226,053	231,115	\$0.98
17-30	204,868	55,671	\$3.68
31 or more	60,420	7,954	\$7.60
Total Residential	\$491,341	422,414	

Figure 4-8 summarizes the revenue generated by the base volumetric and demand management components for the residential customer class; the sum of the base volumetric and demand management component by tier comprise the quantity charge.

Figure 4-8. Total Revenue from Residential Quantity Charge

	FY 2015-16 Projected HCF	Base Volumetric \$/HCF	Demand Management \$/HCF	Quantity Charge \$/HCF	Base Volumetric Revenue	Demand Management Revenue	Quantity Charge Revenue
	a	b	c	b+c	a*b	a*c	a*(b+c)
1-4	127,674	\$8.35	\$0.00	\$8.35	\$ 1,065,808	\$ -	\$ 1,065,808
5-16	231,115	\$8.35	\$0.98	\$9.33	1,929,322	226,052	2,155,374
17-30	55,671	\$8.35	\$3.68	\$12.03	464,735	204,868	669,603
31 or more	7,954	\$8.35	\$7.60	\$15.94	66,399	60,420	126,819
Total Residential	422,414				\$ 3,526,264	\$ 491,340	\$ 4,017,604

Residential Tier Structure

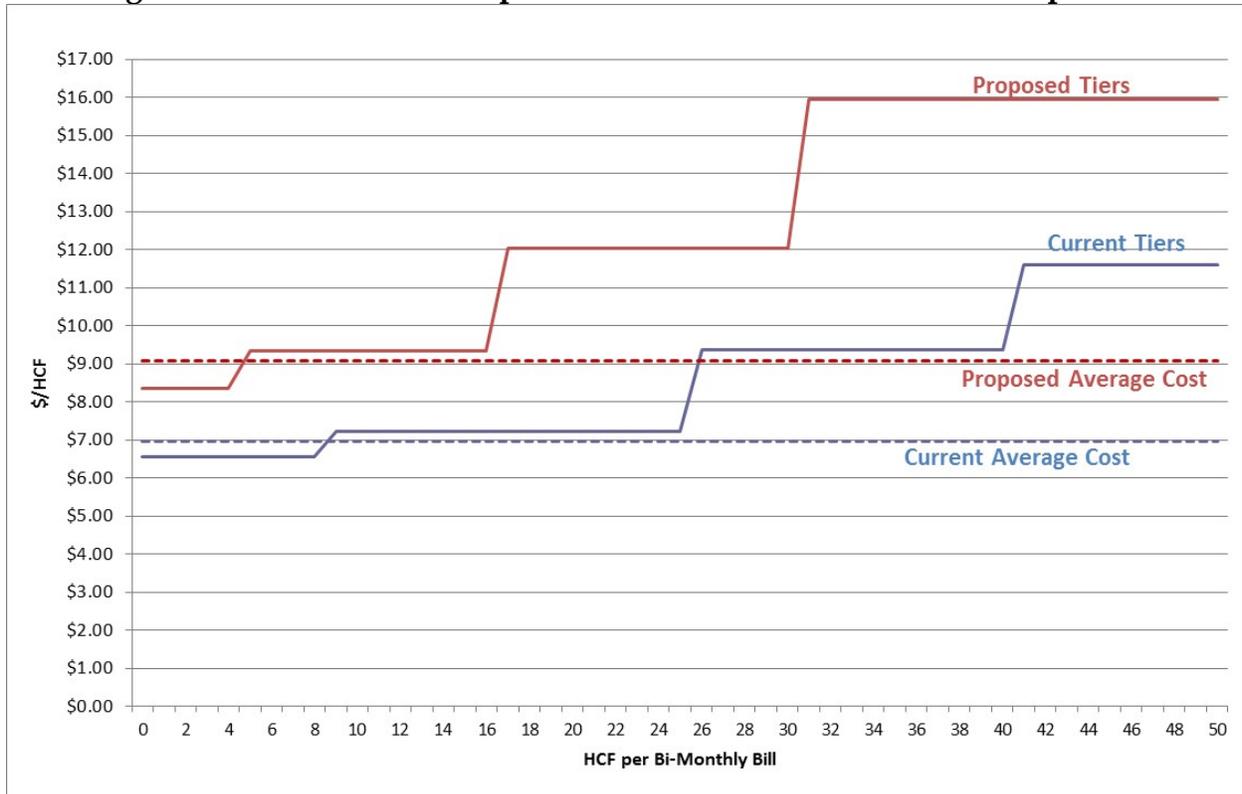
The proposed tier structure is compared with the current tier structure in **Figure 4-9**. In general, the proposed breakpoints are less and the prices are higher. With smaller tiers, demand is charged a higher rate sooner. The rates themselves are also higher, which compounds the price signal to customers.

Figure 4-9 also shows the average cost for the current and proposed rate structures. The average cost is simply the total volumetric revenue requirement divided by the total demand and in effect represents that uniform rate for an un-tiered structure.⁷ Comparing the tiered rates with the average cost indicates the slight reduction in cost

⁷ The average cost or uniform rate could be charged by the District instead of its tiered rates. Uniform rates are another acceptable rate structure. However, uniform rates are less precise in representing the cost of serving customers across a wide range of consumption. Analysis indicates that the unit cost of serving low demands is less than the unit cost of serving high demands. For that reason, the District employs tiered rates.

that demand in Tier 1 receives and the successive increases in cost that occur in Tiers 2, 3, and 4, which reflects the proportionate cost of serving above-average demands.

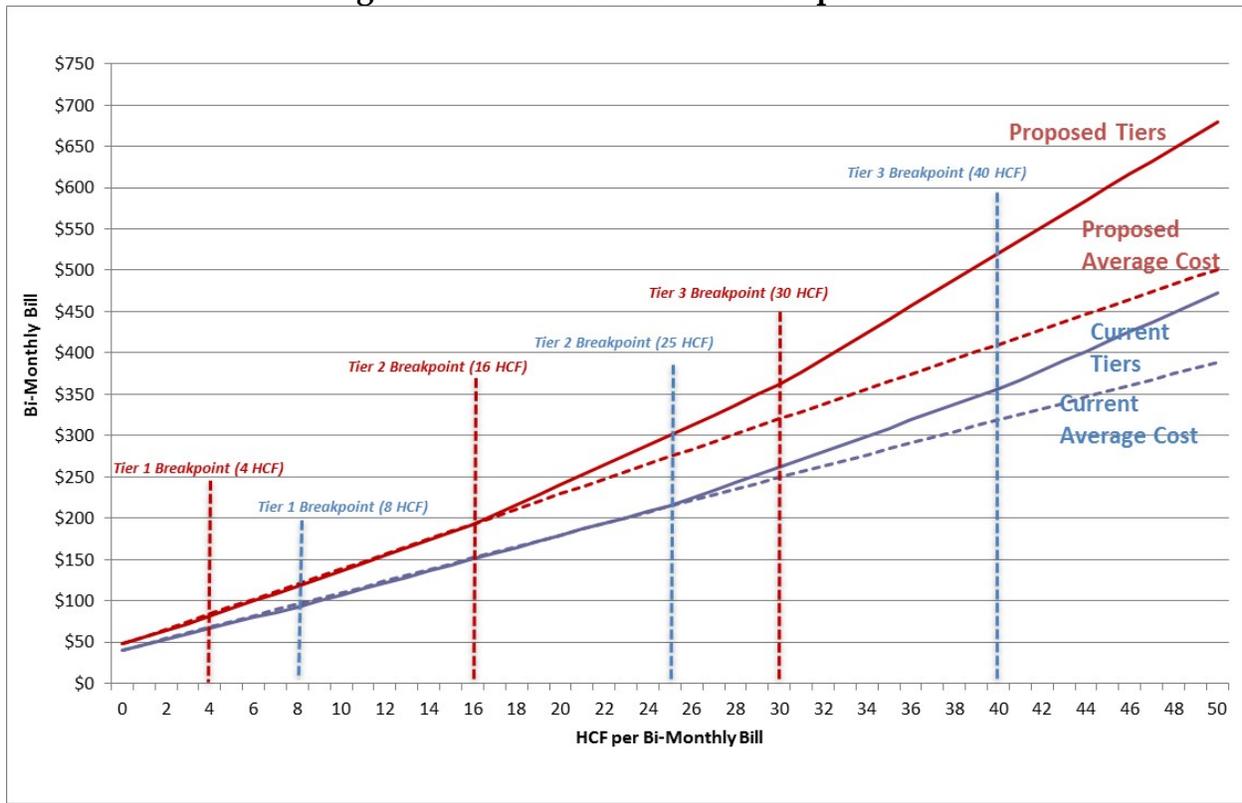
Figure 4-9. Current and Proposed Residential Tier Structure Comparison



Residential Bill Comparison

Figure 4-10 compares the residential customer bills for the current and proposed rates across a range of consumption. The bills include both the base service charges and the quantity charges. Comparing the bills under the tiered structures with the average cost “bills” shows the influence of the tier structure that reflects the higher unit cost of serving higher demands.

Figure 4-10. Residential Bill Comparison



Under both the current and proposed structures, it is noteworthy that customer bills fairly closely track the average cost passing through Tier 2 into Tier 3. Until then, when the prices per tier are below or slightly above the average cost, there is very little difference. In Tier 3, however, the rate is significant above the average cost, leading to bills that become increasing greater compared to the average cost. The values plotted in **Figure 4-10** are also shown in tabular format in **Figure 4-11**.

Figure 4-11. Residential Current and Proposed Bill Comparison

Bimonthly (HCF)	Current Bills	Proposed Bills	Change (\$)	Change (%)
0	\$40.13	\$47.45	\$7.32	18%
1	\$46.68	\$55.80	\$9.12	20%
2	\$53.23	\$64.15	\$10.92	21%
3	\$59.78	\$72.50	\$12.72	21%
4	\$66.33	\$80.85	\$14.52	22%
5	\$72.88	\$90.18	\$17.30	24%
6	\$79.44	\$99.51	\$20.07	25%
7	\$85.99	\$108.84	\$22.85	27%
8	\$92.54	\$118.17	\$25.63	28%
9	\$99.75	\$127.50	\$27.75	28%
10	\$106.97	\$136.83	\$29.86	28%
11	\$114.18	\$146.16	\$31.98	28%
12	\$121.40	\$155.49	\$34.09	28%
13	\$128.62	\$164.82	\$36.20	28%
14	\$135.83	\$174.15	\$38.32	28%
15	\$143.05	\$183.48	\$40.43	28%
16	\$150.26	\$192.81	\$42.55	28%
17	\$157.48	\$204.84	\$47.36	30%
18	\$164.70	\$216.87	\$52.17	32%
19	\$171.91	\$228.90	\$56.99	33%
20	\$179.13	\$240.93	\$61.80	35%
21	\$186.34	\$252.96	\$66.62	36%
22	\$193.56	\$264.99	\$71.43	37%
23	\$200.77	\$277.02	\$76.25	38%
24	\$207.99	\$289.05	\$81.06	39%
25	\$215.21	\$301.08	\$85.87	40%
26	\$224.59	\$313.11	\$88.52	39%
27	\$233.98	\$325.14	\$91.16	39%
28	\$243.36	\$337.17	\$93.81	39%
29	\$252.75	\$349.20	\$96.45	38%
30	\$262.13	\$361.23	\$99.10	38%
31	\$271.52	\$377.17	\$105.65	39%
32	\$280.90	\$393.11	\$112.21	40%
33	\$290.29	\$409.05	\$118.76	41%
34	\$299.67	\$424.99	\$125.32	42%
35	\$309.05	\$440.93	\$131.88	43%
36	\$318.44	\$456.87	\$138.43	43%
37	\$327.82	\$472.81	\$144.99	44%
38	\$337.21	\$488.75	\$151.54	45%
39	\$346.59	\$504.69	\$158.10	46%
40	\$355.98	\$520.63	\$164.65	46%

Non-Residential Uniform Quantity Charges

The current non-residential quantity charge is a uniform rate structure. Tiered rate structures for non-residential customers are complex because non-residential customers are not as homogeneous as the residential customer class. Hence, uniform rate structures are more common for non-residential customers.

The uniform rate was calculated to generate the cost of service for non-residential customers, which also has a base volumetric and demand management component based on the District staff's cost of service analysis (summarized in **Figure 2-3**). The uniform rate of \$10.28 per HCF was calculated by dividing the total cost allocation of \$3,788,899 by total projected non-residential water demand for FY 2015-16 of 368,610 HCF. This rate includes the base volumetric and demand management components, which did not need to be treated as components in the calculation because the rate structure is not tiered. In effect, the cost of service, including the demand management component costs, is distributed evenly across the range of consumption.

APPENDIX A: COST OF SERVICE ANALYSIS

CCWD - FY2015-16 Budget Draft

Draft: 5/7/2015

Account Number	Description	Proposed Budget FY 15/16	Volumetric Demand Management/ Conservation			Non-Residential			Residential			Demand Mgmt/Conservation Allocation			Assumption	
			Volumetric	Base Charge	Management/ Conservation	Volumetric	Base Charge	Volumetric Demand Management/ Conservation	Volumetric	Base Charge	Volumetric Demand Management/ Conservation	Tier 2 Allocation	Tier 3 Allocation	Tier 4 Allocation		
	Projected Usage (hcf)					368,610	368,610	368,610	422,414	422,414	422,414	231,115	55,671	7,954		
	Projected Usage %					47%	47%	47%	53%	53%	53%	78%	19%	3%		
	Meter EMUs %					1,390	1,390	1,390	5,837	5,837	5,837					
	Meter EMUs %					19%	19%	19%	81%	81%	81%					
NON-OPERATING REVENUE																
4170	Hydrant Sales	\$40,000														
4180	Late Penalty	\$90,000														
4230	Service Connections	\$10,000														
4920	Interest Earned	\$2,550														
4930	Property Taxes	\$600,000														
4950	Miscellaneous	\$37,000														
4955	Cell Site Lease Income	\$139,245														
4965	ERAF Refund	\$200,000														
	Total Non-Operating Revenue	\$1,118,795	(1,118,795)													
TOTAL REVENUES																
OPERATING EXPENSES																
Source of Supply																
5130	Water Purchased	\$2,871,946	2,871,946													
Pumping (Electrical)																
5230	Electrical Exp. Nunes WTP	\$29,500														
5231	Electrical Expenses, CSP	\$307,052														
5232	Electrical Expenses/Trans. & Dist.	\$12,800														
5233	Elec Exp/Piscataway Cyn	\$18,000														
5234	Electrical Exp., Denn	\$90,100														
	Subtotal Pumping (Electrical)	\$457,452	457,452													
Transmission & Distribution																
5235	Denn. WTP Oper.	\$30,000	30,000													
5236	Denn WTP Maint	\$32,000	32,000													
5240	Nunes WTP Oper	\$52,764	52,764													
5241	Nunes WTP Maint	\$55,500	55,500													
5242	CSP - Operation	\$6,500	6,500													
5243	CSP - Maintenance	\$37,000	37,000													
5250	Laboratory Expenses	\$40,000	40,000													
5412	Maintenance Expenses	\$268,500	268,500													
5415	Maintenance, Wells	\$40,000	40,000													
	Subtotal Trans & Distribution	\$564,264														
Personnel																
5411	Salaries - Field	\$1,118,506	1,118,688	\$ 14,818	Flow	\$ 514,309	\$ -	\$ 6,905	\$ 589,380	\$ -	\$ 7,913	\$ 6,205	\$ 1,495	\$ 214	% of total (no alloc to Tier 1)	
5610	Salaries, Admin.	\$1,061,780	813,061	\$ 248,720	Flow	\$ 378,879	\$ -	\$ 115,901	\$ 434,182	\$ -	\$ 132,818	\$ 104,147	\$ 25,087	\$ 3,584	% of total (no alloc to Tier 1)	
5684	Payroll Taxes	\$153,056	134,556	\$ 18,500	Flow	\$ 62,702	\$ -	\$ 8,621	\$ 71,854	\$ -	\$ 9,879	\$ 7,747	\$ 1,866	\$ 267	% of total (no alloc to Tier 1)	
5640	Employee Retirement	\$305,322	444,243	\$ 61,080	Flow	\$ 207,013	\$ -	\$ 28,463	\$ 237,230	\$ -	\$ 32,617	\$ 25,576	\$ 6,161	\$ 880	% of total (no alloc to Tier 1)	
5635	Ee/Ret Medical Insurance	\$527,457	463,702	\$ 63,755	Flow	\$ 216,081	\$ -	\$ 29,709	\$ 247,621	\$ -	\$ 34,046	\$ 26,696	\$ 6,431	\$ 919	% of total (no alloc to Tier 1)	
5645	SIP 401a Plan	\$30,000	30,000		Flow	\$ 13,980	\$ -	\$ -	\$ 16,020	\$ -	\$ -	\$ -	\$ -	\$ -		
	Subtotal - Personnel	\$3,396,121														
Other - Administrative and General																
5318	Studies/Surveys/Consulting	\$240,000	95,000	\$ 145,000	Flow	\$ 44,269	\$ -	\$ 67,569	\$ 50,731	\$ -	\$ 77,431	\$ 15,486	\$ 46,459	\$ 15,486	20/60/20 (no alloc to Tier 1) - Assumes most of demand management spend is attributable to use in Tiers 3-4	
5321	Water Conservation	\$37,000	-	\$ 37,000	Flow	\$ -	\$ -	\$ 17,242	\$ -	\$ -	\$ 19,758	\$ 3,952	\$ 11,855	\$ 3,952	20/60/20 (no alloc to Tier 1) - Assumes most of demand management spend is attributable to use in Tiers 3-4	
5322	Community Outreach	\$95,100	23,775	\$ 71,325	Flow	\$ 11,079	\$ -	\$ 33,237	\$ 12,696	\$ -	\$ 38,088	\$ 7,618	\$ 22,853	\$ 7,618	20/60/20 (no alloc to Tier 1) - Assumes most of demand management spend is attributable to use in Tiers 3-4	
5327	Water Resources	\$0														
5414	Motor Vehicle Exp.	\$55,650	52,868	\$ 2,783	Flow	\$ 24,636	\$ -	\$ 1,297	\$ 28,232	\$ -	\$ 1,486	\$ 1,165	\$ 281	\$ 40	% of total (no alloc to Tier 1)	
5620	Office Expenses	\$164,475	164,475		Flow	\$ 76,644	\$ -	\$ -	\$ 87,831	\$ -	\$ -	\$ -	\$ -	\$ -		
5621	Computer Services	\$103,800	103,800		Flow	\$ 48,370	\$ -	\$ -	\$ 55,430	\$ -	\$ -	\$ -	\$ -	\$ -		
5625	Meetings/Training/Seminars	\$24,000	24,000		Flow	\$ 11,184	\$ -	\$ -	\$ 12,816	\$ -	\$ -	\$ -	\$ -	\$ -		
5630	Insurance	\$115,000	115,000		Flow	\$ 53,589	\$ -	\$ -	\$ 61,411	\$ -	\$ -	\$ -	\$ -	\$ -		
5681	Legal	\$60,000	60,000		Flow	\$ 27,959	\$ -	\$ -	\$ 32,041	\$ -	\$ -	\$ -	\$ -	\$ -		
5682	Engineering	\$14,000	14,000		Flow	\$ 6,524	\$ -	\$ -	\$ 7,476	\$ -	\$ -	\$ -	\$ -	\$ -		
5683	Financial Services	\$24,000	24,000		Flow	\$ 11,184	\$ -	\$ -	\$ 12,816	\$ -	\$ -	\$ -	\$ -	\$ -		
5687	Memberships & Subscriptions	\$71,290	71,290		Flow	\$ 33,220	\$ -	\$ -	\$ 38,070	\$ -	\$ -	\$ -	\$ -	\$ -		
5688	Election Expense	\$25,000	25,000		Flow	\$ 11,650	\$ -	\$ -	\$ 13,350	\$ -	\$ -	\$ -	\$ -	\$ -		
5689	Union Expenses	\$6,000	6,000		Flow	\$ 2,796	\$ -	\$ -	\$ 3,204	\$ -	\$ -	\$ -	\$ -	\$ -		
5700	County Fees	\$17,700	17,700		Flow	\$ 8,248	\$ -	\$ -	\$ 9,452	\$ -	\$ -	\$ -	\$ -	\$ -		
5705	State Fees	\$16,000	16,000		Flow	\$ 7,456	\$ -	\$ -	\$ 8,544	\$ -	\$ -	\$ -	\$ -	\$ -		
	Subtotal - Admin & General	\$1,069,015														
Total Operating Expenses			\$8,358,798													
CAPITAL ACCOUNTS																
5712	Existing Bonds - 2006B	\$485,889		\$ 485,889	EMU	\$ -	\$ 93,453	\$ -	\$ -	\$ 392,436	\$ -	\$ -	\$ -	\$ -		
5715	Existing Bond-CIEB 11-099	\$338,024		\$ 338,024	EMU	\$ -	\$ 65,014	\$ -	\$ -	\$ 273,010	\$ -	\$ -	\$ -	\$ -		
	Total Capital Accounts	\$823,913														
TOTAL REVENUE LESS TOTAL EXPENSE																
5713	Cont. to CIP & Reserves	\$1,800,000	396,500	\$ 1,233,500	\$ 170,000	EMU	\$ 76,261	\$ 237,244	\$ 32,697	\$ 320,239	\$ 996,256	\$ 137,303	\$ 27,461	\$ 82,382	\$ 27,461	20/60/20 (no alloc to Tier 1) - Assumes most of demand management spend is attributable to use in Tiers 3-4
			\$9,863,916	\$ 6,973,524	\$ 2,057,413	\$ 832,980	\$ 3,447,260	\$ 395,711	\$ 341,639	\$ 3,528,264	\$ 1,661,702	\$ 491,340	\$ 226,052	\$ 204,868	\$ 60,420	
			\$9,863,916	\$ 2,057,413		\$3,788,899			\$4,017,605							

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