



Water Budget Tiered Rate Study Report

Western Municipal Water District
Riverside Treated Retail Service Area



June 2011

June 17, 2011

Mr. Tim Barr
Water Use Efficiency Manager
Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518

Subject: Water Budget Tiered Rate Study Report for Riverside Treated Retail Service Area

Dear Mr. Barr,

Raftelis Financial Consultants (RFC), Inc. is pleased to provide this Water Budget Tiered Rate Study Report for Western's Riverside Treated Retail Service Area (Report) summarizing our analysis to design the water budget allocations for retail water customers and to determine tiered water rates designed to recover the cost of providing water services to Riverside treated retail water customers in the Western Municipal Water District (District or Western). Working closely with the District Staff, RFC developed a water rate structure and rates that promote water use efficiency, revenue stability and provides funding for alternative sources of supply.

This Report summarizes the key findings and recommendations related to the water budget allocation and the tiered water rates for treated retail water customers in Riverside.

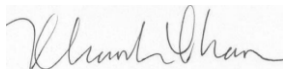
It has been a pleasure working with you and we thank you and the District staff for the support provided during the course of this study.

Sincerely,

Raftelis Financial Consultants, Inc.



Sanjay Gaur
Manager



Khanh Phan
Senior Consultant

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I. Introduction

Western Municipal Water District (Western or District) supplies imported and groundwater directly to approximately 24,000 residential, commercial and agriculture customers in the areas of El Sobrante, Woodcrest, Lake Matthews, March Air Reserve Base, Rainbow Canyon and portions of the cities of Riverside and Murrieta. The Riverside Treated Retail Division (Riverside Division) provides water services to nearly 20,000 retail water accounts in Riverside with approximately 23,275 acre-feet of combined groundwater and imported water. Given the regulatory requirements imposed by the State of California (SB x7-7, AB 1420, AB 1881) as well as recent water supply restrictions, Western engaged Raftelis Financial Consultants, Inc. (RFC) to assist in the analysis and development of a water budget-based rate structure for the District's Murrieta and Riverside Divisions (separate reports were developed for each division). The co-equal goals of the new rate structure were three-fold:

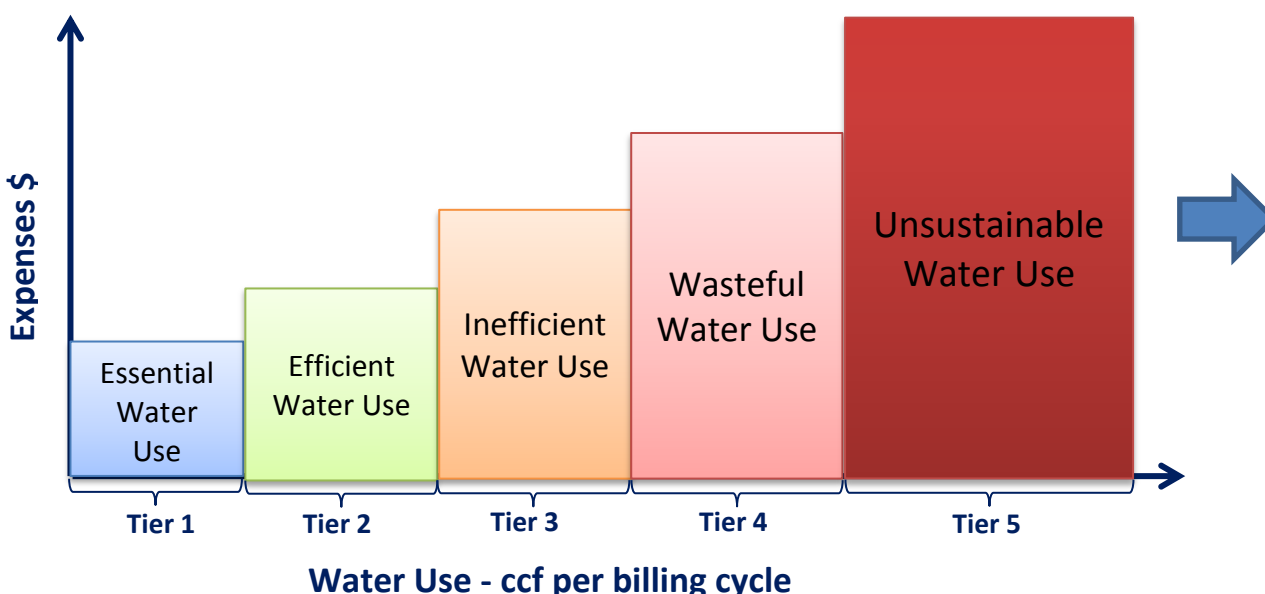
1. Develop individualized water budgets that signal efficient levels of use;
2. Provide all customers with the lowest practical price per unit of water efficiently used;
3. Preserve the District's financial integrity in light of State mandates to decrease water demand.

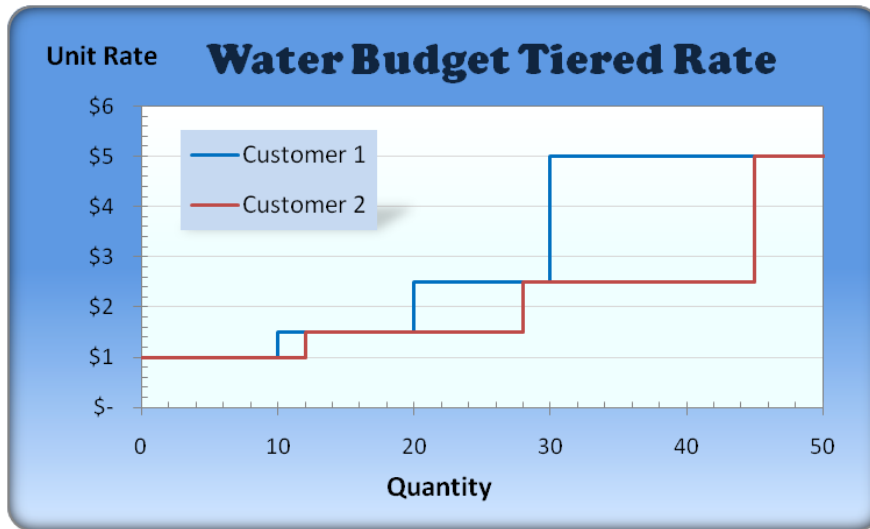
This report documents the standards and studies used to develop the water budgets and basis used to determine the rates.

II. Development of Water Budget and Tier Definitions

A. Development of Water Budget

The American Water Works Association Journal defines water budget as "the quantity of water required for an efficient level of water use by that customer." (Source: *American Water Works Association Journal*, May 2008, Volume 100, Number 5)





Example of Different Customer Budget

To determine an efficient amount of water use, a water budget allocation must be calculated. The budget calculation has to account for the indoor, outdoor, and business process needs of the individual customer. Although water budget allocations and tiered rate structures are designed individually for residential, irrigation and commercial water service accounts, there are many similarities among these unique customers.

1. Residential Indoor Water Budget

The indoor water budget (IWB) is determined by a customer's household size and a standard consumption per person. Western's planned IWB formula is as follows:

$$IWB = \frac{GPCD * HouseholdSize * DaysofService * DF_{indoor}}{748} + V_{indoor}$$

Where:

- GPCD – Gallons per capita per day. The standard consumption per person per day will be set at 60 gallons based on the *AWWA Research Foundation Residential End Uses of Water*, which stated that the mean daily water use per capita is 59.8 gallons, not including leaks. It should be noted that the Water Conservation Act of 2010 (SBx7-7) sets the efficient level of indoor residential water use at 55 gallon per person per day.
- Household Size – Number of residents. The default values for household size will be based on California Department of Finance Statistics for each customer class:

- Single Family: Household Size = 3 persons¹
- Multi Family: Household Size = 2 persons
- Days of Service. The number of days of service varies with each billing cycle for each customer. The actual number of days of service will be applied to calculate the indoor water budget for each billing cycle.
- DF_{indoor} – Indoor drought factor. This part of the budget equation will be used in extreme dry conditions only if needed because of local supply conditions or if required by regional and State agencies. A lower percentage of the typical or usual indoor water budget could be allocated during extreme drought, supply shortage or emergency conditions. Changing the drought factor will be subject to the approval of the District’s Board of Directors. The indoor drought factor will be set at 100 percent, representing 100 percent water budget allotment, in times where no water shortage exist in the District’s service area.
- V_{indoor} – Indoor variance. A water allotment can be adjusted to fit the unique circumstances of any customer. Customers need to contact the District and/or fill-out an adjustment form and return to the District with necessary documentation. 748 is the conversion unit from gallons to billing unit of hundred cubic feet (ccf)

For illustrative purposes, the following indoor water budget calculations for two different customers are provided.

- Customer #1: Household Size = 4 persons, Days of Service in January bill = 30 days, No variance

$$IWB = \frac{60 \text{ gallons/person/day} * 4 \text{ persons} * 30 \text{ Days} * 100\%}{748 \text{ gallons / ccf}} = 9.63 \text{ ccf}$$

- Customer #2: Household Size = 6 persons, Days of Service in January bill = 28 days, Medical need variance = 2 ccf per billing cycle

$$IWB = \frac{60 \text{ gallons/person/day} * 6 \text{ persons} * 28 \text{ Days} * 100\%}{748 \text{ gallons / ccf}} + 2 \text{ ccf} = 15.48 \text{ ccf}$$

2. Outdoor Water Budget (applies to both residential and irrigation services)

The outdoor water budget (OWB) is calculated using three components: irrigated landscape area, local weather data, and an efficiency adjustment factor. The irrigated landscape area is the square footage of landscape on a customer’s property, not necessarily the total property size. The weather data is the daily reference EvapoTranspiration (ET). ET is the measurement of water lost to evaporation and used by a reference plant material (transpiration). This measurement is published by universities, the agriculture industry, and public agencies such as the California Department of Water Resources. In California, the reference plant material is cool-season tall fescue (the most typically planted lawn). ET

¹ Based on California Department of Finance **E-5 Population & Housing Estimates for Cities, Counties and the State** as of 1/1/2010, the average household size for Riverside is 3.096 persons.

adjustment factors (ETAF), sometimes referred to as Landscape Factor or Crop Coefficient, is a State legislated efficiency standard in the form of a coefficient that adjusts the outdoor water budget value based on the crop types and irrigation efficiency. The allocation methodology used by Western is derived from the annual allowances in the State of California Updated Model Water Efficient Landscape Ordinance (Model Ordinance) as chaptered in Assembly Bill 1881 (AB 1881) and in California Code of Regulation, Title 23, Chapter 2.7. Identical to State legislation, Western's OWB accounts for the water needs of existing landscapes and accommodates both the stricter standards required of newly installed landscapes as well as the additional irrigation needs of school sites, public park recreational landscapes, and registered historic sites.

Following are the annual average values for the adjustment factors².

- New Landscape water service: Annual Average ETAF_{New} = 70%
- Existing landscape water service: Annual Average ETAF_{Existing} = 80%
- Special landscape water service³: Annual Average ETAF_{Special} = 100%

To address the seasonality of the growing cycles of plants, the District utilizes University of California Riverside turf grass research to set more accurate monthly adjustment factors. The values in Table 1 show the ET Adjustment Factors by month. Note the annual average ETAF is consistent with the Model Ordinance.

² Based on CA Code of Regulation, Title 23, Chapter 2.7, Section 491 - Model Water Efficient Landscape Ordinance

³ Based on CA Code of Regulation, Title 23, Chapter 2.7, Section 491, Special Landscape Area is defined as an area dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

Table 1: ET Adjustment Factors by Month

Month	Existing Account ⁴	Qualifying Special Account	New Service Account
Jan	0.61	0.76	0.53
Feb	0.64	0.80	0.56
Mar	0.75	0.93	0.65
Apr	1.04	1.30	0.91
May	0.95	1.20	0.83
Jun	0.88	1.10	0.77
Jul	0.94	1.20	0.82
Aug	0.86	1.10	0.75
Sep	0.74	0.92	0.65
Oct	0.75	0.93	0.66
Nov	0.69	0.86	0.60
Dec	0.60	0.75	0.52
Average	0.80	1.00	0.70

The formula to calculate an outdoor water budget is as follows:

$$OWB = \left[\sum_1^d \left(\frac{\text{Landscape Area} * ET_0 * ETAF}{1200} + V_{\text{outdoor}} \right) \right] * DF_{\text{outdoor}}$$

Where:

- “d” is the number of days in the billing period.
- ET₀ is measured in inches of water during the billing period based on daily weather data acquired from HydroPoint Data Systems, Incorporated (HPDS). Western’s service area has 450+ individual weather microzones and each microzone is 0.06 miles square. Western will update the actual daily ET for each microzone on a daily basis through a secure link to the HPDS FTP site. This allows weather changes to be accurately updated for every account in the District on a daily basis.
- ETAF will be defined using the Model Ordinance and Table 1 shown above.
- Landscape Area, also referred to as Irrigated Landscape Area (in square feet), is the measured irrigable landscape area served by a specific water meter. Customers will be asked to return a “Water Budget Adjustment” form confirming their actual landscape area. Accurately

⁴ J. Meyer and V. Gibeault, *Turfgrass Performance Under Reduced Irrigation*, California Agriculture July-August 1986, Table 3 - K_c for cool season grasses

accounting for landscape area for each customer will be the desired objective. Accurate site measurement will facilitate the most accurate water budget for each customer.

- Where the measured irrigable landscape area has not been provided or confirmed by the customer, the landscape area will be estimated using the following formula.

$$\text{Landscape Area (sq ft)} = \text{Area Factor} * \text{Parcel Size}$$

- Area factor varies with parcel size ranges as shown in Table 2 below.
- Percent of parcel size was calculated using historical water demand averages for all lots in the parcel size range.
- Large landscape area caps will be applied to all accounts with known parcel sizes larger than one-quarter (1/4) acre as a default starting point. The landscape area caps, varying with parcel size ranges, are shown in Table 2 below. If an actual irrigated area exceeds the applied cap, it will be the property owner/customer responsibility to provide updated information via an adjustment form.
- Western can only calculate the Landscape Area for the parcel in which the water meter is located. If the water meter serves more than one parcel, it will be the property owner/customer responsibility to provide this information via an adjustment form.

Table 2: Area Factors and Landscape Area Caps for Parcels by Lot Size Ranges

Parcel (Property) Size Range	Irrigated Area - Percent of Known Parcel Size	Landscape Area Caps (sq ft)
≤ 0.2 acre	35%	3,000
0.2 to 1 acre	31%	10,890
1 – 2 acres	34%	10,890
2 – 3 acres	24%	10,890
3 – 5 acres	15%	21,780
5 – 10 acres	12%	21,780
> 10 acres	4%	21,780

- DF_{outdoor} – Outdoor drought factor. This part of the budget equation will be used in extreme dry conditions only if needed because of local supply conditions or if required by regional and State agencies. A lower percentage of the typical or usual outdoor water budget could be allocated during extreme drought, supply shortage or emergency conditions. Changing the drought factor will be subject to the approval of the District's Board of Directors. The outdoor drought factor will be set at 100 percent, representing 100 percent water budget allotment, in times where no water shortage exists in the District's service area.
- V_{outdoor} – Outdoor variance. A water budget can be adjusted to fit the circumstances of any customer. Customers need to contact the District and/or complete an adjustment form and return to the District. Outdoor variance will be subject to the outdoor drought factor in extreme dry conditions.

- 1200 is the factor used to convert to billing units in hundred cubic feet (ccf).

For illustrative purposes, the following outdoor water budget calculations for two different customers are shown.

- Customer #1 – Existing Single Family: Landscape Area = 8,000 sq ft, ET_0 for 30-day January bill = 2.25 inches, ETAF for January = 0.61, no variance:

$$\circ \text{OWB} = \left(\frac{8,000 \text{ sq ft} * 2.25 \text{ inches} * 0.61}{1200} \right) * 100\% = 9.15 \text{ ccf}$$

- Customer #2 – Existing Single Family: Landscape Area = 4,000 sq ft, ET_0 for 28-day January bill = 2.05 inches, ETAF for January = 0.61, Variance = 1 ccf per billing cycle for approved special needs:

$$\circ \text{OWB} = \left(\frac{4,000 \text{ sq ft} * 2.05 \text{ inches} * 0.61}{1200} + 1 \text{ hcf} \right) * 100\% = 5.17 \text{ ccf}$$

3. Historical Water Budget

The remaining classes—commercial, industrial and institutional (CII) — will be allocated water based on the customer’s past historical billing-period use. The water budget rate structure and individualized allocations recognizes that business needs may vary dramatically depending on the type of business. For example, a car wash and an office building may contain the same number of employees, lot size or even building footprint, but their water needs are quite different. Western will calculate each individual billing-period allocation based on a rolling 3-year billing period average use.

The formula to calculate historical water budget (HWB) is as follows:

$$\text{HWB(ccf)} = \left(\frac{\sum \text{Use}_n}{\sum \text{Day}_s} * \text{Days} + V_{\text{historical}} \right) * \text{DF}_{\text{historical}}$$

Where

- Use_n – usage in the billing-period of up to the prior 3 years corresponding to the current billing period.
- Days_n – the days of services for the associated usage
- Days – the days of service in the current billing period
- $\text{DF}_{\text{historical}}$ –drought factor for historical water budget. This part of the budget equation will be used in extreme dry conditions only if needed because of local supply conditions or if required by regional and State agencies. A lower percentage of the historical water budget could be allocated during extreme drought, supply shortage or emergency conditions. Changing the drought factor will be subject to the approval of the District’s Board of Directors. The historical drought factor will be set at 100 percent, representing 100 percent water budget allotment, in times where no water shortage exists in the District’s service area.

- $V_{\text{historical}}$ – historical variance. An “adjustment” to the water budget may be requested for changing or updating the average use and/or change in water need for any business or institutional customer. Historical variance will be subject to the drought factor in extreme shortage conditions.

For illustrative purposes, the following historical water budget calculations for two different customers are shown.

- Customer #1 – Commercial A has the following historical billed usage: Jan 2010 bill – 40 units for 35 days, Jan 2009 bill – 28 units for 30 days and Jan 2008 bill – 34 units for 32 days. No adjustment has been requested. HWB for current bill (Jan 2011) for 30 days is calculated as follows:

$$\circ \text{ HWB} = \left(\frac{40 + 28 + 34}{35 + 30 + 32} * 30 \right) * 100\% = 31.54 \text{ ccf}$$

- Customer #2 – Public Authority B has the following historical billed usage: Jan 2010 bill – 140 units for 35 days, Jan 2009 bill – 182 units for 30 days and Jan 2008 bill – 134 units for 32 days. Variance = 2 ccf per billing cycle for increase in employees over base years. HWB for current bill (Jan 2011) for 32 days is calculated as follows:

$$\circ \text{ HWB} = \left(\frac{140 + 182 + 134}{35 + 30 + 32} * 32 + 2 \right) * 100\% = 152.43 \text{ ccf}$$

Water Budget Allocations by Customer Classes

The table below summarizes the water budget allocation by customer class. Both Single Family and Multi Family customers will receive an indoor and outdoor water budget. Irrigation accounts will receive an outdoor budget. Commercial, Industrial and Institutional (CII) customers will have their water budgets based on historical rolling averages.

Table 3: Water Budget Allocations for each Customer Class

Customer Classes	Water Budget Allocations	Default Values
Existing Single Family	Indoor + Outdoor	Household Size = 3, GPCD = 60 ETAF _{average} = 80%
New Single Family	Indoor + Outdoor	Household Size = 3, GPCD = 60 ETAF _{average} = 70%
Existing Multi Family	Indoor + Outdoor	Household Size = 2, GPCD = 60 ETAF _{average} = 80%
New Multi Family	Indoor + Outdoor	Household Size = 2, GPCD = 60 ETAF _{average} = 70%
Existing Irrigation	Outdoor	ETAF _{average} = 80%
New Irrigation	Outdoor	ETAF _{average} = 70%
Qualifying Special Irrigation	Outdoor	ETAF _{average} = 100%
Commercial / Industrial /Institutional (CII)	Historical	3-year rolling average

B. Tier Definitions

The tier definitions will be tailored to the unique consumption patterns of the District's customers and subject to the District's policy decisions. The recommended tier definitions are based on financial modeling, customer impact analysis using actual customer data, and efficiency standards written into California laws, codes and ordinances.

1. Residential Water Services (Single and multi-family customers)

Tier 1 width (indoor budget) will be based on 60 gallons per person per day in a household plus applicable variance. The Tier 1 width will vary from customer to customer based on the number of people that live on the site. Indoor water use is considered essential for health, safety, and sanitary purposes. Western has determined that at the time of the water budget rate modeling, in the spring of 2011, a portion of the demand for essential indoor water can be met through local sources of water with the balance supplied from import water purchased from the Metropolitan Water District of Southern California (MWD). The combination of local and imported supplies determines the unit cost of water in Western's first tier (Tier 1) of the water budget rate structure.

Tier 2 width will be determined individually for every customer through the outdoor budget formula described in Section II A of this report. Maintaining healthy landscape at an efficient water use level is considered non-essential water relative to health and safety, yet it is important to communities in the arid west. The outdoor water budget calculation determines the actual width of Western's second tier (Tier 2) by using the following principle variables:

- The size of the site landscape (irrigated area);
- The daily weather during the billing period (EvapoTranspiration or ET);
- The monthly ET adjustment factor;
- Any applicable variance; and,
- The days of service during the billing period.

In spring 2011, Western determined that current customer Tier 2 water demands can be supplied with the lowest cost import water purchased from the Metropolitan Water District of Southern California (MWD). The cost of MWD import water directly impacts the unit cost of Tier 2 in Western's rate structure. At the time of modeling, no locally supplied water was available to meet Tier 2 demands.

2. Irrigation Water Service (dedicated landscape irrigation customers)

Tier 1 width for irrigation accounts will be the first 40 percent of the total outdoor water budget as described in Section II A of this report. In spring 2011, Western determined that the water demand of high efficiency landscapes, where only 40 percent of the local EvapoTranspiration rate is used, can be met through local sources of water with the balance supplied from imported water purchased from the MWD. The combination of local and imported supplies determines the unit cost of water in Western's first tier (Tier 1).

Tier 2 width for irrigation accounts will be the balance of the outdoor water budget (the total outdoor budget less Tier 1).

The outdoor water budget calculation determines the actual width of Tier 2 by using the following principle variables:

- The size of the site landscape (irrigated area);
- The daily weather during the billing period (EvapoTranspiration);
- The monthly ET adjustment factor; and,
- The days of service during the billing period.

In spring 2011, Western determined that customer Tier 2 water demands can be supplied with the lowest cost MWD imported water. The cost of MWD Tier 1 imported water directly determines the unit cost of Western's second tier (Tier 2) in the water budget rate structure. At the time of modeling, no locally supplied water was available to meet Tier 2 demands.

3. Commercial / Industrial / Institutional (CII) Water Service

Tier 1 width for CII customers will be 90 percent of the historical average of up to three years of water use during the same or similar billing period. In the case of CII customers with less than 3 years of historical use, a two year average will be used. For a new CII water service account, the first 12 months will be divided with 90 percent of all use in Tier 1 and the balance in Tier 2. When complete, the first year will serve as a “baseline” water use year for the purposes of determining average historical use.

In spring 2011, Western determined that a portion of commercial demands in Western’s first tier (Tier 1) can be met through local sources of water with the balance supplied from MWD imported water. The combination of local and imported supplies determines the unit cost of water in Western’s first tier (Tier 1) of the water budget rate structure.

Tier 2 width for CII customers will be the balance (10 percent) of historical use described above.

The methodology for determining the width of tiers 1 and 2 for commercial customers is derived from the California Water Conservation Act of 2010 (SBx7-7) which requires all urban water providers to reduce consumption in the CII sector by 10 percent by the year 2015. By allocating 90 percent of historical water use into the lowest cost Tier, Western believes that CII customers will have a financial incentive to reduce on site water use by 10 percent. All Western CII customers will be able to submit a request for business growth adjustment when they can demonstrate increased water need because of increased business production or an increase in the number of employees.

In spring 2011, Western determined that Tier 2 commercial water demands can be supplied with the lowest cost MWD imported water. The cost of MWD Tier 1 imported water directly determines the unit cost of Western’s second tier (Tier 2) of the water budget rate structure.

4. Penalty Tiers for All Water Use Sectors

In all water use sectors, Residential, Irrigation and CII, Tier 3 and Tier 4 widths are each set at 25 percent of the total water budget; the total water budget being the sum of Tier 1 and Tier 2 allocations.

Tier 3 and Tier 4 widths will each have set widths of 25 percent, establishing inclining rates for progressively higher levels of wasted water. Tier 3 of Western’s water budget rate structure for all water use sectors will be for water use above 100 percent of the individualized water budget but below 125 percent of the budget. Tier 4 of Western’s water budget rate structure for all water use sectors will be for water use in excess of 125 percent of the individualized water budget but below 150 percent. Tier 5 for all water use sectors will be for all use in excess of 150 percent of a customer’s individualized water budget. The tier definition is further clarified in Table 4 below.

Excess revenue (revenue over the base cost of water and service) in tiers 3, 4 and 5 will be used to fund conservation and efficiency programs and any system-wide upgrades, such as, but not limited to: recycled water expansion and ground-water recharge projects for the purpose of increasing water

available to all customers. The current water supply can accommodate efficient levels of water use within the District. The Tier 3, 4 and 5 rates provide an incentive for each customer to be an efficient water user.

Table 4: Tier Definitions for each Customer Class

Tiers	Single Family	Multi Family	Irrigation	CII
Tier 1 Essential Water Use	100% IWB	100% IWB	40% OWB	90% HWB
Tier 2 Efficient Water Use	100% OWB	100% OWB	60% OWB	10% HWB
Tier 3 Inefficient Water Use	100% to 125% TWB	100% to 125% TWB	100% to 125% OWB	100% to 125% HWB
Tier 4 Wasteful Water Use	125% to 150% TWB	125% to 150% TWB	125% to 150% OWB	125% to 150% HWB
Tier 5 Unsustainable Water use	Above Tier 4	Above Tier 4	Above Tier 4	Above Tier 4

III. Model Development and Usage Analysis

As part of this study, RFC developed a Microsoft Excel-based rate model (Model). The Model was designed to examine multiple rate structures and customer impacts resulting from the various water cost, water supply and water budget scenarios. As with any computer model, the value of the output is highly dependent on the inputs. The major inputs for Single Family Residents (SFR); Multi Family Residential (MFR); Dedication Irrigation (IRR); and Commercial, Industrial, and Institutional (CII) customers are as follows:

- Water consumption records – CY 2009 consumption records served as the basis for the rate structure calculations.
- The SFR model contains 10,066 accounts out of 18,979 residential accounts, or 53 percent of all accounts. Landscape area was determined by calculating an average percentage of parcel size, as Table 2 illustrates.
- The MFR model contains 3 accounts out of 6 accounts, or 50 percent of all accounts. Landscape area was estimated by the District using GIS imagery and County of Riverside parcel information.
- For IRR accounts, the model contains 97 accounts out of 403 accounts, or 24 percent. Landscape area was provided by the District through a variety of means (GIS imagery, site visitation and customer supplied data).
- SFR, MFR and IRR customers will confirm or update their landscape square footages as appropriate to ensure increased accuracy. The District will verify and update the database with the actual square footage as customers provide updated information.

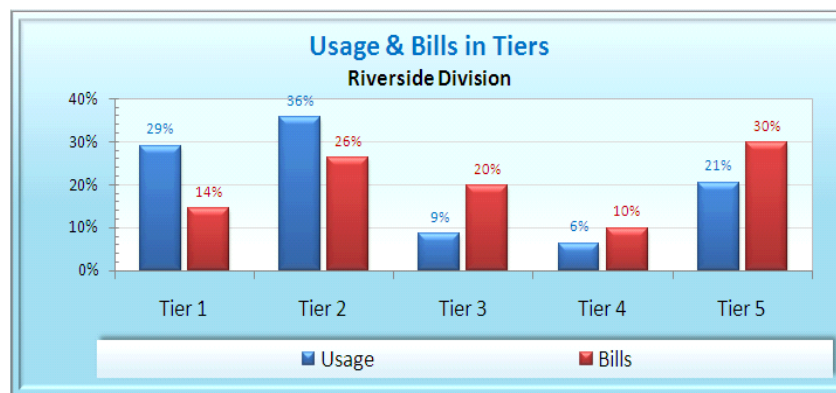
- For CII accounts, the model contains 372 out of 411 accounts, or 91 percent. The 2009 consumption was compared against the three-year monthly average consumption, which was used as the total water budget, to evaluate the efficiency of CII usage.

The usage analyses were performed for all four customer classes on aggregate level to ensure that:

- The water budget allocation will provide an adequate, reasonable amount of water for the District's customers;
- The District will be able to prepare for customers who may potentially apply for water budget adjustments or variances;
- The District's water use efficiency team will be able to develop customer support programs for inefficient customers;
- The financial implication of the reduction in water sales due to conservation will be addressed; and
- The District will be able to make informed policy decisions in consideration of the water budget rate structure both prior to adoption and during implementation, if adopted.

Figure 1 shows that based on historical use statistics, 65 percent of the water usage in all water use sectors would already be considered efficient (29% from Tier 1 and 36% from Tier 2) and about 35 percent would exceed individualized customer water budgets. When examining more than 120,000 monthly customer water service bills, 40 percent (14% from Tier 1 and 26% from Tier 2) of all the bills throughout the year are within their budget. The District can focus its conservation effort on the individuals that are outside their budgets. Note that some of these customers may apply for variances or adjustments to update their actual household size and/or landscape area inputs.

Figure 1: Usage & Bill Distributions for Riverside Treated Retail Water Service



1. Single Family Residential (SFR)

Using the water budget allocations and tier definitions as described in the previous section, the tier distribution of water usage and water bills for single family customers prior to potential water budget adjustments is shown below. Figure 2 shows 40 percent (13% from Tier 1 and 27% from Tier 2) of the water bills in budget and 61 percent (21% from Tier 1 and 40% from Tier 2) of the total water usage in

budget. Note that 31 percent of the bills representing 23 percent of the water usage are in Tier 5, which is 150 percent or more over their respective budgets.

Figure 2: Usage & Bill Distributions for SFR Accounts

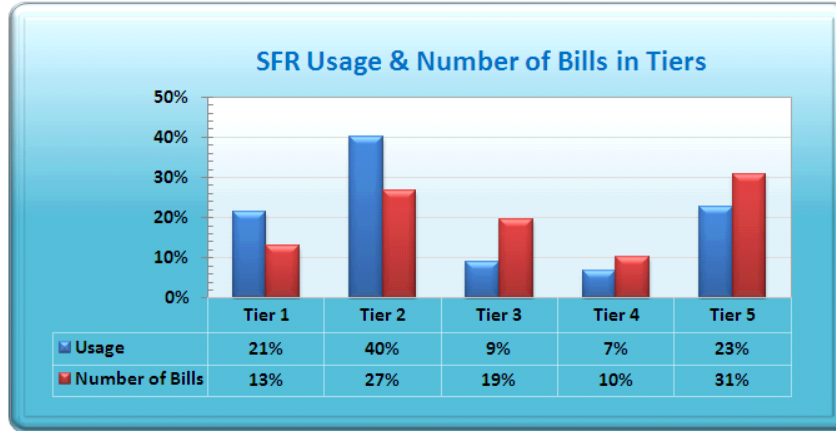
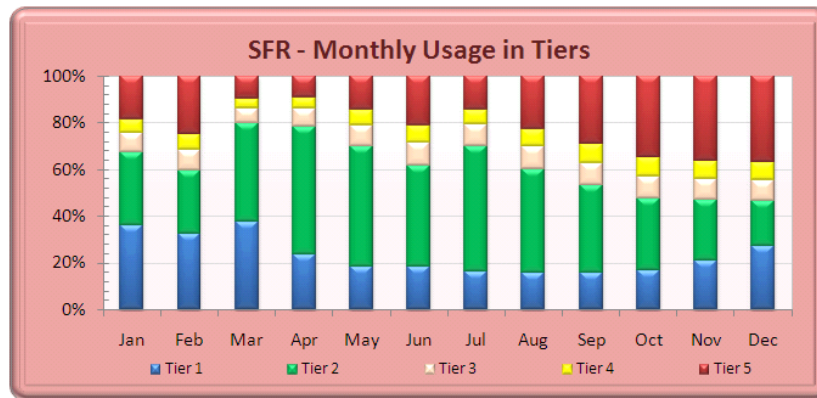


Figure 3 shows the monthly usage distributions of the SFR accounts included in the analysis. The chart indicates that the inefficient usage occurs mostly in Fall and Winter (from Sep to Dec) as shown by the pale, yellow and red bars. During the cooler months, the outdoor water budget will decline (with cooler weather), thus rate structure and real-time water budget allocations will drive water users (customers) to follow weather and use only the water they need to maintain their landscapes. Some customers that have been inattentive under the current rate structure may find that they need to more frequently check and fix inefficient sprinklers and may need to adjust irrigation controllers (timers) as the weather changes to be efficient and remain within their individualized water budget.

Figure 3: SFR – Monthly Usage Distributions



2. Multi-Family Residential (MFR)

At the time of modeling, little data was available about the actual populations of the Multi-Family Residential dwellings in Western’s Riverside service area. Figure 4 shows that 40 percent of total MFR usage is assessed at the Tier 1 rate for indoor use, 16 percent is assessed at Tier 2 for outdoor use, and

about 44 percent is charged the higher rates for inefficient use. Approximately 9 percent of the bills have usage within their allotted indoor and outdoor water budgets, thus only paying Tier 1 and Tier 2 rates. Approximately 91 percent of the bills exceeded their total water budgets. Staff will conduct significant outreach to property owners/managers of Multi-Family dwellings to get more accurate information prior to implementation if the water budget rate structure is adopted.

Figure 4: Usage & Bill Distributions for MFR Accounts

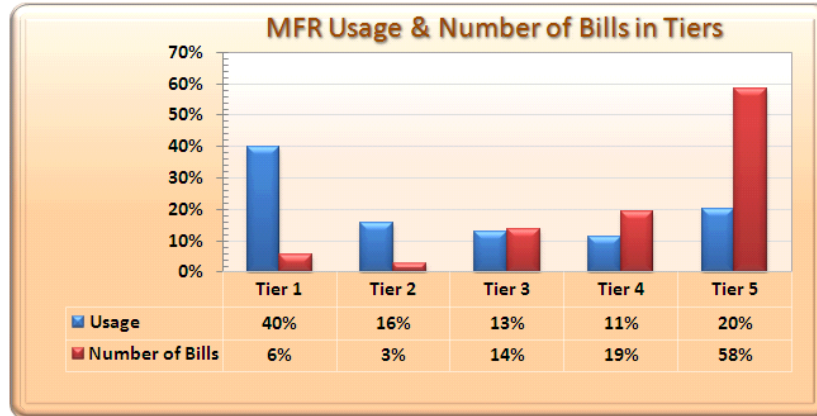
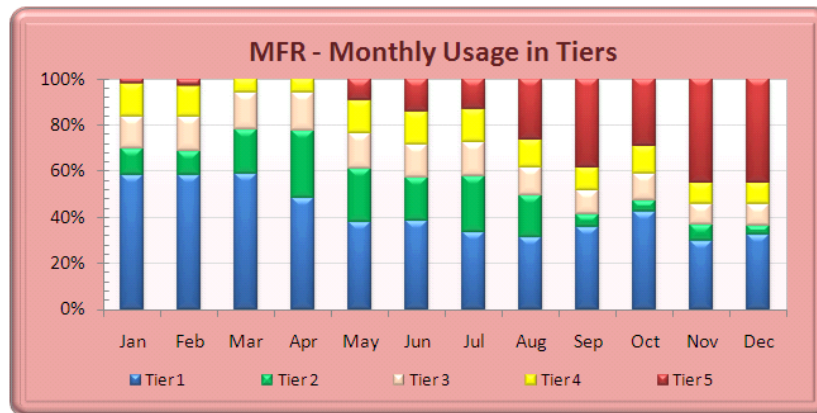


Figure 5 shows the monthly usage distributions of the MFR accounts included in the analysis. The chart indicates that the unsustainable usage (Tier 5) predominantly occurs in August to December – likely as a result of slow response to cooling temperatures and the resulting over-irrigation of landscape plant materials in the fall and winter. These values are expected to change significantly as default water budget data is replaced with more accurate information to be provided by the customer through the water budget adjustment process.

Figure 5: MFR – Monthly Usage Distributions



3. Dedicated Irrigation (IRR)

Figure 6 shows that 65 percent (33% from Tier 1 and 32% from Tier 2) of total IRR usage is considered efficient, which represents 42 percent (24% from Tier 1 and 18% from Tier 2) of all the bills issued.

Based on the information below, the District will be able to better focus the efforts of its efficiency team in reducing the water usage in the higher tiers, especially in Tier 5, which represents 21 percent of the total water usage in this sector.

Figure 6: Usage & Bill Distributions for IRR Accounts

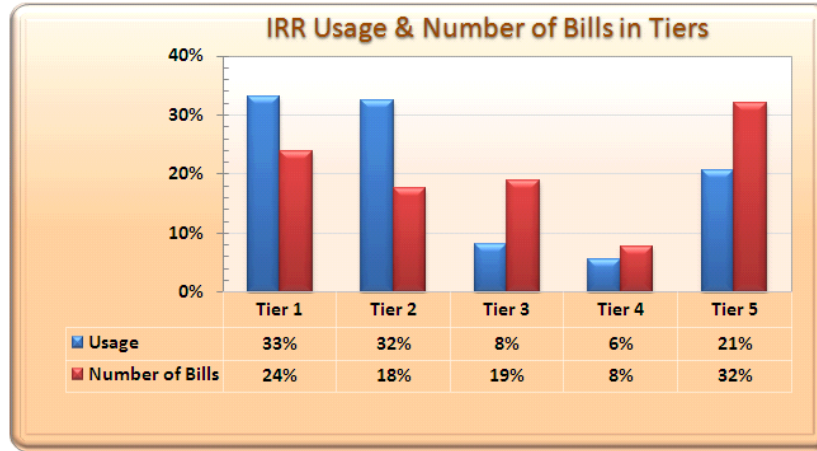


Figure 7 shows the comparisons of the ratios of average usage and average water budget for each of the parcel size ranges. The smaller landscaped areas (street medians and easements for example) use water at a much lower efficiency than the larger landscaped areas (parks and school sites for example). The figure below shows that landscaped areas smaller than 0.5 acre use on average 27 percent above their total allotment, whereas the larger parcel (larger than 2 acres) consume water on average at levels that are 23 percent below their total water budget. This is consistent with other studies conducted by RFC where larger parcels are generally more efficient in water use than smaller ones.

Figure 7: IRR Average Usage & Average Water Budget by Parcel Size

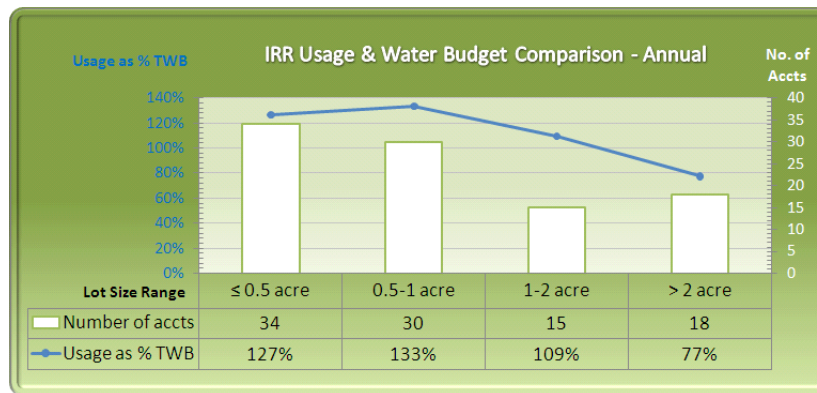
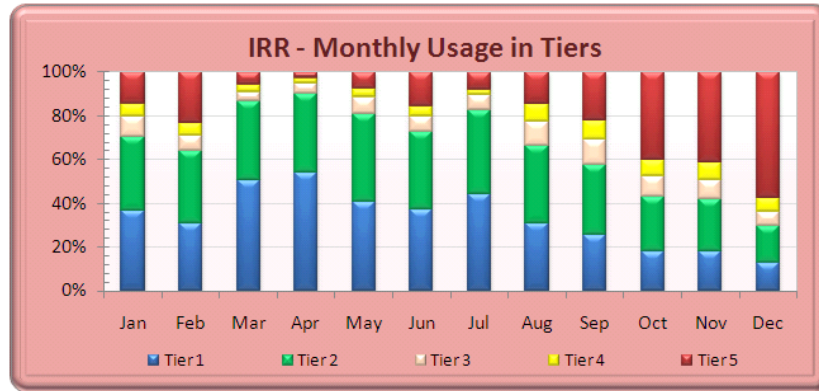


Figure 8 shows the monthly usage distributions of the IRR accounts included in the analysis. Similar to SFR and MFR water use sectors, the chart indicates that inefficient usage occurs mostly in fall and winter (from Sep to Feb) as shown by the pale, yellow and red bars. This usage pattern is observed for irrigation accounts in other agencies as well. District staff will be able to better focus the water

efficiency efforts and educate customers on how to increase water use efficiency during the cooler months.

Figure 8: IRR – Monthly Usage Distributions



4. Commercial/Industrial/Institutional (CII)

Due to the varying consumption needs within the CII customer classes, the District established water budgets based on up to a 3-year rolling average. The District will evaluate and grant requests to increase water budgets on a case by case basis to accommodate economic growth and/or other changes in the business. Figure 9 shows that in calendar year 2009, 38 percent of CII bills (26% from Tier 3, 5% from Tier 4% and 7% from Tier 5) exceeded their allotted 3-year rolling average water budgets, representing only 9 percent (4% from Tier 3, 2% from Tier 4 and 3% from Tier 5) of total CII consumption.

Figure 9: Usage & Bill Distributions for CII Accounts

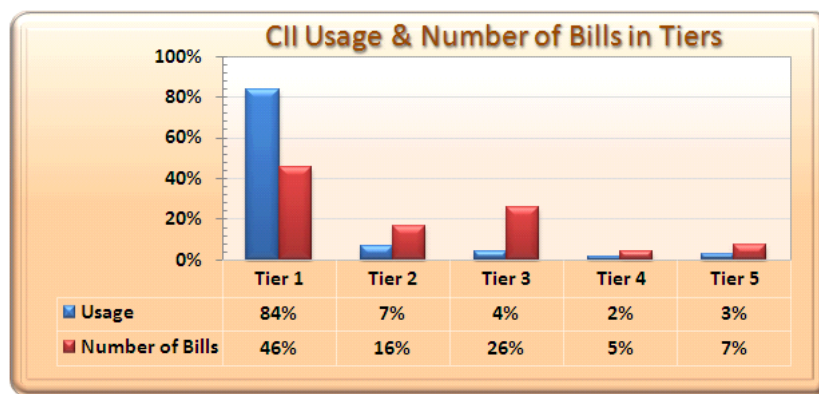
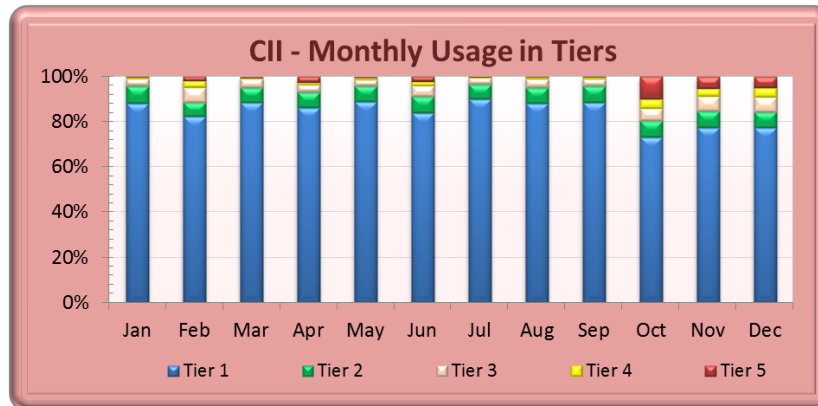


Figure 10 shows that during the last quarter of 2009, approximately 20 percent of usage exceeded the 3-year average allotted water budget. Economic growth might be the driving force for the increased demands during that period compared to the prior 3 years.

Figure 10: CII – Monthly Usage Distributions



IV. Development of Water Rate Structure

Proposition 218 requires a nexus (justification) between the rate and costs of providing service. To meet this requirement, Western identified three different rate components of the commodity rate, including Water Supply, Delivery, and Water Efficiency Program. The following section describes the methodology of developing each rate component.

1. Water Supply Costs

a) Estimated Water Availability and Demand

The District has only a limited amount of water available in its service area. It is estimated that the District has about 23,275 AF of water (24,500 AF with 5 percent unaccountable) to allocate within the Riverside Division. Table 5 shows the amount of water available and the unit costs at the time of modeling associated with each water supply and incremental cost of water above 23,275 AF. Based on the model, it is estimated that the potential demand associated with Tier 1, 2 and 3 is approximately equal to 23,275 AF as shown in Table 6.

Table 5: Water Supply Sources and Unit Costs

Water Supply Sources	Available for Sales Quantity (AF)	Effective Unit Cost <i>(includes 5 percent water loss)</i>
Groundwater	2,717	\$692
MWD Tier 1	15,832	\$783
MWD Tier 2	4,726	\$915
Supplemental Water		\$1,381
Total	23,275	

Table 6: Estimated Potential Water Use (in AF)⁵

Tiers	Estimated Potential Water Use
Tier 1 Essential	7,335
Tier 2 Efficient	12,015
Tier 3 Inefficient	3,925
Total (AF)	23,275

b) Water Supply Unit Costs

The current water supply of the District is allocated to efficient water use in Tier 1 and Tier 2. The lowest cost water supply (local ground water) will apply to Tier 1 use first to provide affordability for the essential indoor usage for health and safety. Tier 2 water costs are based on the lowest cost import water supply. Any excessive usage above the efficient levels (Tiers 1 and 2) will potentially drive the District to seek additional water supply sources at a higher cost to customers. The District wants to avoid purchase of more expensive water, particularly if the cause is wasted water. The District estimates that the supplemental water supply would cost approximately \$1,381 per AF, or \$3.18 per ccf sold (shown in Table 7). Only customers that are above their efficient water budget allocation will pay for the incremental costs (higher tiered rates) associated with the purchase and delivery of any new water supply.

Table 7: Water Supply Unit Costs (includes water loss)

Tiers	Descriptions	Unit Cost (\$ / AF)	Water Cost (\$ / ccf)
Tier 1 Essential Use	Groundwater + MWD Tier 1	\$749	\$1.72
Tier 2 Efficient Use	MWD Tier 1	\$792	\$1.82
Tier 3 Inefficient Use	MWD Tier 2	\$915	\$2.11
Tier 4 Wasteful Use	Supplemental Water	\$1,381	\$3.18
Tier 5 Unsustainable Use	Supplemental Water	\$1,381	\$3.18

⁵ District's estimates

2. District's Delivery Costs

In addition to the water supply costs, the District incurs approximately \$14.7 million net in operations and maintenance expenses to deliver water services to end-users in the Riverside Division. The District's revenue requirements must be recovered by the monthly fixed system charges and the District's delivery cost component in the commodity rates. Table 8 summarizes the District's revenue requirements (\$14,668,869) and the revenues projected to be recovered by fixed system charges (\$5,842,611), pumping charges (\$1,230,915), non-operating revenues from property tax and interest income (\$7,307,114) and the delivery cost as part of the commodity rate (\$288,229).

The ultimate goal of the water budget rate structure is to eliminate inefficient usage (Tier 3 to Tier 5), while maintaining revenue stability. To ensure financial sufficiency and revenue stability, the District's unrecovered fixed cost (or Delivery costs) will be recovered only from the efficient usage. The delivery cost of \$288,229 spread over the reliable efficient usage of 6,798,558 ccf is \$0.05 per ccf.

Table 8: District's Delivery Costs (exclude Water Supply Costs)

Descriptions	Projected Costs in FY 2012
Administrative Expenses	\$8,855,448
Maintenance & Depreciation	\$2,959,457
Materials & Supplies	\$429,500
Miscellaneous Expenses	\$775,972
Outside Services	\$511,500
MWD Capacity Charge	\$476,992
Purchase Power (Pumping)	\$1,200,000
Delinquent Fee Revenue	(\$500,000)
Other Revenues	(\$40,000)
Total Revenue Requirement	\$14,668,869
<i>Less Revenue from Fixed System Charges</i>	<i>\$5,842,611</i>
<i>Less Revenue from Pumping Charges</i>	<i>\$1,230,915</i>
<i>Less Revenue from Property Tax & Interest Income</i>	<i>\$7,307,114</i>
Revenue Requirement for Delivery Costs	\$288,229
Historically Reliable Usage (Tiers 1 & 2)	6,798,558 ccf
Delivery Unit Cost (rounded up)	\$0.05 / ccf

3. Water Efficiency Program

The ultimate goal of the water budget rate structure is to eliminate inefficient usage (Tier 3, Tier 4 and Tier 5), while maintaining revenue stability. To assist customers in using water efficiently, Western employs staff to administer customer programs, evaluation consultants to provide on-site assistance for customers, and provides direct install programs and financial rebates to customers electing to perform efficiency upgrades.

The District projected the water efficiency program cost in the Riverside Treated Retail Service Area to be approximately \$1,720,000. Efficiency program costs will be funded by the "penalty" charges from Tiers 3, 4 and 5. Only customers who use water inefficiently pay the higher tiered rates. The water

efficiency program penalty component in the rates for Tiers 3, 4 and 5 are \$0.30, \$0.60 and \$1.49 per ccf, respectively (shown in Table 9). The pricing differences reflect the significant effort required to help customers reduce their usage from Tier 5 down to Tier 2 (within budget). Bringing a customer from inefficient usage in Tier 5 to being within their water budget requires much more effort than reducing usages from Tier 3 or Tier 4. Tier 3 users generally only need program information, easily assessable online or available through customer service, in order for them to better align their usage with efficiency benchmarks and weather conditions. Tier 4 users may require an on-site efficiency evaluation and rebates for high efficiency fixture replacement. To achieve efficient use from Tier 5 users, all of the above plus funds to promote climate-appropriate landscaping, turf replacement program or weather-based irrigation controller installations will be utilized as necessary. This is consistent with the District's policy to create a conservation pricing structure.

Table 9: Water Efficiency Program Rates

Tiers	Water Efficiency Program Rates
Tier 3	\$0.30 / ccf
Tier 4	\$0.60 / ccf
Tier 5	\$1.49 / ccf

4. Water Budget Tiered Rates

The tiered commodity rates with individual rate components are summarized below for SFR, MFR, IRR and CII customers. The tiered rate structure will send a strong conservation signal to inefficient customers, will meet the legal requirements of Proposition 218, and will help ensure revenue stability.

Table 10: Proposed Water Budget Tiered Rates

Tiers	Water Supply Cost	Delivery Cost	Efficiency Funding	Total Proposed Rates	Current Rate (as of Jan 1, 2011)
Tier 1 Essential Use	\$1.72	\$0.05	\$0	\$1.77 / ccf	\$1.865
Tier 2 Efficient Use	\$1.82	\$0.05	\$0	\$1.87 / ccf	\$1.865
Tier 3 Inefficient Use	\$2.11	\$0	\$0.30	\$2.41 / ccf	\$1.865
Tier 4 Wasteful Use	\$3.18	\$0	\$0.60	\$3.78 / ccf	\$1.865
Tier 5 Unsustainable Use	\$3.18	\$0	\$1.49	\$4.67 / ccf	\$1.865

5. Service Charges & Pumping Charges

The District Staff recommended that the rates for the monthly fixed system charge and pumping charge remain unchanged with the proposed implementation of the water budget rate structure. The monthly fixed system charge rates are shown in Table 11; pumping charge rates are shown in Table 12; and the water reliability charge is shown in Table 13.

Table 11: Monthly Fixed System Charge Rates (30-day billing period)

Meter Sizes	Current (as of Jan 1, 2011)	Proposed
5/8 inch	\$20.44	\$20.44
¾ inch	\$20.44	\$20.44
1 inch	\$33.06	\$33.06
1 ½ inch	\$66.13	\$66.13
2 inch	\$81.88	\$81.88
3 inch	\$99.19	\$99.19
4 inch	\$114.91	\$114.91
6 inch	\$130.67	\$130.67
8 inch	\$147.98	\$147.98
10 inch	\$163.70	\$163.70
12 inch	\$181.01	\$181.01

Table 12: Pumping Charge Rates

Power Zones	Pressure Zones	Current (as of Jan 1, 2011)	Proposed
1	1100s, 1200s, 1300s, 1400s, 1500s, 1800s & 1650, 1666, 1695, 1750, 1945	\$0.099	\$0.099
2	1620 & 1900	\$0.147	\$0.147
3	1783	\$0.135	\$0.135
4	1959 & 2116	\$0.331	\$0.331
5	2320	\$0.577	\$0.577
6	2450	\$0.639	\$0.639

Table 13: Water Reliability Charge

	Current (as of Jan 1, 2011)	Proposed
Water Reliability Charge	\$0.14	\$0.14

V. Customer Impact Analysis

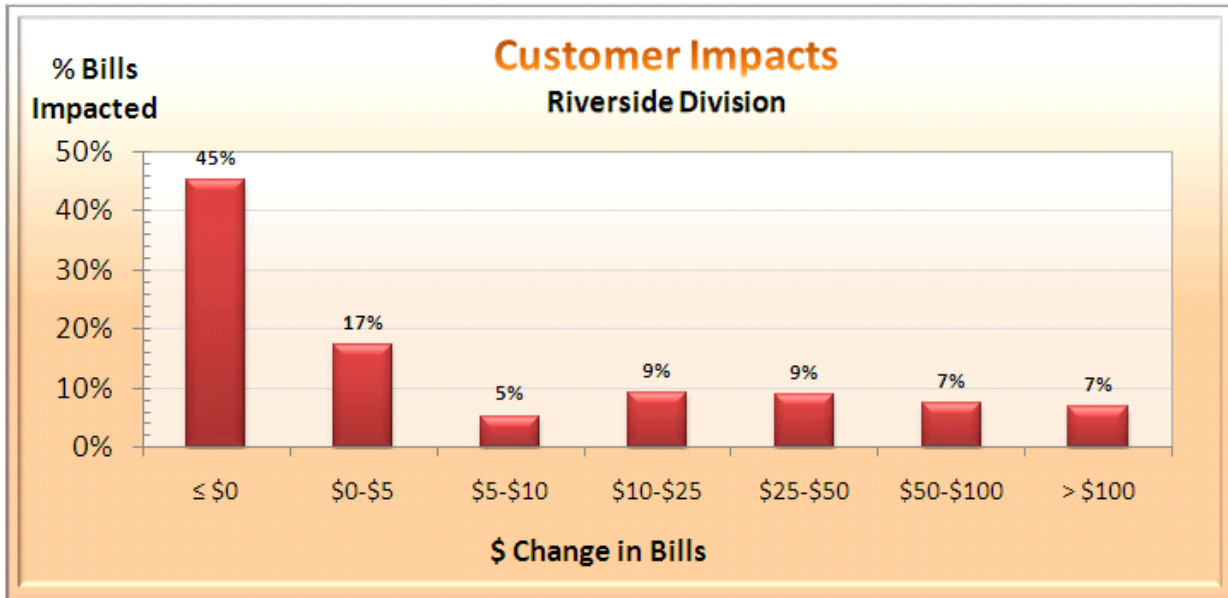
Before implementing any rate structure recommendations, it is important to understand how the proposed rate structure would impact water customers. In the figures below, customer impacts derived from past use and default water budget criteria are presented for each customer class, SFR, MFR, IRR and CII. The customer impacts are driven by the three main changes:

- The change from a uniform rate structure to a water budget tiered rate structure;
- The increase in water supply costs resulting from over-budget water usage; and
- Establishing a mechanism to fund conservation programs.

The chart below summarizes the percentage of customers who will be impacted upon the implementation of the new rate structure. Figure 11 shows the percentage of total customer monthly water bills that will be impacted under the proposed water budget rate structure. This chart assumes the same consumption behaviors of 2009 and assumes that no additional changes to individual water budgets are necessitated by the water budget adjustment process.

Approximately 45 percent of the customer bills in the Riverside treated retail service area will see a slight decrease or no changes in the bills compared to the bills under the current 2011 uniform rate of \$1.865 per ccf. About 17 percent of bills will experience a slight increase in their bill by no more than 5 dollars.

Figure 11: Customer Impacts for Riverside Treated Retail Water Services



VI. Other Staff Recommendations

A. Variance Program (Allocation Adjustments)

A variance program allows customers to adjust their water budget variables to reflect their specific water needs. The District starts with default values based on Census data and parcel size. However, there may be more household residents, larger landscape area or swimming pool, medical needs and/or other water need situations. Accuracy is important to the District to insure allocations fit the needs of the customer. The following policies are recommended by District Staff regarding each type of adjustment.

1. Persons per Household Adjustments

The single family residential account holder may request an adjustment to the number of persons per household. The adjustment of 60 gal per person per day will be applied to the Tier 1 budget. Documentation such as a driver's license, school record, or birth certificate may be required by the District to confirm the number of household residents. The adjustment will revert to the default value of three (3) with any change in the account holder.

2. Landscape Size Adjustments

The District may grant requests from an account holder for changes in landscape area which are used in determine the outdoor water budget. The adjustments will remain with a change in the account holder.

3. Licensed, In-Residence Childcare Adjustments

The District may grant adjustment requests for licensed, in-residence childcare from account holders. The account holders must present a valid childcare license along with the request. There are 2 levels of in-home childcare adjustments:

- Level 1: 9.63 ccf for a 30-day period (8 children at 30 gal/day)
- Level 2: 16.84 ccf for a 30-day period (for 14 children)

This adjustment will be applied to the Tier 2 budget formula and will be removed with any change in the account holder.

4. Equine (horse) Adjustment

The County allows 2 horses per 20,000 sq ft of property with a maximum of 4 animals per acre. The District may grant the equine variance to accounts with parcels larger than 20,000 sq ft. The variance of 30 gallons per animal per day or 1.2 ccf per 30-day period will be applied to the Tier 2 budget formula and will be removed with any change in the account holder. In addition, spaces designated to be specific to the care of equine species (stables, corral, turn out, etc.) can be added to irrigated area measurements to provide water for dust control, wash down, and other sanitary needs.

5. Swimming Pool/Spa or Pond

If a customer has a swimming pool, spa or pond, the total surface area of the water features may be added to the irrigated area to accommodate evaporative losses.

6. Pool Maintenance Adjustment

A residential account holder may request pool maintenance adjustment equal to maximum of 20 billing units once every five years. The intent is to prevent financial penalties associated with periodic maintenance of the pool. The adjustment will be applied to the Tier 2 budget formula and will be removed with any change in the account holder.

7. Medical Adjustment

The District will work with the account holder to determine an appropriate daily adjustment based on medical needs and a review of past usage when applicable. The adjustment will be applied to the Tier 1 budget formula and will be removed with any change in the account holder.